



DG Research and Innovation

Researchers' Report 2013

Scorecards



Deloitte.

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Introduction

The multi-coloured scorecards allow for quick visualisation of the countries' individual progress (or lack thereof) between two different dates for a number of key indicators¹. The indicators were selected on the basis of their a) relevance for the issue to be monitored, b) comparability between dates (availability of data) and c) robustness of the data set. Scorecards serve as a means of monitoring change between different dates by showing if the value of an indicator has increased, decreased or remained stable. The indicators are presented for the following 'monitoring categories':

- The stock of researchers in Europe;
- Women in the research profession;
- Open, transparent and merit-based recruitment;
- Education and training;
- Working conditions in the research profession;
- Mobility and international attractiveness.

The table below presents an overview of the key 10 indicators, the data source(s) and the year(s) of reference.

Table 1: Scorecards - Key 10 indicators, *The Researchers' Report 2013*

Indicators	Data source(s)	Year(s) of reference
The stock of researchers in Europe		
Researchers (Full Time Equivalent) per thousand labour force, Europe, 2009 and 2010	Eurostat	2009, 2010
Women in the research profession		
Women as Grade A academic staff, Europe, 2002 and 2010 (%)	WiS database/ SHE figures	2002, 2010
Open, transparent and merit-based recruitment		
Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, Europe, 2011 and 2012	EURAXESS Jobs Portal	2011, 2012
Education and training		
New doctoral graduates (ISCED 6) per thousand population aged 25-34, Europe, 2009 and 2010	Eurostat	2009, 2010
Working conditions in the research profession		
Researchers employed on fixed-term contracts, Europe, 2012 (%)	MORE2 study	2012
Mobility and international attractiveness		
Non-EU doctoral candidates as a percentage of all doctoral candidates, Europe, 2009 and 2010 (%)	Innovation Union Scoreboard 2013	2009, 2010
Doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State, Europe, 2009 and 2010 (%)	Eurostat	2009, 2010
Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years, Europe, 2012 (%)	MORE2 study	2012
International scientific co-publications per million population, Europe, 2010 and 2011	Science Metrix/Scopus	2010, 2011
Scientific publications in the top 10% most-cited publications worldwide as a percentage of total scientific publications, Europe, 2007 and 2008 (%)	Science Metrix/ Scopus/IUS	2007, 2008

Source: Deloitte

¹ These indicators were agreed upon by the ERA SGHRM (Steering Group on Human Resources and Mobility).

Each scorecard refers to two dimensions:

1. **Score:** the value of the indicator for the latest year available is summarised in four value ranges (from 4 to 1) represented by colours, from 4 (green) to 1 (orange);
2. **Progress:** the value of the indicator against its value from the previous year (or latest year available). This makes it possible to monitor progress (or lack thereof) by showing if the value of the indicator has increased (↑), decreased (↓) or remained stable (↔).

The countries (and in some cases the EU-27, US, Japan and China) are put in four performance groups²:

Table 2: Scorecards – Methodology

Category	Calculation
Green (4)	The country's/region's performance is at least 20% above the EU-27 average.
Light green (3)	The country's/region's performance is between -10% and +20% of the EU-27 average.
Yellow (2)	The country's/region's performance is between -50% and -10% of the EU-27 average.
Orange (1)	The country's/region's performance is below 50% of the EU-27 average.

Source: Deloitte

In most cases, we observe a positive trend in the EU-27 performance between two different dates:

- Between 2009 and 2010, the number of researchers (FTE) per 1 000 labour force increased in the EU-27 by 2.3%, less than in Japan (3.7%), but more than in the US (1.3%);
- Between 2002 and 2010, the average percentage of women Grade A academic staff in the EU-27 increased from 15.3% to 19.8% (+29%);
- Between 2011 and 2012, the average number of research posts advertised via the EURAXESS Jobs portal per thousand researchers in the public sector in the EU-27 increased from 33.3% to 40.8% (+23%);
- The number of new doctoral graduates (ISCED 6) per thousand population aged 25-34 in the EU-27 increased from 1.5 in 2009 to 1.6 in 2010 (+7%);
- Between 2009 and 2010, the EU-27 share of non-EU doctoral candidates as a percentage of all doctoral candidates decreased slightly from 20.5% to 20.0% (-2%);
- Between 2009 and 2010, the proportion of doctoral candidates (ISCED 6) in the EU-27 with a citizenship of another EU-27 Member State remained unchanged and stood at 7.8%;
- Between 2010 and 2011, the number of international scientific co-publications per million population in the EU-27 remained almost unchanged. The EU-27 average was around 300 co-publications per million population in comparison with around 450 in the United States, 211 in Japan and 43 in China;
- Between 2007 and 2008, EU-27 scientific publications in the top 10% most-cited publications worldwide as a percentage of all scientific publications increased from 10.7% to 10.9% (+2%).

² Based on the methodology applied in the "Innovation Union Scoreboard 2013", European Commission (2013)

The table below presents the performance of the EU-27 (and in some cases of the US, Japan and China) for a number of indicators, showing the name of the indicator(s), the values per year of reference and the long- and short-term trend for each indicator (where data are available).

Table 3: Scorecards - Current situation and trend per key indicator for the EU-27, US, China and Japan

Name of the indicator	Values/ progress	Years of reference	EU-27		United States		China (except Hong Kong)		Japan	
Researchers (Full Time Equivalent) per thousand labour force, EU-27, US, China, Japan, 2000, 2009 and 2010	Values	2000	4.9		9.0		1		9.6	
		2009	6.5		9.4		1.4		9.9	
		2010	6.6		9.5		1.9		10.3	
	Progress	2000-2010	↑	35%	↑	6%	↑	101%	↑	7%
		2009-2010	↑	2%	↑	1%	↑	32%	↑	4%
Women as Grade A academic staff, Europe, 2002 and 2010, EU-27	Values (%)	2002	15.3		:		:		:	
		2010	19.8							
	Progress	2002-2010	↑	29%						
Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, EU-27, 2011 and 2012	Values (%)	2011	33.3		:		:		:	
		2012	40.8							
	Progress	2011-2012	↑	23%						
New doctoral graduates (ISCED 6) per thousand population aged 25-34, EU-27, US, China, Japan, 2000, 2009 and 2010	Values	2000	1.1		1.1		:		0.7	
		2009	1.5		1.6		2.4		1.1	
		2010	1.6		1.7		2.4		1.1	
	Progress	2000-2010	↑	45%	↑	55%	:	:	↑	52%
		2009-2010	↑	7%	↑	6%	↔	0%	↓	-4%
Non-EU doctoral candidates as a percentage of all doctoral candidates, EU-27, 2004, 2009 and 2010	Values (%)	2004	17.1		:		:		:	
		2009	20.5							
		2010	20.0							
	Progress	2004-2010	↑	17%						
		2009-2010	↓	-2%						
Doctoral candidates (ISCED 6) with citizenship of another EU-27 Member State, EU-27, 2004, 2009 and 2010	Values (%)	2004	5.8		:		:		:	
		2009	7.8							
		2010	7.8							
	Progress	2004-2010	↑	34%						
		2009-2010	↔	0%						
International scientific co-publications per million population, EU-27, US, China, Japan, 2002, 2010 and 2011	Values	2002	129		:		:		:	
		2010	301		441		38		204	
		2011	300		450		43		211	
	Progress	2002-2011	↑	133%	:		:		:	
		2010-2011	↔	0%	↑	2%	↑	12%	↑	4%
Scientific publications in the top 10% most-cited publications worldwide as a percentage of total scientific publications, EU-27, US, China, Japan, 2004, 2007 and 2008	Values (%)	2004	10.2		14.31		6.6		7.2	
		2007	10.7		14.4		6.6		7.2	
		2008	10.9		14.3		6.8		7.3	
	Progress	2004-2008	↑	7%	↔	0%	↑	15%	↓	-2%
		2007-2008	↑	2%	↓	-1%	↑	4%	↑	1%

