European Commission

Research and Innovation performance in

Slovenia

Country Profile

2014

Research and Innovation

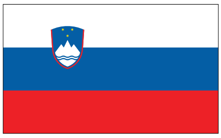
EUROPEAN COMMISSION

Directorate-General for Research and Innovation
Directorate A — Policy Development and Coordination
Unit A4 — Analysis and monitoring of national research policies
Contact: Román Arjona and Diana Senczyszyn

E-mail: RTD-PUBLICATIONS@ec.europa.eu
European Commission
B-1049 Brussels

Luxembourg: Publications Office of the European Union, 2014

ISBN 978-92-79-40311-8
doi 10.2777/92668



Slovenia

Towards a knowledge-intensive economy

Summary: Performance in research and innovation

The indicators in the table below present a synthesis of research and innovation (R&I) performance in Slovenia. They relate knowledge investment and input to performance and economic output throughout the innovation cycle. They show thematic strengths in key technologies and also the high-tech and medium-tech contribution to the trade balance. The indicator on excellence in science and technology takes into consideration the quality of scientific production as well as technological development. The Innovation Output Indicator covers technological innovation, skills in knowledge-intensive activities, the competitiveness of knowledge-intensive goods and services, and the innovativeness of fast-growing enterprises, focusing on innovation output. The indicator on knowledge-intensity of the economy focuses on the economy's sectoral composition and specialisation and shows the evolution of the weight of knowledge-intensive sectors and products.

Key indicators of research and innovation performance	
R&D intensity 2012: **2.80 %** (EU: 2.07 %; US: 2.79 %) 2007-2012: **+12.7 %** (EU: 2.4 %; US: 1.2 %)	***Excellence in S&T***[1] 2012: **28.8** (EU: 47.8; US: 58.1) 2007-2012: **+9.9 %** (EU: +2.9 %; US: -0.2)
Innovation Output Indicator 2012: **87.4** (EU: 101.6)	***Knowledge-intensity of the economy***[2] 2012: **50.3** (EU: 51.2; US: 59.9) 2007-2012: **+3.7 %** (EU: +1.0 %; US: +0.5 %)
Areas of marked S&T specialisations: New production technologies, materials, food, ICT, security, and construction technologies	***HT + MT contribution to the trade balance*** 2012: **6.5 %** (EU: 4.23 %; US: 1.02 %) 2007-2012: **+9.4 %** (EU: +4.8 %; US: -32.3 %)

R&D intensity in Slovenia increased from 1.38 % in 2000 to 2.8 % in 2012, thus its R&D intensity target of 3 % for 2020 seems achievable. In spite of the economic crisis, business expenditure on R&D as a percentage of GDP increased from 0.87 % in 2007 to 2.16 % in 2012, making Slovenia one of the top performers in the EU in terms of business R&D. The country ranks third in the EU, outperformed only by Finland and Sweden.

This is a clear signal that Slovenia regards investment in R&D as a priority for the development of medium-high and high-tech competitive enterprises and for increased and sustainable economic growth. It is meeting the challenge of reaching its 2020 R&D intensity target of 3 % by mobilising incentives and resources from public and private sources (human, financial, infrastructural) and providing a smooth path for more technological innovation. Improving the overall governance and ensuring a clearer research prioritisation with a stronger focus on knowledge transfer remain the main challenges for the Slovenian R&I system to support the efficient and effective use of available resources.

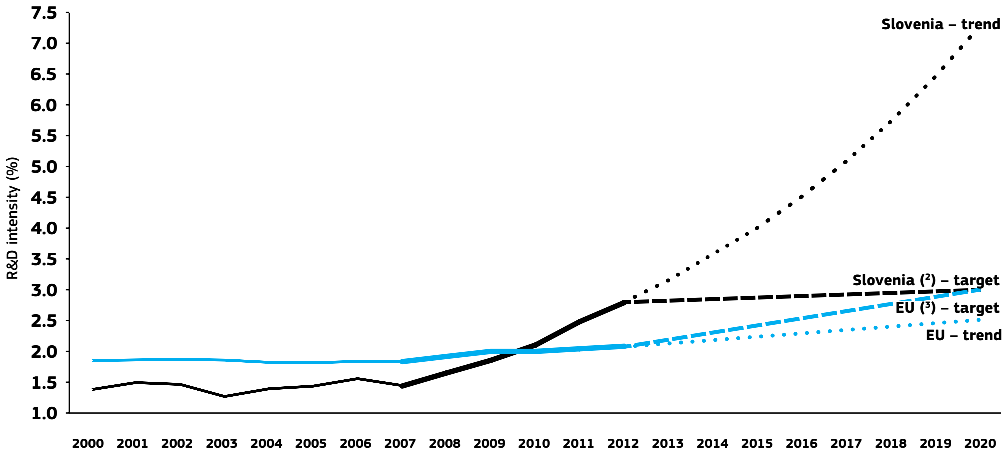
To tackle these challenges, the National Research and Innovation Strategy 2011-2020 needs to be implemented and coordinated with the 2013 industrial policy strategies as well as with the upcoming strategies on smart specialisation and transport, and to ensure their prompt implementation and assessment of effectiveness. Measures to foster knowledge transfer and commercialisation of research results – such as the introduction of funding linked to research performance, removal of obstacles to establishing university spin-offs and cross-border venture capital investments – would contribute to creating a favourable business environment for innovative companies in key sectors.

