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Regional
Innovation Scoreboard
2016

Internal Market Industry, Entrepreneurship and SMEs

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Regional **Innovation** Scoreboard 2016

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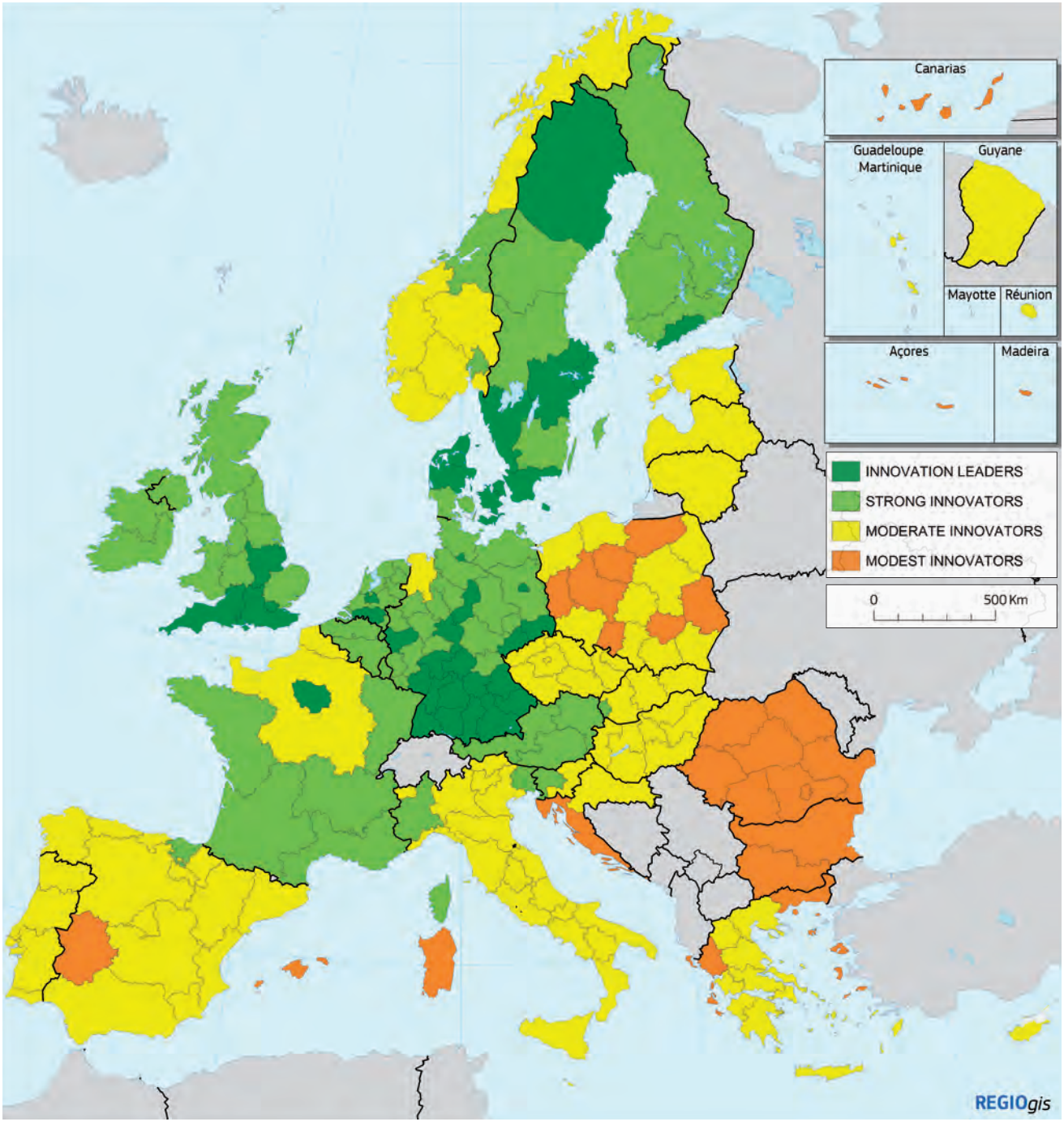
Executive summary

This 7th edition of the Regional Innovation Scoreboard (RIS) provides a comparative assessment of innovation performance across 214 regions of 22 EU Member States and Norway. In addition, Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta are included at the country level, as the regional administrative level as such does not exist in these countries.

The RIS accompanies the European Innovation Scoreboard (EIS) which benchmarks innovation performance at the level of Member States.[1] Where the EIS provides an annual benchmark of the innovation performance of Member States and other European countries, regional innovation benchmarks are less frequent and less detailed due to



For Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta, performance group membership is identical to that in the European Innovation Scoreboard 2016 report.

[1] *The annual country-level reports have been published under the name "European Innovation Scoreboard" until 2009, as "Innovation Union Scoreboard" (IUS) between 2010 and 2015, and once again as "European Innovation Scoreboard" from 2016 onwards.*

a general lack of innovation data at the regional level. The Regional Innovation Scoreboard addresses this gap by providing statistical facts on regions' innovation performance. Compared to the EIS, the RIS has a stronger focus on the performance of small and medium-sized enterprises (SMEs).

Regional performance groups

Similar to the EIS, where countries are classified into four innovation performance groups, Europe's regions have been classified into regional Innovation Leaders (36 regions), regional Strong Innovators (65 regions), regional Moderate Innovators (83 regions) and regional Modest Innovators (30 regions).

The most innovative regions are typically in the most innovative countries

Regional performance groups largely match the corresponding European Innovation Scoreboard (EIS) 2016 country performance groups. Almost all of the regional Innovation Leaders and Strong Innovators are located in the EIS Innovation Leader and Strong Innovator countries. Most of the regional Moderate and Modest Innovators are found in the EIS Moderate and Modest Innovator countries.

Innovation excellence is concentrated in relatively few areas in Europe. All 36 EU regional Innovation Leaders are located in seven EU Member States: Denmark, Finland, France, Germany, the Netherlands, Sweden and the United Kingdom.

For most countries, there is limited variation in regional performance groups, suggesting that regional and national innovation performance are linked. However, a stronger variation in some (mainly larger) countries also highlights regional specificities and the existence of regional 'pockets of excellence'. In Austria, Belgium, Bulgaria, the Czech Republic, Hungary, Ireland and Romania, all regions are in the same performance group, and in 12 countries, there are two different regional performance groups. Only in four larger Member States (France, Germany, Italy and Spain), there are three different regional performance groups.

For most regions, innovation has improved over time, but most recently performance has declined for the majority of regions

An analysis over a nine-year period, with 2016 as the most recent year, shows that performance group membership has been stable for most regions (70%), while several changes to both lower and higher performance groups can be observed for other regions. Within performance groups, average performance of regional Strong and Moderate Innovators has been improving over time, while it has been declining for the regional Innovation Leaders and Modest Innovators. There is thus a partial process of convergence with the Strong and Moderate Innovators decreasing their performance gap towards the Innovation Leaders.

For the first seven years of the nine-year period of analysis, performance growth has been positive for all performance groups and 175 regions. Between the two most recent periods, performance has declined for all performance groups and 154 regions. This recent decline in innovation performance is mainly due to a weakening in four indicators using data on SMEs from the Community Innovation Survey 2012: shares of SMEs innovating in-house, SMEs collaborating with others, SMEs with product or process innovations, and SMEs with marketing or organisational innovations. A similar effect of using the latest CIS 2012 data on countries' innovation performance was also observed in the Innovation Union Scoreboard 2015.

Specialisation in Key Enabling Technologies is positively linked to regional innovation performance

Key Enabling Technologies (KETs) are a group of six technologies that provide the basis for innovation in a range of products across all industrial sectors. Specialisation in KETs is positively linked to regional innovation performance, in particular in Advanced materials, Industrial biotechnology, Photonics, and Advanced manufacturing technologies. For all KETs, except Advanced manufacturing technologies, specialisation has been improving for the regional Strong and Moderate Innovators and has been declining for the regional Innovation Leaders. Less innovative regions have thus become more specialised, thereby laying the foundation for possible innovation performance increases in the future.

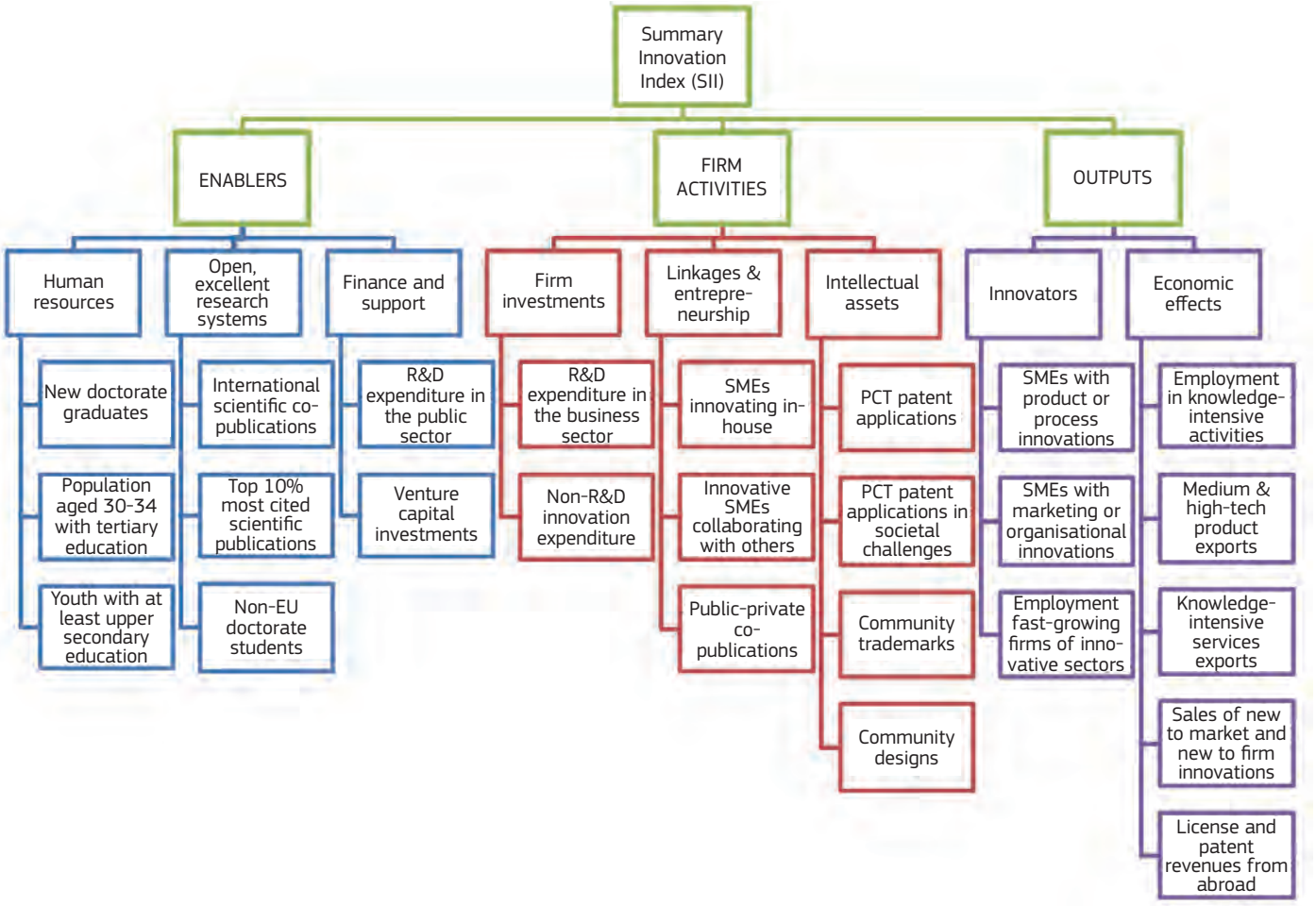
RIS methodology

The RIS 2016 replicates the European Innovation Scoreboard methodology used at national level to measure performance of regional systems of innovation. The RIS 2016 uses data for 12 of the 25 indicators used in the EIS for 214 regions across Europe. Compared to the RIS 2014, the number of indicators has increased thanks to the availability of regional data on exports of medium-high and high technology-intensive manufacturing industries. As both Germany and Greece are now covered at the NUTS2 level, the nominal number of regions covered has increased as well.

1. Introduction

The Regional Innovation Scoreboard (RIS) is a regional extension of the European Innovation Scoreboard (EIS). The EIS provides a comparative assessment of the innovation performance at the country level of the EU Member States and other countries.[2] Innovation performance is measured using a composite indicator – the Summary Innovation Index – which summarizes the performance based on 25 indicators. These indicators are grouped into three main types – Enablers, Firm activities and Outputs – and eight innovation dimensions. The measurement framework is presented in Figure 1.

Figure 1: Measurement framework of the European Innovation Scoreboard



[2] *The annual country-level reports have been published under the name "European Innovation Scoreboard" until 2009, as "Innovation Union Scoreboard" (IUS) between 2010 and 2015, and once again as "European Innovation Scoreboard" from 2016 onwards.*

As regions are important engines of economic development, innovation performance deserves particular attention at the regional level. Regional Systems of Innovation (RSIs) have therefore become the focus of many academic studies and policy reports.[3] Economic literature has identified three stylized facts: 1) innovation is not uniformly distributed across regions, 2) innovation tends to be spatially concentrated over time, and 3) even regions with similar innovation capacity have different economic growth patterns. However, attempts to monitor RSIs and regions' innovation performance are severely hindered by a lack of regional innovation data.

The RIS addresses this gap and provides statistical facts on regions' innovation performance. Regional innovation performance is measured using a composite indicator – the Regional Innovation Index (RII) – which summarizes the performance on 12 indicators. The RIS 2016 provides an update of the RIS 2014. Regional data availability has improved, as regional Community Innovation Survey (CIS) data are now available for more regions, and regional data are available for one more EIS indicator (exports of medium-high and high tech products).

Section 2 discusses the availability of regional data, the indicators that are used for constructing the Regional Innovation Index, and the regions which are included in the RIS 2016. Section 3 presents results for the Regional Innovation Index and group membership in four distinct regional innovation performance groups. Section 3 also discusses performance trends over time. Section 4 explores the link between regional innovation performance and specialisation in Key Enabling Technologies (KETs). Section 5 shows performance maps and the best performing regions for each indicator. Section 6 discusses the full methodology for calculating the Regional Innovation Index and for imputing missing data, and the impact of including, for the first-time, estimates for exports of medium and high tech products.

The years used in the titles of the RIS reports refer to the years in which the respective editions were published, i.e. RIS 2014, RIS 2012, RIS 2009 and RIS 2006. For the RIS 2016, most recent data refer to 2014 for two indicators, 2013 for three indicators, 2012 for six indicators and 2011 for one indicator. A reference to the most recent performance year (RII2016) in this report should thus be interpreted as referring to data two to three years prior to the 2016 reference year.

[3] *Annex 6 in the Regional Innovation Scoreboard 2014 report provides a more detailed discussion of Regional Systems of Innovation.*

2. RIS indicators, regions and data availability

This chapter discusses the indicators used in the Regional Innovation Scoreboard 2016 (section 2.1), the regional coverage (section 2.2) and regional data availability (section 2.3).

2.1 Indicators

In the Regional Innovation Scoreboard (RIS), regional innovation performance should ideally be measured using the full measurement framework of the European Innovation Scoreboard (EIS), i.e. using regional data for the same indicators applied to measure innovation performance at the country level. However, for many indicators used in the EIS, regional data are not available.

The RIS is limited to using regional data for 12 of the 25 indicators used in the EIS (Table 1). For several indicators, slightly different definitions have been used, as regional data would not be available if the definitions were the same as in the EIS. For two indicators using data from the Community Innovation Survey (CIS) – Non-R&D innovation expenditures and Sales share of new-to-market and new-to-firm innovations – the data refer only to SMEs and not to all companies. For the indicator on PCT patent applications, regional data are not available, and instead regional data on EPO patent applications are used. For the indicator on employment in knowledge-intensive activities, regional data are also not available, and instead employment in medium-high and high tech manufacturing and knowledge-intensive services is used. Finally, for the indicator on medium and high tech product exports, regional data are not available, and instead regional estimates have been used for the share of exports of medium-high and high technology-intensive manufacturing industries. The indicators are explained in more detail in Annex 1. Annex 3 shows performance maps for each of the indicators. Section 2.3 presents a more detailed discussion of the availability of regional data for the indicators used in the RIS.