Source: Deloitte

The table below presents an overview of national performance for each key indicator, showing the number of European countries in each of the monitoring categories.

Table 4: Scorecards - Distribution of countries per key indicator, Europe

	Stock of researchers	Women in the research profession	Open, transparent and merit-based recruitment	Education and training	Working conditions in the research profession	Mobility and international attractiveness				
	Researchers (Full Time Equivalent) per thousand labour force, Europe, 2009 and 2010 (%)	Women as Grade A academic staff, Europe, 2002 and 2010 (%)	Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, Europe, 2011 and 2012 (%)	New doctoral graduates (ISCED 6) per thousand population aged 25-34, Europe, 2009 and 2010 (%)	Researchers employed on fixed-term contracts, Europe, 2012 (%) ³	Non-EU doctoral candidates as a percentage of all doctoral candidates, Europe, 2009 and 2010 (%)	Doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State, Europe, 2009 and 2010 (%)	Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years, Europe, 2012 (%)	International scientific co-publications per million population, Europe, 2010 and 2011 ⁴⁵ (%)	Scientific publications in the top 10% most-cited publications worldwide as a percentage of total scientific publications 2007 and 2008 (%)
Green (4)	10	8	11	8	13	4	5	12	25	5
Light Green (3)	5	8	2	10	6	5	12	8	1	12
Yellow (2)	13	13	3	8	4	3	8	12	4	8
Orange (1)	4	0	17	8	10	17	8	1	3	8
Total number of countries	32	29	33	34	33	29	33	33	33	33

Source: Deloitte

³ For the purposes of this indicator, countries reporting a comparatively low share of researchers employed on fixed-term contracts compared to the EU-average are presented on top (green).

⁴ Based on the average of EU-27 Member States.

⁵ International scientific co-publications are a proxy for the quality of scientific research as collaboration increases scientific productivity. The numerator refers to the number of scientific publications with at least one co-author based abroad (where abroad is non-EU for the EU-27).

1. Researchers (Full Time Equivalent) per thousand labour force, Europe, 2009 and 2010

Table 5: Value ranges - Researchers (Full Time Equivalent) per thousand labour force, Europe, 2009 and 2010

Green (4)	The number of researchers (Full Time Equivalent) per thousand labour force is at least 20% above the EU-27 average.
Light Green (3)	The number of researchers (Full Time Equivalent) per thousand labour force is between -10% and +20% of the EU-27 average.
Yellow (2)	The number of researchers (Full Time Equivalent) per thousand labour force is between -50% and -10% of the EU-27 average.
Orange (1)	The number of researchers (Full Time Equivalent) per thousand labour force is below 50% of the EU-27 average.

The EU is lagging behind its main competitors in the share of researchers in the total labour force, despite a moderate increase between 2009 and 2010. In 2010, the ratio was 6.64 per 1 000 in the EU-27, compared to 9.51 in the US and 10.27 in Japan. The Nordic countries and Luxembourg do better than the EU average.

Between 2000 and 2010, the number of researchers (FTE) in relation to the labour force increased from 4.92 to 6.64 in the EU-27, up from 6.49 in 2009. The increase in the United States between 2000 and 2010 was from 9.0 to 9.51. In Japan, it was from 9.57 to 10.27, while China reported an increase from 0.95 to 1.91, still below any European country. (The total labour force – i.e. including both the employed and unemployed – was some 239 million in the EU-27 in 2010, compared to 155 million in the United States, 66 million in Japan and 800 million in China.)

Between 2009 and 2010, the number of researchers (FTE) per 1 000 labour force increased in Europe by 2.3%, less than in Japan (3.7%), but more than in the US (1.3%).

Table 6: Scorecard: Researchers (Full Time Equivalent) per thousand labour force, EU-27, US, China, Japan, 2009 and 2010

Region	2009	2010	Progress/2009 (%)	
<i>European Union 27</i>	6.5	6.6	↑	2
<i>United States</i>	9.4	9.5	↑	1
<i>China (except Hong Kong)</i>	1.4	1.9	↑	32
<i>Japan</i>	9.9	10.3	↑	4

Source: Deloitte

Data: Eurostat

All Nordic countries have a higher share of researchers (FTE) per thousand labour force than the US. Finland and Denmark rank highest of EU-27 countries, with more than fifteen researchers per thousand labour force – higher also than Japan.

Within the EU-27 in 2010, the share of researchers per thousand labour force was highest in two Nordic countries (Finland and Denmark). It was lowest in a number of Eastern European countries, such as Romania, Bulgaria, Latvia and Poland.

Iceland reported the highest ratio of all the countries looked at, with 15.5 researchers per thousand labour force in 2010. Five countries had more than 10 researchers per thousand labour force, i.e. Luxembourg and all the Nordic countries except Sweden. Sweden is the sixth ranked country, with just below 10. The top four rank above Japan; the top six rank above the US. Of the EU-27 countries, Romania and Bulgaria, and the Mediterranean islands, report the lowest numbers, with four or fewer researchers per thousand labour force.

