



CERlecon – CE119

# **Transnational RIS3 eReport on smart specialisation strategies.**

Deliverable D.T1.1.1

PP3 - REGIONE DEL VENETO – DIREZIONE LAVORO  
PP4 - ENAIP Veneto

## Table of Contents

<b>Project Summary &amp; document introduction</b>	<b>3</b>
<b>Analysis of Regional Context and potential for Innovation</b>	<b>14</b>
CERlecon Partner	14
Stadtschulrat für Wien, Europa Büro AUSTRIA P.L.	14
Wirtschaftsuniversität Wien AUSTRIA PP2	14
CERlecon Partners: REGIONE VENETO Direzione Lavoro PP 3	27
ENAIIP VENETO PP 4	27
CERlecon Partners: Wirtschaftsförderung Region Stuttgart GmbH. PP5	47
Hochschule der Medien Stuttgart PP6	47
CERlecon Partners Municipality of the Capital of the Slovak Republic Bratislava (PP7)	55
Slovak Business Agency (PP8)	55
CERlecon Partners – Grad Rijeka City of Rijeka PP9	103
STEP RI znanstveno-tehnologijski park Sveučilišta u Rijeci d.o.o. PP10	103
CERlecon Partner: The Chamber of Commerce of the Czech Republic & Statutory city of Brno (PP12 & P11)	133
CERlecon Partner	158
Gmina Miejska Kraków - Urząd Miasta Krakowa PP13	158
Izba Przemysłów o-Handlowa w Krakowie PP14	158

“... an entrepreneurship ecosystem is as ‘a set of networked institutions [...] with the objective of aiding the entrepreneur to go through all the stages of the process of new venture development.

It can be understood as a service network, where the entrepreneur is the focus of action and the measure of success.”

(Isenberg 2010; Isenberg 2011)

## Project Summary & document introduction

Change is still needed to make the cities and regions in Central Europe better places to work and live. Daring young entrepreneurs with brilliant ideas could contribute considerably to this change. But they can't. Factors such as a lack of an entrepreneurial culture and mind-set leading to a limited interest in entrepreneurship are hampering their efforts. There is also inadequate training to improve their skills and entrepreneurial competences and innovation in general is being hampered by the lingering effects of the historical east-west divide and the recent economic crisis through an underinvestment in R&D.

And yet, entrepreneurs must be empowered to create change; they “form the majority of business entities and are the biggest employers” in Central Europe. “It is important to provide, at regional level, the right mix of financial and non-financial support to assist entrepreneurs to create new firms.” “And this is our goal. **By mid-2019, we will contribute to a change in the way entrepreneurs are inspired, trained and supported through a balanced package of strategies, actions plans, pilot actions, training, and tools to create new-type comprehensive regional innovation entrepreneurship ecosystems in seven Central Europe regions.** With our three-step logical project approach (Development – Implementation – Improvement), we want entrepreneurs and SMEs to benefit the most from what we do. But also their regions will benefit because from now on regional smart specialization strategies will be further used to develop novel technologies, and brilliant products and services for economic and social innovation.” The joint development of all outputs and a transnational network interlinking the regional entrepreneurship ecosystems to improve international skills emphasize the project's transnational character. At present, there is presumably no such state-of-the art innovative support scheme in Central Europe. “That is why everything that we do will be transferable for the benefit of others.”

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**WORK PACKAGE T1** is the strategic starting and finishing point in tackling the common territorial challenges and lays the foundation for the change that CERlecon plans to achieve. It provides the smart strategies that will implement the new-type innovation entrepreneurship ecosystems incorporating the six domains (*policy, finance, culture, supports, human capital and markets*) that need to interact for target-oriented SME training (D. Isenberg) in the project regions. T1 will produce two outputs to achieve Project Specific Objective 1.

Results: Output T1.1 - **Regional Playparks**: eSmart-strategies for regional innovation entrepreneurship ecosystems in CE regions through two activities: (1) Concept Development of eSmart-strategies for regional entrepreneurship ecosystems in CE regions, which will be tested and evaluated through pilots/activities in T2 & T3, leading to (2) Strategy Finalisation: eSmart-strategies for regional innovation entrepreneurship ecosystems in CE regions. Throughout regional policy level stakeholders will be involved to ensure the viability / sustainability of the strategies and the Playparks after project lifetime. Output T1.2: **Playparks network**: eSmart-strategy for a

transnational network of innovation entrepreneurship ecosystems in CE regions through two activities: (1) Concept Development of an eSmart-strategy for a transnational network of innovation entrepreneurship ecosystems in CE regions, which will be tested and evaluated through pilots/activities in T2 & T3 leading to (2) Strategy Finalisation: eSmart-strategy for a transnational network of innovation entrepreneurship ecosystems in CE regions. Throughout regional policy level stakeholders will be involved. Process-related communication will aim to engage the selected target groups (e.g. policy/support/SME/funding initiatives) as essential partners in output development.

Led by strong and experienced partners (PP3 REGIONE DEL VENETO and PP4 ENAIP VENETO), all project partners will be involved in all WP activities. The WP is logically the basis for the two following thematic WPs.

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## THE INNOVATION SITUATION IN CERlecon ENTREPRENEURSHIP ECOSYSTEMS<sup>1</sup>

### Austria

LP Vienna Board of Education, European Office

PP2 Vienna University of Economics and Business

PP23 Centre for Social Innovation

Austria is a Strong Innovator. Innovation performance increased until 2010, but declined strongly in 2011, followed by a strong recovery in 2012 and 2013. In 2014 and 2015, performance has declined once again. The performance relative to the EU peaked at 119% in 2010 and is at 13.3% above average in 2015.

Austria performs better than the EU in most dimensions, except in economic effects because of poor relative performance in license and patent revenues from abroad and exports of knowledge-intensive services. In terms of indicators, relative strengths for Austria are particularly International scientific co-publications: public-private co-publications, Community designs, R&D expenditures in the business sector, and Community trademarks.

Most dimensions and indicators show positive growth. The strongest increases in performance are observed for International scientific co-publications (7.1%) and Community trademarks (3.6%). Significant declines in performance are observed in Sales share of new innovations (-4.6%) and SMEs with product or process innovations (-4.1%).

Provisional CIS 2014 data show improved performance for four indicators. The overall impact on the innovation index is expected to be positive with the index possibly increasing from 0.591 to 0.609 assuming that for the other indicators performance would not change.



Figure 1 shows some stakeholders from the start-up and co-working space's sector, whom the partners could cooperate during the regional implementation in the Vienna region with.

<sup>1</sup> European Innovation Scoreboard 2016



Figure 1: Austrian Startups Map

Source: Austrian Startups, 2016 (<http://www.austrianstartups.com/map/>, 28.10.2016, 14:20)

Table 1 shows the different stakeholders' roles in the ecosystem in Vienna, based on their services offered for young emerging entrepreneurs in their idea generation phase, or even before, in their start-up, and growth phases.

Table 1: Stakeholder map in the Viennese ecosystem

Education/Edutainment	Ideation	Start-up	Early	Accelerate	Growth
Schools					
Vienna Board of Education					
'Kreativ Wirtschaft' - creative labs					
Smart Brunch events in SMART Point Vienna					
		Local public authority			
		Regional public authority			
		National public authority			
	Sectoral agencies				
	Interest groups including NGOs				
Higher education and research institutions					
Education/training centres					
			Business support organisations		
	SMEs				
	Innovation hubs				

Source: Own summary, 2016

## Italy

### PP3 REGION OF VENETO – DIREZIONE LAVORO

### PP4 ENAIP VENETO SOCIAL ENTERPRISE

### PP24 CA' FOSCARI UNIVERSITY – VENEZIA - DEPARTMENT OF MANAGEMENT

Italy is a Moderate Innovator. Its innovation performance increased steadily until 2011, experienced a decline in 2012, and increased again in 2013-2014. Performance declined slightly in 2015. Italy has been increasing its innovation performance relative to the EU from 78% in 2008 to almost 83% in 2015.

Italy performs below the EU average in most dimensions, in particular in Finance and support and in Firm investments, with the worst relative performance in Venture capital investments and License and patent revenues from abroad. In the Innovators dimension, Italy performs better than the EU average.

Italy has experienced performance increases for most indicators. Growth has been strong in the dimension of Open, excellent and attractive research systems (7.4%), due to performance improvements in Non- EU doctorate students (14%) and International scientific co-publications (6.9%). Performance has also increased strongly in License and patent revenues from abroad (19%). A strong performance decline is observed in Venture capital investments (-9.5%).

Provisional CIS 2014 data show improved performance for one and worsened performance for three indicators. The overall impact on the innovation index is expected to be negative with the index possibly declining from 0.432 to 0.414 assuming that for the other indicators performance would not change.





## Germany

### PP5 Stuttgart Region Economic Development Corporation

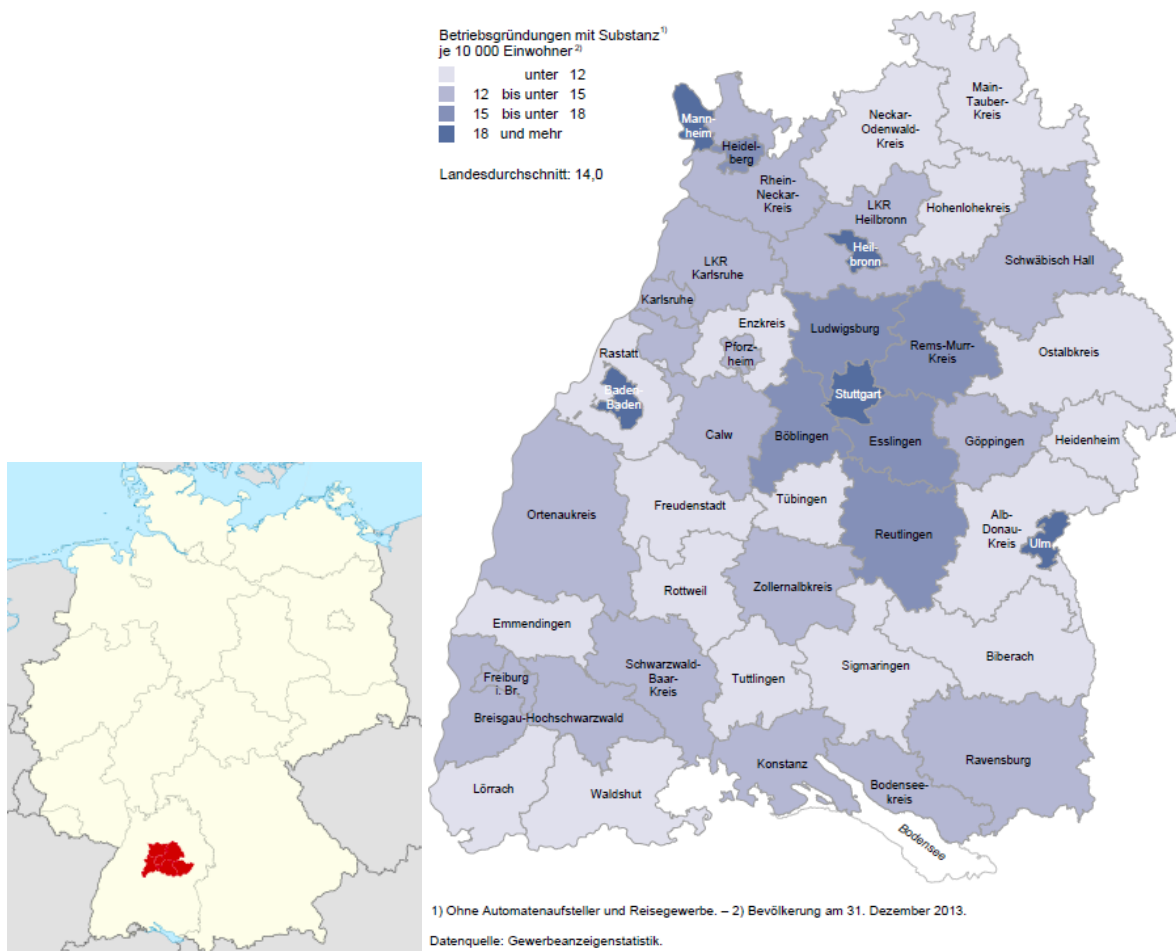
### PP6 Stuttgart Media University

Germany is an Innovation Leader. Innovation performance increased up until 2012, after which it started to decline. Relative to EU, performance was highest at 28% above the average in 2012, but has dropped to 21% above the EU in 2015.

Germany's strongest dimensions are Firm investments and Innovators. In all other dimensions except Open, excellent and attractive research systems, the country is also performing above the EU average. Relative weaknesses are in Non-EU doctorate students and License and patent revenues from abroad.

Performance has improved most strongly in License and patent revenues from abroad (32%), Non-R&D innovation expenditures (6.3%), and International scientific co-publications (6.3%). Strong performance declines are observed for Non-EU doctorate students (-5.8%) and Sales share of new product innovations (-5.5%).

Provisional CIS 2014 data show worsened performance for four and improved performance for two indicators. The overall impact on the innovation index is expected to be negative with the index possibly declining from 0.632 to 0.629 assuming that for the other indicators performance would not change.





## Slovak Republic

### PP7 Municipality of the Capital of the Slovak Republic, Bratislava

### PP8 Slovak Business Agency

Slovakia is a Moderate Innovator. Innovation performance has increased between 2008 and 2015, but declined in 2011 and in 2012. The performance relative to the EU shows a similar trend. Performance relative to the EU reached a peak in 2014 at almost 68% of the EU average, and is at 67% in 2015.

Except for Human resources, Slovakia performs below the EU average for all dimensions, and also for most indicators. Large relative strengths in terms of indicators are in Sales share of new innovations and New doctorate graduates. Large relative weaknesses are in License and patent revenues from abroad, PCT patent applications in societal challenges, Non-EU doctorate students, Venture capital investments, and PCT patent applications.

Performance in most dimensions and most indicators has improved. The highest growth in terms of indicators is observed for Non-EU doctorate students (16%), Community trademarks (12%) and R&D expenditures in the public sector (11%). A very strong decline in performance can be observed in License and patent revenues from abroad (-25%) and Non- R&D innovation expenditures (-8.8%).

Provisional CIS 2014 data show improved performance for one and worsened performance for five indicators. The overall impact on the innovation index is expected to be negative with the index possibly declining from 0.350 to 0.342 assuming that for the other indicators performance would not change.



## Croatia

### PP9 City of Rijeka

### PP 10 STEP RI Science and Technology Park of the University of Rijeka Ltd.

Croatia is a Moderate Innovator. After a decline until 2010, innovation performance improved until 2012 and then declined again. Performance relative to the EU was above 60% in 2008, but has fallen to less than 54% by 2015.

Croatia is performing below the EU average in most dimensions. It only performs above the EU average in Human resources, due to above-average performance in Youth with upper secondary level education. The weakest performing dimensions are Open, excellent and attractive research systems, Innovators, and Intellectual assets. Non-R&D innovation expenditures is the best performing indicator.

Performance increases in dimensions are observed in Finance and support (6.8%) and Open, excellent and attractive research systems (4.3%), with the largest improvement at the indicator level for Community trademarks (29%). Performance has worsened in Linkages and entrepreneurship (-9.4%), Economic effects (-2.6%) and Innovators (-2.3%), with the indicators declining most being PCT patent applications in societal challenges (-14%), Public-private co-publications (-9.4%) and PCT patent applications (-9.3%).

Provisional CIS 2014 data show improved performance for four and worsened performance for two indicators. The overall impact on the innovation index is expected to be small with the index possibly increasing from 0.280 to 0.281 assuming that for the other indicators performance would not change.



## Czech Republic<sup>2</sup>

**PP 11 Statutory City of Brno, municipal district Brno-střed**

**PP12 The Chamber of Commerce of the Czech Republic**

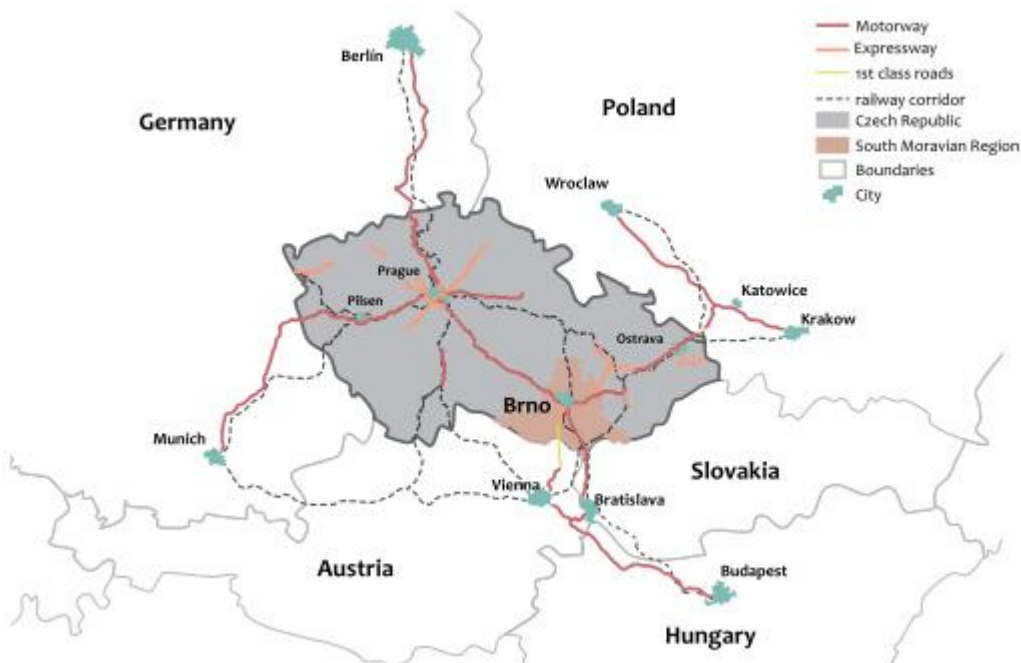
**PP15 Young Entrepreneurs Association of Slovakia**

**PP16 I-Europa, s.r.o.**

The Czech Republic is a Moderate Innovator. Innovation performance increased until 2012, declined in 2013, and increased again in more recent years. The performance relative to that of the EU shows a similar trend. Performance relative to the EU is at 83.1% in 2015.

Relative strengths compared to the EU average are in Human resources, Firm investments, and Finance and support. Relative weaknesses are in Intellectual assets and Open, excellent and attractive research systems. In the former, quite a diverse pattern can be observed with below-average performance for most cited scientific publications and Non-EU doctorate students, and above average performance for International scientific co-publications. Performance has improved most in Open, excellent and attractive research systems (6.0%). The fastest growing indicators are License and patent revenues from abroad (15%), International scientific co-publications (9.0%) and Community trademarks (8.9%). A strong decline is observed in Venture capital investments (-30%).

Provisional CIS 2014 data show improved performance for three and worsened performance for three indicators. The overall impact on the innovation index is expected to be positive with the index possibly increasing from 0.434 to 0.436 assuming that for the other indicators performance would not change revised CIS 2014 data were made available after the editorial deadline.



<sup>2</sup> Profile included in the EIS (European Innovation Scoreboard) 2016 report as revised CIS 2014 data were made available after the editorial deadline.

## Poland

**PP13 Municipality of Krakow - Krakow Municipal Office**

**PP 14 Cracow Chamber of Commerce and Industry**

**PP17 Kraków Technology Park**

**PP18 Marshal Office of the Małopolska Region (Department of Economic Development)**

**PP19 Cracow University of Technology, Technology Transfer Centre**

**PP20 INNOAGH Sp. z o.o. Cracow Centre of Innovative Technologies**

**PP22 Cracow University of Economics - Department of Entrepreneurship and Innovativeness**

Poland is a Moderate Innovator. Innovation performance has been somewhat volatile within a relatively narrow range. Compared to 2008, performance has increased marginally. Poland's relative performance has declined from 59% in 2009 to 56% in 2015.

Poland is performing below the EU average in all dimensions, particularly in Linkages and entrepreneurship and Open, excellent and attractive research systems. For most indicators, performance is also below the EU average, with largest relative weaknesses in Non-EU doctorate students, Public-private co-publications, PCT patent applications (in societal challenges), and License and patent revenues from abroad. Relative strengths are in Non-R&D innovation expenditures and Community designs.

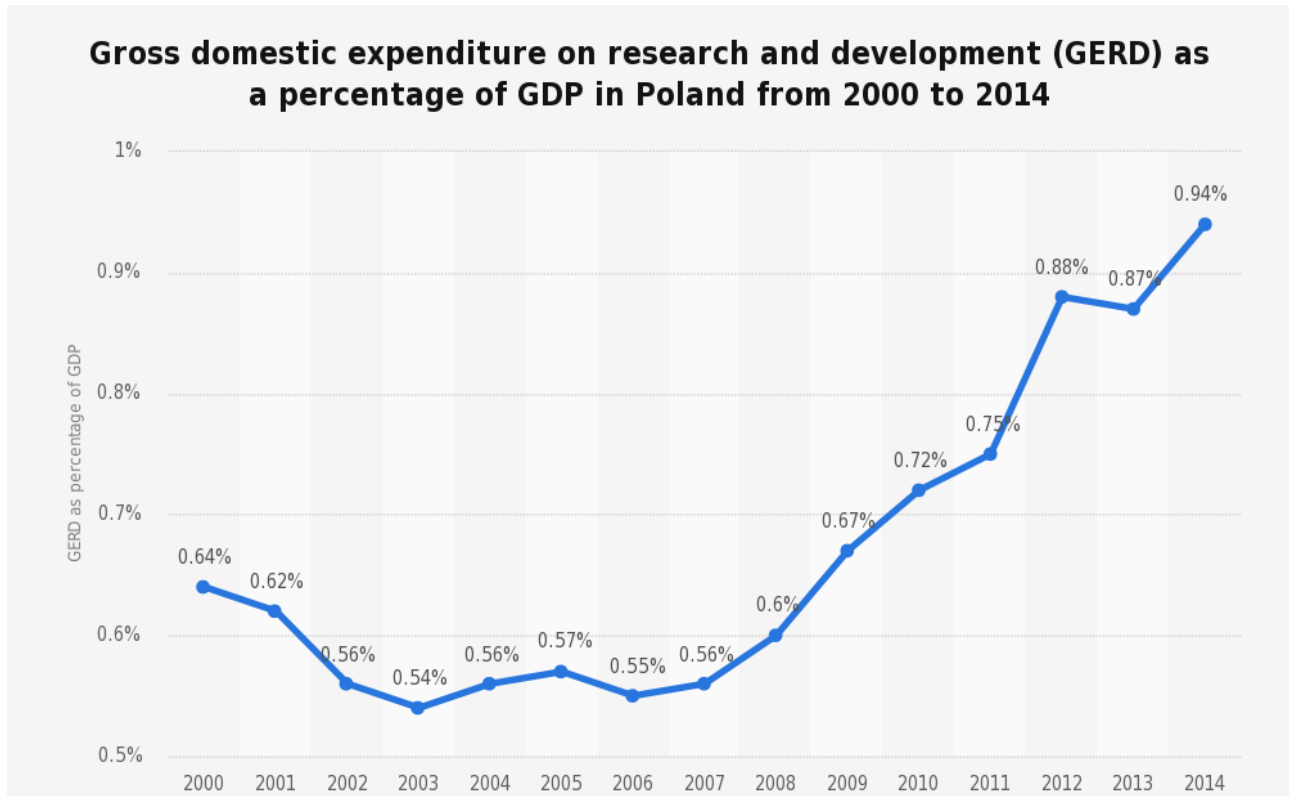
Performance has increased for most of the dimensions and indicators. High growth is observed for R&D expenditures in the business sector (15%) and License and patent revenues from abroad (15%). Fairly strong declines in performance are observed in Innovative SMEs collaborating with others (-12%) and SMEs with marketing or organisational innovations (-9.7%).

Provisional CIS 2014 data show improved performance for four and worsened performance for two indicators. The overall impact on the innovation index is expected to be positive with the index possibly increasing from 0.292 to 0.305 assuming that for the other indicators performance would not change.



Source: Raport Polskie Startupy 2016, A. Skala, E. Kruczkowska; [www.startuppoland.org](http://www.startuppoland.org)

Performance has increased for most of the dimensions and indicators. High growth is observed for R&D expenditures in the business sector (15%) and License and patent revenues from abroad (15%). Fairly strong declines in performance are observed in Innovative SMEs collaborating with others (-12%) and SMEs with marketing or organisational innovations (-9.7%).



Source: OECD

Provisional CIS 2014 data show improved performance for four and worsened performance for two indicators. The overall impact on the innovation index is expected to be positive with the index possibly increasing from 0.292 to 0.305 assuming that for the other indicators performance would not change.

## Analysis of Regional Context and potential for Innovation

### CERlecon Region AUSTRIA

CERlecon Partner

Stadtschulrat für Wien, Europa Büro AUSTRIA P.L.

Wirtschaftsuniversität Wien AUSTRIA PP2



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#### 1. General information

1.1 Area 41,487 ha

#### 1.2 Population

1.2.1 N. of inhabitants 1 840 226 (2016)

1.2.2 Population Growth Forecast 2,4 %

1.2.3 Migration inflow Growth Rate 0,01 %

1.2.4 Migrant persons (percentage on population) 27,4 %

1.2.5 Migrants' countries of origin:

1) Serbia (4,1%),

2) Turkey (2,5 %),

3) Germany 2,3 %),

\*\*\*

#### 1.3 Employment

1.3.1 Employment rate 71,1%,

1.3.2 Employment rate by gender: women 67,1% men 75,1%)

1.3.3 Unemployment rate 8,6%

1.3.4 Inactivity rate 33,475 %.

1.3.5 Youth unemployment rate (aged 15-24) 5,8 %,

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#### 1.4 GDP



1.4.1 Regional GDP per capita 43,438.9 (2015)

1.4.2 2,99% of national -

1.4.3 Growth Rate 2016: 0,4 %

\*\*\*

### 1.5 - Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;

Intermediate (IN), the share of population living in rural local units is between 15% and 50%;

Predominantly Rural (PR), the share of population living in rural local units is higher than 50%

\*\*\*

### 1.6 Number of registered enterprise (registered VAT) 565.054 (2014)

Source: [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs\\_sc\\_ind\\_r2&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=sbs_sc_ind_r2&lang=en)

#### 1.6.1 - Type of businesses: Enterprise size class:

- 1-9 employees 226 (n. of units)

- 10-49 employees 100 (n. of units)

- 50-249 employees 18 (n. of units)

- 250 and over employees 7 (n. of units)

#### 1.6.2 Main regional business sectors (NACE classification)

- Food and Drink industry
- Mechanical and Steel Engineering
- Chemical and Automotive industry
- Electrics and Electronics industry and
- Wood, Pulp and Paper industry

\*\*\*

### 1.7 Production

1.7.1 Production for national market 25.6% (2014)

1.7.2 Production value € 84.2 billion (2014)

1.7.3 Growth Rate 2016: 0,5 (real) %

1.7.4 Export production 21,8 %

1.7.5 Production value 81.802€ gross regional product

1.7.7 Main export areas 1) Chemical products, plastics 36%; 2) Electrical machinery and apparatus 14,8%; 3) Machines, mechanical devices 11,1%

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## 1.8 R&D expenditure

1.8.1 National total R&D expenditure as a percentage of GDP (all sector) 3,07 % (2016)

1.8.2 Growth Rate: -0,03 %

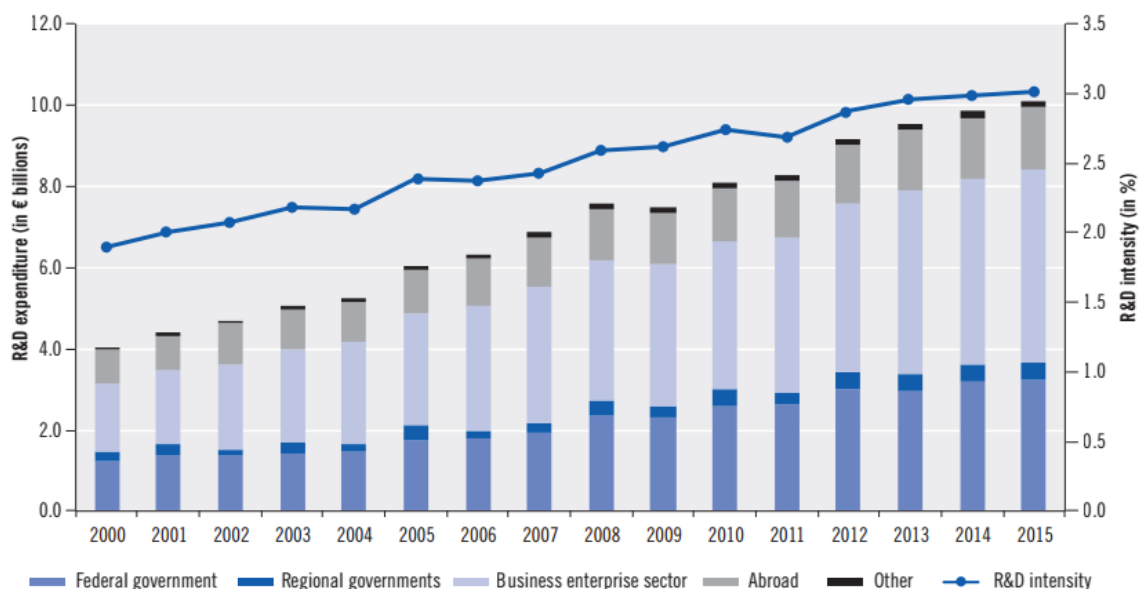
1.8.3 Researchers as a percentage of persons employed 2,9 %

29.666 researchers (2013)

43.708 R&D Beschäftigte (2013)

1.011.178 Insgesamt Beschäftigte in Wien (2013)

Fig. 1-1: Expenditure on research and development in Austria by sources of funds



Source: Statistics Austria, Global Estimate as at 21 April 2015, nominal values.

[https://www.bmvit.gv.at/en/service/publications/downloads/downloads\\_ftb/ftb\\_2015\\_en.pdf](https://www.bmvit.gv.at/en/service/publications/downloads/downloads_ftb/ftb_2015_en.pdf)

**Table 3-2: Total R&D expenditures by sectors of performance, 2011**

Sectors of performance	Vienna		Styria		Upper Austria		Carinthia		Tyrol		Salzburg	
	R&D expenditure in											
	€ millions	%	€ millions	%	€ millions	%	€ millions	%	€ millions	%	€ millions	%
Higher education sector	1,096.9	38.2	419.5	25.5	128.1	9.9	45.5	9.5	288.6	39.6	92.3	32.1
of which universities (without univ. hospitals)	848.4	29.6	349.8	21.2	102.7	7.9	38.8	8.1	216.8	29.7	79.9	27.8
Government sector <sup>1</sup>	242.9	8.5	<sup>4)</sup>	<sup>4)</sup>	17.0	1.3	11.5	2.4	23.7	3.3	<sup>4)</sup>	<sup>4)</sup>
Private non-profit sector <sup>2</sup>	20.7	0.7	<sup>4)</sup>	<sup>4)</sup>	1.1	0.1	0.5	0.1	0.2	0.0	<sup>4)</sup>	<sup>4)</sup>
Business enterprise sector <sup>3</sup>	1,510.2	52.6	1,164.1	70.7	1,149.6	88.7	422.7	88.0	416.3	57.1	178.1	61.9
<b>Total</b>	<b>2,870.8</b>	<b>100</b>	<b>1,647.0</b>	<b>100</b>	<b>1,295.9</b>	<b>100</b>	<b>480.1</b>	<b>100</b>	<b>728.8</b>	<b>100</b>	<b>287.7</b>	<b>100</b>

1) Federal institutions (not including those combined in the higher education sector), state, local government and chamber institutions, R&D institutions of the social insurance carriers, public sector-financed and/or controlled private non-profit institutions as well as R&D institutions of the Ludwig Boltzmann Gesellschaft; not including regional hospitals; 2) Private non-profit institutions whose status is predominantly private or under civil law, sectarian, or other non-public; 3) Including The Austrian Institute of Technology GmbH and competence centres; 4) For confidentiality reasons, the data cannot be listed separately, yet are included in the final sum.

Source: Statistics Austria: Survey of research and experimental development (R&D) 2011.

In: [https://www.bmvit.gv.at/en/service/publications/downloads/downloads\\_ftb/ftb\\_2015\\_en.pdf](https://www.bmvit.gv.at/en/service/publications/downloads/downloads_ftb/ftb_2015_en.pdf), 16/11./2016, 12:33

### Facts and figures for Lower Austria (Niederösterreich - NÖ) (incl. Vienna)

- unemployment rate 2011: 4,1%
- economic growth:
  - 2010: +2%
  - 2011: +3,3% P
  - 2012/13: +1,1%/+1%
- start-ups 2011: 7.434
- total exports: € 16 Mrd.
- Gross Domestic Product Contribution NÖ 15,8%
- Export rate: approx 44,9 %
- R&D expenditures 635,4 Mio
- R&D share on GDP 1,44 %

(Source:

[http://s3platform.jrc.ec.europa.eu/documents/20182/109974/IPriedl\\_BXL\\_08112012\\_SMEs\\_S3.pdf/de524e09-ff82-449b-bb9e-29189223c48b](http://s3platform.jrc.ec.europa.eu/documents/20182/109974/IPriedl_BXL_08112012_SMEs_S3.pdf/de524e09-ff82-449b-bb9e-29189223c48b))

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### 1.9 Labor cost

1.9.1 - Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions) 31.190€/ Brutto (2014)

1.9.2 - Average Monthly Disposable Salary - 40h/week (Net After Tax) 21.143€/ Netto

1.9.3 - Pay Frequency  weekly / x monthly

1.9 - Cost of Living (please provide informations about housing affordability, household final consumption expenditure, comparative prices) Wien Cost of Living 1976€ (2006)  
cost of living index for Austria 101,6 (2015)

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## **2.Trends:**

Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental. Please list main behaviours and trends of the regional entrepreneurship ecosystem as far as innovation related activities are concerned covering the following areas: □ Profiles of companies that develop innovations; □ The impact of innovations on turnover, and the proportion of turnover invested in innovation activities; □ Barriers to commercialisation of both innovative and non-innovative goods and services; □ Preferred types of public support for the commercialisation of goods or services; □ The role of design, and the use of advanced manufacturing technologies; □ Involvement in public procurement and the role innovation plays in this process.

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## **3. RIS3 Regional potential for innovation - Territorial Smart specialisation sectors**

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on:

- 1) regional assets,
- 2) linkage with other regions,
- 3) dynamics of the entrepreneurial environment.

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### **3.1. Regional assets analysis:**

According to the regional specificities, identify the main regional ecosystem assets, and also any bottlenecks of the innovation system and key challenges both for the economy and the society.

To implement this analysis, suitable tools are the SWOT analysis, regional profiling studies, targeted surveys and expert assessments.

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### **3.2. Linkages with the rest of the world and the position of the region within the European and global economy analysis**

Please make comparisons with the other CERlecon and European regions in order to outline possible linkages and to better accede to RIS3 assessment of existing local regional innovative advantages. International value chains in this respect are a crucial element to be considered. This analysis will prevent "blind" duplication of investments" already done in other European regions, averting from an excessive fragmentation of investments that could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration with other CERlecon entrepreneurship ecosystems should be pursued whenever similarities or complementarities with other regions are detected.

To implement this analysis, suitable tools are: comparative studies, rounds of interviews with other regions and interregional work groups.

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### 3.3. Dynamics of the entrepreneurial environment.

Please point out the characteristics of your regional entrepreneurship ecosystem, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals.

To implement this analysis, suitable tools are: statistics on entrepreneurial activities, direct discussion (consultations and interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organisations).

#### Start-up Characteristics

“The following analyses refer to start-ups in Vienna and Bratislava which were defined as follows:

Young/newly created company (<7 years)

with a scalable business model (operating margin increases as the revenues grow),  
built on some sort of product or marketing innovation,  
and showing global ambitions.

The respective data were collected in nine expert interviews and a quantitative survey by Röhrich (n=37, 2012) in Vienna and 21 expert interviews and a quantitative survey (n=180) in Bratislava.

#### Typical Vienna Start-up

##### Legal Form

Besides the sole proprietorship, the most common legal form in Austria is the GmbH (llc), which in 2012 accounted for 8.6% (3,058) of all new companies. However, when it comes to (high growth) start-ups there are indications (e.g. from expert interviews and data from Statistics Austria) that a similar pattern as in Bratislava is true for Vienna as well (almost all start-ups are llcs).

##### Gender Distribution

Generally, there is a greater involvement of men in start-up activities in most economies. This reflects what most of our interviewed experts are observing, too. In a recent survey among start-ups (Röhrich, 2012), even all of the respondents (n=37) were male.”

Source:

[http://www.twinentrepreneurs.eu/media/file/8\\_TwinEntrepreneurs\\_Regional\\_Study.pdf](http://www.twinentrepreneurs.eu/media/file/8_TwinEntrepreneurs_Regional_Study.pdf)

Table 2 summarizes the findings on typical patterns of start-ups in Vienna and Bratislava.

**Table 2: Typical patterns of start-ups and young companies in the Vienna and the Bratislava Regions**

	Start-up in Vienna	Start-up in the Bratislava Region
Number of founders	2-3	1-3
Legal form	Limited Liability Company (GmbH)	Limited Liability Company (s.r.o.)
Gender	Mostly men	Mostly men (approximately 30% women)
Age	25-34 years (founders in Life Sciences are usually older)	25-29 years (in case of more founders, usually one of the founders is >30 years)
Education	University education	University education
Education specialization	Technics, economics	Technics, economics
Previous start-up experience	54% Yes, 46% No (IT sector: more no)	45% Yes, 55% No
Sectorial (branch) experience	n.a.	Yes
Scope of business activities	ICT, Life Sciences	IT, other services
Sales	n.a.	less than 50,000 EUR (in case of one founder less than 10,000 EUR)
Number of employees	n.a.	0
Age of company	Less than 3 years	Less than 2 years

Sources: Röhrich, 2012, and own analysis (9 expert interviews in Vienna; 21 expert interviews and quantitative survey [n=180] in Bratislava)

Source:

[http://www.twinentrepreneurs.eu/media/file/8\\_TwinEntrepreneurs\\_Regional\\_Study.pdf](http://www.twinentrepreneurs.eu/media/file/8_TwinEntrepreneurs_Regional_Study.pdf)

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### 3.4 Smart Specialization Sectors

Please identify 1 - 4 regional entrepreneurship ecosystem knowledge specialisations that best fit the innovation potential within RIS3 themes in CERlecon (Agri-food - Digital Growth - Energy - Industrial Modernization). Smart specialisation requires CERlecon partners identify a limited number of priorities. Their implementation will allow the CERlecon stakeholders to strengthen their innovation systems.

The whole region of Eastern Austria has specific strengths with respect to the share of R&D expenditures in the public sector (0.580), the share of R&D expenditures in the business sector (0.577), the share of innovative SMEs collaborating with other (0.707). On the other hand, there



are some weaknesses, especially with respect to the share of the population with tertiary education (0.419) and the share of non-R&D innovation expenditures (0.221).

Predominant sectors in Lower Austria:

- 1) IT
- 2) Energy
- 3) Life science
- 4) Nano and Micro Technology
- 5) Transport

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#### 4. SWOT ANALYSIS

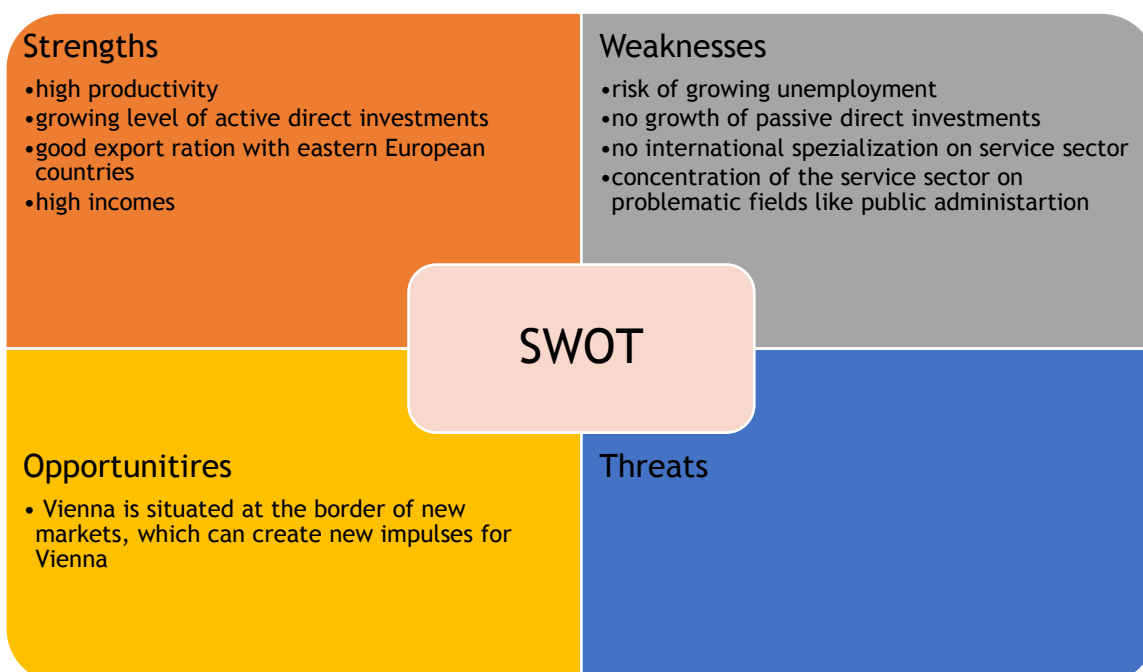
In order to analyze the CERlecon regional entrepreneurship ecosystems and its potential for innovation, please focus on regional strengths and weaknesses using the SWOT analysis model. Refer to the main contents of the SWOT analysis as follows:

Strengths are advantageous resources in the regional CERlecon entrepreneurship ecosystem capable to improve its innovation system. CERlecon strategy and action plan will be built on strengths;

Weaknesses are limits and faults in the regional entrepreneurship ecosystem that will keep it from improving innovation. CERlecon actions will focus on eliminating weaknesses;

Opportunities are favourable situations in the region's entrepreneurship ecosystem. CERlecon's goal is to take advantage of these opportunities;

Threats are unadvantageous and unfavourable situations in the entrepreneurship ecosystem's environment that damage the CERlecon strategy. CERlecon actions will limit the negative effects of these threats.



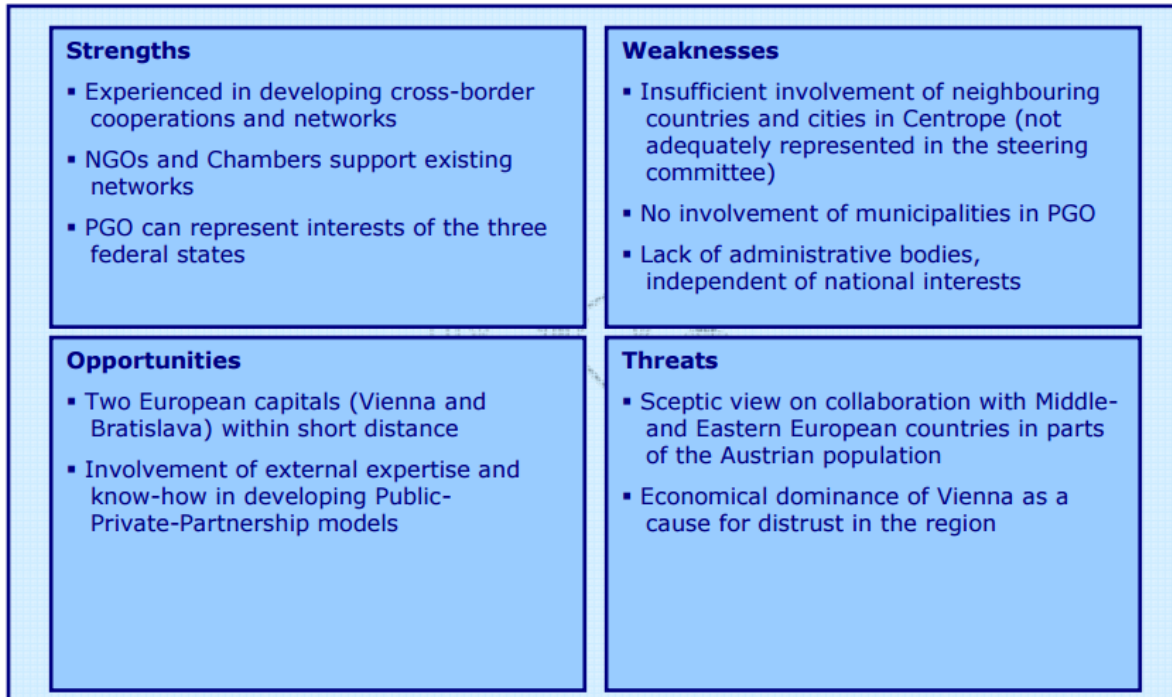
## Education and Research & Development

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Quite good education in natural-science subjects</li> <li>• Many employees in research and development</li> <li>• <b>Energy partnerships</b></li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>▪ General level of education is low</li> <li>▪ Just a few employees in knowledge intensive services</li> <li>▪ Lack of academics and researchers</li> <li>▪ <b>Relatively low outcome in research and development (expenditures/output)</b></li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Research and development in Bratislava</li> <li>• <b>Increasing significance of biotech and pharmacy industries</b></li> <li>• <b>Need for alternative energy sources</b></li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>▪ <b>Insufficient capacities in technology-based education</b></li> </ul>

## Cluster Development

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>▪ Strategic instruments available</li> <li>▪ Technical infrastructure for clusters available/under construction</li> <li>▪ <b>Life Science as established cluster</b></li> <li>▪ <b>Global players (leading companies) existing</b></li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>▪ Network structures not yet developed in ICT, Creative and Automotive Industries</li> <li>▪ Low interaction between companies, authorities and education</li> <li>▪ Climate for innovation low</li> <li>▪ Small number of spin-offs</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>▪ <b>Globalisation - focus on export, highly specialised products</b></li> <li>▪ <b>Biotechnology and bioinformatics as promising fields</b></li> <li>▪ <b>Growing together of the two cities – synergies</b></li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>▪ Relatively low sums spent on R&amp;D in Europe</li> <li>▪ Financial support of the EU is limited</li> <li>▪ <b>Globalisation - Global players without local roots; individuality</b></li> <li>▪ <b>Munich as competitor</b></li> <li>▪ <b>Rejection of genetic manipulation</b></li> </ul>

## Cooperations and Networks



Source:

[http://www.srf.tuwien.ac.at/lva/p3\\_vienna\\_bratislava/ws\\_1/p3\\_workshop01\\_swot\\_270206.pdf](http://www.srf.tuwien.ac.at/lva/p3_vienna_bratislava/ws_1/p3_workshop01_swot_270206.pdf)

Lower Austria needs to:

Create its unique selling proposition, no duplication of other regions

Collaborate with neighbor regions

Create critical mass in R&D and Innovation in niche technologies

Facilitate innovation also in rural areas, foster innovation capacity

Encourage co-operations between instruments

Key challenges

-Lacking critical mass in public R&D: Vienna as Austria's R&D hub in the middle of NÖ, but own province

-Lacking critical urban agglomeration: low population density - 83 people per km<sup>2</sup>, capital St. Pölten only 50.000 inhabitants, > 410 km rural border region

Highly diversified economy, no strong sectorial specialization

-Dominated by very small companies

(Source: [http://www.srf.tuwien.ac.at/lva/p3\\_vienna\\_bratislava/ws\\_1/p3\\_workshop01\\_swot\\_270206.pdf](http://www.srf.tuwien.ac.at/lva/p3_vienna_bratislava/ws_1/p3_workshop01_swot_270206.pdf))

“Current status of the specialisation and prioritisation in the region The Lower Austrian research landscape is significantly dominated by the business sector. Within the business sector there are - compared to other Austrian regions as Carinthia and Vienna - no significant concentrations of activities to a small number of sectors. Instead, R&D activities are spread over a large number of different sectors. R&D expenditures in the Lower Austrian business sector approximately doubled in the period approx.. from 2002 to 2009. Contrary to the Austrian trend, Lower Austria could slightly shift R&D expenditures from the service sector to the manufacturing sector. The financing of R&D expenditures in the business sector in Lower Austria in 2009 accounted for 80.6 % of the (domestic) business sector. In terms of innovation behaviour in Lower Austria, the Community Innovation Survey tells us that almost every second company (49.4 %) in Lower Austria was innovating (was introducing or implementing product and/or process innovations) from 2004 to 2009. Including organisational and market innovation, two of three Lower Austrian companies carried out innovation (65.5 %). In Lower Austria especially small companies (> 9 employees) were largely engaged in innovation activities. Still below average are innovation activities in the service sector. Lower Austria is characterized by innovation activities above average in the manufacturing sector and a in need to catch up of the service sector, compared to Austria in the period from 2002 to 2004 as well as from 2004 to 2006 (Ploder et al. 2010). As Lower Austria does not significantly concentrate its activities to a small number of sectors, it has been decided to focus on functional priorities, such as the establishment of Technopols and Clusters to identify and develop relative specialisations in niche technologies or markets. Since experiences were very positive with these instruments, they will be continued in the future. Currently, there are discussions to establish a fourth Technopol in Wieselburg, however, it remains to be seen if the location would be able to fulfil all the conditions necessary for the establishment of a Technopol. Currently there are still debates whether there is enough tertiary education in Wieselburg.” (OECD-Project Report on Smart Specialisation, <https://era.gv.at/object/document/1151>, 23/11/2016, 12:48)

Excerpt from Innovative Vienna 2020

“Objectives under Innovative Vienna 2020 Innovation objective no. 1 City of opportunity: Vienna provides optimal conditions for innovation potential to develop in the metropolitan region. Innovation objective no. 2 Innovative City Administration: Vienna is committed to innovation driven by the public sector and to its role in shaping, buying and using innovations. Innovation objective no. 3 Vienna as a place where different people meet: Vienna creates an innovation-friendly climate and relies on cooperation and open-mindedness.

1 City of opportunity:

Vienna as an attractive location for researchers and businesses Vienna wants to become a magnet for talented researchers and new entrepreneurs while further raising the share of women in these areas along the way. This calls for adequate career prospects in science and research on the one hand, and for optimal conditions for innovative businesses on the other hand. A proactive and welcoming approach underlines Vienna’s openminded attitude. Further development of areas of strength Vienna’s areas of strength, which currently include life

sciences, ICT, the creative industry, the liberal arts, cultural and social studies and special fields in mathematics and physics, will be developed further and have to acquire sufficient critical mass to act as beacons with international visibility. Moreover, Vienna invests specifically in innovative solutions that enable sustainable and socially inclusive further development of the city (smart solutions) and support innovative production and manufacturing processes, thus safeguarding local jobs (smart production). Relying on stable partnerships to position the Vienna metropolitan region both at European and global level is crucial for Vienna to increase its visibility on the international RTI map. Vienna will intensify its cooperation with neighbouring regions, cities and countries in its current areas of strength. Sustainable financing and effective funding Vienna's system of grants and subsidies is to be not only transparent and efficient, but also flexible enough to be ready to cope with new challenges. The purpose of providing funding is to strengthen specific areas of research, trigger innovation in business, support new business models and encourage private investors to invest in bright ideas 'made in Vienna'. Education as a stepping stone towards innovation From kindergarten to university, all young people in Vienna must have access to opportunities and learn to make innovation part of their culture. This applies as much to what is being taught as to the way it is being taught and under what circumstances, ranging from organisational to architectural considerations.

## 2 Innovative City Administration

The Vienna City Administration will continue striving to improve and further develop the city's public services on an on-going basis. Providing conditions that support private enterprise and showing a proclivity for innovation in public procurement are important elements in this context. As an innovator in its own right, the public sector also plays an active role in this field.