1 Composite indicator that includes PCT per population, ERC grants per public R&D, top universities and research institutes per GERD and highly cited publications per total publications.

2 Composite indicator that includes R&D, skills, sectoral specialisation, international specialisation and internationalisation sub-indicators

Investing in knowledge

Slovenia – R&D intensity projections: 2000–2020 (1)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: DG Research and Innovation, Eurostat, Member State
Notes: (1) The R&D intensity projections based on trends are derived from the average annual growth in R&D intensity for 2007–2012 in the case of the EU, and for 2008–2010 in the case of Slovenia.
(2) SI: The projection is based on a tentative R&D intensity target of 3.0 % for 2020.
(3) EU: The projection is based on the R&D intensity target of 3.0 % for 2020.
(4) SI: There are breaks in series between 2008 and the previous years and between 2011 and the previous years.

Since 2000, the level of R&D investment in Slovenia has increased at an unprecedented and unparalleled rate, making it one of the leading EU Member States in this respect. R&D intensity in Slovenia increased from 1.38 % in 2000 to 1.45 % in 2007 and 2.8 % in 2012. Thus, Slovenia's R&D intensity target of 3 % for 2020 is clearly achievable despite the economic crisis. This remarkable achievement is the result of strong public support and a set of ambitious innovation measures.

In spite of the economic crisis, business expenditure on R&D as a percentage of GDP increased from 0.87 % in 2007 to 2.16 % in 2012, making it one of the EU's top performers in terms of business R&D. However, it should be noted that this performance has been achieved with a very high level of public support to business R&D.

Notwithstanding budgetary constraints, public sector expenditure on R&D in 2012 was 0.64 % of GDP, slightly below the EU average but above those countries with similar research and knowledge structures.

Slovenian R&I also receive support from the EU budget through two main instruments: the Structural Funds and the Seventh Framework Programme (FP7). Of the EUR 4101 million of Structural Funds allocated to Slovenia over the 2007-2013 programming period, around EUR 1013 million (24.7 % of the total) related to RTDI[3]. A total of 849 participants from Slovenia benefited by around EUR 152 million from FP7. The success rate of participants is 15.62 %, below the EU average of 19.62 %.

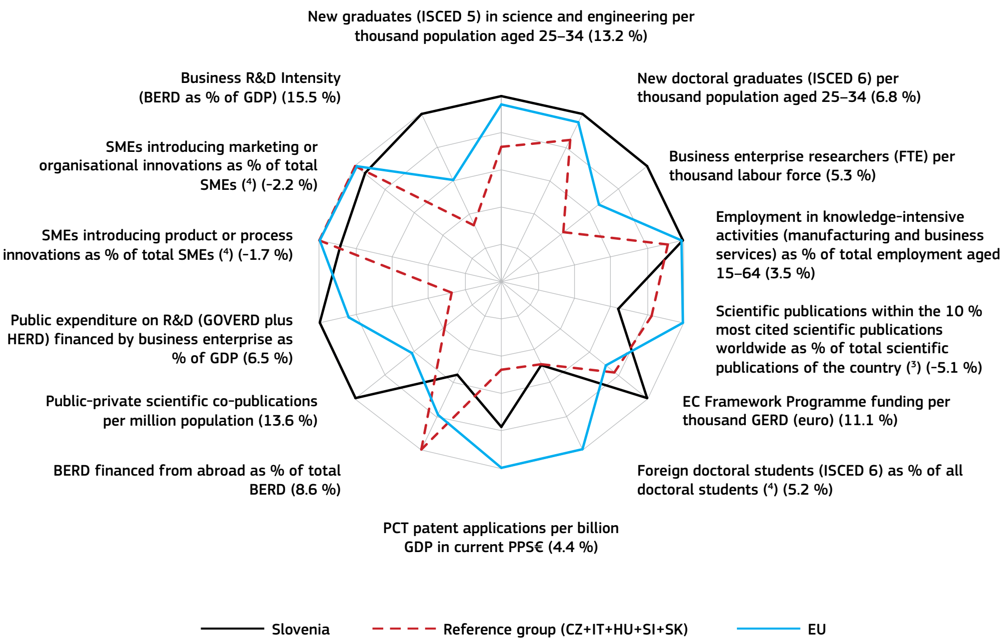
[3] RTDI includes the following sectors: (01) RTD activities in research centres, (02) RTD infrastructures and centres of competence, (03) Technology transfer and improvement of cooperation of networks, (04) Assistance to RTD, particularly in SMEs (and RTD services in research centres), (06) Assistance to SMEs for the promotion of environmentally friendly products and processes, (07) Investment in firms directly linked to research and innovation, (09) Other methods to stimulate research and innovation and entrepreneurship in SMEs, and (74) Developing human potential in the field of research and innovation.