Table 1: A comparison of the indicators included in EIS and RIS

European Innovation Scoreboard (EIS)	Regional Innovation Scoreboard (RIS)
ENABLERS	
Human resources	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	No regional data
Percentage population aged 30-34 having completed tertiary education	Identical
Percentage youth aged 20-24 having attained at least upper secondary level education	No regional data
Open, excellent and attractive research systems	
International scientific co-publications per million population	No regional data
Scientific publications among the top 10% most cited publications worldwide as percentage of total scientific publications of the country	No regional data
Non-EU doctorate students as a percentage of all doctorate students	No regional data
Finance and support	
R&D expenditure in the public sector as percentage of GDP	Identical
Venture capital expenditure as percentage of GDP	No regional data
FIRM ACTIVITIES	
Firm investments	
R&D expenditure in the business sector as percentage of GDP	Identical
Non-R&D innovation expenditures as percentage of total turnover	Similar: only for SMEs
Linkages & entrepreneurship	
SMEs innovating in-house as percentage of SMEs	Identical
Innovative SMEs collaborating with others as percentage of SMEs	Identical
Public-private co-publications per million population	No regional data
Intellectual assets	
PCT patent applications per billion GDP (PPS€)	EPO patent applications per billion regional GDP (PPS€)
PCT patent applications in societal challenges per billion GDP (PPS€)	No regional data
Community trademarks per billion GDP (PPS€)	No regional data
Community designs per billion GDP (PPS€)	No regional data
OUTPUTS	
Innovators	
SMEs introducing product or process innovations as percentage of SMEs	Identical
SMEs introducing marketing or organisa¬tional innovations as percentage of SMEs	Identical
Employment in fast-growing firms of innovative sectors	No regional data
Economic effects	
Employment in knowledge-intensive activities (manufacturing and services) as percentage of total employment	Employment in medium-high and high tech manufacturing and knowledge-intensive services as percentage of total employment
Medium and high tech product exports as percentage of total product exports	Exports of medium-high and high technology-intensive manufacturing industries as percentage of total manufacturing exports
Knowledge-intensive services exports as percentage of total service exports	No regional data
Sales of new-to-market and new-to-firm innovations as percentage of total turnover	Similar: only for SMEs
License and patent revenues from abroad as percentage of GDP	No regional data

2.2 Regional coverage

The Regional Innovation Scoreboard covers 214 regions in 22 EU Member States and Norway at different NUTS levels. The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing the economic territory of the EU, which distinguishes between three levels: NUTS1 captures major socio-economic regions, NUTS2 captures basic regions for the application of regional policies, and NUTS3 captures small regions for specific diagnoses.

Depending on differences in regional data availability, the RIS covers 29 NUTS1 level regions and 185 NUTS2 level regions (Table 2). For 15 regions, the NUTS2 level is identical to the NUTS1 level (i.e. eight regions in Germany, two regions in Spain and Portugal, and one region in Finland, Greece and Hungary). These regions are listed on NUTS2 level. In addition, the EU Member States Cyprus, Estonia, Latvia, Lithuania, Luxembourg, and Malta are included at the country level, as the regional administrative level as such does not exist in these countries (NUTS1 and NUTS2 levels are identical to the country territory). For the countries included at the country level, their performance levels relative to the EU28 scores from the EIS 2016 have been used.

In the RIS 2012 and RIS 2014 reports, Germany was covered at the NUTS1 level, as regional CIS data were not available and had to be estimated. For the RIS 2016, estimates of regional CIS 2012 data at the NUTS2 level have been made available by the Centre for European Economic Research (ZEW), making it possible to change the coverage of Germany to the NUTS2 level. A direct comparison of the maps in this report with those in previous RIS reports is not possible, as in previous reports all German NUTS2 regions belonging to the same NUTS1 region had identical scores.

With some countries only being covered at the NUTS1 level, there can be significant differences in the average size of regions. For instance, the average population of a NUTS1 region in France is 7.4 million, whereas it is 2.9 million for an average NUTS2 region in Italy. The average unit of regional innovation performance analysis is thus 2.5 times larger in France than in Italy. These differences in unit size have implications for the variation of performance scores within countries. In general, a higher number of regions implies larger differences between regions.

Table 2: NUTS1 and NUTS2 regions included in RIS 2016

	COUNTRY	NUMBER OF REGIONS AT NUTS LEVEL		AVERAGE POPULATION SIZE (2015)	REGIONS (NUTS CODE)	
		1	2			
BE	Belgium	3		3,752,800	Région de Bruxelles-Capitale / Brussels, Hoofdstedelijk Gewest (BE1)	Vlaams Gewest (BE2), Région Wallonne (BE3)
BG	Bulgaria	2		3,601,100	Severna i yugoiztochna Bulgaria (BG3)	Yugozapadna i yuzhna tsentralna Bulgaria (BG4)
CZ	Czech Republic		8	1,317,300	Praha (CZ01), Střední Cechy (CZ02), Jihozápad (CZ03), Severozápad (CZ04)	Severovýchod (CZ05), Jihovýchod (CZ06), Střední Morava (CZ07), Moravskoslezsko (CZ08)
DK	Denmark		5	1,131,900	Hovedstaden (DK01), jælland (DK02), Syddanmark (DK03)	Midtjylland (DK04), Nordjylland (DK05)
DE	Germany		39	1,955,800	Stuttgart (DE11), Karlsruhe (DE12), Freiburg (DE13), Tübingen (DE14), Oberbayern (DE21), Niederbayern (DE22), Oberpfalz (DE23), Oberfranken (DE24), Mittelfranken (DE25), Unterfranken (DE26), Schwaben (DE27), Berlin (DE30), randenburg – Nordost (DE41), Brandenburg – Südwest (DE42), Bremen (DE50), Hamburg (DE60), Darmstadt (DE71), Gießen (DE72), Kassel (DE73), Mecklenburg-Vorpommern (DE80)	Braunschweig (DE91), Hannover (DE92), Lüneburg (DE93), Weser-Ems (DE94), Düsseldorf (DEA1), Köln (DEA2), Münster (DEA3), Detmold (DEA4), Arnsberg (DEA5), Koblenz (DEB1), Trier (DEB2), Rheinhessen-Pfalz (DEB3), Saarland (DEC0), Dresden (DED2), Chemnitz (DED4), Leipzig (DED5), Sachsen-Anhalt (DEE0), Schleswig-Holstein (DEF0), Thüringen (DEG0)
IE	Ireland		2	2,314,500	Border, Midland and Western (IE01)	Southern and Eastern (IE02)
EL	Greece		13	835,200	Anatoliki Makedonia, Thraki (EL11), Kentriki Makedonia (EL12), Dytiki Makedonia (EL13), Thessalia (EL14), Ipeiros (EL21), Ionia Nisia (EL22), Dytiki Ellada (EL23)	Sterea Ellada (EL24), Peloponnisos (EL25), Attiki (EL30), Voreio Aigaio (EL41), Notio Aigaio (EL42), Kriti (EL43)
ES	Spain		19	2,444,700	Galicia (ES11), Principado de Asturias (ES12), Cantabria (ES13), País Vasco (ES21), Comunidad Foral de Navarra (ES22), La Rioja (ES23), Aragón (ES24), Comunidad de Madrid (ES30), Castilla y León (ES41)	Castilla-la Mancha (ES42), Extremadura (ES43), Cataluña (ES51), Comunidad Valenciana (ES52), Illes Balears (ES53), Andalucía (ES61), Región de Murcia (ES62), Ciudad Autónoma de Ceuta (ES63), Ciudad Autónoma de Melilla (ES64), Canarias (ES70)
FR	France	9		7,379,500	Île de France (FR1), Bassin Parisien (FR2), Nord - Pas-de-Calais (FR3), Est (FR4), Ouest (FR5)	Sud-Ouest (FR6), Centre-Est (FR7), Méditerranée (FR8), Départements d'outre
HR	Croatia		2	2,112,700	Jadranska Hrvatska (HR03)	Kontinentalna Hrvatska (HR04)
IT	Italy		21	2,895,000	Piemonte (ITC1), Valle d'Aosta/Vallée d'Aoste (ITC2), Liguria (ITC3), Lombardia (ITC4), Provincia Autonoma Bolzano/Bozen (ITH1), Provincia Autonoma Trento (ITH2), Veneto (ITH3), Friuli-Venezia Giulia (ITH4), Emilia-Romagna (ITH5), Toscana (ITI1)	Umbria (ITI2), Marche (ITI3), Lazio (ITI4), Abruzzo (ITF1), Molise (ITF2), Campania (ITF3), Puglia (ITF4), Basilicata (ITF5), Calabria (ITF6), Sicilia (ITG1), Sardegna (ITG2)
HU	Hungary		7	1,407,900	Közép-Magyarország (HU10), Közép-Dunántúl (HU21), Nyugat-Dunántúl (HU22), Dél-Dunántúl (HU23)	Észak-Magyarország (HU31), Észak-Alföld (HU32), Dél-Alföld (HU33)
NL	Netherlands		12	1,408,400	Groningen (NL11), Friesland (NL12), Drenthe (NL13), Overijssel (NL21), Gelderland (NL22), Flevoland (NL23)	Utrecht (NL31), Noord-Holland (NL32), Zuid-Holland (NL33), Zeeland (NL34), Noord-Brabant (NL41), Limburg (NL42)
AT	Austria	3		2,858,800	Ostösterreich (AT1), Südösterreich (AT2)	Westösterreich (AT3)
PL	Poland		16	2,375,400	Łódzkie (PL11), Mazowieckie (PL12), Małopolskie (PL21), Śląskie (PL22), Lubelskie (PL31), Podkarpackie (PL32), Świętokrzyskie (PL33), Podlaskie (PL34)	Wielkopolskie (PL41), Zachodniopomorskie (PL42), Lubuskie (PL43), Dolnośląskie (PL51), Opolskie (PL52), Kujawsko-Pomorskie (PL61), Warmińsko-Mazurskie (PL62), Pomorskie (PL63)
PT	Portugal		7	1,482,100	Norte (PT11), Algarve (PT15), Centro (PT16), Lisboa (PT17)	Alentejo (PT18), Região Autónoma dos Açores (PT20), Região Autónoma da Madeira (PT30)
RO	Romania		8	2,483,800	Nord-Vest (RO11), Centru (RO12), Nord-Est (RO21), Sud-Est (RO22)	Sud - Muntenia (RO31), Bucuresti - Ilfov (RO32), Sud-Vest Oltenia (RO41), Vest (RO42)
SI	Slovenia		2	1,031,400	Vzhodna Slovenija (SI01)	Zahodna Slovenija (SI02)
SK	Slovakia		4	1,355,300	Bratislavský kraj (SK01), Západné Slovensko (SK02)	Stredné Slovensko (SK03), Východné Slovensko (SK04)
FI	Finland		5	1,094,400	Helsinki-Uusimaa (FI1B), Etelä-Suomi (FI1C), Länsi-Suomi (FI19)	Pohjois- ja Itä-Suomi (FI1D), Åland (FI20)
SE	Sweden		8	1,218,400	Stockholm (SE11), Östra Mellansverige (SE12), Småland med öarna (SE21), Sydsverige (SE22)	Västsverige (SE23), Norra Mellansverige (SE31), Mellersta Norrland (SE32), Övre Norrland (SE33)
UK	United Kingdom	12		5,406,300	North East (UKC), North West (UKD), Yorkshire and The Humber (UKE), East Midlands (UKF), West Midlands (UKG), East of England (UKH)	London (UKI), South East (UKJ), South West (UKK), Wales (UKL), Scotland (UKM), Northern Ireland (UKN)
NO	Norway		7	738,100	Oslo og Akershus (NO01), Hedmark og Oppland (NO02), Sør-Østlandet (NO03), Agder og Rogaland (NO04)	Vestlandet (NO05), Trøndelag (NO06), Nord-Norge (NO07)

2.3 Regional data availability

Regional innovation data for five indicators are directly available from Eurostat. For the share of population aged 25-64 having completed tertiary education, R&D expenditures in the public and business sector, EPO patent applications, and Employment in medium-high/high tech manufacturing and knowledge-intensive services, regional data can be extracted from Eurostat's online regional database. For exports of medium and high tech products, estimates have been used for Exports of medium-high and high technology-intensive manufacturing industries from a study prepared for the European Commission.[4] For the six indicators using Community Innovation Survey (CIS) data, regional data are not directly available from Eurostat, and a special data request had to be made to obtain regional CIS data.

Regional CIS data request

To collect regional CIS data, data requests were made by Eurostat in 2014 to most Member States, excluding those countries for which NUTS1 and NUTS2 levels are identical to the country territory, or countries for which national CIS samples are too small to allow them to deliver reliable regional-level data. Eurostat shared regional CIS 2012 data with the project team for 20 countries (Austria, Belgium, Bulgaria, Croatia, the Czech Republic, Denmark, Finland, France, Greece, Hungary, Italy, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom) for the following indicators included in the RIS 2016[5]:

- Non-R&D innovation expenditure by SMEs (percentage of turnover in SMEs)
- SMEs innovating in-house (percentage of all SMEs)
- Innovative SMEs collaborating with others (percentage of all SMEs)
- SMEs with product or process innovation (percentage of all SMEs)
- SMEs with marketing or organisational innovations (percentage of all SMEs)
- Sales of new-to-market and new-to-firm product innovations by SMEs (percentage of turnover in SMEs)

For Germany, regional CIS data for the same indicators have been made available by the Centre for European Economic Research (ZEW).

Regional CIS data are not publicly available and have been made explicitly available for the Regional Innovation Scoreboard by national statistical offices. The CIS assigns the innovation activities of multi-establishment enterprises to the region where the head office is located. There is a risk that regions without head offices score lower on the CIS indicators as some of the activities in these regions are assigned to those regions with head offices. In order to minimize this risk, the regional CIS data excludes large firms (which are more likely to have multiple establishments in different regions) and focuses on SMEs only. More details are available in the RIS 2016 Methodology report.

Timeliness of regional data

For the RIS 2016, most recent data refer to 2014 for two indicators (tertiary education and employment in medium-high/high tech manufacturing and knowledge-intensive services), 2013 for three indicators (both indicators on public and private R&D expenditures, and exports of medium-high and high tech manufacturing), 2012 for six indicators (all six indicators using CIS data), and 2011 for one indicator (EPO patents).

Following the availability of the most recent data, the RIS will present a Regional Innovation Index (RII) for five reference years:

- RII2016 using regional CIS 2012 data;
- RII2014 using data two years less timely than those used for the RII2016 including regional CIS 2010 data;
- RII2012 using data four years less timely than those used for the RII2016 including regional CIS 2008 data;
- RII2010 using data six years less timely than those used for the RII2016 including regional CIS 2006 data;
- RII2008 using data eight years less timely than those used for the RII2016 including regional CIS 2004 data.

Data availability by indicator and country

The RIS 2016 database contains 12,840 data cells (214 regions, 12 indicators, and 5 years), of which 3,150 data cells (24.5%) are missing due to absence of data. Data availability particularly depends on the availability of regional CIS data. As shown in Table 3, data availability is below average for all indicators using CIS data. Data availability for the most recent year is much higher, at almost 89% on average. For five out of six CIS-based indicators, regional CIS 2012 data are available for almost 93% of the regions. Only for sales of new-to-market and new-to-firm product innovations, data availability is relatively poor at 77%.