## 3 Vienna as a place where different people meet

Vienna as a place where different people meet Innovation often comes about at the boundaries and transition points between subject matters, institutions and areas of responsibility. This is why an open dialogue and cooperation between business, science, art and culture, the City Administration and society at large will help leverage the city's potential for innovation. This includes identifying social trends, aiding and supporting innovation in artistic and cultural settings and ensuring the participation of the Viennese citizens (e.g. Open Science and Citizen Science). As the focus here is on how innovation can benefit society, the Open Innovation approach calls for different views to be incorporated, regardless of gender, sexual orientation, origin, beliefs, financial standing and income. Vienna's international profile as an RTI location will gain increasing recognition.

## Top innovation location

Vienna features 1,466 research entities Vienna, i.e. universities, businesses or institutions active in research, which accounts for 30% of all research entities in Austria (2011). Among them, 785 businesses together account for more than half of Vienna's R&D spending (EUR 1.75 billion ).

Research funding rate Vienna is among the top regions to have reached the EU's official 3% target for spending on research (share of R&D spending in the gross regional product). Overall, only 32 of the 266 regions (for which data are available) attain this target. In 2012, Vienna's research funding rate stood at 3.55%, the rate for Austria was 2.97% and that for the EU-28 was 2.0%." (Innovative Vienna 2020, <https://www.wien.gv.at/english/research/pdf/innovative-vienna-2020.pdf>)



## CERlecon Regional Ecosystem **REGIONE VENETO**

CERlecon Partners: REGIONE VENETO Direzione Lavoro PP 3  
ENAIIP VENETO PP 4



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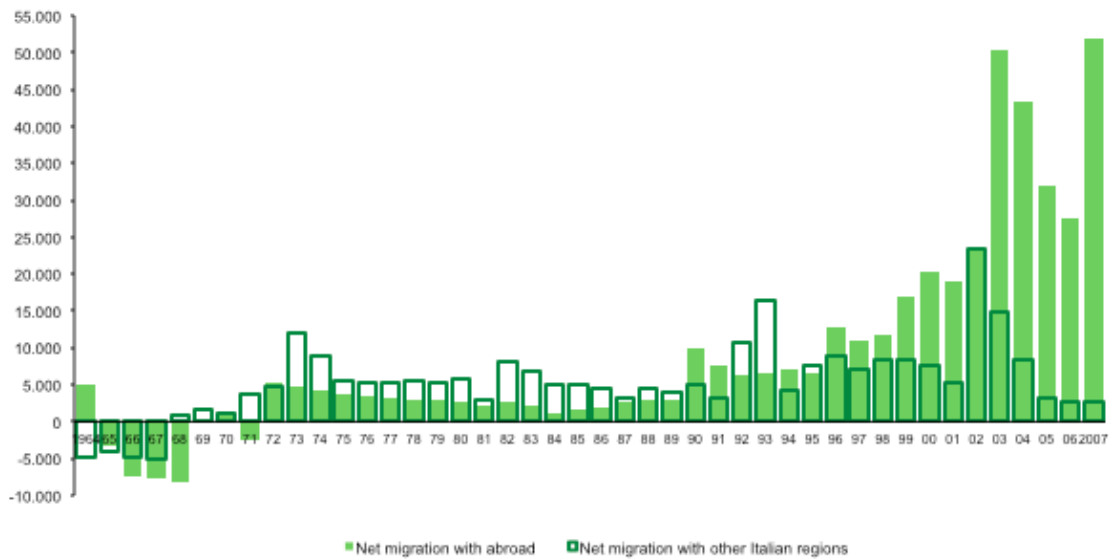
### CERlecon Regional Ecosystem Evolution

Through the changes seen in migration patterns we can see Veneto moving from a rural, more financially limited situation to becoming more solid economically and socially as it developed from a region of emigration into a region of immigration.

The turning point occurred towards the end of the 1960s: from 1968 on, net migration with other Italian regions began to be positive, followed shortly afterwards by positive migration from abroad.

From here on, numbers of people arriving from other regions or from abroad (i.e. Italians returning home or, more often than not, new foreigners) are more numerous than those leaving. This confirms Veneto was becoming more attractive and able to offer new financial and employment opportunities. (Figure 8.3)

Fig. 8.3 - Migration with other Italian regions and abroad. Veneto - Years 1964–2007 (\*)



(\*) Net migration with abroad is calculated as the difference between the number of permanent arrivals from abroad and departures for abroad in an area. Domestic net migration with other Italian regions, on the other hand, is the difference between the number of permanent arrivals from other Italian municipalities and departures for other Italian municipalities. Data from before 1980 is based on Istat estimates. Some of the particularly abnormal peaks, especially with regards net migration with other regions, occur as a consequence of censuses (1971, 1981, 1991 and 2001), which corrected data in municipal registers.

Source: processing by Regione Veneto - Direzione Sistema Statistico Regionale on Istat data

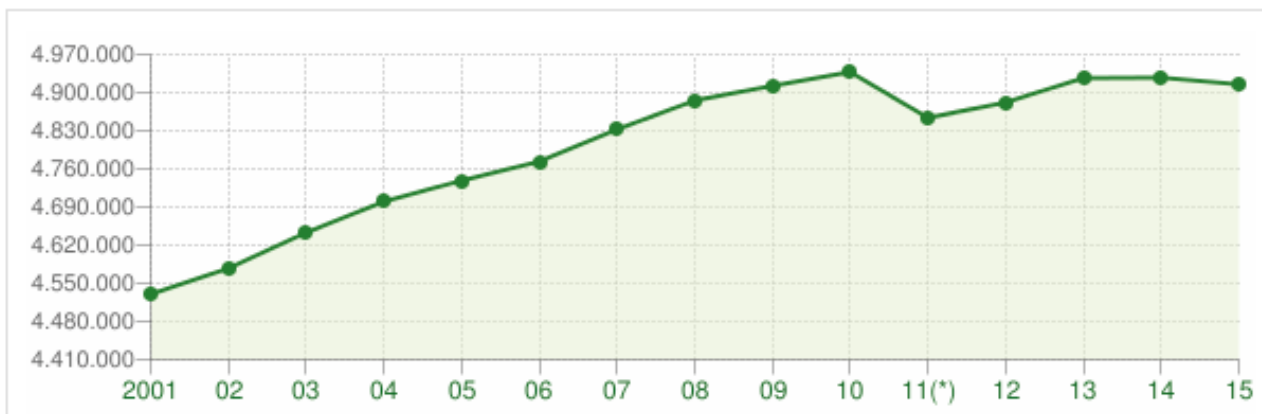
Veneto saw another turning point at the beginning of the 1990s. With the exception of a few years that didn't follow the trend of the period, Veneto began to see an ever-larger influx of foreigners, meaning that net migration from abroad overtook domestic migration. Domestic migration remains lower still today.

The registration of foreigners in municipal registers soared suddenly from 2000 in particular; this can be attributed to Italy's periodic introduction of measures to regularise foreign residents who were originally here illegally, as well as to economic factors in migrants' countries of origin and to the changes in Eastern Europe's political and economic situation.

Arrivals from abroad contribute to containing the effects of a negative or slower natural growth rate, especially in some areas, and they constitute an indispensable resource for overall population growth.

In 2014/2015, Veneto maintained its GDP on the level of last year's values. Domestic demand is still weak; household consumption stabilized around low values and investments were reduced by 1.8%. Veneto's specialized quality and strong flexibility, which the economy of this region has always shown in the past, are characteristics conducive to grasp the elements of recovery. In 2015, GDP recorded a +0,8 and in 2016 a + 1,3 %

The population in Veneto also grew in the last years. The population is mainly concentrated in the provinces of Padova (18.8%), Verona (18.5%) and Treviso (18.0%). These provinces have also seen the highest population growth. Population density is 262.6 inhabitants per kmq for the region overall: Padova has the highest density with 424.8 inhabitants per kmq and Belluno the lowest with 58.1.



Resident Population in Region Veneto (ISTAT)

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## 1. General informations

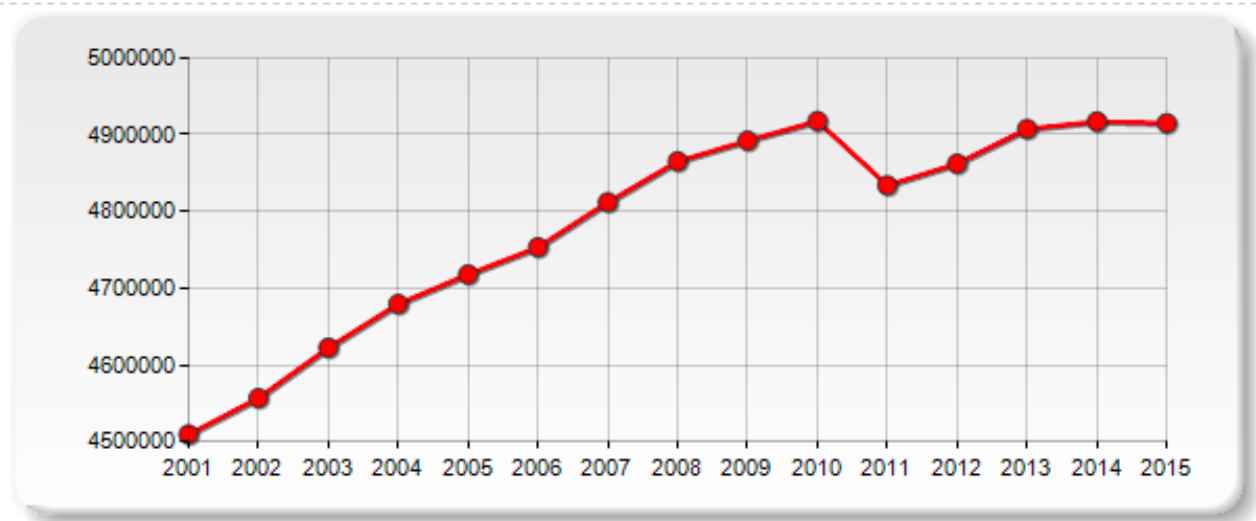
1.1 Area 18.407,42 kmq - Inhabitants /kmq 267 - Municipalities 576 - Provinces 7

### 1.2 Population

1.2.1 N. of inhabitants 4.927.695 (2016)

1.2.2 Population Growth Forecast -0,4 %

### TREND POPOLAZIONE



Population trend in Veneto Region

1.2.3 Migration inflow Growth Rate: Migrants in Veneto were 511.558 (2015), but represent 22/25% one quarter of infants, 15% of adolescents, 13.6% of the school population and 12% of the unemployed. 52.4 percent of the foreign visitors are women, 57% are of European origin. Two out of three (66%) are in Italian with long-term permits.

1.2.4 Migrant persons (percentage on population) 10,4 % (2015)

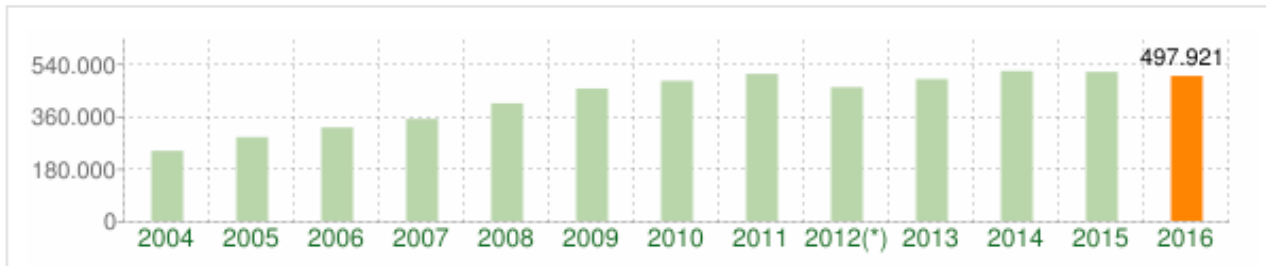
1.2.5 Migrants' countries of origin:

1) Romania (116.000,00, +26% since 2012), (23%)

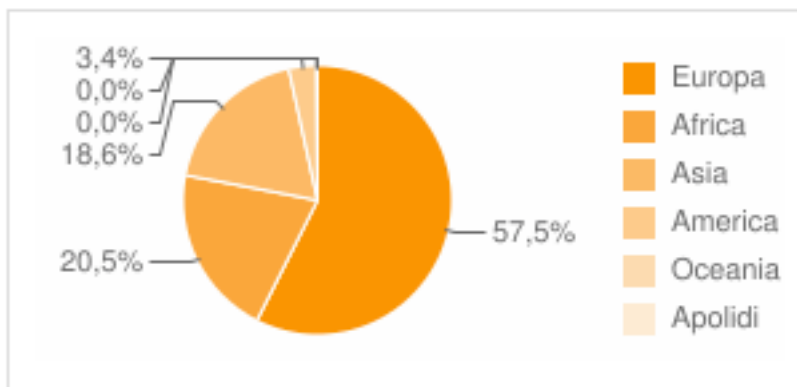
2) Morocco (53.000) (10%)

4) Albania (40.000) Moldova (38.700) (7,5%)

Source: "Ufficio Statistica Regione Veneto"



Migrants in Regione Veneto (ISTAT 2015)



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### 1.3 Employment\*

1.3.1 Employment rate 63.7% (Italy 55,7%) \*

1.3.2 Employment rate by gender: women 8,8 % men 5,8 % (Regione Veneto su dati Istat)

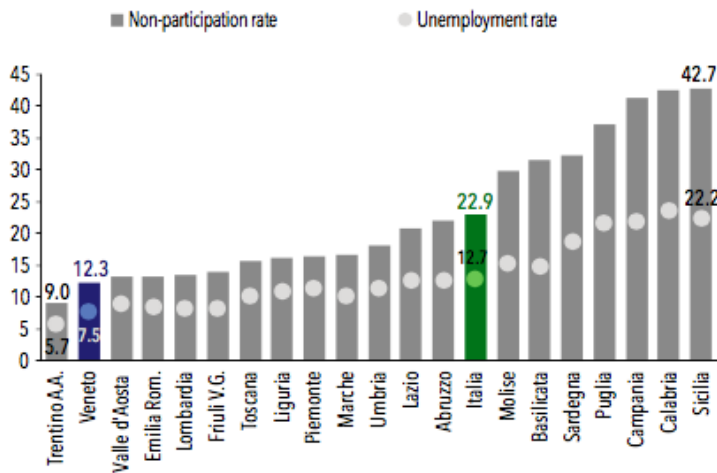
1.3.3 Unemployment rate 7,5 % (Italy 12,7%) \*

1.3.4 Inactivity rate 12,3 %\*

1.3.5 Youth unemployment rate (aged 15-24) 24,7 %\*

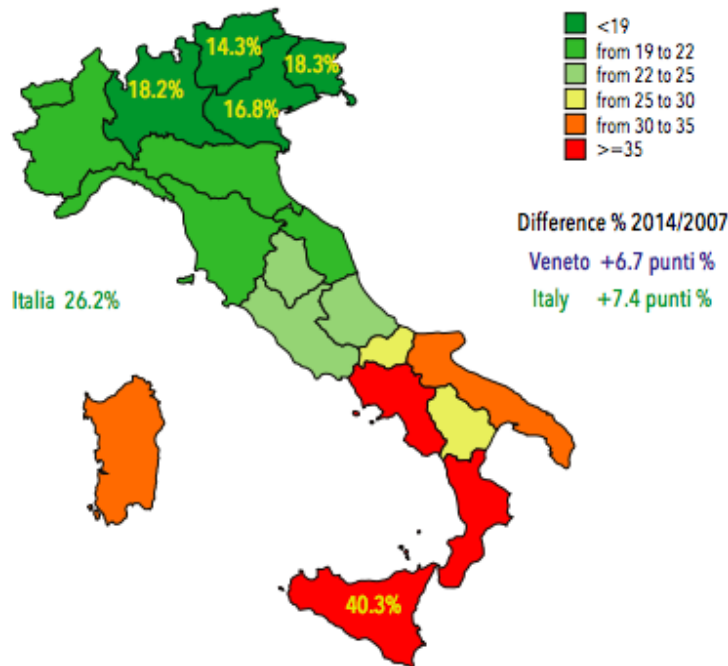
\* Statistical Report Regione Veneto 2015

**Fig. 9.3.6 - Unemployment rate and rate of non-participation to the labour market (\*). – Regional ranking - Year 2014**



(\*). Unemployment rate = (Persons searching for a job/Workforce) x100  
 Non-participation rate = (Unemployed + Inactive not seeking work but available to work / Workforce + Inactive non seeking for work but available to work) x100  
 Source: Veneto Region Data Processing- Regional Statistical System on ISTAT data

**Fig. 9.3.4 - Percentage of 15-29 years old in NEET conditions (\*) – Year 2014**



(\*).Not (engaged) in Education, Employment or Training Source: Veneto Region Data Processing- Regional Statistical System on ISTAT data

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## 1.4 GDP

1.4.1 Regional GDP per capita 30,800,00 euro (Istat 2015)

1.4.2 9% of national (Rapporto statistic Regione Veneto 2015)

1.4.3 Growth Rate 2016: +0,4 %

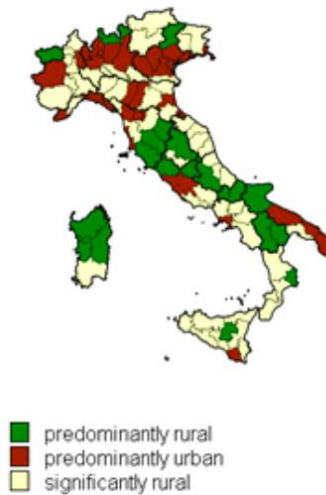
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## 1.5 - Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;

X  Intermediate (IN), the share of population living in rural local units is between 15% and 50%;

Predominantly Rural (PR), the share of population living in rural local units is higher than 50%



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## 1.6 Number of registered enterprise (registered VAT) **439.307**

1.6.1 - Type of businesses: Enterprise size class:

- 1-9	employees 369.704 (n. of units)	94 % of regional
- 10-49	employees 162.838 (n. of units)	41 % of regional
- 50-249	employees 21.142 (n. of units)	5 % of regional
- 250 and over	employees 342 (n. of units)	0,1 % of regional

Source: Elaboration Regione Veneto - Sezione Sistema Statistico Regionale on Istat data (Archivio Asia 2013) - Regione veneto Statistical report 2015

1.6.2 Main regional business sectors (NACE classification)

**Agribusiness:** There are about 120,000 farms in Veneto; 3,650 food industries, with nearly 34,000 employees

**Mechanics:** 16,754 SMEs (2011) - 219,550 employees

**Construction** has 57,504 local units (2011); approximately 149,881 people employed; Wood-furniture has more than 12,000 companies employing more than 70,000 people.

“**Sistema Casa**” (wood, furniture, furniture, piece of furniture, lighting, furnishing textiles, building components, tiles, bathroom fittings for housing).

\*\*\*

## 1.7 Production

1.7.1 Production for national market (9 %)

1.7.2 Production value 132.239.000 (Euro)

1.7.3 Growth Rate 2016: +0,4%

1.7.4 Export production (13,9 % of national export)

1.7.5 Production value 57.517.000 (Euro)

1.7.6 Growth Rate 2015/2014: +5,3%

1.7.7 Main export areas 1) European Union; 2) Other European Countries; 3) Asia



(AVN) – Venezia, 30 maggio 2016

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## 1.8 R&D expenditure

1.8.1 Regional Total R&D expenditure as a percentage of GDP (all sector) 1,5 % (2011)

1.8.2 Growth Rate: + 0,4 %

1.8.3 National total R&D expenditure as a percentage of GDP (all sector) 1,38 % (2014-2016)

1.8.4 Growth Rate: 1,1 %

1.8.5 Researchers as a percentage of persons employed 4,5 per 1000 employees (source Ris3 Regione Veneto)



Source: www.istat.it/it/files/2015/12/11-Ricerca-innovazione-Bes2015.pdf

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## 1.9 Labor cost

RAL media 2014 (Valori in Euro) vs Occupati dipendenti 2013 (% sul totale occupati)



RAL Media 2014 per settore e inquadramento

SETTORE	DIRIGENTI	QUADRI	IMPIEGATI	OPERAI
AGRICOLTURA	€ 89.822	€ 49.897	€ 29.850	€ 21.297
INDUSTRIA DI PROCESSO	€ 112.265	€ 55.960	€ 33.910	€ 25.328
INDUSTRIA MANIFATTURIERA	€ 106.100	€ 54.842	€ 34.144	€ 25.306
EDILIZIA	€ 94.825	€ 56.931	€ 32.275	€ 22.897
UTILITIES	€ 109.859	€ 53.412	€ 33.810	€ 27.447
COMMERCIO	€ 114.784	€ 53.434	€ 30.131	€ 24.467
SERVIZI	€ 98.565	€ 51.567	€ 29.611	€ 23.082
SERVIZI FINANZIARI	€ 112.735	€ 55.610	€ 31.573	nd
TOTALE	€ 108.553	€ 54.260	€ 31.209	€ 23.913

Source: JP Salary outlook 2015 Veneto

1.9.1 - Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions)

The average employment costs, gross of taxes and social contributions is 30,953 euro per year. The worker, in the form of net pay, receives 53.3%, 16,498 euro. Source Istat 2012.

1.9.2 - Average Monthly Disposable Salary - 40h/week (Net After Tax): In Veneto: 19.141 euro (Istat Bes 2016). On average, in 2013 someone with a college degree in Veneto earned 25% more than a person with at most a middle school diploma and 15% more than someone with a secondary school diploma. A woman with a college degree earned on average € 1,400 per month, € 200 more than an employed woman with a secondary school diploma and 300 more than employed woman with a middle school diploma. The differences were even more significant for men: a college graduate earned € 1,750 against 1,350 for a middle school graduate and 1200-1300 for someone with lower education.

1.9.3 - Pay Frequency  weekly / X monthly

1.9 - Cost of Living (please provide information about housing affordability, household final consumption expenditure, comparative prices)

In 2015, the average monthly household spending at current value amounted to EUR 2.499.37 (+ 0.4% compared to 2014, + 1.1% against 2013). Net of the cost of the rent, the average household expenditure was in 2015 EUR 1,910.34, an increase of 0.7% compared to 2014 and by 1.9% compared to 2013. The average level of food expenditure is equal to € 441.50 per month (€ 436.06 in 2014, + 1.2%).

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## 2.Trends:

Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental. Please list main behaviours and trends of the regional entrepreneurship ecosystem as far as innovation related activities are concerned covering the following areas: □ Profiles of companies that develop innovations; □ The impact of innovations on turnover, and the proportion of turnover invested in innovation activities; □ Barriers to commercialization of both innovative and non-innovative goods and services; □ Preferred types of public support for the commercialization of goods or services; □ The role of design, and the use of advanced manufacturing technologies; □ Involvement in public procurement and the role innovation plays in this process.

In the Veneto Region, industrial production, according to VenetoCongiuntura2 survey data, recorded in 2015 an increase of 1.8 percent, in line with the value of last year. Production levels have recorded values around the annual average in the first half, with an increase of 1.7 percent earlier in the year and 1.8 percent in the months between April and June. The third quarter saw a slight slowdown (+ 1.5%) which was recovered in the last part of the year, an increase of +2.3 percent. The positive dynamics of production seems to continue into the first quarter of 2016, with the index of industrial production increased by +2.2 percent.

In general, the dynamics of production in 2015 reflects a recovery situation and the Veneto economy recovery. With the exception of the textile and clothing sectors and transport, which showed a decline of -1.9 and -0.4 percent, all other sectors have ended the year with positive average annual variations. In particular, plastic and rubber (+ 3.9%), food and beverages (+ 3.5%). Wood and furniture (+ 2.3%), machinery and mechanical appliances (+ 2%), metals and metal products (+ 1.9%), paper and printing (+ 1%). Below 1 percent changes in other sectors.

In terms of size of enterprise, industrial production in 2015 marked dynamic results. Micro enterprises increased (+ 2.7%), as medium enterprises (+ 2.3%), while there was a less marked increase in large enterprises (+ 1.1%) and small companies (+ 1%).

In line with production, even the industrial sales indicator showed an average annual growth of +2.3 per cent, confirming the change in trend that was registered in the previous year (+ 1.9% ) after the negative results of 2012 and 2013 (-3.9% and -0.3%). The indicator favorable trend is confirmed by the change in the first quarter of 2016, which recorded a trend increase of +2.6 percent. (source: Rapporto annuale Unioncamere Veneto 2016).

Investments by manufacturing companies are mainly concentrated in the improvement of manufacturing processes: 87 percent invested it in the purchase of machinery and plant, while 43 percent chose to optimize office automation. 29.6 and 28.8 per cent of companies have chosen to invest respectively in training and human resources and in research and development. 25.6 percent of companies have made investments in buildings to be allocated to the production or to offices and 20.8 percent has focused on renewable energy and energy efficiency. Compared to 2014 they increased for investment in energy saving and renewable energies and those on human resources and training (approximately + 3% compared to last year).

The dynamics of the tourism sector in 2015 confirmed further growth. The flow of visitors was up +6.1 per cent compared to 2014 and reached a new record of more than 17 million arrivals.

Foreign arrivals totaled more than 11 million, +5.8 percent compared to 2014. It 'was also recorded also increased domestic tourism with a variation of +6.7 percent and a number of tourists amounted to more than 6 million.

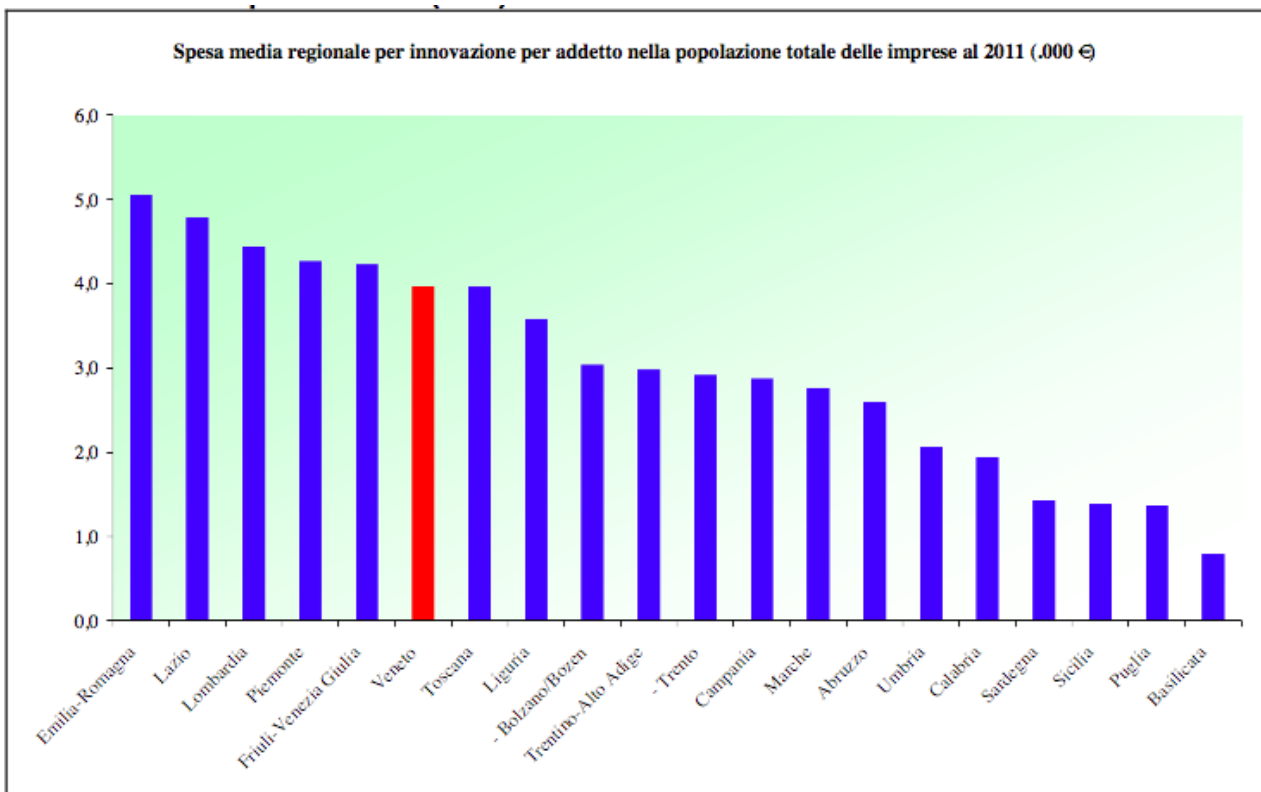
The accommodation facilities registered a strong growth in hotels 5 and 4 stars (+ 14.1% and + 7.4% in arrivals).

The agricultural sector in 2015 has had to deal once again with the adverse weather conditions. The total value of gross agricultural production Veneto, which in 2015 is to be estimated at 5.7 billion euro, slightly down on the previous year (-1%)

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### 3. RIS3 Regional potential for innovation - Territorial Smart specialization sectors

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on: 1) regional assets, 2) linkage with other regions, 3) dynamics of the entrepreneurial environment.



Average regional expenditure in innovation (source: Statistical report 2015 Regione Veneto)

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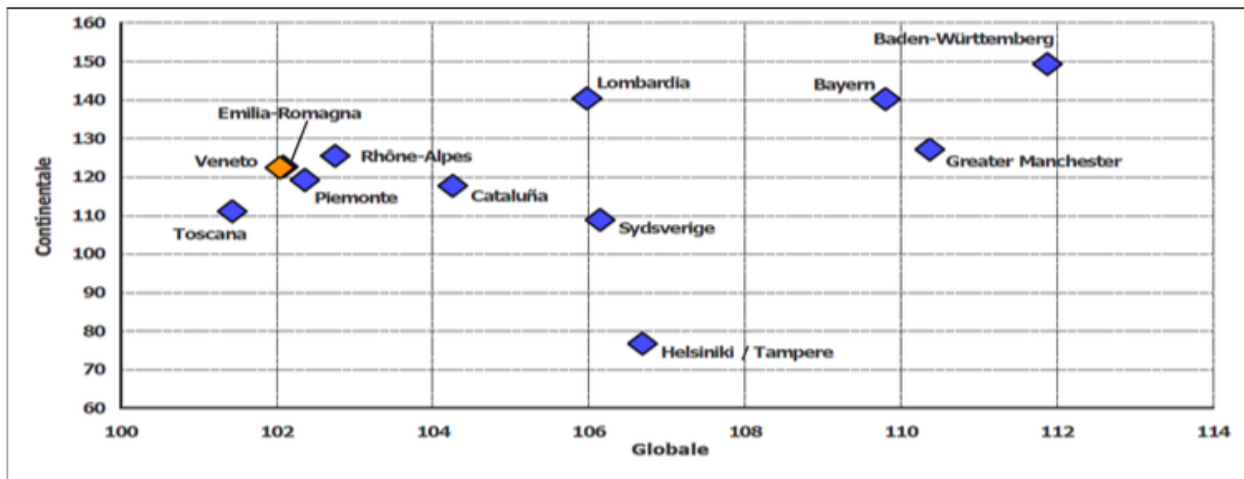
#### 3.1. Regional assets analysis:

According to the regional specificities, this report will try to identify the main regional ecosystem assets, any bottlenecks of the innovation system and the key challenges both for the economy and the society. To implement this analysis, suitable tools are: regional profiling studies, targeted surveys and expert assessments.

The Veneto Region has multiple and modern economic infrastructure of strategic interest. This is the result of "widespread industrialization." It is necessary for the development and improvement of trade, mobility and both trade flows that tourism: roads, railways, ports, airports and d 'catchment areas, banking networks and a range of services, facilities and networks for telephony and data transmission as well as systems / energy and environmental networks. the facilities are particularly important given the geographical positioning of the Veneto region and "high propensity to" export. in the regional ranking of "index endowment general economic infrastructure. (source "Institute Tagliacarne 2011). Veneto is the fourth Italian region better equipped. Regione Veneto fact stands out for the high supply of harbors and facilities and environmental energy networks. Only for the provisioning of rail network Venetian Region is lower than the national rate.

Italy has almost reached the initial and important goal of providing basic broadband coverage to all its citizens (2% of the population excluded), and must recover the large gap in infrastructure development of high-speed and ultra-fast broadband, being late by almost three years with respect to the European average and the targets set by the European Commission (universal coverage for high-speed Internet by 2015 and at least 50% of households subscribing to ultra-fast Internet by 2020). The Veneto Region has done everything possible in recent years to recover a gap that is extremely penalizing for businesses, given that in 2010 almost one-fifth of Veneto was not covered by broadband. The Region has invested nearly 85 million Euros in infrastructure, for a series of interventions starting with the laying of a thousand kilometers of optical fiber, so that by the end of 2015 there will be basic broadband coverage throughout the region. High-speed broadband coverage, however, is limited to 15.9% of the population, less than the national average (21%). However, an experimental action is being defined for ultra-wideband development. E-commerce represents a primary driver of development and it's rapidly increasing, nevertheless it is still not enough widespread; 42% of companies with at least 10 employees and 26% of the smaller ones make use of it. They use it mainly to make purchases and much less to sell their products.

E-Government services: Among the targets of the Digital Agenda in the Regione Veneto there are also objectives for P.A. digital services. The main objective was for 50% of the population to use digital services to interact with the P.A. by 2015. The P. A.'s interactive online services are undergoing expansion and development in our country, but they are not yet fully exploited, partly because the public is not that computer literate yet. In Veneto, as in Italy, 36.7% of people aged 16 to 74 said they use the Internet to interact with public authorities, when in Europe it was 58.6%. The main activities on the web ranged from booking medical services to paying taxes, enrolling in schools, accessing public libraries and requesting personal documents and certificates. The P. A.'s digital services focus on some strategic sectors, such as justice, education and healthcare.



(2012) Bakbasel – Global and continental accessibility 2012

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### 3.2. Linkages with the rest of the world and the position of the region within the European and global economy analysis

Please make a comparisons with the other CERlecon and European regions in order to outline possible linkages and to better accede to RIS3 assessment of existing local regional innovative advantages. International value chains in this respect are a crucial element to be considered. This analysis will prevent “blind' duplication of investments” already done in other European regions, averting from an excessive fragmentation of investments that could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration with other CERlecon entrepreneurship ecosystems should be pursued whenever similarities or complementarities with other regions are detected.

To implement this analysis, suitable tools are: comparative studies, rounds of interviews with other regions and interregional work groups.





The Veneto lies in a strategic location in Europe due to its network of major cross-trade traffic routes (East-West, North-South) and to recent enlargement, which has moved the centre of the continent eastwards. This new-found location at the heart of Europe should be considered in terms of both physical distance and as a gateway towards the east and the south of the world. However, although the Veneto's location does put it in a privileged position and give it a competitive edge, there are also causes for concern. The Veneto is crossed by European Corridors I (Brenner) and V (Barcelona-Kiev). These two key axes, plus its strategic location for trade with Eastern Europe and southern Mediterranean countries, mean that the Veneto is being subjected to a constant increase in cross-border traffic, which puts additional pressure on a road network that is already used for short-haul intraregional mobility. Consequently, citizens have to endure a negative impact brought about by the current state of the road network, which includes congestion, difficult access, accidents, plus atmosphere and noise pollution: all unpleasant features that affect the environment, health and quality of life. If the Veneto is to make the most of its privileged location, then it must introduce mobility policies, i.e. it must complete major infrastructure, improve regional network use, improve demand management for passenger and freight mobility, and build a new relationship between territory and transport and between users and transport.

The standard of infrastructure across the Veneto in physical terms, namely the Veneto's physical resources, can be analyzed by what literature refers to as equipment indicators. For instance, the indicator that calculates the kilometres of main road network per 100 km<sup>2</sup> of territorial surface places the Veneto in line with the national figure and second only to Piemonte, which is considered to be one of the Veneto's competitors. The same indicator, when used to calculate results for individual provinces, reveals a disadvantage for Belluno and Venezia only, whilst all the other provinces have values in line with, or even far above, the Italian figure.

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### **3.3. Dynamics of the entrepreneurial environment.**

Please point out the characteristics of your regional entrepreneurship ecosystem, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals.

To implement this analysis, suitable tools are: statistics on entrepreneurial activities, direct discussion (consultations and interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organizations).

The economic downturn from 2008 to 2014 led to a sharp decline of Veneto's production system; the number of active enterprises decreased from 462,567 to 439,307, with a net loss of 23,260 units. In 2014, the decline was 0.3% compared to 2013 if we exclude the agricultural sector and 0.7% if we include it. The construction and manufacturing industries were still struggling, -2.1% and -1.4% respectively compared to 2013. The tertiary sector, which represented 53% of the region's productive activities, was up by a positive 0.5%. Banking and financial services were the most positive, closing the year with a net 2.3% increase. Micro enterprises with relationships, subcontractors and those who work based on orders from larger companies and suffer the decline in demand, acknowledge their weakness.

Larger companies have greater strategic abilities and an expansionist logic based on increasing their range of products/services, seeking out new markets, becoming more internationalized and investing more in innovation and research.

Veneto's manufacturing industry is more aggressive with respect to other sectors, more geared toward expanding its strategic options abroad, looking for partnerships to improve competitiveness and more mature in its approach to investment in innovation and R&D. Among these companies, there are the innovative startups, introduced into Italian law for the first time in 2012. They are defined as special companies whose primary purpose is to develop, produce and sell products and services considered innovative in all respects and of high technological value. In Veneto there were 246, up 71% in 2014; they represented 7.7% of all startups in Italy, the fourth highest percentage after Lombardy, Emilia Romagna and Lazio.

There is also a transitive association among businesses, international openness and willingness to innovate. Veneto's distribution channels have a limited degree of internationalization. This lack is certainly detrimental, including as regards manufacturing enterprises (especially the food industry), as it deprives products of important showcases in foreign markets and takes away the opportunity to learn about the styles of consumption of new markets through Italian and Veneto distributors.

Table 1. Top-15 clusters by stars, employment and specialisation

Cluster	Region	Employees	Specialisation	Stars
Automotive	Piemonte	85 914	3.49	★★★
Production Tech.	Emilia-Romagna	60 722	2.76	★★★
Building Fixtures	Veneto	55 023	2.19	★★★
Footwear	Marche	29 772	20.57	★★★
Furniture	Friuli-Venezia Giulia	14 390	4.80	★★★
Finance	Lombardia	174 101	1.10	★★
Metal	Lombardia	166 590	1.91	★★
Construction	Lombardia	145 687	1.00	★★
Textiles	Lombardia	91 468	2.28	★★
Finance	Lazio	85 767	1.08	★★
Construction	Veneto	72 723	1.03	★★
Metal	Veneto	69 847	1.66	★★
Transportation	Lazio	68 884	1.01	★★
Finance	Emilia-Romagna	67 184	0.98	★★
Construction	Campania	66 548	1.14	★★

Source: Innovation Clusters in Europe: A statistical analysis and overview of current policy support

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### 3.4 Smart Specialization Sectors

Please identify 1 - 4 regional entrepreneurship ecosystem knowledge specializations that best fit the innovation potential within RIS3 themes in CERlecon (Agri-food – Digital Growth – Energy – Industrial Modernization). Smart specialisation requires CERlecon partners identify a limited number of priorities. Their implementation will allow the CERlecon stakeholders to strengthen their innovation systems.

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**The Veneto Region's** entrepreneurship ecosystem knowledge specializations that best fit the innovation potential within RIS3 themes in CERlecon, according to Regione Veneto sources (Documento di Strategia di Ricerca e Innovazione per la Specializzazione Intelligente approvato con DGR n. 1020 del 17 giugno 2014) are:



## 1) AGRIFOOD

- TRADITIONAL SECTORS: Agriculture Livestock Fishing Industries food processing
- CROSS SECTORS Packaging- Energy- Logistics Catering- Chemistry- Agricultural engineering – Mechanics - Biomedical
- ENABLING TECHNOLOGIES Biotechnologies ICT - Advanced materials - Advanced manufacturing systems.
- INNOVATION DRIVER Environmental Sustainability - Energy Efficiency
- POSSIBLE PATHS OF DEVELOPMENT Farming technology - Bio-fertilizers- Nutraceutical - Agriculture of precision – Recovery of traditional industries with high added value - Biomass / energy sources - Food safety - Enhancement of traditional products (DOP, DOC, IGP, IGT, DOCG,...) – Traceability - Intelligent Packaging – Territorial Planning - Sustainable Production Systems - Intelligent management of natural resources

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## 2) SUSTAINABLE LIVING

- TRADITIONAL SECTORS: Construction, - Furniture - Tourism - Lighting technology.
- CROSS SECTORS: Mechanics - Energy – Mobility - Forestry - Biomedical – Chemistry.
- ENABLING TECHNOLOGIES: ICT - Advanced Materials - Nanotechnology - Photonics
- INNOVATION DRIVER: Environmental sustainability - Active aging – Design.

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## 3) SMART MANUFACTURING

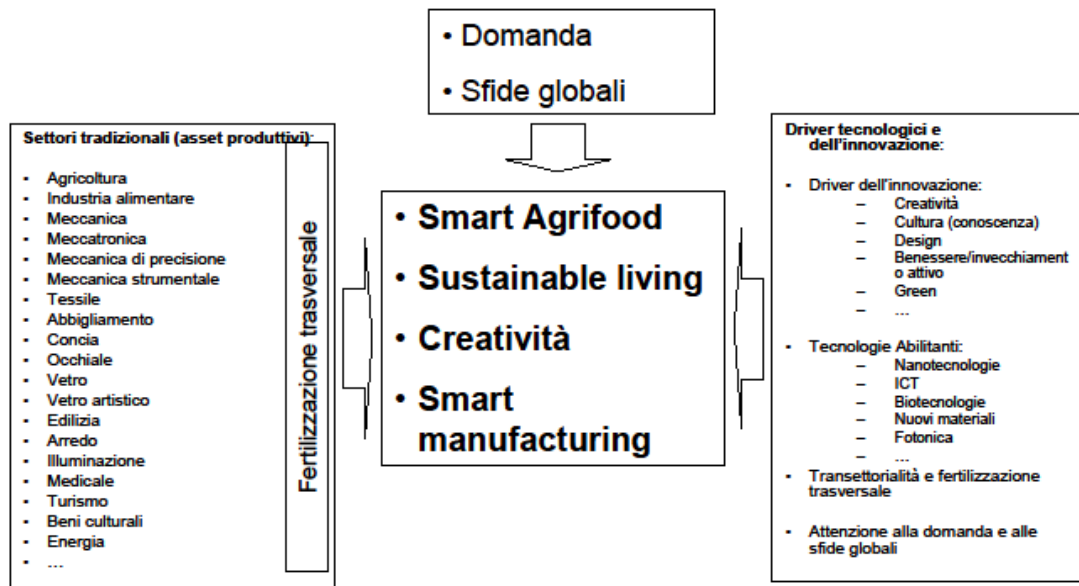
- TRADITIONAL SECTORS: Mechanical components - Mechatronics - Mechanical engineering - Mechanics of Precision
- CROSS SECTORS: Agriculture, Construction, Furniture, Food, Packaging, Restaurants Biomedical
- ENABLING TECHNOLOGIES: ICT - Advanced materials - Photonics - Nanotechnologists - Prototyping
- INNOVATION DRIVER: Active Ageing - Design - Energy Efficiency
- POSSIBLE PATHS OF DEVELOPMENT: Productions and sustainable processes - Cognitive Systems and Automation - Innovative and inclusive workplaces - New organizational and production models - Design and advanced production technology

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## 4) CREATIVE INDUSTRIES

- TRADITIONAL SECTORS: Footwear - Clothing - tanning of leather - Goldsmith - Eyewear - Ceramic Art - Art Glass - Tourism - Culture - Mobile - Fashion
- CROSS SECTORS: - Agriculture - Mechanical - Chemical - Biomedical
- ENABLING TECHNOLOGIES: ICT - Advanced materials - Advanced manufacturing systems - Prototyping - Biotechnologies - Nanotechnology - Plasma tissues treatment
- INNOVATION DRIVER: - Design - Creativity - Active aging
- POSSIBLE PATHS OF DEVELOPMENT: Innovative materials and biomaterials - New business models - Creative designs - Innovative marketing and virtualization products - Technologies and systems for the use of cultural heritage.

## GLI AMBITI STRATEGICI



### SMART AGRIFOOD

The agribusiness sector is a sector with great potential. In this sector different strategies and actions are identified at regional level. Future strategies will focus on the improvement and innovation in plants, concerning the processing, transformation, and preservation of the traditional products. Research and experimentation will ensure efficient food production and ensure a sustainable management as well as sustainable use of natural resources.

Biotechnology will improve the variety and quality of products from Veneto Region. Processing plants will be implemented through innovative management structures using bio-economic and innovative forms of work organization. This will give value to the entire production chain. Also the systems of conservation offer possibilities for innovative improvement, both through new techniques and through the use of new materials. Crop production and animal wastes recycling offer some potential for research and innovation too. Interesting opportunities will come from a better and more efficient production of bio-fuels derived from biomass and biogas. In all these areas of research and innovation, information technology and communication strategies will provide vast and systematic support. For example fostering the tracking techniques of products through advanced sensors and information systems, promoting information on quality and food safety, stimulating food and wine tourism.

### SMART MANUFACTURING

“Smart Manufacturing” is a term that helps to represent the set of processes, activities and knowledge derived from the introduction of "smart technologies" within production systems (ATECO C). These innovations are shaping a global and rapidly changing world of work, with obvious advantages in terms of production efficiency and product quality. Making the production facilities "smart" is therefore strategic for the Veneto region. This is necessary especially in companies organized using the more conventional systems. Introducing innovative elements in these structures can raise competitiveness, both nationally and at international level. Mechatronics for example, combining various fields of technical and scientific research is a very successful industry, able to provide adequate answers to many different demands for innovation.

The concept of "intelligent factory of the future" sums up the vision of a mechanical chain: mechatronics, control systems, industrial robotics, application of 3D simulations, production of software, accompanied by an increasingly sustainable production, ethical, clean, green and safe.

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## CREATIVE INDUSTRIES

This sector is characterized by a continuing need for restructuring and modernization, generated by multiple factors such as changing consumer preferences, rapid technological progress, innovation on the materials, commercial competition and variation of the production costs resulting from global competition.

Creativity and innovation are fundamental in the fashion industry, one of the known excellence of the Veneto Region. Creativity is also related to the fashion accessories production and to the related services (e.g. goggles), craftsmanship, glass and other artifacts typical of the region.

The creative industry fosters the creativity and imagination of designers, graphic designers, artists, architects, designers also making them interact with more technical professionals. Encourage and facilitate these processes of ideation and collaboration between different types of knowledge is a necessary step to achieve RIS-3 in the Veneto Region.

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## SUSTAINABLE LIVING

The "sustainable living" sector has a high potential for the welfare of cities and their citizens (including the elderly and people with special needs). The efficiency and environmental safety, the housing situation and the enhancement of cultural heritage integrated into the environment, quality of life and living is closely connected to the surrounding environment, to preserve nature and the construction of sustainable buildings and energy-efficient are only some examples of the possible development of this sector.

The sector offers opportunities in research and development of processes that lead to environmental protection, services to the citizen and to processes for the reduction of pollution including innovative technological monitoring systems, optimization and innovation of the waste cycle and materials for energy-efficient construction. Innovative living environments and home automation ensure, through technological tools, remote management and virtualization, safer management of private and public spaces. The Venetian cultural heritage could also be protected and restored through the use of innovative techniques and advanced materials, and offered to the tourists through the development of innovative information technologies.

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#### 4.SWOT ANALYSIS

In order to analyze the CERlecon regional entrepreneurship ecosystems and its potential for innovation, please focus on regional strenghts and weaknesses using the SWOT analysis model. Refer to the main contents of the SWOT analysis as follows:

Strengths are advantageous resources in the regional CERlecon entrepreneurship ecosystem capable to improve its innovation system. CERlecon strategy and action plan will be built on strengths;

Weaknesses are limits and faults in the regional entrepreneurship ecosystem that will keep it from improving innovation. CERlecon actions will focus on eliminating weaknesses;

Opportunities are favourable situations in the region's entrepreneurship ecosystem. CERlecon's goal is to take advantage of these opportunities;

Threats are unadvantageous and unfavourable situations in the entrepreneurship ecosystem's environment that damage the CERlecon strategy. CERlecon actions will limit the negative effects of these threats.



#### STRENGHTS

- High density manufacturing territory
- Presence of research and development centers of excellence (universities, science parks, research centers)
- Knowledge and skills available from university research
- Regional laws to support the development of innovative enterprises and internationalization
- High District vocation Region with low-tech specialization
- Presence of leading companies
- High propensity to export
- Widespread Entrepreneurship Culture
- Presence of skilled workers

- Strong tourist vocation Region
- Large cultural and environmental heritage
- Excellence in innovation of production processes

#### WEAKNESSES

- Underuse of the system of knowledge by firms
- Offer of research centers not in line with the needs of companies
- Difficulty of districts to develop innovative projects
- Research centers unconnected
- Limited use of venture capital
- Poor use of ICT in micro enterprises
- Poor training availability for soft skills
- Complexity of access to funds
- Low capacity to access the European funds
- Search only performed on publications
- International competition (firms in subcontracting);
- Lack of structured training and innovation;
- Shortly developed entrepreneurship training system in mechanical engineering;
- Lack of capacity in networking

#### OPPORTUNITIES

- High specialization in traditional sectors
- Increased presence of innovative and technological companies
- New policies instruments in favor of clusters and enterprise networks
- Participation of national technology cluster
- Complementarity of skills, knowledge and expertise between European clusters
- Complementarity of knowledge and skills between different clusters
- Possible development in research and development
- Innovation of the production processes

#### THREATS

- Changes in consumer needs
- Loss of competitiveness in emerging sectors
- Loss of manufacturing skills by specialized districts
- Brain-drain
- Difficult access to credit and funds
- High costs associated with transport

The SWOT matrix represents the synthesis of Structural components of the Venetian productive capacity. The combination of the strengths with the opportunities identifies the strategic advantage; weaknesses identify barriers restricting the development. In the regional context Innovation is essential for supporting the competitiveness of the region Veneto.

The basic elements are:

- strengthen and coordinate scientific research,
- improving and disseminating technology transfer,
- improve the competitiveness and innovation of the production system,
- increase the use of patents,
- promote and facilitate international networks,
- promote new entrepreneurship and innovation clusters,
- strengthen and improve the systems of business networks and clusters,
- increase the share of research and development investments,
- contribute to the qualification of training,
- strengthen and improve the effectiveness of the regional innovation system
- promote interaction between training and support institutions and companies,
- boost research and innovation in enterprises,
- increase the incidence of innovative productive specializations in the regional economic system,
- support innovative services for enterprises and for citizenship.
- support for investment in research, development and innovation,
- support for technology transfer
- support to the aggregation between companies

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## CERlecon Region STUTTGART GERMANY (Baden-Württemberg)

CERlecon Partners: Wirtschaftsförderung Region Stuttgart GmbH. PP5  
Hochschule der Medien Stuttgart PP6



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### CERlecon Regional Ecosystem Evolution

Please lay out basic facts about regional evolutions of entrepreneurship, employment unemployment and wages in the post war period, including adverse shocks to the regional employment system, how they were adjusted, how wages declined, if new jobs were created to replace those jobs destroyed or if workers moved out. Please provide all information to better understand the local entrepreneurship<sup>3</sup>.

Baden-Württemberg is one of 16 German federal states located in the southwest of the Federal Republic of Germany. On the basis of the number of inhabitants (10.9m, end of 2013) and surface (35.751 km<sup>2</sup>) Baden-Württemberg stands at the third place compared to the other federal states in Germany. The population density of Baden-Württemberg accounts for 305 inhabitants per km<sup>2</sup>. Baden-Württemberg has borders with France, Switzerland and within Germany with Bavaria, Rhineland-Palatinate and Hessen. Baden-Württemberg's capital city is Stuttgart.

**Please note: Due to a lack of data specifically for the Stuttgart Region this report refers to Baden-Württemberg data, unless otherwise stated.**

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### 1. General informations

In 2014, the regional GDP in Baden-Württemberg (BW) was €438bn accounting for 15.1% of the German GDP (behind the much larger Northrhine-Westphalia (21.5%) and Bavaria (18.0%)). The federal state was severely hit by the latest financial and economic crises. Between 2008 and 2009 GDP dropped by 9.2%. However, a growth rate of 7.0% between 2009 and 2010 indicates a quick recovery. With a GDP per capita of €38,716 (2013) BW lies at the third place of all non-city federal states. In 2014, the export volume of Baden-Württemberg amounted to €181bn, representing 16.1% of German exports.