An effective research and innovation system building on the European Research Area

The graph below illustrates the strengths and weaknesses of Slovenia's R&I system. Reading clockwise, it provides information on human resources, scientific production, technology valorisation and innovation. Average annual growth rates from 2000 to the latest available year are given in brackets.

Slovenia, 2012 (1)

In brackets: average annual growth for Slovenia, 2007–2012 (2)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: DG Research and Innovation, Eurostat, OECD, Science-Metrix/Scopus (Elsevier), Innovation Union Scoreboard.
Notes: (1) The values refer to 2012 or to the latest available year.
(2) Growth rates which do not refer to 2007–2012 refer to growth between the earliest available year and the latest available year for which comparable data are available over the period 2007–2012.
(3) Fractional counting method.
(4) EU does not include EL.

The graph above shows that Slovenia's R&I system is performing well, with several indicators close to or above the EU average and showing positive trends. These include human resources, innovation in business, and R&D expenditure. Nevertheless, there are some weaknesses in the fields of knowledge commercialisation, private and public sector internationalisation, and research quality.

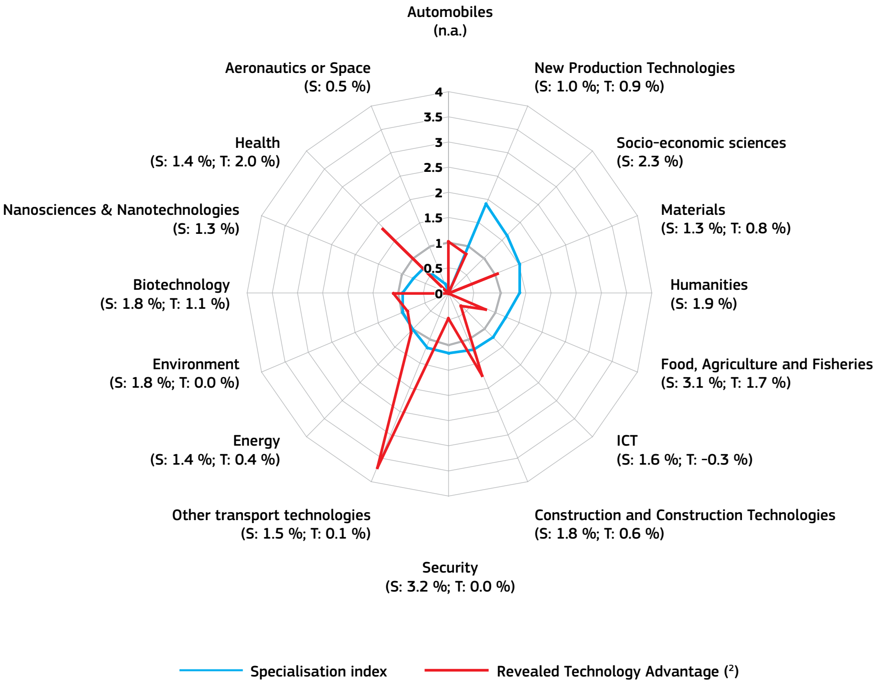
As regards human resources, Slovenia already has a high level of new doctoral graduates, above the EU average, but is still catching up in terms of new graduates in science and engineering. Employment of researchers by business enterprises and in knowledge-intensive activities is also at a high level. In this respect, it would appear that highly skilled graduates are readily absorbed into the Slovenian economy. However, despite its good performance in human resources, Slovenia is still not attractive enough for foreign doctoral students.

As regards scientific production, Slovenia produces high levels of international scientific co-publications and public-private scientific co-publications but needs to improve their quality in order to perform better in terms of scientific publications within the 10 % most-cited scientific publications worldwide. In terms of knowledge commercialisation, the country has an increasing number of PCT patent applications and a high level of patent applications to the European Patent Office (EPO) in the field of health-related technologies. However, the levels of both total PCT and total EPO patent applications are below the EU average. Slovenian small and medium-sized enterprises (SMEs) perform well in terms of (non-technological) marketing and organisational innovations and fairly well in introducing product or process innovations.