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[4] *The 2015 study "Identifying Revealed Comparative Advantages in an EU Regional Context" has been prepared by the Lower Saxony Institute for Economic Research (NIW), the Vienna Institute for International Economic Studies (wiiw) and the Center for European Economic Research (ZEW).*

[5] *Regional CIS have also been made available for the share of SMEs with a procurement contract for the domestic and/or foreign public sector that undertake innovation activities required or not required as part of the contract. The indicator has not been included in the RIS as no comparable indicator is used in the European Innovation Scoreboard. Correlation analysis has shown that the share of SMEs with a procurement contract is not significantly correlated with a region's innovation performance, and data on the share of SMEs with a procurement contract will not be further discussed in the RIS 2016.*

Table 3: Regional data availability by indicator

	DATA AVAILABILITY RII2008-RII2016	DATA AVAILABILITY RII2016
Population having completed tertiary education	95.5%	96.3%
Exports of medium-high/high technology-intensive manufacturing	91.4%	91.1%
Employment in medium-high/high tech manufacturing and knowledge-intensive services	91.2%	96.3%
EPO patent applications	91.1%	91.6%
R&D expenditure in the business sector	87.1%	74.8%
R&D expenditure in the public sector	*86.5%*	*75.2%*
All indicators	75.5%	88.7%
SMEs with product or process innovations (CIS)	64.5%	92.5%
Innovative SMEs collaborating with others (CIS)	64.4%	92.5%
SMEs with marketing or organisational innovations (CIS)	63.1%	92.5%
SMEs innovating in-house (CIS)	62.0%	92.5%
Non-R&D innovation expenditure by SMEs (CIS)	58.6%	92.5%
Sales of new-to-market and new-to-firm innovations by SMEs (CIS)	50.2%	76.6%

There are large differences of regional data availability across countries. Data availability is very good for the whole nine-year period at 95% or more for seven countries (Belgium, Bulgaria, Czech Republic, Poland, Romania, Slovakia and Slovenia), good (below 95% but above average) for eight countries (Austria, Finland, France, Hungary, Italy, Portugal, Spain and Sweden), below average for three countries (Croatia, Norway and the UK) and far below average for five countries (Denmark, Germany, Greece, Ireland and the Netherlands) (Table 4). Data availability for the most recent year is much better, and is above 90% for 18 countries. For the Netherlands, data availability is poor as regional CIS data are not available.

To improve data availability, several imputation techniques have been used to provide estimates for all missing data. Data availability after imputation improves to 100% for all countries. Chapter 5 provides more details on the imputation techniques, and Annex 4 shows the most recent data for all regions and indicators after imputation.

Table 4: Regional data availability by country

	COUNTRY	DATA AVAILABILITY RII2008-RII2016	DATA AVAILABILITY RII2016		COUNTRY	DATA AVAILABILITY RII2008-RII2016	DATA AVAILABILITY RII2016
BE	Belgium	100%	100%	IT	Italy	80.9%	91.3%
BG	Bulgaria	100%	100%	FI	Finland	81.7%	91.7%
CZ	Czech Republic	100%	100%	SE	Sweden	80.0%	100%
SK	Slovakia	100%	100%	All regions		75.5%	88.7%
RO	Romania	99.0%	100%	UK	United Kingdom	73.3%	100%
PL	Poland	98.5%	97.9%	HR	Croatia	71.7%	91.7%
SI	Slovenia	98.3%	100%	NO	Norway	71.7%	66.7%
PT	Portugal	93.6%	94.0%	DK	Denmark	53.0%	98.3%
ES	Spain	92.4%	96.1%	DE	Germany	52.3%	80.8%
AT	Austria	90.0%	100%	IE	Ireland	50.0%	50.0%
HU	Hungary	90.0%	100%	EL	Greece	47.3%	88.5%
FR	France	82.4%	98.1%	NL	Netherlands	44.4%	36.1%

3. Regional innovation performance

3.1 Regional performance groups

Europe's regions are grouped into four innovation performance groups according to their performance on the Regional Innovation Index relative to that of the EU. The thresholds in relative performance are the same as those used in the European Innovation Scoreboard. Innovation Leaders are those regions which perform 20% or more above the EU average. Strong Innovators are regions performing between 90% and 120% of the EU average. Moderate Innovators are regions performing between 50% and 90% of the EU average, and Modest Innovators perform below 50% of the EU average.

Most regions are either Strong or Moderate Innovators (Table 5) with almost seven out of ten regions belonging to one of these groups (performance group membership for each region is shown in Annex 2). The group of Innovation Leaders is quite stable and currently includes 36 regions. The number of regions included in the group of Strong Innovators increased over time until three years ago and has then declined strongly. The number of regions in the group of Moderate Innovators has declined over time and currently includes 83 regions. The number of regions in the group of Modest Innovators has increased strongly over time and now includes 30 regions.

In the most recent period, 32 regions have changed performance group membership with eight regions moving up from the Strong Innovators to the Innovation Leaders (of which three regions in the UK, two regions each in Denmark and Germany, and one region in Sweden), and six regions moving down from the Innovation Leaders to the Strong Innovators (of which two regions in both Finland and Germany, and one region in both Ireland and the UK). The number of Innovation Leaders thereby increased from 34 to 36. Seven regions moved down from the Strong Innovators to the Moderate Innovators (of which two regions in both France and Italy, and one region each in Germany, Norway and Spain), thereby reducing the number of Strong Innovators from 74 to 65. Only two regions managed to move up from the Modest to the Moderate Innovators (Lódzkie (PL11) and Swietokrzyskie (PL33)), whereas nine regions moved down from the Moderate to the Modest Innovators (of which four regions in Greece, and one region each in Croatia, Italy, Poland, Portugal and Romania).

Table 5: Distribution of regional performance groups

	INNOVATION LEADERS	STRONG INNOVATORS	MODERATE INNOVATORS	MODEST INNOVATORS
RII2008	28	73	96	17
RII2010	34	67	96	17
RII2012	33	69	88	24
RII2014	34	74	83	23
RII2016	36	65	83	30

The Innovation Leaders have the highest performance on all indicators, except on the share of Innovative SMEs collaborating with others (shared with the Strong Innovators) (Table 6). The Innovation Leaders perform particularly well with average performance levels of 30% or more above the EU average on R&D expenditures in the public sector, SMEs innovating in-house, Innovative SMEs collaborating with others, EPO patent applications, SMEs with product or process innovators, SMEs with marketing or organisational innovators, and Employment in medium-high/high tech manufacturing and knowledge-intensive services.

The Strong Innovators perform close to average on most indicators, except for Innovative SMEs collaborating with others, where average performance is identical to that of the Innovation Leaders at 31% above the EU average. Also in SMEs innovating in-house, SMEs with product or process innovators and SMEs with marketing or organisational innovations, the Strong Innovators perform close to 20% above the EU average or higher. The Strong Innovators perform relatively less well on indicators related to the performance of their business sector: performance is below that of the EU in R&D expenditures in the business sector, Non-R&D expenditures in SMEs, EPO patent applications, Employment in medium-high/high tech manufacturing and knowledge-intensive services, and Exports of medium-high/high technology-intensive manufacturing.

The Moderate Innovators perform below the EU average on all indicators, except Non-R&D innovation expenditures in SMEs. The Moderate Innovators perform below average on several indicators related to business performance, in particular on R&D expenditures in the business sector and EPO patent applications, where performance is about half that of the EU average. Low business R&D expenditures and high non-R&D innovation expenditures in SMEs indicate that companies in these regions innovate more by adopting technologies and innovation already developed elsewhere and less so by developing new product or process innovations themselves.

The Modest Innovators perform below the EU average on all indicators and in particular on the indicators related to business performance. These regions are relatively well equipped with a well-educated population (75% of the EU average) but face weaknesses in most other domains of their regional innovation system.

Table 6: Performance group scores by indicator

	INNOVATION LEADERS	STRONG INNOVATORS	MODERATE INNOVATORS	MODEST INNOVATORS
Population having completed tertiary education	110	98	85	75
R&D expenditure in the public sector	134	97	74	48
R&D expenditure in the business sector	121	91	57	22
Non-R&D innovation expenditures in SMEs	116	96	111	68
SMEs innovating in-house	131	117	79	39
Innovative SMEs collaborating with others	131	131	66	30
EPO patent applications	141	97	47	24
SMEs with product or process innovations	141	124	82	41
SMEs with marketing or organisational innovations	137	120	83	40
Employment in medium-high/high tech manufacturing and knowledge-intensive services	132	97	84	54
Exports of medium-high/high technology-intensive manufacturing	113	93	83	62
Sales of new-to-market and new-to-firm innovations in SMEs[6]	94	91	77	43

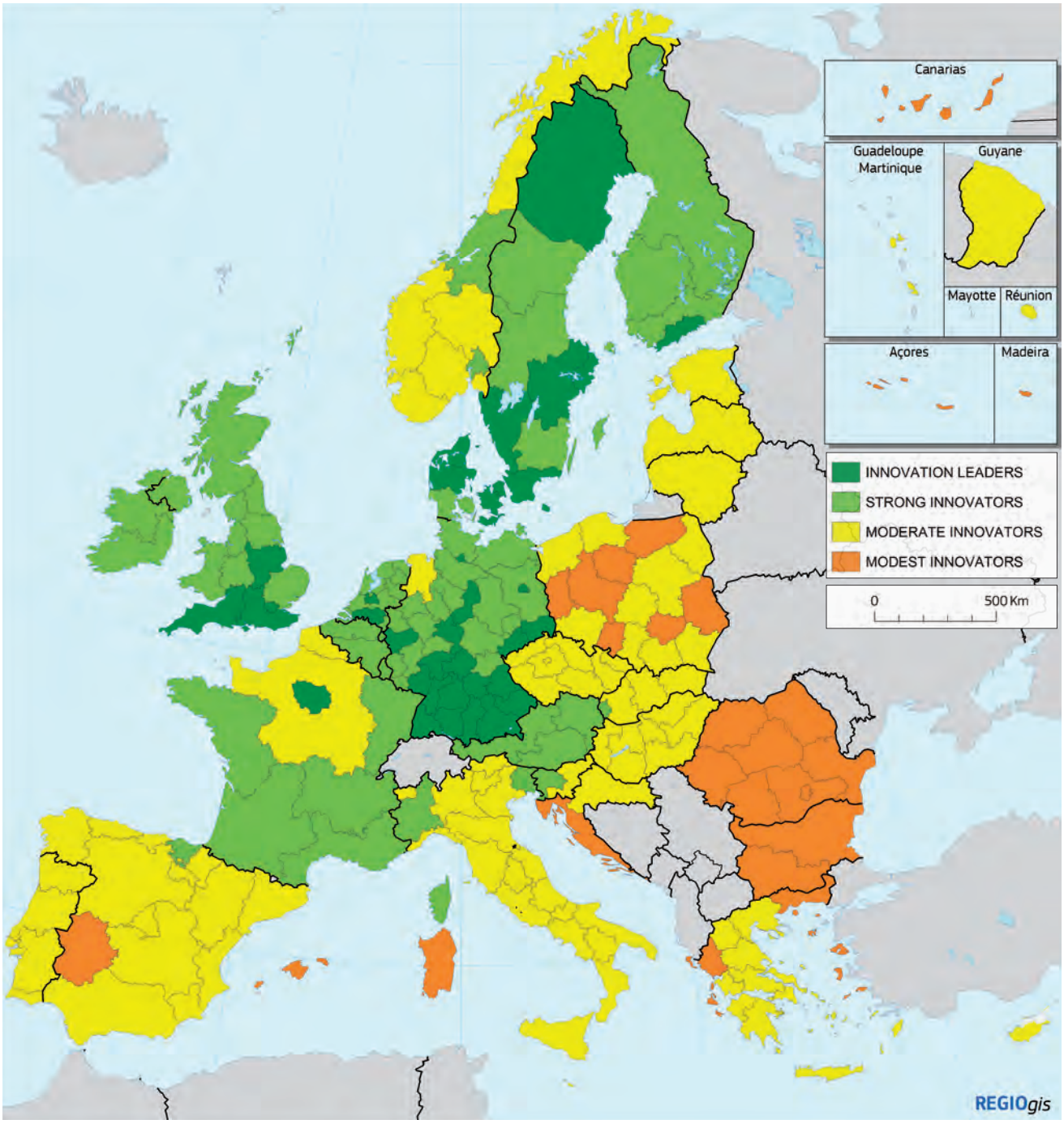
Average scores for each performance group relative to the EU average (=100). Scores calculated excluding countries for which regions do not exist and regional data are not available (Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta).

[6] *For all performance groups, average performance is below the EU average of 100. In theory, this should not be possible as not all regions can score below average. However, where the EU average is a weighted average with larger regions having a larger contribution to this average than smaller regions, the average group performance scores are unweighted averages with equal contributions for all regions. For the indicator on Sales of new-to-market and new-to-firm innovations in SMEs, the UK scores far above average (18.1 compared to 9.0 for the EU) and the UK regions' contribution to the EU average is almost 35%. The contribution to the group averages, however, is much smaller, as the 12 UK regions only represent 5.6% of all 214 regions. The above average scores of the 12 UK regions are thus not fully captured in the average performance scores for the Innovation Leaders (four UK regions) and Strong Innovators (eight UK regions).*

A geographical map of the regional performance groups is shown in Figure 2. For most countries, there is limited variation in regional performance groups, suggesting that regional and national innovation performance are linked. However, a stronger variation in some (mainly larger) countries also highlights regional specificities and the existence of regional 'pockets of excellence'.

Only in four larger countries (France, Germany, Italy and Spain), there are three different regional performance groups (Table 7). In 12 countries, there are two different regional performance groups, and in Austria, Belgium, Bulgaria, the Czech Republic, Hungary, Ireland and Romania, all regions are in the same performance group.[7]

Figure 2: Regional performance groups



For Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta, performance group membership is identical to that in the European Innovation Scoreboard 2016 report.

[7] *For Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta, there are no separate regions.*

Despite the variation in regional performance within countries, regional performance groups largely match the corresponding EIS country performance groups. Most of the regional Innovation Leaders are found in countries identified as Innovation Leaders in the EIS 2016, i.e. Denmark, Finland, Germany, the Netherlands and Sweden. Some regional Innovation Leaders are found in EIS 2016 Strong Innovator countries: East Midlands, London, South East and South West in the UK, and Île de France in France. All regional Innovation Leaders (36 regions) are located in seven EU Member States.

Most of the regional Strong Innovators are found in the EIS 2016 Innovation Leader and Strong Innovator countries, but there are also six regional Strong Innovators in EIS 2016 Moderate Innovator countries: Oslo og Akershus (NO01) and Trøndelag (NO06) in Norway, Piemonte (ITC1) and Friuli-Venezia Giulia (ITH4) in Italy, País Vasco (ES21) in Spain and Bratislavský kraj (SK01) in Slovakia.

Almost all of the regional Moderate Innovators are found in EIS 2016 Moderate Innovator countries, except for Weser-Ems (DE94) in Germany, Bassin Parisien (FR2), Nord-Pas-de-Calais (FR3) and Départements d'outre-mer (FR9) in France, and Vzhodna Slovenija (SI01) in Slovenia. All regional Modest Innovators are found in EIS 2016 Moderate Innovator and Modest Innovator countries.

Table 7 shows that in several countries there are 'regions of excellence' belonging to a higher performance group than the country in the EIS 2016. These regions include East Midlands (UKF), London (UKI), South East (UKJ) and South West (UKK) in the UK, Île de France (FR1) in France, Oslo og Akershus (NO01) and Trøndelag (NO06) in Norway, Piemonte (ITC1) and Friuli-Venezia Giulia (ITD4) in Italy, País Vasco (ES21) in Spain, and Bratislavský kraj (SK01) in Slovakia.

The Modest Innovator regions in Portugal and Spain are peripheral regions. These include island regions (Região Autónoma dos Açores (PT20), Região Autónoma da Madeira (PT30), Illes Balears (ES53) and Canarias (ES70)) and autonomous cities located on the north coast of Africa (Ciudad Autónoma de Ceuta (ES63) and Ciudad Autónoma de Melilla (ES64)).