In 2014, 31.3% of employees were occupied in manufacturing and construction, while the share of the service sector is 67.5%, and only 1.2% of employees were occupied in the agricultural sector. Thus, Baden-Württemberg is highly industrialised compared to the national average: agricultural

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<sup>3</sup> Olivier Jean Blanchard Massachusetts Institute of Technology and Lawrence F. Katz Harvard University



sector 1.5%, manufacturing and construction 24.6%, and service sector 73.9%. Looking at employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) in 2014, Baden-Württemberg with a share of 5.1% exceeds the national average of 4.1%. In particular, Baden-Württemberg has manufacturing strengths as the employment share of high and medium high-technology manufacturing is 16.2% (2014). In 2014, the rate of unemployment was with an average 3.1% one of the lowest in Germany (federal average 5.0%). With 5.7mn people, Baden-Württemberg's share was 13.7% of the economically active population in 2014. Looking at the number of firms in the manufacturing sector, 18.2% of German firms are located in BW (2014). With regard to size distribution (measured in number of employees), the federal state only marginally deviates from the national average.

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## 1.2 Population

- 1.2.1 N. of inhabitants *10,879,618* (2016)
- 1.2.2 Population Growth Forecast +2.1 %
- 1.2.3 Migration inflow Growth Rate +11.88 %
- 1.2.4 Migrant persons (percentage on population) 13.85 %
- 1.2.5 Migrants' countries of origin:
  - 1) Turkey (16.96 %),
  - 2) Italy\_ (11.52 %),
  - 3) Romania\_\_ (6.6 %),

## 1.3 Employment

In 2014, 31.3% of employees were occupied in manufacturing and construction, while the share of the service sector is 67.5%, and only 1.2% of employees were occupied in the agricultural sector. Thus, Baden-Württemberg is highly industrialised compared to the national average: agricultural sector 1.5%, manufacturing and construction 24.6%, and service sector 73.9%. Looking at employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) in 2014, Baden-Württemberg with a share of 5.1% exceeds the national average of 4.1%. In particular, Baden-Württemberg has manufacturing strengths as the employment share of high and medium high-technology manufacturing is 16.2% (2014). In 2014, the rate of unemployment was with an average 3.1% one of the lowest in Germany (federal average 5.0%).

- 1.3.1 Employment rate 72.8\_%,
- 1.3.2 Employment rate by gender: women \_\_\_% men \_\_\_%)
- 1.3.3 Unemployment rate 3.8\_% (Sept. 2016)
- 1.3.4 Inactivity rate \_\_\_ %.
- 1.3.5 Youth unemployment rate (aged 15-24) 3.4\_ %,

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## 1.4 GDP

In 2014, the regional GDP in Baden-Württemberg (BW) was €438bn accounting for 15.1% of the German GDP (behind the much larger Northrhine-Westphalia (21.5%) and Bavaria (18.0%)). The

federal state was severely hit by the latest financial and economic crises. Between 2008 and 2009 GDP dropped by 9.2%. However, a growth rate of 7.0% between 2009 and 2010 indicates a quick recovery.

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### 1.5 - Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;
- Intermediate (IN), the share of population living in rural local units is between 15% and 50%;
- Predominantly Rural (PR), the share of population living in rural local units is higher than 50%

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### 1.6 Number of registered enterprise (registered VAT) \_528.868 (2013)\_

With 5.7mn people, Baden-Württemberg's share was 13.7% of the economically active population in 2014. Looking at the number of firms in the manufacturing sector, 18.2% of German firms are located in BW (2014). With regard to size distribution (measured in number of employees), the federal state only marginally deviates from the national average

#### 1.6.1 - Type of businesses: Enterprise size class:

- 1-9 employees \_\_34174\_\_ (n. of units) \_6.46\_ % of regional
- 10-49 employees \_\_45229\_\_ (n. of units) 8.55\_ % of regional
- 50-249 employees \_\_66291\_\_ (n. of units) \_12.53\_ % of regional
- 250 and over employees \_\_383174\_\_ (n. of units) \_72.45\_ % of regional

#### 1.6.2 Main regional business sectors (NACE classification)

DK.29	Manufacture of machinery and equipment n.e.c.
DJ.27	Manufacture of basic metals
DM.34	Manufacture of motor vehicles, trailers and semi-trailers

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### 1.7 Production

Although compared to the national average, high-technology industries have a higher share in terms of employment, the strengths of the regional economy are clearly the automotive industry, mechanical engineering and the pharmaceutical industry. The automotive industry generates nearly half of the total R&D expenditures in BW. In line with the huge R&D investments is the

success of output. In 2014, with 14,533 patent applications at the German patent office (DPMA), 30.2% of all applicants from Germany came from BW.

1.7.1 Production for national market (\_?\_%)

1.7.2 Production value \_\_\_\_\_?\_\_\_ (Euro)

1.7.3 Growth Rate 2016: \_?\_%

1.7.4 Export production (\_? %)

1.7.5 Production value \_\_\_\_\_?\_\_\_ (Euro)

1.7.6 Growth Rate 2016: \_?\_%

1.7.7 Main export areas 1) \_Cars and Car parts (50.4 billion €); 2) \_Machinery 39.5 billion €; 3)

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### 1.8 R&D expenditure

With research and development (R&D) expenditures reaching €20.2b in 2013 and a share of 4.8% of its GDP, Baden-Württemberg (BW) clearly lies above the national average (2.8%) and EU average (2.0%). Compared to all federal states BW reaches the highest R&D intensity. More than 80% of the regional R&D activities account for the business sector. Further 11% account for the universities and 8% for the non-university research institutes.

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### 1.9 Labor cost

With a GDP per capita of €38,716 (2013) BW lies at the third place of all non-city federal states. In 2014, the export volume of Baden-Württemberg amounted to €181bn, representing 16.1% of German exports.

1.9.1 - Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions) \_\_\_\_\_40 €\_\_\_\_\_

1.9.2 - Average Monthly Disposable Salary - 40h/week (Net After Tax) \_\_\_\_\_2849 €\_\_\_\_\_

1.9.3 - Pay Frequency x monthly

1.9 - Cost of Living (please provide information about housing affordability, household final consumption expenditure, comparative prices)

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### 2.Trends:

Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental. Please list main behaviours and trends of the regional entrepreneurship ecosystem as far as innovation related activities are concerned covering the following areas:  Profiles of companies that develop innovations;  The impact of innovations on turnover, and the proportion of turnover invested in innovation activities;  Barriers to commercialization of both innovative and non-innovative goods and services;  Preferred types of public support for the commercialization of goods or services;  The role of design, and the use of advanced manufacturing technologies;  Involvement in public procurement and the role innovation plays in this process.

In 2014, 31.3% of employees were occupied in manufacturing and construction, while the share of the service sector is 67.5%, and only 1.2% of employees were occupied in the agricultural sector. Thus, Baden-Württemberg is highly industrialised compared to the national average: agricultural sector 1.5%, manufacturing and construction 24.6%, and service sector 73.9%. Looking at employment in high-technology sectors (high-technology manufacturing and knowledge-intensive high-technology services) in 2014, Baden-Württemberg with a share of 5.1% exceeds the national average of 4.1%. In particular, Baden-Württemberg has manufacturing strengths as the employment share of high and medium high-technology manufacturing is 16.2% (2014). In 2014, the rate of unemployment was with an average 3.1% one of the lowest in Germany (federal average 5.0%). With 5.7mn people, Baden-Württemberg's share was 13.7% of the economically active population in 2014. Looking at the number of firms in the manufacturing sector, 18.2% of German firms are located in BW (2014). With regard to size distribution (measured in number of employees), the federal state only marginally deviates from the national average.

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### **3. RIS3 Regional potential for innovation - Territorial Smart specialization sectors**

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on: 1) regional assets, 2) linkage with other regions, 3) dynamics of the entrepreneurial environment.

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#### **3.1. Regional assets analysis:**

According to the regional specificities, identify the main regional ecosystem assets, and also any bottlenecks of the innovation system and key challenges both for the economy and the society.

To implement this analysis, suitable tools are: regional profiling studies, targeted surveys and expert assessments.

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#### **3.2. Linkages with the rest of the world and the position of the region within the European and global economy analysis**

Please make a comparisons with the other CERlecon and European regions in order to outline possible linkages and to better accede to RIS3 assessment of existing local regional innovative advantages. International value chains in this respect are a crucial element to be considered. This analysis will prevent "blind' duplication of investments" already done in other European regions, averting from an excessive fragmentation of investments that could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration with other CERlecon entrepreneurship ecosystems should be pursued whenever similarities or complementarities with other regions are detected.

To implement this analysis, suitable tools are: comparative studies, rounds of interviews with other regions and interregional work groups.

In 2014 its Ministry for Financial and Economic Affairs published a structural study called "Industrie 4.0 für Baden-Württemberg". This study concludes that BW already has a high potential in

advanced manufacturing and provides companies with advice on their way towards this “new industry”.

The Ministry has also established a database (“Kompetenzatlas Industrie 4.0 in Baden-Württemberg”) on its website, which lists all the companies, clusters, chambers and associations as well as research institutions, working in this sector. Furthermore, it promoted the establishment of the Allianz Industrie 4.0, which was started in 2015. The aim is to position Baden-Württemberg as a lead provider and lead market for Industry 4.0. The Allianz Industrie 4.0 is comprised of almost 60 partners. Among these are the Ministry itself, networks and clusters (like bwcon Baden-Württemberg Connected, CyberForum, Manufacture BW, Leichtbau BW, Photonics BW), research institutes (like the Fraunhofer institutes IAO, IOSB, IPA, ISI, the Hahn-Schickard-Gesellschaft, Steinbeis), industrial associations (e.g. VDI, VDMA, ZVEI), associat

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### 3.3. Dynamics of the entrepreneurial environment.

Please point out the characteristics of your regional entrepreneurship ecosystem, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals.

To implement this analysis, suitable tools are: statistics on entrepreneurial activities, direct discussion (consultations and interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organizations).

The research infrastructure in BW is very strong: the higher education landscape in BW comprises 9 universities, 5 private higher education institutions, 8 colleges of arts and music, 6 colleges of education, 46 universities of applied sciences, thereof 22 public, and the cooperative state university (Duale Hochschule). The non-higher education sector comprises a large number of public research institutions that are active in the areas of basic and application-oriented research (12 Max-Planck Institutes, 15 institutes of the Fraunhofer Society, 7 institutes of the Gottfried Wilhelm Leibniz Science Association, 2 centres of the Helmholtz Society). In addition, there are almost 70 further institutes fulfilling R&D activities. Baden-Württemberg has about 354,000 students enrolled at the various HEIs mentioned above (2014).

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### 3.4 Smart Specialization Sectors

Please identify 1 - 4 regional entrepreneurship ecosystem knowledge specializations that best fit the innovation potential within RIS3 themes in CERlecon (Agri-food – Digital Growth – Energy – Industrial Modernization). Smart specialisation requires CERlecon partners identify a limited number of priorities. Their implementation will allow the CERlecon stakeholders to strengthen their innovation systems.

Baden-Württemberg (BW) has a long tradition in innovation and manufacturing industry. Besides the automobile many other important innovations originate from there. Building on its long tradition it continues to be one of Germany’s most innovative states and to have a comparatively high share of manufacturing in its overall economy.

Due to the economic importance of the industrial activities and its interest in keeping a leading position, Baden-Württemberg has a special interest in the promotion of advanced manufacturing.

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#### 4.SWOT ANALYSIS

In order to analyze the CERlecon regional entrepreneurship ecosystems and its potential for innovation, please focus on regional strenghts and weaknesses using the SWOT analysis model. Refer to the main contents of the SWOT analysis as follows:

Strengths are advantageous resources in the regional CERlecon entrepreneurship ecosystem capable to improve its innovation system. CERlecon strategy and action plan will be built on strengths;

Weaknesses are limits and faults in the regional entrepreneurship ecosystem that will keep it from improving innovation. CERlecon actions will focus on eliminating weaknesses;

Opportunities are favourable situations in the region’s entrepreneurship ecosystem. CERlecon’s goal is to take advantage of these opportunities;

Threats are unadvantageous and unfavourable situations in the entrepreneurship ecosystem’s environment that damage the CERlecon strategy. CERlecon actions will limit the negative effects of these threats.

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Highly innovative industry</li> <li>• Excellent science and research institutions</li> <li>• Highly advanced innovation system</li> <li>• Internationality</li> <li>• High qualification level of personnel</li> <li>• Excellent cultural and natural landscapes</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Dependency on leading industry sectors</li> <li>• Low enterprise foundation rate</li> <li>• Deficits in technology transfer</li> <li>• Shortage in adequate spaces</li> <li>• Shortage in traffic infrastructure</li> <li>• Shortage in skilled personnel</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Opportunities at technological interfaces by combining industry with cross-sectoral technologies and services</li> <li>• Development from an automotive to a mobility region</li> <li>• New approaches in sustainable urban and regional development, sustainable mobility, environment and renewable energy</li> <li>• Opportunities arising from climate change and limited resources</li> </ul>	<p><b>Risks</b></p> <ul style="list-style-type: none"> <li>• In risk to lose leading position in technological developments</li> <li>• Decreasing innovation activities in SMEs</li> <li>• Increasing shortage in skilled personnel</li> <li>• Shortage in public transport and infrastructure as a potential obstacle for development</li> <li>• Growing prices for raw materials and energy could be seen as risk for the competitiveness in manufacturing SMEs</li> </ul>

The Stuttgart Region shows high strengths in Science, Economy and Public Administration. However in combination with highly densified urban on the one hand and rural areas on the other hand this leads to the challenge of finding the balance between securing an innovative development of the mobility, production and economic region as well as coping with environmental

issues and quality of life. The players in the Stuttgart Region will therefore strengthen their potential in the future development of these subjects.

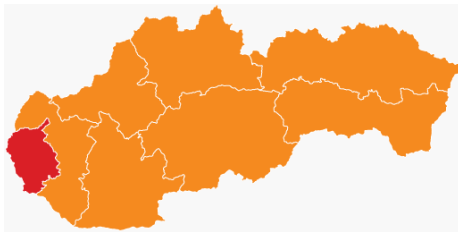
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**CERlecon Region BRATISLAVA REGION SLOVAK REPUBLIC  
CERlecon Regional Ecosystem: Bratislava**

CERlecon Partners Municipality of the Capital of the Slovak Republic Bratislava (PP7)

Slovak Business Agency (PP8) \*\*\*



Regional Ecosystem map



Coat of arms of Bratislava Self-Governing region  
Coat of arms of Bratislava City

region



## CERlecon Regional Ecosystem Evolution

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### 1. General information

1.1 Area: **2 052,6 km<sup>2</sup>** (Bratislava region, 49 036 km<sup>2</sup> Slovakia)

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### 1.2 Population

1.2.1 N. of inhabitants

Bratislava region: **633,288** (December 2015, **Source:** Statistical Office of the Slovak Republic)

Slovakia: **5,432,788** (September 2016, **Source:** Statistical Office of the Slovak Republic)

1.2.2 Population Growth Forecast (Slovakia)

Years	Population Forecast (medium scenario)	Growth Forecast in % (in comparison with 2016)
2020	5,503,107	1.3
2030	5,557,973	1.0
2060	5,344,930	-3.8

**Source:** Infostat, Bleha - Šprocha - Vaňo: Prognóza populačného vývoja Slovenskej republiky do roku 2060, Bratislava 2013

1.2.3 Migration inflow Growth Rate (Slovakia)

#### The number of foreigners with residence permits in Slovakia

	2011	2012	2013	2014	2015
The number of foreigners	66,191	67,877	71,649	76,715	84,787
Growth Rate of the number of foreigners with residence permits in Slovakia	-	2.5%	5.6%	7.1%	10.5%

**Source:** BBAP P PF – Statistical Overview of Legal and Illegal Migration in the Slovak Republic in 2015

#### The number of foreigners of the Non-EU countries with residence permits in Bratislava region

	2011	2012	2013	2014	2015
The number of foreigners of the Non-EU countries	9,395	9,615	10,234	11,944	15,232
Growth Rate of the number of foreigners with residence permits in Bratislava region	-	2.3%	6.4%	16.7%	27.5%

**Source:** BBAP P PF – Statistical Overview of Legal and Illegal Migration in the Slovak Republic

1.2.4 Migrant persons (percentage on population)

### The number of foreigners with residence permits in Slovakia

	2014	2015
Foreigners of the EU countries	47,544	49,526
Foreigners of the Non-EU countries	29,171	35,261
Total foreigners	76,715	84,787
<b>Share of foreigner in total population of SR</b>	<b>1.4%</b>	<b>1.6%</b>

Source: BBAP P PF – Statistical Overview of Legal and Illegal Migration in the Slovak Republic in 2015

### The number of foreigners of the Non-EU countries with residence permits in Bratislava region

	2014	2015
Foreigners of the Non-EU countries in Bratislava region	11,944	15,232
<b>Share of foreigner of the Non-EU countries in total population of Bratislava region</b>	<b>1.9%</b>	<b>2.4%</b>

Source: BBAP P PF – Statistical Overview of Legal and Illegal Migration in the Slovak Republic

#### 1.2.5 Migrants' countries of origin:

### The number of foreigners of the EU countries in Slovakia in 2015

Top nationalities	the number of foreigners	in % of total number of foreigners
Czech Republic	9,927	11.7
Hungary	7,593	9.0
Romania	6,573	7.8

Source: BBAP P PF – Statistical Overview of Legal and Illegal Migration in the Slovak Republic in 2015

### The number of foreigners of the Non-EU countries in Slovakia in 2015

Top nationalities	the number of foreigners	in % of total number of foreigners
Ukraine	10,706	12.6
Serbia	5,528	6.5
Russian Federation	3,532	4.2

Source: BBAP P PF – Statistical Overview of Legal and Illegal Migration in the Slovak Republic in 2015

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## 1.3 Employment

### 1.3.1 Employment rate (Slovakia)

#### Employment rate (15–64) in %

	2011	2012	2013	2014	2015
<b>Employment rate</b>	59.3	59.7	59.9	61.0	62.7

Source: Statistical Office of the Slovak Republic (Methodology of Labour Force Sample Survey)

#### Employment rate (20–64) in Bratislava region in %

	2011	2012	2013	2014	2015
<b>Employment rate in Bratislava region</b>	75.5	75.6	75.0	75.4	76,0

**Source:** Statistical Office of the Slovak Republic (Methodology of Labour Force Sample Survey)

### 1.3.2 Employment rate by gender (Slovakia)

#### Employment rate by gender (15–64) in %

	2011	2012	2013	2014	2015
male	66.1	66.7	66.4	67.7	69.4
female	52.5	52.7	53.3	54.3	55.9

**Source:** Statistical Office of the Slovak Republic (Methodology of Labour Force Sample Survey)

#### Employment rate by gender (20–64) in Bratislava region in %

	2011	2012	2013	2014	2015
male	81.6	81.7	81.1	81.8	82.1
female	69.8	70.0	69.4	69.4	70.4

**Source:** Statistical Office of the Slovak Republic (Methodology of Labour Force Sample Survey)

### 1.3.3 Unemployment rate

#### Unemployment rate in %

	2011	2012	2013	2014	2015
Unemployment rate	13.6	14.0	14.2	13.2	11.5

**Source:** Statistical Office of the Slovak Republic (Methodology of Labour Force Sample Survey)

#### Unemployment rate in Bratislava region in %

	2011	2012	2013	2014	2015
Unemployment rate	5.5	5.9	6.6	6.0	5.9

**Source:** Statistical Office of the Slovak Republic (Methodology of Labour Force Sample Survey)

### 1.3.4 Inactivity rate

#### Economic activity rate

	2011	2012	2013	2014	2015
Economic activity rate in %	58.8	59.2	59.3	59.4	59.7

**Source:** Statistical Office of the Slovak Republic. Inactivity rate is not available

### 1.3.5 Youth unemployment rate (aged 15-24) \_\_\_\_ %,

#### Youth unemployment rate

Age	2011	2012	2013	2014	2015
15-24	33.7	34	33.7	29.7	26.5

**Source:** Statistical Office of the Slovak Republic

## 1.4 GDP

### 1.4.1 Regional GDP per capita

#### Regional GDP per capita in EUR in 2014

Regions	GDP per capita in EUR in 2014
Bratislava	33,895.5
Trnava	15,476.8
Trenčín	12,130.0
Nitra	12,026.6
Žilina	12,079.9
Banská Bystrica	9,962.9
Prešov	8,363.7
Košice	10,930.0
<b>Slovak Republic total</b>	<b>13,944.8</b>

Source: Statistical Office of the Slovak Republic

### 1.4.2 % of national GDP

#### Regional GDP per capita in 2014 as % of national

Regions	GDP per capita in 2014 as % of national
Bratislava	243.1%
Trnava	111.0%
Trenčín	87.0%
Nitra	86.2%
Žilina	86.6%
Banská Bystrica	71.4%
Prešov	60.0%
Košice	78.4%
<b>Slovak Republic total</b>	<b>100.0%</b>

Source: Statistical Office of the Slovak Republic

### 1.4.3 Growth Rate 2016 (national GDP)

#### Percentage change of GDP compared with the same quarter of the previous year in %

	1.Q. 2016	2.Q. 2016	3.Q. 2016
GDP at constant prices non-seasonally adjusted	3.4	3.8	3

Source: Statistical Office of the Slovak Republic

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## 1.5 Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;
- Intermediate (IN), the share of population living in rural local units is between 15% and 50%;

- Predominantly Rural (PR), the share of population living in rural local units is higher than 50%

### Population of active enterprises according to type of regions in 2015

Region Classification	2015
Predominantly urban regions (PU) - Bratislava region	114,452
Intermediate regions (IN) - Trenčín, Žilina, Košice region	178,724
Predominantly rural regions (PR) - (Trnava, Nitra, Banská Bystrica, Prešov)	238,492
<b>Total Slovakia</b>	<b>531,668</b>

Source: SBA on the basis of data from the Register of Organisations of SO SR

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## 1.6 Number of registered enterprise (registered VAT)

1.6.1 Type of businesses: Enterprise size class:

### Number of registered enterprise (with minimum of 1 employee) in 2015

Size category/ employees	(1-9)	(10-49 )	(50-249 )	(250 and over )
<b>Number of enterprises</b>	<b>106,275</b>	<b>12,972</b>	<b>2,839</b>	<b>660</b>
<b>Regional structure of enterprises in %</b>				
Bratislava	24.4%	24.7%	27.9%	32.4%
Trnava	10.0%	10.4%	9.8%	9.2%
Trenčín	9.6%	10.7%	10.9%	12.9%
Nitra	12.1%	11.9%	12.2%	9.4%
Žilina	12.1%	12.3%	12.3%	10.6%
Banská Bystrica	9.7%	8.9%	8.7%	7.4%
Prešov	10.7%	11.3%	9.9%	9.4%
Košice	11.5%	9.8%	8.2%	8.6%

Source: SBA. on the basis of data from the Register of Organisations of SO SR.

Note: Number of VAT registered enterprise according to size categories is not available.

1.6.2 Main regional business sectors (NACE classification)

### Sector structure of enterprises (with minimum of 1 employee) in regions in 2015

Regions	agriculture	industry	construction	trade	services	total
Bratislava	0.8%	6.4%	5.3%	22.1%	65.4%	100.0%
Trnava	3.6%	13.1%	10.2%	24.4%	48.8%	100.0%
Trenčín	2.9%	16.4%	8.4%	30.0%	42.4%	100.0%
Nitra	3.9%	12.8%	8.5%	29.3%	45.6%	100.0%
Žilina	3.4%	12.9%	10.7%	33.0%	40.0%	100.0%
Banská Bystrica	5.2%	11.3%	8.5%	28.1%	47.0%	100.0%
Prešov	4.2%	13.7%	12.3%	26.6%	43.1%	100.0%



Košice	3.4%	10.3%	8.9%	32.9%	44.5%	100.0%
<b>Total</b>	<b>3.0%</b>	<b>11.3%</b>	<b>8.6%</b>	<b>27.5%</b>	<b>49.5%</b>	<b>100.0%</b>

**Source:** SBA on the basis of data from the Register of Organisations of SO SR.

**Note:** Number of VAT registered enterprise according to regions is not available.

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## 1.7 Production

### 1.7.1 Production for national market

#### Production for national market in 2014

	in %
Production for national market	40%

**Source:** SBA, estimated value processed based on data from Eurostat and SO SR

### 1.7.2 Production value

#### Production value

	2014 (in million EURO)
Production value	116,900

**Source:** Eurostat. NACE: B-N\_S95\_X\_K

### 1.7.3 Growth Rate 2016

#### Growth Rate of production value in 2016 in % (January-September)

Selected sectors	in %
Industry	3.5
Construction	-7.8

**Source:** Statistical Office of the Slovak Republic

### 1.7.4 Export production

#### Export production as % of total production in 2014

	in %
Export production (goods and services)	60%

**Source:** SBA, estimated value processed based on data from Eurostat and SO SR

### 1.7.5 Production value

#### Export production (goods and services) in million EURO

	2015	2016Q1	2016Q2
Export production (goods and services)	73,561.8	17,744.4	19,534.2

**Source:** Statistical Office of the Slovak Republic

#### Export production (goods) in million EURO of enterprises in Bratislava region

	2014	2015
Export production (goods)	15,982	16,582

**Source:** SBA on the basis of data Statistical Office of the Slovak Republic

### 1.7.6 Growth Rate 2016

#### Growth Rate of export production (goods and services) in 2016 in %

	2016Q1	2016Q2
Growth Rate	0.3	7.8

Source: Statistical Office of the Slovak Republic

### 1.7.7 Main export areas

Countries	share in %
1. Germany	22.4%
2. Czech Republic	12.4%
3. Poland	8.3%

Source: Statistical Office of the Slovak Republic

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## 1.8 R&D expenditure

### 1.8.1 Regional Total R&D expenditure as a percentage of GDP (all sector)

#### Regional Total R&D expenditure as a percentage of GDP in %

	2010	2011	2012	2013	2014
Bratislava region	1.1	1.24	1.6	1.67	1.48
Western Slovakia	0.44	0.36	0.34	0.34	0.65
Central Slovakia	0.37	0.5	0.64	0.65	0.76
Eastern Slovakia	0.48	0.53	0.65	0.59	0.57

Source: Eurostat

### 1.8.2 Growth Rate

#### Growth Rate of regional R&D expenditure

	2010	2011	2012	2013	2014
Bratislava region	-	16.6%	30.6%	9.4%	-10.3%
Western Slovakia	-	-13.5%	-0.4%	-0.7%	95.0%
Central Slovakia	-	37.5%	32.4%	4.7%	18.7%
Eastern Slovakia	-	17.9%	27.1%	-8.2%	0.1%

Source: Eurostat

### 1.8.3 National total R&D expenditure as a percentage of GDP (all sector)

#### Total R&D expenditure as a percentage of GDP

	2011	2012	2013	2014	2015
Slovakia (in %)	0.66	0.8	0.82	0.88	1.18

Source: Eurostat

#### 1.8.4 Growth Rate

##### Total R&D expenditure in million EURO and Growth Rate

	2011	2012	2013	2014	2015
In million EURO	468.4	585.2	610.9	669.6	927.3
Growth Rate in %		24.9	4.4	9.6	38.5

Source: Eurostat

##### Total R&D expenditure in million EURO and Growth Rate in Bratislava region

	2010	2011	2012	2013	2014
In million EURO	208.2	242.7	317.1	346.9	311.2
Growth Rate in %		16.6	30.6	9.4	-10.3

Source: Eurostat

#### 1.8.5 Researchers as a percentage of persons employed

##### Total researchers as % of total labour force and total employment

	2010	2011	2012	2013	2014
Slovakia (in %)	0.89	0.93	0.93	0.90	0.93

Source: Eurostat

##### Total researchers as % of total labour force and total employment in Bratislava region

	2010	2011	2012	2013	2014
Bratislava region (in %)	3.73	4.05	3.93	3.76	3.62

Source: Eurostat, Percentage of total employment - numerator in head count (HC)

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## 1.9 Labor cost

1.9.1 Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions)

##### Average hourly labour costs (in EURO)

	2012	2013	2014	2015
Slovakia	8.9	9.2	9.7	10.0

Source: Eurostat

1.9.2 Average Monthly Disposable Salary - 40h/week (Net After Tax)

##### Net monthly earnings (in EURO)

	2010	2011	2012	2013	2014	2015
Slovakia	659	665	689	701	740	763

Source: Statistical Office of the Slovak Republic

### Net monthly earnings in Bratislava region (in EURO)

	2010	2011	2012	2013	2014	2015
Bratislava region	861	878	899	902	967	987

**Source:** Statistical Office of the Slovak Republic

1.9.3 Pay Frequency  weekly /  monthly

1.9.4 Cost of Living (please provide information about housing affordability, household final consumption expenditure, comparative prices)

#### Housing affordability

Significantly rising house prices in the 3rd quarter of 2016 were not sufficiently compensated by growth in household income. In the long term the improvement of housing affordability is currently stopped. The reason is mainly stronger growth in housing prices in recent quarters of 2016. This finding also applies to the majority of Slovak regions (**Source:** National bank of Slovakia).

#### Final consumption households

	2011	2012	2013	2014	2015	2016Q1	2016Q2
Growth Rate in %	-0.6%	-0.4%	-0.8%	1.4%	2.2%	2.6%	3.1%

**Source:** Statistical Office of the Slovak Republic

Final consumption of households in Slovakia maintains growth also in the year 2016. In the second quarter 2016 increased by 3.1%. The largest share of total consumption expenditure to represent household spending related to housing (26.5%) and grocery purchases (18.9%).

#### Comparative price level

The price level of Slovak Republic was 66.7% below the EU average according to comparative price levels of final consumption by private households in 2015 (**Source:** Eurostat).

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## 2. Trends:

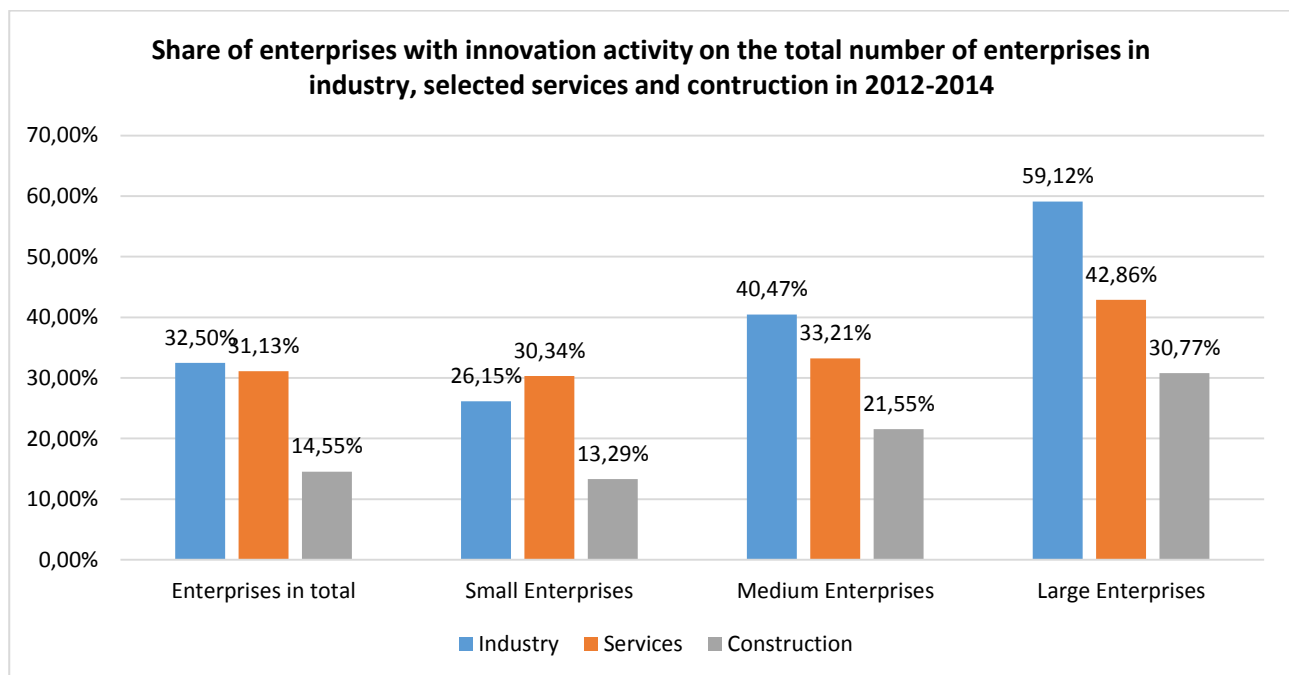
Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental.

### 3.1 Profiles of companies that develop innovations

Enterprises with innovation activity are those that introduced new or significantly improved products to the market or introduced a new or significantly improved process within the enterprise. Further abandoned or on-going innovation activities are also included to this group of enterprises. There were 29.17 % of enterprises with innovation activity in the Slovak Republic during the period 2012-2014. Ability to innovate was higher in the industrial sector (32.50 %) than in the service sector (31.10 %) and construction sector (14.55 %).

The innovation activity of enterprises was proportional to their size. The following figure shows the share of enterprises with innovation activity in total number of enterprises in industry, selected services and construction during the period 2012-2014.

Figure



Source: SLOVSTAT

In comparison with the period 2010-2012, share of innovation active enterprises in the industry sector is mostly almost identical (Enterprises in total increased share by 0.1 %, Small Enterprises increased share by 0.25 %, Medium Enterprises increased share by 1.17 % and Large Enterprises decreased share by 4.68 %). Greater differences were noticed in services and construction sector. In the service sector, Enterprises in total decreased share by 4.67 %, Small Enterprises decreased share by 3.26 %, Medium Enterprises decreased share by 8.19 % and Large Enterprises decreased share by 15.24 %. In the construction sector, Enterprises in total decreased share by 1.56 %, Small Enterprises decreased share by 1.45 %, Medium Enterprises increased share by 1.15 % and Large Enterprises decreased share by 13.67 %.

## 2.2 The impact of innovations on turnover, and the proportion of turnover invested in innovation activities

Turnover in enterprises with innovation activity decreased in comparison with 2012 year by 5.75 mld. EUR to 72.46 mld. EUR in 2014. The total share on overall turnover of all enterprises simultaneously decreased by 2.91 % to 62.56 % in 2014. As we can see from sectoral perspective, turnover in enterprises with innovation activity in the industry sector decreased by 2.76 mld. EUR to 53,41 mld. EUR, in the service sector decreased by 2.41 mld. EUR to 18.00 mld. EUR and in the construction sector decreased by 0.58 mld. EUR to 1.05 mld. EUR. Expenditures of enterprises with innovation activity on innovation are stated in following table.

**Table**

Indicator	2012	2014
<b>Expenditures on innovation (k EUR)</b>		
<i>Enterprises in total</i>	1 374 553	963 760
<i>Industry</i>	1 125 500	697 619
<i>Services</i>	2 570	10 760
<i>Construction</i>	246 482	255 381
<b>Proportion of turnover invested in innovation activities (%)</b>		
<i>Enterprises in total</i>	1,76	1,33
<i>Industry</i>	2,00	1,31
<i>Services</i>	1,21	1,42
<i>Construction</i>	0,16	1,02

Source: SLOVSTAT

## 2.3 Barriers to commercialization of both innovative and non-innovative goods and services

There exists several **barriers to commercialization of both innovative and non-innovative goods and services** according to Innobarometer 2016<sup>4</sup>. Considering Slovakia, enterprises that have introduced innovations agree that major problems regarding commercialization are lack of financial resources (75 %), cost or complexity of meeting regulations or standards (63 %) and domination by established competitors on the market (62 %). Enterprises that have not introduced any innovations agree that major problems regarding commercialization are lack of financial resources (65 %), cost or complexity of meeting regulations or standards (60 %), domination by established competitors on the market (54 %).

## 2.4 Preferred types of public support for the commercialization of goods or services

According to Innobarometer 2016, enterprises that have introduced innovation see following types of **intervention** as the most positive for commercialization of their innovative goods or services: training staff in how to promote and market innovative goods or services (29 %), participating in conferences, trade fairs, and exhibitions (19 %) and accessing or reinforcing online selling (17 %). , Enterprises that have not introduced any innovation see following types of intervention as the most positive for commercialization of their innovative goods or services:

<sup>4</sup> FLASH EUROBAROMETER 433 “Innobarometer 2016 - EU BUSINESS INNOVATION TRENDS”



training staff in how to promote and market innovative goods or services (20 %), meeting regulations or standards (15 %) and accessing or reinforcing online selling (10 %).

## 2.5 The role of design, and the use of advanced manufacturing technologies

**Design does not have a significant position** in activities of enterprises in Slovakia, according to Innobarometer 2016. Only 10 % of enterprises see design as a central element in the enterprise's strategy, 39 % of enterprises do not use design in the company, for 18 % of enterprises is design an integral, but not central element of development work in the enterprise, equally 18% of enterprises does not work systematically with design, 13 % of enterprises use design as last finish, enhancing the appearance and attractiveness of the final product and last 2 % of enterprises do not know exactly describe position of design in their enterprise.

**Use of advanced manufacturing technologies** is available as overall indicator for EU. According to Innobarometer 2016, less than a fifth of manufacturing enterprises use high performance manufacturing or sustainable technologies and less than one fifth of manufacturing enterprises plan to use high performance or sustainable manufacturing technologies. **Enterprises that say design is the central element of their strategy are more likely to have used and plan to use these technologies** in the future compared to those that do not use design. **Innovating enterprises are more likely to have used these technologies** and have further plans to use them, compared with non-innovating enterprises. Enterprises that plan to increase their percentage of investment in innovation are more likely to have used these technologies and to plan to do so in the future compared with those that do not foresee any investment or will keep their proportion of investment unchanged.

## 2.6 Involvement in public procurement and the role innovation plays in this process

According to Innobarometer 2015<sup>5</sup>, since January 2012 more than half of enterprises in Slovakia has never submitted a tender nor investigated opportunities to bid on a public procurement contract (52 %), 20 % of enterprises at least won one public procurement contract, 16 % of enterprises submitted at least one tender for a public procurement contract without success, 7 % of enterprises submitted at least one tender for a public procurement contract and the outcome is unknown, 5 % of enterprises investigated opportunities to bid on one or more public procurement contracts, but have never submitted a tender and last 6 % do not know.

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<sup>5</sup> FLASH EUROBAROMETER 415 "Innobarometer 2015 - THE INNOVATION TRENDS AT EU ENTERPRISES"

### 3. RIS3 Regional potential for innovation - Territorial Smart specialization sectors<sup>6</sup>

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on: 1) regional assets, 2) linkage with other regions, 3) dynamics of the entrepreneurial environment.

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#### 3.1 Regional assets analysis:

##### 3.1.1 Areas of economic specialisation

- Automotive and mechanical engineering industries
- Consumer electronics and electrical equipment
- ICT and Services
- Production and processing of iron and steel

Development trends in the specialization areas of economy

- to increase domestic value-added products, particularly through the effective transfer of technology and R&D results into the production process,
- to develop of production processes in industry focusing on better use of available resources, greater use of recycling materials and environment-friendly materials through the R&D&I development,
- the use, placement and replacement of previously used materials for advanced materials with a new and more complex performance, including technological processing (machining, forming, joining),
- to develop of technological investment units, particularly in the field of engineering, energy and integrated industrial equipment, with respect to the application and use of light metals and advanced materials in the manufacture of transport and construction facility to reduce overall weight and contribute to the green economy (development and application usage of composite materials),
- to develop of technological investment units, particularly in the energy and industrial facilities, with respect to internationalization activities and the development of so-called "Emerging countries",
- to make more efficient the production and logistics processes,
- to use of ICT and robotics in the production processes,
- to involve in supply chains and internationalization - "the purchase of cooperation is also a purchase",
- know-how transfer from large to small subjects and vice versa in the framework of the cooperation,
- energy efficiency and renewable energy.

##### 3.1.2 Prospective areas of specialisation

- Automation, Robotics and Digital Technology,
- Production and processing of plastics,
- Creative industry,

<sup>6</sup> Chapter 3 provided by the Municipality of the Capital of the Slovak Republic Bratislava (PP7)

- Increasing the value of domestic raw material base.

*Development trends in prospective areas of specialization*

- new technologies allowing the transmission, processing and storage of data,
- smart production system,
- smart and industrial transport,
- smart technologies for the intelligent management of smart products consumption,
- technologies and services for the active life and aging, i.e. health care, diagnostics and wellness,
- support of the smart technologies in the field of raw materials processing in regions of their occurrence.

Some identified areas of specialization have partly created conditions for increasing their economic performance and competitiveness through the implementation of R & I activities in cooperation with R & I organizations with infrastructure capacity. To make more efficient their activities it will be needed to complete the necessary structure, mechanisms and linkages which will increase their innovation performance.

3.1.3 Areas of specialisation from the point of view of available scientific and research capacities

- Research of materials and nanotechnology,
- Biomedicine and Biotechnology,
- Environment and agriculture,
- Sustainable energy.

*Development trends based on the available R&I capacities*

- new materials,
- R & I in the field of linking dynamic parts of machines and mechanisms in order to increase the life and performance of devices,
- in the field of plastics it will be realized a research focused on the use of biodegradable plastics in specific applications with reduced burden on the environment after the lifetime,
- R & I in the field of bimetallic welding, electron surfacing and untraditional coupling of components,
- exploration of domestic energy sources, including fossil fuels, uranium, geothermal energy and their use,
- development of technologies for obtaining electricity and heat from renewable sources (water, sun, wind, biomass),
- research in nuclear energy with a focus on safety, storage of spent fuel; research of Generation IV reactors and problems of the nuclear fusion, Slovakia's participation in global projects,
- development of new systems of energy transfer (power cables free of stray electric and magnetic fields).

In Slovakia those prospective areas currently have not established sufficient conditions for the economic revaluation and therefore it will be necessary to complete the links between the research institutes and the business sector as well as the mechanisms of direct economic revaluation.

The positive effect in addressing societal issues will be reached through the support of identified priority areas. The issues are:

- Employment of the young people in varying conditions,
- Population aging and quality of life,
- Marginalized groups and social inclusion,
- Reducing emissions, protection and better use of natural resources (especially water, land and forests)...

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### **3.2 Linkages with the rest of the world and the position of the region within the European and global economy analysis**

Slovak economy achieves a strong position, both in comparison with the Central European economies and with the innovation leaders, only in the area of foreign direct investments and transfer of technologies. Increased arrival of foreign investments into the economy is demonstrated by the high level of a production process where the Slovak economy is ranked relatively well (34th position), when compared with the neighbouring countries.

In the indicator of the nature of competitive advantage the position of Slovakia among the V4 countries is the worst (115th position). From the point of view of this indicator the Slovakia's competitive advantage still depends rather on factors of prices and costs (labour costs, low taxes, tax stimuli and others) than on quality factors (e.g. quality of institutions, education system or national innovation system). There is a risk that after gradual (and naturally expected) depletion of competitive advantages in terms of prices Slovakia will not have any adequate quality factors of economic growth.

#### **3.2.1 Basic trends in development of the Slovak export**

The economy of Slovakia is small and very open. The share of export of products and services in the gross domestic product grew in the 1995-2012 period up to 95.4 %. The openness of our economy has increased especially after 2000 in relation to introduction of economic reforms, global economic growth and position of the Slovak Republic as a future EU member state. Further significant growth appeared after 2005 with arrival of large foreign investors in the sectors of automobile and electronic industries. At present, Slovakia achieves a high rate of integration in global networks of trade in goods and services.

##### **3.2.1.1 EXPORTS OF GOODS**

A competitive advantage of Slovakia in the major export markets (the European Union, China and Russia) can be characterised by indexes of export specialisation. The Balassa index of revealed comparative advantage (RCA1) indicates that, comparing to the EU27, most of the Slovak advantages are concentrated in export of automobiles (RCA = 1.628), consumer electronics (RCA = 5.005), electronic machinery and equipment other than consumer electronics (RCA = 1.131) and iron and steel (RCA = 1.832). Slovakia has a moderate advantage also in export of machinery and equipment (RCA = 1.041).

##### **3.2.1.2 EXPORTS OF SERVICES**

In the 1995-2012, services recorded a relative decrease of importance in the Slovak exports. It is given by growing importance of exports of automobiles and motor vehicles, on one hand, and by stagnation of income growth from export of services in tourism and transport, on the other hand (including incomes from transit of oil and gas).

Slovakia holds a relatively good position and above-average specialisation in the area of computer and information services. The share of these services in total exports of the Slovak services still grows, from 0.37 % in 1996 (first available data) to 8.67 % in 2011. Slovakia was successful in exporting computer and information services to the USA, where as much as one fourth of exports was oriented in the 2008-2011 period.

Further development of information and communication technologies will be supported by implementation of the Strategy for further development of digital services and infrastructure of access network of a new generation in Slovakia. It will create conditions for development of the sector of information and communication technologies through public procurement of technologically developed solutions. The digital economy will directly affect the implementation of the Smart Specialisation Strategy through application of the following measures:

- involvement of the Slovak citizens in building and improving the system (e.g. through ensuring a general access to broadband internet which will enable their effective participation in the single European market),
- effective provision of electronic services to citizens and entrepreneurs,
- gradual transfer of the public administration (eGovernment) to a smart public administration (Smart Government).

### **3.2.2 Position of the most important sectors in the Slovak economy**

Connection of the most important sectors to the domestic production, i.e. helping in development of domestic economic activities of major sub-suppliers, is an important parameter of development of the society showing their connection with the economic and social framework of the country. Only in the case of the sufficient rooting of export-intensive sectors in the structure of economy it is possible to use and develop this potential.

In an ideal case the sectors, to which the country is specialised in export, are (a) lucrative from the point of view of high added value, (b) well rooted in the production structure of economy and (c) linked to other sectors of the national economy.

The main export sectors of the Slovak industry are characterised so far by a high rate of intermediate consumption and low rate of added value (production of motor vehicles 13.8 % in the 2007-2009 period, production of computer, electronic and optical products 13.2 %, production of metals 28.4 %, production of metal structures 38.5 %, production of coke and refined oil products 13.4 %, average level of added value in the Slovak economy 40.7 %). In the monitored period the share of added value in the total production did not grow significantly in any of monitored sectors. In services there was a positive trend in growing importance of export of computer and information services.

In absolute volumes the export is dominated by goods, especially motor vehicles, articles of consumer electronics and metals and metal structures. Input-output analysis for the 2007-2009 period indicates that especially sectors of production of motor vehicles and consumer electronics

are still more and more integrated into the production structures of the Slovak economy, i.e. their complex import intensity is decreasing. Strengthening position of these decisive export sectors in the Slovak economy:

- has positive effects on employment and economic growth,
- reduces risk of economic collapse in the case of departure of important foreign investors from Slovakia,
- contributes to the employment growth.

The analysis of inter-sectoral flows of goods and services indicates that the main export sectors are mutually relatively well interlinked in the framework of networks of suppliers and customers and also to other, medium important sectors (production of rubber and plastics, production of machinery and equipment, production of electric machinery, production of metal articles and structures). This is a traditional example of interlinked complementary functions which are combined in production of complex articles, such as automobiles or consumer electronics.

From the point of view of the smart specialisation it is appropriate to focus on further development of complementary sectors linked to production of automobiles and consumer electronics and increase their added value. Increasing added value can be supported also by the research, especially in the area of metal and non-metal materials. These are priority areas in the field of material research and industrial technologies (transport, machinery, electronics). An important priority is constituted also by information and communication technologies which are still better sold both as a separate article and as a complementary input in production of automobiles and consumer electronics (e.g. navigation software, management systems, communication systems, etc.).

### **3.2.3 Linking the priority sectors to research and knowledge intensive services**

Slovakia belonged in 2011 in the EU27 among the countries with the lowest share of the enterprise research and development in the gross domestic product – only 0.2 % of GDP (EU27: 1.9 % of GDP). Very low enterprise expenses were reflected in Slovakia in very low inputs of research and development in the production of key sectors, both in absolute and relative figures. In the largest Slovak sector – production of motor vehicles – the input of research and development was EUR 20.3 million annually (on average), which is approximately 0.2 % of total inputs in this sector. In absolute values, this input was roughly 10 times lower than in the main competitors of Slovakia in production of automobiles (Czech Republic and Hungary). A slightly better situation of Slovakia was in production of electric machinery and equipment. The average annual input of research and development in the 2007-2009 period was EUR 11.8 million which was the second highest in the region after Hungary. The total input intensity (0.2 % of total inputs) was, however, very low.

As regards inputs of the knowledge-intensive services (sectors NACE J62-63, M69-75), after deduction of research and development services, the input volume of knowledge-intensive services in Slovakia is comparable with the Czech Republic and Hungary. The classes M69 (legal and accounting activities), M70 (management consultancy activities) and M71 (architecture and design) are dominant in all countries compared in inputs into key sectors. When compared to other competitors, Slovakia has higher inputs of services in classes J62-63 (computer and information services). For Slovakia it will not be simple in a short time to get to the level of the Czech Republic and Hungary in expenditures to industrial development and research.



However, Slovakia is relatively competitive in the area of inputs of the knowledge-intensive services for the key economic sectors, especially in the area of production of motor vehicles, consumer electronics, machinery and equipment and metals.

The strengthening position of the sectors has to be supported by implementation of proper mechanisms, especially in the area of research, development and innovative activities.

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### 3.3 Dynamics of the entrepreneurial environment.

Assessing entrepreneurial dynamics in Region:

- Dynamic development of automotive industry (VW and PSA) and IT companies is typical for the BA region
- The construction materials (light metals and polymers) research is important for the automotive industry, the IT development (security (Eset), navigation systems (Sygic), data recognition for manufacturing, transport and marketing processes, the biomolecular research for fast cancer diseases diagnostics

Involvement of entrepreneurial actors in Region:

- The research and academic community is more active than the business community as they lack money
- The large MNC as VW or Siemens are not enough interesting in RIS3 as they make research mostly in their headquarters
- Need to negotiate with MNC headquarters

The innovative SMEs are more interested but they lack any support

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### 3.4 Smart Specialization Sectors

The group of experts from universities, research institutes, industry research institutes, representatives of the industry and industry unions was created for the analysis of the science and research. The expert group formulated three basic groups of the thematic priorities:

- Research and Development priorities
- Technological priorities
- Social priorities

The expert group mainly derived from the data analysis of the international success in projects as an objective criterion which reflects the international competitiveness of the Slovak science and research. The next actions of the group are based on the analysis. With regard to the data concerning international published scientific works as well as existing infrastructure of the research the group identified following 7 themes of the scientific research where there is an assumption for the growth and cooperation with the business practice and solving of urgent social problems:

**Research and Development priorities:**

1. Material research and Nanotechnology
2. Information and Communication technologies
3. Biomedicine and Biotechnology

**Technological priorities:**

4. Industrial technologies
5. Sustainable Energy
6. Environment and Agriculture

**Social priorities:**

7. Selected areas of social sciences (with respect to the most pressing problems of the Slovak society)

3.4.1 Priorities of research and development

- **Material research and nanotechnology** focusing on new materials (especially lightweight structural materials and composites, organic materials, steel and special materials), surface treatment and diagnosis system for applications in the field of the Slovak economic specialization, especially in the automotive industry, mechanical engineering, engineering, electronics, metallurgy, energy. In these fields Slovakia has more than 1 000 researchers, who published almost 30% of all outputs in the international scientific journals.
- **Information and communication technologies** focusing on information and communication systems, including technological process management systems, as well as data mining services and processing of large databases and the safe use of ICT including web technologies and cloud solutions. These fields are the core for the creative industry, which is growing segment of the Slovak export of services for 10 years and currently 40 000 employees work in this segment. Together with business services it represents more than third of the Slovak export of services. This field has a potential for the creation of new small businesses, development of existing firms and the creation of new jobs with high added value. This agenda is crucial for implementing of the digital agenda in Slovakia. Almost 1 300 R&D employees work in the academic institutions with the specialization and 1 500 alumni finish the Master's study in the specialization per year. This segment is the most successful in the FP7 in all research sectors.
- **Biomedicine and Biotechnology** focusing on new diagnostic and therapeutic approaches for cancer, heart disease, blood vessels and brain, endocrine and metabolic disorders, infectious diseases and allergies. In the field of the biotechnology it is an focus on pharmacological and industrial biotechnologies. Almost 2 000 researchers work in the segment and they publish more than fourth of all Slovak publications in international scientific journals. The results are used in the field of the diagnostic, prevention and therapy of diseases in cooperation with three medical faculties.