Slovenia's scientific and technological strengths

The graph below illustrates the areas, based on the Framework Programme thematic priorities, where Slovenia shows scientific and technological specialisations. Both the specialisation index (SI, based on the number of publications) and the revealed technological advantage (RTA, based on the number of patents) measure the country's scientific (SI) and technological (RTA) capacity compared to that at the world level. For each specialisation field it provides information on the growth rate in the number of publications and patents.

Slovenia – S&T National Specialisation (1) in thematic priorities, 2000–2010
in brackets: growth rate in number of publications (3) (S) and in number of patents (4) (T)



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Science-Metrix Canada; Bocconi University, Italy
Notes: (1) Values over 1 show specialisation; values under 1 show a lack of specialisation.
(2) The Revealed Technology Advantage (RTA) is calculated based on the data corresponding to the WIPO-PCT number of patent applications by country of inventors. For the thematic priorities with fewer than 5 patent applications over 2000–2010, the RTA is not taken into account. Patent applications in 'Aeronautics or Space' refer only to 'Aeronautics' data.
(3) The growth rate index of the publications (S) refers to the periods 2000–2004 and 2005–2009.
(4) The growth rate in number of patents (T) refers to the periods 2000–2002 and 2003–2006.

Comparison of the scientific and technological specialisation in selected thematic priorities shows some co-specialisations with small mismatches. In most of the sectors, scientific production is combined with certain technological specialisation, although scientific quality is limited in sectors relevant to its industry.

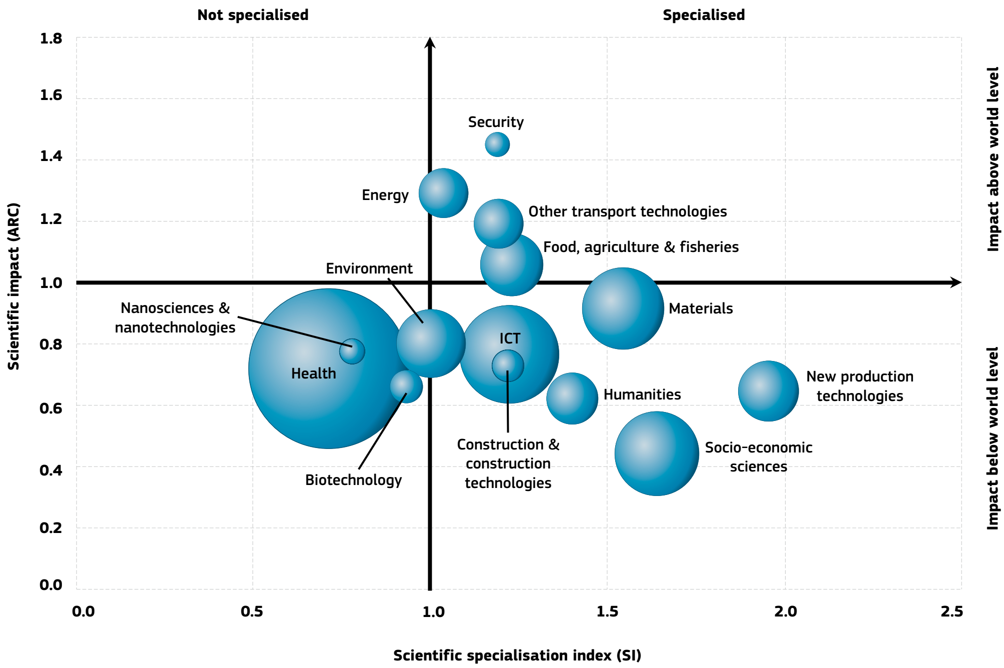
The country displays relevant scientific specialisation in several sectors, such as new production technologies, materials, food, agriculture and fisheries, ICT, security, construction technologies and, to less extent, in energy, environment, and biotechnology. The scientific profile is coupled with the country's technological profile in most of the sectors except for ICT and security.

On the other hand, the strong technological specialisation in health and in other transport technologies is not backed up by a strong domestic scientific specialisation. Taking into account the technological specialisation of Slovenia in these fields, the country would probably benefit from fostering scientific specialisation and scientific quality in this sector.

Slovenia has established strength in the field of energy, other transport technologies, food agriculture and fisheries, and energy where scientific production and quality are correlated with a certain technological specialisation. However, there is a room for improvement on scientific impact of some sectors ranking high on the science specialisation indicator – i.e. ICT, materials or new production technologies. Finally, the quality of domestic science in security is not coupled with the country's scientific and technological specialisation profile. In contrast, the strong technological specialisation in health is not leveraged by high scientific quality and specialisation of domestic science in Slovenia.

The graph below illustrates the positional analysis of Slovenian publications showing the country's situation in terms of scientific specialisation and scientific impact over the period 2000-2010. The scientific production of the country is reflected by the size of bubbles, which corresponds to the share of scientific publications from a science field in the country's total publications.

