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The Innovation Union Scoreboard: Monitoring the innovation performance of the 27 EU Member States

The Innovation Union Scoreboard 2010 is commissioned by the Directorate-General for Enterprise and Industry of the European Commission. It is prepared by the Maastricht Economic and Social Research and Training Centre on Innovation and Technology (MERIT), assisted by the Joint Research Centre of the European Commission. For additional information, see [IP/11/114](#). For the performance of individual countries, see the full report available on the [Innovation Union website](#).

What is the Research and Innovation Union Scoreboard?

Since 2001 the European Innovation Scoreboard (EIS) has been providing an annual assessment of innovation performance across the EU. The 2010 edition marks the debut of the new Innovation Union Scoreboard (IUS) after the adoption of the Innovation Union Communication in October 2010. Building on the previous experience of the EIS, the Innovation Union Scoreboard 2010 provides a better picture of the EU's overall situation. International comparability, in particular, has been improved and the scoreboard also closely integrates research and innovation to help monitor the implementation of the Innovation Union. The Scoreboard provides a comparative assessment of the research and innovation performance of the EU27 Member States and the relative strengths and weaknesses of their research and innovation systems. In this way, it complements the Europe 2020 Annual Growth Survey and helps Member States assess areas in which they need to concentrate to boost their innovation performance.

What are the main indicators used?

A full list is given in Table 2.

In brief, the indicators are divided into three main groups. The first group "Enablers" refers to the main drivers of research and innovation performance external to the firm, covering for example the quality of the available workforce, the science and research base and access to public and private finance. The second type of indicator "Firm activities" reflects innovation efforts at firm level, using indicators such as R&D and other innovation investment, entrepreneurship, cooperation with the public sector and the generation of intellectual property rights. Finally, the "Outputs" category covers questions such as how many firms have brought innovations to market, the number of high-growth firms and the extent to which innovation has boosted sales and jobs.

What are the new indicators?

The Innovation Union Scoreboard 2010 largely follows the methodology of previous editions of the EIS in distinguishing between three main categories of indicator and eight innovation dimensions, capturing a total of 25 different indicators.

However, the previous list of 29 indicators of the EIS has been replaced with a new list of 25 indicators (see Table 2), which better capture the performance of national research and innovation systems as a whole. Twelve of these 29 indicators have not been changed, two indicators have been merged, five indicators have been partly changed using broader or narrower definitions or different denominators and seven new indicators have been introduced. A comparative table (Table 3) with the two sets of indicators is included in this memo.

What are the main conclusions of the 2010 Research and Innovation Union Scoreboard?

Countries at the top of the ranking for the composite innovation indicator (see Table 1a below) have in common a number of strengths in their national research and innovation systems. While there is no single way to attain top innovation performance, most innovation leaders perform very well in business R&D expenditure and other innovation indicators related to firm activities.

All the innovation leaders have higher than average scores in the public-private co-publications per million of population indicator, which points to good linkages between the science base and businesses. All Europe's most innovative countries also excel in the commercialisation of their technological knowledge, as demonstrated by their good performance on the "License and patent revenues from abroad" indicator.

The results show that successful countries have a consistently high performance across all or most of the indicators. There is no evidence that success can be achieved on the back of exceptional performances in a limited number of areas, compensating for other indicators scoring poorly.