3.4.2 Technological priorities

- **Industrial technologies** focusing on automation, control, robotics, as well as the technology for forming, cutting and joining of new metallic and non-metallic materials and composites, logistic technologies, processing technologies for polymers, wood and products thereof. Slovakia has about 700 employees in the field, who published more than 10% of all outputs in international scientific journals.
- **Effective usable energy sources** (reduction of the energy intensity, emission reduction program ALEGRO, smart grid technology, the safety of nuclear power plants, etc.). Slovakia has experiences with construction, operation and decommissioning of nuclear power plants. At the same time it also has research and training capacities. It is therefore real priority to ensure energy security of the country and finding new sustainable ways of producing electricity. Slovakia has 350 researchers in the field.
- **Environment, Agriculture, Food security** with a focus on advanced technologies and practices in agriculture and food production to ensure the sufficiency of quality food production. The better utilization of the forests, which cover almost 50% of the Slovak area, is a good chance together with the following processing of wood. Slovakia has about 450 researchers in this field, who produce about 9% of all outputs in international scientific journals.

### 3.4.3 Societal priorities

**Social thematic priorities are specified** with regard to the most pressing problems of the Slovak society with the greatest burden for the Slovak society. Slovakia has a relatively adequate scientific potential in many disciplines of social sciences and humanities. Social thematic priorities are:

- The aging population and quality of life focusing especially on the active aging, health security of aged people including the help in the field of psychical health, social security, elimination of barriers for handicapped and friendly self-government. According to the demographic prospects the Slovak population will be one of the most rapid ageing in Europe. Therefore there is a need to look for better conditions for an active life of aged people and quality of their life.
- **Multiethnicity, social inclusion and poverty problems** of some groups. We will focus on seeking solutions for the groups most affected by the poverty, to identify objective and subjective reasons of the poverty, habits and specifications. The emphasis will be based on long-term sustainable solutions.
- **Employment of young people in the changing conditions.** An employment of young people after finishing their studies and especially their first job are critical factors in the field of education and preparing young people for the job. Due to the high rate of employment it is necessary to look for more efficient ways. Currently, there are many alternatives for the employment of young people, not only an employment contract. Opportunities are also in the field of creative activities and doing own business. Therefore we will focus on the ways to support the employment of young people. Although there is a research capacity, which can handle it, the emphasis will be done on the practical support mechanisms.

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## 4 SWOT ANALYSIS

Characteristics of entrepreneurship ecosystem in Bratislava region and its potential for innovation may be comprehensively summed up by the following SWOT analysis:

<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<p><b>Human capital &amp; education</b></p> <ul style="list-style-type: none"> <li>• Sufficiency of educated human resources in the competitive production sectors</li> <li>• Slovak center of educational institutions</li> <li>• economically active and productive population</li> <li>• High level of employment</li> </ul>	<p><b>Human capital &amp; education</b></p> <ul style="list-style-type: none"> <li>• Educational system is not linked to the practical needs, especially in the area of technical and natural sciences</li> <li>• Insufficient capitalization and protection of intellectual property</li> <li>• Increasing level of youth unemployment</li> </ul>
<p><b>Research, Innovation &amp; transfer of knowledge into practice</b></p> <ul style="list-style-type: none"> <li>• Good results in selected scientific and technological disciplines, with concentrated research teams and workplaces (materials and nanotechnologies, ICT, biomedicine and biotechnologies, industrial technologies, energetics and energy, environment and agriculture, social sciences and humanities),</li> <li>• Slovak center of science and research</li> <li>• Existing business incubators at universities (Slovak university of technology, Comenius university)</li> </ul>	<p><b>Research, Innovation &amp; transfer of knowledge into practice</b></p> <ul style="list-style-type: none"> <li>• Absence of universities with European importance</li> <li>• Insufficient share of own (Slovak) R&amp;I activities in export sectors in Slovakia</li> <li>• Low level of cooperation between academic sector and economic subjects</li> <li>• Low number of efficient R&amp;I employees focused on the practical utilization of the results</li> <li>• Absence of the system and the support of business education and development of creativity in the educational</li> <li>• Lack of financial support for R&amp;I at universities</li> </ul>
<p><b>Clusters, networking &amp; entrepreneurial environment</b></p> <ul style="list-style-type: none"> <li>• Dynamic growth of ICT usage in all business processes</li> <li>• Competitive technological level and production level in export sectors</li> <li>• High concentration of entrepreneurs and firms</li> <li>• High level of GDP per capita in the region</li> </ul>	<p><b>Clusters, networking &amp; entrepreneurial environment</b></p> <ul style="list-style-type: none"> <li>• Absence of the system and the support of business education and development of creativity in the educational process</li> <li>• Insufficient integration of domestic businesses into sub-supplier chains for MNCs</li> <li>• Undercapitalization of businesses associated with low innovation performance, especially SMEs</li> <li>• Low own added value of production of domestic businesses</li> <li>• Barriers for companies to access the infrastructure of public R&amp;I workplaces</li> </ul>
<b>OPPORTUNITIES</b>	<b>THREATS</b>
<p><b>Human capital &amp; education</b></p> <ul style="list-style-type: none"> <li>• Availability of educated professionals (many university graduates)</li> <li>• Support of graduates to work in the region</li> <li>• Support of talents to start their own business</li> <li>• Cross-border labor market</li> </ul>	<p><b>Human capital &amp; education</b></p> <ul style="list-style-type: none"> <li>• Brain-drain abroad</li> <li>• Deteriorating composition of graduates in the educational process.</li> <li>• Missing graduates especially in technical and natural sciences</li> <li>• Imbalance of employees' age structure</li> <li>• Changing population structure with increasing share of population with insufficient quality of education and low professional skills</li> <li>• Persisting educational orientation towards the areas that do not correspond with the needs of the economic practice and knowledge based society</li> </ul>

<p><b>Research, Innovation &amp; transfer of knowledge into practice</b></p> <ul style="list-style-type: none"> <li>• Involvement of young R&amp;I workers in solving practical business problems</li> <li>• Utilizing the potential of networking (enterprises, R&amp;I structures)</li> <li>• Development of social innovations and creative industry</li> <li>• Entry of national innovative firms into global markets</li> <li>• Deepening the dialogue with industry sectors</li> </ul>	<p><b>Research, Innovation &amp; transfer of knowledge into practice</b></p> <ul style="list-style-type: none"> <li>• Unwillingness of businesses to invest in R&amp;I in Slovakia</li> <li>• Inability to cooperate between research and firms</li> <li>• Insufficient support of infrastructure for R&amp;I</li> <li>• Low commercialization of R&amp;I</li> </ul>
<p><b>Clusters, networking &amp; entrepreneurial environment</b></p> <ul style="list-style-type: none"> <li>• Broadening the connection of domestic sub-suppliers to global supplier MNC chains</li> <li>• Motivate the businesses to support the innovations and technological transfers by financial tools (innovation vouchers, venture capital funds)</li> <li>• Deepening the dialogue with academic sectors</li> <li>• Utilizing the potential of networking (enterprises, R&amp;I structures)</li> <li>• Cross-border business space</li> <li>• Cooperation with strong international companies</li> <li>• Support of local products and increasing of local economy</li> <li>• Infrastructure for cooperation of SME</li> <li>• To build a supporting network for SME (hubs, incubators, co-working places, ...)</li> </ul>	<p><b>Clusters, networking &amp; entrepreneurial environment</b></p> <ul style="list-style-type: none"> <li>• Insufficient investments in products and technologies based on knowledge also due to insufficient links between MNC and local R&amp;I infrastructure</li> <li>• The shift of investors into territories with different comparative advantages in comparison to the SR (EU)</li> <li>• Persisting educational orientation towards the areas that do not correspond with the needs of the economic practice and knowledge based society</li> <li>• Complicated administrative processes for start-up entrepreneurs</li> </ul>

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## 5 ISENBERG'S SIX DOMAINS ENTREPRENEURSHIP ANALYSIS

Following analysis scans the regional entrepreneurship ecosystem using the Isenberg six domains indicators as listed hereinafter.

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### 5.1 POLICY

According to the SBA Fact Sheet 2016, Slovakia performs well below the EU average and is among the three worst performing EU countries in the SBA area “**Responsive administration**”<sup>7</sup> and its performance has been stagnating since 2008. The main obstacles faced by Slovak entrepreneurs are in the field of law enforcement, corruption, instability and ambiguity of laws, tax and contribution burden, functioning of tenders etc.

Over the last 12 months Slovakia made some progress on simplifying its tax administration, especially VAT administration<sup>8</sup>.

However, the **general administrative environment remains burdensome**. There are many more SMEs in Slovakia than elsewhere in the EU reporting overly **complex bureaucratic procedures and problems due to fast-changing regulations and policies**. The areas that still require substantial improvement include:

- the efficiency and speed of the services delivered by the ‘Point of Single Contact’ for start-up procedures and other government services should be made more efficient;
- different databases still need to be better connected to ensure the successful application of the ‘once-only’ principle;
- the one-stop-shops dealing with administrative procedures for start-ups do not cover the full spectrum of services to enterprises.

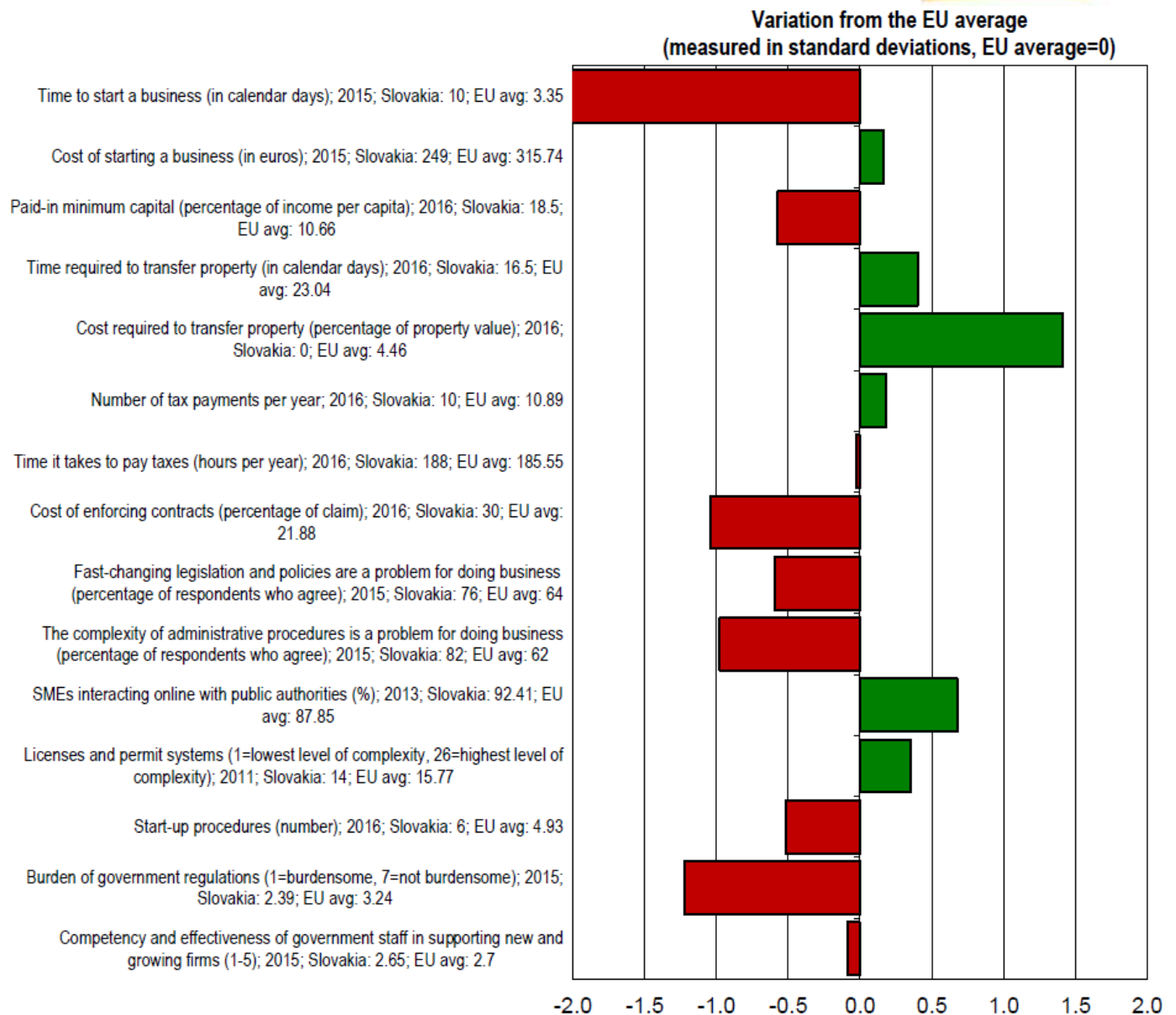
This last issue should be addressed by the launch of the “National Business Centre” that is to provide comprehensive support to entrepreneurship and SMEs under one roof. The first NBC, being prepared by Slovak Business Agency, is established in Bratislava and should start its activities later in 2017.

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<sup>7</sup> SBA Fact Sheet 2016: Slovakia. Available: <http://ec.europa.eu/DocsRoom/documents/20302>

<sup>8</sup> As a result, the number of tax payments has halved from 20 to 10 and the time required for paying taxes dropped from an average 207 to 188 hours.





*Note: Data bars pointing right show better performance than the EU average and data bars pointing left show weaker performance.*

**Source:** SBA Fact Sheet 2016: Slovakia

With regard to start-up conditions the current set-up also needs to be improved, as the complex administrative procedure is affecting start-up activity in Slovakia<sup>9</sup>.

For instance, it is quite difficult for start-ups to hire employees. Their activities are therefore usually being performed by the founders themselves, their relatives or external contractors. Two different approaches can be observed in the field of start-up support. On the one hand government declares its support for start-ups and SMEs (e.g. through micro-loans, mentoring programs). On the other hand it takes measures with negative impact on all entrepreneurs (tax licenses, special VAT-reports, VAT-collateral etc.) as it pursues its aim to fight tax frauds and tax evasions. A coordinator whose aim would be to improve the SMEs ecosystem is missing, too.

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<sup>9</sup> SBA Fact Sheet 2016: Slovakia, p. 8

## 5.2 FINANCE

Sufficient funding opportunities and good access to finance are the very fuel that drive the engine of every entrepreneurship ecosystem. In order to advance, it is thus necessary that such system disposes with good funding for both its supporting infrastructures such as research institutions, training and vocational centers or platforms that facilitate dialogue between stakeholders and for their businesses alike. Although major part of the data that will be given in the forthcoming section applies to Slovakia as a whole, it is particularly relevant to the Bratislava region as the region concentrates more than 50% of the Slovak R&D base which includes innovative companies, research institutions, training and vocational centers, public bodies and agencies in charge of R&D and o.<sup>10</sup>

**Financing of research and innovation** (“R&D”) is the basic premise for the sustainability of economic development and long-term competitiveness of the Bratislava self-governing region and Slovak republic as a whole. In various scientific disciplines Slovak R&D achieves results equaling world standards nevertheless underfunding and brain-drain remain its major problems.

Financing of R&D processes is characterised by predominance of public funding, particularly from the Structural Funds. Gaining a greater amount of financial support from business sources and partnership of the state and public sector and private sector, including SMEs is one of the objectives of the RIS3 SK for the years 2014 – 2020.

In 2015, total expenditure on R&D amounted to 1.19% of GDP, which in absolute terms means an increase in total expenditure of 257 639,98 TEUR, an increase of 38.47%.<sup>11</sup> From the total amount of 927 272,295 TEUR, 35% was public funding, 25% was private funding, 27% were foreign sources and the rest came from higher education and private NGOs.<sup>12</sup>

Bratislava region, being the region spending the biggest amount on the R&D among all 8 Slovak regions, copied this trend in 2015 when from the total amount of 384 880 TEUR almost 38% was public funding, 22% was private funding, 37% of funds came from abroad and the rest were higher institution and private NGOs sources.

One of the main objectives of RIS3 is to support R&D funding from private resources so that the private sector share of the total R&D funding in Slovak republic in 2020 would account for 2/3. Among the initiatives to support the interest of private sector in the R&D are the subsidies for R&D in form of incentives administrated by The Ministry of Education, Science, Research and Sport of the Slovak Republic (“MoE”) or the new type of tax advantage which consists in deducting expenses for R&D from the tax base, the so-called “superdeduction” introduced on 1 January 2015 by an amendment of the Income Tax Act.<sup>13</sup>

**As far as the access to finance for companies** and particularly SMEs is concerned, according to the 2016 SBA Fact Sheet published annually by the European Commission, in absolute terms access to finance conditions in Slovakia improved in 2015, although not as fast as elsewhere in the EU. In particular, access to credit finance improved thanks to a marked increase in the willingness of banks to provide loans. In 2015, only a small minority — 4.3 % of all SMEs — reported a

<sup>10</sup> Innovation strategy of Bratislava self-governing region, BIC Bratislava, spol. s r.o., 2012, p. 7

<sup>11</sup> Report on the state of research and development in the Slovak Republic and its comparison with other countries in 2015; The Ministry of Education, Science, Research and Sport of the Slovak Republic; p. 5

<sup>12</sup> Idem, p. 4

<sup>13</sup> Report on the state of research and development in the Slovak Republic and its comparison with other countries in 2015; The Ministry of Education, Science, Research and Sport of the Slovak Republic; p. 5

deterioration in this respect, down from almost 11 % in 2014. In the same vein, the share of firms citing more difficulties in accessing public financial support instruments dropped, as did the proportion of SMEs complaining about rejected loan applications.

Also, the mark-up costs for small loans compared to those worth more than EUR 1 million fell slightly, from almost 44 % to 42 %. This is still a very significant mark-up for SMEs.

The relatively high share of bad debt losses is a problem for SMEs' cash flow. On the positive side, SMEs in Slovakia get paid faster for their services than their counterparts in the EU.

The situation as regards access to venture capital is mixed. As with all other EU Member States, the availability of equity finance is scarce. Still, there are some positive signs: Slovakia ranks very high in the EU on access to business angel funding for small and growing firms.<sup>14</sup>

A total of 179 SMEs received technological innovation funding from public sources in 2012 – 2014 in Bratislava region.<sup>15</sup>

According to the available data, conditions have not improved since 2008. However, this also holds true for the EU in general.

Since 2008, policy progress on this SBA area has been moderate. The adopted measures, in line with some SBA recommendations, made it possible to create additional sources of funds for innovation investments (e.g. an innovation and technology fund, which made risk capital available to fast-growing companies and export activities). A micro-loans programme has also been set up by the Slovak Business Agency to support SMEs.

However, despite the positive results on business angel funding, Slovakia still lacks a dedicated business angel funds programme and early stage financing sources. Slovakia also still lacks national grants to support start-ups. Furthermore, Slovak SMEs cannot easily access EU-based funds specifically targeting small and medium enterprises.

With regards to the funding and support of innovative SME, the 'Financial vouchers for legal, technological or business partnerships' scheme is an interesting initiative ran by the Slovak Ministry of Finance that the new start-ups can use to take advantage of legal and technological advice or support for business partnerships creation in connection with the protection of intellectual property rights. The vouchers can be used to receive specialised technical advice on patenting products and to buy services related to the protection of intellectual property. Companies cannot use vouchers to buy software equipment, market research, marketing strategies or promotional activities. Vouchers are different for each industry area and will be issued electronically, every 3 months, by the respective sectoral institutions. Vouchers for a specific area can be used by a new start-up only once, but each quarter the start-up may apply for different vouchers in other areas.

The objective of the measure is to support up to 1 000 new start-ups through vouchers with a value of between EUR 3 000 and 8 000 each, and in this way spread overall knowledge on rules in force for intellectual property rights protection. Moreover, by spreading information about the commercial use of intellectual property, the initiative seeks to revitalise industries in the cultural sector, which are heavily dependent on intellectual property. The measure was launched in the second half of

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<sup>14</sup> 2016 SBA Fact Sheet, EC, p. ...

<sup>15</sup> INNOVATION ACTIVITY OF ENTERPRISES IN THE SLOVAK REPUBLIC 2012-2014, Statistical Office of the Slovak Republic, p. 211

2015 and is in the process of being fully implemented. It is a part of a wider initiative to support start-up projects, with an overall budget of EUR 50 million.<sup>16</sup>

Other than the financial initiatives listed above, following table provides overview of some of the other funding opportunities available to start-ups and SMEs in Bratislava City and region:

NAME	TYPE OF FUNDING PROVIDED
<a href="#">RubixLab</a>	Incubator offering seed founding up to 150.000 EUR.
<a href="#">CEED Tech</a>	Consortium of five startup accelerators building and scaling global companies, operating through <a href="#">Booster by The Spot</a> accelerator in Bratislava. Each team accepted to the accelerator will receive initial seed financing in the form of a grant in total of up to €30,000. In addition, the most promising companies with the highest potential business ideas, will receive follow-up funding of €30,000 - 250,000 after the programme. CEED Tech is a project co-funded by the European Commission under the Seventh Framework Programme (2007-2013). All investments made are co-financed by private angels and venture investors with proven track records of cooperation with our accelerators. The private investment will be made in return for 5% to 15% of equity stake in the startup.
<a href="#">LAUNCHER</a>	Startup studio focused on seed and early stage investments and startups in Central Europe.
<a href="#">42angels</a>	Platform providing angel/seed stage financing with added value.
<a href="#">Slovakian business angel network</a>	First network of business angels in Slovak Republic established in 2011. The amount of investment in the project is very variable and depends on many factors such as the amount of the share, the quality of the project, stage of the project and so on. In most cases, however, the amount of investment ranges from €10,000 to €80,000 per project.
<a href="#">Neulogy Ventures</a>	Slovakia-based management company running fully regulated seed and venture capital funds structured along the highest industry standards. Early-stage seed capital investments range from €50K to €200K. Later-stage venture capital investments range from €300K to €1.5 million, with the possibility of multiple rounds of investment per company up to €4.5 million.
<a href="#">Credo Ventures</a>	One of the oldest and biggest Venture Capital funds in the Central Europe, based in Prague, Czech Republic, but active also in Slovakia, providing investment from seed to series B ranging from €50K to €6MM.
<a href="#">Limerock Advisory</a>	Corporate finance and financial advisory services firm. Limerock Fund Manager focuses on attractive small and medium enterprises and provides growth and expansion capital with no buyout element.
<a href="#">Crowdberry</a>	Equity-based crowd funding platform portal, whose essential nature is to link groups of qualified investors, namely known and organised in the investor club, with dynamic business ideas. The overall investment for company seeking capital through Crowdberry ranges from €100 000 to €5 000 000.
<a href="#">G4 Investment</a>	Private club of individual investors looking for space for further investments. Primarily through entering into equity, mezzanine finance, and project finance

<sup>16</sup> 2016 SBA Fact Sheet, EC, p. 15

<a href="#">club</a>	loans. Indicative amount of individual investment on the order of €100.000 to €2mln.
<a href="#">Braun Holding</a>	Investment company focused mainly on looking for opulent investments with future in diverse fields including the segment of sports, culture and very much oriented in philanthropy.
<a href="#">National holding fund</a>	Specialised subsidiary company through which Slovak Business Agency supports growth-oriented business projects by providing venture capital. The long-term mission of the fund is the directing of activities of 7 other individual funds among which are <a href="#">Fund of Innovation and Technology</a> , <a href="#">Slovak Growth Fund</a> or <a href="#">Slovak Growth Capital Fund</a> . Investments range from €20 000 to €2 500 000.

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## 5.3 CULTURE

### 5.3.1 Societal norms

The 6-D Model©, developed by Geert Hofstede provides an overview of the deep drivers of Slovak culture relative to other world cultures. Geert Hofstede defines culture as “the collective programming of the mind distinguishing the members of one group or category of people from others”. The model of national culture consists of six dimensions. The cultural dimensions represent independent preferences for one state of affairs over another that distinguish countries (rather than individuals) from each other.

The scores on the cultural dimensions defined by Geert Hofstede and their interpretations are in the text below.

Scores on the 6-D Model dimensions - Slovakia<sup>17</sup>



### Power Distance

<sup>17</sup> Geert Hofstede: Country comparison. Available: <https://geert-hofstede.com/slovakia.html>



Power Distance is defined as *the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally.*

With a score of 100 points **Slovakia is at the highest end of this dimension** compared to other countries. In societies scoring high on Power Distance **it is perfectly accepted that some people have more power than others.** It is accepted and expected that these people **also use their power.** Not in a negative way but **to create clarity and structure for people around them.** In spite of the very high score on PDI, a manager still has to prove him or herself in order to make people respect and accept decisions from above or the (foreign) headquarter. Visibility and showing results is key.

### Individualism

The fundamental issue addressed by this dimension is *the degree of interdependence a society maintains among its members.*

In Individualist societies people are supposed to look after themselves and their direct family only. In Collectivist societies, people belong to 'in groups' that take care of them in exchange for loyalty.

**Slovakia**, with a score of 52, is right in the middle of this dimension, thus it **points to no clear preference.**

### Masculinity

A high score (Masculine) on this dimension indicates that the society will be driven by competition, achievement and success, with success being defined by the winner / best in field – a value system that starts in school and continues throughout organisational life.

A Feminine society is one where quality of life is the sign of success and standing out from the crowd is not admirable. *The fundamental issue here is what motivates people, wanting to be the best (Masculine) or liking what you do (Feminine).*

**At 100 Slovakia is a strongly Masculine society – highly success oriented and driven.** Status is an important aspect in this, and of course being able to show which status you have. **People work hard to achieve a high living standard and being able to “show their achievements”.** Long working hours and dedication to work are needed in order to achieve this.

### Uncertainty Avoidance

*The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these* is reflected in the score on Uncertainty Avoidance.

With an intermediate score of 51 on this dimension, **Slovakia shows no clear preference.**

### Long Term Orientation

This dimension describes *how every society has to maintain some links with its own past while dealing with the challenges of the present and future,* and societies prioritise these two existential goals differently.

With a high score of 77, it is clear that **Slovakia has a pragmatic culture**. In societies with a pragmatic orientation, people **believe that truth depends very much on situation, context and time**. They show an ability to **adapt traditions easily to changed conditions**, a strong propensity to save and invest thriftiness and perseverance in achieving results.

### Indulgence

This dimension is defined as *the extent to which people try to control their desires and impulses*, based on the way they were raised. Relatively weak control is called "Indulgence" and relatively strong control is called "Restraint". Cultures can, therefore, be described as Indulgent or Restrained.

A low score of 28 on this dimension means that **Slovakia has a culture of Restraint**. Societies with a low score in this dimension have **a tendency to cynicism and pessimism**. Also, in contrast to Indulgent societies, "Restrained societies" **do not put much emphasis on leisure time and control the gratification of their desires**. People with this orientation have the perception that their actions are restrained by social norms and feel that indulging themselves is somewhat wrong.

### Global entrepreneurship monitor<sup>18</sup>

Based on the results of the GEM survey and feedback provided by the stakeholders and experts participating in the regional workshop, instead of facilitating entrepreneurial activity, the **business environment** in Slovakia creates barriers to its development and hinders the entrepreneurial activities of the population.

According to Global Entrepreneurship Monitor ("GEM"), **entrepreneurial activity** of established entrepreneurs in Slovakia is below 5 year average. Entrepreneurial activity is constrained by the high tax burden, administrative complexity, unpredictable legislation and poor law enforcement.

Although **perception of opportunities to start a firm**, as one of the key indicators, shows positive dynamics (26,4% in 2015), Slovakia still lags behind the EU average (36% in 2016), the Visegrad countries or group of countries development of which is based on innovations.

The **attitudes towards entrepreneurship** have not changed in 2015. Entrepreneurship is seen as a good career choice by only 50,8% of the population (in comparison to the EU average - 55,9%). Moreover, the percentage of population agreeing that successful entrepreneurs receive high status in the society is only 64,2% (EU average 66%). The attitudes of the population are partially improved by the increased media attention given to entrepreneurship.

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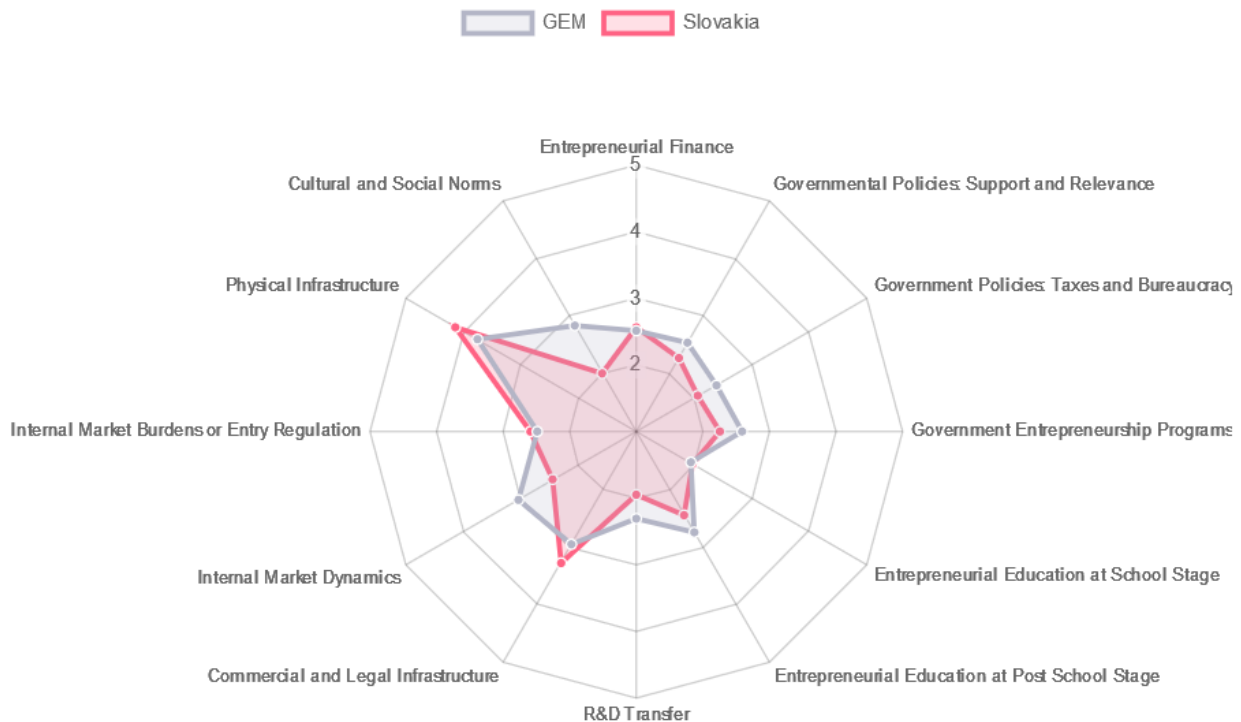
<sup>18</sup> [http://www.sbagency.sk/globalny-monitor-podnikania-gem-rok-2015-na-slovensku#.WH5Uk\\_nhCUI](http://www.sbagency.sk/globalny-monitor-podnikania-gem-rok-2015-na-slovensku#.WH5Uk_nhCUI)



# The Entrepreneurial Ecosystem

Most recent data: 2015

Expert Ratings: 1 = highly insufficient, 5 = highly sufficient



Source: <http://gemconsortium.org/country-profile/106>

On the other hand, the values of indicators “**perceived capabilities rate**” (the percentage of population who believe that they have the required skills and knowledge to start a business) and “**fear of failure rate**” (percentage of population) who indicate that fear of failure would prevent them from setting up a business) showed positive dynamics in 2015 in comparison to the EU average (52,4% vs. 43,1% and 41,4% vs. 44,9% respectively).

The **motivation to start a business** is slightly improved towards doing business because of the opportunity to increase the income and improve economic independence. This reduces the proportion of those who are starting out of necessity. Bratislava region has the highest total of the initial business activity calculated from the five-year average (14.2%) of all Slovak regions.

When it comes to the entrepreneurial activity of the marginalized groups (women, seniors or youth), it was only the group of **young people** (age 18-24) whose entrepreneurial activity was above the EU average. However, the value of the indicator decreased in 2015 by 6% (from 18,2%

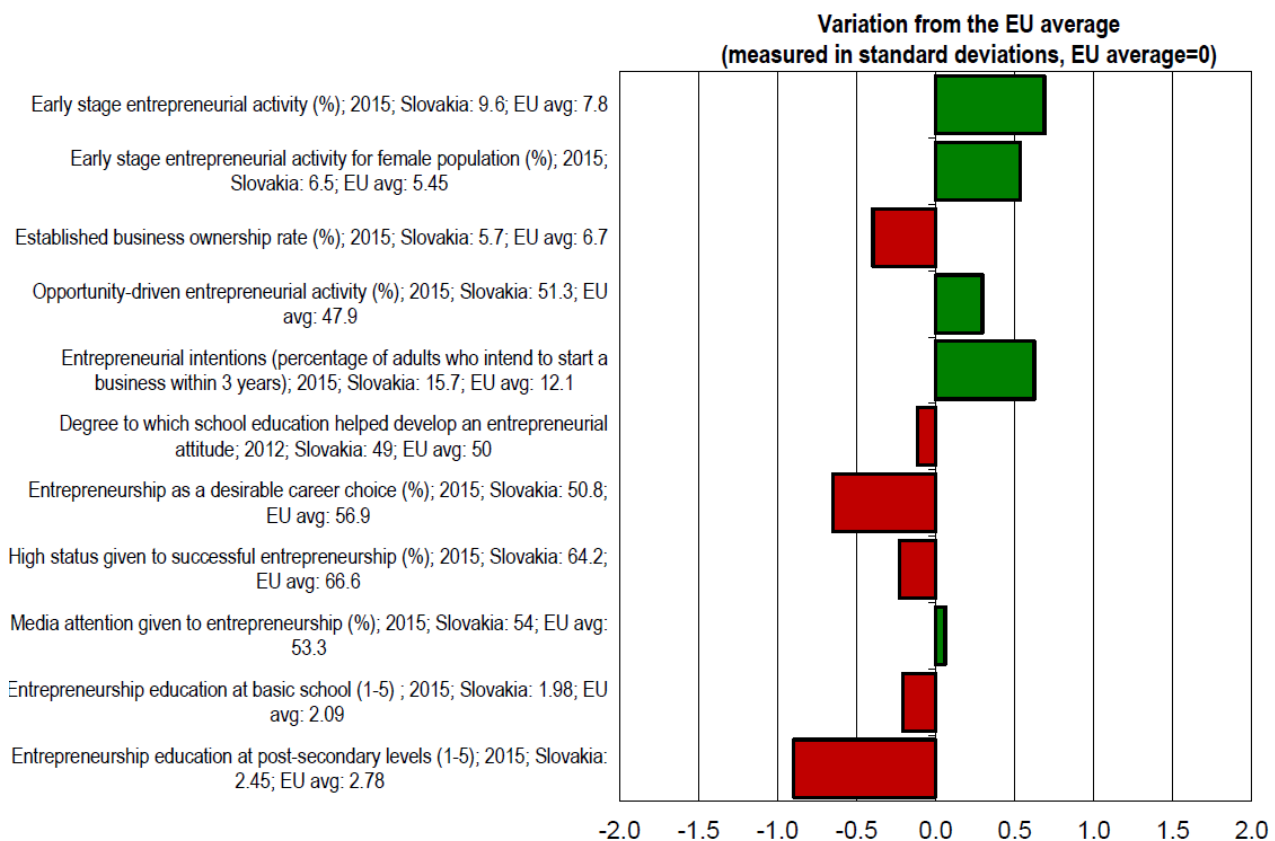
to 12,1%). Regarding the **entrepreneurial activity of women**, the share of early stage female entrepreneurs did not change in 2015 and remains below the EU average (33%).<sup>19</sup>

When it comes to the **future of entrepreneurship**, according another survey realized by the GfK agency for the company Amway in 45 countries around the world on 50 861 respondents, Slovaks are rather pessimistic. The opinion of the majority is that number of entrepreneurs will decline in the future or will remain the same as today. Only 19% of respondents thinks that number of entrepreneurs will rise in 5 years.<sup>20</sup>

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### 5.3.2 Actions implemented in the regional entrepreneurship ecosystem in order to create a conducive culture

According to the SBA Fact Sheet 2016 providing assessment of a Member State's performance in the 10 SBA principles implementation, Slovakia's performance in the priority "Entrepreneurship" is on a par with the EU average. While the level of entrepreneurial activity still hovers above the EU average, **there has been an absence of entrepreneurial dynamism in recent years.**



<sup>19</sup> [http://www.sbagency.sk/globalny-monitor-podnikania-gem-rok-2015-na-slovensku#.WH5Uk\\_nhCUI](http://www.sbagency.sk/globalny-monitor-podnikania-gem-rok-2015-na-slovensku#.WH5Uk_nhCUI)

<sup>20</sup> <http://www.webnoviny.sk/spravy/clanok/1120081-slovaci-su-voci-sukromnemu-podnikaniu-velmi-skepticki/>

As for the indicators assessing the actions to **improve the image of an entrepreneur in the society**, Slovakia has been lagging behind the EU average in all indicators but “The media attention given to entrepreneurship”.

Although a variety of actions implemented in the regional entrepreneurship ecosystem to create a conducive culture have been identified, the **entrepreneurship education indicators** in Slovakia are also below the EU average. While both, the private sector and the public sector entities are important pillars in the regional entrepreneurship ecosystem, due to the lack of a strategy defining frameworks of the regional ecosystem development and coordination among the actors, the efforts often lead to overlapping and inefficiencies. For more information on entrepreneurship education see chapter 5.5.

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## 5.4 SUPPORT

As the most developed and the richest of the 8 Slovak regions, **Bratislava region disposes with the best developed infrastructural and institutional support**, both from public and private sector, for its entrepreneurship ecosystem.

Bratislava region has a well-developed **transport infrastructure** – highways, with about 100km of express ways and 140km of first class roads, connecting it to all its three neighboring states (Austria, Czech Republic and Hungary); railway system; a naval and cargo port (connecting it to Vienna, Budapest and further) and an international airport – making it very attractive not only for domestic but also foreign investors. Bratislava airport is a hub for low-cost provider Ryanair with scheduled flights to 20 destinations. Vienna airport, hub for Austrian Airlines, has a dense network of European and long-haul flights to Asia or North America and is accessible through highway in 40 minutes from the Bratislava city.<sup>21</sup> Most of the European capitals are located within 2 000km and can be reached within 2h of flight. Transport infrastructure is in an ongoing process of widening, amelioration and modernisation and remains one of the priorities of the region. Bratislava region has also well-developed telecommunications infrastructure with the 4g coverage on the most part of its territory.

It is in Bratislava region and the city in particular where entrepreneurs can also benefit from the largest **administrative and technical support** such as legal and accounting services, business counseling and mentoring and coaching. All the top ten largest law firms in Slovakia in 2016 as published by the Slovak spectator are seated in Bratislava with some well-established transnational brands including Allen & Overy, White & Case or Kinstellar.<sup>22</sup> Bratislava also houses the biggest number of accounting, counselling and consulting firms and accommodates the “big four” international players such as PwC, Deloitte, E&Y and KPMG but also enough of smaller companies that may be more accessible for SMEs and start-ups.

Bratislava also has a good infrastructure of both **public and private institutions dedicated specially to business support** activities such as office space, advisory services and financing. Majority of the public institutions, public and private universities and NGOs with the national scope of activities such as Ministries (Economy, Finance, Culture...), public agencies (SBA, Slovak Centre of Scientific and Technical Information,...), universities (University of Economics in

<sup>21</sup> Bratislava Fast Growing MICE hub in Central Europe, The Bratislava Convention Bureau, p.4

<sup>22</sup> <http://spectator.sme.sk/c/20065015/which-are-the-largest-law-firms-in-slovakia.html>

Bratislava, Comenius University, Slovak Technical University,...), private universities or business support associations (Entrepreneur Association of Slovakia, Young Entrepreneurs Association of Slovakia) are located in Bratislava.

Moreover Bratislava offers a range of local and regional public and private initiatives and entities such as coworking spaces, accelerators, hubs and incubators offering both support and funding summarised in the table below (some of them were already mentioned in the chapter 5.2):

Category	Institution	Action
Education	<a href="#">Ministry of the Economy/Slovak Business Agency</a>	<b>'Start-up postgraduate scholarship programme'</b> : students and graduates have access to a start-up postgraduate scholarship programme. They will be exempt from paying related social contributions and will receive a monthly scholarship of EUR 700 over six months. The programme is intended to provide support similar to that provided by many start-up incubators.
	<a href="#">AIESEC</a>	<a href="#">Global Talent Entrepreneur</a> gives young people the opportunity to <b>work and become a part of the</b> dynamic and fast changing <b>world of start-up companies</b> .
	<a href="#">City of Bratislava</a>	<b>Smart Point – mentoring and advisory programme</b> aiming at development of transformative business skills, such as creativity, empathy, design thinking, intuition.
	<a href="#">Junior Achievement Slovensko</a>	Entrepreneurial Skills Pass - <a href="#">ESP</a> is an <b>international qualification</b> that certifies students (15-19 years old), who have had a real entrepreneurship experience, have gained the necessary knowledge, skills and competences to start a business or to be successfully employed. ESP includes a full-year in-school <b>mini-company experience</b> ; a <b>self-assessment</b> of entrepreneurial competences; an <b>examination of business, economic and financial knowledge</b> and the possibility to <b>access further opportunities</b> offered by small and large businesses, top higher institutions and international organisations across Europe.
	<a href="#">Slovak Business Agency</a>	<a href="#">Start-up Sharks</a> - a programme enabling participation of Slovak start-up companies in international start-up events (e.g. Slush, Web Summit) through covering the participants' fees, travel and accommodation costs.
Co-working Spaces, Incubators, Accelerators	<a href="#">BrainHouse</a>	A mix of a coworking space and accelerator.
	<a href="#">Clusterhaus</a>	Startup enrichment center and the largest technology hub in Slovakia.
	<a href="#">Connect Coworking</a>	Coworking offering space and dedicated events and Startup Pirates @Bratislava - an 8 days <b>acceleration program</b> for the entrepreneurs and startups. The programme helped participants to develop their ideas with <b>combination of workshops,</b>

	<p><b>mentoring and intensive team work.</b> On the final day of the program, participants presented their ideas in front of investors, public and jury. The winners received prizes in total value of 20 000€.</p>
<p><a href="#">HUB Bratislava</a></p>	<p>Coworking space offering background and support to all types of clients ranging from new market entrants, startup projects, individual entrepreneurs, short-term projects, business travelers, language schools, small and medium-sized companies to those hustling representative rooms for negotiations.</p>
<p><a href="#">Impact Hub</a></p>	<p>The idea of Impact Incubator is to bring solutions that might have a deeper meaning for the whole community. During the 3-months <b>programme</b> the participants get the <b>basic validation of their market potential, training</b> developing business skills. Impact Hub also helps startups and established projects with the expansion into foreign markets, thanks to their active network worldwide and non-profit organizations to sustainably manage and develop their activities. Focused on social business/Technology for GOOD.</p>
<p><a href="#">INQB</a></p>	<p>The workplace of the Slovakian Technical University in Bratislava, which helps emerging entrepreneurs in the early stages of company development. It focuses on the promotion of technical / technology-oriented innovative ideas. Its aim is to tie science, research and innovation practice. It offers discounted rental office space and a number of additional services, such as various programs, events, consulting services and so on.</p>
<p><a href="#">RubixLab</a></p>	<p><a href="#">Incubation &amp; Acceleration</a> - <b>business incubator focused on technological startups.</b> Their “mission is to source ideas and early stage startups from around the world to join us for 18 months of incubation in the heart of Europe – Bratislava.” Focused on technological start-ups.</p>
<p><a href="#">The Spot</a></p>	<p>Co-working space hosting also start-up events and own <b>accelerator</b> - <a href="#">Booster</a> - identifying unspotted talent and bridging it to global start-up hubs. Run by veteran entrepreneurs and fintech investors based in Bratislava, Slovakia, Booster prepares start-ups for the major fintech league. Focused mainly on fintech, but exceptional candidates covering b2b, SaaS and mobile solutions were accepted.</p>
<p><b>Events</b></p>	<p><a href="#">Start-up weekend</a></p> <p>Startup Weekends are all about <b>learning through the act of creating.</b> Don't just listen to theory, build your own strategy and test it as you go.</p>
	<p>Start-up Camp</p> <p>Monthly meet-ups held in Bratislava, Kosice and Prague - founders, coders, designers and investors can meet. Each camp is a networking event, but there's also an official part involving presentations by successful founders, mentors and consultants, as well as a round of 4-minutes long startup presentations followed by a round of Q&amp;As from the audience.</p>

	<a href="#">TEDx Bratislava:</a>	The multigenre conference TEDxBratislava is a celebration of creativity, ideas worth spreading, innovation and open-mindedness. They give the stage to extraordinary people from Slovakia and other countries, to talk about their ideas, deeds, talents and potential.
	<a href="#">RubixLab</a>	<b>Hackathon</b> hosted by RubixLab in Bratislava an challenge event on a 6-months basis trying to solve current problems. It is for software developers, designers, entrepreneurs, students, academics, corporate people and also anybody with the right motivation. <a href="#">Smart City Hackathon</a> - on a topic – Smart Cities.
<b>Awards/ Competitions</b>	<a href="#">Ministry of Economy/Slovak Innovation and Energy Agency</a>	<a href="#">Innovative action of the year</a> – competition organized to <b>encourage innovation activities</b> . Awards are granted in 4 categories: 1. Product Innovation, 2. Technology Innovation, 3. Service Innovation (non-technology process), 4. International Cooperation
	<a href="#">Neulogy</a>	<a href="#">Start-up awards</a> - the largest startup and innovation event in Slovakia and the most prestigious <b>competition for Slovak early-stage innovative companies</b> . It recognizes top early-stage technology companies in four categories. Focuses on Digital, Science, Art & Design, and Society.
	EY	<a href="#">EY Entrepreneur of the Year</a> – The Entrepreneur Of The Year® (EOY) awards program was created originally in the United States in 1986 to <b>honor entrepreneurs whose ingenuity and perseverance have created and sustained successful, growing business ventures</b> .
	<a href="#">Slovak Business Agency</a>	<a href="#">Businesswoman of Slovakia</a> - The contest was introduced in Slovakia in 1999 for the first time. The main idea of the project is to <b>reward successful women in business</b> and their ability to establish their companies firmly at the market.
	Pontis Foundation	<a href="#">Via Bona Slovakia</a> - Pontis foundation every year awards the prestigious Via Bona Slovakia Award to most inspiring <b>corporate philanthropy and responsible entrepreneurship projects</b> .

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## 5.5 HUMAN CAPITAL

This part of the analysis is focused on the **actions** implemented in the regional entrepreneurship ecosystem in order **to improve relevant human capital** (e.g. encourage entrepreneurship, innovative training programmes for entrepreneurs, employees and unemployed people).

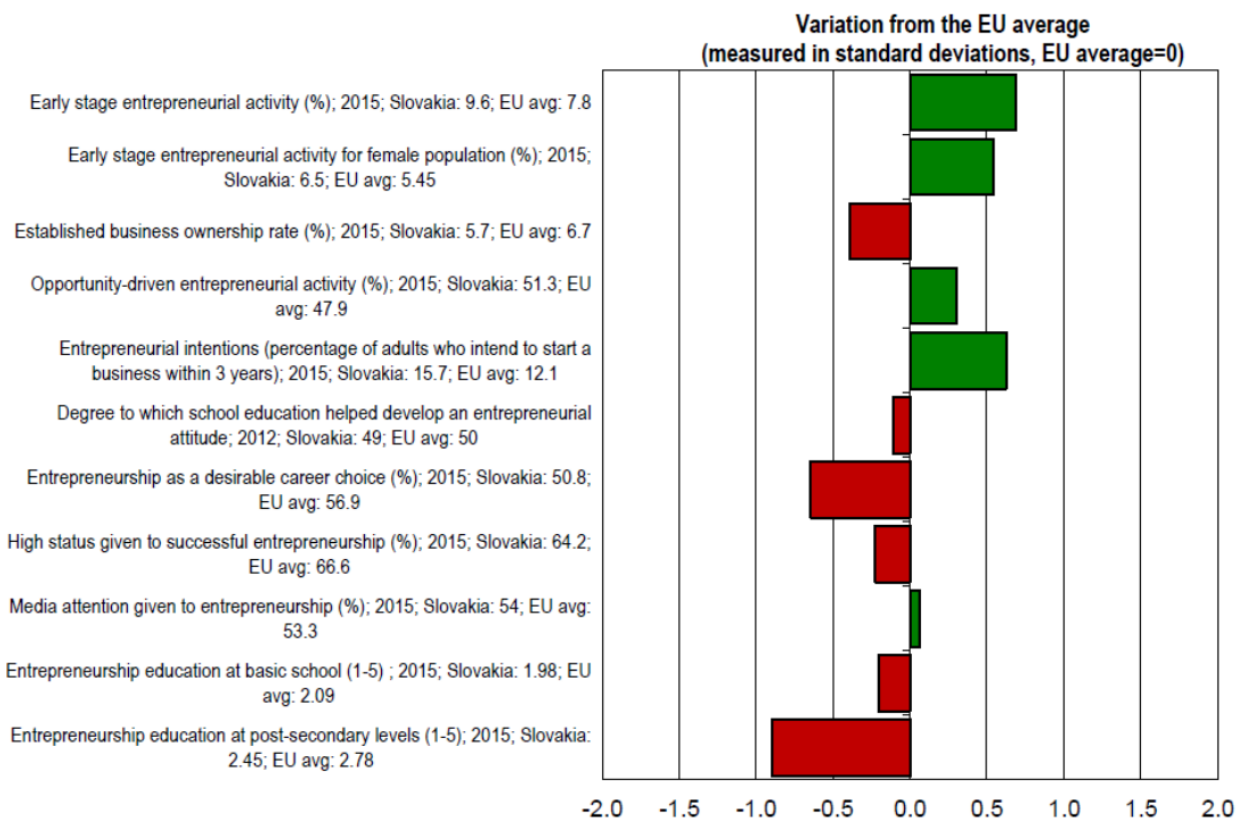
As the information on **regional competitive advantages** (localised know-how and special experiences and skills of regional actors) are provided in chapters 3, 5.3. and 5.4, we provide only an outline of the activity domains where the regional entrepreneurship ecosystem is specialized.



The chapter contains also data on regional R&D investment and R&D activities outcomes (e.g. patent applications). Analysis of the attractiveness of working conditions for researchers and mobility of research and innovation employees between the public and the private sector are mentioned in the last part of the chapter.

### 5.5.1 Actions implemented in the regional entrepreneurship ecosystem in order to encourage entrepreneurship and innovative training programmes for entrepreneurs, employees and unemployed people

Implementation of policies in the field of entrepreneurship education comprised by one of the SBA principles has been assessed annually and published in the SBA Fact Sheet. According to the SBA Fact Sheet 2016<sup>23</sup>, the Slovak government adopted measures targeting some SBA recommendations, e.g. measures to help women, young people and the unemployed create their own businesses. However, entrepreneurship education and training and business transfers have not been significantly addressed through dedicated policies, although a project by the National Institute of Vocational Training supports entrepreneurship education for secondary school



students.