Slovenia – Positional analysis of publications in Scopus (specialisation versus impact), 2000–2010



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Science-Metrix Canada, based on Scopus
Note: Scientific specialisation includes 2000–2010 data; the impact is calculated for publications of 2000–2006, citation window 2007–2009.

As quality in research is correlated to more cooperation with researchers from other European countries and beyond, in order to increase its research quality Slovenia would benefit from actively supporting and providing incentives for its researchers to connect to Horizon 2020 networks.

Policies and reforms for research and innovation

In 2011, the Slovenian authorities approved its Research and Innovation Strategy 2011-2020 (RISS); however, the measures outlined therein have yet to be implemented and coordinated with the 2013 industrial policy strategies and with the upcoming strategies on smart specialisation and transport, and their prompt implementation and assessment of effectiveness ensured.

The Slovenian Research Agency is in charge of financing basic and applied research primarily in the public-research sector, while the newly formed SPIRIT, the agency combining the former Technology and Innovation Agency, the Public Agency for Entrepreneurship and Foreign Investment, and the Slovenian Tourism organisation should be in charge of entrepreneurial support and financing R&D activity in business sector. Yet, only some of the calls have been entrusted to the new agency and some have been performed directly by the Ministry of Economic Development and Technology. Support for business-sector R&D is also partially provided through the Slovenian Enterprise Fund, especially for start-ups in an innovation environment and bank guarantees for SMEs engaged in R&D projects and technological restructuring.

The RISS includes important measures for fostering knowledge transfer and the commercialisation of research results, such as the introduction of institutional funding linked to an assessment of research performance or the removal of obstacles to the establishment of university spin-outs and to cross-border venture-capital investments. This strategy proposed several changes in R&D financing, especially with regard to higher education institutions. The main argument for change was to give more independence and autonomy to universities and institutes, allowing them to allocate the funds internally, on one hand, and to increase the competitive funding, as suggested by the OECD and ERAC (European Research Area and Innovation Committee) evaluations, on the other. Such a change required a new or at least significantly amended Law on R&D (2002). In October 2013, the ministry appointed an expert group with the task of drafting the new law, but gave no directions in terms of new institutional/funding set-up. By the end of 2013, a draft of the new law had been prepared within the group, but it has not yet been presented to the government or the public.

The government significantly increased the R&D tax subsidy which, from 2012, has been at the level of 100 %. In 2011, a thousand companies had benefited from this measure, which has been welcomed in particular by larger enterprises that invest significantly in R&D (for example, pharmaceutical companies). The planned change of offering more subsidised credit rather than subsidies for R&D projects, which the government wanted to implement in 2012, proved not to be the measure Slovenian, especially small enterprises, would favour.

Lack of thematic funding has been identified as a weakness in several evaluations of the national innovation system. Slovenia currently only supports certain sectors through the funding of eight centres of excellence, seven competence centres and 17 development centres, all co-founded through the Structural Funds. The competence centres are led by businesses combining basic and applied research with a view to creating future market opportunities, and to some extent complement the centres of excellence, introduced in 2009. The latter focus on basic research carried out by public research organisations, in cooperation with business R&D units active in the same area. And finally, the development centres (consortia of business firms) support 'close to the market' research projects with a view to developing new products, processes and services. It is also noteworthy that tax allowances for R&I were increased in April 2012.

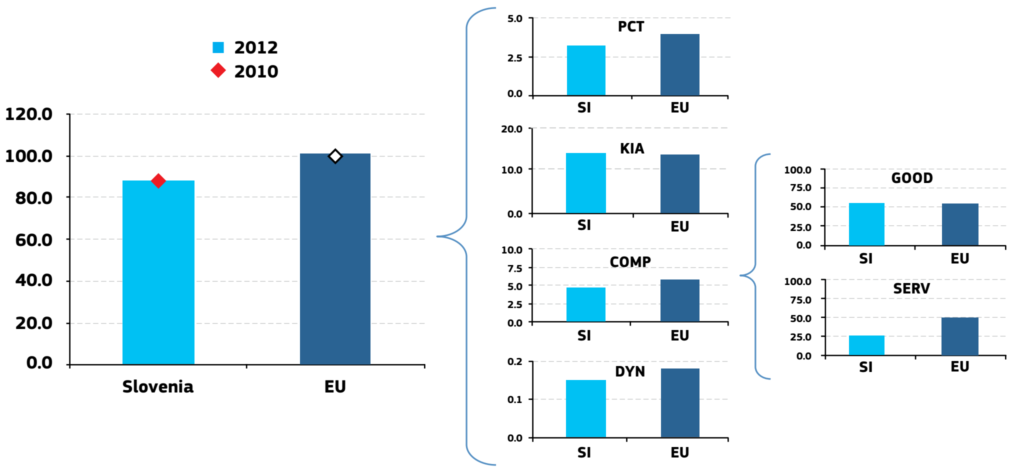
To improve cooperation between the public and private sectors, in 2012, Slovenia developed the research voucher (EUR 8 million) to help enterprises to commission research at R&D institutes and higher education organisations for a period of three years. The final aim was to connect companies with universities.