Table 7: Scorecard: Researchers (Full Time Equivalent) per thousand labour force, Europe, 2009 and 2010

Country	2009	2010	Progress/2009 (%)	
<i>Iceland</i>	16.0	15.5	↓	3
<i>Finland</i>	15.3	15.5	↑	2
<i>Denmark</i>	12.5	12.9	↑	3
<i>Luxembourg</i>	10.5	11.4	↓	9
<i>Norway</i>	10.2	10.2	↔	0
<i>Sweden</i>	9.6	9.9	↑	4
<i>Austria</i>	8.1	8.5	↑	4
<i>France</i>	8.3	8.4	↑	2
<i>Portugal</i>	7.8	8.2	↑	5
<i>United Kingdom</i>	8.2	8.2	↔	0
<i>Germany</i>	7.6	7.9	↑	3
<i>Belgium</i>	8.0	7.8	↓	2
<i>Slovenia</i>	7.1	7.4	↑	3
<i>Ireland</i>	6.6	6.6	↔	0
<i>Netherlands</i>	5.3	6.1	↑	16
<i>Estonia</i>	6.2	5.9	↓	5
<i>Spain</i>	5.8	5.8	↔	0
<i>Slovakia</i>	4.9	5.6	↑	14
<i>Czech Republic</i>	5.4	5.6	↑	2
<i>Lithuania</i>	5.2	5.3	↑	2
<i>Switzerland</i>	6.5	5.2	↓	19
<i>Hungary</i>	4.8	5.0	↑	5
<i>Greece</i>	4.5	4.6	↑	2
<i>Italy</i>	4.1	4.1	↑	2
<i>Poland</i>	3.5	3.7	↑	3
<i>Croatia</i>	3.6	3.6	↑	1
<i>Latvia</i>	3.1	3.4	↑	10
<i>Malta</i>	2.9	3.4	↑	19
<i>Bulgaria</i>	3.4	3.2	↓	6
<i>Turkey</i>	2.4	2.5	↑	7
<i>Cyprus</i>	2.2	2.2	↑	1
<i>Romania</i>	1.9	2.0	↑	2

Source: Deloitte

Data: Eurostat

*No information available for BiH, FYROM, IL, LI, ME and SR

2. Women as Grade A⁶ academic staff, Europe, 2002 and 2010 (%)

Table 8: Value ranges – Women as Grade A academic staff, Europe, 2002 and 2010 (%)

Green (4)	The percentage of women as Grade A academic staff is at least 20% above the EU-27 average.
Light Green (3)	The percentage of women as Grade A academic staff is between -10% and +20% of the EU-27 average.
Yellow (2)	The percentage of women as Grade A academic staff is between -50% and -10% of the EU-27 average.
Orange (1)	The percentage of women as Grade A academic staff is below 50% of the EU-27 average.

The ratio of women in top-level positions in research between 2007 and 2010 rose in nearly every country but unevenly.

Between 2007 and 2010, the average percentage of women academic Grade A staff in the EU-27 increased from 18.7% to 19.8%, and the majority of countries in the scope of this report reported an increase in the ratio of women in high-ranking academic positions.

Table 9: Scorecard: Women as Grade A academic staff, EU-27, 2002 and 2010 (%)

Region	2002	2010	Progress/2002 (%)	
<i>European Union 27</i>	15.3	19.8	↑	29

Source: Deloitte

Data: WIS database/SHE figures

The under-representation of women at the higher levels of the academic hierarchy is reflected in the share of women in Grade A academic positions. The culmination of a research career is reaching a top-level position. In 2010, the EU-27 average of the share of women among Grade A academics was 19.8%. The proportion of women in top research positions was highest (>25%) in Romania (35.6%), followed by Latvia (32.1%), Turkey (28.1%), Croatia (26.4%), Switzerland (25.9%) and Bulgaria (25.9%). Cyprus (10.7%), Luxembourg (11.4%), Belgium (12.2%), the Czech Republic (13.1%), and the Netherlands (13.1%) reported lowest (<14%) figures for women in top-level academic positions.

⁶ Grade A: The single highest grade/post at which research is normally conducted.

Table 10: Scorecard: Women as Grade A academic staff, Europe, 2002 and 2010 (%)

Country	2002	2010	Progress/2002 (%)	
Romania	26.2	35.6	↑	36
Latvia	22.9	32.1	↑	40
Turkey	25.3	28.1	↑	11
Croatia	26.2	26.4	↑	0
Switzerland	11.0	25.9	↑	137
Bulgaria	17.8	25.9	↑	45
Iceland	16.0	24.2	↑	52
Finland	19.9	24.2	↑	21
Slovakia	9.2	22.7	↑	148
Portugal	20.5	22.5	↑	10
Norway	15.7	21.4	↑	36
Hungary	13.6	20.6	↑	51
Slovenia	12.1	20.1	↑	66
Italy	15.6	20.1	↑	29
Sweden	14.0	20.0	↑	43
France	17.3	18.7	↑	8
United Kingdom	15.1	17.5	↑	16
Austria	9.5	17.4	↑	83
Estonia	17.3	17.2	↓	1
Spain	12.6	16.9	↑	35
Denmark	10.3	15.0	↑	45
Germany	8.0	14.6	↑	82
Israel	12.7	14.5	↑	14
Lithuania	12.2	14.4	↑	18
Czech Republic	8.7	13.1	↑	50
Netherlands	8.2	13.1	↑	59
Belgium	8.4	12.2	↑	46
Luxembourg	10.0	11.4	↑	14
Cyprus	5.6	10.7	↑	92

Source: Deloitte

Data: WIS database/SHE figures

*No information available for BiH, EL, FYROM, IE, LI, MT, ME, PL, and SR

** Exceptions to the reference years: 2002: NL, UK, NO: 2003; HR: 2008; IL: 2006; 2010: CZ: 2008; DK, FR, CY, AT, PT, RO, SE: 2009; EE: 2004; LT: 2007; SK: 2011; UK: 2006

*** Data estimated: EU-27 (by DG Research and Innovation)

3. Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, Europe, 2011 and 2012

Table 11: Value ranges – Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, Europe, 2011 and 2012

Green (4)	The number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector is at least 20% above the EU-27 average.
Light Green (3)	The number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector is between -10% and +20% of the EU-27 average.
Yellow (2)	The number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector is between -50% and -10% of the EU-27 average.
Orange (1)	The number of researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector is below 50% of the EU-27 average.

The number of research posts advertised on via the EURAXESS Jobs portal per thousand researchers in the public sector rose significantly in the vast majority of European countries between 2011 and 2012, but not equally rapidly everywhere.

Between 2011 and 2012, the average number of research posts advertised via the EURAXESS Jobs portal per thousand researchers in the public sector in the EU-27 increased from 33.3 to 40.8 (+23%), and the vast majority of countries within the scope of this report reported an increase in the number of research posts advertised on the portal, though the pattern of increases was uneven.