**Source:** SBA Fact Sheet 2016 – Slovakia

Significant measures introduced during 2015 and the first quarter of 2016 include the “Exemption for start-ups from income tax for the first two years of their existence”; “Financial vouchers for

<sup>23</sup> Available: <http://ec.europa.eu/DocsRoom/documents/20302>

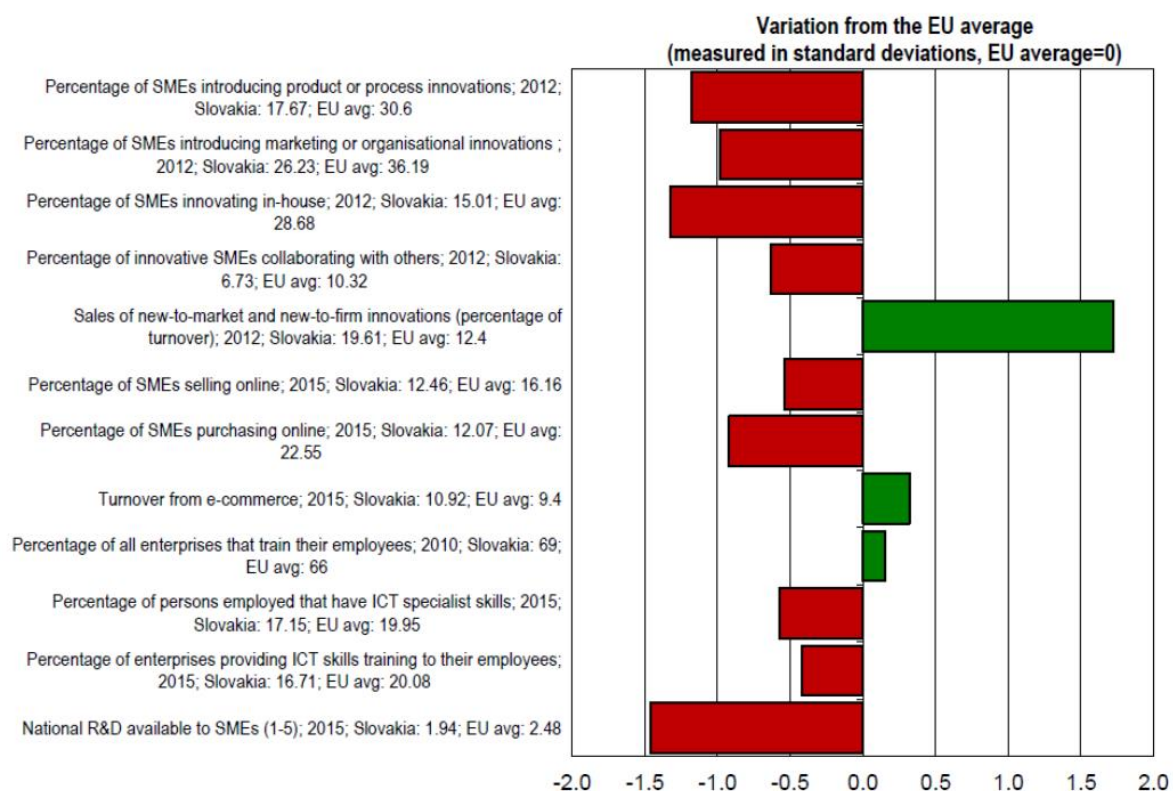


legal, technological or business partnerships” and “**Start-up postgraduate scholarship programme**”.

**In case of innovation and skills development**, Slovakia performs below the EU average. Since 2008 Slovakia, has implemented a limited number of SBA-related measures in this area to stem the negative trends in innovation and skills development. In particular, it has implemented measures to boost research activities in SMEs, promote development and innovation competences and support high-growth innovative companies. The government also continued to implement its innovation vouchers scheme.

**Slovakia has not yet addressed persistent problems on skills development.** There is a lack of an effective network of training providers, which should be available across the entire country to support skills enhancement in all sectors. Slovakia still has no mechanisms to assess the labour market’s needs in order to better shape the vocational training framework and match public demand requirements.

On innovation, **financial support is also inadequate or completely lacking in the areas of proof-of-concept and commercialisation of innovation.**



**Source:** SBA Fact Sheet 2016 – Slovakia

During the reference period, the government introduced two significant measures:

- **A tax deduction for research and development expenses**, which will cover a broad selection of eligible costs, including 25 % of research costs, 25 % of the wages of all newly hired employees in the first year of employment and 25 % of the yearly increases in R&D costs.

- The establishment of **'regional innovation offices'** as part of the national 'Increase of the innovation performance of the Slovak economy' project. To begin with, the offices will be set up in six regions of the country. The main aims of these innovation offices will be to:
  - provide professional consulting services to several target groups, mostly SMEs, in the areas of research, development and innovation;
  - encourage more strategic thinking within overall company planning.

### **Entrepreneurship promotion and education and young people**

The agenda of entrepreneurship promotion and education aimed at young people is divided among several institutions and their organizational units (including public sector, private sector and NGOs/NPOs), which requires effective coordination of their activities, including linking the entrepreneurial education provided by primary, secondary schools, universities and life-long learning programmes with specific advisory programmes for small and medium-sized enterprises and support activities provided to young people.

As a best practice in the entrepreneurial education **the programmes of the association "JA Slovakia"** can be mentioned. The programmes developed under the umbrella of **"The Entrepreneurial School" initiative**<sup>24</sup> reflect needs of schools, labour market and society and in the school year 2016/2017 implementation of JA programs is recommended by the Ministry of Education, Science, Research and Sports of the Slovak Republic.

At the **regional level** there have been **no specific innovative training programmes provided by the public sector identified.**

According to the report<sup>25</sup>, one of the **major challenges** in promotion of business education among young people is the **lack of cooperation among relevant actors**, especially in case of high schools and universities providing study programmes in the field other than economic, business or management.

In order to improve the entrepreneurship education quality, specific **learning outcomes** and **teaching methods** in the field of entrepreneurship should be defined.

As for the **e-learning programmes** that might compensate the insufficient entrepreneurial education at schools, there has been a wide gap identified, especially in case of on-line courses on basic entrepreneurial skills.

Another important aspect of the entrepreneurial culture is the image of entrepreneurs and perception of entrepreneurship as a career option. This could be achieved by **presentation of successful entrepreneurs through the positive impact of entrepreneurship for the society**, e.g. through establishing a network of ambassadors, reality shows about start-ups (such as the "Dragons' Day" in the UK, "Den D" in the Czech republic or "The Apprentice"), more intensive

<sup>24</sup> TES is one of the largest entrepreneurship education initiatives in Europe, co-funded by the European Commission through the Competitiveness and Innovation Programme (CIP). It aims at supporting teachers professional development in applying the entrepreneurial learning in several subjects and learning environments (primary, secondary, upper secondary and vocational schools).

The Entrepreneurial School works on five key areas and the project directly or indirectly addresses all 5: 1. Teachers' continuing professional development and training, 2. Establishing quality supporting frameworks to measure best practice and to evaluate impact, 3. Development of appropriate support structures and activities, 4. Establishing networks between best practices, 5. It will focus on the initial education of teachers and the integration in the curriculum.

<sup>25</sup> [https://www.iuventa.sk/files/documents/4%20iuventa/aktualne\\_dok\\_stranka/som\\_schvalena\\_vladou\\_sr.pdf](https://www.iuventa.sk/files/documents/4%20iuventa/aktualne_dok_stranka/som_schvalena_vladou_sr.pdf)

presentation of entrepreneurship at schools (esp. high schools and universities), providing information on support programmes and services available to young people interested in establishing and/or running a business on the websites of regional actors (schools, regional development agencies, regions).

In addition to the need for coordination in the field of entrepreneurial education, there is also **lack of cooperation among actors in case of support programmes aimed at young people** financed from the public sources.

On the other hand, the actions encouraging entrepreneurship **in the Bratislava region** might include the **activities of the private sector** provided by several spaces providing support to the local start-ups and entrepreneurs, e.g. hubs, co-working spaces or incubator. For more information please see chapter 5.3.

### 5.5.2 Regional competitive advantages

Information on localised know-how and special experiences and skills of regional actors (public and private sector, academia and NGO/NPO) are included in chapter 3 and 5.4.

### 5.5.3 Regional analyses on R&D investment, publications and citations or other data concerning patent applications

According to the “Regional innovation performance (EIS 2014)”, Slovakia belongs to countries where there is variation in regional performance within the country<sup>26</sup>.

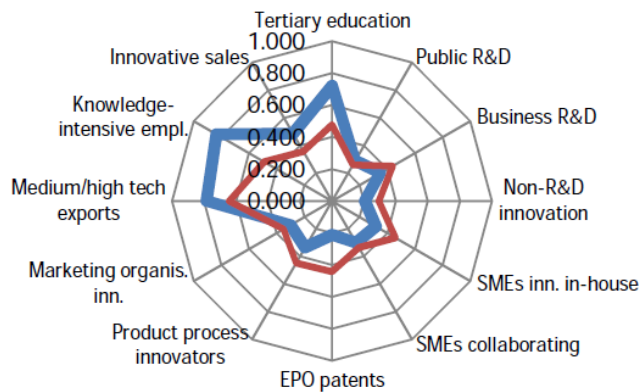
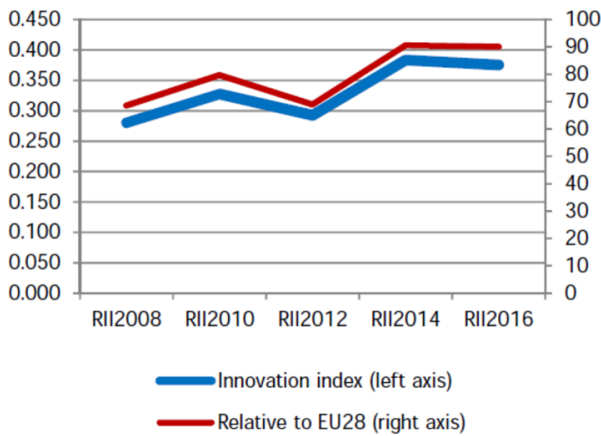
**The region of Bratislavský kraj is a Strong Innovator**<sup>27</sup>. The radar graph shows that relative strengths compared to the EU28 are in Employment in knowledge-intensive industries, Tertiary education attainment, and Sales of new product innovations.

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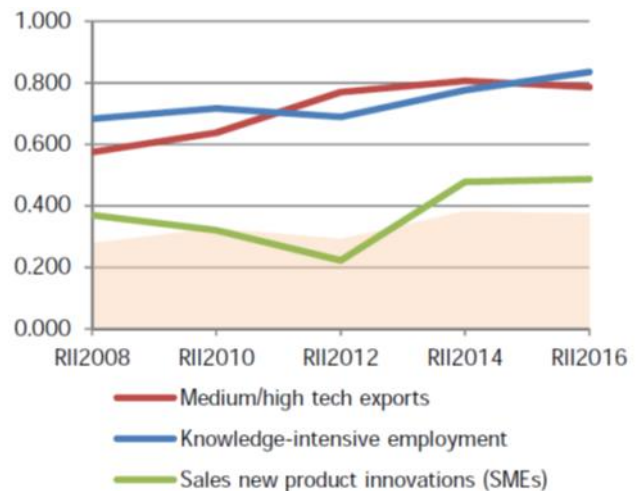
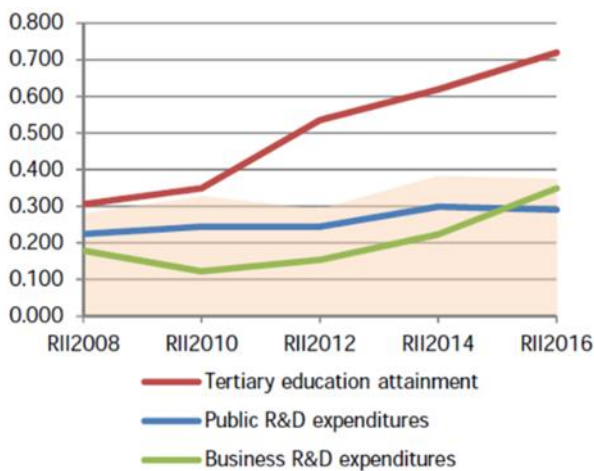
<sup>26</sup> Oslo og Akershus, Vestlandet and Trøndelag in Norway, Piemonte, Friuli- Venezia Giulia and Emilia-Romagna in Italy, País Vasco and Comunidad Foral de Navarra in Spain, Lisboa in Portugal and Bratislavský kraj in Slovakia.

<sup>27</sup> Regional Innovation Scoreboard 2016: <http://ec.europa.eu/DocsRoom/documents/17824>

Bratislavský kraj (SK01) EU28



The **relative strengths** in the regional innovation system (i.e. the indicators which are most above the shaded area showing the region's Regional Innovation Index) are Employment in knowledge

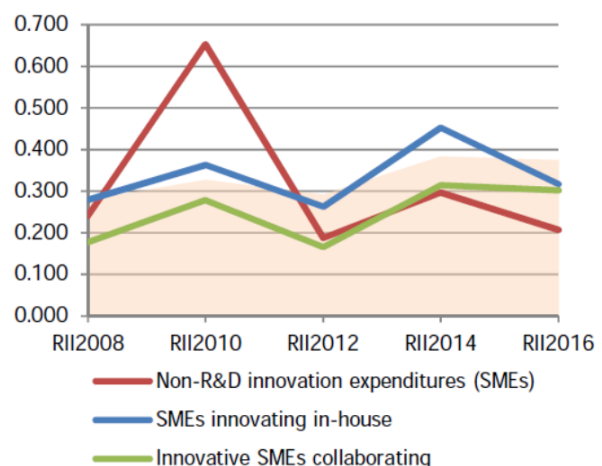


intensive industries, Exports of medium and high tech products, and Tertiary education attainment.

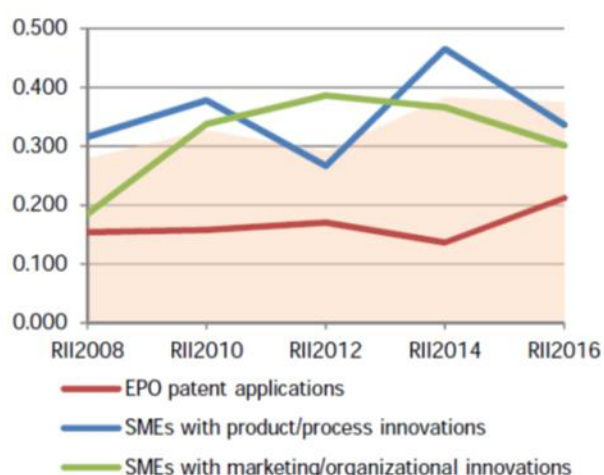
**Relative weaknesses** are in Non-R&D innovation expenditures, EPO patent applications, and Public R&D expenditures.

While the Slovak economy is highly integrated into global value chains, production is concentrated in few sectors and regions. Slovakia is an internationally integrated economy, especially in the lower parts of value chains, as a large share of the car and electronics production is carried out by foreign-owned firms and exported<sup>28</sup>.

These sectors constitute a non-negligible part of domestic output and are concentrated mainly in the Western region.



<sup>28</sup> [http://ec.europa.eu/europe2020/pdf/csr2016/cr2016\\_slovakia](http://ec.europa.eu/europe2020/pdf/csr2016/cr2016_slovakia)



There have been **no major efforts so far to diversify the economy into other industrial sectors and this exposes it to external demand volatility**. Low innovation performance and business spending on R&D inhibit long-term growth prospects.

According to the Report on the state of Research and Development in Slovakia in 2015<sup>29</sup>, The Slovak gross expenditure on research and development (GERD) was €669.6m (0.89% of GDP) in 2014 (2013: €610.9 and 0.83% GDP). The 2014 National Reform Programme for the Slovak Republic set 2020 targets for GERD and the business expenditure on research and development (BERD) to 1.2% and 0.8% respectively<sup>30</sup>. These targets are rather modest, but they seem realistic. There were some significant increases in business research spending since 2008 (albeit from a lower base).

#### Main R&I indicators 2012 – 2014

Indicator	2012	2013	2014	EU average
GDP per capita	13,400	13,600	13,900	27,400
GDP growth rate	1.6	1.4	2.5	1.4
Budget deficit as % of GDP	-4.3	-2.7	-2.7	-3.0
Government debt as % of GDP	52.4	55.0	53.9	86.8
Unemployment rate as percentage of the labour force	14.0	14.2	13.2	10.2
GERD in €m	585.2	610.9	669.6	283,009.4
GERD as % of the GDP	0.81	0.83	0.89	2.03
GERD (EUR per capita)	108.3	112.9	123.6	558.4
Employment in high- and medium-high-technology manufacturing sectors as share of total employment	10.2	9.8	9.4	5.7
Employment in knowledge-intensive service sectors as share of total employment	31.9	32.8	34.0	39.8
Turnover from innovation as % of total turnover	19.6	x	x	11.9 (2012)
Value added of manufacturing as share of total value added	30.0	32.6	x	26.2 (2012)
Value added of high tech manufacturing as share of total value added	2.5	2.1	x	2.5 (2012)

Source: RIO COUNTRY REPORT 2015: Slovak Republic

<sup>29</sup>Report on the state of Research and Development in Slovakia in 2015

<sup>30</sup> Report on the state of Research and Development in Slovakia in 2015: [www.rio.jrc.ec.europa.eu/en/file/9611/download?token=0175Ba7Z](http://www.rio.jrc.ec.europa.eu/en/file/9611/download?token=0175Ba7Z)



In **2015 there has been a significant increase of the R&D expenditures**. However, based on the analysis of financial sources, the share of foreign sources has been raised by 67, 52 %, while the public sector investments have been raised by 11, 82 % and private sector investments by 7, 69 %. Additionally, the growth of R&D investments was **achieved by capital expenditures only** (by 223, 41 % in comparison to 2014), while the **amount of operational expenditures was even reduced**, which means that the **increase in R&D investments was experienced due to the infrastructure development financed by the structural funds**.

Moreover, **the Slovak self-governing regions have no competences in research and higher education, and fairly limited competences in the field of innovation**. If a region wants to support research and innovation, the usual way is to include these items into 'support to regional planning and development'. **Support to human resources (secondary education in particular) is the only important competence Slovak regions have in field of innovation development**<sup>31</sup>.

#### Regional R&D indicators

SK	Region	R&D expenditures public sector	R&D expenditures business sector	Non-R&D innovation expenditures	SMEs innovating in-house	Innovative SMEs collaborating with others
SK01	Bratislavsky kraj	0.290	0.364	0.207	0.317	0.302
SK02	Zapadne Slovensko	0.063	0.169	0.358	0.224	0.205
SK03	Stredne Slovensko	0.170	0.174	0.321	0.196	0.193
SK04	Vychodne Slovensko	0.160	0.160	0.425	0.214	0.162

**Source:** RIS Normalised database 2016 - Slovakia

However, several top R&D Slovak performers are located in the Bratislava region, e.g. several organisational units of the Slovak academy of Sciences, Comenius University in Bratislava, several faculties of the Slovak University of Technology or Slovak Medical University in Bratislava.

Top 10 R&D performers in Slovakia, by 2015 Scimago research output indicator and amount of institutional R&D funding

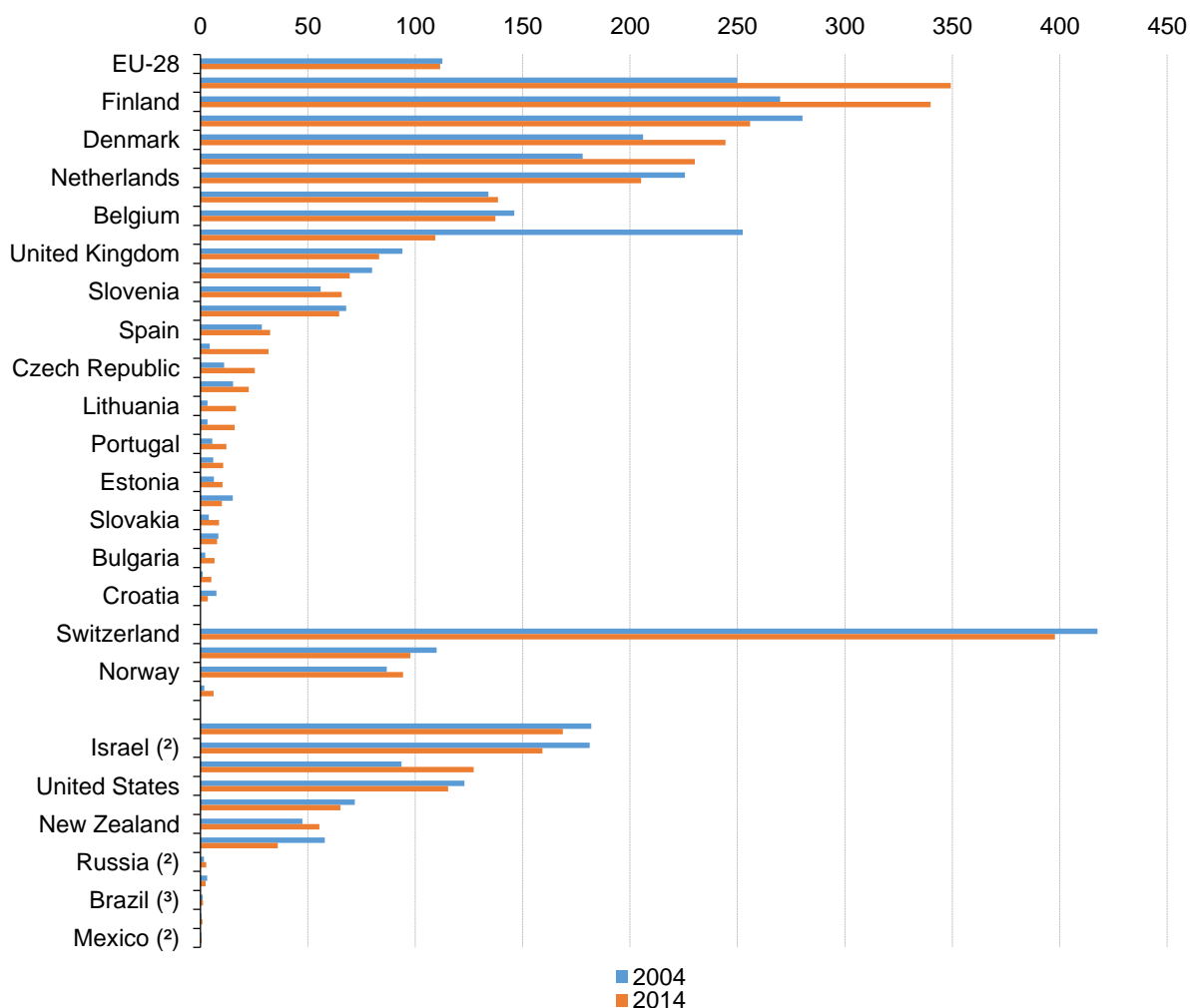
<sup>31</sup> RIO Country report 2015: Slovak republic, p. 22. Available: <https://ec.europa.eu/jrc/en/publication/euro-scientific-and-technical-research-reports/rio-country-report-2015-slovak-republic>

Rank	Institution	Output	Institutional R&D funding (€m)
1	Slovak Academy of Sciences	3.42	58.52
2	Comenius University in Bratislava	2.20	32.01
3	Slovak University of Technology	1.56	22.58
4	Technical University of Kosice	0.88	13.54
5	Pavol Jozef Safarik University in Kosice	0.75	10.50
6	University of Zilina	0.47	10.54
7	Slovak Medical University in Bratislava <sup>(a)</sup>	0.22	n.a.
8	Slovak University of Agriculture in Nitra	0.20	5.86
9	Technical University in Zvolen	0.18	3.16
10	Constantine the Philosopher University in Nitra	0.17	4.82

Source: RIO COUNTRY REPORT 2015: Slovak Republic

Between 2004 and 2014 the number of patent applications filed at the EPO Slovakia was among 21 countries that reported the largest increases of patent applications in relative terms.

Patent applications to the EPO, 2004 and 2014





Source: EUROSTAT<sup>32</sup>

The Slovak Republic underperformed in most publication indicators compared to the EU28 average in 2013. The 2014 Innovation Union Scoreboard indicated that Slovakia produced just 15.7 public-private co-publications per million population in 2011 (EU28: 52.8; CZ: 33.7; HU: 31.2). Low numbers of public-private co-publications refer to low co-operation by public and private research sectors in Slovakia (see chapter 3.3.2 for more details).

### Main publications indicator

Indicator	Slovakia (2013)	EU average (2013)
Number of publications per thousand of population	1.13	1.43
Share of international co-publications	37.4%	36.4%
Number of international publications per thousand of population	0.42	0.52
Percentage of publications in the top 10% most cited publications	5.73 <sup>(a)</sup>	11.29 <sup>(a)</sup>
Share of public-private co-publications	0.7% <sup>(b)</sup>	1.8% <sup>b</sup>

Notes: (a) Average for 2000-2013; (b) average for 2011-2013

Source: RIO COUNTRY REPORT 2015: Slovak Republic

### Attractiveness of working conditions for researchers and mobility of research and innovation employees between the public and the private sector

According to the 2013 ERA Communication Synthesis report, Slovakia belongs to the group of countries with the '**centrally regulated systems in motion**' in Central and Eastern Europe.

The Slovak Higher education Institutions (HEIs) and the Slovak Academy of Sciences (SAS) enjoy **significant academic freedoms** in terms of staffing and setting research/teaching programmes. **Budgets** of the HEIs and SAS, however, **are strictly set by the Ministry of Education, Science, Research and Sport** of the Slovak republic.

While the public support to research is stagnating, the **number of researchers is decreasing**. The Eurostat data indicate there were 14,742 researchers in the full time equivalent in 2014 in Slovakia. The share of researchers in total population was 0.27% in Slovakia, 0.26% in Hungary and 0.34% in the Czech Republic in the same year. Numbers of researchers dropped by 2.9% in Slovakia, but increased by 22.8% in Hungary and 23.3% in the Czech Republic between 2010 and 2014.

Although the Slovak Republic adopted a programme to support the return of Slovak professionals from abroad in July 2015, the **wages in research sector are rather low compared to other sectors of the economy and appear to be unattractive for young and talented researchers**.

<sup>32</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/Patent\\_statistics#Main\\_tables](http://ec.europa.eu/eurostat/statistics-explained/index.php/Patent_statistics#Main_tables)

There were also changes in **sectoral structure of researcher employment** in last 10 years. The HEIs and the business sector accounted for major increases in researcher numbers, while the number of researchers in the government sector (SAS) stagnated in the abovementioned period.

While the country has implemented a number of additional policy measures to stimulate knowledge transfers, these have mainly been focused on physical infrastructure<sup>33</sup>. There has been **less emphasis on improving framework conditions** to create incentives for, and reward academics engaging in, cooperation with industry, or on providing support for the creation and development of spin-off companies. A National Office for Technology Transfer was established and will now work more intensively with offices located within universities. So far, researchers are predominantly evaluated on their publication record and teaching achievements, with the commercialisation of research outputs playing little role in their career advancement.

Despite the recent growth of the Slovak economy and increase in the R&D expenditures, the **inadequate financing and brain-drain remain the major barriers to the development of Slovak R&D sector.**

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## 5.6 MARKET

According to the Regional Innovation Scoreboard 2016 published by the EC, **sales of new product innovations** are one of the relative strengths of the Bratislava region.<sup>34</sup> Given the rather small size of the Bratislava regional market and Slovak market in general, local companies selling new innovative products tend to focus more on foreign markets. Accession of new foreign markets both within and beyond EU borders where regional companies could sell their innovative products is in the successful internationalisation and its support.

According to the 2016 SBA Fact Sheet 2016, Slovakia is performing well below the EU average as far as the **internationalisation** is concerned. The main reason is the extra-EU trading performance of Slovakian SMEs. The proportion of Slovakian SMEs exporting to extra-EU countries is one of the lowest in the EU. The same holds for the SMEs importing from extra-EU sources. Since 2010, these shares have remained stuck at this very low level, despite a fundamentally accommodating administrative trading environment. In terms of the costs and the time required for export and import transactions, Slovakia offers conditions which are very much on a par with the EU in general.

Policy-wise, since 2008 progress on support for internationalisation has been moderate. Slovakia has delivered a policy response to most SBA recommendations in this area, with initiatives stimulating trade and exports, financial support for the internationalisation of SMEs, support for clusters, accelerators and trade organisations.

Other important initiatives launched since 2008 include the 'MISIA 14 — Made in Slovakia' project, launched in September 2013, which aims to increase exports from SMEs and their share in Slovakia's total exports. The 2014-2020 external economic relations strategy adopted in March 2014 aims to establish an efficient export support framework in Slovakia.

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<sup>33</sup> [http://ec.europa.eu/europe2020/pdf/csr2016/cr2016\\_slovakia\\_en.pdf](http://ec.europa.eu/europe2020/pdf/csr2016/cr2016_slovakia_en.pdf)

<sup>34</sup> Regional Innovation Scoreboard 2016 – Slovakia Country Profile, EC, p.1

The National Business Centre, strategic national project of the SBA to be launched in the near future, will serve as an umbrella organisation providing different forms of institutional support (strategic, operational, legal and financial) to all entrepreneurs interested in expanding their business abroad. SBA also performs activities in support of internationalisation through Enterprise Europe Network (“EEN”), being one of the partners of project Business and Innovation Support Services in Slovakia representing EEN in Slovakia that helps to find business foreign business partners from EU member states, or its Start-up program mentioned in the chapter 5.4.

The reference period saw the adoption of the ‘Act on administration, operation and use of the central electronic file information system in the import, export and transit of goods’ (Zákon o správe, prevádzke a používaní informačného systému Centrálny elektronický priečinok pri dovoze, vývoze a tranzite tovaru). The measure allows international traders, forwarders and carriers to handle the paperwork for the movement of goods more quickly and efficiently, reducing the number of required business documents and accelerating their processing through the use of e-services. The Act implements the 2014-2020 external economic relations strategy. This will include the legal basis for e-commerce and the necessary IT infrastructure.

Some activities in support of internationalisation are also offered by other public and private institutions and NGOs listed in the previous chapters.<sup>35</sup>

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<sup>35</sup> 2016 SBA Fact Sheet, EC, p. 1

## CERlecon Region: Adriatic Croatia

CERlecon Partners – Grad Rijeka City of Rijeka PP9

STEP RI znanstveno-tehnološki park Sveučilišta u Rijeci d.o.o. PP10

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### CERlecon Regional Ecosystem Evolution

Please lay out basic facts about regional evolutions of entrepreneurship, employment unemployment and wages in the post war period, including adverse shocks to the regional employment system, how they were adjusted, how wages declined, if new jobs were created to replace those jobs destroyed or if workers moved out. Please provide all informations to better understand the local entrepreneurship<sup>36</sup>.

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#### 1.General informations

1.1 Area 26,7 thousand km<sup>2</sup>

#### 1.2 Population

1.2.1 N. of inhabitants 1,411,935 (2011.)

1.2.2 Population Growth Forecast - 0,1% to - 0,2 % (*Rate per 1 000 inhabitants*)

1.2.3 Migration inflow Growth Rate 0,3% (2001 – 2011)

1.2.4 Migrant persons (percentage on population) 0,10 % (2001 – 2011)

1.2.5 Migrants' countries of origin: (2001 – 2011)

- 1) Bosnia and Herzegovina (41 %),
- 2) Germany (17%),
- 3) Serbia (14%),
- 4) Kosovo (4%)
- 5) Slovenia (2%)
- 6) Other (20%)
- 7) Unknown (2%)

**Source: Croatian Bureau of Statistics, 2011**

**GEO: Adriatic Croatia**

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<sup>36</sup> Olivier Jean Blanchard Massachusetts Institute of Technology and Lawrence F. Katz Harvard University

### 1.3 Employment

1.3.1 Employment rate 54,9%,

1.3.2 Employment rate by gender: women 52% men 57,8%)

1.3.3 Unemployment rate 17%

1.3.4 Inactivity rate 48,7 %.

1.3.5 Youth unemployment rate (aged 15-24) 44,7 %,

**Source: Eurostat, 2016**

**GEO: Adriatic Croatia**

\*\*\*

### 1.4 GDP (ovo imam, ali na poslu)

1.4.1 Regional GDP per capita 15,500 EUR (2014)

1.4.2 31,9 % of national (2014)

1.4.3 Growth Rate 2016: 2,8 %

**Source: Eurostat, 2015**

**GEO: Adriatic Croatia**

\*\*\*

### 1.5 - Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;

**Intermediate (IN), the share of population living in rural local units is between 15% and 50%;**

Predominantly Rural (PR), the share of population living in rural local units is higher than 50%

**Source: Croatian Bureau of Statistics, 2011**

**GEO: Adriatic Croatia**

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### 1.6 Number of registered enterprise (registered VAT) **40511**

1.6.1 - Type of businesses: Enterprise size class:

- 1-49 employees (n. of units) 40.074 - 98,92 % of regional

- 50-249 employees 356 (n. of units) - 0,87% of regional

- 250 and over employees 81 (n. of units) 0,19% of regional

**Source: Croatian Financial Agency (FINA), 2015**

**GEO: Adriatic Croatia**

1.6.2 Main regional business sectors (NACE classification)

Professional, scientific and technical activities, Distributive trades, Manufacturing, Construction

**Source: FINA, 2016**

**GEO: Adriatic Croatia**

\*\*\*

## 1.7 Production\*

1.7.1 Production for national market (54,71%)

1.7.2 Production value 2,178,287,899 EUR

1.7.3 Growth Rate 2016: 4.6%

1.7.4 Export production (45,29%)

1.7.5 Production value 1,803,098,270 EUR

1.7.6 Growth Rate 2016: 2.6 %

1.7.7 Main export areas 1) Oil&Mineral Fuels 2) Industrial Machinery 3) Electrical Machinery

\*Production of industrial products

**Source: Croatian Bureau of Statistics, 2016.**

**GEO: Adriatic Croatia**

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## 1.8 R&D expenditure

1.8.1 Regional Total R&D expenditure as a percentage of GDP (all sector) 0,45%

**Source: Eurostat, 2016**

**GEO: Adriatic Croatia**

1.8.2 Growth Rate: N/A

1.8.3 National total R&D expenditure as a percentage of GDP (all sector) 0,85%

**Source: Eurostat, 2016**

**GEO: Croatia**

1.8.4 Growth Rate: N/A

1.8.5 Researchers as a percentage of persons employed 0,29%

**Source: Eurostat, 2014**

**GEO: Adriatic Croatia**

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## 1.9 Labor cost

1.9.1 - Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions) - 886 EUR

1.9.2 - Average Monthly Disposable Salary - 40h/week (Net After Tax) - 628 EUR

1.9.3 - Pay Frequency  weekly /  monthly

**Source: Fina, 2016.**

**GEO: Adriatic Croatia**

1.9.4 - Cost of Living (please provide information about housing affordability, household final consumption expenditure, comparative prices)

80.8% of the population in Croatia are living in houses and 19.1% in flats. 89,7% of the population are owning their dwelling. 42,1% of the population are living in overcrowded households, 26.3% of the population are living in the households with heavy financial burden due to the housing costs, 34.7% in the households with financial burden due to the housing costs, and 3.6 % in the households without financial burden due to the housing costs. On a scale from 0 ("not satisfied at all") to 10 ("fully satisfied"), Croatian residents aged 16 and over rated their satisfaction with accommodation at 6.9 (EU average 7.5).

Croatia is relatively cheap as compared with the EU average, comparative price level is 65.4. According to the 2014 Household Budget Survey, consumption expenditures amounted to 81 054 kuna (cca 10 793 EUR) per household on average.

**Source: Eurostat, 2015, Croatian Bureau of Statistics, 2015,**

**GEO:Croatia**

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## 2.Trends:

*Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental. Please list main behaviours and trends of the regional entrepreneurship ecosystem as far as innovation related activities are concerned covering the following areas: □ Profiles of companies that develop innovations; □ The impact of innovations on turnover, and the proportion of turnover invested in innovation activities; □ Barriers to commercialization of both innovative and non-innovative goods and services; □ Preferred types of public support for the commercialization of goods or services; □ The role of design, and the use of advanced manufacturing technologies; □ Involvement in public procurement and the role innovation plays in this process.*

The regional entrepreneurship ecosystem, as far as innovation related activities are concerned, is focused mainly in the public sector, where the dominance of the R&D expenditure is, strongly oriented towards fundamental research. Another aspect of the ecosystem is an insufficient collaboration between private and public sector. Universities and R&D companies are rarely seen as sources of information for innovation: only 6.9% of firms in Croatia would turn to universities for innovation. The result is the fact that Croatia has amongst the lowest level of patenting intensity, with approximately 4.26 patents per million populations, in comparison to an EU average of 110. In Adriatic Croatia, the situation is even worse: out of the total number of patent applications of resident applicants in 2014, 27,1% patents were filed by applicants from Adriatic Croatia while the share increased by 5.4 percentage points in 2015.

In contrast to the decline of R&D activities in traditionally large performers, there is a growing niche of innovative, technology-based SMEs. The most innovative sectors, based on the number of patents of Croatian applicants and inventors that were granted by the EPO, are the pharmaceutical, biotechnology, medical and ICT sector (e.g. Jadran Galenski Laboratorij in the Adriatic region).

The highest reported R&D expenditures in Croatia are linked to the following sectors: scientific research and development (33.0%); manufacture of basic pharmaceutical products and pharmaceutical preparations (18.4%); telecommunications (14.0%) and motor vehicles (7%), food (6%), civil engineering (5%) and financial and other services (4%).

The report performed by Deloitte<sup>37</sup> showed that 30% of the questioned companies plan to invest in 2016 more than 10% of their turnover in R&D, which is a slight increase compared to 2015, when only 21% of the companies invested more than 10%.

<sup>37</sup> <https://www2.deloitte.com/hr/hr/pages/about-deloitte/articles/ce-corporate-rnd-2016.html>



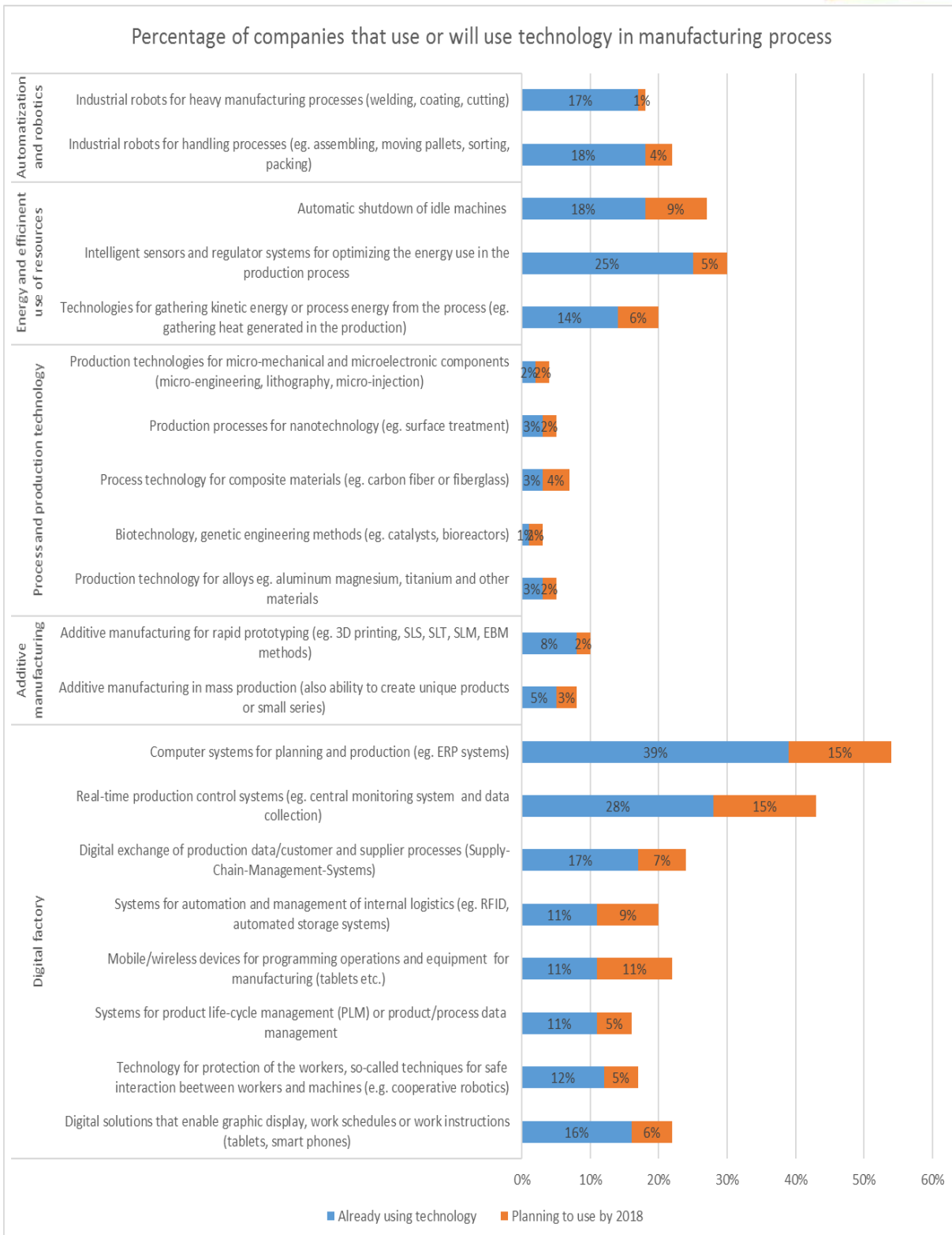
The main identified barrier to innovation and its commercialization is the lack of adequate linkages between research institutions and the business sector. In order to address this issue and to initiate innovation commercialization many supporting institutions have been established in the last few years: science and technology parks (e.g. Step Ri d.o.o.), business and technology incubators/parks (e.g. Inovativni Zadar d.o.o.), development agencies (e.g. IDA Pula), centres of competences (e.g. METRIS) and other institutions aimed at developing new products, services, technology, improving business processes and management models.

Another barrier lies in the fact that activities related to technology or knowledge transfer are not recognized as important. So far, there are no clear guidelines or legal framework regarding spin-off creation by scientists. Several universities in the region such as University of Rijeka and University of Split, are developing their own IPR regulations and guidelines that include incentives for individual scientists to commercialise R&D results through TTOs. The IP protection of research results is important in order to increase number of commercially relevant technologies being licensed by industry and number of new start-ups born out of higher level research. The Government is in the process of addressing this issue.

The research performed by the Faculty of economics Zagreb, Fraunhofer and FSB<sup>38</sup> showed that the majority of the manufacturing companies are lacking behind in the use of advanced technologies (as shown in the picture). There are few of them that are following the global trends and plan to introduce industrial robots until year 2018.

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<sup>38</sup> [http://web.efzg.hr/dok/OIM/jprester/hzz%202014/2016/Doprinos%20BDP%2001042016\\_8%20Maja%20izmijene.pdf](http://web.efzg.hr/dok/OIM/jprester/hzz%202014/2016/Doprinos%20BDP%2001042016_8%20Maja%20izmijene.pdf)



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### 3. RIS3 Regional potential for innovation - Territorial Smart specialization sectors

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on: 1) regional assets, 2) linkage with other regions, 3) dynamics of the entrepreneurial environment.

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### **3.1. Regional assets analysis:**

*According to the regional specificities, identify the main regional ecosystem assets, and also any bottlenecks of the innovation system and key challenges both for the economy and the society.*

*To implement this analysis, suitable tools are: regional profiling studies, targeted surveys and expert assessments.*

The Croatian enterprise sector in 2015 numbered 106 569 registered enterprises, of which only 38,5% are in Adriatic Croatia. The distribution of the number of firms, employment and value added across firm size is similar in Adriatic Croatia to the other EU regions. Small and medium-sized enterprises (SMEs) account for over 99% of firms. SMEs are less productive than their counterparts in Croatia and elsewhere in the EU, especially in traditional SME-relevant sectors such as construction and tourism, but also in high-tech manufacturing and knowledge-intensive services.

The regional economic activity is currently dominated by service industries, mainly focused on four activities: wholesale and retail; professional, scientific and engineering activities; construction and tourism. Most manufacturing employment is in low and medium-low technology and it has the lowest share of high-technology manufacturing employment.

Production of pharmaceuticals is one of the leading manufacturing sectors in terms of technological sophistication, R&D investments, export orientation and profit. Another important part of the manufacturing sector is the automotive industry which is based on a very diversified range of products and on inherited expertise and a strong tradition in the various sectors providing support to the automotive components manufacturing such as metal processing and metal tool production, plastic product manufacturing, glass product manufacturing and textiles. The majority of the manufacturing facilities are located in Istria and Split-Dalmatia counties.

The shipbuilding sector has its importance for the overall manufacturing production and export. The majority of the total revenues is created by a small number of high value ships manufactured by a few large shipyards in Adriatic Croatia: Brodosplit Shipyard Ltd., Shipbuilding industry 3 Maj Inc. and shipyard Uljanik Inc.

The Information and communications technology (ICT) industry has been also another source of major productivity gains high due to global demand trends and the integration of ICT in other economic activities. The main representatives of this industry are situated in Pula and in Rijeka (e.g. Infobip Ltd).

In the wood processing industry, RDI capacity is mainly concentrated in larger companies whose departments are mostly concerned with finding innovative solutions for the modernisation of production (mostly through application of robotic devices and new ICT solutions, i.e. 3D printers), automation of the production processes, application of new materials for surface treatment (coating, oil, etc.) and sustainable wood production. The wood processing industry closely cooperates and exchanges knowledge about Innovation Policy with other CE European countries, primarily Italy (Wood Technological Institutes Cosmo Pesaro and Cates Udine) and the German wood sector (particularly in the Federal State of Bavaria). The importance of this process is recognized at the strategic level, and now it is important to establish closer cooperation with their official bodies and organizations in order to continue the process of know-how transfer.

Another main asset in the region is the human capital which shows an above average performance in New doctorate graduates and Youth with upper secondary level education but is behind in the number of students and graduates in mathematics, science and engineering. There is also a low share of tertiary educated workforce and low rate of employment among tertiary graduates. This results in a lack of qualified personnel in the workforce as an important constraint on innovation.

The main business related infrastructure consists of the economic zones (manufacturing and business) and the supporting institutions such as: chambers of commerce, regional development agencies, startup incubators, business centers, science and technology parks, technology incubators, foundations and local action groups.

The weakest performing asset is the research system and the intellectual assets. The ratio of new businesses to the total number of businesses (firm birth rate) is an indicator that may be suggestive of the region's entrepreneurial potential. Nevertheless, the innovation system is still operating below its potential, whether measured by the system's inputs, outputs or by the contribution of innovation to economic growth. The bottleneck of the innovation system is the lack of cooperation between the public R&D centers and the business sector, the lack of the necessary culture for RDI investments in the business sector, tax regime, lack of early stage financing and low technological capabilities.

The key challenges both for the economy and the society are to create and implement measures and interventions focused on productivity increase, technology upgrading and diversification that are going to increase the potential of the region to generate growth.

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### **3.2. Linkages with the rest of the world and the position of the region within the European and global economy analysis**

*Please make a comparisons with the other CERlecon and European regions in order to outline possible linkages and to better accede to RIS3 assessment of existing local regional innovative advantages. International value chains in this respect are a crucial element to be considered. This analysis will prevent "blind' duplication of investments" already done in other European regions, averting from an excessive fragmentation of investments that could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration with other CERlecon entrepreneurship ecosystems should be pursued whenever similarities or complementarities with other regions are detected.*

*To implement this analysis, suitable tools are: comparative studies, rounds of interviews with other regions and interregional work groups.*

The RIS3 assessment processes in Croatia resulted with a selection of 5 thematic priority areas with relevant technological and production fields: (1) Health and quality of life, (2) Energy and sustainable environment, (3) Transport and mobility, (4) Security and (5) Food and bio-economy. Additionally, Croatia has identified two cross-cutting themes able to create the biggest added value and foster the emergence of new economic activities, rising of the productivity of the Croatian economy and the creation of new and sustainable job opportunities. Cross-cutting themes are KETs and ICT.

Considering the TPAs and national level and the existing regional innovative advantages the Adriatic Croatia focuses on:

- Health industry which is characterized as high technology and export-oriented sector and one of the major contributors to the economic growth of the region. In 2013 a health cluster was established (gathering 14 private companies, 13 research institutions and 3 representatives of local and regional authorities). This sector deals with tackling societal challenges such as an ageing population, chronic diseases and an increase of healthcare expenditures through optimization of current health service and processes and development of new health services and new methods of preventive medicine and diagnostics. Market size and future opportunities are very high in this sector.

There are other CERlecon regions that focus on human health and that have identified similar regional innovation advantages: Germany (combating common illnesses, individualized medicine, prevention and nutrition, innovative care, research on active substances & innovative medical technology), Poland (medical diagnosis and treatment of lifestyle diseases and personalized medicine), Italy (advanced solutions for prevention, diagnostics, therapy, telemedicine and assistance, improvement of life quality, innovative medical technology) and Czech Republic (healthcare and medical technology and devices).

- ICT sector which represents one of the key factors of the economic and social development, taking into consideration employees' skills, technology level, value added, business performance, high BERD values, share in GDP, increasing export orientation and growth potential.

ICT is recognized as an important sector for innovation in all the CERlecon regions but the focus differs: Germany - industry 4.0, smart services, smart data, cloud computing, digital networks, digital science, digital education & digital life worlds; Slovakia – ICT and services such as computer programming, consultancy & related services; Austria – embedded systems, micro-electronics, visual computing, semantic systems, quantum informatics, opto-electronics; Czech Republic – ICT, automatization and electronics; Poland – smart networks and geo-information technologies, optoelectronic systems and materials, automation and robotics processes.

- Biotechnology & Pharmaceuticals (together with ICT) which represent financially the strongest R&D sectors clearly signaling which technology sectors are the most promising in the region. The market is characterized by one big producer (JGL) that has a significant share of the annual turnover and export, holds a dominant position on the market and is the leading generic company in Eastern Europe. They produce nutraceuticals, including herbal products, specific diets and processed foods such as cereals, soups and beverages and dietary supplements. Apart from the Adriatic Croatia that gives special relevance to this sector, Italy is also focusing on the biotechnology and pharmaceuticals (especially green chemistry). Poland has recognized its potential in the production of basic pharmaceutical products & pharmaceutical preparations.
- Transport and mobility sector, characterized by long tradition in production and is made of export-oriented sectors (metal, plastic, electrical and ICT sector for automotive, rail vehicle and maritime applications) and knowledge intensive service sector (logistics). Croatian companies dealing with the production of automotive parts have a tradition in high-precision

manufacturing with zero tolerance for breakdowns and the main competitive advantage is the excellent quality of their products. Over three quarters, the added value in the automotive industry is realized in the production of components for installation and activities related to the development of vehicles and related processes. There is also a shipbuilding sector focused on innovative design procedures, technologies and materials on specialized and high value ships.

There are other CERlecon regions that focus on transport and mobility and that have identified similar regional innovation advantages: Germany (intelligent traffic infrastructure, innovative mobility concepts and networks, e-mobility, automotive technologies, aeronautics & maritime technologies), Italy (naval components, smart manufacturing, advanced sensors, shipbuilding and ship repairing), Slovakia (automotive & mechanical engineering industries), Austria (transporting and storage), Czech Republic (automotive, aerospace, including ecosystem of supplying and supporting industries) and Poland (environmentally friendly transport solutions).

- The food industry which is characterized by the sustainable food production and processing focused mainly on fishery (both marine and freshwater). The fishing industry includes sea fishing, fish farming and producers of fish feed - the entire value chain from 'sea to table'. Food processing companies mainly rely on fishery production and are relatively competitive. Apart from large companies as Cromaris Ltd., there are many developed and growing SMEs and private farms that are creating a network of successful food producers dealing with production and processing of confectionery products such as milk and cheese, baked goods, beer production, processing of tea and coffee and the production of soft drinks.

There are other CERlecon regions that focus on the food industry and that have identified similar regional innovation advantages: Italy (smart agrifood, sustainable living, advanced manufacturing) and Poland (healthy food from the aspect of high quality and performance of production).

In comparison with other CERlecon regions the R&D in the business sector is almost entirely performed by a few large companies in the pharmaceutical, telecommunications, agricultural, and food and beverage industries. The overall R&D intensity of the country is 1.17% (6th place in EU27). In that respect, Croatia is close to Netherlands and Austria, and above Spain, France, and Italy. However, the R&D intensity of small firms is low at 0.34% (16th place), and that of large firms is high 1.98% (4th position), whereas for medium-sized firms it reaches only 0.16% (21st place, Figure 13). This suggest that the R&D intensity of Croatian business sector is largely confined on a few R&D intensive firms while the rest of business sector has very low R&D intensity.