Slovenia has room to better address funding priorities. There is a need for more focus on, and critical mass in, sectors related to Slovenia's existing R&D strengths and economic strengths. The measures outlined in the Research and Innovation Strategy and in the Industrial Policy Strategy need to be implemented and coordinated with the smart specialisation process in order to harness the country's potential for smart growth and the knowledge economy.

Innovation Output Indicator

The Innovation Output Indicator, launched by the European Commission in 2013, was developed at the request of the European Council to benchmark national innovation policies and to monitor the EU's performance against its main trading partners. It measures the extent to which ideas stemming from innovative sectors are capable of reaching the market, providing better jobs and making Europe more competitive. The indicator focuses on four policy axes: growth via technology – (patents); jobs (knowledge-intensive employment); long-term global competitiveness (trade in mid/high-tech commodities); and future business opportunities (jobs in innovative fast-growing firms). The graph below enables a comprehensive comparison of Slovenia's position on the indicator's different components:

Slovenia – Innovation Output Indicator



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat, OECD, Innovation Union Scoreboard 2014, DG JRC
Notes: All data refer to 2012 except PCT data, which refer to 2010.
PCT = Number of PCT patent applications per billion GDP, PPS.
KIA = Employment in knowledge-intensive activities in business industries as % of total employment.
DYN = Innovativeness of high-growth enterprises (employment-weighted average).
COMP = Combination of sub-components GOOD and SERV, using equal weights.
GOOD = High-tech and medium-high-tech products exports as % total exports. EU value refers to EU-28 average (extra-EU = 59.7 %).
SERV = Knowledge-intensive services exports as % of total service exports. EU value refers to EU-28 average (extra-EU = 56 %).

Slovenia is a medium-low performer in the European innovation indicator. This is the result of a diversified performance in the indicator's components. It is near the EU average for employment in knowledge-intensive activities and for the share of medium-high and high-tech manufacturing goods in total goods exports, but low for knowledge-intensive service exports, for patents, and for the innovativeness of high-growth enterprises.

Slovenia performs near the EU average as regards the share of medium-high/high-tech goods in total goods exports. This is the result of a balance between, on the one hand, strong exports of pharmaceutical products, electrical machinery and road vehicles, and of wood products, food and textiles on the other.

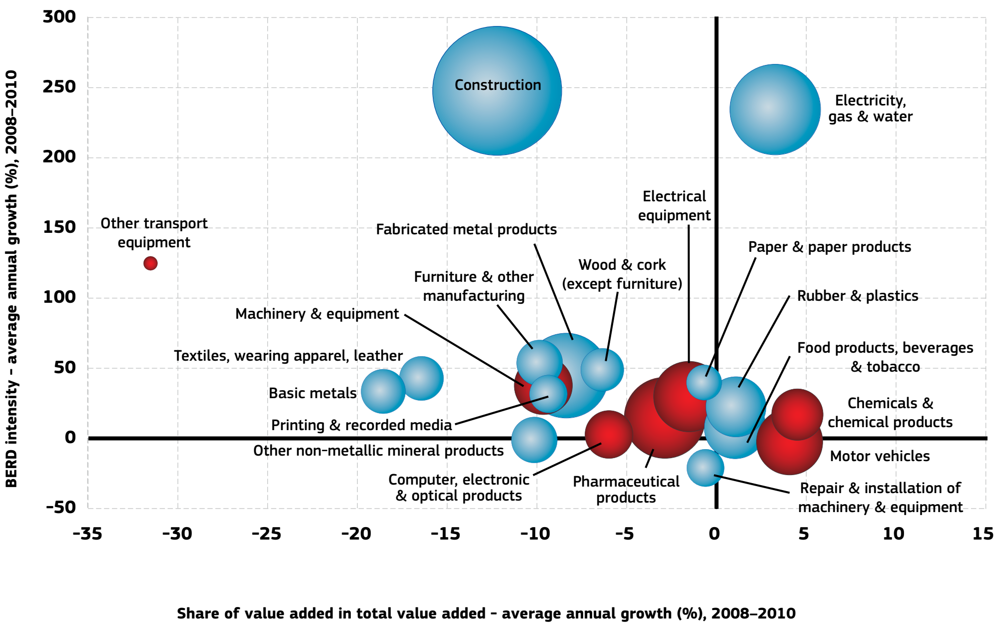
The low share of knowledge-intensive service exports is explained by the relative importance of tourism and of non-KIS transport services (mainly road freight transport, but also rail freight), not compensated for by any strongholds in KIS exports.