Table 12: Scorecard: Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, EU-27, 2011 and 2012

Region	2011	2012	Progress/2011 (%)	
European Union 27	33.3	40.8	↑	23

Source: Deloitte
Data: Euraxess Jobs Portal

The share of research posts advertised on the EURAXESS Jobs portal per thousand researchers in the public sector provides an indication as to the extent to which vacancies are open to international competition among a country's institutions. Poland, Luxembourg, Greece, Sweden and Ireland rank best for the share of jobs posted on the EURAXESS Jobs portal.

Generally speaking, if job positions are not advertised publicly and widely, the chances of recruiting the best possible talent are more limited. In 2012, the average number of job postings on the EURAXESS Jobs portal per thousand researchers in the public sector for the EU-27 was 41, with a range from 158 in Poland to five or fewer in several countries. The number of jobs advertised via the online platform was particularly high (>100) in Poland and Luxembourg (158), Greece (116), Sweden (112) and Ireland (100). Thus, researchers across Europe benefit from more open and transparent access to research-related jobs in these countries.

We note a low (<5) share of researchers posts advertised on the EURAXESS Jobs portal per thousand researchers in the public sector in a range of countries: Portugal, Lithuania, Hungary, FYROM, Latvia, Bulgaria, Turkey and Slovakia. The publication of job vacancies on relevant Europe-wide online platforms such as EURAXESS Jobs is only one of many indications of an open, transparent and merit-based recruitment system. Countries such as Germany, which report a relatively low number of research posts advertised on the EURAXESS Jobs portal per thousand researchers in the public sector, have set up national systems to advertise positions.

Table 13: Scorecard - Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector, Europe, 2011 and 2012

Country	2011	2012	Progress/2011 (%)	
<i>Poland</i>	19.3	158.5	↑	721
<i>Luxembourg</i>	114.8	158.2	↑	38
<i>Greece</i>	42.5	116.5	↑	174
<i>Sweden</i>	38.1	112.4	↑	195
<i>Ireland</i>	86.0	100.1	↑	16
<i>Netherlands</i>	74.6	83.7	↑	12
<i>Cyprus</i>	128.8	82.7	↓	36
<i>Austria</i>	43.1	58.1	↑	35
<i>Norway</i>	55.0	58.1	↑	6
<i>United Kingdom</i>	88.0	55.5	↓	37
<i>Belgium</i>	37.3	53.3	↑	43
<i>France</i>	39.0	37.5	↓	4
<i>Romania</i>	12.9	37.4	↑	189
<i>Czech Republic</i>	15.3	32.9	↑	116
<i>Italy</i>	18.5	23.2	↑	25
<i>Croatia</i>	52.3	20.6	↓	61
<i>Estonia</i>	23.1	19.1	↓	17
<i>Slovenia</i>	7.4	18.8	↑	153
<i>Denmark</i>	6.8	18.1	↑	166
<i>Switzerland</i>	23.3	17.8	↓	24
<i>Iceland</i>	14.1	17.3	↑	23
<i>Malta</i>	:	15.5	↔	:
<i>Finland</i>	11.5	10.1	↓	13
<i>Spain</i>	6.5	8.1	↑	25
<i>Germany</i>	4.2	5.1	↑	21
<i>Portugal</i>	6.5	3.5	↓	47
<i>Lithuania</i>	1.1	2.3	↑	113
<i>Hungary</i>	1.7	2.0	↑	16
<i>Macedonia (FYR)</i>	5.1	1.3	↓	75
<i>Latvia</i>	:	0.9	↔	:
<i>Bulgaria</i>	1.3	0.7	↓	42
<i>Turkey</i>	0.2	0.4	↑	75
<i>Slovakia</i>	0.5	0.3	↓	33

Source: Deloitte

Data: EURAXESS Jobs portal; no information available for BiH, IL, LI, ME and SR

4. New doctoral graduates (ISCED 6) per thousand population aged 25-34, Europe, 2009 and 2010

Table 14: Value ranges – New doctoral graduates (ISCED 6) per thousand population aged 25-34, Europe, 2009 and 2010

Green (4)	The number of new doctoral graduates (ISCED 6) per thousand population aged 25-34 is at least 20% above the EU-27 average.
Light Green (3)	The number of new doctoral graduates (ISCED 6) per thousand population aged 25-34 is between -10% and +20% of the EU-27 average.
Yellow (2)	The number of new doctoral graduates (ISCED 6) per thousand population aged 25-34 is between -50% and -10% of the EU-27 average.
Orange (1)	The number of new doctoral graduates (ISCED 6) per thousand population aged 25-34 is below 50% of the EU-27 average.

The number of new doctoral graduates in the EU-27 has risen significantly in the past decade, increasing from around 72 000 in 2000 to around 115 000 in 2010.

The number of new doctoral graduates in the EU-27 increased from 72 251 (in 2000) to 114 518⁷ (in 2010). The increase for the US was from 44 808 in 2000 to 69 570 in 2010. In Japan, the number of new doctoral graduates increased from 12 192 in 2000 to 15 867 in 2010.

The number of new doctoral graduates (ISCED 6) per thousand population aged 25-34 in the EU-27 increased from 1.1 in 2000 to 1.6⁸ in 2010. The increase in the United States was from 1.1 in 2000 to 1.7 in 2010, while in Japan, it went from 0.7 in 2000 to 1.0 in 2010.

Table 15: Scorecard: New doctoral graduates (ISCED 6) per thousand population aged 25-34, EU-27, US, China, Japan, 2009 and 2010

Region	2009	2010	Progress/2009 (%)	
<i>European Union 27</i>	1.5	1.6	↑	7
<i>United States</i>	1.6	1.7	↑	6
<i>China</i>	2.4	2.4	↔	0
<i>Japan</i>	1.1	1.1	↓	4

Source: Deloitte

Data: Eurostat

The highest number of new doctoral graduates per thousand population aged 25-34 in Europe in 2010 was in Switzerland. The leading EU-27 countries were Slovakia, Sweden, Germany and Finland.

In 2010, the average number of new doctoral graduates per thousand population aged 25-34 for the EU-27 was 1.6, with a range from 3.7 in Switzerland to 0.5 or less in some other European countries.