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### 3.3. Dynamics of the entrepreneurial environment.

*Please point out the characteristics of your regional entrepreneurship ecosystem, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals.*

*To implement this analysis, suitable tools are: statistics on entrepreneurial activities, direct discussion (consultations and interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organizations.*



The global crisis delayed the implementation of necessary reforms in Croatia, needed to resolve the administrative barriers and to implement new policies, and it stressed even more the structural problems in the Croatian economy. Low competitiveness, slow restructuring of the economy and very low levels of export-oriented foreign direct investment, have further weakened the research and development activities that could not generate a significant flow of entrepreneurial discoveries and innovative ideas. There was also a lack of awareness of entrepreneurs in terms of their obligations, rights and opportunities, caused primarily by the fact that this information was not presented in a structured and comprehensive way.

In order to encourage the development of entrepreneurship in the region, a large number of supporting institutions was established, which resulted in an improvement of the entrepreneurship ecosystem in the last decade.

Even though, there are still problems connected to the low investment into R&D (especially in the business sector), which is resulting in a lack of innovation with commercial potential.

Today the ecosystem is more efficient and effective than it was, but is far from being rich in experiments and entrepreneurial proposals.

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### 3.4 Smart Specialization Sectors

Please identify 1 - 4 regional entrepreneurship ecosystem knowledge specializations that best fit the innovation potential within RIS3 themes in CERlecon (Agri-food – Digital Growth – Energy – Industrial Modernization). Smart specialisation requires CERlecon partners identify a limited number of priorities. Their implementation will allow the CERlecon stakeholders to strengthen their innovation systems.

- 1) Agri-food RIS3 Theme (agriculture, fishery, food processing, biotechnology and applied genetics of plants, animals and microbes, aquaculture)
- 2) Digital growth RIS3 Theme (ICT, electronics, smart services, digital networks)
- 3) Energy RIS3 Theme (smart energy systems, smart energy utilization, hydro-energy)
- 4) Industrial Modernization RIS3 Theme (high-precision manufacturing, innovative design and technologies, maritime technologies, advanced and nanomaterials)

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### 4.SWOT ANALYSIS

*In order to analyze the CERlecon regional entrepreneurship ecosystems and its potential for innovation, please focus on regional strengths and weaknesses using the SWOT analysis model. Refer to the main contents of the SWOT analysis as follows:*

*Strengths are advantageous resources in the regional CERlecon entrepreneurship ecosystem capable to improve its innovation system. CERlecon strategy and action plan will be built on strengths;*

*Weaknesses are limits and faults in the regional entrepreneurship ecosystem that will keep it from improving innovation. CERlecon actions will focus on eliminating weaknesses;*

*Opportunities are favourable situations in the region's entrepreneurship ecosystem. CERlecon's goal is to take advantage of these opportunities;*

*Threats are unadvantageous and unfavourable situations in the entrepreneurship ecosystem's environment that damage the CERlecon strategy. CERlecon actions will limit the negative effects of these threats.*

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>▪ Existence of large number of science and R&amp;D institutions</li> <li>▪ Above average educated population in terms of secondary education which ensures potentially significant inflow into tertiary education</li> <li>▪ Global competitiveness of the traffic route (crossroad of Central and South-Eastern Europe)</li> <li>▪ Regional firms possess export strengths in few industries (tourism, pharmaceuticals, shipbuilding, manufacturing, automotive and chemical industry)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Low level of public resources devoted to R&amp;D in business sector</li> <li>▪ Lack of high quality innovation services (business support organizations provide general, insufficiently developed and low value added programmes for SMEs)</li> <li>▪ Inadequate/underdeveloped research infrastructure and equipment</li> <li>▪ Poor horizontal and vertical integration of enterprises and lack of cooperation with scientific research institutions at all levels (especially the lack of joint projects)</li> <li>▪ Lack of action to enhance the competitiveness of the industry (technology development, innovation, business technology connectivity, clusters, etc.).</li> <li>▪ A mismatch of education/skills of graduates and business needs within education system that is too focused on theoretical knowledge regardless of practical application of knowledge resulting in qualification rather than a competence oriented system</li> <li>▪ Inefficient tertiary education with large drop-out rate</li> <li>▪ Unsatisfactory level of product finalization (low share of added value)</li> <li>▪ Difficult access to external funding sources</li> <li>▪ Insufficient commercialization of research results and insufficient research orientation towards the needs of the economy</li> <li>▪ Limited patenting and commercialization culture</li> <li>▪ Low proportion of innovative enterprises</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>▪ Access to EU and other international and domestic funds for the financing of development projects in various sectors of the economy (e.g. environmental protection, energy effectiveness, management development, social affairs, development of entrepreneurship, etc.)</li> <li>▪ A community of innovation-oriented start-ups and established enterprises can be found among the country's SMEs</li> <li>▪ Enhancing innovation infrastructure and capacities, (e.g. Centres of Competences)</li> <li>▪ Enhancement of the technology transfer system through the establishment of</li> </ul>	<ul style="list-style-type: none"> <li>▪ Brain drain of researchers and experts</li> <li>▪ Competitive pressures coming from EU and China market</li> <li>▪ Prolonged recession</li> <li>▪ Reducing of the budget and investments in higher education and R&amp;D</li> <li>▪ Continued depopulation</li> <li>▪ Regional absorption capabilities of the Structural Funds</li> <li>▪ Poor culture of lifelong learning</li> </ul>

Science and Technology Parks and strengthening TTOs

- Excellence in few research groups in topics relevant to competitiveness of Croatia and formation of first national Centres of Scientific Excellence (e.g. in Split, Rijeka,...)
- Increased international collaboration and access to international research funding (e.g. Horizon 2020)

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## 5. ISENBERG'S SIX DOMAINS ENTREPRENEURSHIP ANALYSIS

Please scan the regional ecosystem using the Isenberg six domains indicators as listed hereinafter.

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### 5.1 REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

#### DOMAIN: POLICY

LEADERSHIP (Unequivocal support - Social legitimacy – Open door for advocate - Entrepreneurship strategy - Urgency, crisis and challenge).

GOVERNMENT (Institutions e.g. Investment, support - Financial support e.g. for R&D. for jump start funds - Regulatory framework Incentives, e.g. Tax benefits - Research institutes - Venture-friendly legislation e.g. Bankruptcy, contract enforcement, property rights, and labor).

Please focus on Governance Model, point out the endorsement of the innovation strategy at political level, analyze the priorities of public investment in research/education/innovation within the CERlecon regional entrepreneurship ecosystem. Focus on reliance on consultations with the regional stakeholders and the support of regional stakeholders to the innovation policy. Please list if there are specific provisions in public procurement procedures for innovation; Also explore the policies to support the collaboration of education/vocational training and research organizations with businesses; analyze local Key Enabling Technologies (KETs).

#### Governance model

The configuration of Croatian institutions in charge of governing economy, entrepreneurship, science, technology and innovation is similar to governance structures of most of the EU countries. Higher levels of governance are in charge of orienting and programming policy and include the Parliament (in particular, the Parliamentary Committee on the Economy, Education, Science and Culture Committee and Committee on Regional Development and EU funds in addition to the general body's say on changes in legislation) and four central government ministries: the Ministry of Economy, Entrepreneurship and Crafts, the Ministry of Regional Development and EU Funds and the Ministry of Science and Education.

The governance of R&D system in Croatia is centralised at the state level under the authority of the Ministry of Science and Education (MSE). Research and innovation activities are mostly

funded by the public resources from the central state budget. Public R&D funding is based on annual budget cycles proposed by the National Council for Science, Higher Education and Technological Development - the highest advisory body in respective domains, and agreed with the MSE and the Ministry of Finance<sup>39</sup>.

### **Endorsement of the Innovation strategy**

The Strategy for innovation encouragement of Croatia 2014-2020 was adopted in December 2014. Its main objective is to increase the level of competitiveness of the Croatian economy and increase social well-being. Within that strategic framework, Croatia has made significant organizational, institutional, legal and administrative changes in order to create a better environment for entrepreneurship based on knowledge and innovation. Government adopted a package of measures aimed at strengthening the innovation potential of the economy, strengthening of the human resources in innovation and creation of an attractive environment for world-class researchers and encouraging cooperation and knowledge flows between business and academia.

Key central role in the national innovation system has HAMAG-BICRO, Croatian innovation and technology-implementing agency, whose programs have had a crucial positive impact for the Croatian innovation system and represent an important source of funding but also beyond that, professional and networking capacities for customized support and mentoring for innovative SMEs. National experience in design and implementation of private sector-targeted innovation programs through BICRO, as well as outputs of BICRO programs provide a solid ground for further growth of private sector R&D and innovation activities and investments<sup>40</sup>.

The Smart Specialisation Strategy (S3) was adopted by the Croatian Government in March 2016. The preparation of the S3 was coordinated by the former Ministry of economy (MoE) supported by the EU co-funded team of experts (S3-Expert team) who assisted in drafting the analytical part of the Strategy in the period September 2013-March 2014. Besides, MoE has established the Inter-ministerial Working and Steering Group which included other relevant ministries. MoE conducted partnership consultations to provide inputs and feedback to ideas for strategic directions of S3. In the process of preparation, private and public research sectors were continuously consulted, and the four rounds of regional workshops (Partnership Consultations) were held. A number of analytical input documents have been produced as a starting point for the S3 such as Business expenditure on R&D, Cross-Sector competitive advantage analysis, Technology usage and availability including KETs, Research and development, KET deployment in Croatia by the PRODCOM identification methodology, etc. It turned out that identification of economic areas, industries and key enabling technologies of strong comparative advantages presented a challenging task, characterised by much diversified economic structure, scattered research capacities and a lack of analytical data<sup>41</sup>. The specialisation areas given in the Croatian Smart Specialisation Strategy include 5 areas: Health and quality of life; Energy and sustainable environment; Transport and mobility; Security; Agro Food and Bio-economy. The smart specialisation areas chosen by the Croatian authorities correspond to several areas funded by the FP7. The area of Food, Agriculture and Fisheries and the area of Security which are among the

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<sup>39</sup> <https://vlada.gov.hr/en>

<sup>40</sup> <http://www.investcroatia.hr/>

<sup>41</sup> Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512

leading research areas supported by the FP7 are fully integrated in to the national S3 strategy. The Strategy also recognised two important cross cutting themes: KETs and ICT (tourism and creative and cultural industries have been excluded in the meantime)<sup>42</sup>.

### **Public investment in research/education/innovation**

In 2015, Croatia had an R&D intensity of 0.85% of GDP and a business R&D intensity of 0.47%. Croatia's R&D intensity increased from 0.74 % in 2010. to 0,85% in 2015. This was mainly due to the recovery of the economy after global financial and economic crisis. Total R&D expenditure (GERD) which amounted to EUR 380 million in 2015 increased by 16.56% between 2010. and 2015. Still, Croatia's R&D intensity of 0.85% in 2015 was well below the EU average of 2.03%<sup>43</sup>. General government expenditure on education as a proportion of GDP rose from 4.7 % of GDP in 2007 to 5.1 % in 2013, and then fell back to 4.7% in 2014 . This figure places Croatia below the EU average of 4.9 % and among the bottom 10 EU Member States. In real terms, between 2007 and 2013 there has been only a small increase of 1.4 % in absolute expenditure on education, however there has been a drop of 7.8% between 2013 and 2014 - the second highest drop in the EU<sup>44</sup>.

Croatia'objectives in this area are the increase in the share of total domestic expenses for research and development to 1.4% of the GDP by 2020, creating greater interaction between research and development activities and industry and enhancing the innovation potential<sup>45</sup>.

### **Consultations with the regional stakeholders and the support of regional stakeholders to the innovation policy**

The involvement of different stakeholders (industry, NGO, local/regional authorities) regarding organisation and funding of research activities is rather weak due to the traditional closeness of research community and centralised governance at the state level. However, a wider range of stakeholders is usually involved in the preparation of documents of a broader national significance such as the various strategies, action plans, etc. Relevant stakeholders are also included in preparation of tender documents for Calls for proposals when Calls are open for public consultations (in case of open calls). They usually participate through consultations, public hearings or direct involvement in documents' preparation. Many research institutions plan to intensify cooperation with business, public, civil sector and society at large, in order to promote and encourage science and knowledge society culture, networking, cooperation and science promotion<sup>46</sup>.

### **Public procurement**

One means of creating demand for Croatian innovations is an increased public procurement activity. According to the World Economic Forum's Global Competitiveness Index 2014-2015, Croatia ranks 129 (out of 144) in the public procurement for technological products to increase demand for innovations. Specific provisions in public procurement procedures for innovation in Croatia, can be found under the label "competitive dialogue". It consists of three phases. First, firms are encouraged to submit their participation applications. In the second phase, a competitive

<sup>42</sup> Croatian Smart Specialization Strategy (OG 32/16)

<sup>43</sup> Eurostat, 2016

<sup>44</sup> Eurostat, 2015

<sup>45</sup> Croatian Smart Specialization Strategy

<sup>46</sup> Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512



dialogue with selected applicants is conducted, where customized solutions are developed. In the third phase the applicants submit their proposals<sup>47</sup>. The competitive dialogue offers high flexibility and an intensive interchange between both parties, and is therefore an ideal procedure for the public procurement of innovations. However, compared to the total procurement volume, the competitive dialogue has a share of less than 1 percent<sup>48</sup>.

### **Policies to support the collaboration of education/vocational training and research organizations with businesses**

A number of Croatian strategic documents recognise the importance of industry/academia cooperation in line with the objectives of the 'Europe 2020' strategy. These documents include previously mentioned Strategy for innovation encouragement of Croatia 2014-2020, the Economic Programme of the Republic of Croatia 2013, Strategy for the development of entrepreneurship 2013-2020, Strategy of education, science and technology, National reform programme 2015, Croatian Government Programme for the Mandate 2016-2019, and of course Croatian RIS3.

Some of the key programmes and initiatives intended to implement the strategic objectives to create links between the public and private sectors and train enough researchers to reach Croatia's R&D targets, are Croatian Science Foundation's Partnership in Research Programme which aims to improve cooperation between research institutions, industry and entrepreneurship and thus increase investments in research, New International Fellowship Mobility Programme for Experienced Researchers in Croatia – NEWFELPRO whose strategic objective is to provide an impetus to an effective labor market for researchers in Croatia, connecting industry and universities, public and private research institutions, and industrial laboratories, enhancing knowledge transfer and preparing better employment opportunities for researchers with special attention to SMEs' innovative processes, HAMAG BICRO programmes such as the RAZUM project on soft loans; supporting patent applications; feasibility studies or matching grants to foster private-public cooperation and the technology-transfer programme; the UKF (Unity through Knowledge Fund) project aimed at collaboration between Croatian researchers and the Croatian scientific diaspora, PoC PUBLIC –project that provides funding for ideas and concepts, prototypes and intellectual property protection and a "spin-off" from universities and scientific institutes; PoC PRIVATE – provides checking and confirmation of the commercial application of research results and helps establish an appropriate strategy for continued commercialisation; TEHCRO - supports commercialisation of research outputs and the transfer of knowledge from universities and scientific institutions to business and also supports development of Technology Business Centres, Technology Incubators and Research and Development Centres; provides funding for research projects that develop new technologies and that upon completion of the research phase strive to further commercialise and create new products or services; IRCRO – supports cooperation between industry and technology institutions, facilitates maximum usage of infrastructure in scientific research centres and supports industrial companies in substantially increasing their R&D activities<sup>49</sup>.

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<sup>47</sup> Act on Procurement (OG 90/11, 83/13, 143/13, 13/14)

<sup>48</sup> Ministry of Economy, 2015

<sup>49</sup> Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512



## Key Enabling Technologies (KETs)

Key Enabling Technologies (KETs), as the technologies of the future, provide the technological building blocks and key source of innovation in Croatia.

**Biotechnology** is one of the most important and most widespread KETs, in public ROs as well as in business sector, and contains several categories: Blue, White, Green, Grey and Red Biotech.

Blue and Green biotechnology are especially important in activities focused on food production, biodiversity protection and use of by-products. White biotechnology (Industrial biotech) is particularly important in the processes for the cost-efficient conversion of various biomass to biofuels and to basic chemicals and intermediates, due to the prominence of biomass in Croatia. Indicative research themes for White, Grey, Blue and Green Bio Tech are: environment sustainability – plants & soil and water management; food security; food processing; healthy food ingredients and food packaging systems for preserving food from microbial contamination and for improving shelf life and cost-efficient consumer food packaging with increased environmental sustainability. The use of Red biotechnology is mostly present in health care and pharmaceutical industry which is recognized as one of the quickest growing industrial sectors in Croatia. Indicative research themes related to Red Biotech are: more efficient and less invasive drugs and therapies; devices and systems for targeted diagnostics and personalized medicines and functional and lifestyle foods to meet diversifying dietary requirements of consumers.

The use of **advanced materials and nanotechnologies** has its application in improvement of existing products and in development of the new ones in numerous industries. Some examples would be in the automotive (batteries, sensors, coatings) and health (bio-implants and devices) industry. There is also realistic potential with biocompatible and biodegradable materials in food industry, with renewable energy technologies (solar cells, hydrogen and lithium based batteries), with functional coatings and metamaterials in industries such as textile or defence, and with specialized sensors for radiation detection in the defence industry. Indicative research themes are: advance material and nano technology for functional (para-) medical textiles and functionalized textile products for better health, wellbeing, comfort and aesthetics; advanced and/or functional construction and building materials and components for Energy Efficiency (advanced composite materials and new material architectures with added functionalities, ceramics; intermetallic, alloys and metal/ceramic-based composite materials for high-performance applications; insulating materials and components for the energetic improvement of the building envelope; construction materials and components with low lifecycle carbon footprint; lightweight structural beams and components); competitive more sustainable alternatives to conventional materials (bio-based products, as well as specialty, chemicals, bio-polymers and other bio-based derivatives); advanced materials for high-strength / low-weight fibre-reinforced polymer composite materials and technical textiles and textile products for specialized industrial applications; advance materials an nano technology for wearable active textiles and clothing for improved human performance aimed at human safety and protection; advance material for coatings and surfaces with high scratch resistance and/or weather ability and/or with self-repairing capabilities.

**Micro- and nano-electronics**, including semiconductors, are mostly applicable in smart industrial control systems as they permit more efficient management of electricity generation, storage, transport and consumption through intelligent electrical grids and devices. Indicative research themes are micro and nano-electronics for connected systems for: theranostics, high potential renewable energy systems, advance non-renewable energy solutions, smart grid enforcement and embedded energy systems; satellite or drone-based Earth observation for meteorology, environment monitoring and other wide area services; autonomous vehicles (underwater, land and

air) with purpose of monitoring and increasing safety and security in / at sea, on land and in the air; highly efficient energy management and conversion electronics, eco-friendly and green transport propulsion solutions with cleaner and greener fuel combustion; solutions for adapting infrastructures to innovative transport means and lightweight vehicle embedded circuits and systems; E-propulsion and widespread E-mobility; advanced broadband wireless communication, embedded broadband communication payload and high bandwidth optical networks; multimodal all cargo logistic chains; satellite or drone-based wide area surveillance in air, land and water; embedded circuits and systems for severe operational conditions and high autonomy and communicating devices and secure and dependable communication platforms and IT infrastructures and services, relying on cryptography, authentication, authorization and computing methods, deperimeterized firewalling, pro-active STDP (security, trust, dependability and privacy) solutions, physical hardening, etc.

**Photonics**, among other things, provides the technological basis for the economical conversion of sunlight to electricity which is important for the production of renewable energy, and a variety of electronic components and equipment such as photodiodes, LEDs and lasers. One of the indicative research themes is photonics for energy-efficient interconnected and versatile lighting.

**Advanced manufacturing** and processing technologies and photonics have potential applications in all TPAs. There is in fact a significant input of these technologies in the successful Croatian defense industries (mine detection vehicles), as well as in the automotive industry (batteries). Some of the indicative research themes are: AMT for robots supporting professional care and robot assistive technologies and processes for the cost-efficient conversion of various biomasses to biofuels.

Industry is an important actor in deploying KETs, hence the culture of doing business between academia and industry has an influence on the deployment of KETs. A good insight into the strengths and weaknesses of KETs innovation system is essential to stimulate collaboration among the appropriate actors in the KETs areas of interest. The role of KET is emphasized in thematic innovation platforms under Innovation Network for Industry (Croatian RIS3)<sup>50</sup>.

### 5.1.1 Green/Blue technologies

A resource-efficient Europe is one of seven flagship initiatives as part of the Europe 2020 strategy aiming to deliver smart, sustainable and inclusive growth. Green economy can refer to sectors (e.g. energy), topics (e.g. pollution), principles (e.g. polluter pays) or policies (e.g. economic instruments). It can also describe an underpinning strategy, such as the mainstreaming of environmental policies or a supportive economic structure. The European Commission in its 2014 Communication on Innovation in the Blue Economy acknowledged, "Growth in the Blue Economy will require an appropriately skilled workforce, able to apply the latest technologies in engineering and a range of other disciplines. There is currently a skills gap that must be tackled."

Please provide information about your regional entrepreneurship ecosystem's main strategy for generating growth and jobs, to identify and create new opportunities for economic growth and greater innovation within green/blue economy (please list regional assessment and indicator set).

The main strategy of the regional entrepreneurship ecosystem relies on the national strategy that aims to create new initiatives and opportunities for economic growth and greater innovation within green/blue economy. In order to achieve this the former Ministry of Environmental and Nature Protection and the national Environmental Protection and Energy Efficiency Fund of Croatia, in

<sup>50</sup> Croatian Smart Specialization Strategy

collaboration with the former Ministry of Science Education and Sports, launched a new project line for funding applied and basic research directed to monitoring and mitigation effects of climate change, resource efficiency and green-house gases. Almost 10 million EUR will be invested in RDI activities within this field, starting from 2016. The focus of this project line will be set on innovative products and technologies related to above-mentioned challenges.

The modern biotechnology is considered one of the drivers of innovative change in a variety of sectors in the region (health care and pharmaceuticals, green technologies and food production) and it provides many opportunities for the development of new products and services. Focusing on the development of modern biotechnology, a number of different projects have already been funded.

The project RISK-Research Infrastructure for Campus-based Laboratories at the University of Rijeka, supported by the regional authorities, is the first infrastructural project funded by Cohesion EU funding. Through this project the research capacities of the University of Rijeka (in particular it's Department of Biotechnology and Centre for high-throughput technologies) in the field of biotechnology have been improved. This project will generate growth and jobs and will improve the cooperation between industry and research institutions, especially in the field of agriculture, food production and food processing.

Biotechnology will open also great possibilities for exploitation of marine resources. This is the reason why the Institute of Oceanography and Fisheries is considered the main platform for carrying out national and international scientific projects in the field of fisheries and aquaculture. The institute, declared the Reference Maritime Center, will support the growth of innovations related to the sector of marine (blue) biotechnology,

All this new initiatives and strategic approaches will tackle the skills gap and influence the creation of greater innovation within green/blue economy.

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## **5.2. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM**

### **DOMAIN: FINANCE**

FINANCIAL CAPITAL (Micro-loans, Angel investors, friends and family Zero-stage venture capital - Venture capital funds - Private equity - Public capital markets - Debt)

Please describe the actions implemented in the regional entrepreneurship ecosystem in order to facilitate policies and leadership like improving and financing public research, training and vocational centers, associations, NGOs) or platforms for dialogue between stakeholders; describe the actions implemented in the regional entrepreneurship ecosystem in order to promote the accessibility of dedicated finance like equity investment, business angels and venture capitalists, local business environment favourable conditions to the creation of new SMEs, the possible existence of instruments to foster the commercialisation of the innovation's outputs, specific measures to support young innovative enterprises. Provide information on budgetary framework, stability of public funding in research, education and innovation;

One of the main objectives of the Strategy for Development of Entrepreneurship in the Republic of Croatia 2013–2020 is to facilitate access to sources of financing for small and medium enterprises

and Strategy for Fostering Innovation in Croatia 2015-2020 envisages a number of measures which should facilitate access to finance, especially for young innovative companies.

In Croatia, traditional sources of financing are available to owners of small and medium enterprises, which are represented by banks and credit unions and government incentive programs and subsidised credit lines. The market of bank loans intended for small and medium enterprises in Croatia is highly developed. Almost all banks have various types of loans intended for the small and medium enterprise sector in their offer: loans for financing exports, for working capital, investment loans, construction loans, loans for tourism services, mortgage loans, loans for specific (green) activities (development of olive growing, development of viticulture and winemaking), loans for financing solar systems for the production of electricity and heat, loans for startups, loans for suppliers, loans for women entrepreneurs, etc.

In addition to the offer of financial products, almost all banks provide additional lines of financing to entrepreneurs which are based on business cooperation with ministries, Croatian Bank for Reconstruction and Development -HBOR, HAMAG-BICRO, regional and local self-government units, and international financial institutions (EBRD – European Bank for Reconstruction and Development, EIB – European Investment Bank, CEB – Council of Europe Development Bank, EFSE – European Fund for Southeast Europe, EIF – European Investment Fund, etc.)<sup>51</sup>.

Public policy instruments designed to provide support to young innovative companies and the creation of new SMEs include grant schemes, loan guarantees programs, interest rate subsidy programs, and funds of economic cooperation. The legislative framework is harmonized with EU *acquis communautaire* in terms of state regional supports for investment, however sufficiently attractive and competitive in comparison to other EU national legislative frameworks focused on supporting direct investments.

Through “Business Impulse” programme the Ministry of Economy, Entrepreneurship and Crafts supports entrepreneurial growth and development, technological improvement, competitiveness, balanced regional development and smart use of EU financial funds. The program emphasizes instruments which support start-ups, new employment, internationalization of business, which is expected to encourage SMEs entrepreneurial, innovative and exporting capacity.

As part of the 2014 Program’s first priority - Strengthening competitiveness of small economy - measure B2 was intended for innovations in entrepreneurship. The objective was to increase the share of innovative companies in the overall entrepreneurial community, to support employment in innovative enterprises, to support innovative business models in business entities, to improve commercialisation of innovative products and services, as well as to improve the survival rate of start-ups focused on knowledge creation, making them a going concern companies. The measure provided an opportunity for physical entities (prior to the establishment of a legal entity) to apply for support an innovative business idea with a high market potential, which acquired a positive opinion from an entrepreneurial supporting institution, science and research institutions or other competent body related to the field in subject. According to the Ministry of Entrepreneurship and Crafts data (MoE, 2015) in 2014 altogether €826 thousands were allocated to innovative entrepreneurs. Average intensity of support was 71.64%.

Apart from grants, the Program’s financial support schemes include micro-crediting, intended for young companies which are doing business up to 24 months (in 2014 46 micro loans were allocated, worth €12.800 on average), guarantee schemes (in 2014 €44 m worth guarantees were issued resulting in new loans worth €85m and in over a billion euros worth investments), interest

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<sup>51</sup> Small and Medium Enterprises Report – Croatia 2015, CEPOR, ISSN 1848-3526

rates subsidies for entrepreneurial loans (in 2014 almost €4m was allocated for subsidized interest rates, and altogether 33 applications were approved for Croatian Bank for Renewal and Development loans), and funds of economic cooperation (i.e. venture capital funds). In 2015 these measures are expanded with guarantees for investments in equity capital, venture capital fund, Croatian seed fund and with a program to encourage investment in the equity of innovative small business entities. Moreover, the Business Impulse 2015 includes additional funds for manufacturing activities which register the highest added value in the Croatian economy and encompass large number of SMEs. Also, the Program is in particular directed to SMEs based on knowledge, innovations and new technologies.

Based on the financial strength of the Ministry of Entrepreneurship and Crafts, the Croatian Agency for SMEs, Innovations and Investments (HAMAG-BICRO) supports entrepreneurs in research and development activities, as well as in the phase of results commercialisation. The Agency supports investments in small economy, and establishment of SMEs and their business via loan and guarantees schemes, as well as through R&D grant schemes. It also provides support for innovative companies focused on technological development. The Framework for Supporting the Innovation Process was established as part of the second Science and Technology Project, under which approximately €2m is allocated for projects in 2015, €4m for projects in 2016 and €2m for projects in 2017. Funds are intended for R&D&I projects in order to maintain stable market demand, to increase the number of SMEs and researchers able to apply projects for EU funds<sup>52</sup>.

Economic co-operation funds (ECF) are open venture capital investment funds with private equity that are established in 2011 and operate in accordance with the Alternative Investment Funds Act. HBOR, as a qualified investor appointed by the Government of the Republic of Croatia, participates in the implementation of ECFs' activities together with 4 private investors. The aim of their establishment is to promote the development of the economy, to preserve the current and create new jobs, to strengthen the existing and start-up new business entities by means of ownership restructuring through the investment of additional capital<sup>53</sup>.

Further improvements are being made regarding the accessibility of dedicated finance like business angels and crowd funding, through the engagement of the European Structural and Investment Funds (ESIF), as over EUR 1.9 billion is allocated to strengthening the competitiveness of Croatian SMEs for the period 2014-2020. A set of new financial instruments supported through EUR 310 million of ERDF and ESF funding (leveraged by private funds) is being put in place to support entrepreneurship and SMEs through loans, guarantees and venture/risk funds.

Further benefits to the Croatian economy and small and medium enterprises are arising from the Investment Plan, launched in 2015 by the Commission. The Investment Plan is driven by the European Fund for Strategic Investments (EFSI) which aims to support strategic investments including risk finance for small businesses. The European Investment Fund (EIF) and HBOR have signed the first InnovFin SME agreement in Croatia in 2016. The InnovFin agreement enables HBOR to provide loans to innovative companies in Croatia over the next 2 years with the support of a guarantee provided by the EIF and backed under Horizon 2020, the EU Framework Programme for Research and Innovation. The EU support for innovative Croatian companies is expected to generate a portfolio of EUR 20m (c. HRK 150m) loans<sup>54</sup>.

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<sup>52</sup> Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512

<sup>53</sup> <http://www.hbor.hr/en>

<sup>54</sup> EC Country Report Croatia 2016, Brussels, 3.3.2016 SWD(2016) 80 final/2



The European Bank for Reconstruction and Development (EBRD) and the Zagreb Stock Exchange (ZSE) have launched the “SME Growth Market Project” in 2016, which aims to increase the access of local small and medium-sized enterprises (SMEs) to local capital markets, by creating a regional SME financing platform in order to create an efficient and attractive instrument in compliance with the EU’s Capital Market Union action plan<sup>55</sup>.

In Croatia there is a clear interest for crowdfunding. There are no legal obstacles with regard to crowd donating and crowd sponsoring. There are two Croatian crowdfunding platforms: Croinvest, platform established in 2014 as a pilot project in cooperation with the World Bank that combines five models of financing (donations, awards, loans, ownership participation and profit participation) customized to domestic law, and Croenergy, donation based crowdfunding platform exclusively for sustainable energy and environmental protection projects established in 2015. The most important foreign platform is Indiegogo, US based platform under which 47 projects were launched in 2015. The second foreign crowdfunding platform operating in Croatia is Kickstarter. Every year there is a slow progress in the amount of campaigns backed, started or successfully produced and funded by Croatians. The number of supporters of local campaigns in 2015 rose to 7673 compared to 6636 from 2014<sup>56</sup>.

One of the main organization of business angels in Croatia is Croatian Business Angel Network - CRANE, non – profit association founded in 2008. Up until 2015, members of Crane have invested over 3 million EUR in Croatian companies<sup>57</sup>.

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### 5.3. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

#### DOMAIN: CULTURE

SUCCESS STORIES (Visible successes - Wealth generation for founders - International reputation)

SOCIETAL NORMS (Tolerance of risk, mistakes, failure Innovation, creativity, experimentation Social status of entrepreneur - Wealth creation - Ambition, drive, hunger)

Please describe the actions implemented in the regional entrepreneurship ecosystem in order to create a conducive culture (e.g. to foster tolerance of risk and mistakes, create a positive social status of entrepreneurs);

Croatian government has recognised the impact that positive attitude towards business has on country’s economic development and thus defined the active promotion of entrepreneurship as one of the main strategic objectives in the Strategy for Development of Entrepreneurship in Croatia 2013 – 2020.

Within that strategic framework, Croatian Government, counties, cities and municipalities, national, regional and local chambers, as key stakeholders are providing systematic support for the needs of fostering entrepreneurship culture, creation of favourable climate and positive attitude among

<sup>55</sup> <http://www.ebrd.com/news/2016/ebd-and-zse-support-growth-in-croatia.html>

<sup>56</sup> Current State of Crowdfunding in Europe 2016, CrowdfundingHub

<sup>57</sup> <http://www.crane.hr/en>



the public regarding private entrepreneurship through number of activities, inter alia through educating (young) about entrepreneurship, highlighting opportunities for start-ups, promoting lifelong learning and promoting entrepreneurial success stories.

Former Ministry of entrepreneurship and Crafts Programme Business Impulse includes measures dealing with education for entrepreneurship, in order to improve key competences among future entrepreneurs, to support entrepreneurial climate in the society, to develop positive attitude towards the concept of lifelong learning, and to increase the rate of self-employment through entrepreneurship<sup>58</sup>.

According to the GEM data, 63% of Croatian adults are seeing entrepreneurship as a good career, and 47% of adults are thinking that successful entrepreneurs receive high status in Croatia<sup>59</sup>.

Creation of conducive culture is still work in progress, but positive entrepreneurial culture is being fostered.

#### **5.4. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM**

##### **DOMAIN: SUPPORT**

NON GOVERNMENTAL INSTITUTIONS (Entrepreneurship promotion in non-profits - Business plan contests Conferences - Entrepreneur-friendly associations)

SUPPORT PROFESSIONS (Legal Accounting Investment bankers Technical experts, advisors)

INFRASTRUCTURES (Telecommunications - Transportation & logistics - Energy - Zones, incubation centers, clusters)

Please describe the actual situation and the actions implemented in the regional entrepreneurship ecosystem in order to create a set of infrastructural and institutional supports (e.g. transnational legal and accounting services in order to promote the identification of skilled advisors and consultants), to improve telecommunications and transport infrastructures, to sustain entrepreneurship and craftsmanship, either as individuals and as associations, supporting innovation in cooperation with stakeholder (like private enterprises / research centers / universities / trade unions / employers association / vocational training centers / public institutions). Point out other forms of support like the creation of aggregative forms between enterprises, fab labs or business incubators; outline the existence of regional “cluster”;

##### **Infrastructure**

Public investment was an important driver of growth in the pre-crisis period. In the period 2002-2008, Croatia’s public investment averaged 6.0 % of GDP (higher than in all EU Member States) and focused predominantly on general economic affairs (mainly construction of roads). The

<sup>58</sup> Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512

<sup>59</sup> GEM-Global Entrepreneurship Monitor, 2015

investment boom has been reflected in the quality of infrastructure. The World Economic Forum's 'Quality of Overall Infrastructure' Index (largely based on business executives' perceptions of the quality of transport and network infrastructure), reached EU average by 2010 and exceeded the peer countries' average by around 25 %. The abovementioned quality of infrastructure index started to deteriorate due to the strong reduction in public investment in the period of financial crisis, but the recovery has begun, and good infrastructure (telecommunications, roads) is still the strongest enabler of entrepreneurial activity in Croatia. Croatia is planning to further step-up investment into energy field, transportation and fast broadband. Financing under the new European Fund for Strategic Investments (EFSI), Horizon 2020, the Connecting Europe Facility and other directly managed EU funds is additional to the ESI Funds. Following the first rounds of calls for projects under the Connecting Europe Facility, Croatia has signed agreements for EUR 8 million in the energy field and EUR 44 million for transport projects. Also, the Croatian authorities plan to develop a high speed access network and a backhaul broadband infrastructure. Total investment involved amounts to EUR 203 million from the European Regional Development Fund, to be leveraged by private and public national funds<sup>60</sup>.

### **R&I support "infrastructures"**

One of the main tasks of the Croatian government is a revival of the much needed innovation infrastructure, which must be based on the actual needs of the economy. Significant expectations have been put to absorption of available EU funding for R&D activities and infrastructure as a mean to support and increase R&D funding in Croatia.

Initial steps were made through the identification of prosperous industrial sectors of the economy of Croatia and networking of stakeholders through competitiveness clusters.

Competitiveness clusters were formed in the first half of 2013, for the following industrial sectors: Automotive industry, Wood processing industry, Food Processing industry, Defense industry, Health industry and pharmaceuticals, Chemical Industry, Sector of Electro and production machinery and technologies, ICT, Maritime industry, Creative industries, Construction Industry, Textile industry.

Clusters of competitiveness represent formal collaboration structure and concentration of stakeholders (Triple Helix model) from identified industrial sectors with common interest and capacity to: strengthen competitiveness of sector through pursuing and upgrading existing comparative advantages, focus on R&D&I investments and projects, identify technologies based on identical demand, connect and position in EU and Global value chains. Important role for the future development and strengthening the role of competitiveness clusters will be their focus on R&D&I projects that tend to be funded through ESI Funds<sup>61</sup>.

Competitiveness clusters will prepare projects for Centres of competence which represent specialized businesses that conduct research projects of the development or production nature and develop competence in certain areas, for which other businesses can arrange research and development in order to strengthen certain economic/industrial sectors. Such centres are focused on development and applied research and its commercialization and to the support for the protection and management of intellectual property rights in specific subject areas and branches of competence. Networking of centres of competence (CoC, in Croat. CEKOM) has just begun. Grant

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<sup>60</sup> EC Country Report Croatia 2016, Brussels, 3.3.2016 SWD(2016) 80 final/2

<sup>61</sup> Croatian Smart Specialization Strategy

scheme is managed by the MoEEC and funded through the ERDF. Total budget of €150m for the period 2016-2020 includes €105m from ERDF, €2.25 from national budget and €42.75m from beneficiaries (as own co-funding). Former MoE opened first call for expression of interest in 2016, and through this call, eligible costs will include construction and equipping of research infrastructure and co-funding of R&D activities in maximum duration of three years.

CoCs will have an important role for the development of research infrastructure in the business sector. They will increase the capacity for innovation particularly for SMEs by providing R&D infrastructure and services for industrial research and experimental development in areas that have not adequately developed R&D infrastructure<sup>62</sup>.

### **Access to information and advisory services**

The advisory infrastructure for the development of the SMEs sector in Croatia consists of a network of business support institutions (BSI) and private professional consulting companies.

The BSI network consists of 46 regional and local development agencies, 44 centers for entrepreneurship, 38 business incubators, 15 business and technology parks and about 300 business zones. BSI services are aimed primarily at providing information and advisory services related to preparation of business plans, and submission of project applications for published tenders<sup>63</sup>. Croatian authorities are providing support for entrepreneurial supporting institutions (i.e. technology parks, business incubators, entrepreneurial accelerators), development agencies, entrepreneurial centres and initiatives related to the internationalization of business, mostly through non-refundable aid<sup>64</sup>.

In contrast to most BSIs, professional consulting companies provide, in addition to the mentioned services of business plan preparation and submission of project applications for tenders, more complex and more specialised advisory services. There are 2,799 private consulting companies (FINA, 2014). In the period from 2011 to 2014, 22% of SMEs hired a consultant, mostly to solve problems of legal nature, problems related to preparation of a business plan, problems in financial management, or management in general. Certification programs and associations of professional consultants have an important role in building trust and recognition of quality consultants. The vast majority of consulting companies for SMEs is familiar with the work of associations of consultants in Croatia (89%), and every other consulting company is a member of an association<sup>65</sup>.

### **Institutions focused on the support of development of SMEs**

The most important institutions focused on the support of development of small and medium enterprises in Croatia are: Croatian Chamber of Economy (CCE), Croatian Chamber of Trades and Crafts (CCTC), Croatian Employers' Association (CEA), European Bank for Reconstruction and Development (EBRD), European Enterprise Network (EEN), and regional and local development agencies, entrepreneurial centers and zones, business incubators and business zones.

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<sup>62</sup> <http://www.mingo.hr/en>

<sup>63</sup> Study of the Consultancy Market in Croatia", CEPOR – SMEs and Entrepreneurship Policy Center, Zagreb, 2014, [www.cepor.hr](http://www.cepor.hr)

<sup>64</sup> [www.minpo.hr](http://www.minpo.hr)

<sup>65</sup> Study of the Consultancy Market in Croatia", CEPOR – SMEs and Entrepreneurship Policy Center, Zagreb, 2014, [www.cepor.hr](http://www.cepor.hr)

CCE, Centre for Entrepreneurship, Innovations and Technological Development, aims to influence the creation of favourable entrepreneurial climate, encourage the development of economy and entrepreneurship, new employment and revive areas of special state concern. Centre's activities are focused on providing systematic horizontal support to SMEs, particularly innovative businesses and clusters, and thus the Centre sponsors and co-organises national and international innovation fairs and provides Croatian companies with opportunities to find business partners and commercialise their innovations. The Centre organises a series of seminars and trainings on topics like innovation and its protection and pre-diagnostic examination of intellectual property in SMEs, challenges of small and medium entrepreneurship, insurance in entrepreneurship and crafts, how to be a more successful exporter, etc.

CCTC promotes crafts and craftsmanship. Main activities of CCTC are representing the interests of craftsmen before state authorities in shaping the economic system, giving opinions and suggestions to state authorities when enacting legislation in the field of craftsmanship, establishing commissions for apprentice and master exams, and providing help to craftsmen during the establishment and operation of crafts. CCTC is also active in the organisation, co-financing and encouraging appearances of craftsmen at trade fairs in the country and abroad. Participation and presentation of members of the CCTC at trade fairs is co-financed in the amount from 30% to 50%, while for local trade fairs CCTC grants aid to the organisers.

Small and Medium Sized Enterprises' Association of the Croatian Employers' Association participates in the drafting of legislation and implementation of activities and projects aimed at promoting the interests of small and medium enterprises.

Through the Small Business Support team – SBS, European Bank for Reconstruction and Development provides support to small and medium enterprises in accessing professional business information and advisory services significant for achieving growth, exports and increasing employment, with a special emphasis on increasing the capacity to compete in the EU market and the areas of women entrepreneurship and energy efficiency.

European Enterprise Network ([www.een.hr](http://www.een.hr)) provides support and advisory services to entrepreneurs in Europe with the aim to enable exploitation of opportunities provided by the EU and the single European market. Croatia became a member of EEN in 2010. EEN services are created for small and medium enterprises, but they are also available to large business entities, research centers and European universities. EEN is composed of almost 600 partner organisations and institutions (chambers, agencies, institutes, etc.), it provides contacts and connections in 49 countries and 83 consortiums, and connects over 4,000 experts in the field of entrepreneurship, innovation and technology transfer. EEN's network in Croatia consists of regional partners in Rijeka (Science and Technology Park of the University of Rijeka – STEP RI), Osijek (Technology Development Centre – Tera Tehnopolis), Rijeka (Science and Technology Park of the University of Rijeka – STEP RI), Split (Technology Transfer Office), Varaždin (Technology park) and Zagreb (Croatian Chamber of Economy, HAMAG-BICRO).

Entrepreneurial centers are part of the business support infrastructure, whose objective is to provide advisory and educational services for the launching and development of entrepreneurial ventures (information about possibilities for starting a business venture and incentive measures, advice for conducting business, help in preparation of business plans, etc.). Entrepreneurial centers organise seminars and other forms of additional education and cooperate with local and

regional administration on implementation of development programs. Centers operate as parts of county/city administration, as independent enterprises or as associations i.e., nongovernmental organisations, and are financed from local budgets, donations of international organisations, European Union projects, Ministry of Economy, Entrepreneurship and Crafts aids and own sources of financing. Over the years of work some of entrepreneurial centers have developed into regional development agencies. In 2014, 44 entrepreneurial centers operated in Croatia.

Business parks are registered legal persons that provide physical space, land and resources for accommodation of businesses entities on a commercial basis. Business parks in Croatia are: Business Park Bjelovar, Business Park Virovitica, Business Park Zagreb, Business Park Međimurje and Business Park Karlovac. Technology Parks connect experts and entrepreneurs with the intention of achieving economic goals with the help on new technologies. Technology parks place emphasis on development and scientific-research activities, and they are established primarily in the vicinity of higher education institutions and research centers i.e. important economic-technological systems. Technology parks in Croatia are: Science and Technology Park of the University of Rijeka, Technology Park Varaždin, Technology – Innovation Centre of Rijeka, Technology Park Zagreb, Technology Center Split, Technology Development Centre – Regional Development Agency of Brod-Posavina County, Technology Department – Business Incubator BIOS, Technology Innovation Centre Međimurje, Technology Park BISC Nova Gradiška and Technology Park Vinkovci.

Entrepreneurial zones promote development of small and medium enterprises by providing benefits to entrepreneurs in construction of business premises on land that is fully equipped with infrastructure. The objective of the development of entrepreneurial zones at the level of local and regional administration is to encourage balanced development and increase employment. There are about 370 entrepreneurial zones in Croatia<sup>66</sup>.

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## **5.5. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM**

### **DOMAIN: HUMAN CAPITAL**

EDUCATIONAL INSTITUTIONS (General degrees, professional and academic - Specific entrepreneurship training)

LABOR (Skilled and unskilled - Serial entrepreneurs - Later generation family)

Please describe the actual situation and the actions implemented in the regional entrepreneurship ecosystem in order to improve relevant human capital (e.g. encourage entrepreneurship, innovative training programmes for entrepreneurs, employees and unemployed people); List regional competitive advantages like localized know-how and special experiences and skills of regional actors. Outline activity domains where the regional entrepreneurship ecosystem is specialized. List available regional analyses on R&D investment, publications and citations or other data concerning patent applications and attractiveness of working conditions for researchers; mobility of research and innovation employees between the public and the private sector.

<sup>66</sup> Small and Medium Enterprises Report – Croatia 2015, CEPOR, ISSN 1848-3526



The Croatian workforce is relatively well qualified, but compared to the EU and countries with similar income per capita, Croatia has few students and graduates in mathematics, science and engineering low share of tertiary educated workforce, low rate of employment among tertiary graduates and one of the lowest levels of on-the-job training and lifelong learning. There are also indications of bottlenecks in the transfer of knowledge from abroad, as suggested by the low levels of inward and outward mobility of researchers and the low incidence of international co-publications relative to comparable countries. Furthermore we have relatively low shares of professionals and experts among the employed in key industries for the implementation of S3<sup>67</sup>.

Systematic policy response in this area includes a comprehensive structural and curricular reform of primary and lower secondary education, which started in 2015 and is tackling basic skills deficits, significant investment programme, financed through EU funds, to raise the level of digitisation in 60 % of primary and secondary schools by 2020, reform of the Croatian qualifications framework of that aims at aligning higher education and secondary VET outcomes with labour market needs so as to reduce skills mismatches. Furthermore, the strategy for lifelong learning and career guidance adopted in October 2015 should help improve career guidance and participation in lifelong learning. Similarly, the introduction of a system for recognising and validating non-formal and informal learning could open up possibilities for upskilling in the long run<sup>68</sup>.

All in all, it should be mentioned that by the European innovation scoreboard (EC, 2015a), Croatia performs well in human resources due to new doctoral graduates and youth with upper secondary level education. (EC, 2015a). The Innovation Union progress report (EC, 2014b) perceives additional advantages of R&I capacities in new graduates in science and engineering, well performing in FP funding and in the BERD financed from abroad, the categories in which Croatia performs better or close to the EU average<sup>69</sup>.

Education for and about entrepreneurship is represented at all formal levels of education, but unevenly. Entrepreneurial education as knowledge and skill required to achieve entrepreneurial competence is minimally represented in the curriculum at the primary level of the Croatian education system. In secondary education, entrepreneurship is recognised as an important set of knowledge and skills only in vocational schools, and is introduced as a mandatory subject in the curriculum of economy secondary schools. In the higher education system, entrepreneurship is present on at least one level of study at five Croatian universities, and at four polytechnics and two colleges.

There are numerous institutions outside the system of formal education that offer education for beginner entrepreneurs and / or already operational enterprises, such as centers for entrepreneurship, Croatian Chamber of Economy, Croatian Employers' Association and private enterprises active in the sector of adult education<sup>70</sup>.

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<sup>67</sup> Education and Training Monitor 2016 Croatia, EU 2016

<sup>68</sup> EC Country Report Croatia 2016, Brussels, 3.3.2016 SWD(2016) 80 final/2

<sup>69</sup> Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512

<sup>70</sup> Small and Medium Enterprises Report – Croatia 2015, CEPOR, ISSN 1848-3526



Analyses on R&D investment, publications and citations, other data concerning patent applications and attractiveness of working conditions for researchers; mobility of research and innovation employees between the public and the private sector:

- Education and Training Monitor 2016 Croatia, EU 2016
- EC Country Report Croatia 2016, Brussels, 3.3.2016 SWD(2016) 80 final/2
- Domagoj Račić, Jadranka Švarc; Hristo Hristov, RIO Country Report 2015: Croatia; EUR 27862 EN; doi:10.2791/639512
- Researchers' Report 2014 Country Profile: Croatia, Deloitte

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## 5.6. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

### DOMAIN: MARKET

NETWORKS (Entrepreneur's networks - Diaspora networks - Multinational corporations)

EARLY CUSTOMERS (Early adopters for proof-of- concept - Expertise in productizing - Reference customer - First reviews - Distribution channels)

Please describe the actual situation and the actions implemented in the regional entrepreneurship ecosystem in order to create new markets or to improve venture friendly markets for products (e.g. transnational networks, support in identifying early adopters for innovative products or services);

Croatia is a small country with open economy.

Many companies in Croatia have recognized all the advantages of operating in the Single EU Market. Still, Croatia's entrepreneurs face multiple obstacles and adverse framework conditions in getting ideas to the market. Innovative firms are lacking the resources and in-house capabilities needed to progress towards new-to-the-market and new-to-the-world innovation. Also, relatively few SMEs in Croatia are doing business beyond Europe.

Therefore, key action of industrial policy is to provide support services to SMEs in order to make it easier for them to access new markets and do international business with both EU and third country markets.

In order to create new markets and to improve venture friendly markets for products, several actions are being implemented, both on national and on regional and local level. These actions are focused on improving the framework conditions for innovation and leveraging other government policies (such as regulation and public procurement) to raise demand for innovation, overcoming the fragmentation of innovation value chain and the gap between research and business sector through strengthening the innovation system, development of innovation infrastructure, clustering and establishment of innovation platforms in thematic priority areas of Croatian economy. State, county, city and municipal authorities are encouraging clustering, as a form of joint promotion for products and services, and creation of Centers of Competences.

Import/export administrative procedures have been simplified. In recent years, policy measures to support exports have been introduced. An 'Action Plan on Export Support 2014-2015' coordinated by the Ministry of Foreign and European Affairs addresses crucial issues such as small capacity,

production fragmentation, and insufficient competitiveness of Croatian firms<sup>71</sup>. The Croatian government launched a new portal for exporters in June 2015. The function of the portal is to consolidate all relevant and updated information that could be of interest to potential Croatian exporters<sup>72</sup>.

Main providers of support services to SMEs in order to make it easier for them to access new markets and do international business are Croatian Chamber of Economy as an independent professional and business organisation of all legal entities engaging in business, and HAMAG BICRO.

CCE is providing support by enclosing information on rules and regulations, market opportunities and tax incentives, making connections between Croatian and foreign companies, organising foreign business delegations to Croatia and Croatian business delegations abroad, organising individual meetings between Croatian and foreign companies, organising seminars and presentations about foreign markets and promoting and presenting Croatian products and economic trends to foreign investors<sup>73</sup>.

HAMAG BICRO is providing consultancy network and export support by supporting programs to develop platform for export promotion for SMEs, providing guarantees to small and medium enterprises (SMEs) in compliance with the SME Development Promotion Act, issuing guarantees for loans approved by credit institutions and other legal entities, approving loans to SMEs, and providing certified business advisory services<sup>74</sup>.