Slovenia also performs at a low level as regards the average innovativeness of fast-growing firms. This is the result of a high share of employment in fast-growing enterprises in manufacturing sectors with low innovation coefficients. Therefore, it seems that Slovenia may not have fully developed its innovative potential. One of the reasons is that some components of the business and competitive framework have changed very little: links between the public and private sector remain weak and some structural aspects of the business environment are hindering foreign direct investment. In order to improve competitiveness, it would be beneficial to consider developing a new industrial policy, including a strategy for attracting foreign capital, notably linked to R&I. Both should be consistent mutually as well as with other Slovenian strategic documents.

Upgrading the manufacturing sector through research and technologies

The graph below illustrates the upgrading of knowledge in different manufacturing industries. The position on the horizontal axis illustrates the changing weight of each industry sector in value added over the period. The general trend to the left-hand side reflects the decline in manufacturing in the overall economy. The sectors above the x-axis are those where research intensity has increased over time. The size of the bubble represents the sector share (in value added) in manufacturing (for all sectors presented on the graph). The red sectors are high-tech or medium-high-tech sectors.

Slovenia – Share of value added versus BERD intensity: average annual growth, 2008–2010



Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat
Note: (1) High-tech and medium-high-tech sectors (NACE Rev. 2 – two-digit level) are shown in red.

The Slovenian economy is characterised by a relatively strong manufacturing industry. Manufacturing makes a higher contribution to total value added than the EU average. Nevertheless, as in many other countries, the share of manufacturing value added is moving towards a decline (as shown by the position of most of the sectors on the left side of the graph), due to a corresponding increase in services value added.

Although some industry sectors have achieved a slight increase in their share of the economy, specialisation in labour-intensive industries has decreased considerably over the last few decades. As the graph illustrates, Slovenia's manufacturing industries are moving towards higher research intensity in almost all sectors. Highly innovation-intensive sectors are: electrical equipment, machinery and equipment, electronic and optical products, pharmaceutical products, chemical and chemical products, and motor vehicles, with the latter showing increasing added value in the country's economy. Slovenia has two companies in the 2011 EU Industrial R&D Scoreboard, in the fields of pharmaceuticals, and construction and materials.

Key indicators for Slovenia

SLOVENIA	2000	2005	2006	2007	2008	2009	2010	2011	2012	Average annual growth 2007–2012 (1) (%)	EU average (2)	Rank within EU
ENABLERS Investment in knowledge												
New doctoral graduates (ISCED 6) per thousand population aged 25–34	1.00	1.24	1.31	1.37	1.34	1.52	1.51	1.72	1.90	6.8	*1.81*	12
Performance in mathematics of 15-year-old students: mean score (PISA study)	:	:	504	:	:	501	:	:	501	-3.3 (3)	495 (4)	9 (4)
Business enterprise expenditure on R&D (BERD) as % of GDP	0.78	0.85	0.94	0.87	1.07 (5)	1.20	1.43	1.83 (6)	*2.16*	15.5	1.31	3
Public expenditure on R&D (GOVERD + HERD) as % of GDP	0.59	0.59	0.62	0.58	0.59	0.66	0.68	0.65 (7)	*0.64*	5.3	*0.74*	13
Venture capital as % of GDP	:	:	:	:	:	:	:	:	:	:	:	:
S&T excellence and cooperation												
Composite indicator on research excellence	:	:	:	18.0	:	:	:	:	28.8	9.9	47.8	15
Scientific publications within the 10% most cited scientific publications worldwide as % of total scientific publications of the country	:	6.9	6.8	7.8	7.5	7.0	:	:	:	-5.1	11.0	18
International scientific co-publications per million population	:	588	573	691	796	834	868	966	1042	8.5	343	10
Public–private scientific co-publications per million population	:	:	:	51	54	61	70	85	:	13.6	53	7
FIRM ACTIVITIES AND IMPACT Innovation contributing to international competitiveness												
PCT patent applications per billion GDP in current PPS (EUR)	2.1	2.7	2.5	2.7	3.1	3.2	3.1	:	:	4.4	3.9	10
License and patent revenues from abroad as % of GDP	0.06	0.05	0.04	0.04	0.07	0.07	0.08	0.11	0.10	19.4	0.59	18
Community trademark (CTM) applications per million population	2	16	31	71	104	78	108	73	102	7.6	152	17
Community design (CD) applications per million population	:	9	19	20	24	28	30	32	36	12.3	29	8
Sales of new-to-market and new-to-firm innovations as % of turnover	:	:	13.3	:	16.3	:	10.6	:	:	-19.2	14.4	17
Knowledge-intensive services exports as % total service exports	:	18.6	17.7	18.9	23.8	21.7	20.8	21.4	:	3.1	45.3	25
Contribution of high-tech and medium-tech products to the trade balance as % of total exports plus imports of products	1.34	3.74	3.96	4.16	4.77	5.79	6.06	6.05	6.54	-	4.23 (8)	2
Growth of total factor productivity (total economy): 2007 = 100	87	95	98	100	99	92	94	95	93	-7 (9)	97	22
Factors for structural change and addressing societal challenges												
Composite indicator on structural change	:	:	:	42.0	:	:	:	:	50.3	3.7	51.2	12
Employment in knowledge-intensive activities (manufacturing and business services) as % of total employment aged 15–64	:	:	:	:	12.2	13.0	13.4	13.8	14.0	3.5	13.9	14
SMEs introducing product or process innovations as % of SMEs	:	:	31.7	:	31.0	:	30.0	:	:	-1.7	33.8	17
Environment-related technologies: patent applications to the EPO per billion GDP in current PPS (EUR)	0.10	0.08	0.08	0.03	0.07	0.16	:	:	:	118.4	0.44	14
Health-related technologies: patent applications to the EPO per billion GDP in current PPS (EUR)	0.26	0.81	1.19	1.19	1.15	0.76	:	:	:	-20.2	0.53	5
EUROPE 2020 OBJECTIVES FOR GROWTH, JOBS AND SOCIETAL CHALLENGES												
Employment rate of the population aged 20–64 (%)	68.5	71.1	71.5	72.4	73.0	71.9	70.3	68.4	68.3	-1.2	68.4	14
R&D intensity (GERD as % of GDP)	1.38	1.44	1.56	1.45	1.66 (5)	1.85	2.10	2.47 (6)	*2.80*	12.7	*2.07*	6
Greenhouse gas emissions: 1990 = 100	103	110	112	112	116	105	106	106	:	-7 (10)	83	22 (11)
Share of renewable energy in gross final energy consumption (%)	:	16.0	15.6	15.6	15.0	19.0	19.6	18.8	:	4.8	13.0	10
Share of population aged 30–34 who have successfully completed tertiary education (%)	18.5	24.6	28.1	31.0	30.9	31.6	34.8	37.9	39.2	4.8	35.7	13
Share of population aged 18–24 with at most lower secondary education and not in further education or training (%)	:	4.9	5.6	4.1	5.1	5.3	5.0	4.2	4.4	1.4	12.7	2 (11)
Share of population at risk of poverty or social exclusion (%)	:	18.5	17.1	17.1	18.5	17.1	18.3	19.3	19.6	2.8	24.8	10 (11)