Table 7: Occurrence of regional performance groups by country

	PERFORMANCE GROUP EUROPEAN INNOVATION SCOREBOARD 2016	REGIONAL INNOVATION LEADERS	REGIONAL STRONG INNOVATORS	REGIONAL MODERATE INNOVATORS	REGIONAL MODEST INNOVATORS
		36	65	83	30
Sweden	Innovation Leader	**5**	**3**	0	0
Denmark	Innovation Leader	**4**	**1**	0	0
Finland	Innovation Leader	**1**	**4**	0	0
Germany	Innovation Leader	**19**	**19**	**1**	0
Netherlands	Innovation Leader	**2**	**10**	0	0
United Kingdom	Strong Innovator	**4**	**8**	0	0
Ireland	Strong Innovator	0	**2**	0	0
Belgium	Strong Innovator	0	**3**	0	0
Luxembourg	*Strong Innovator*	--	--	--	--
Austria	Strong Innovator	0	**3**	0	0
France	Strong Innovator	**1**	**5**	**3**	0
Slovenia	Strong Innovator	0	**1**	**1**	0
Norway	Moderate Innovator	0	**2**	**5**	0
Cyprus	*Moderate Innovator*	--	--	--	--
Estonia	*Moderate Innovator*	--	--	--	--
Malta	*Moderate Innovator*	--	--	--	--
Czech Republic	Moderate Innovator	0	0	**8**	0
Italy	Moderate Innovator	0	**2**	**18**	**1**
Portugal	Moderate Innovator	0	0	**5**	**2**
Spain	Moderate Innovator	0	**1**	**13**	**5**
Greece	Moderate Innovator	0	0	**9**	**4**
Hungary	Moderate Innovator	0	0	**7**	0
Slovakia	Moderate Innovator	0	**1**	**3**	0
Poland	Moderate Innovator	0	0	**9**	**7**
Lithuania	*Moderate Innovator*	--	--	--	--
Croatia	Moderate Innovator	0	0	**1**	**1**
Latvia	Moderate Innovator	--	--	--	--
Bulgaria	Modest Innovator	0	0	0	**2**
Romania	Modest Innovator	0	0	0	**8**

Countries ordered by their performance score in the European Innovation Scoreboard 2016.

3.2 Performance changes over time

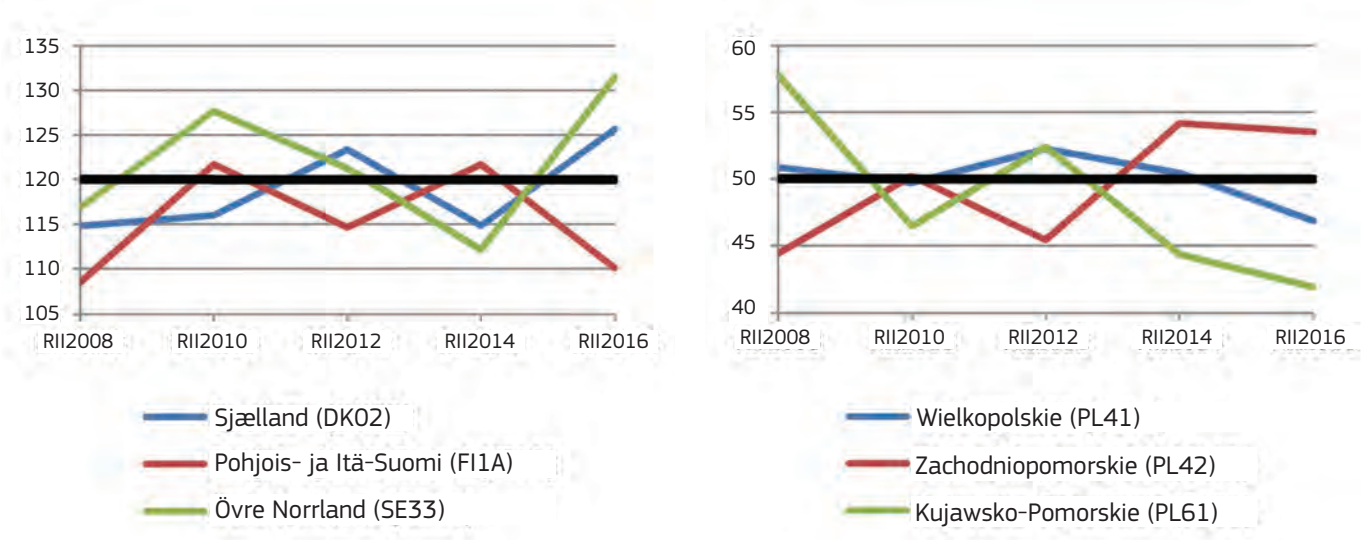
There are changes in the composition of the regional performance groups over time. Over the full nine-year period, 97 changes in performance group membership have taken place, of which 46 to a higher performance group and 51 to a lower performance group (Table 8). Between the most recent periods, there has been a significant increase in changes in performance group membership with more than two-thirds of these changes to a lower performance group.

For the majority of regions (70%), performance group membership has not changed over time. For 36 regions, membership changed only once, and for 21 regions, membership changed twice. For five regions, membership changed three times (Figure 3). Sjælland (DK02) and Övre Norrland (SE33) both moved to the group of Innovation Leaders twice. Zachodniopomorskie (PL42) moved to the group of Moderate Innovators twice, and Wielkopolskie (PL41) as well as Kujawsko-Pomorskie (PL61) dropped twice to the group of Modest Innovators. Pohjois- ja Itä-Suomi (FI1A) changed group membership four times.

Table 8: Number of changes in regional performance groups

	CHANGE TO HIGHER PERFORMANCE GROUP	CHANGE TO LOWER PERFORMANCE GROUP	TOTAL
RII2008-RII2010	13	7	20
RII2010-RII2012	8	15	23
RII2012-RII2014	15	7	22
RII2014-RII2016	10	22	32
Total	**46**	**51**	**97**

Figure 3: Regions with three or more changes in group membership



Average performance for the regional Strong and Moderate Innovators has been improving over time (Table 9) with the Strong Innovators growing fastest at an average growth rate of the Regional Innovation Index of 0.9% per two-year period. For the Innovation Leaders and Modest Innovators, performance has declined. For the most recent period, performance has declined for all groups, and most strongly for the Modest Innovators (-11.4%) and the Innovation Leaders (-9.0%).

Over the full nine-year period, performance has improved for 123 regions and worsened for 91 regions (Table 10). The number of regions for which performance increased has declined significantly (from 160 between the first two reference years to only 60 between the latest two reference years). For the most recent period, the number of regions for which performance decreased exceeds for the first time the number of regions for which performance increased and is more than 2.5 times as high.

Table 9: Regional innovation groups: average performance over time

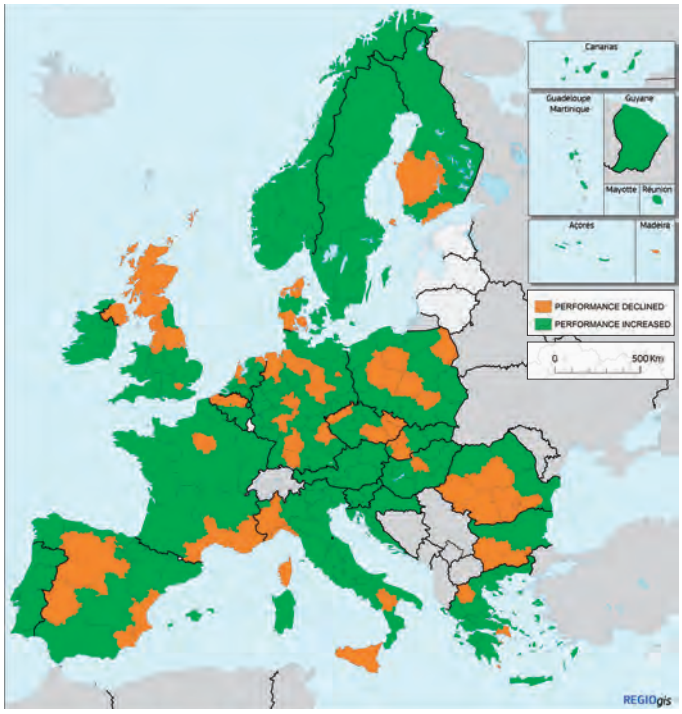
	INNOVATION LEADERS	STRONG INNOVATORS	MODERATE INNOVATORS	MODEST INNOVATORS
RII2008	0.552	0.422	0.300	0.205
RII2010	0.567	0.429	0.320	0.229
RII2012	0.564	0.445	0.324	0.224
RII2014	0.577	0.457	0.318	0.215
RII2016	0.525	0.438	0.305	0.190
Average growth rate RII2008-RII2016 per two-year period	-1.3%	0.9%	0.4%	-1.9%
Average growth rate RII2008-RII2014 per two-year period	1.4%	2.7%	2.0%	1.5%
Growth rate RII2014-RII2016	-9.0%	-4.2%	-4.2%	-11.4%

Table 10: Number of regions for which performance increased or decreased over time

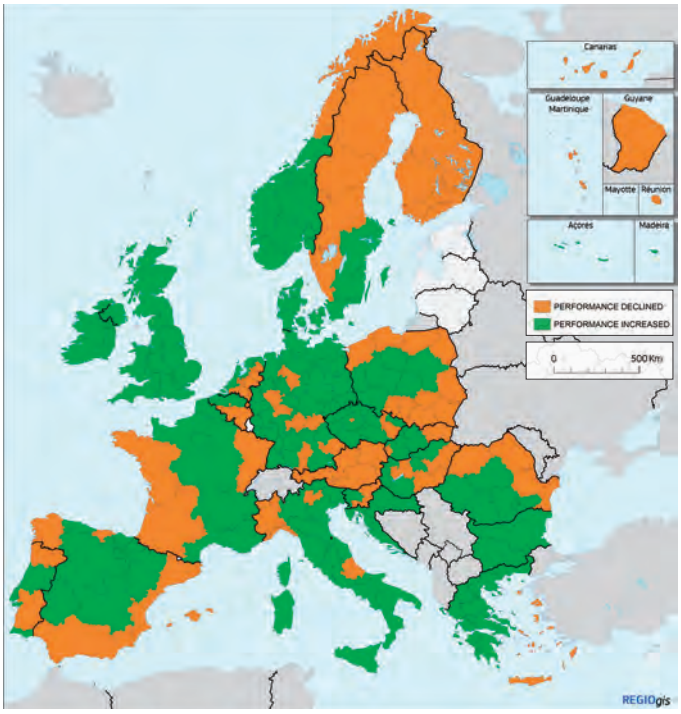
NUMBER OF REGIONS FOR WHICH ...	RII2008-RII2016	RII2008-RII2014	RII2008-RII2010	RII2010-RII2012	RII2012-RII2014	RII2014-RII2016
... performance increased	123	175	160	142	135	60
... performance decreased	91	39	54	72	79	154

Figure 4: Increasing number of regions for which performance declines

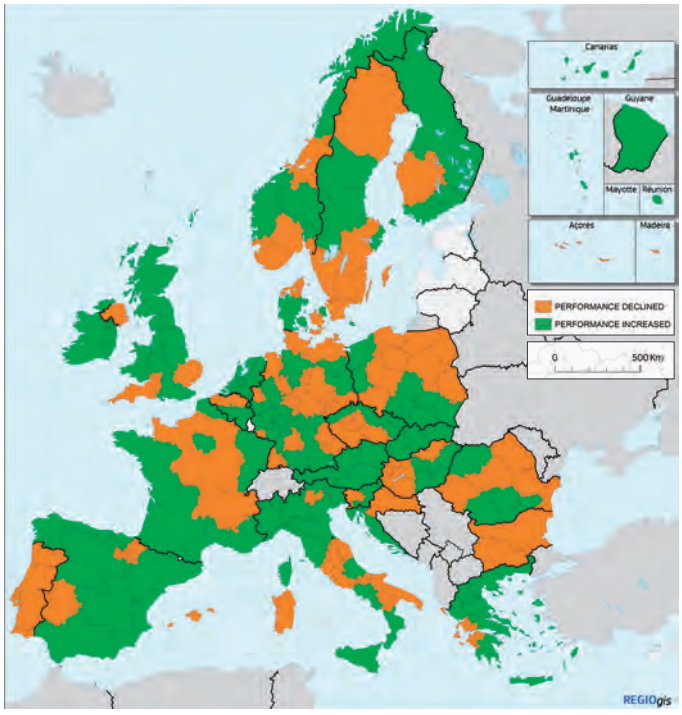
Performance change RII2008-RII2010



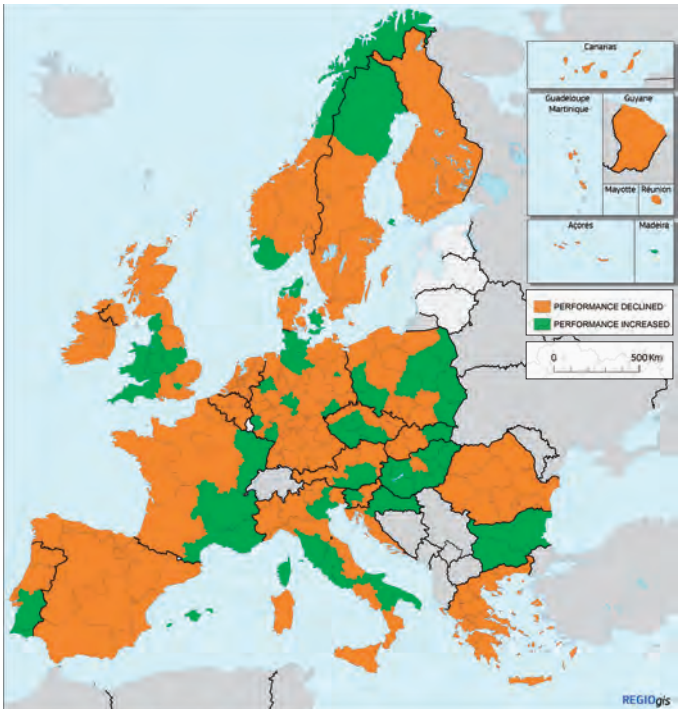
Performance change RII2010-RII2012



Performance change RII2012-RII2014



Performance change RII2014-RII2016



Countries for which either regions do not exist or regional data are not available (Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta) are not included.

Figure 4 visualizes the change over time in the number of regions for which performance increased or declined between two consecutive reference years. For the first four reference years, the first three maps reveal that for the majority of regions performance increased, although the number of regions for which performance worsened increased from 54 between the first two reference years (RII2008-RII2010) to 79 between the third and fourth reference year (RII2012-RII2014). The map between the two most recent reference years (RII2014-RII2016) is quite different with regions for which performance worsened now dominating the map. The number of regions for which performance declined has increased very strongly from 79 between the third and fourth reference year (RII2012-RII2014) to 154 between the two most recent reference years.

The strong increase in the number of regions for which performance decreased between the two most recent reference years is observed across all four performance groups, but most notably among the Strong Innovators with an increase from 7 to 32 regions (Table 11). But also for the Innovation Leaders and Moderate Innovators there has been a strong increase in the number of regions for which performance declined. In Belgium, Greece, Ireland, the Netherlands and Romania, performance declined in all regions, and in all other countries except Bulgaria, performance declined for at least one out of two regions. Bulgaria is the only country where performance increased for all regions.

Table 11: Number of regions for which performance declined

	INNOVATION LEADERS	STRONG INNOVATORS	MODERATE INNOVATORS	MODEST INNOVATORS
RII2008-RII2010	14	11	23	6
RII2010-RII2012	15	16	38	3
RII2012-RII2014	25	7	41	6
RII2014-RII2016	43	32	71	8

The decline in innovation performance in the most recent period is mostly due to a declining performance on the following indicators (Table 12):

- The share of SMEs innovating in-house declined on average by 11.9%, as compared to a decline of 4.8% over the entire nine-year period. The number of regions for which performance declined is almost the same for the entire nine-year period (147 regions) as for the most recent period (153 regions).
- The share of Innovative SMEs collaborating with others declined on average by 10.8%, as compared to only 0.2% over the entire nine-year period. Also the number of regions for which performance declined increased significantly from 108 to 148.
- The share of SMEs with product or process innovations declined on average by 12.5%, as compared to almost 5% over the entire nine-year period.
- The share of SMEs with marketing or organizational innovations declined on average by 12.1%, as compared to 5.7% over the entire nine-year period. The number of regions for which performance declined increased from 133 to 156.
- The share of exports of medium-high and high technology-intensive manufacturing declined on average by 4.6%, as compared to less than 1% over the entire nine-year period. The number of regions for which performance declined increased from 127 to 147.