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<sup>71</sup> <http://www.mvep.hr/en/info-servis/press-releases/progress-in-implementation-of-croatian-exporters-support-measures-,23059.html>

<sup>72</sup> EC Country Report Croatia 2016, Brussels, 3.3.2016 SWD(2016) 80 final/2

<sup>73</sup> <http://www.hgk.hr/english>

<sup>74</sup> <http://www.investcroatia.hr/>

## CERlecon Regional Ecosystem: Brno (CZ)

CERlecon Partner: The Chamber of Commerce of the Czech Republic  
& Statutory city of Brno (PP12 & P11)

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### CERlecon Regional Ecosystem Evolution

*Please lay out basic facts about regional evolutions of entrepreneurship, employment unemployment and wages in the post war period, including adverse shocks to the regional employment system, how they were adjusted, how wages declined, if new jobs were created to replace those jobs destroyed or if workers moved out. Please provide all informations to better understand the local entrepreneurship<sup>75</sup>.*

Brno agglomeration is with more than 600 thousands inhabitants second largest city in Czech republic (CR). The city of Brno is political and economic center of the South Moravian Region (SMR). Brno is the second most important control and economic center of the CR. There is a high concentration of activities with an added value (ICT, specialized services, research organizations, etc.). South Moravian Region has the second largest share of service sector after Prague (61.2% for employment and 60.2% for gross added value in the economic structure). Since 2007, the development of GDP in the SMR region has been higher than the development of GDP in the whole CR. The economy of the South Moravian Region is mostly driven by the processing industry and services with a high added value. After 2005, SMR, together with Prague, represented the main target region for the DFI in the CR.

#### **GDP (PPP) per capita (EU 28 = 100 %)**

	2011	2012	2013
Czech rep.	82,3	82,1	81,3
South Moravian Region	77,1	78,7	79,7
Brno	123,1	130,1	133,0
Praha	173,4	170,9	170,9

KSM, Eurostat, ČSÚ, ČSÚ, 2015

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<sup>75</sup> OLIVIER JEAN BLANCHARD Massachusetts Institute of Technology and LAWRENCE F. KATZ Harvard University

## 1. General informations<sup>76</sup>

1.1 Area 230 km<sup>2</sup>

### 1.2 Population

1.2.1 N. of inhabitants 377 028 (2015)

1.2.2 Population Growth Forecast -0.11 %<sup>77</sup>

1.2.3 Migration inflow Growth Rate -0.20 %<sup>78</sup>

1.2.4 Migrant persons (percentage on population) 6,59 %

1.2.5 Migrants' countries of origin<sup>79</sup>:

1) Ukraine ( 1.67 %),

2) Slovakia (1,43 %),

3) Vietnam ( 0.72 %),

\*\*\*

### 1.3 Employment<sup>80</sup>

1.3.1 Employment rate 58.1 %

1.3.2 Employment rate by gender: (women 65.4 % men 49.3 %)

1.3.3 Unemployment rate 5.88 % (Brno 7.1 %; ČR 5.16 %)

1.3.4 Inactivity rate 39.9 %

1.3.5 Youth unemployment rate (aged 15-24) 6.1 %

\*\*\*

### 1.4 GDP<sup>81</sup>

1.4.1 Regional GDP per capita 397.233 Kč (14.445 EUR)

1.4.2 98.1 % of national

1.4.3 Growth Rate 2014: 3.0 %

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### 1.5 - Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;

Intermediate (IN), the share of population living in rural local units is between 15% and 50%;

<sup>76</sup> Data concerning City of Brno

<sup>77</sup> 2015

<sup>78</sup> 2015

<sup>79</sup> Directorate of Alien Police Service, 2015

<sup>80</sup> South Moravian Region (ČSÚ, MPSV, 2015, 2016)

<sup>81</sup> South Moravian Region (ČSÚ, 2014)

Predominantly Rural (PR), the share of population living in rural local units is higher than 50%

\*\*\*

## 1.6 Number of registered enterprise (~~registered VAT~~) 128 462

### 1.6.1 - Type of businesses: Enterprise size class:

- unknown		76.603 (n. of units) 59,6 % of regional
- no employees		35.525 (n. of units) 27,7 % of regional
- 1-9	employees	13.192 (n. of units) 10.3 % of regional
- 10-49	employees	2.467 (n. of units) 1.9 % of regional
- 50-249	employees	553 (n. of units) 0.4 % of regional
- 250 and over	employees	122 (n. of units) 0.1 % of regional

### 1.6.2 Main regional business sectors (NACE classification)

Health and social services 16.82 %

Trade 10.31 %

Public administration 9.68 %

Communications 9.49 %

Profession, science 7.99 %

Construction 7.48 %

Transport and warehousing 5.73 %

Electrical engineering 4.26 %

Engineering 3.79 %

\*\*\*

## 1.7 Production<sup>82</sup>

1.7.5 Production value 6 627 mil. (Euro)

1.7.7 Main export areas 1) Machinery and transport equipment (46.5 %); 2) Industrial consumer goods (20.0 %); 3) Semi-finished products and materials (18.7 %)

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## 1.8 R&D expenditure<sup>83</sup>

1.8.1 Regional Total R&D expenditure as a percentage of GDP (all sector) 3.7 %

1.8.2 Growth Rate: 15 %<sup>84</sup>

1.8.3 National total R&D expenditure as a percentage of GDP (all sector) 2.0 %

<sup>82</sup> Data not available in regional level (some data for South Moravian Region are available only for 2010)

<sup>83</sup> South Moravian Region (2014)

<sup>84</sup> Average annual growth rate from 2015 to 2014

1.8.4 Growth Rate: 9 % <sup>85</sup>

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## 1.9 Labor cost

1.9.1 - Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions)

830 EUR to 1560 EUR per month according to education

1.9.2 - Average Monthly Disposable Salary - 40h/week (Net After Tax)

460 EUR to 880 EUR per month according to education

1.9.3 - Pay Frequency  weekly /  monthly

1.9 - Cost of Living (please provide informations about housing affordability, household final consumption expenditure, comparative prices)

### AVERAGE RENTS

	month / m <sup>2</sup>
Retail Space	20 - 30 EUR
Offices	10 - 12 EUR
Production sites	4 - 5 EUR

Source: real estate agents, prime location 1A, 2014

Source: Brno Business Facts ([www.brno.cz](http://www.brno.cz))

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## 2. Trends:

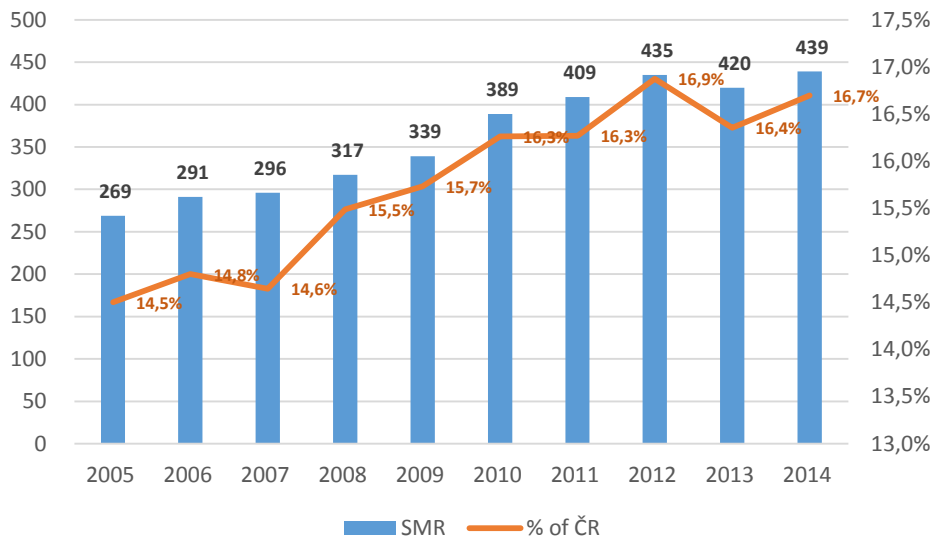
*Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental. Please list main behaviours and trends of the regional entrepreneurship ecosystem as far as innovation related activities are concerned covering the following areas:*  Profiles of companies that develop innovations;  The impact of innovations on turnover, and the proportion of turnover invested in innovation activities;  Barriers to commercialisation of both innovative and non-innovative goods and services;  Preferred types of public support for the commercialisation of goods or services;  The role of design, and the use of advanced manufacturing technologies;  Involvement in public procurement and the role innovation plays in this process.

South Moravian Region is the most successful region in the CR in the growth dynamics of the number of companies implementing their own R&D. The number of companies implementing their own R&D rise in South Moravian Region from 269 in 2005 to 439 in 2014.

### **Number of private companies performing R&D (South Moravian Region)**

<sup>85</sup> Average annual growth rate from 2015 to 2014

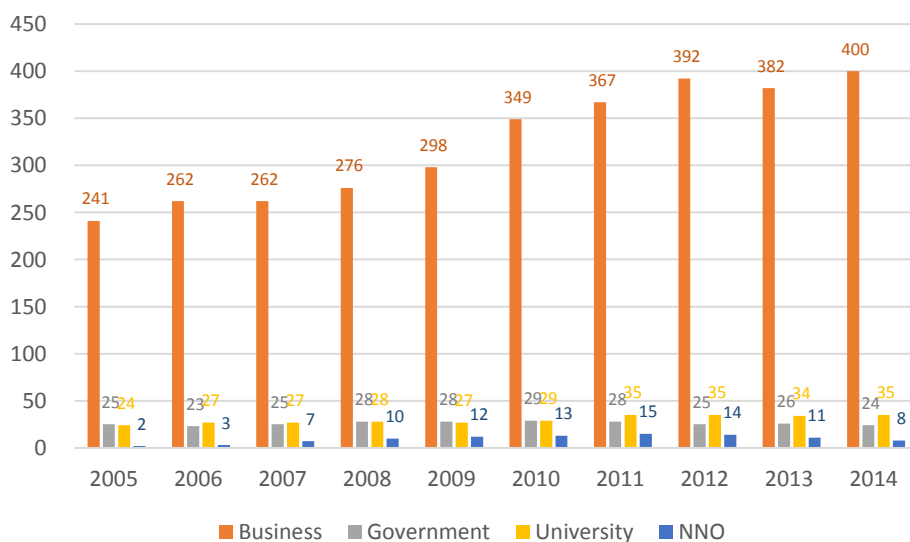




Source: ČSÚ

The number of R&D departments in SMR have increasing trend between the years from 2005 to 2014. The increase was significant mainly in the business sector where was created more than 150 R&D departments. The number of R&D departments at universities increased in the year 2011 from 29 to 35 departments. R&D departments in NGO's increased significantly from 2 to 15 departments in the period between 2005 and 2011.

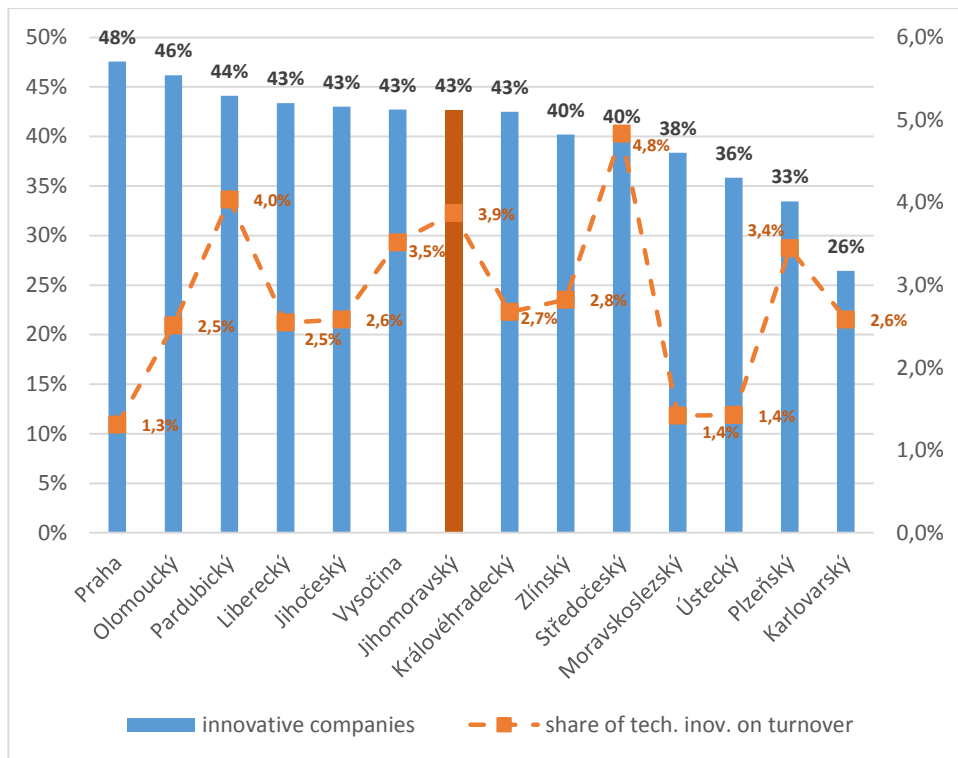
### R&D departments by sector (South Moravian Region)



Source: ČSÚ

Innovative activities of the companies are in the South Moravian region comparable with another Czech regions slightly behind the Prague. According to the last survey 43 % of the companies in the SMR innovate compared to Prague with the share of 48 % of innovative companies.

**Innovative companies in regions of the Czech rep.**

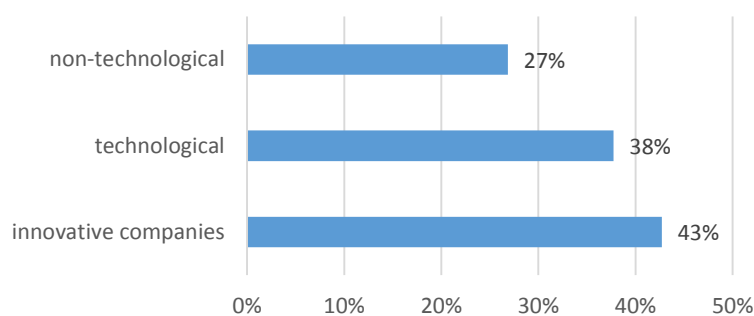


Source: ČSÚ (survey 2012-2014)

Comment: Share of tech. Innovations on turnover in tompanies with technological innovation.

From total 38 % of the companies in SMR focus on technological innovations and 27 % on non-technological innovations.

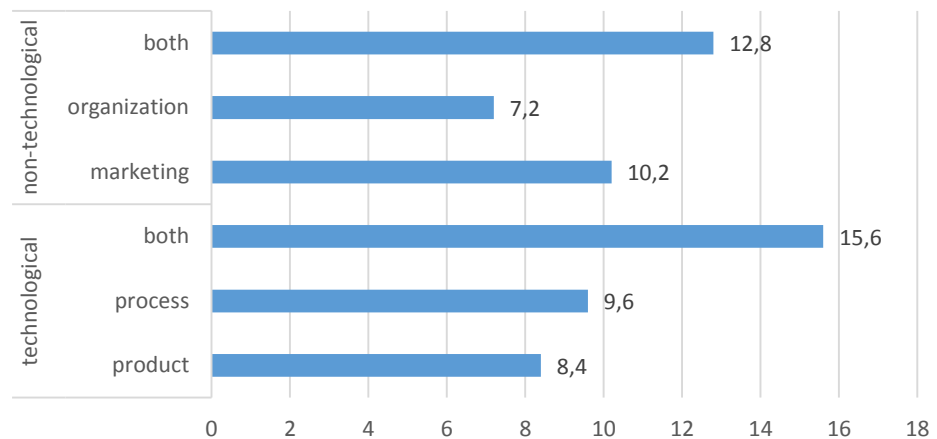
**Innovative companies in South Moravian Region**



Source: ČSÚ (survey 2012-2014)

Detailed proportion of the types of innovations realized by companies in SMR is presented on the graph below.

**Innovative firms by type of innovation (South Moravian Region)**



Source: ČSÚ (survey 2012-2014)

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### 3. RIS3 Regional potential for innovation - Territorial Smart specialisation sectors

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on: 1) regional assets, 2) linkage with other regions, 3) dynamics of the entrepreneurial environment.

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#### 3.1. Regional assets analysis:

*According to the regional specificities, identify the main regional ecosystem assets, and also any bottlenecks of the innovation system and key challenges both for the economy and the society.*

*To implement this analysis, suitable tools are the SWOT analysis, regional profiling studies, targeted surveys and expert assessments.*

#### Brno Basic Business Facts:

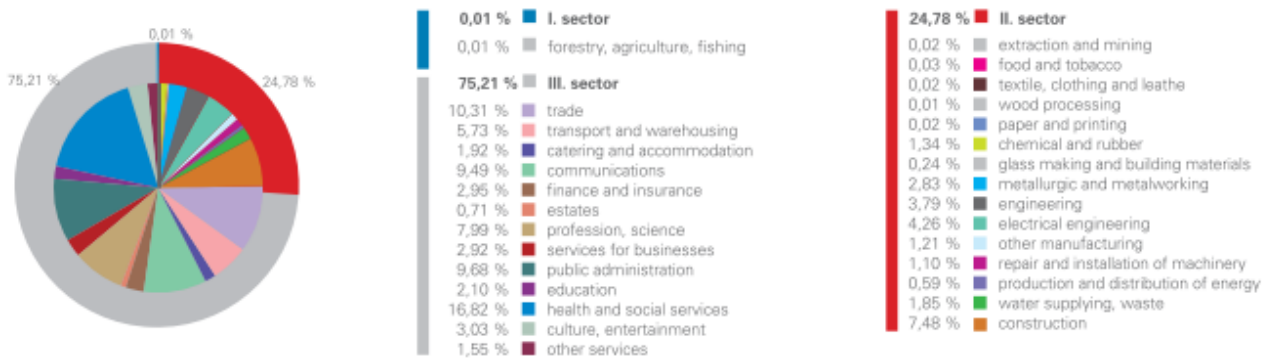
- Strategic geographic position within Central Europe (Brno, Vienna, Bratislava triangle) with excellent transport accessibility, including an international airport
- Modern, dynamic and fast growing centre of industry, trade, science, information technology, research and innovation with business incubators and centres of excellence in science
- Important centre of international trade fairs and exhibitions, annually visited by almost 800,000 visitors
- A city of universities with more than 77,000 students at 13 universities and 3 university campuses
- Good business environment – major global companies and property developers, investor care system

- Support infrastructure for business in the field of science, research and innovation
- Educated, skilled, competitive and flexible workforce
- High quality of life – a centre of culture and sports, historical sights, Villa Tugendhat – a UNESCO site, functionalist architecture, shopping centres and services for leisure time, beautiful natural environment

In terms of international competitiveness and with regards to the local economy generating income from abroad, the main specialisations of SMR are, according to NACE classification:

- engineering industry - NACE 29,
- electro technical - NACE 27 and electronic - NACE 26 - industry.

### SECTORS OF THE ECONOMY



Source: Survey of employment in the South Moravian Region, data as of 31 December 2014

Source: Brno Business Facts ([www.brno.cz](http://www.brno.cz))

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### 3.2. Linkages with the rest of the world and the position of the region within the European and global economy analysis

Please make a comparisons with the other CERlecon and European regions in order to outline possible linkages and to better accede to RIS3 assessment of existing local regional innovative advantages. International value chains in this respect is a crucial element to be considered. This analysis will prevent "blind' duplication of investments" already done in other European regions, averting from an excessive fragmentation of investments that could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration with other CERlecon entrepreneurship ecosystems should be pursued whenever similarities or complementarities with other regions are detected.

To implement this analysis, suitable tools are: comparative studies, rounds of interviews with other regions and interregional work groups.

Advanced transport infrastructure allows entrepreneurs and investors to take advantage of the strategic location of Brno as well as the entire region. Brno is an important transportation hub situated at the junction of roads leading to 4 major cities - Prague, Bratislava, Vienna and

Budapest. Thanks to the sophisticated Integrated Transport System of the South Moravian Region, Brno is also easily accessible by train and bus services for almost all inhabitants of the region.

Specialised companies, concentrating their skills into specific fields, are able to compete in foreign markets and generate income for the local economy. It is important that these industrial sectors are **strongly interlinked** (e.g. industrial automatisations, delivery of investment units, etc.). In SMR region, i.e. in Brno, we can see a dynamic development of IT; a majority of IT companies specialise in SW solutions for industry. The dynamic development of IT and its link to the traditional specialisation in engineering and electrotechnics create a **beneficial environment** for the development of modern technologies and knowledge intensive companies.

In addition to this performance-dominant specialisation, there are other specific specialisations that have a major impact on the non- metropolitan regions. In particular, in the southern and eastern parts of the region, **agriculture and food industries** play an important role. The competitiveness of these industries must be evaluated within the context of the national market and the market of the surrounding countries. The region has an agricultural tradition and suitable conditions for agricultural activities, and, also, well-established companies involved in processing and producing foodstuffs. It is easy to access the nearby markets of big cities which, in accordance with the long-term trends, show a growing demand for high quality food, supported by strong purchase power (Brno, Bratislava, Vienna). South Moravian wine making is known for its first-quality products and it is of national importance; in the areas of Znojmo and Břeclav wine making is a major driving force supporting, among others, a specific type of tourism.

In terms of the development of knowledge economy, **university education and healthcare** represent fundamental specialisations. There are over 80 thousand university students studying in Brno which creates the human resources necessary for the development of enterprise and innovation, and the development of research. Thanks to the accessibility of talent, some Czech companies from other regions consider relocating, or placing their R&D activities in Brno. Brno University of Technology represents the **main partner for R&D** for many companies from Moravia. There are two big university hospitals providing top quality healthcare, and the very special Masaryk Oncology Institute, together with the first quality Medical Faculty, have a major capacity for creating and using new medical and related technologies. They represent a considerable source of human resources. For these reasons, and in relation to the global trends of demographic aging and a bigger emphasis on health and quality of life, these institutions represent a major development potential for the development of knowledge economy in SMR.

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### 3.3. Dynamics of the entrepreneurial environment.

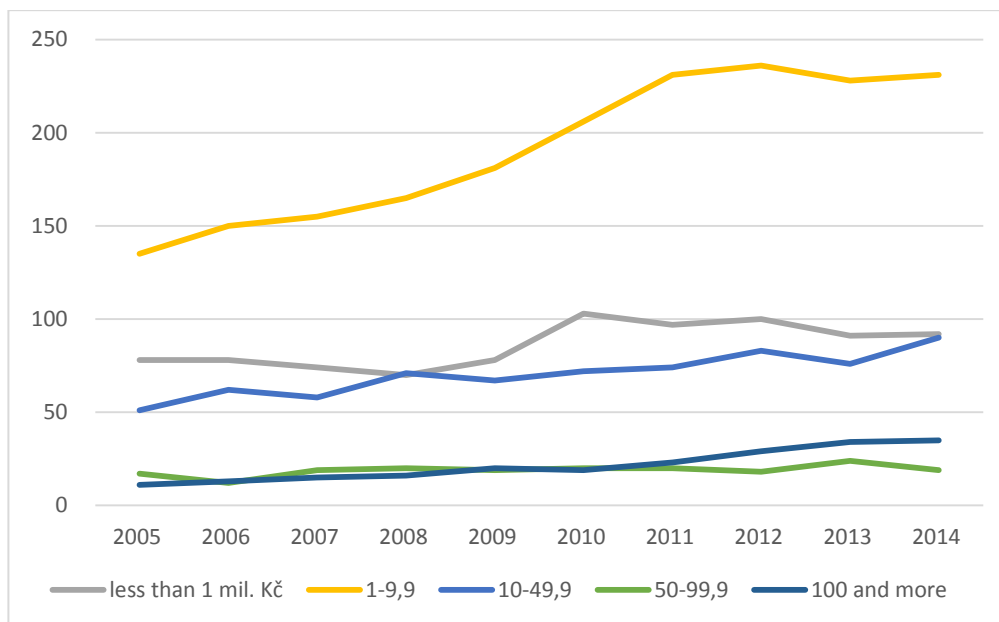
*Please point out the characteristics of your regional entrepreneurship ecosystem, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals.*

*To implement this analysis, suitable tools are: statistics on entrepreneurial activities, direct discussion (consultations and interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organisations).*

Based on the scope of R&D capacities, SMR has the second best suitable conditions for the development of knowledge economy after Prague and South Moravian Region ranks among the 50 most innovative regions in the European Union.

The ranking of the region by R&D capacities is not only due to the concentration of universities and public research organisations. South Moravian Region is the most successful region in the CR in the growth dynamics of the number of companies implementing their own R&D (see above). Positive trend is also in the investment to the R&D which represents the level of technological aspiration of the companies. For innovations it is important to have companies who implement R&D systematically and invest a critical volume of resources. The increase in number of R&D departments between years 2005 and 2014 was mainly in the range of investments from 1 to 9 mil. Kč (37 to 333 thous. EUR).

**Number of R&D departments by expenditure in South Moravian Region (mil. Kč = 37 thous. EUR)**



Source: ČSÚ

There are five public universities in the South Moravian Region (Masaryk University, Brno University of Technology, Mendel University in Brno, Veterinary and Pharmaceutical University in Brno, Janáček Academy of Performing Arts) and one state university (University of Defence). In terms of relevance for RIS, their specialisation is reflected by the activities of the OP R&DfI centres.

There are four Centres of Excellence in the South Moravian region financed from the Operational Programme Research and Development for Innovation. These centers represents a specific group of research "entities" with high level research and potential.

The public support infrastructure for research and innovation in the South Moravian Region is relatively developed and provides wide scale of support for business, especially start-ups (see support domain below).

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### 3.4 Smart Specialization Sectors

Please identify 1 - 4 regional entrepreneurship ecosystem knowledge specialisations that best fit the innovation potential within RIS3 themes in CERlecon (Agri-food – Digital Growth – Energy – Industrial Modernization). Smart specialisation requires CERlecon partners identify a limited



*number of priorities. Their implementation will allow the CERlecon stakeholders to strengthen their innovation systems.*

Specialisation of the Region - Key Economic Domain according to RIS3 strategy of the SMR are:

- 1) Advanced manufacturing and engineering technologies
  - Power engineering and equipment for the distribution of electricity
  - Engineering production technology
  - Investment units
  - Special production machinery
- 2) Precision instruments
  - Scientific instruments
  - Precision measuring instruments and sensors
- 3) Software and hardware development
  - IT security and cognitronics
  - SW development, in particular, for businesses
- 4) Pharmaceuticals, medical care and diagnostics
- 5) Aircraft technology

**Strategic targets in the key area of changes according to RIS3 strategy of the SMR are:**

- 1) Pro-innovation administration and governance
  - Pro-innovation administration and governance
  - To improve the legal framework and improve administrative processes in public administration in R&D
  - **To improve the legal framework for (innovative) business**
  - To improve good quality management of RIS implementation
- 2) Excellence in Research
  - To improve the quality and problem orientation of public research in SMR
  - To maximise economic benefits of public investment in R&D in the region
- 3) **Competitive innovative companies**
  - **To create suitable conditions for innovations driven by the growth of "mature" knowledge-intensive companies in SMR**
  - **To increase the number of new companies with aspirations and the potential to have a dominant position on the market**
  - **To increase the number of people starting their own business for the first time**

#### 4) Top European Education

- To improve organisational and material conditions in order to increase the quality of primary and secondary education in SMR
- To improve the quality and relevance of education, reflecting the needs of companies working in key industries of SMR
- Definition of a new educational policy for SMR to ensure a long-term prosperity of the region
- To improve the quality and relevance of university education in the region
- To improve the quality and attractiveness of teacher training in the region
- To increase internationalisation, openness and permeability of universities in the region

#### 5) Attractive region (communication)

- Creating Governance
- To create a regional brand
- Creating a network of external ambassadors
- **To link up important stakeholders**

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## 4.SWOT ANALYSIS

In order to analyze the CERlecon regional entrepreneurship ecosystems and its potential for innovation, please focus on regional strenghts and weaknesses using the SWOT analysis model. Refer to the main contents of the SWOT analysis as follows:

Strengths are advantageous resources in the regional CERlecon entrepreneurship ecosystem capable to improve its innovation system. CERlecon strategy and action plan will be built on strengths;

Weaknesses are limits and faults in the regional entrepreneurship ecosystem that will keep it from improving innovation. CERlecon actions will focus on eliminating weaknesses;

Opportunities are favourable situations in the region's entrepreneurship ecosystem. CERlecon's goal is to take advantage of these opportunities;

Threats are unadvantageous and unfavourable situations in the entrepreneurship ecosystem's environment that damage the CERlecon strategy. CERlecon actions will limit the negative effects of these threats.

### Strengths and weaknesses

#### Strengths

There is a consensus among the institutions about the mission and vision of the region; the entrepreneurial culture and management

#### Weaknesses

##### Position of the region

There is a strong internal polarity between the dynamic city (including wider surroundings) and the peripheral parts of the

of the region is highly developed.

region.

Brno is attractive for direct foreign investments focusing on activities with a higher added value.

### **Innovative enterprise**

The South Moravian Region (in particular, the city of Brno) is quite unique within the CR thanks to the new knowledge-intensive companies that are being funded in the city. *(New knowledge-intensive companies represent a major potential for the growth of local mature companies through acquisitions. For starting companies the presence of top technology companies represents an opportunity for fast growth, taking advantage of the functional processes set up by the mature companies.)*

Low ambition and response of owners of small and medium size enterprises that have their growth potential based on innovations. Weak advance strategic management.

There is a critical number of companies that have been achieving first class quality in the selected industrial sectors (precision instruments, power engineering, industrial engineering - investment units) for a long period of time. There is a critical number of highly qualified people with a technical background. Companies can choose when staffing key positions in R&D, construction, etc. "Labour market pooling" - distribution and development of knowledge through mobility of experts between companies, fields and sectors).

As a result of a low proportion of job positions in management and strategic functions of large companies (there are no company headquarters), business competences are not developed among the economically active population.

The ability to achieve first class quality (technology level) in the newly established non-industrial fields (IT security - AVG, InveaTeach).

There are manufacturing plants of foreign companies (including technology leaders - Honeywell, ABB, Siemens) present and they represent a potential for the development of activities with a higher added value (including research and development).

### **Research and development**

There is a good knowledge base of technical (functional) competencies essential for research and development at universities/research organisations and companies.

The growing administrative burden and insufficiently operating support processes restrict the efficiency of research staff at universities and research organisations.

Thanks to the massive investment from structural funds, Brno will have had world-class research infrastructure by 2015

The ambition and management of development strategies of Brno universities and research organisations do not really

(instruments, laboratories and related equipment).  
There are several research teams able to generate unique, world-class results (e.g. identifying speech, molecular processes in cells, stem cell research etc.).

Concentration of a wide spectrum of research fields = unused potential for the development of multidisciplinary research (e.g. research agenda for solutions requiring cooperation across the established sectors).

The existence of international "alumni" in the research area can be used as a potential to strengthen internationalisation.

#### **Human resources for innovation and R&D**

Good quality secondary schools (Řečkovice Grammar School, Cpt Jaroš Grammar School and others); the students of these schools are repeatedly winning nationwide students competitions.

Scope of university capacities in Brno. Thanks to the fact that Brno is an inter-regional centre of university education, there is a concentration of talent and university qualified people in the region (however, the concentration is in Brno and surroundings, only). Brno, as a university city, produces tens of thousands of graduates who represent an interesting employment potential.

The subject structure of university education enables to create unique interdisciplinary subjects.

correspond to the challenges and trends of the 21st century. (weak interdisciplinarity, regional character, the third role is not reflected into priorities and management, inefficient management/project management, responsiveness....) The stated topics are formally included in the strategies but their real improvement is slow.

Frequent absence of management and strategic competencies and non-efficient management structure.  
Research teams often set themselves research tasks that are not ambitious enough, restricted relevance of research topics, absence of research strategies  
Insufficient readiness of universities and research organisations to cooperate with the application sphere, continuing mutual distrust. (Low readiness in terms of processes and human resources).

The functional competencies (professional knowledge and skills) and "soft" competencies (soft skills) of graduates are not in compliance with the requirements of the employers, and this non-compliance restricts young people in their ability to compete on the (international) job market. The existing content and quality of education in many fields leads to wasting of talent and public funds.

Education must not only respond to the existing situation but proactively prepare students for future demand. There is no strategic and prognostic information about the labour market. There is no system where companies could define their future needs. (There is no clear definition of demand and its quantification). The entire problem is complicated by the unambiguously used concepts (for example, does it mean when we speak about "fulfilling the needs of the labour market", "how to measure it", etc.)

Underinvestment in the infrastructure of primary and secondary schools. No modern IT infrastructure (e.g. each teacher has his/her own computer), there is often a shortage of modern teaching aids - be it books or the equipment of school laboratories, obsolete school buildings mean higher operating costs (e.g. energy).

Some of the fields of study on offer in Brno are so good that many students from the whole of the CR/SR apply to study in Brno and choose Brno universities as their first choice university (informatics, law, some of the VUT FSI fields, FEKT, some fields of medicine, sociology...).

Insufficient infrastructure for employees of international companies.

## Opportunities and threats

### Opportunities

Opportunities for a more daring, more targeted and continuous policy in the area of education, research and innovation, lowering dependency of leading officials on politicians. If the Public Service Act is passed, the high influence of politicians on appointing managers in public administration will be restricted, and it can be expected that the quality of teams and the performance of public administration will gradually increase.

### Political/legislative influences

### Threats

Business legislation. Constant changes and instability resulting out of the unpredictability of the environment. With the expected political changes at the national level (2014) we can expect further adjustments in tax and other legislation.

The existing regulation framework for research and innovation is getting worse and it is unsatisfactory - fragmented access/departmentalism, fragmentation of resources instead of concentrating on long-term support.

### Economic/financial impacts

Using freely available global know how for the growth of SMR companies Intellectual ownership (protection and handling). A major part of the global know-how is freely available and unused. Growing demand to protect own know-how and use available know-how.

Growing pressure to increase taxes as a result of the inefficient (non-effective) public administration. Current perception of public administration being an unreliable/incompetent partner.

Organising a value chain (sector specific). Growing importance of customisation, just-in-time logistics and the vicinity of development and production. It is likely that more development (parts of) will be reallocated near large production units. A new SF programming period 2014-2020 represents a major opportunity for research, development and education - providing that the corresponding project selection criteria will improve/will be introduced, the efficiency (eliminating excessive administration) will increase and relevant checks of allocated funds will be made.

A growing risk of restricting free trade (in particular non-tariff conditions). It can be expected that, in combination with a growing shortage of political leaders at the EU level, political and consequently economic nationalism will grow.

A shortage of public funds for essential investment to ensure high quality education will be even more prominent. Concurrently, the tension between quality and an equal access to education will intensify which will lead to the necessity to find new solutions to ensure access to high quality education for low income people.

### Social/demographic impact

Rise of new business opportunities (product and service area) as a result of aging population and a dynamic growth of the number of pensioners.

Less talent (decreasing the number of university students, current minimum secondary education, temporary growth of primary education) as a result of the

The number of people with ambitions to start their own business is growing thanks to the media, examples of successful entrepreneurs, better standard of living, and the conditions created.

As a result of migration, SMR will become more cosmopolitan if necessary conditions are created.

The aging population represents an opportunity to use the potential of "active pensioners" who are able to become involve and help foreigners coming to SMR, in particular, young researchers and their families with no social links ("adoptive grandparents").

dynamics of the population curve.

The tension between quality and an equal access to education will intensify, which will lead to the necessity to find new solutions to ensure access to high quality education for low income people.

## 5. ISENBERG'S SIX DOMAINS ENTREPRENEUSHIP ANALYSIS

*Please scan the regional ecosystem using the Isenberg six domains indicators as listed hereinafter.*

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### 5.1 REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

#### DOMAIN: POLICY

*Please focus on Governance Model, point out the endorsement of the innovation strategy at political level, analyze the priorities of public investment in research/education/innovation within the CERlecon regional entrepreneurship ecosystem. Focus on reliance on consultations with the regional stakeholders and the support of regional stakeholders to the innovation policy. Please list if there are specific provisions in public procurement procedures for innovation; Also explore the policies to support the collaboration of education/vocational training and research organisations with businesses; analyze local Key Enabling Technologies (KETs).*

The Assembly of the South Moravian Region is a self-governing body of the region with the powers to decide especially about issues of independent authorization. The law authorizes the Regional Assembly to submit draft legislative documents to the Chamber of Deputies, to submit proposals for cancellations of legal regulations to the Constitutional Court, to issue generally binding decrees of the region, to coordinate regional development, to approve concepts of development of regional tourism, to specify the scope of transport serviceability for the region, to decide about international cooperation, to approve the regional budget, to establish and cancel allowance organizations, to grant regional awards etc. The policy of economic competitiveness of SMR has been implemented through the Regional Innovation Strategies of SMR.

RIS SMR is known as a branch strategy for the South Moravian Region and it is governed by the Development Strategy for the South Moravian Region, and, in terms of the development policy of the statutory city of Brno, by the Strategy for Brno. These superior documents state the basic directions of economic competitiveness support, in particular, within the context of other local government policies (social policy, infrastructure, healthcare, etc.). RIS SMR develops these



directions into specific priorities, objectives, activities and projects/programmes. RIS SMR is in compliance with other strategic documents, such as the Regional Development Programme, the Strategy of Human Resources Development SMR, and the Concept of the Economic Development of the City of Brno (KERM). RIS SMR is not reflected in the strategic plans of major towns in SMR, although initial discussions were held in the town of Znojmo.

RIS SMR was defined on the basis of data collected as part of the extensive "Field Research of Companies in the South Moravian Region", when 185 personal interviews were conducted with companies in the key sectors in SMR and 30 interviews were conducted with researchers; 65 members of five working groups were involved. In order to direct the interventions of RIS SMR more precisely a "Field Research of Public Scientific and Research Offices in the South Moravian Region" and a "Field Research of Life Science in the South Moravian Region and adjacent regions in the CR" were conducted. A set of profile sheets, "Brno Business Navigator" and "Brno Research Navigator", were compiled for a more detailed analysis of the key stakeholders in RIS SMR and intervention clients.

On the basis of the analytical inputs stated above, RIS SMR determined four horizontal priorities:

- transfer of technologies;
- company services;
- human resources;
- and internationalization.

Four economic sectors were identified from the RIS SMR analysis: engineering, electrical engineering, information technology, and life science. Each horizontal priority was developed into strategic and specific objectives of the activities.

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## 5.2. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

### DOMAIN: FINANCE

*Please describe the actions implemented in the regional entrepreneurship ecosystem in order to facilitate policies and leadership like improving and financing public research, training and vocational centers, associations, NGOs) or platforms for dialogue between stakeholders; describe the actions implemented in the regional entrepreneurship ecosystem in order to promote the accessibility of dedicated finance like equity investment, business angels and venture capitalists, local business environment favourable conditions to the creation of new SMEs, the possible existence of instruments to foster the commercialisation of the innovation's outputs, specific measures to support young innovative enterprises. Provide informations on budgetary framework, stability of public funding in research, education and innovation;*

Thanks to strong co-operation between the City of Brno, the South Moravian Region, local universities, scientific institutions and local companies, funds worth more than 17 billion CZK were obtained from the Operational Programme Research and Development for Innovations for the construction and operation of high-end scientific centres in the last five years. Centres of excellence in science manage to lure the best scientists and professionals from around the world and talented students and research teams are supported.

The City of Brno finances Brno PhD Talent Project which has been launched in 2009. Its aim is to attract, motivate and support young talented scientists to doctoral study in Brno through financial support. It is a unique concept of the competition for talented PhD students in the Czech Republic. Already 72 students have been supported by total amount of 25,2 million CZK during the project existence.

The City of Brno also contributes annually by amount of 14 million CZK to the operation of VIDA! science centre which was opened on 1st December 2014. The purpose of the centre is to inspire not only children but also the general public for science, acquaint them with scientific knowledge in an interactive way and to convince them that science can be even fun. (*Brno Business Facts*).

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Over a long period of time, the following two autonomous institutions have been most active in the South Moravian Region (SMR): South Moravian Region and the Statutory City of Brno. In 2013, Znojmo started working towards supporting (innovative) enterprise.

The South Moravian Region has been supporting research and innovation since 2003 when the first generation of RIS has been discussed. SMR have been continuously supporting the activities of organisations established by the region (or in cooperation with the region), such as JIC (South Moravian Innovation Centre, 30 million CZK/year), the South Moravian Centre for International Mobility (10 million CZK/year), the Regional Development Agency of South Moravia (12 million CZK/year) and the Moravian Science Centre Brno (14 million CZK/year).

SMR is the bearer of SoMoPro (I., II.) programme which aims to finance an influx of foreign scientists and a return of Czech scientists into SMR. The volume of the programme was 95 million CZK for SoMoPro I. (2009–2013), and 105 million CZK for SoMoPro II. (2012–2015). Since 2005, SMR has invested five million into the Microloan Fund through JIC (JIC|Fund) which was used to finance new innovative companies. SMR has invested into the support of innovation infrastructure: construction of Technology Incubator II (120 million CZK); construction of INBIT biotechnology incubator and acquisition of research equipment (160 million CZK); construction of a scientific and technology park INMEC (394 million CZK); construction of the Competence Centre for Machine Tools Kuřim and acquisition of research equipment (72 million CZK); construction of the Moravian Science Centre Brno and acquisition of an exhibition (596 million CZK).

The Statutory City of Brno has been supporting research and innovation since 2003 when it co-founded JIC. The Statutory City of Brno (SCB) has been supporting activities of JIC since 2003 in the amount of two or three million CZK/year. Since 2005, the SCB has invested five million into the Microloan Fund through JIC (JIC|Fund) which was used to finance new innovation companies. The SCB made the support of investment and innovations more intensive after negotiating the third generation of RIS SMR in 2009. The SCB finances the Innovation Voucher Programme, having provided 8 million (until 2011), i.e. four million CZK/year, and Brno PhD Talent, having provided 8 million (until 2011), i.e. four million CZK/year. The SCB supports the activities of Brno Expat Centre by 1.5 million CZK/year and from 2015 it will be contributing up to 14 million CZK/year towards the activities of the Moravian Science Centre Brno. Furthermore, SCB prepared a feasibility study for a Creative Centre project through JIC (incubator for creative industries) within the premises of a former Penitentiary Centre, investing four million crowns. Last, but not least, it should be

mentioned that SCB makes significant investments into "hard" infrastructure" in the surroundings of the constructed research OP R&DI centers, investing hundreds of millions of CZK.

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### **5.3. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM**

#### **DOMAIN: CULTURE**

*Please describe the actions implemented in the regional entrepreneurship ecosystem in order to create a conducive culture (e.g. to foster tolerance of risk and mistakes, create a positive social status of entrepreneurs);*

There is a consensus among the institutions about the mission and vision of the region; the entrepreneurial culture and management of the region is highly developed.

There is no known specific action of Assembly of the South Moravian Region with purpose of achieving of the conducive culture in SMR. Creation of positive status of entrepreneurs is therefore provided by professional associations and by the Czech Chamber of Commerce (CCC), in SMR namely by South Moravian Regional Chamber of Commerce and Regional Chamber of Commerce Brno. CCC is the largest and most representative business association in the Czech Republic representing small, medium-sized and large companies, self-employed entrepreneurs, associations, unions and craftsmen organizations.

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### **5.4. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM**

#### **DOMAIN: SUPPORT**

*Please describe the actual situation and the actions implemented in the regional entrepreneurship ecosystem in order to create a set of infrastructural and institutional supports (e.g. transnational legal and accounting services in order to promote the identification of skilled advisors and consultants), to improve telecommunications and transport infrastructures, to sustain entrepreneurship and craftsmanship, either as individuals and as associations, supporting innovation in cooperation with stakeholder (like private enterprises / research centers / universities / trade unions / employers association / vocational training centers / public institutions). Point out other forms of support like the creation of aggregative forms between enterprises, fab labs or business incubators; outline the existence of regional "cluster";*

Based on the scope of R&D capacities, SMR has the second best suitable conditions for the development of knowledge economy after Prague. Its share of total R&D expenditure (GERD), in 2012, amounted to 20.3% of the total expenditure in the CR. Its share of GDP is 10.5%. Based on the number of employees in R&D, the share is 18.8%.

The support infrastructure for research and innovation in the South Moravian Region can be classified in several categories. One of the categories is the form of ownership (public vs private) and a focus on the target group (businessmen, researchers, students or wider public).

Considering the long-term and continuous political support of research and innovation policies in SMR, the public support infrastructure is relatively developed. The research and innovation support in SMR is implemented through the following public institutions<sup>86</sup>:

- **CzechInvest – regional office** provides information and services for the Operational Programme for Enterprise and Innovation and other national programmes supporting businesses. Furthermore, CzechInvest assists new foreign investors coming into the region.
- **Hvězdárna Brno**, p.o. (Brno Observatory and Planetarium) of the Statutory City of Brno, operates the planetarium with the aim to popularize scientific results and motivate children and teenagers to study natural sciences and technical subjects.
- **Intemac Solutions, spol. s r.o.**, is a shared, research and development platform focusing on dealing with company problems in the field of machine tools. The company provides services in the field of testing and measuring, machining technology, machine construction (identification of weak points of the existing machines, proposing optimal solutions, new concepts). Intemac Solutions, spol. s r.o. is a subsidiary company of JIC, an interest association of legal entities.
- **JIC, interest association of legal entities**, focusing on the support of knowledge-intensive companies (StartUp Programme), on supporting the development of new knowledge-intensive companies (Innovation Park programme) and on supporting the development of mature companies with growth potential (technology support programme and JIC/Platinn programme). Since 2009 JIC has been entrusted with the coordination of preparation and implementation of the Regional Innovation Strategy SMR. JIC is managed by SMR, Statutory City of Brno, Masaryk University, Brno University of Technology, Mendel University in Brno and the Veterinary and Pharmaceutical University in Brno.
- **Jihomoravské centrum pro mezinárodní mobilitu, z.s.p.o., (JCMM - South Moravian Centre for International Mobility)** focuses on supporting gifted students and human resources for research. JCMM implements the following activities: supporting an influx of experienced scientists into the region (SoMoPro programmes I., II., EURAXESS project); supporting new scientists (Brno PhD Talent programme); supporting an influx of foreign students and young scientists into the region (Internationalisation programme); supporting gifted students at secondary schools and Universities in SMR (Secondary Specialised Activities Support, Gifted Students Support and other activities to popularize science). JCMM is managed by SMR, Statutory City of Brno, Masaryk University, Brno University of Technology, Mendel University in Brno and the Veterinary and Pharmaceutical University in Brno.
- **Moravian Science Centre Brno, p.o.** of the South Moravian Region is operating the local science centre with the aim to popularize, promote and publicize scientific results in order to motivate children and teenagers to study natural and technical subjects. The annual budget of the centre is approximately 50 million CZK.
- **Regionální rozvojová agentura jižní Moravy, z.s.p.o., (RRA JM – Regional Development Agency South Moravia)** is mainly dealing with the preparation of projects for EU Structural Funds, supporting investment in the region and selected information services for the municipal sphere, with the administration of Small Project Funds in South Moravia/Lower Austria as part of European Territorial Cooperation, and development of environment for innovation and support of brownfield regeneration. The role of the RRA JM is a key for the implementation of RIS, in particular because it extends beyond the

<sup>86</sup> Institutions are listed alphabetically, not in terms of the significance of their impact on creating an innovation system.

municipal and regional government. RRA JM is established by SMR, the Regional Chamber of Commerce for South Moravia, and the Association of Municipalities in South Moravia.

- **Centres for Transfer of Technologies (CTT)** operating at public universities in SMR representing a specific "innovation infrastructure". CTT are established by **Masaryk University** (established in 2005), **Brno University of Technology** (established in 1997) and **Mendel University in Brno** (established in 2012). All three centres implement similar activities, namely: administration of intellectual property of the university; identification of intellectual property of the university; protection and commercial use of intellectual ownership through licences and foundation of companies; provision of material samples; mediating contractual research for the application sphere, mediating the use of laboratory capacities for the application sphere, mediating professional consultation for the application sphere, etc. The quality and scope of the services provided differs among the CTTs, depending on the term and scope of funding of the centres.

In addition to the public institutions in SMR mentioned above, there are also the following institutions:

- **South Moravian Regional Chamber of Commerce (SMRCC)** is an interest association of Chambers of Commerce from individual districts in the South Moravian Region and it is the main entity of the business autonomy in the region. The SMRCC provides comprehensive advisory services (customs, export, legal, subsidies etc.), and cultivates and develops human resources in order to increase innovativeness and competitiveness. Foreign enterprise missions are organised to support internationalisation of companies. Last, but not least, many contact events are organised for entrepreneurs to improve their networking, to share experience and serve as examples of good practice. The SMRCC founded two subsidiary companies in order to build and operate scientific and technology parks, VTP Brno, a.s., and Biology Park Brno a.s. These parks provide place for scientific and development activities of innovative companies, in addition to the provision of the service required and consultancy to support and develop innovations.
- **Brnopolis, o.s.**, implements the **Brno Expat Centre Project** in order to enable integration of highly qualified foreigners in Brno.

Private law institutions implement support activities that are partly subsidised by the local government or through grants from national/European funds.

Risk capital and business angels funds represent key innovation "infrastructures". There are several risk capital funds in SMR, such as Brno **Y Soft Venture Fund**, Prague **Credo Ventures**, business angels association **42Angels** and others that cannot be stated publicly. More than 50 million crowns was invested into startup companies in SMR.<sup>87</sup>

All support infrastructure institutes are located in Brno, apart from Intemac Solution, spol. s r.o., (Kuřim). Public agencies such as JIC, JCMM, SMRCC, MSCB operate within the entire region. The regional focus of their activities is also significantly influenced by the geographical location of their clients.

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<sup>87</sup> Data for investment from VC and BA was provided by JIC, z.s.p.o., the data was collated from its clients.



## 5.5. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

### DOMAIN: HUMAN CAPITAL

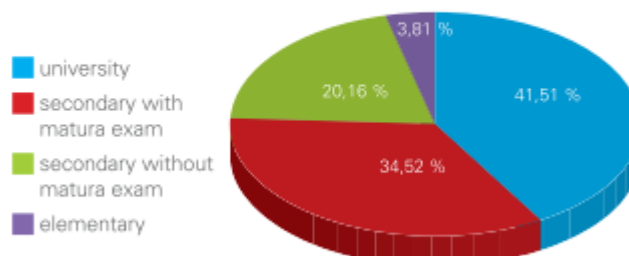
*Please describe the actual situation and the actions implemented in the regional entrepreneurship ecosystem in order to improve relevant human capital (e.g. encourage entrepreneurship, innovative training programmes for entrepreneurs, employees and unemployed people); List regional competitive advantages like localised know-how and special experiences and skills of regional actors. Outline activity domains where the regional entrepreneurship ecosystem is specialized. List available regional analyses on R&D investment, publications and citations or other data concerning patent applications and attractiveness of working conditions for researchers; mobility of research and innovation employees between the public and the private sector.*

In the field of human capital, the most important is the scope of university capacities in Brno. Thanks to the fact that Brno is an inter-regional centre of university education, there is a concentration of talent and university qualified people in the region (however, the concentration is in Brno and surroundings, only). Brno, as a university city, produces tens of thousands of graduates who represent an interesting employment potential. The subject structure of university education enables to create unique interdisciplinary subjects.

Some of the fields of study on offer in Brno are so good that many students from the whole of the CR/SR apply to study in Brno and choose Brno universities as their first choice university (informatics, law, some of the VUT FSI fields, FEKT, some fields of medicine, sociology...).

In terms of the development of knowledge economy, university education and healthcare represent fundamental specialisations. There are over 80 thousand university students studying in Brno which creates the human resources necessary for the development of enterprise and innovation, and the development of research. Thanks to the accessibility of talent, some Czech companies from other regions consider relocating, or placing their R&D activities in Brno. Brno University of Technology represents the main partner for R&D for many companies from Moravia.