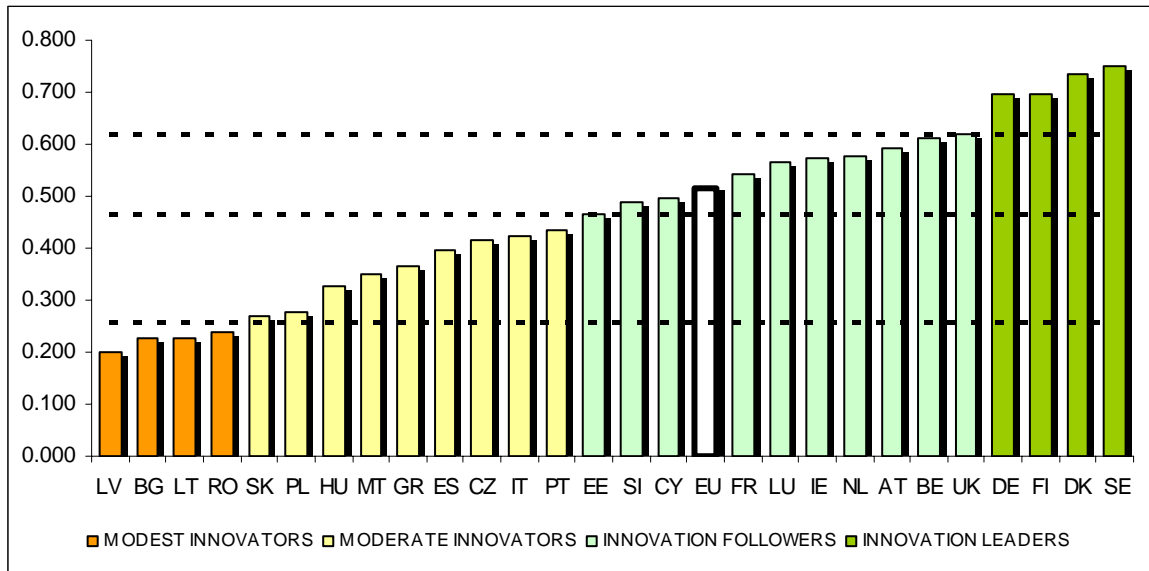
How does the EU fare in comparison to its international partners?

International comparisons in the Scoreboard show that the largest gap with the US and Japan lies in the Firm activities category where the EU27 lags behind in public-private co-publications, business R&D expenditure, and, with respect to the gap with Japan, in PCT (Patent Cooperation Treaty) patents. This means that improving the exploitation of research results by the business sector, in particular through a more efficient patent system, is key to raising the innovation performance of the EU to the level of its main competitors.

In addition, the particularly important and rapidly increasing EU lag in license and patent revenues from abroad shows that the EU produces fewer high-impact patents (relative to GDP) than the US and Japan and/or that the EU is not positioning itself effectively in the sectors where world demand is strongest. It also shows that the economic model and functioning of the internal market for protected knowledge in the EU are not adequate.

Overall, the EU27 is maintaining its lead over India and Russia. However, the EU27 is losing its lead over Brazil, in particular in the Firm activities category and License and patents revenues from abroad. China continues rapidly to narrow its performance gap with the EU, in particular in the Firm activities category.

Table 1a Overall innovation performance: the 2010 IUS Summary Innovation Index



Note: Average performance is measured using a composite indicator building on data for 24 indicators going from a lowest possible performance of 0 to a maximum possible performance of 1. Average performance in 2010 reflects performance in 2008/2009 due to a lag in data availability.

The performance of Innovation leaders is 20% or more above that of the EU27; of Innovation followers it is less than 20% above but more than 10% below that of the EU27; of Moderate innovators it is less than 10% below but more than 50% below that of the EU27; and for Modest innovators it is below 50% that of the EU27