⁷ Eurostat

⁸ Computed by Deloitte by including Italy in the total provided by Eurostat

Table 16: Scorecard: New doctoral graduates (ISCED 6) per thousand population aged 25-34, Europe, 2009 and 2010

Country	2009	2010	Progress/2009 (%)	
<i>Switzerland</i>	3.6	3.7	↑	3
<i>Slovakia</i>	2.1	3.1	↑	48
<i>Sweden</i>	3.1	2.9	↓	6
<i>Germany</i>	2.6	2.7	↑	4
<i>Finland</i>	2.9	2.6	↓	10
<i>Austria</i>	2.1	2.3	↑	10
<i>United Kingdom</i>	2.2	2.3	↑	5
<i>Denmark</i>	1.7	2.1	↑	24
<i>Netherlands</i>	1.7	1.9	↑	12
<i>Portugal</i>	2.7	1.9	↓	30
<i>Norway</i>	1.7	1.9	↑	12
<i>Ireland</i>	1.5	1.6	↑	7
<i>France</i>	1.5	1.6	↑	7
<i>Italy</i>	1.6	1.6	↔	0
<i>Belgium</i>	1.4	1.5	↑	7
<i>Slovenia</i>	1.5	1.5	↔	0
<i>Romania</i>	1.3	1.4	↑	8
<i>Croatia</i>	0.9	1.4	↑	56
<i>Czech Republic</i>	1.4	1.3	↓	7
<i>Greece</i>	:	1.2	↔	:
<i>Spain</i>	1.0	1.2	↑	20
<i>Estonia</i>	0.8	0.9	↑	13
<i>Lithuania</i>	0.9	0.9	↔	0
<i>Luxembourg</i>	:	0.8	↔	:
<i>Hungary</i>	0.9	0.8	↓	11
<i>Iceland</i>	0.7	0.8	↑	14
<i>Bulgaria</i>	0.6	0.5	↓	17
<i>Poland</i>	0.8	0.5	↓	38
<i>Macedonia (FRY)</i>	0.4	0.5	↑	25
<i>Latvia</i>	0.5	0.4	↓	20
<i>Turkey</i>	0.3	0.4	↑	33
<i>Cyprus</i>	0.2	0.2	↔	0
<i>Malta</i>	0.3	0.2	↓	33
<i>Liechtenstein</i>	3.3	0.2	↓	94

Source: Deloitte

Data: UNESCO OECD Eurostat education survey/IUS

*No information unavailable for 2000 and 2010 for BiH, IL, ME and SR and for 2000 for EL, CH, HR, IS, LI and RO

5. Researchers employed on fixed-term contracts, Europe, 2012 (%)⁹

Table 17: Value ranges – Researchers employed on fixed-term contracts, Europe, 2012 (%)

Green (4)	The percentage of researchers employed on fixed-term contracts is below -80% of the EU-27 average.
Light Green (3)	The percentage of researchers employed on fixed-term contracts is between -80% and +10% of the EU-27 average.
Yellow (2)	The percentage of researchers employed on fixed-term contracts is between 10% and 50% of the EU-27 average.
Orange (1)	The percentage of researchers employed on fixed-term contracts is more than 50% of the EU-27 average.

In 2012, many researchers worked on a fixed-term contract or had no contract at all. This was most pronounced during earlier career stages (R1 - First Stage Researcher and R2 – Recognised Researcher).

The type of employment contract has a significant impact on the attractiveness of researchers' employment and working conditions. Young researchers are often employed on temporary short-term contracts to help carry out specific research projects to the detriment of academic independence, job security and sufficient social security. Senior researchers, on the other hand, are often employed on permanent contracts, with progression based on seniority rather than performance. This indicator should however be treated with caution as there are a number of other factors which can have a major impact on a researcher's working conditions. This includes the remuneration package, access to research funding, provision of training and career development, career prospects, etc.

In 2012, researchers with no contracts, 'others' (often student status) and those with a fixed-term contract of one year maximum accounted for 31% of R1¹⁰ PhD researchers, 10% of R2¹¹, 4% of R3¹² and 3% of R4¹³. Moreover, 55% of researchers in the R1 group with a PhD and 47% of the R2 group also had fixed-term contracts, albeit of a slightly longer duration than 12 months. These figures highlight the precarious contractual situation of early-stage researchers, particularly PhD researchers. The share of permanent (open-ended) contracts increases from lower (13% of R1 in PhD) to higher career stages (90% of R4). This suggests that researchers typically find stable positions only relatively late during their career paths, after having completed their doctorate¹⁴.

Table 18: Scorecard: Researchers employed on fixed-term contracts, EU-27, 2012 (%)

Region	% of fixed-term contracts
<i>European Union 27</i>	34.3

Source: Deloitte

⁹ The individual countries' scores are presented in ascending order: the countries reporting a comparatively lower share of researchers employed on fixed-term contracts compared to the EU-average are presented in green (the percentage of researchers employed on fixed-term contracts is below -80% of the EU-27 average).

¹⁰ R1: First Stage Researcher (up to the point of PhD)

¹¹ R2: Recognized Researcher (PhD holders or equivalent who are not yet fully independent)

¹² R3: Established Researcher (researchers who have developed a level of independence)

¹³ R4: Leading Researcher (researchers leading their research area or field)

¹⁴ IDEA Consult (2013)

Table 19: Scorecard: Researchers employed on fixed-term contracts, Europe, 2012 (%)

Country	% of fixed-term contracts
<i>Malta</i>	4.8
<i>Italy</i>	6.9
<i>Romania</i>	7.1
<i>Bulgaria</i>	11.2
<i>Slovenia</i>	20.0
<i>France</i>	20.3
<i>Spain</i>	20.7
<i>Iceland</i>	21.0
<i>Greece</i>	22.6
<i>Hungary</i>	22.7
<i>Macedonia (FYROM)</i>	23.9
<i>Turkey</i>	25.0
<i>Ireland</i>	25.8
<i>United Kingdom</i>	28.0
<i>Norway</i>	30.7
<i>Poland</i>	31.7
<i>Cyprus</i>	33.7
<i>Portugal</i>	36.6
<i>Latvia</i>	37.6
<i>Austria</i>	45.3
<i>Croatia</i>	45.7
<i>Czech Republic</i>	45.7
<i>Sweden</i>	50.5
<i>Slovakia</i>	51.8
<i>Netherlands</i>	51.8
<i>Germany</i>	53.9
<i>Denmark</i>	56.0
<i>Switzerland</i>	61.4
<i>Finland</i>	63.1
<i>Belgium</i>	63.1
<i>Luxembourg</i>	65.1
<i>Estonia</i>	72.9
<i>Lithuania</i>	73.9

Source: Deloitte

Data: MORE2 study "Support for continued data collection and analysis concerning mobility patterns and career paths of researchers",
IDEA Consult (2013)

* The individual countries' scores are presented in ascending order: the countries reporting a comparatively lower share of researchers employed on fixed-term contracts compared to the EU-average are presented on the top.