From the above one may conclude that the recent decline in performance is mainly due to a decline in performance on the indicators using the latest CIS 2012 data. A similar observation was made in the IUS 2015 report, which used CIS 2012 data instead of CIS 2010 data in the IUS 2014: for the indicators using CIS data performance was negatively affected using the latest CIS 2012 data. The results using the latest regional CIS 2012 data in the RIS 2016 thus fully reflect the observation of a general decline in innovation performance at the country level in the IUS 2015.

Table 12: Changes in indicator performance over time

	PERCENTAGE CHANGE		NUMBER OF REGIONS FOR WHICH PERFORMANCE INCREASED		NUMBER OF REGIONS FOR WHICH PERFORMANCE DECREASED	
	RII2008-RII2016	RII2014-RII2016	RII2008-RII2016	RII2014-RII2016	RII2008-RII2016	RII2014-RII2016
Population having completed tertiary education	11.7%	10.4%	189	153	24	61
R&D expenditure in the public sector	5.6%	2.8%	163	109	43	85
R&D expenditure in the business sector	5.5%	7.1%	156	127	51	79
Non-R&D innovation expenditure in SMEs	-2.2%	8.2%	84	100	118	102
SMEs innovating in-house	-4.8%	-11.9%	67	59	147	153
Innovative SMEs collaborating with others	-0.2%	-10.8%	106	66	108	148
EPO patent applications	5.7%	8.3%	155	113	56	101
SMEs with product or process innovations	-4.9%	-12.5%	63	51	151	163
SMEs with marketing or organisational innovations	-5.7%	-12.1%	81	58	133	156
Employment in medium-high/high tech manufacturing and knowledge-intensive services	3.8%	4.1%	150	132	63	80
Exports of medium-high/high technology intensive manufacturing	-0.8%	-4.6%	87	67	127	147
Sales of new-to-market and new-to-firm innovations in SMEs	-3.6%	-1.5%	87	60	127	152

4. Innovation performance and Key Enabling Technologies in EU regions

Key Enabling Technologies (KETs) are a group of six technologies: Advanced materials, Advanced manufacturing technologies, Industrial biotechnology, Nanotechnology, Micro- and Nano-electronics, and Photonics.[8] KETs have applications in multiple industries and help tackle societal challenges. KETs provide the basis for innovation in a range of products across all industrial sectors, thereby offering a large potential for economic growth and employment. Their importance makes them a key element of European industrial policy, and countries and regions that fully exploit KETs are well positioned to be at the forefront of creating advanced and sustainable economies. The economic impact of KETs is considerable: products strongly dependent on KETs account for a production volume of 953 billion euros or 19% of total EU production, and altogether, KETs enable 3.3 million European jobs.[9]

A recent analysis[10] found that KETs directly boost EU regions' growth, particularly those which lag behind in innovation. The results confirm and reinforce the important role that KETs may play to meet the European Commission priority on boosting growth and creating more jobs.

In this chapter, data on regional specialisation in KETs will be compared with data on regional innovation performance in order to analyse the impact of different KETs on innovation performance.

4.1 Methodology for calculating specialisation in KETs

Patent application data for the six KETs at the NUTS2 level are available from the KETs Observatory for 2002-2011.[11] Aggregate numbers of KETs applications have been calculated for 5 periods: 2002-2003, 2004-2005, 2006-2007, 2008-2009 and 2010-2011.

The revealed technology advantage (RTA) index provides an indication of the relative specialisation of a region in the selected technological domains. The RTA is defined as a region's share of patents in particular technology fields divided by the region's share in all patent fields. The index is equal to zero when the region has no patents in a given sector; it is equal to 1 when the region's share in the sector equals its share in all fields (no specialisation); and it is above (or below) 1 when a positive (or negative) specialisation is observed. RTA indexes have been calculated for each individual KET and for the aggregate of the six KETs for those regions where the number of patent applications in any period is at least five.

4.2 Specialisation in KETs and regional innovation performance

The number of patent applications in KETs differs vastly across the RIS performance groups. The regional Innovation Leaders as a group have on average more than 13,000 patents per two-year period, the Strong Innovators as a group more than 8,600 patents, the Moderate Innovators as a group more than 2,500 patents, and the Modest Innovators as a group less than 50 patents. The distribution of KETs patents is thus highly skewed in favour of the more innovative regions who apply for about 90% of all patents (Table 13).

Specialisation in KETs is positive for the group of Innovation Leaders and the group of Strong Innovators, and negative for the group of Moderate and group of Modest Innovators. For the group of Innovation Leaders, however, specialisation has been declining over time. For the group of Strong Innovators, specialisation has remained almost constant. For the group of Moderate Innovators, specialisation has been increasing, and for the group of Modest Innovators, specialisation in KETs has been fluctuating over time.

Table 13: Specialisation in KETs by RIS regional performance groups

	ALL REGIONS	GROUP OF INNOVATION LEADERS		GROUP OF STRONG INNOVATORS		GROUP OF MODERATE INNOVATORS		GROUP OF MODEST INNOVATORS	
	Number of patents	Number of patents	RTA	Number of patents	RTA	Number of patents	RTA	Number of patents	RTA
2002-2003	24,027	13,555	1.074	8,309	0.996	2,125	0.715	38	0.458
2004-2005	23,371	12,815	1.064	8,141	0.999	2,374	0.765	41	0.537
2006-2007	24,650	13,314	1.054	8,653	1.008	2,646	0.792	37	0.424
2008-2009	25,040	13,347	1.063	8,853	0.999	2,776	0.789	64	0.638
2010-2011	24,955	12,756	1.026	9,305	1.045	2,833	0.810	62	0.552

RTAs for each performance group have been calculated by accumulating the total number of KETs and all patents for all regions in a particular performance group.

[8] http://ec.europa.eu/growth/industry/key-enabling-technologies/index_en.htm

[9] Source: KETs Observatory

[10] The Specialisation of EU Regions in Fast Growing and Key Enabling Technologies, JRC Technical Report, European Commission 2015, https://ec.europa.eu/jrc/en/news/key-enabling-technologies-foster-economic-growth-especially-low-tech-eu-regions?r=dnl

[11] The KETs Observatory (https://ec.europa.eu/growth/tools-databases/kets-tools/about) is an initiative funded by the European Commission with the objective of providing national policymakers and business stakeholders with information (quantitative and qualitative) on the performance of EU Member States and competing economies regarding the deployment of KETs. The KETs Observatory has collected data on technology, production, demand, trade, employment and turnover indicators.

Specialisation in KETs is positively linked to innovation performance as shown by the correlation results in Table 14, where the five Regional Innovation Index scores have been correlated with the five RTAs, assuming a uniform delay of five to six years for the impact of the RTA on the RII. For the first reference year, the correlation with the RTA of 2002-2003 is 0.382. For the most recent reference year, the correlation with the RTA of 2010-2011 is 0.206. The size of the regression coefficients suggests that there is a weak to moderate positive linear relationship between KETs specialisation and regional innovation performance.

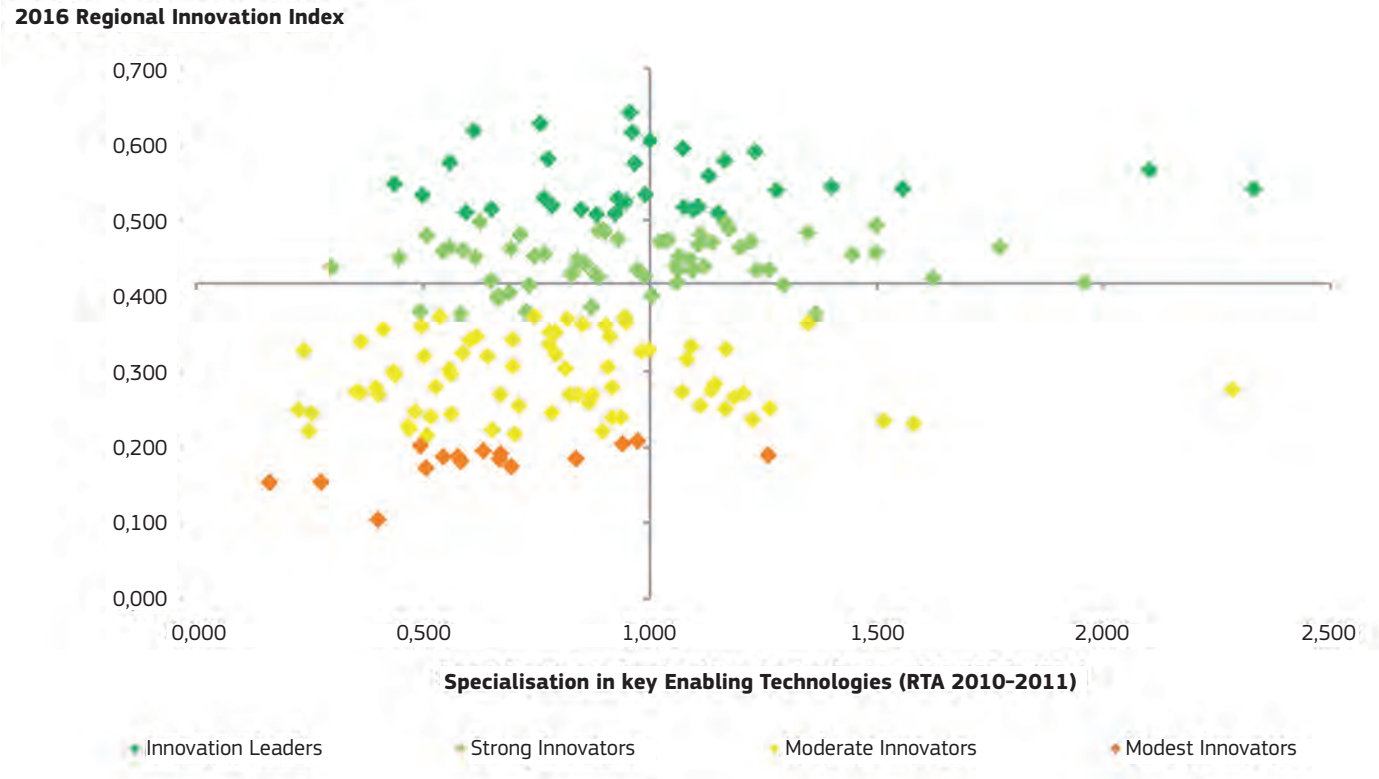
The scatter plot in Figure 5 visualizes the positive correlation between the specialisation in KETs in 2010-2011 and the 2016 Regional Innovation Index for all regions. Within each of the regional performance groups, there is no significant correlation between specialisation in KETs and innovation performance. However, as shown in the next section, specialisation in individual KET technologies does have a positive impact on innovation performance.

Table 14: Correlation results between KETs and innovation performance

	RII2008	RII2010	RII2012	RII2014	RII2016
Pearson Correlation	0.382** RTA2002-03	0.362** RTA2004-5	0.362** RTA2006-07	0.492** RTA2008-09	0.206** RTA2010-11
Significance (2-tailed)	0.000	0.000	0.000	0.000	0.004
Number of regions	182	186	192	196	196

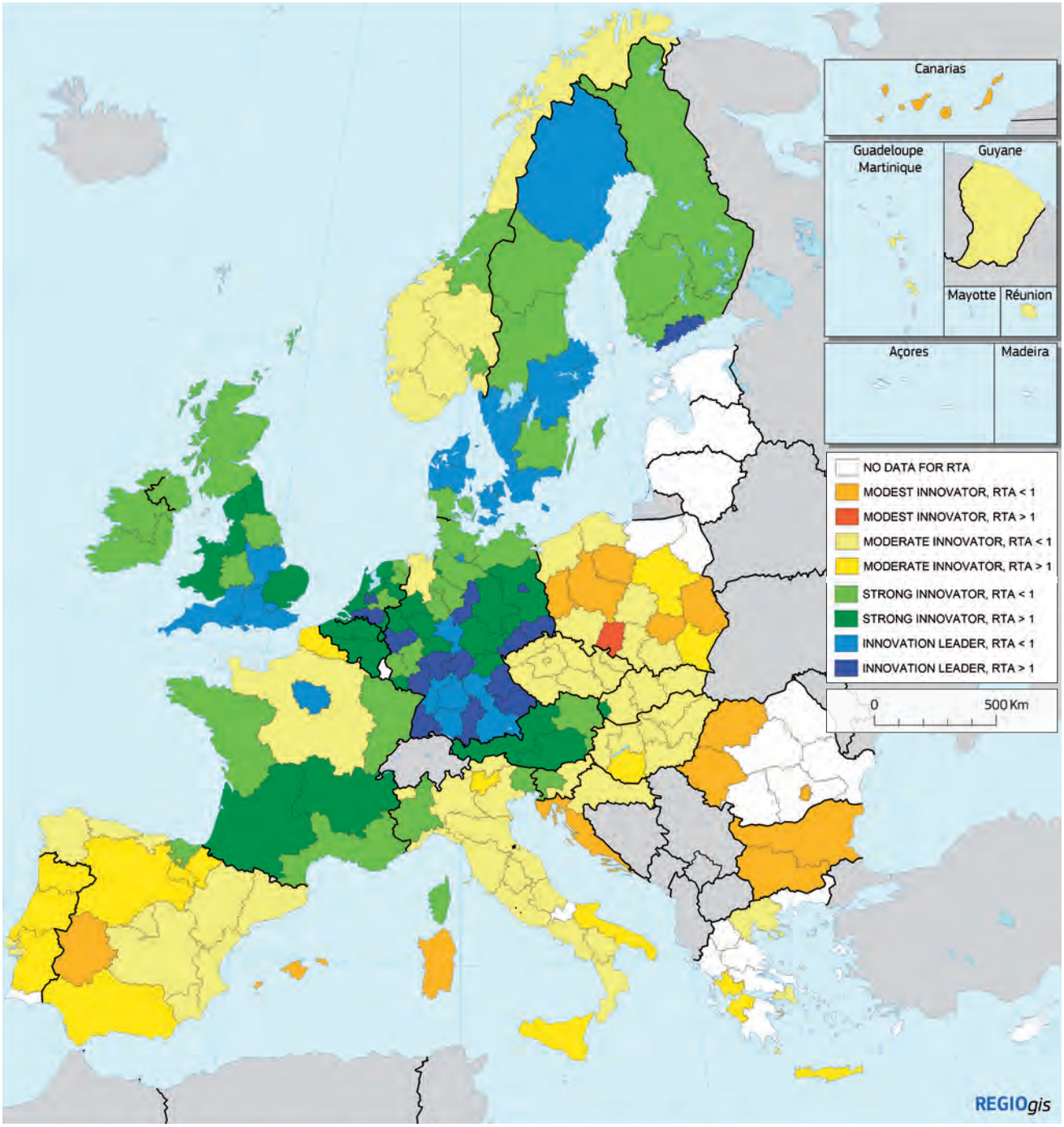
*** Correlation is significant at the 0.01 level (2-tailed).*

Figure 5: KETs specialisation and innovation performance



A geographical map of Europe (Figure 6) shows that regions with a positive specialisation in KETs are found across the whole of Europe but in particular in Austria (regions highlighted in dark green), Belgium (dark green), Southern France (dark green), Germany (dark green and dark blue), the Netherlands (dark green and dark blue), Portugal (bright yellow), Spain (bright yellow), and some regions in Finland (dark blue), Greece, Italy and Poland (bright yellow).

Figure 6: KETs specialisation and innovation performance, a map of Europe



4.3 Specialisation in individual KETs and regional innovation performance

Specialisation in KETs is positively linked to regional innovation performance, but results are different for each of the six KETs technologies. The highest number of patent applications is found in Advanced manufacturing technologies, followed by Industrial biotechnology and Photonics (Table 15).

The Innovation Leaders apply for more than half of all patents in Advanced materials, Nanotechnology, Photonics, and Advanced manufacturing technologies. For the Innovation Leaders, specialisation is positive but at least partly declining in Advanced materials, Photonics and Advanced manufacturing technologies. Specialisation was positive in Nanotechnology until recently when the RTA dropped below 1. Total numbers of patent applications are falling in those KETs where the specialisation for the Innovation Leaders is declining: Nanotechnology and in particular Micro- and Nano-electronics.