Table 1b EU27 Growth performance

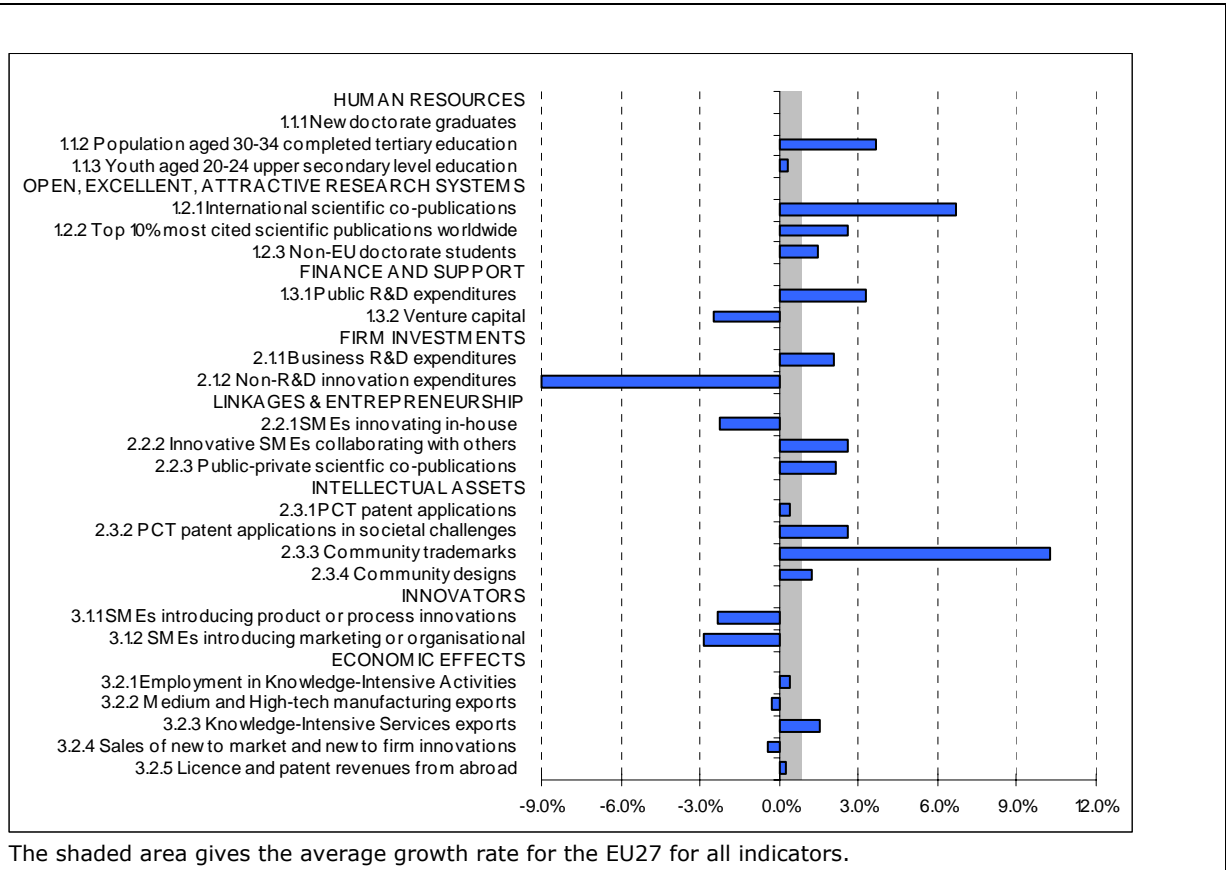


Table 2: Indicators for the Innovation Union Scoreboard 2010

Main type / innovation dimension / indicator	Data source	Reference year(s)
ENABLERS		
Human resources		
1.1.1 New doctorate graduates (ISCED 6) per 1000 population aged 25-34	Eurostat	2004 – <u>2008</u>
1.1.2 Percentage population aged 30-34 having completed tertiary education	Eurostat	2005 – <u>2009</u>
1.1.3 Percentage youth aged 20-24 having attained at least upper secondary level education	Eurostat	2005 – <u>2009</u>
Open, excellent and attractive research systems		
1.2.1 International scientific co-publications per million population	Science Metrix / Scopus	2004 – <u>2008</u>
1.2.2 Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	Science Metrix / Scopus	2003 – <u>2007</u>
1.2.3 Non-EU doctorate students ¹ as a % of all doctorate students	Eurostat	2003 – <u>2007</u>
Finance and support		
1.3.1 Public R&D expenditures as % of GDP	Eurostat	2005 – <u>2009</u>
1.3.2 Venture capital (early stage, expansion and replacement) as % of GDP	Eurostat	2005 – <u>2009</u>
FIRM ACTIVITIES		
Firm investments		
2.1.1 Business R&D expenditures as % of GDP	Eurostat	2005 – <u>2009</u>
2.1.2 Non-R&D innovation expenditures as % of turnover	Eurostat	2004, 2006, <u>2008</u>
Linkages & entrepreneurship		
2.2.1 SMEs innovating in-house as % of SMEs	Eurostat	2004, 2006, <u>2008</u>
2.2.2 Innovative SMEs collaborating with others as % of SMEs	Eurostat	2004, 2006, <u>2008</u>