### STRUCTURE OF EMPLOYMENT BY ACHIEVED EDUCATION LEVEL

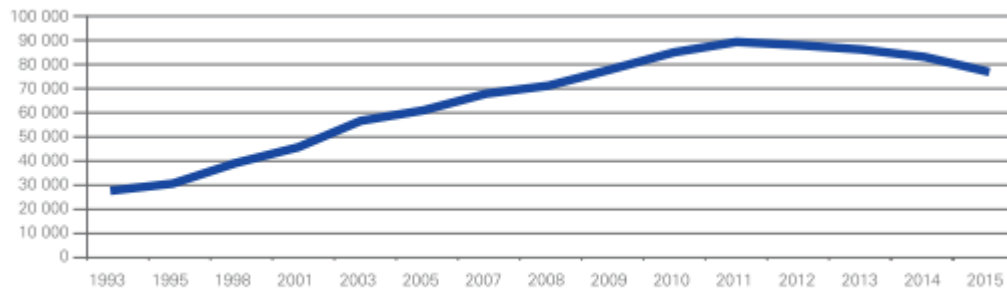


Source: Survey of employment in the South Moravian Region, data as of 31 December 2014

Brno Business Facts ([www.bрно.cz](http://www.bрно.cz))



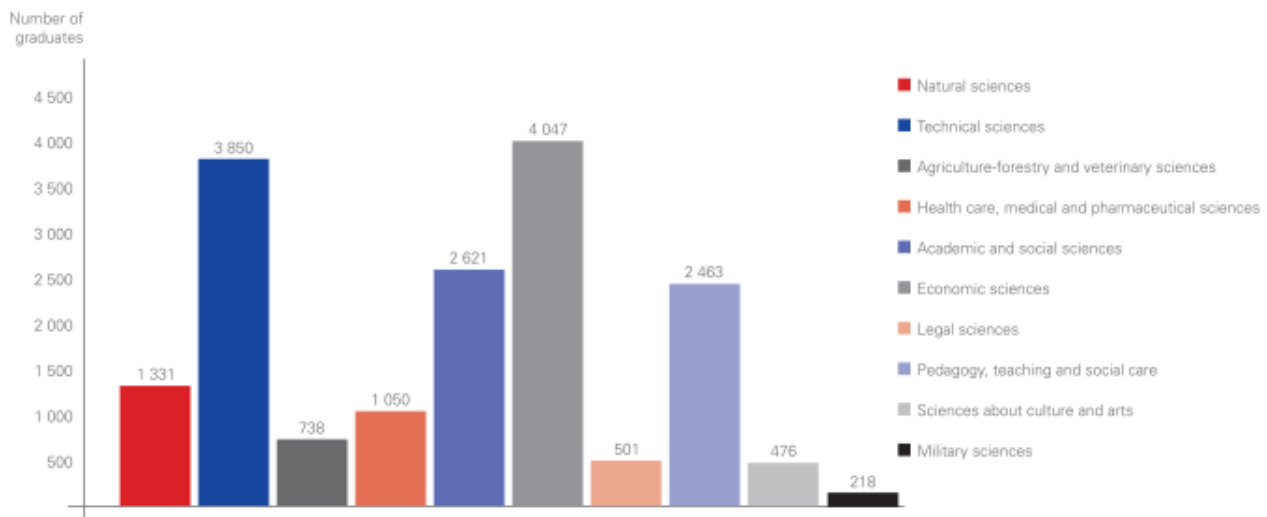
## PROGRESS OF NUMBER OF STUDENTS



Source: City Strategy Office, available data as of 2015

Brno Business Facts ([www.brno.cz](http://www.brno.cz))

## UNIVERSITY GRADUATES IN BRNO BY BRANCHES



Source: City Strategy Office, available data as of 2015

Brno Business Facts ([www.brno.cz](http://www.brno.cz))

There are also good quality secondary schools (Řečkovice Grammar School, Cpt. Jaroš Grammar School and others); the students of these schools are repeatedly winning nationwide students competitions.

Innovative seminars, courses and workshops for entrepreneurs are offered by institutions stated in previous chapter with aim to promote innovative entrepreneurship and commercialization of R&D in South Moravian Region.

The Brno Expat Centre helps foreigners find a new home in Brno and create an open environment, so enabling them to take part in the life of the city. Their vision is to be the main place for foreigners to turn to for advice and help, and a key partner of the City of Brno and local international businesses when it comes to communication with foreigners. BEC offers skilled foreign professionals and their families who live and work in Brno or plan to do so:

- individual consultation and advice on a variety of daily living issues:

- assistance and interpreting in meetings with authorities and service providers;
- networking events;
- entertaining English language writing and a monthly newsletter;
- and social network channels (Facebook, LinkedIn) for sharing knowledge and contacts.

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## 5.6. REGIONAL INNOVATION CERlecon ENTREPRENEURSHIP ECOSYSTEM

### DOMAIN: MARKET

*Please describe the actual situation and the actions implemented in the regional entrepreneurship ecosystem in order to create new markets or to improve venture friendly markets for products (e.g. transnational networks, support in identifying early adopters for innovative products or services);*

The overview of the implemented/ongoing selected actions:

<b>SCHEMA, support, project name</b>	<b>Implementation guarantor</b>	<b>Financial resource/guarantor</b>	<b>Approximate allocation in the last 2 years</b>	<b>Brief evaluation (outputs, results)</b>
SoMoPro I. II- (South Moravian Programme for Distinguished Researchers)	JCMM/SMR	SMR 60%/FP7 40%	95 million 2009–2013 105 million 2012–2015	Attracting foreign scientists and reintegration of scientists (SoMoPro I. – 27 scientists, SoMoPro II. – 25 scientists).
JIC   StartUp Program (StarCube, StartUp Club, MIC Minutes, etc.)	JIC	SMR/Brno - City/income JIC/OP EC	5 million/year	Supporting the foundation of knowledge intensive companies. 9603 persons were trained in total, there were 339 events, 668 enrolled into the StarCube programme, 153 attended StarCube, 25 new companies were founded, more than 20 million CZK was invested from BA or VC, and there were 50 active external mentors.
Incubation programme (JIC   Innovation Park)	JIC	SMR/Brno City/revenue of JIC/OP EI	approx. 15 million/year	Supporting the development of knowledge-intensive companies. Over 160 startup companies were supported and more than 40 million was invested through BA or VC (from 2004 to 2013).

Microloans (JIC/Fond)	JIC	SMR/Brno City	2 x 5 million a single deposit into the fund	Supporting financing of debts of start-up companies
JIC   Innovation vouchers	JIC	Statutory City of Brno	4 million/year	Supporting the initiation of collaboration between companies and research organisations - so far, 250 collaborations have been supported.
Department of Transfer of Technologies Brno University of Technology	University of Technology	University of Technology	approx 4 million/year	Provision of TT services to researchers and companies
Centre of technology transfer MU	MU	OP EI/MU OP R&DfI	Approx. 15 million/year	Provision of TT services to researchers and companies
Centre for technology transfer MENDELU	MENDELU	OP R&DfI	10 million/year	Provision of TT services to researchers and companies
JIC   Internationalisation.	JIC	SMR	3 million/year	Supporting inclusion of companies and research organisations into foreign research projects.
Construction of IT VUT incubator	University of Technology	Phare/Park Ministry of Industry and Trade/VUT	50 million	1200 m <sup>2</sup> office space
Construction of TI II incubator	SMR	OP EI/SMR	100 million	3000 m <sup>2</sup> office space
Construction of INBIT incubator	SMR	OP EI/SMR	160 million	3000 m <sup>2</sup> office space and laboratories
Construction of INMEC incubator	SMR	OP EI/SMR	400 million	6000 m <sup>2</sup> office space and laboratories
Competence Centre Kuřim - machine tools/Intemac Solutions, s.r.o.	Engineering companies/JIC/SMR	OP EI/SMR	72 million (initial investment) Op. budget 2014 – 5.3 M	Provision of research and measuring services to engineering companies with regards to machine tools.
Creative centre (incubator for creative industry)	JIC	SMB	4 million	Completed feasibility study
Business incubator - Znojmo	City of Znojmo		0.5 million/year	Pilot operation

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CERlecon Partner

Gmina Miejska Kraków - Urząd Miasta Krakowa PP13

Izba Przemysłow o-Handlowa w Krakowie PP14

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### CERlecon Regional Ecosystem Evolution

Please lay out basic facts about regional evolutions of entrepreneurship, employment unemployment and wages in the post war period, including adverse shocks to the regional employment system, how they were adjusted, how wages declined, if new jobs were created to replace those jobs destroyed or if workers moved out. Please provide all informations to better understand the local entrepreneurship<sup>88</sup>.

(Quantity of text / number of characters in all the descriptive sections below are left to the discretion and to the data availability of each Partner).

Małopolska is one of the most attractive regions in Poland which is undergoing a dynamic development process, starting from the nineties of the twentieth century. Today, Małopolska is an important place for the development of entrepreneurship.

Małopolska provides 7.2 % of Poland's GDP and has high rates of economic growth. The unemployment rate in Małopolska was at **9,5 %**, the end of Q3 2010 (today is 6,9 %), the number of employees in productive age (18-59 years for women and 18-64 for men) amounted to over **2 million** persons. Małopolska is also characteristic for its great availability of qualified workforce. Labours costs in the region are close to the national average (**average monthly salary in the region** : approximately **780 euro** (2014)). At the same time, the level of the social activity, which is one of the indicators of workforce quality, is above average.

The average monthly gross wages and salaries in enterprises sector in the first half-year of 2015 amounted to PLN 3614.9, which is 125% of the average for Poland. In 2013 Lesser Poland voivodship made a contribution of 7.7 % to the GDP of Poland.

Calculated per capita, it amounted to PLN 35163.6 with the average for Poland PLN 43175.

<sup>88</sup> Olivier Jean Blanchard Massachusetts Institute of Technology and Lawrence F. Katz Harvard University

With this result the voivodship takes the 7th place in the country. The GDP growth rate in the voivodship in the years 2003-2013 amounted to 208% while the average for Poland amounted to 197%.

The structure of employment in the voivodship is characterised by a relatively high share of the service sector (58.5%) whereas a share of the agricultural and industrial sectors are respectively 11% and 30.5% (Central Statistical Office, Local Data Bank 2015).

In the structure of voivodship's trade important role is played by: manufacture of food products (16% of sold production of the whole voivodship's industry at the end of 2013), manufacture of metal products (8%), manufacture of electric appliances (6%), manufacture of rubber and plastic products (5%) and manufacture of metals (5%).

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## 1. General informations about Malopolska Region

1.1 Area -15 183 square km

### 1.2 Population

1.2.1 N. of inhabitants 3.368.336 (2014)

1.2.2 Population Growth Forecast - in 2050 -12 %

1.2.3 Migration inflow Growth Rate 0,09 %

1.2.4 Migrant persons (percentage on population) 2,4 %

1.2.5 Migrants' countries of origin:

1) Ukraine (31 %),

2) Vietnam (11%),

3) Russia (10%)

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### 1.3 Employment

1.3.1 Employment rate: 52,5%,

1.3.2 Employment rate by gender: women 20,5% men 32 %

1.3.3 Unemployment rate: 8,3% ( September 2015), in Poland : 9,7%.

1.3.4 Inactivity rate 7,2 %.

1.3.5 Youth unemployment rate (aged 15-24) 1,8 %,

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### 1.4 GDP

1.4.1 Regional GDP per capita in zł – 38 157

1.4.2 Regional GDP is 7% of national GDP per capita

1.4.3 Growth Rate 2016: 3,6 % (2012 in relation to 2011

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### 1.5 - Business Demography (OECD Region Classification):

- Predominantly Urban (PU), the share of population living in rural local units is below 15%;

x Intermediate (IN), the share of population living in rural local units is between 15% and 50%;

Predominantly Rural (PR), the share of population living in rural local units is higher than 50%

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## 1.6 Number of registered enterprise (registered VAT)

1.6.1 - Type of businesses: Enterprise size class:

- 1-9 employees 325 256 (n. of units) of regional
- 10-49 employees 15 451 (n. of units) of regional
- 50-249 employees 2 586 (n. of units) \_\_\_ % of regional
- 250 and over employees 433 (n. of units) \_\_\_ % of regional

1.6.2 Main regional business sectors (NACE classification)

C10 - Manufacture of food products

C20 - Manufacture of chemicals and chemical products

**C27** - Manufacture of electrical equipment

C29 - Manufacture of motor vehicles, trailers and semi-trailers

C31 - Manufacture of furniture

F41 - Construction of buildings

F41.2 - Construction of residential and non-residential buildings

J61 - Telecommunications

J62 - Computer programming, consultancy and related activities

## 1.7 Production

1.7.1 Production for national market ( 95%)

1.7.2 Production value 18 763,

8 Millions Euro

1.7.3 Growth Rate 2016: 3,1 %

1.7.4 Export production- 5% of GDP

1.7.5 Production value 938,15 Millions Euro

1.7.6 Growth Rate 2016: 8 %

1.7.7 Main export areas 1) Niemcy 2) Wielka Brytania 3) Czechy

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## 1.8 R&D expenditure

1.8.1 Regional Total R&D expenditure as a percentage of GDP (all sector) 0,1 %

1.8.2 Growth Rate: 1,9 %

1.8.3 National total R&D expenditure as a percentage of GDP (all sector) 0,9 %

1.8.4 Growth Rate: 2%

1.8.5 Researchers as a percentage of persons employed 8%

## 1.9 Labor cost



1.9.1 - Average labor costs per employee (including wages, salaries in cash and in kind, employers' social security contributions) 3 740 in PLN

1.9.2 - Average Monthly Disposable Salary - 40h/week (Net After Tax) 2700 in PLN

1.9.3 - Pay Frequency  weekly  monthly

1.9 - Cost of Living (please provide information about housing affordability, household final consumption expenditure, comparative prices)

### Restaurants:

Meal, Inexpensive Restaurant 25.00 zł

Meal for 2 People, Mid-range Restaurant, Three-course 100.00 zł

### Markets

Milk (1 liter) 2.38 zł

Loaf of Fresh White Bread (500g) 2.66 zł

Rice (white), (1kg) 3.19 zł

Eggs (12) 6.43 zł

Local Cheese (1kg) 21.05 zł

### Transportation

Monthly Pass (Regular Price) 100.00 zł

Taxi Start (Normal Tariff) 7.00 zł

Taxi 1km (Normal Tariff) 2.20 zł

### Rent Per Month

Apartment (1 bedroom) in City Centre 1,652.82 zł

Apartment (1 bedroom) Outside of Centre 1,283.88 zł

### Buy Apartment Price

Price per Square Meter to Buy Apartment in City Centre 7,559.28 zł

Price per Square Meter to Buy Apartment Outside of Centre 5,187.18 zł

Distribution of expenses using our statistical model:

Transportation- 13,2 %

Clothing And Shoes- 3 %

Sports And Leisure-7 %

Markets - 28,2 %

Utilities (Monthly)-9,7%

Rent Per Month - 25%

Restaurants- 12,7%

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## 2.Trends:

Innovation is crucial to Europe's economic growth and the role of companies as primary sources of innovation and engines for growth and creation of jobs is fundamental. Please list main behaviours and trends of the regional entrepreneurship ecosystem as far as innovation related activities are concerned covering the following areas:  Profiles of companies that develop innovations;  The impact of innovations on turnover, and the proportion of turnover invested in innovation activities;  Barriers to commercialization of both innovative and non-innovative goods and services;  Preferred types of public support for the commercialization of goods or services;  The role of design, and the use of advanced manufacturing technologies;  Involvement in public procurement and the role innovation plays in this process.

Today, we can see in Polish startups the trends that may be crucial for the further development of Polish startups.

First of all, there is a decline in the number of companies targeting their products at individual customers from 49% to 42% in exchange for a greater share in corporations, governments and NGOs.

Another is the growing group of startups working for corporations, NGOs and the largest structures in the world, i.e. government administrations.

Recently we can see a trend of global needs. In Poland is 29% of startups working for corporations, 23% in the B2G model and 14% for NGOs. It's a B2N2G model, because NGOs often perform tasks that before were part of the structures of central and local governments.

This trend not only gives startups sales that are usually on a large scale, but also changes Polish reality, providing completely new solutions and allowing you to dream of global aspirations for Polish startups.

It is tendency for startups to become independent from research units. Thanks to the tax benefits some companies prefer to conduct such tests at home (almost half of the startups declare collaboration with the scientific community, and 1 in 10 startups have their own laboratories).

It is also tendency that scientists are more and more eager to transform their unique knowledge into products corresponding to real customer problems (every fifth startups founder is a scientist).

More than half of the startups are registered in one of four locations: Warsaw, Krakow, Poznań and the Tri-City area. Other significant places of startup registration also include Wrocław, Szczecin, Białystok, Łódź, Lublin and Katowice. International registrations are mostly based in the United Kingdom and the United States. 23% of startups are registered in other Polish cities, and 3% abroad.

Examples of **startups** in malopolska region, which have developed innovations include: Estimote, Kontakt.io, Duckie Deck, Azimo, Brainly, Eventory, Sher.ly, Husarion, MISBHV

In other Polish regions are:

Egzotech in Gliwice,

Brand24, Emerald, Pixers, LiveChat, Techland, PiLab in Wrocław,

Audioteka, GoldenLine, Infinity, Growbots, Neuroon, Showroom, Migam, Evenea, DreamJay, Risk Made in Warsaw, Social WiFi, MUSE, Saule Technologies, Codility in Warsaw,

Listonic in Łódź,

Booklikes, Qpony, JakDojade, Legimi, IC Solutions, Omni3D in Poznań,

UXPin, VoiceLab, Everytap, Blast Lab, Quantum Lab in Tri-City

Pixel Legend, Wspieram.to, Tidiochat, WellServed in Szczecin.

**Barriers to commercialization of both innovative and non-innovative goods and services include:**

Insufficient knowledge by startups on how to protect their inventions, as well as the benefits of obtaining such protection. In some industries, especially in IT, patent protection does not provide real protection today. Obtaining a patent requires the disclosure of technology. Due to the nature of territorial patents, obtaining a wide range of security requires high costs and in the case of startup budgets it is a very high investment.

Barriers to the interface between science and business :

1. Differences in the perception of the value of technology.
  2. Problems with the transfer of rights.
  3. Developing solutions in research and development units that are often divorced from the needs of the market.
  4. Too low TRL (Technology readiness levels) for development of quickly profitable business.
- Startups estimate the costs, time and risks associated with scaling technology.

Preferred types of public support for the commercialization of goods or services is National Centre of R&D and Horizon 2020 grants. Among the startups that raised capital from external sources, the most often chosen sources are: subsidies from the European Union (24%), Venture Capital funds (22%) and business angels (17%).

Almost 80% of the startups have used their own funds (including revenue from sales) for their venture.

Non-financial support- almost every fourth startups used the services of an incubator or accelerator. The fewest startups benefited from the support given at universities

A highly specialised institution operating in business environment, making a powerful impact on the economic development in Małopolska is **Kraków Technology Park with Małopolska Information Technology Park (MPTI), The KTP TECHNOLOGY INCUBATOR and clusters.**

**Małopolska Information Technology Park (MPTI)** is the most modern IT park in Malopolska. MPTI has generous infrastructure, state-of-the-art labs, office space and a vast range of training, information, and consulting opportunities for IT sector businesses. Małopolska Information Technology Park (MPTI) is the nexus of cooperation of businesses, research units, and local and regional government. This is where both small and medium-sized ICT businesses will find their home. Great ideas and innovation are born here.

**THE KTP TECHNOLOGY INCUBATOR** have supported young IT businesses since 2008, and have worked with over a hundred of them. Joining a large community of businesses operating in the same sector, businesses that find their way to this incubator can count on preferential rent and a quick start.

The Kraków Technology Park (KTP) is more than just infrastructure and creative environment. KTP provide the most innovative businesses with access to financial assets that let them develop products and services changing the world. Cooperating with capital investors, KTP set up investment vehicles that finance the development of innovative enterprises at the early, most risky stage of development.

Operating currently at the KTP are the KTP Seed Fund and INNOventure.

**KPT Seed Fund** The KTP Seed Fund is a joint project of the Kraków Technology Park and SATUS Venture. It makes investments in innovative business projects, developing capital companies with concept owners. Its portfolio includes over 20 businesses, many of which have already acquired successive investors – both individuals and venture capital funds. In 2010–14, the KTP Seed Fund investments made use of the Innovation Economy programme. Beginning with 2015, the Fund uses capital from own funds obtained from the sales of shares in companies in which it made prior investments. The KTP Seed Fund is especially interested in engineering, technology, and IT projects.

**The INNOventure** is a fund that specialises in commercialisation of results of research and scientific work. It was set up in December 2014 in collaboration with private investors and the National Centre for Research and Development, as part of the BRIDGE Alpha programme. INNOventure supports scientists and inventors in project development and marketing, and increasing project value. Embarking on cooperation with the fund, concept owners may count on minimum bureaucracy, protection of intellectual property rights, a transparent path of commercialisation, and financial assets for pre-incubation activities and investments. INNOventure fund cooperates closely with institutions of higher education, scientific institutes, technology transfer centres, and special purpose vehicles spun off by institutions of higher education. This cooperation has resulted in the setting up of the first companies based on intellectual property developed in institutions of higher education. The funds operating at the Kraków Technology Park invest money, yet their support goes far beyond pure capital. Understanding the extensive range of

needs and requirements that a new, developing firm faces, they also provide support at the content, advisory, and business levels.

### Clusters:

**Kraków Film Cluster (KKF)** is a cluster of professional businesses, organisations, and experienced professionals operating in the film sector in Małopolska. It is also a platform for exchanging information, and promotional, educational and innovative activities. The cluster offers complete on-set, production, and postproduction services, which streamlines film production in Małopolska. It helps to acquire funds in the region and manage the project. Its support extends both to major and small-scale productions, ensuring top-class specialists, professional equipment, picturesque locations, and high quality of services at preferential prices. Its services are offered to foreign producers and Polish ones from outside Małopolska. Thanks to its members, the cluster is a production conglomerate capable of completing any film production in the south of Poland. The KKF is also the partner of the Kraków Technology Park (KTP) multimedia laboratory (MultiLab).

**Digital Entertainment Cluster** The operation of the Digital Entertainment Cluster (DEC) was initiated in 2013, and its main mission is to support the games market. The basic tasks of the cluster include organisation of cooperation between Polish businesses, enhancement of the potential of the Polish sector at foreign fairs, and support in obtaining financing for participation therein. Following the principle that “size does matter”, it significantly leverages promotion of Polish businesses at international events. Additionally, the DEC supports the process of acquiring foreign business partners for Polish companies from the sector.

**MAKE-IT MAŁOPOLSKA CLUSTER** is an alliance of businesses operating in the realm of new technologies. It is primarily a group of people who believe that it is quality that provides the greatest competitive edge of the Polish IT sector. An ecosystem favouring cooperation has been developed inside the KTP building. The presence of many businesses at a single location helps to start business contacts, run projects, exchange experience, and jointly represent the interests of IT sector businesses.

**MAŁOPOLSKA EDUCATION CLUSTER** The agreement incorporating the Małopolska education cluster was signed in May 2015. It aims at improving the quality of vocational education, increase availability of hands-on training, internships and residencies for students conducted in the actual working environment. Members of the cluster include schools, centres for vocational and life-long education, communes, counties, companies (including Pawbol sp. z oo., Fideltronik Poland sp. z oo., Krakodlew SA,), the Local Education Authority in Kraków, Małopolska Regional HQ for Voluntary Labour Corps, Małopolska Chamber of Craft and Entrepreneurship, and Małopolska In-Service Teacher Training Centre. As the coordinator of the cluster, the Kraków Technology Park organises reconnaissance visits in businesses situated both within the special economic zone and beyond for students of lower secondary, vocational, and technical secondary schools from the Małopolska Region.

Public procurement. Among the startups , 83% of them declared that they have never applied for the award of a public contract.

The group that competes for public tenders is quite characteristic: they are startups with a better position on the market than the average in the study (more than 60% of them were registered before 2014) and are larger (every third employs more than 10 people). They produce or design hardware (one in three), or their products relate to mobile technologies, IT or electronics and robotics. These are moderately profitable companies with a distinctive, high share of funding from external sources, especially VCs, business angels and NCBiR (The National Centre for Research and Development), Horizon 2020, or PARP (The Polish Agency for Enterprise Development). Every fourth founder in these startups has a doctorate, and 2/3rds of them are involved in research

and development, while half are working with local universities, and every sixth has patents – also abroad. Half of them are exporters, but mostly small portions of their sales, and the main direction of these exports are the European Union countries.

It can be stated that developing startups seeking to commercialize new scientific solutions in the field of high technology, using external funding, including public funds allocated for this purpose, are interested in the acquisition of public procurements.

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### 3. RIS3 Regional potential for innovation - Territorial Smart specialization sectors

To better understand CERlecon entrepreneurship ecosystem, a RIS3 approach is needed to analyze each regional ecosystem, in order to assess existing assets and future development. The aim of this analysis is to focus on: 1) regional assets, 2) linkage with other regions, 3) dynamics of the entrepreneurial environment.

#### \*3.1. Regional assets analysis:

According to the regional specificities, identify the main regional ecosystem assets, and also any bottlenecks of the innovation system and key challenges both for the economy and the society.

To implement this analysis, suitable tools are: regional profiling studies, targeted surveys and expert assessments.

The main Małopolska ecosystem assets, in relation to other Polish regions:

- excellent human potential - entrepreneurial, educated population,
- very active start-up community, thanks to which Kraków is considered a city of start-ups, and Małopolska is recognised as a region of modern technologies, notably or its global start-ups, such as Estimote, Brainly, Seed Labs,
- modern infrastructure crucial for implementing innovative solutions,
- the greatest pool of EU structural funds for the region to date – nearly EUR 2.9 billion.
- regional self-government open to cooperation and creating new activities,
- high rank of Małopolska in world rankings:
- Małopolska taking the top ranks in the FDI European Cities&Regions of the Future 2014/2015 ranking by Financial Times:
  - Rank 2 among the regions of Eastern Europe with the best strategy for attracting investors,
  - Rank 10 for Małopolska (the only Polish region) among the medium-sized regions with the best strategy for attracting foreign direct investment,
  - Rank 5 for Małopolska among the most attractive Eastern European regions for investors (top rank among Polish regions)
- Rank 9 for Kraków among the best global BPO/SSC destinations and the top rank in the THOLONS 2013 Top 100 Outsourcing Destinations Rankings (best destination for business services in Europe),
- high university potential, with the number of students among the highest in Poland, which is to determine the region's future,
- 32 higher education institutions and universities, representing 7.1% of all higher education institutions in Poland. Over 180 thousand students and more than 55 thousand graduates per year,



- Małopolska has a high potential for scientific research and higher education - Kraków is the second center for research - development in Poland,
- More than 100 research - development centres including Foundry Research Institute, Institute of Forensic Research, Institute of Oil and Gas, Institute of Advanced Manufacturing Technologies. In addition, numerous research and design centres of international companies: ABB, Cisco, CH2M, Teva R&D Centre, Comarch R&D Centre, SYNTHOS R&D Centre, Delphi Technical Centre, Sabre Software Development Centre.
- Financial outlays on R & D place the Region on the 2nd position in the country.

Selected higher education institutions:

**Stanisław Staszic University of Science and Technology in Kraków**, selected faculties: automatics and robotics, construction, electronics and telecommunication, geodesy and cartography, mining and geology, information technology, materials engineering, metallurgy, chemical technology.

**Tadeusz Kościuszko Technical University in Kraków**, selected faculties: architecture and development, automatics and robotics, construction, electrical engineering, energy, information technology, chemistry and process engineering, mechanics and machine construction, environment protection, logistic.

**Jagiellonian University in Kraków**, selected faculties: administration, biotechnology, economics, information technology pedagogy, management, public health, law

**Collegium Medicum UJ**, Selected faculties: surgery, dentistry, cardiology, pharmacy, health sciences

**Hugon Kołłątaj Academy of Agriculture**, selected faculties: biotechnology, economics, geodesy and cartography, environmental engineering, forestry, horticulture, agriculture, agricultural and forestry technology, animal husbandry.

**University of Economics in Kraków**, selected faculties: economics, finance and banking, spatial management, information technology and econometrics.

In 2013, over 25 % of entrepreneurs' spending's on innovations were allocated on R&D (1<sup>st</sup> place in the country).

The Malopolska Region is the first Polish region honoured with the prestigious award- the title of the European Entrepreneurial Region 2016. This award from the President of the European Committee of Regions, was received in Brussels by the Marshal of the Malopolska Region.

The European Entrepreneurial Region 2016 (EER) is an initiative of the Committee of the Regions started in 2011. In this way they, EU regions that stand with outstanding and innovative business strategy are rewarded. Regions that provide the most reliable, future-oriented and promising action plans in a given year are awarded the title of the European Entrepreneurial Region. Every year, top three regions are selected.

Malopolska has the infrastructure, which is of particular importance for enterprises operating in the field of smart regional specialisations. The key centres include:

- **Małopolska Information Technology Park:** a modern business and science centre offering space for young IT companies and providing opportunities for broad development and mentoring carried out by the company in cooperation with the Małopolska Region – Krakow Technology Park.
- **Małopolska Smart Specialisation Parks**, i.e. a network of science and technology parks in the areas of the region's smart specialisation, operating at the AGH University of Science and Technology, the Cracow University of Technology, the University of Agriculture, the Jagiellonian University and the University of Economics in Cracow. The parks'



infrastructure will be designed to host innovative enterprises set up based mostly on technologies developed at the universities.

- **Life Science Park**, whose activity focuses mainly on providing laboratory space, financing and supporting development of new innovative companies and scientific projects in the area of life science, making available the resources of Cracow-based universities, and delivering educational projects designed to prepare a group of managers for the conducting of businesses in the life science industry.
- **Colab** – a Kraków co-working centre offering space for the activities of young start-ups while at the same time providing networking opportunities, exchange of know-how and sharing ideas on joint projects.
- **hub:raum Kraków** – an incubator of innovation established by Deutsche Telekom to lend support to young start-ups operating in high technology industries in four areas: financing, providing space to work (co-working), consultancy by mentors and experts, and access to the resources of Deutsche Telekom (mainly to the infrastructure and the client base).
- **Technology Incubator of the Kraków Technology Park** - established in 2008 with a view to promoting the idea of commercialisation of modern technologies and creating conditions supportive to a design and development of innovative projects. To date, it has been successfully pursuing these goals in that it has offered space for creative people seeking suitable environment for themselves and for their ideas.
- **Academic Incubators of Entrepreneurship (AIE)** – a network of incubators set up by a buoyant community of people with entrepreneurial zeal. There are more than 310 businesses operating within AIEs in Cracow. AIEs are present, among other places, at Małopolska-based universities, but operate also as independent entities offering each person the possibility of registering their business activity under the legal personality of the incubator and providing accounting and legal services as well as office space.

The Małopolska Region is a shareholder in 6 companies being business environment institutions, key to enterprise development in the region:

- **Krakow Technology Park:** implements a number of projects which influence the region's technological growth, enterprise development, promotion of innovation and new technologies, and creation of a positive climate around business; it also manages the Special Economic Zone in Cracow.
- **Małopolska Regional Development Agency:** specialises in services designed for enterprises, providing comprehensive know-how and modern financial solutions; it renders services related to the obtaining of the EU funds and helps to effectively invest in Małopolska.
- **Małopolska Industrial Parks:** its tasks are to locate new business projects in the region, obtain new sites for investment projects, and also to provide management and administration services with regard to premises and buildings.
- **Tarnow Regional Development Agency:** is a specialised regional development institution cooperating with state and local governments, institutions, organisations and business entities.
- **Malopolska Credit Guarantee Fund:** is an institution focusing on a provision of support to a development of small and medium-sized enterprises, consisting in facilitating of their access to debt financing through granting of guarantees for credit facilities and loans taken out by them.
- **Malopolska Regional Guarantee Fund:** is a company whose task is to facilitate entrepreneurs' access to external sources of financing in the form of credit facilities and loans offered by banks and other financial institutions.

**Bottlenecks of the innovation system :**

- a lack of an sufficient entrepreneurial culture and mind-set leading to a limited interest in entrepreneurship (compared to European business leaders in innovation),
- inadequate links between R&D and business support institutions and enterprises, lower than the potential.

**Key challenges both for the economy and the society:**

The one of the biggest challenges facing the ecosystem of startups in Poland is the implementation of joint research and development projects by startups and researchers in the EU financial perspective 2014–2020.

The biggest challenge for both parties is not the sharing of intellectual property rights, but also establishing the rights of individual partners participating in joint projects. This has an impact on the distribution of profits from the use of the joint intellectual property and the ability to make decisions about the commercialization of the intellectual property. Collaboration with scientists leading to the creation of joint intellectual property entails the need to respect the rights of these partners, including their right to profit from the exploitation of these rights.

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**3.2. Linkages with the rest of the world and the position of the region within the European and global economy analysis**

Please make a comparisons with the other CERlecon and European regions in order to outline possible linkages and to better accede to RIS3 assessment of existing local regional innovative advantages. International value chains in this respect are a crucial element to be considered. This analysis will prevent “blind’ duplication of investments” already done in other European regions, averting from an excessive fragmentation of investments that could hamper the reach of the critical mass required for success. On the contrary, interregional collaboration with other CERlecon entrepreneurship ecosystems should be pursued whenever similarities or complementarities with other regions are detected.

To implement this analysis, suitable tools are: comparative studies, rounds of interviews with other regions and interregional work groups.

Poland like Italy, Slovakia, Croatia and Czech Republic is a Moderate Innovator.

Like in the most developed countries, the strategy of using one's own resources, is becoming more popular in Poland. It requires resourceful financing, rapid revenue generation and avoiding expensive investments at the start.

Poland, as one of only few EU countries, introduced business education in the school curricula. Schools in Małopolska also follow these curricula in order to prepare young people to be enterprising and teach them how to conduct their own business.

Małopolska’s ecosystem of start-ups is relatively young but developing dynamically. A large group of people in various firms, initiatives and organizations spare no effort to make the Kraków start-up environment internationally visible as a vibrant and successful community. These people’s

ambition is to catch up with European leaders, and to become a leader in Central and Eastern Europe. Kraków's start-ups have already had international success, as shown by such companies as Estimote, Brainly, BASE CRM – small firms that have developed into global leaders.

Compared to European and world leaders, the level of patent activity among Polish startups is generally very low (about a thousand Polish enterprises request patents for their industrial property or that they acquire). In addition, most of them apply for patents within the framework of international procedures. Among the startups, 14% of them, or one in seven, has a patent or a pending patent procedure in Poland (every third patent holder) or abroad (2/3rds of patents). Startups with patents are characterized by a shorter history on the market than others – more than half of them were founded no earlier than 2015 or have yet to register. Every other one characterizes its stage of development as "Solution-Product Fit", or a rather early level of development. Only one in five has regular revenue – but for those that have revenues, their growth in the last six months in 70% of cases exceeded 50%. Half of the patented startups export their products, mainly to the EU and the U.S.

The main activity of these entities is to work on a product that is a source of innovation, market advantage and the core of their development. Almost 80% of them claim that their product is a total novelty on the market. Three out of four lead research and development activities or collaborate with a university, research laboratory or individual scientists.

Patenting startups are financed exclusively from their own funds less than the rest (36%).

European research shows that Polish startups are still young – their average age is under two years. This puts us in third place in Europe with the youngest business, right after Romania (1.3 years) and Italy (1.7 years).

These startups are pups – 38% have only existed for one year. Companies in existence since 2012 made up only 21%.

Polish startups are a very Polish – 95.4% of employees and 94.9% of startup founders are native citizens. This is a high score compared to other EU countries, where 12% of founders and subsequently 32% of employees come from countries other than the country of incorporation. Nearly 3/4ths of the startups are in the middle stages of development, which rely mainly on intensive work on product development.

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### 3.3. Dynamics of the entrepreneurial environment.

Please point out the characteristics of your regional entrepreneurship ecosystem, assessing whether it is lively and can generate a significant flow of experiments, innovation ideas, or entrepreneurial discoveries, or it is poor in experiments and entrepreneurial proposals.

To implement this analysis, suitable tools are: statistics on entrepreneurial activities, direct discussion (consultations and interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organizations).

The Małopolska Region has a clear potential for innovation development. Numerous institutions supporting innovation development are active in Małopolska, including: Technology Transfer Centre – University of Technology, Jagiellonian University Centre of Innovation, Technology Transfer and University Development, Jagiellonian Centre of Innovation Ltd. Krakow Technology Park. Małopolska universities and research centres have a great R&D potential in such fields as biotechnology, computer science, product quality and competitiveness, environment shaping and protection in the context of sustainable development, nanotechnology, new technologies in medicine and renewable energy sources. Higher education is very developed, and the ratio of

persons employed in the R&D sector to the number of inhabitants is high. Expenditure on R&D activities in Małopolska show a growth tendency, making the region the second in this field in the country.

Małopolska is the place of various actions raising innovation, entrepreneurship, creativity and education in this region:

Global Entrepreneurship Week in Małopolska – organised in the region since 2010 as part of a global initiative. Its objective is to create a social environment to actively support entrepreneurial attitudes and creative initiatives of young people. The programme of the event is delivered by approx. 50 partners in more than a dozen cities and towns in the Region, for example by universities, institutions supporting enterprises, and by entrepreneurs. These institutions, as part of their programme offer training courses, workshops, conferences, meetings with entrepreneurs, educational games, competitions, discussions and debates on such topics as, among other things, why to start one's own business, or the procedures and formalities required in the process of starting one's own business.

Already in the first year of its implementation, the Małopolska initiative was pronounced the best project of the Global Entrepreneurship Week in Poland.

Competition for doctoral students from the region: "Małopolska Incubator of Ingenuity" organised since 2011. In the competition promising business plans are selected, incorporating innovative ideas and/or technologies that have a chance of being implemented, commercialised and becoming a market success. The main prize in the competition is PLN 20,000 (EUR 4,800). Technical evaluation of the applications submitted is carried out by independent experts who assist in the starting and conducting of a business based on innovative solutions coherent with regional specialisations.

Numerous competitions and awards for Małopolska-based businesses serving as engines of the region's growth, such as:

- Małopolska Business Award – granted since 2009, is a prestigious distinction for Małopolska's entrepreneurs (small, medium-sized and large ones) for their outstanding achievements in supporting the economy and entrepreneurship. It is intended to promote the best enterprises in the region and inspire their growth, promote pro-investment attitudes and specific innovative achievements, as well as to enhance competition between enterprises.
- Małopolska's Innovator – a competition organised by Cracow University of Technology and the Małopolska Region to be held for the eleventh time in 2016. Its objective is to select the most innovative Małopolska's businesses in the following categories: micro-, small and medium-sized enterprise, and thus to promote them, and also to encourage other firms in the region to invest in modern solutions.
- Honorary Medals of Merit for the Małopolska Region, awarded by the Region's Self-Government. Persons awarded since 2011 include numerous entrepreneurs from the region who established top-ranking companies in their respective industries, such as Maspex Wadowice or Fakro.

The capital of Małopolska – Kraków recognised as a city of start-ups has a huge potential of new technologies development, the greatest of all Polish regions.

Startups are the key to an innovation development. Thanks to them, ideas and research are transformed into companies. In Małopolska region there is a large digital environment and a developing startup community (today, in all Poland there are approx. 2,700 startups). Most of them produce software and supply their products and services to other companies.

The Małopolska start-up community is very active as regards the number of, mostly grass-roots, events it has organised. The aim of such initiatives is, first of all, development, gaining expertise and networking, but also seeking inspiration and motivation. On average, around eight various events per week are held. Among the most important events one should mention: TEDxKraków, TEDxKazimierz, TEDxKraków Salon, TechCamp, Hive53, Startup Stage, Krakspot, conferences: Mobile Trends Conference, Atmosphere, PLNOG and meetings such as Open Coffee KRK.

This startup community is not uniform. Founders start from different positions, with unequal access to capital and time that they can devote to the realization of their dreams. Not all of them are motivated by the idea of making the world a better place. What they have in common is mutual support, a willingness to cooperate and energy, thanks to which they think they can do much more than others, and that's exactly what they're doing.

The majority of companies (59%) are micro-enterprises. More than 80% of the companies increased their number of employees in the past six months.

Almost half of them do not employ on the basis of employment contracts

Nearly every fourth startup hires foreigners. 26% of the startups had at least one woman among the founders. 13% had someone with a doctorate.

The legal form - more than 2/3rds of the startups (68%) is a limited liability company. Almost every fifth functions as a sole proprietorship, and only 3% as a joint stock company.

Among the startups 38% were registered in 2015 or later and 28% in 2013–2014. Every fifth startup was founded before 2013, and every seventh operates informally (i.e. is not yet registered).

The startups current stage of development can be characterized by as follows:

1. Problem-Solution Fit Stage, or formulating assumptions for the business model and putting together a team.
2. Solution-Product Fit Stage, or intensive work on the project, company registration, prototyping, first sales and/or users
3. Product-Market Fit Stage, or stable sales and user base, functioning business model.
4. Scaling Stage, or a rapidly growing number of customers and/or users and revenue.

Almost 3/4ths of the Polish startups (73%) are currently in the two middle stages of development, which rely mainly on intensive work on product development and testing business and revenue models. Fewer startups are in the initial stage of development or the expansion stage (12% and 15%, respectively).

Most startups exist briefly, but intensely, trying to create solutions to old and new problems. Insufficient analysis of the actual needs of customers means that many of these solutions never find buyers, and after 2–3 years of fighting with the market the startup folds.

Polish founders are maturing; more than 50% of the companies are run by 30–year-olds, and 14% are 40+.

The vast majority of the startups (77%) pursue a Business to Business (B2B) sales model. In this group, however, there are also startups that sell to both business and individual customers, or implement a mixed model (26% of respondents). Half of the surveyed entities implement the "pure" model of B2B, while 18% sell exclusively in the model of Business to Consumer (B2C). Startups in the "other" category perform variations of these models (B2B2C, B2G, etc.).

The startups most often identified their main products or services as belonging to the category of "mobile", "e-commerce" and "software companies". The high share of those involved in "education", "Big Data" and the "Internet of Things". Every fifth startup declared that their product is related to hardware – in terms of the production and/or design of such solutions.



Startups are employers- they provide jobs not only to their founders, but also to their employees. They are also actively looking for new employees, who they willingly finance using funds raised from external investors.

The majority of the companies (59%) are micro-enterprises, i.e. companies employing up to 10 people. Other entities were more or less equally divided (approx. 20%) into those that are over 10 people, and those that do not employ anyone.

The founders and CEOs of startups are usually people in their 20s or 30s who are well educated and are willing to expand their qualifications. Three out of four have a university degree, half in the area of technical or natural sciences (including computer science, electronics and mathematics), and the other half in the field of social sciences or humanities (including economics and law). Among the startups with higher educations, 36% graduated with more than one specialization, and every fourth went on to post-graduate studies. Every sixth studied or graduated abroad.

Among the startups 47% are exporters. The main direction of exports-startups usually chose the European Union (54%), including the UK (14%) and Germany (9%). Every fourth exporter focuses its sales on the United States. Other export destinations are much less popular. The fact that more than one-third of startups in Poland base their sales mainly on exports testifies to the maturation of the industry. This process of entering foreign markets is made much easier today through technology and modern services. In the era of teleconferencing, instant payment and real-time marketing, distance has ceased to be relevant.

The measurable indicators of levels of innovation are: patent activity and collaboration with scientific research centers.

The level of patent activity in general among Polish enterprises is very low-about a thousand Polish enterprises request patents for their industrial property or that they acquire.

The scientific collaborations that take place in the framework of research and development, declare 42% of startups. Every fourth startup works with a university, and a similar number work with an individual researcher. Every tenth surveyed startup has its own research laboratory.-This activity is weak in the initial phase but significantly increases in the development phase, when the main task of the startup is product development and collaboration with the scientific partner that provides additional knowledge and/or staff. In the phase of intensive customer acquisition the importance of this cooperation falls, only to increase again during the expansion stage, especially in foreign markets. Then again is there a need for the further improvement of the underlying product as well as the establishment of professional R&D departments and/or laboratories being created in the companies.

The main vehicle of Polish startup innovation is the product. More than half of the startups declare that their startup creates a completely new product, and 43% indicated that their innovation is an improvement of existing solutions. Only 4% of the companies said that they were simply copying other products or services.

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### 3.4 Smart Specialization Sectors

Please identify 1 - 4 regional entrepreneurship ecosystem knowledge specializations that best fit the innovation potential within RIS3 themes in CERlecon (Agri-food – Digital Growth – Energy – Industrial Modernization). Smart specialisation requires CERlecon partners identify a limited number of priorities. Their implementation will allow the CERlecon stakeholders to strengthen their innovation systems.



Smart specialization sectors, outlined in the Regional Innovation Strategy for Malopolska Region 2014-2020:

- Biotechnology and Life sciences;
- Sustainable energy;
- Information and communication technologies;
- Chemical industry;
- Manufacturing of metals and metal products as well as products made of mineral non-metallic materials;
- Electrical engineering and machine-building industry;
- Creative and leisure-related industries.

The regional entrepreneurship ecosystem knowledge specializations that best fit the innovation potential within RIS3 themes in CERlecon:

### **Biotechnology & Life Science**

The capital of the Małopolska region - Kraków - becomes a powerful centre for the biotechnology industry. Each year there is more and more young biotechnology graduates on the market. A significant proportion of biology students - 18% of the total number of students in these fields in the country.

Biotech companies in the region - Selvita, TEVA Group, BioCentrum, Bielenda Natural Cosmetics, Farmina, LuxMed, MicroBioLab, Silvermedia, Herbapol.

### **ICT**

According to the Top 100 Outsourcing Destinations Ranking - Global Services and Tholons ranking, Kraków was among the 9 most attractive cities in the world for investment in the sector outsourcing (especially IT outsourcing) - Kraków takes the 1st place in Europe. Kraków is perceived as a kind of Polish Silicon Valley because of several universities which educate IT specialist here and because of numerous IT companies born in Malopolska region.

### **Chemical industry**

The chemical industry is an important branch of Małopolska economy. The chemical plants located in Tarnów, Oświęcim and Alwernia are significant employers in the region and a manufacturer of a strategic role for the Polish economy. As many as 93% of Małopolska companies operating in the chemical sector have introduced innovations in the years 2010-2012.

The largest regional companies in the chemical industry include: Grupa Azoty S.A., Synthos S.A., Alwernia Chemical Plant S.A., Trzebinia Refinery S.A.

### **Manufacture of basic metals and metal products**

This industry has a big impact on the export of the Małopolska region - aluminium and articles of aluminium are among most important export commodities.

The share of Małopolska export in the precious metals and products export is 6.9%.

As many as 75% of Małopolska companies of the sector have introduced innovations in the years 2010-2012.

### **Creative and leisure industry**

The creative sector includes the production, manufacture, exhibiting and sale of goods protected by copyright, as well as cultural activities and tourism.

A high percentage of arts students in the Region - 13.3% of all students in the arts faculties in Poland studied in Małopolska.

The emerging Małopolska Creativity and Design Centre will support the use of high quality industrial design in the economy and promote region as a centre of design and creative industries.

Małopolska intends to build its competitive advantages based on young, innovative start-ups, as well as companies operating in regional smart specialisation areas. It also has an adequate infrastructure and a high human capital of well-educated and creative residents. Dynamically developing media industries may serve as an example in this respect.

In 2012 the Kraków Technology Park (KTP) in cooperation with the Małopolska region organised the first edition of the Digital Dragons conference.

From the very beginning it has become the largest game industry event in Central and Eastern Europe, bringing together game producers, publishers, industry's media, business, opinion-making circles and the academic community (300 participants in 2012, 598 participants in 2013, 822 participants in 2014).

The Digital Entertainment Cluster, was established on the KTP's initiative, creating the environment for the development of Małopolska's game and initiating cooperation between the partners within the cluster.

The European Game Academy is very active in Małopolska. It was established at the Kraków Technology Park in cooperation with the Jagiellonian University, the AGH University of Science and technology, and about twenty companies connected with the industry (including. CD Projekt, Reality Pump, Nibris, Techland and Blooberteam). The Academy offers two-year post-graduate studies in six game industry related specialisation areas (production, technologies etc.), stressing on the specialisation and practice in specific projects, with a teaching staff consisting mostly of experience game designers and game developing companies' staff.

Małopolska can also boast the largest and the most modern film studio in Poland– Alvernia Studios, of particular importance for the development of the game industry, offering film services and investment in its own production and co-productions. The studio produces feature films of international circulation, musical project and commercials, and participates in production of video games.

#### \*\*\*4.SWOT ANALYSIS

In order to analyze the CERlecon regional entrepreneurship ecosystems and its potential for innovation, please focus on regional strenghts and weaknesses using the SWOT analysis model. Refer to the main contents of the SWOT analysis as follows:

Strengths are advantageous resources in the regional CERlecon entrepreneurship ecosystem capable to improve its innovation system. CERlecon strategy and action plan will be built on strengths;

Weaknesses are limits and faults in the regional entrepreneurship ecosystem that will keep it from improving innovation. CERlecon actions will focus on eliminating weaknesses;

Opportunities are favourable situations in the region's entrepreneurship ecosystem. CERlecon's goal is to take advantage of these opportunities;

Threats are unadvantageous and unfavourable situations in the entrepreneurship ecosystem's environment that damage the CERlecon strategy. CERlecon actions will limit the negative effects of these threats.

#### **Strengths:**

- Excellent geography and accessibility of the region (direct road, rail connections with other countries and regions, International Kraków-Balice Airport),
- Małopolska is a nationwide leader in terms of the number of students and universities, and the leader in educating IT specialists,
- Małopolska is one of the most important Polish Bio-Regions with high potential for development of life sciences with well-developed medical facilities,
- Good infrastructure facilities for creative industries (museums, libraries) - Kraków is one of the most important industrial designers education centres in Poland,
- High entrepreneurial potential of the population, their high competences
- Broad and diversified support of the region for businesses and entrepreneurship development,
- High number of active business environment institutions, presence of many business clusters (cluster initiatives),
- Infrastructure for establishing and creating innovative businesses (e.g. Małopolska Information Technology Park, Life Science Park), developed on a continuous basis,
- High position of the region (4th rank in the country) in terms of the number of registered business operators and steady growth for several years (from over 314 thousand in 2009 to 356,8 thousand in 2014),
- Dynamic start-up community,
- Favourable population structure of smaller enterprises: relatively higher number of small enterprises and lower number of micro-enterprises compared to the whole country,
- Growing area of economic activity zones (currently 49 zones in 37 municipalities (gminas), another 14 are planned in 12 communes) and of the special economic zone (707 ha)
- Highly appreciated attractiveness of Małopolska for investors (Kraków among the top ten global BPO/SSC destinations
- Growing awareness of Małopolska's businesses with respect to investing in innovations,
- The natural wealth of Małopolska - geothermal resources

#### **Weaknesses:**

- High intraregional diversification of the entrepreneurial activity rate – large number of poviats with a low rate, very large domination of Kraków – the region's capital city,
- inadequate links between R&D and business support institutions and enterprises, lower than the potential,
- Adverse population structure of large enterprises: low share of large-scale companies characterised by top innovation intensity,
- Domination of first-generation economic activity zones, which are characterised by poor ties with the R&D sector
- Shortage of large areas for greenfield investments.

#### **Threats:**

- Onset of economic crisis and declining investment in new technologies among companies,
- Deepening intraregional disparities in terms of the business activity rate,
- Continued poor quality of the institutional environment in Poland, reducing the willingness to invest in Małopolska,
- Fast exhaustion of existing competitive advantages of the country (notably the relatively low labour costs),
- Growing competition faced by Polish products and services in the European market,
- Growing competition from better developing countries and regions,

- Domestic regulations likely to constrain the development of new companies, and the implementation of innovations, which may result in relocation of companies to foreign countries offering more business-friendly conditions,
- Slowly changing attitudes of financial institutions to supporting high-risk innovative solutions (unable to make up for the development of modern technologies in the world), which may weaken the technology potential of Małopolska's companies.

#### **Opportunities:**

- Improving conditions for conducting business activity in Poland, including Małopolska,
- Strong and real partnership within the triple helix: science + business + administration, active involvement of society,
- Stepping up support for Małopolska's start-ups so that they can develop into global players, and thus promote the region internationally
- The new 2014-2020 perspective, which places a heavy stress on supporting entrepreneurship and improving the availability of external sources of funding for innovative activity (Małopolska is the second Polish region, after Silesia, as regards funds allocated for the regional operational programme),
- Ever better quality of human resources in the region
- Creating a system of incentives for financing innovative activity of enterprises in cooperation with the well developed regional R&D sector;
- Change of attitudes to financing among companies, i.e. giving preference to R&D rather than purchasing finished machinery and technologies (which is reflected in the regional operational programme),
- Improved climate for investing in Poland and further influx of foreign investment.

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