The Strong Innovators show a positive and mostly increasing specialisation in Nanotechnology, Micro- and Nano-electronics, Industrial biotechnology, and very recently also in Photonics. The Moderate Innovators show a recent positive specialisation in Nanotechnology and Micro- and Nano-electronics. For the Modest Innovators, patent numbers are too small to calculate RTAs over time for all technology fields, but there are no signs of positive specialisation in any technology field for which RTAs could be calculated.

In particular for Nanotechnology, Micro- and Nano-electronics and Photonics, relative specialisation patterns have been changing over time, with the most innovative regions becoming less specialised, and the Strong and in particular the Moderate Innovators becoming more specialised. Less innovative regions have thus become more specialised, thereby laying the foundation for possible innovation performance increases in the future.

Table 15: Specialisation in KETs by RIS regional performance groups

	ALL REGIONS	INNOVATION LEADERS		STRONG INNOVATORS		MODERATE INNOVATORS		MODEST INNOVATORS	
	Number of patents	Number of patents	RTA	Number of patents	RTA	Number of patents	RTA	Number of patents	RTA
Advanced materials									
2002-2003	3,348	2,044	1.162	1,046	0.899	251	0.606	7	--
2004-2005	3,103	1,876	1.173	926	0.856	298	0.722	4	--
2006-2007	3,261	1,967	1.177	934	0.822	355	0.802	5	--
2008-2009	3,752	2,227	1.183	1148	0.865	369	0.700	8	--
2010-2011	4,017	2,309	1.153	1310	0.914	394	0.700	3	--
Nanotechnology									
2002-2003	1,143	646	1.075	409	1.031	87	0.615	1	--
2004-2005	1,243	657	1.026	452	1.043	131	0.795	3	--
2006-2007	1,386	727	1.023	527	1.092	128	0.680	4	--
2008-2009	1,278	646	1.008	471	1.042	152	0.848	8	--
2010-2011	1,023	465	0.913	380	1.042	170	1.188	7	--
Micro- and Nano-electronics									
2002-2003	3,894	1,969	0.970	1,511	1.126	377	0.790	7	--
2004-2005	3,208	1,545	0.935	1,266	1.132	389	0.913	7	--
2006-2007	3,222	1,413	0.855	1,386	1.235	415	0.950	9	--
2008-2009	3,186	1,382	0.865	1,294	1.148	499	1.115	10	0.795
2010-2011	3,067	1,294	0.847	1,314	1.200	448	1.041	11	0.810
Industrial biotechnology									
2002-2003	5,805	2,829	0.928	2,360	1.170	611	0.851	4	--
2004-2005	5,516	2,641	0.929	2,210	1.149	660	0.901	5	--
2006-2007	5,834	2,715	0.908	2,394	1.178	720	0.911	5	--
2008-2009	5,497	2,559	0.928	2,266	1.165	659	0.853	13	0.598
2010-2011	5,722	2,468	0.865	2,512	1.230	736	0.917	7	--
Photonics									
2002-2003	4,207	2,695	1.219	1,266	0.867	235	0.452	11	0.746
2004-2005	3,968	2,478	1.212	1,246	0.900	239	0.454	6	--
2006-2007	4,065	2,430	1.166	1,364	0.963	266	0.483	5	--
2008-2009	4,637	2,679	1.152	1,618	0.986	331	0.508	9	--
2010-2011	4,593	2,556	1.117	1,673	1.020	355	0.551	9	--
Advanced manufacturing technologies									
2002-2003	5,661	3,373	1.134	1,716	0.873	563	0.804	8	--
2004-2005	6,333	3,619	1.109	2,042	0.925	657	0.780	16	0.757
2006-2007	6,880	4,062	1.152	2,048	0.854	763	0.818	8	--
2008-2009	6,690	3,854	1.148	2,055	0.868	766	0.815	15	0.558
2010-2011	6,533	3,663	1.125	2,116	0.907	730	0.797	25	0.846

RTAs for each performance group have been calculated by accumulating the total number of KETs and all patents for all regions in a particular performance group. RTAs are only calculated if the number of patents is at least 10 for the performance group at large.

Only for Advanced materials, Industrial biotechnology, Photonics and Advanced manufacturing technologies, there is a positive and significant link between the degree of specialisation and regional innovation performance in the most recent reference year RII2016 (Table 16). Analysing the trend over time shows that for Advanced materials and Industrial biotechnology, there is a weak to moderate and mostly increasing link with innovation. For Photonics, the link with innovation is weak but increasing over time. For Advanced manufacturing technologies, the link with innovation is weak and decreasing over time.

Table 16: Correlation results between individual KETs and innovation performance

	RII2008	RII2010	RII2012	RII2014	RII2016
Advanced materials					
Pearson Correlation	0.208**	0.075	0.334**	0.145*	0.400**
Significance (2-tailed)	0.002	0.280	0.000	0.036	0.000
Number of regions	209	208	209	209	207
Nanotechnology					
Pearson Correlation	0.043	0.020	-0.046	-0.090	-0.080
Significance (2-tailed)	0.533	0.776	0.505	0.195	0.250
Number of regions	209	208	209	209	207
Micro- and Nano-electronics					
Pearson Correlation	0.087	0.044	0.056	0.053	0.003
Significance (2-tailed)	0.213	0.528	0.423	0.448	0.971
Number of regions	209	208	209	209	207
Industrial biotechnology					
Pearson Correlation	0.169*	0.260**	0.237**	-0.024	0.339**
Significance (2-tailed)	0.014	0.000	0.001	0.733	0.000
Number of regions	209	208	209	209	207
Photonics					
Pearson Correlation	-0.008	0.099	0.239**	0.271**	0.264**
Significance (2-tailed)	0.913	0.154	0.000	0.000	0.000
Number of regions	209	208	209	209	207
Advanced manufacturing technologies					
Pearson Correlation	0.215**	0.212**	0.370**	0.142*	0.181**
Significance (2-tailed)	0.002	0.002	0.000	0.040	0.009
Number of regions	209	208	209	209	207

***. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).*

4.4 Conclusion

Specialisation in Key Enabling Technologies (KETs) is positively linked to regional innovation performance. The Regional Innovation Index is positively correlated with the revealed technology advantage (RTA) index which measures the degree of specialisation in KETs. The Innovation Leaders and Strong Innovators account for almost 90% of all patents in KETs. Regions with a positive specialisation in KETs are found across the whole of Europe but in particular in Austria, Belgium, Southern France, Germany, the Netherlands, Portugal and Spain.

However, not all KET technologies 'contribute' equally to innovation performance. In particular, specialisation in Advanced materials, Industrial biotechnology, Photonics, and Advanced manufacturing technologies is positively linked to regional innovation performance with the Innovation Leaders being specialised in three of these KETs technologies. For all KETs, except Advanced manufacturing technologies, relative specialisation patterns have been changing over time. In particular, for Nanotechnology, Micro- and Nano-electronics, and Photonics, specialisation has declined for the Innovation Leaders and has increased for the Strong and in particular the Moderate Innovators. Less innovative regions have become more specialised, thereby laying the foundation for possible innovation performance increases in the future.

5. Performance maps per indicator

For each of the indicators used in the RIS 2016, regional performance is shown in geographical maps. Regions are grouped according to their performance relative to the EU average using the same thresholds applied in Section 3 of this report. For each indicator, the top 20 best performing regions are listed.[12]

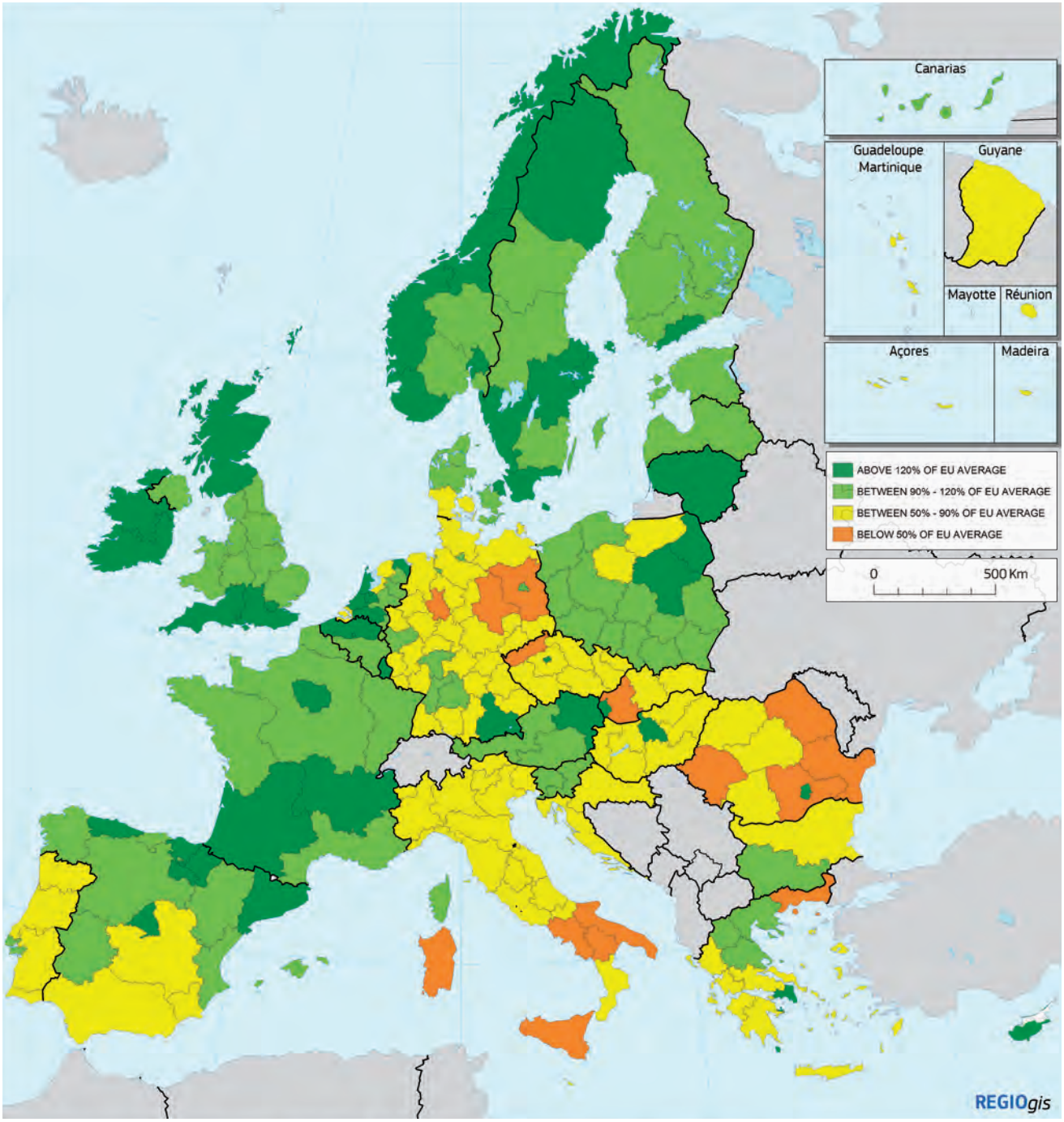
The distribution of relative performance scores varies strongly across indicators. For instance, as many as 78 regions perform above 120% of the EU average on SMEs with product or process innovations and SMEs with marketing or organizational innovations (Table 17). By contrast, as many as 83 regions perform below 50% of the EU average on EPO patent applications. These differences reflect the fact that most indicator scores are not symmetrically distributed with equal shares of regions having high and low scores. An example is EPO patent applications, where 20 regions account for 50% of all patent applications.

Table 17: Number of regions in different performance groups per indicator

	PERFORMANCE ABOVE 120% OF EU	PERFORMANCE BETWEEN 90% AND 120% OF EU	PERFORMANCE BETWEEN 50% AND 90% OF EU	PERFORMANCE BELOW 50% OF EU
Population having completed tertiary education	44	65	89	16
R&D expenditure in the public sector	47	37	79	51
R&D expenditure in the business sector	28	40	82	64
Non-R&D innovation expenditure by SMEs	61	73	53	27
SMEs innovating in-house	71	49	50	44
Innovative SMEs collaborating with others	66	34	54	60
EPO patent applications	38	36	57	83
SMEs with product or process innovations	78	53	43	40
SMEs with marketing or organisational innovations	78	57	34	45
Employment in medium-high/high tech manufacturing and knowledge-intensive services	49	63	70	32
Exports of medium-high/high technology-intensive manufacturing	39	71	76	28
Sales of new-to-market and new-to-firm innovations by SMEs	19	51	105	39
Regional Innovation Index 2016	36	65	83	30

[12] *Cyprus, Estonia, Latvia, Lithuania, Luxembourg and Malta, where there is no regional administrative level, are excluded from the top 20 listings, although they might score highly on some indicators.*

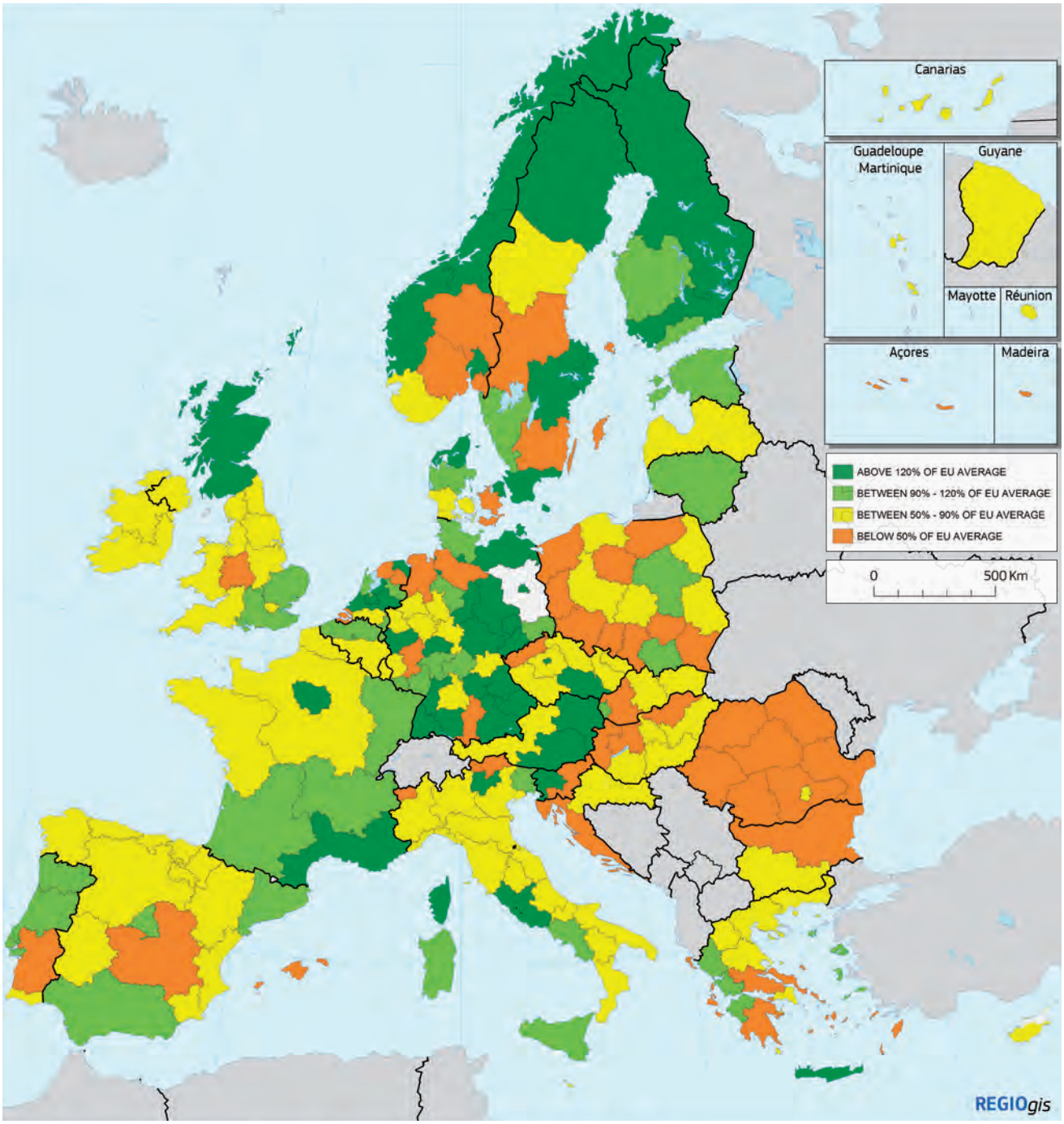
Percentage population aged 30-34 having completed tertiary education



Tertiary education attainment is not uniformly spread within each country. For instance, tertiary education attainment in Southern Spain is below 90% of the EU average, whereas for other Spanish regions, it is close to the EU average, and for several regions in Northern Spain and Comunidad de Madrid (ES30), it is well above the EU average. Tertiary education attainment is relatively weak in Bulgaria, Croatia, the Czech Republic, Germany, Italy, Portugal, Slovakia, Hungary, and Romania, as shown by relatively large numbers of regions which perform below the EU average. In Germany, one can observe stronger performance in several of the country's regions in the South, in particular in Oberbayern (DE21). In many countries, performance is highest in capital regions, a direct result of above-average shares of employment in both public and private services, which typically employ more people with a tertiary degree.