2.2.3 Public-private co-publications per million population	CWTS / Thomson Reuters	2004 – <u>2008</u>
Intellectual assets		
2.3.1 PCT patents applications per billion GDP (in PPSE)	Eurostat	2003 – <u>2007</u>
2.3.2 PCT patent applications in societal challenges per billion GDP (in PPSE) (climate change mitigation; health)	OECD / Eurostat	2003 – <u>2007</u>
2.3.3 Community trademarks per billion GDP (in PPSE)	OHIM / Eurostat	2005 – <u>2009</u>
2.3.4 Community designs per billion GDP (in PPSE)	OHIM / Eurostat	2005 – <u>2009</u>
OUTPUTS		
Innovators		
3.1.1 SMEs introducing product or process innovations as % of SMEs	Eurostat	2004, 2006, <u>2008</u>
3.1.2 SMEs introducing marketing or organisational innovations as % of SMEs	Eurostat	2004, 2006, <u>2008</u>
3.1.3 High-growth innovative firms	N/A	N/A
Economic effects		
3.2.1 Employment in knowledge-intensive activities (manufacturing and services) as % of total employment	Eurostat	2008, <u>2009</u>
3.2.2 Medium and high-tech product exports as % total product exports	UN / Eurostat	2005 – <u>2009</u>
3.2.3 Knowledge-intensive services exports as % total service exports	UN / Eurostat	2004 – <u>2008</u>
3.2.4 Sales of new to market and new to firm innovations as % of turnover	Eurostat	2004 – <u>2008</u>
3.2.5 License and patent revenues from abroad as % of GDP	Eurostat	2005 – <u>2009</u>

¹ For non-EU countries the indicator measures the share of non-domestic doctoral students.

Table 3. A comparison of the indicators in the 2009 European Innovation Scoreboard (EIS) and the 2010 Innovation Union Scoreboard (IUS)