6. Non-EU doctoral candidates as a percentage of all doctoral candidates, Europe, 2009 and 2010 (%)

Table 20: Value ranges - Non-EU doctoral candidates as a percentage of all doctoral candidates, Europe, 2009 and 2010 (%)

Green (4)	Non-EU doctoral candidates as percentage of all doctoral candidates is at least 20% above the EU-27 average.
Light Green (3)	Non-EU doctoral candidates as percentage of all doctoral candidates is between -10% and +20% of the EU-27 average.
Yellow (2)	Non-EU doctoral candidates as percentage of all doctoral candidates is between -50% and -10% of the EU-27 average.
Orange (1)	Non-EU doctoral candidates as percentage of all doctoral candidates is below 50% of the EU-27 average.

The share of non-EU doctoral candidates¹⁵ as a percentage of all doctoral candidates serves as a useful indicator of the openness and attractiveness of a research system. The average share for the EU-27 is 20%. Those above the EU-27 average are Ireland (22.3%), the UK (31.4%) and France (35.4%).

The share of non-EU doctoral candidates serves as an indication of the openness and attractiveness of the research system. The average share of non-EU doctoral candidates is 20%.

Table 21: Scorecard: Non-EU doctoral candidates as a percentage of all doctoral candidates, EU-27, 2009 and 2010 (%)

Region	2009	2010	Progress/2009 (%)	
<i>European Union 27</i>	20.5	20.0	↓	2

Source: Deloitte

Data: Innovation Union Scoreboard 2013

In France and the UK the share of non-EU doctoral candidates is between 30% and 35%. The proportion of foreign doctoral candidates is even higher in Switzerland — almost half, and it is above 30% in Norway, but this includes those from EU countries. In addition to the cases of France and the UK, there is a relatively high share (10-20%) of non-EU doctoral candidates in a number of other older Member States, e.g. Belgium (19.7%), Spain (17.3%), Denmark (15.4%) and Portugal (10.6%) while the lowest share of non-EU doctoral candidates as a percentage of all doctoral candidates (<5%) is in a number of the new Member States, ranging from 4.1% in Bulgaria to 0.2% in Lithuania.

Table 22: Scorecard: Non-EU-27 doctoral candidates as a percentage of all doctoral candidates, Europe, 2009 and 2010 (%)

Country	2009	2010	Progress/2009 (%)	
<i>Switzerland</i>	47.0	48.2	↑	3
<i>France</i>	34.3	35.4	↑	3
<i>United Kingdom</i>	31.6	31.4	↓	0
<i>Norway</i>	29.1	30.9	↑	6
<i>Ireland</i>	:	22.3	:	:

¹⁵ "Non-EU doctoral candidates" refers to foreign doctoral candidates in the case of non-EU countries.

Country	2009	2010	Progress/2009 (%)	
<i>Iceland</i>	23.0	20.8	↓	10
<i>Luxembourg</i>	:	20.4	:	:
<i>Sweden</i>	18.3	20.0	↑	9
<i>Belgium</i>	19.3	19.7	↑	2
<i>Spain</i>	17.1	17.3	↑	1
<i>Denmark</i>	10.5	15.4	↑	47
<i>Portugal</i>	10.0	10.6	↑	6
<i>Austria</i>	11.1	8.8	↓	21
<i>Macedonia (FYR)</i>	4.1	7.1	↑	71
<i>Serbia</i>	1.3	7.0	↑	437
<i>Slovenia</i>	6.6	6.5	↓	1
<i>Finland</i>	5.1	5.9	↑	16
<i>Bulgaria</i>	3.9	4.1	↑	5
<i>Czech Republic</i>	3.7	4.0	↑	7
<i>Hungary</i>	2.8	2.6	↓	6
<i>Turkey</i>	2.8	2.5	↓	11
<i>Croatia</i>	2.5	2.2	↓	13
<i>Romania</i>	2.1	2.0	↓	4
<i>Poland</i>	2.0	1.9	↓	4
<i>Cyprus</i>	1.8	1.6	↓	9
<i>Estonia</i>	3.0	1.5	↓	49
<i>Slovakia</i>	1.4	1.4	↓	4
<i>Latvia</i>	0.5	0.6	↑	22
<i>Lithuania</i>	0.6	0.2	↓	61
<i>Italy</i>	6.2	:	:	:
<i>Malta</i>	4.1	:	:	:

Source: Deloitte

Data: Innovation Union Scoreboard 2013

No information available for BiH, DE, FI, IL, LI, ME and NL

7. Doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State, Europe, 2009 and 2010 (%)

Table 23: Value ranges - Doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State, Europe, 2009 and 2010 (%)

Green (4)	The percentage of doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State is at least 20% above the EU-27 average.
Light Green (3)	The percentage of doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State is between -10% and +20% of the EU-27 average.
Yellow (2)	The percentage of doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State is between -50% and -10% of the EU-27 average.
Orange (1)	The percentage of doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State is below 50% of the EU-27 average.

Compared to the EU-27 average (7.8%), Austria (18.2%) is the EU-27 country where the highest proportion of doctoral students from other EU-27 countries are to be found, followed by the UK (16.4%) and Ireland (16%). Member States with the lowest relative inflows of doctoral candidates from other EU-27 countries are some of the new Member States, Italy and Portugal.

The highest level of doctoral candidates with citizenship of another EU-27 Member State in 2010 (>10%) was in a number of the older Member States, e.g. Austria (18.2%), the UK (16.4%), Ireland (16%), Belgium (13.6%) and Denmark (12.4%). In terms of absolute numbers, the UK is the first choice, followed by France and Spain, but it should be noted that there are no figures available for Germany. The lowest share (<5%) was in a number of the new Member States, ranging from 3.3% in Bulgaria to 0.3% in Lithuania.

Table 24: Scorecard: Doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State, EU-27, 2009 and 2010 (%)

Region	2009	2010	Progress/2009 (%)	
<i>European Union 27</i>	7.8	7.8	↔	0

Source: Deloitte

Data: Eurostat

Table 25: Scorecard: Doctoral candidates (ISCED 6) with a citizenship of another EU-27 Member State, Europe, 2009 and 2010 (%)

Country	2009	2010	Progress/2009 (%)	
<i>Liechtenstein</i>	83.3	88.9	↑	7
<i>Luxembourg</i>	:	67.9	↔	:
<i>Switzerland</i>	36.1	36.3	↑	1
<i>Austria</i>	19.6	18.2	↓	7
<i>United Kingdom</i>	16.4	16.4	↔	0
<i>Ireland</i>	:	16.0	↔	:
<i>Iceland</i>	13.5	13.7	↑	2
<i>Belgium</i>	13.3	13.6	↑	2
<i>Norway</i>	12.4	12.9	↑	4