The 20 regions with the highest scores are (in descending order) Oslo og Akershus (NO01), London (UKI), Hovedstaden (DK01), País Vasco (ES21), Utrecht (NL31), Stockholm (SE11), Mazowieckie (PL12), Scotland (UKM), Trøndelag (NO06), Southern and Eastern (IE02), Comunidad de Madrid (ES30), Bratislavský kraj (SK01), Itä-Suomi (FI13), Île de France (FR1), Noord-Holland (NL32), Principado de Asturias (ES12), Sydsverige (SE22), Sud-Ouest (FR6), Vestlandet (NO05), and Nord-Norge (NO07).

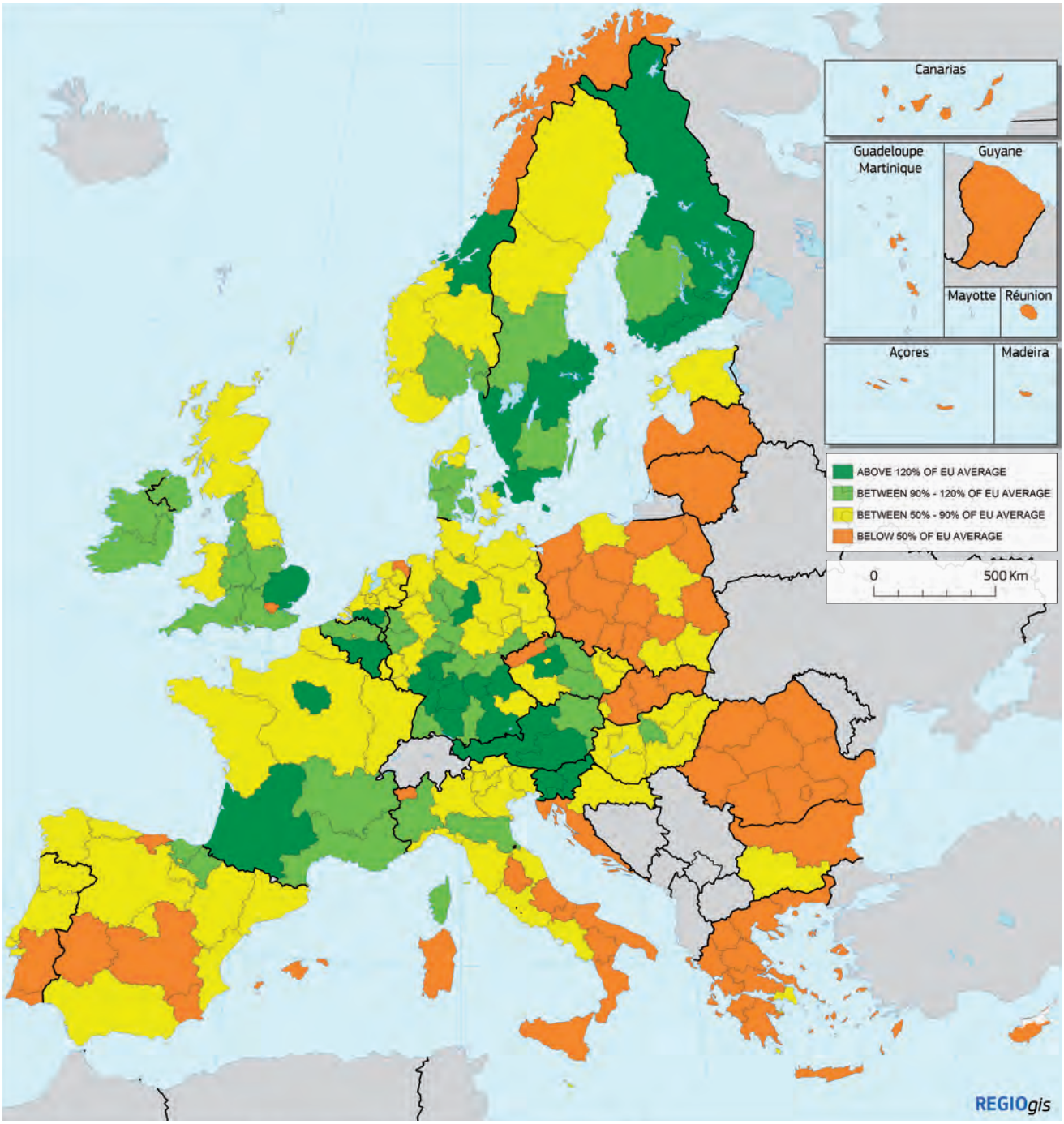
R&D expenditure in the public sector as percentage of GDP



The map shows that high public R&D expenditure is observed in several countries, in capital regions, but also non-capital regions. Public R&D expenditures are particularly high in several regions in Austria, Denmark, Finland, Germany, the Netherlands, Norway, Sweden, and the UK. There are also several high performing regions in some Mediterranean countries (e.g. Kriti (EL43), Lazio (ITI4) and Provincia Autonoma Trento (ITH2)) and Central and Eastern Europe (e.g. Praha (CZ01), Jihovýchod (CZ06) and Mazowieckie (PL12)).

The 20 regions with the highest scores are (in descending order) Nordjylland (DK05), Dresden (DED2), Braunschweig (DE91), Berlin (DE30), Trøndelag (NO06), Övre Norrland (SE33), Köln (DEA2), Leipzig (DED3), Bremen (DE50), Praha (CZ01), Karlsruhe (DE12), Hovedstaden (DK01), Östra Mellansverige (SE12), Groningen (NL11), Oslo og Akershus (NO01), Brandenburg - Südwest (DE42), Jihovýchod (CZ06), Nord-Norge (NO07), Utrecht (NL31), and Mecklenburg-Vorpommern (DE80).

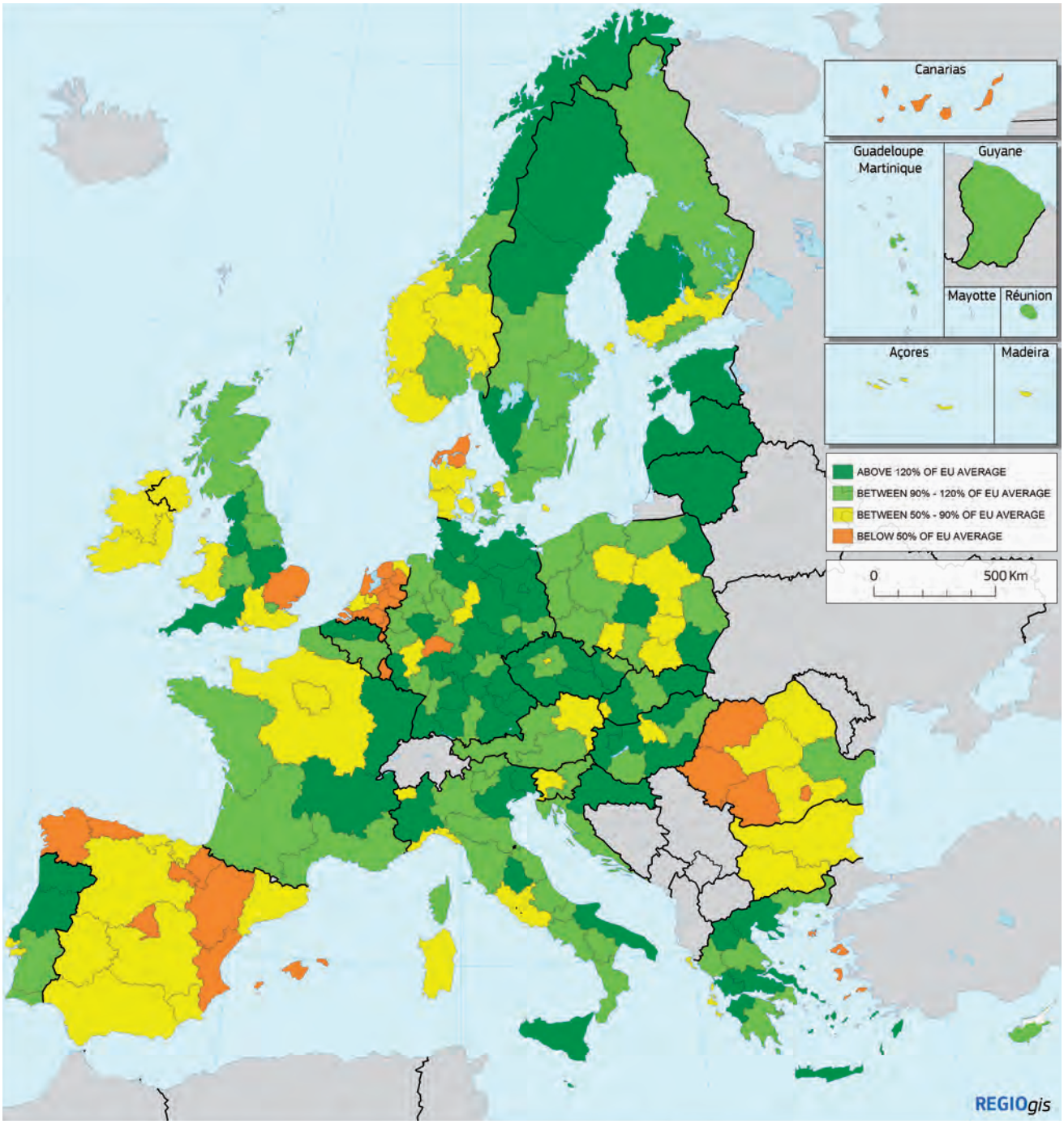
R&D expenditure in the business sector as percentage of GDP



Business R&D expenditures are highest in several regions of the Nordic countries (Denmark, Finland, Norway, and Sweden), Austria, Belgium, Ireland, Slovenia, Southern France and the Paris region, Southern Netherlands, large parts of Germany, much of the Czech Republic, and Southern UK. There are also 'pockets of excellence' in some of the Moderate and Modest Innovator countries: Střední Cechy (CZ02) in the Czech Republic, Közép-Magyarország (HU10) in Hungary, Piemonte (ITC1) and Emilia-Romagna (ITH5) in Italy, Oslo og Akershus (NO01), Sør-Østlandet (NO03) and Trøndelag (NO06) in Norway, and País Vasco (ES21) and Comunidad Foral de Navarra (ES22) in Spain.

The 20 regions with the highest scores are (in descending order) Stuttgart (DE11), Braunschweig (DE91), Tübingen (DE14), Hovedstaden (DK01), Oberbayern (DE21), Südösterreich (AT2), Stockholm (SE11), East of England (UKH), Västsverige (SE23), Etelä-Suomi (FI18), Mittelfranken (DE25), Sydsverige (SE22), Darmstadt (DE71), Karlsruhe (DE12), Trøndelag (NO06), Östra Mellansverige (SE12), Rheinhessen-Pfalz (DEB3), Itä-Suomi (FI13), Région Wallonne (BE3), and Noord-Brabant (NL41).

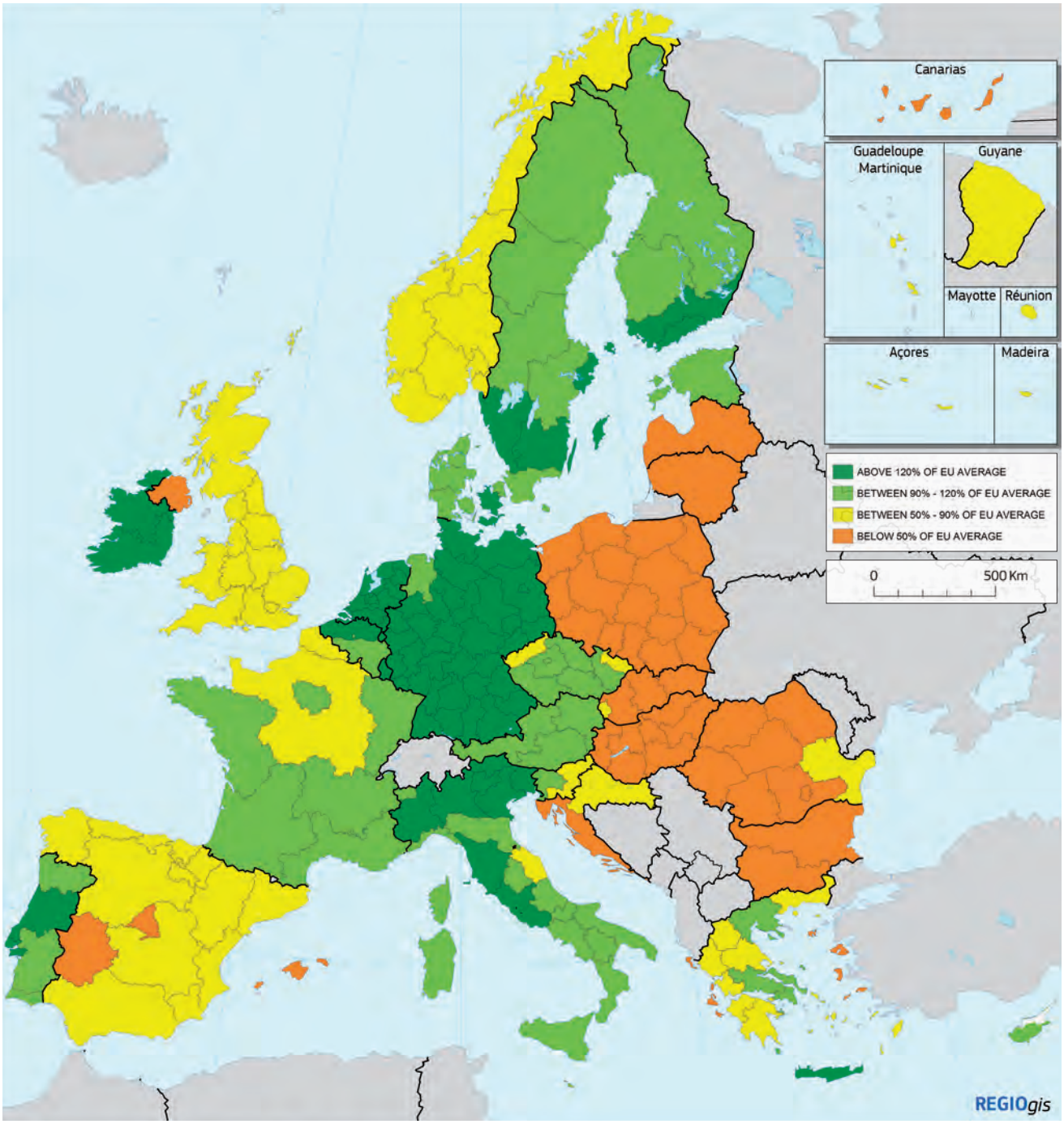
Non-R&D innovation expenditures in SMEs as percentage of turnover



Regions with a high share of non-R&D innovation expenditures in SMEs are distributed across the whole of Europe, with at least one region performing at least 20% above the EU average in 15 countries. The share of non-R&D innovation expenditures is low in Bulgaria, Denmark, Ireland, the Netherlands, Romania, and Spain, where all regions, except Sud-Est (RO22), perform (well) below the EU average.