EIS 2009	IUS 2010	COMMENT
ENABLERS	ENABLERS	
Human resources	Human resources	
1.1.1 S&E and SSH graduates (1 st stage) per 1000 population aged 20-29	---	EIS 2009 indicator no longer used
1.1.2 S&E and SSH doctorate graduates (2 nd stage) per 1000 population aged 25-34	1.1.1 New doctorate graduates (ISCED 6) per 1000 population aged 25-34	Broader definition than that used in the EIS 2009
1.1.3 Population with tertiary education per 100 population <i>aged 25-64</i>	1.1.2 Percentage population <i>aged 30-34</i> having completed tertiary education	Age group more narrowly defined than in EIS 2009
1.1.4 Participation in life-long learning per 100 population aged 25-64	---	EIS 2009 indicator no longer used
1.1.5 Youth education attainment level	1.1.3 Percentage youth aged 20-24 having attained at least upper secondary level education	Different names but identical
---	Open, excellent and attractive research systems	
---	1.2.1 International scientific co-publications per million population	New indicator
---	1.2.2 Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	New indicator
---	1.2.3 Non-EU doctorate students as % of total doctorate students of the country	New indicator
Finance and support	Finance and support	
1.2.1 Public R&D expenditures as % of GDP	1.3.1 Public R&D expenditures as % of GDP	Identical
1.2.2 Venture capital as % of GDP	1.3.2 Venture capital (early stage, expansion and replacement) as % of GDP	Identical
1.2.3 Private credit as a % of GDP	---	EIS 2009 indicator no longer used
1.2.4 Broadband access by firms	---	EIS 2009 indicator no longer used
FIRM ACTIVITIES	FIRM ACTIVITIES	
Firm investments	Firm investments	
2.1.1 Business R&D expenditures as % of GDP	2.1.1 Business R&D expenditures as % of GDP	Identical
2.1.2 IT expenditures as a % of GDP	---	EIS 2009 indicator no longer used
2.1.3 Non-R&D innovation expenditures as % of turnover	2.1.2 Non-R&D innovation expenditures as % of turnover	Identical
---	Linkages & entrepreneurship	
2.2.1 SMEs innovating in-house as % of SMEs	2.2.1 SMEs innovating in-house as % of SMEs	Identical
2.2.2 Innovative SMEs collaborating with others as % of SMEs	2.2.2 Innovative SMEs collaborating with others as % of SMEs	Identical
2.2.3 Firm renewal rate (SMEs entries and exits as a % of all SMEs)	---	EIS 2009 indicator no longer used
2.2.4 Public-private co-publications per million population	2.2.3 Public-private co-publications per million population	Identical to EIS
Throughputs	Intellectual Assets	
2.3.1 EPO patent applications million population	---	EIS 2009 indicator no longer used
---	2.3.1 PCT patents applications per billion GDP (in PPSE)	New indicator
---	2.3.2 PCT patent applications in societal challenges per billion GDP (in PPSE) (climate change mitigation; health)	New indicator
2.3.2 Community trademarks <i>per million population</i>	2.3.3 Community trademarks <i>per billion GDP</i> (in PPSE)	Different denominator
2.3.3 Community designs <i>per million population</i>	2.3.4 Community designs <i>per billion GDP</i> (in PPSE)	Different denominator

EIS 2009	IUS 2010	COMMENT
2.3.4 Technology Balance of Payments flows as % of GDP	---	Receipts captured in IUS 2010 indicator 3.2.5
OUTPUTS	OUTPUTS	
Innovators	Innovators	
3.1.1 SMEs introducing product or process innovations as % of SMEs	3.1.1 SMEs introducing product or process innovations as % of SMEs	Identical
3.1.2 SMEs introducing marketing or organisational innovations as % of SMEs	3.1.2 SMEs introducing marketing or organisational innovations as % of SMEs	Identical
3.1.3 Resource efficiency innovators as % of all firms	---	EIS 2009 indicator no longer used
---	3.1.3 High-growth innovative enterprises	New indicator
Economic effects	Economic effects	
3.2.1 Employment in medium-high & high-tech manufacturing as % of workforce	---	EIS 2009 indicator no longer used
3.2.2 Employment in knowledge-intensive services as % of workforce	---	EIS 2009 indicator no longer used
---	3.2.1 Employment in knowledge-intensive activities (manufacturing and services) as % of workforce	New indicator
3.2.3 Medium and high-tech manufacturing exports as % of total product exports	3.2.2 Medium and high-tech product exports as % of total product exports	Identical
3.2.4 Knowledge-intensive services exports as % of total services exports	3.2.3 Knowledge-intensive services exports as % of total services exports	Identical
3.2.5 Sales of new to market innovations as % of turnover	3.2.4 Sales of new to market and new to firm innovations as % of turnover	Combines EIS 2009 indicators 3.2.5 and 3.2.6
3.2.6 Sales of new to firm innovations as % of turnover		
---	3.2.5 Licence and patent revenues from abroad as % of GDP	Part of EIS indicator 2.3.4 on TBP flows

The full report is available at:

http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/index_en.htm

and

<http://www.proinno-europe.eu/metrics>