Source: DG Research and Innovation – Unit for the Analysis and Monitoring of National Research Policies
Data: Eurostat, DG JRC – Ispra, DG ECFIN, OECD, Science Metrix / Scopus (Elsevier), Innovation Union Scoreboard
Notes: (1) Average annual growth refers to growth between the earliest available year and the latest available year for which compatible data are available over the period 2007–2012.
(2) EU average for the latest available year.
(3) The value is the difference between 2012 and 2006.
(4) PISA (Programme for Internatonal Student Assessment) score for EU does not include CY and MT. These Member States were not included in the EU ranking.
(5) Break in series between 2008 and the previous years.
(6) Break in series between 2011 and the previous years. Average annual growth refers to 2008–2010.
(7) Break in series between 2011 and the previous years. Average annual growth refers to 2007–2010.
(8) EU is the weighted average of the values for the Member States.
(9) The value is the difference between 2012 and 2007.
(10) The value is the difference between 2011 and 2007. A negative value means lower emissions.
(11) The values for this indicator were ranked from lowest to highest.
(12) Values in italics are estimated or provisional.

2014 Country-specific recommendation on R&I adopted by the Council in July 2014

"Streamline priorities and ensure consistency between the 2011 research and innovation and the 2013 industrial policy strategies with the upcoming strategies on smart specialisation and transport, and ensure their prompt implementation and assessment of effectiveness."

How to obtain EU publications

Free publications:

- one copy:
  via EU Bookshop (http://bookshop.europa.eu);
- more than one copy or posters/maps:
  from the European Union's representations (http://ec.europa.eu/represent_en.htm);
  from the delegations in non-EU countries (http://eeas.europa.eu/delegations/index_en.htm);
  by contacting the Europe Direct service (http://europa.eu/europedirect/index_en.htm) or
  calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (*).

  (*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Priced publications:

- via EU Bookshop (http://bookshop.europa.eu).

Priced subscriptions:

- via one of the sales agents of the Publications Office of the European Union
  (http://publications.europa.eu/others/agents/index_en.htm).

KI-01-14-824-EN-N

"If we get it right, Europe will become the leading destination for ground-breaking science and innovation."

Máire Geoghegan-Quinn
European Commissioner for Research, Innovation and Science

Research and Innovation policy

Publications Office

doi:10.2777/92668