Country	2009	2010	Progress/2009 (%)	
<i>Denmark</i>	11.4	12.4	↑	8
<i>Sweden</i>	9.5	10.0	↑	6
<i>Czech Republic</i>	7.9	8.4	↑	6
<i>France</i>	8.0	8.0	↑	1
<i>Cyprus</i>	9.0	7.8	↓	14
<i>Slovenia</i>	6.6	6.7	↑	2
<i>Slovakia</i>	6.2	6.3	↑	2
<i>Macedonia (FYR)</i>	1.3	6.3	↑	381
<i>Finland</i>	5.3	5.8	↑	9
<i>Hungary</i>	5.8	5.7	↓	2
<i>Spain</i>	5.3	5.7	↑	8
<i>Estonia</i>	4.4	5.2	↑	19
<i>Bulgaria</i>	3.0	3.3	↑	10
<i>Croatia</i>	3.1	3.2	↑	2
<i>Serbia</i>	1.8	3.1	↑	73
<i>Portugal</i>	2.6	3.0	↑	15
<i>Bulgaria</i>	3.6	2.6	↓	28
<i>Croatia</i>	2.5	2.2	↓	11
<i>Poland</i>	1.9	1.8	↓	8
<i>Romania</i>	1.9	1.7	↓	9
<i>Latvia</i>	0.4	0.8	↑	112
<i>Lithuania</i>	0.7	0.3	↓	50
<i>Italy</i>	3.1	:	↔	:
<i>Malta</i>	4.1	:	↔	:

Source: Deloitte

Data: Eurostat

*No information available for BiH, DE, EL, FI, IL, ME, MT, NL and SR

8. Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years, Europe, 2012 (%)

Table 26: Value ranges - Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years, Europe, 2012 (%)

Green (4)	Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years is at least 20% above the EU-27 average.
Light Green (3)	Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years is between -10% and +20% of the EU-27 average.
Yellow (2)	Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years is between -50% and -10% of the EU-27 average.
Orange (1)	Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years is below 50% of the EU-27 average.

Mobility is a feature of the career path of many researchers. Around one in three EU researchers (31%) have been 'internationally mobile' for at least three months in the last 10 years.

Table 27: Scorecard: Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years, EU-27, 2012 (%)

Region	2012
<i>European Union 27</i>	31.0

Source: Deloitte

Data: MORE2 study "Support for continued data collection and analysis concerning mobility patterns and career paths of researchers", IDEA Consult (2013)

Switzerland and Denmark have the highest levels of mobile researchers on this criterion (>50%). Researchers from Latvia, Romania, Croatia, Lithuania, Bulgaria, Czech Republic and Poland were the least mobile of those in the study population (<20%). In Greece, Hungary, Ireland, Spain, France and the UK, on the other hand, a relatively large group of researchers was mobile for three months more than ten years ago (>20%).

Table 28: Scorecard: Researchers (post-PhD) having spent a period of at least three months as a researcher in another country in the last 10 years, Europe, 2012 (%)

Country	2012
<i>Switzerland</i>	53.1
<i>Denmark</i>	53.0
<i>Iceland</i>	48.9
<i>Luxembourg</i>	47.4
<i>Belgium</i>	46.5
<i>Netherlands</i>	46.1
<i>Austria</i>	45.4
<i>Germany</i>	44.7

Country	2012
<i>Cyprus</i>	44.1
<i>Norway</i>	43.4
<i>Finland</i>	42.3
<i>Sweden</i>	39.5
<i>Ireland</i>	36.9
<i>Hungary</i>	34.0
<i>Greece</i>	33.9
<i>Slovenia</i>	33.8
<i>Macedonia (FYR)</i>	33.5
<i>Spain</i>	32.3
<i>Turkey</i>	28.6
<i>United Kingdom</i>	28.5
<i>Slovakia</i>	27.6
<i>Portugal</i>	27.4
<i>Estonia</i>	26.6
<i>France</i>	26.5
<i>Italy</i>	25.2
<i>Malta</i>	24.2
<i>Latvia</i>	19.7
<i>Romania</i>	19.7
<i>Croatia</i>	18.9
<i>Lithuania</i>	18.1
<i>Bulgaria</i>	18.0
<i>Czech Republic</i>	16.2
<i>Poland</i>	9.1

Source: Deloitte

Data: MORE2 study "Support for continued data collection and analysis concerning mobility patterns and career paths of researchers", IDEA Consult (2013)

*No information available for BiH, IL, LI, ME and SR

9. International scientific co-publications per million population, Europe, 2010 and 2011

Table 29: Value ranges - International scientific co-publications per million population, Europe, 2010 and 2011

Green (4)	The number of international scientific co-publications per million population is at least 20% above the EU-27 average.
Light Green (3)	The number of international scientific co-publications per million population is between -10% and +20% of the EU-27 average.
Yellow (2)	The number of international scientific co-publications per million population is between -50% and -10% of the EU-27 average.
Orange (1)	The number of international scientific co-publications per million population is below 50% of the EU-27 average.

In 2011, the EU-27 was second to the United States in the production of international scientific co-publications.

In 2011, the EU-27 lagged behind the United States in terms of international scientific co-publications per million population¹⁶. The EU-27 average was around 300 co-publications per million population in comparison with around 450 in the United States, 211 in Japan and 43 in China. The EU-27 average should be seen in context: only co-publications with non-EU countries are included. This obviously creates a downward distortion. The level per Member State is higher than that for the US in a very large number of cases.

Switzerland and Iceland have very high levels, of more than 2 000 co-publications per million population, followed by a number of Nordic countries such as Denmark, Sweden, Norway and Finland (in descending order) and Luxembourg, the Netherlands, Belgium, Austria, Ireland and Cyprus with more than 1 000 co-publications per million population. The lowest number (<500) of co-publications per million population was in a number of new Member States, such as Hungary, Slovakia, Lithuania, Poland, Bulgaria, Latvia and Romania (in descending order).

Table 30: Scorecard: International scientific co-publications per million population, EU-27, US, China, Japan, 2010 and 2011

Region	2010	2011	Progress/2010 (%)	
<i>European Union 27</i>	301	300	↔	0
<i>United States</i>	441	450	↑	2
<i>China</i>	38	43	↑	12
<i>Japan</i>	204	211	↑	4

Source: Deloitte

Data : Science Metrix/Scopus

¹⁶ International scientific co-publications are a proxy for the quality of scientific research as collaboration increases scientific productivity. The numerator refers to the number of scientific publications with at least one co-author based abroad (where abroad is non-EU for the EU-27).

Table 31: Scorecard: International scientific co-publications per million population, Europe, 2010 and 2011

Country	2010	2011	Progress/2010 (%)	
<i>Switzerland</i>	2 351	2 505	↑	7
<i>Iceland</i>	2 386	2 349	↓	2
<i>Denmark</i>	1 562	1 692	↑	8
<i>Sweden</i>	1 513	1 604	↑	6
<i>Norway</i>	1 416	1 483	↑	5
<i>Luxembourg</i>	1 257	1 428	↑	14
<i>Netherlands</i>	1 271	1 330	↑	5
<i>Finland</i>	1 266	1 323	↑	5
<i>Belgium</i>	1 195	1 280	↑	7
<i>Austria</i>	1 096	1 180	↑	8
<i>Ireland</i>	1 094	1 131	↑	3
<i>Cyprus</i>	985	1 004	↑	2
<i>United Kingdom</i>	949	989	↑	4
<i>Slovenia</i>	857	955	↑	11
<i>Estonia</i>	673	734	↑	9
<i>Germany</i>	681	715	↑	5
<i>France</i>	660	683	↑	3
<i>Portugal</i>	600	678	↑	13
<i>Spain</i>	546	599	↑	10
<i>Greece</i>	512	544	↑	6
<i>Czech Republic</i>	509	529	↑	4
<i>Italy</i>	476	500	↑	5
<i>Croatia</i>	334	388	↑	16
<i>Hungary</i>	359	387	↑	8
<i>Slovakia</i>	358	379	↑	6
<i>Malta</i>	292	328	↑	12
<i>Lithuania</i>	219	265	↑	21
<i>Poland</i>	203	213	↑	5
<i>Bulgaria</i>	211	205	↓	3
<i>Latvia</i>	131	178	↑	36
<i>Romania</i>	144	148	↑	3
<i>Serbia</i>	119	134	↑	12
<i>Turkey</i>	66	71	↑	7

Source: Deloitte

Data: Science Metrix/Scopus

*No information unavailable for BiH, FYROM, IL, LI and ME

10. Scientific publications in the top 10% most-cited publications worldwide as a percentage of total scientific publications, Europe, 2007 and 2008 (%)

Table 32: Value ranges - Scientific publications in the top 10% most-cited publications worldwide as a percentage of all scientific publications, Europe, 2007 and 2008 (%)

Green (4)	The number of scientific publications amounting to the top 10% most-cited publications worldwide as a percentage of total scientific publications is at least 20% above the EU-27 average.
Light Green (3)	The number of scientific publications amounting to the top 10% most-cited publications worldwide as a percentage of total scientific publications is between -10% and +20% of the EU-27 average.
Yellow (2)	The number of scientific publications amounting to the top 10% most-cited publications worldwide as a percentage of total scientific publications is between -50% and -10% of the EU-27 average.
Orange (1)	The number of scientific publications amounting to the top 10% most-cited publications worldwide as a percentage of total scientific publications is below 50% of the EU-27 average.

In 2008, the EU-27 lagged behind the US in terms of scientific publications in the top 10% most-cited publications worldwide. The indicator is a proxy for the excellence of the research system as highly cited publications are assumed to be of higher quality.

When it comes to the scientific quality of research worldwide, an indicator even more important than the sheer number of scientific co-publications is the capacity to produce scientific publications with high international impact. The number of citations that a scientific publication generates is an indication of its excellence and its chance of generating further scientific results. On average, a country is expected to have 10% of its publications among the top 10% most cited worldwide.

In 2008, 10.9% of EU-27 scientific publications were in the top 10% most-cited publications worldwide in comparison with 14.31% scientific publications produced in the United States.

Table 33: Scorecard: Scientific publications in the top 10% most-cited publications worldwide as a percentage of all scientific publications, EU-27, US, China, Japan, 2007 and 2008 (%)

Region	2007	2008	Progress/2007 (%)	
<i>European Union 27</i>	10.7	10.9	↑	2
<i>United States</i>	14.4	14.3	↓	1
<i>China</i>	6.6	6.8	↑	4
<i>Japan</i>	7.2	7.3	↑	1

Source: Deloitte

Data: Science Metrix/Scopus/IUS

Individually, the best performance (>10%) in the EU-27 was shown (in descending order) by Netherlands, Denmark, Belgium, UK, Sweden, Germany, Finland, Ireland, Austria, France, Spain, Italy, Luxembourg and Portugal. Countries like France and Germany, where researchers are more likely to publish more in their own language, are more likely to underperform on this indicator

relative to their real academic excellence. The share is lowest in Bulgaria followed by Croatia, Slovakia, Poland, Romania, Latvia and Hungary.

Table 34: Scorecard: Scientific publications in the top 10% most-cited publications worldwide as a percentage of all scientific publications, Europe, 2007 and 2008 (%)

Country	2007	2008	Progress/2007 (%)	
<i>Switzerland</i>	15.4	15.8	↑	3
<i>Netherlands</i>	15.0	15.1	↑	1
<i>Denmark</i>	14.8	14.6	↓	1
<i>Belgium</i>	13.4	13.6	↑	1
<i>United Kingdom</i>	12.8	13.3	↑	4
<i>Sweden</i>	12.2	12.3	↑	1
<i>Norway</i>	11.1	12.2	↑	10
<i>Germany</i>	11.4	11.6	↑	2
<i>Finland</i>	11.8	11.5	↓	2
<i>Ireland</i>	11.5	11.4	↓	1
<i>Iceland</i>	11.7	11.2	↓	5
<i>Austria</i>	11.4	10.9	↓	4
<i>France</i>	10.1	10.3	↑	3
<i>Spain</i>	9.6	10.2	↑	7
<i>Italy</i>	9.9	10.1	↑	2
<i>Luxembourg</i>	9.1	10.1	↑	12
<i>Portugal</i>	9.3	10.0	↑	8
<i>Greece</i>	9.5	9.5	↑	1
<i>Cyprus</i>	9.0	8.9	↓	1
<i>Estonia</i>	7.5	7.5	↓	1
<i>Slovenia</i>	7.6	7.4	↓	3
<i>Malta</i>	5.3	7.1	↑	33
<i>Turkey</i>	6.6	6.7	↑	2
<i>Lithuania</i>	5.7	6.0	↑	4
<i>Czech Republic</i>	4.8	5.5	↑	14
<i>Hungary</i>	5.5	4.9	↓	11
<i>Latvia</i>	2.2	4.0	↑	80
<i>Romania</i>	4.2	3.8	↓	10
<i>Poland</i>	3.6	3.5	↓	2
<i>Slovakia</i>	3.7	3.3	↓	12
<i>Croatia</i>	3.1	3.2	↑	2
<i>Serbia</i>	1.8	3.1	↑	73
<i>Bulgaria</i>	3.6	2.6	↓	28

Source: Deloitte

Data: Science Metrix/Scopus/IUS

*No information unavailable for BiH, FYROM, IL, LI and ME