The 20 regions with the highest scores are (in descending order) Övre Norrland (SE33), Nyugat-Dunántúl (HU22), Notio Aigaio (EL42), Sterea Ellada (EL24), Severozápad (CZ04), Dél-Alföld (HU33), Kriti (EL43), East Midlands (UKF), Dytiki Makedonia (EL13), Unterfranken (DE26), Podlaskie (PL34), Dytiki Ellada (EL23), Mellersta Norrland (SE32), Saarland (DEC0), Közép-Dunántúl (HU21), South West (UKK), Lüneburg (DE93), Tübingen (DE14), Jihovýchod (CZ06), and Veneto (ITH3). Of the top 20 regions, 12 regions are from an EIS Moderate Innovator country.

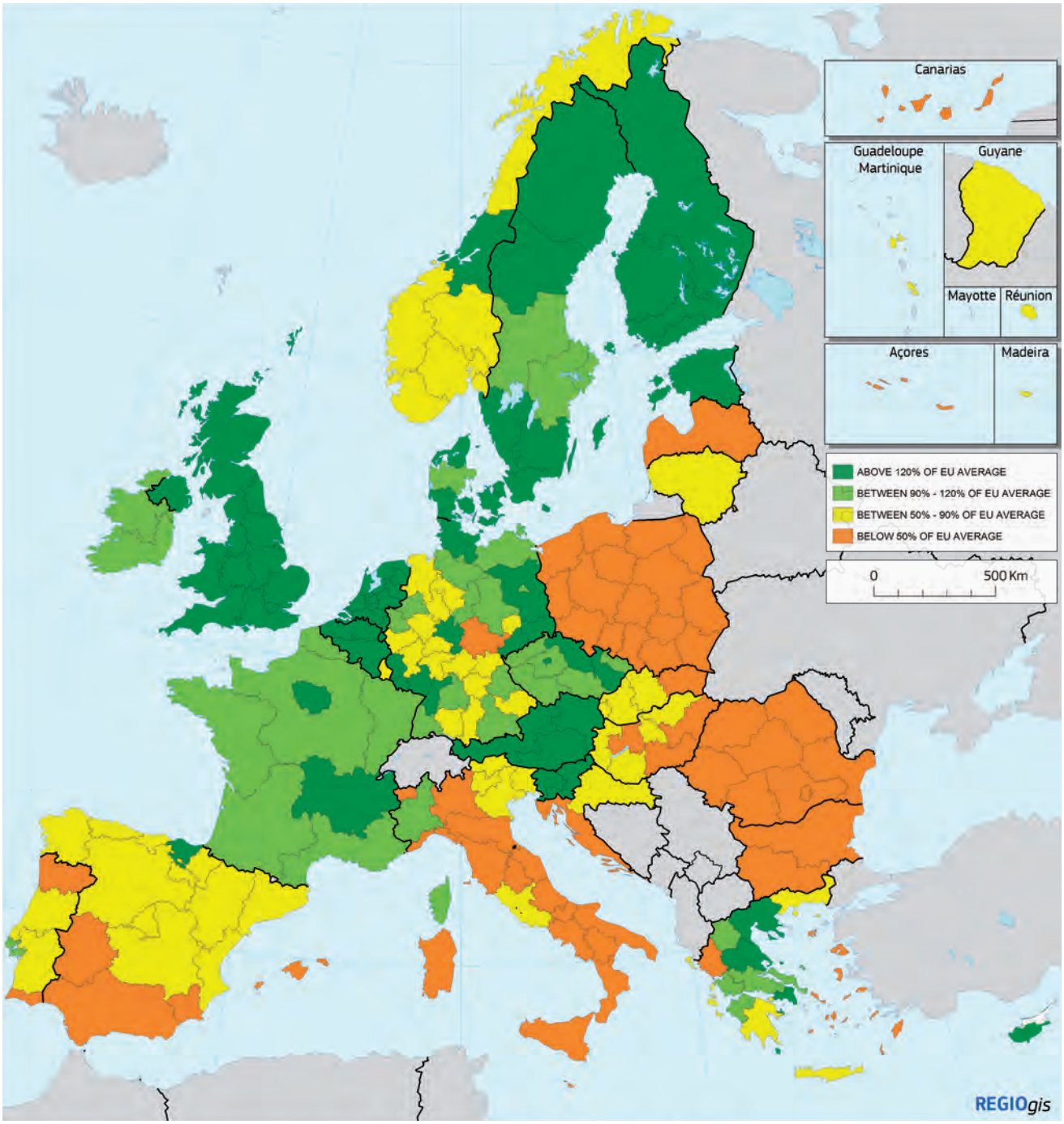
SMEs innovating in-house as percentage of SMEs



For the share of SMEs innovating in-house, regional variation within countries is relatively small. In many countries, regions belong to the same relative performance group, and only in a few countries, regions belong to more than one relative performance group. In Greece, regions belong to four different performance groups. In Italy, Portugal and Spain, regions belong to three different performance groups. In Greece, Kriti (EL43) performs more than 20% above the EU average. In Spain, Ciudad Autónoma de Melilla (ES64) performs above the EU average, and in Italy, eight regions perform more than 20% above the EU average, 12 regions perform close to the EU average, and only one region performs below the EU average (Marche (ITI3)).

The 20 regions with the highest scores (in descending order) are Karlsruhe (DE12), Rheinhessen-Pfalz (DEB3), Schwaben (DE27), Kassel (DE73), Chemnitz (DED1), Münster (DEA3), Veneto (ITH3), Darmstadt (DE71), Niederbayern (DE22), Freiburg (DE13), Hamburg (DE60), Berlin (DE30), Dresden (DED2), Thüringen (DEG0), Stuttgart (DE11), Lüneburg (DE93), Schleswig-Holstein (DEF0), Oberpfalz (DE23), Oberbayern (DE21), and Sachsen-Anhalt (DEE0).

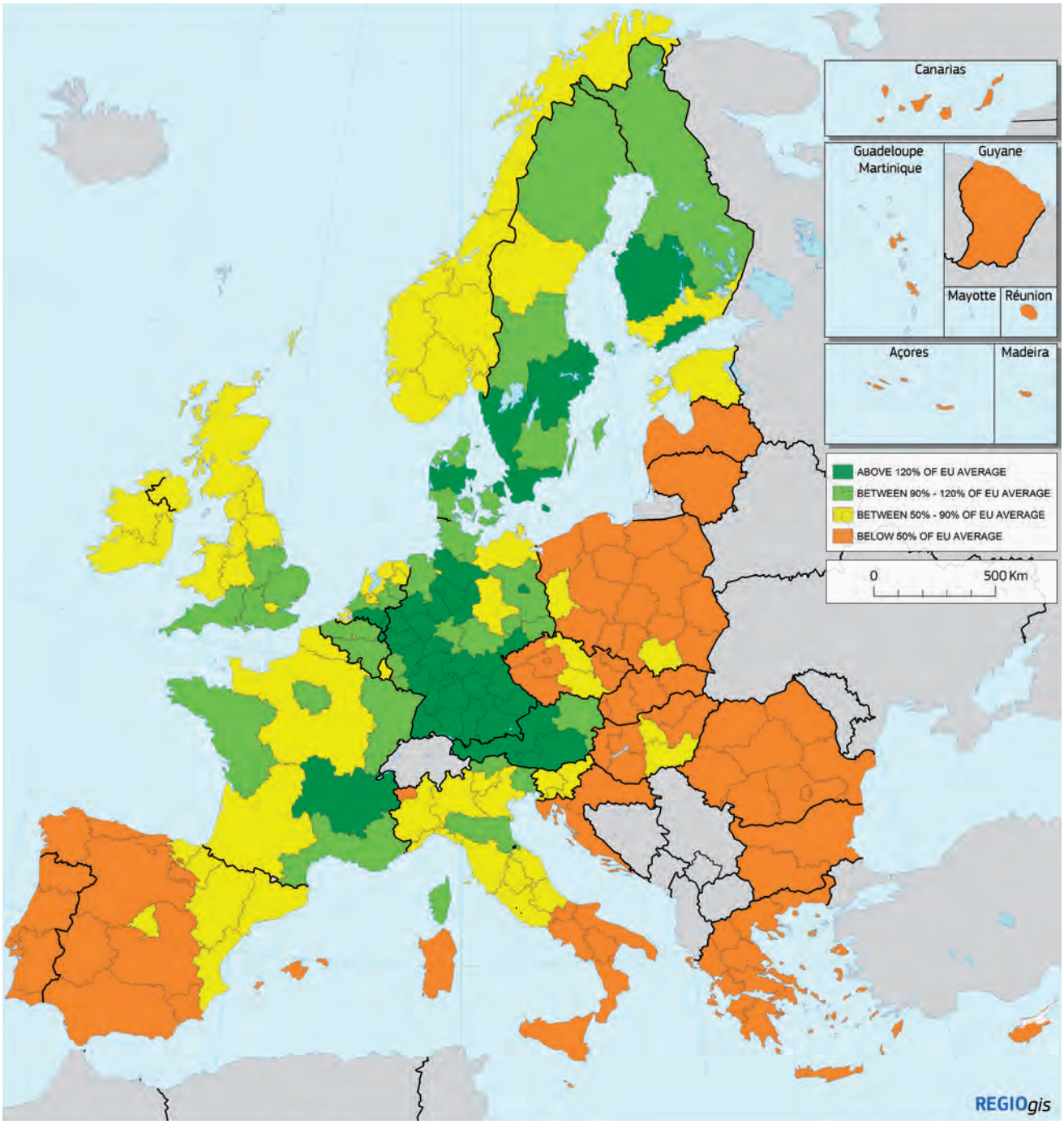
Innovative SMEs collaborating with others as percentage of SMEs



SMEs in regions in Austria, Belgium, the Czech Republic, France, Ireland, the Netherlands, Slovenia, the UK, and the Nordic countries (except Norway) are most likely to collaborate with others in their innovation activities. Shares of innovative SMEs collaborating with others are below the EU average in most regions in Mediterranean and Central and Eastern Europe, with the exception of several regions in Greece (Kentriki Makedonia (EL12), Dytiki Makedonia (EL13), Thessalia (EL14), Dytiki Ellada (EL23), Sterea Ellada (EL24) and Attiki (EL30)), Italy (Piemonte (ITC1)), and Spain (País Vasco (ES21)).

The 20 regions with the highest scores are (in descending order) South East (UKJ), Vlaams Gewest (BE2), North West (UKD), West Midlands (UKG), London (UKI), East Midlands (UKF), East of England (UKH), Wales (UKL), Yorkshire and The Humber (UKE), Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest (BE1), South West (UKK), Sjælland (DK02), North East (UKC), Thessalia (EL14), Chemnitz (DED1), Northern Ireland (UKN), Nordjylland (DK05), Övre Norrland (SE33), Drenthe (NL13), and Région Wallonne (BE3). Of the top 20 regions, 11 regions are from the UK, only Scotland (UKM) is missing from the top 20.

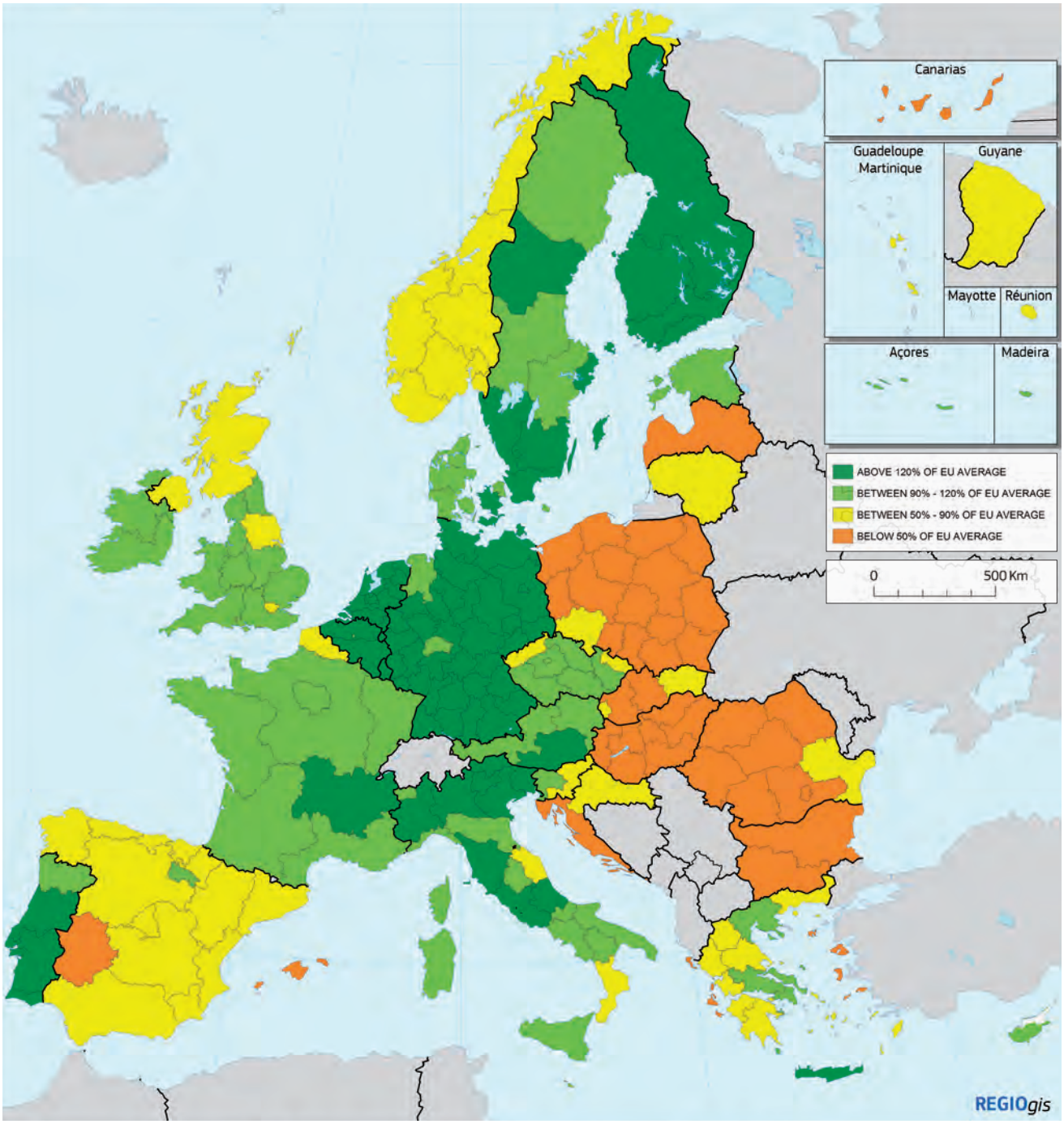
EPO patent applications per billion regional GDP (PPS€)



There are strong geographical performance differences in the number of EPO patent applications per billion GDP. Only a few regions in Belgium, Finland, France, Germany and Sweden perform below 90% of the EU average (Bremen (DE5), Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest (BE1), Etelä-Suomi (FI1C), Mecklenburg-Vorpommern (DE80), Mellersta Norrland (SE32) and Sachsen-Anhalt (DEE0)). By contrast, in the Mediterranean countries, only regions in Italy (Provincia Autonoma Bolzano/Bozen (ITD1), Friuli-Venezia Giulia (ITD4) and Emilia-Romagna (ITH5)) show a performance close to that of the EU.

The 20 regions with the highest scores are (in descending order) Noord-Brabant (NL41), Itä-Suomi (FI13), Mittelfranken (DE25), Stuttgart (DE11), Oberpfalz (DE23), Tübingen (DE14), Karlsruhe (DE12), Sydsverige (SE22), Freiburg (DE13), Oberbayern (DE21), Rheinhessen-Pfalz (DEB3), Unterfranken (DE26), Schwaben (DE27), Midtjylland (DK04), Stockholm (SE11), Östra Mellansverige (SE12), Länsi-Suomi (FI19), Centre-Est (FR7), Detmold (DEA4), and Oberfranken (DE24).

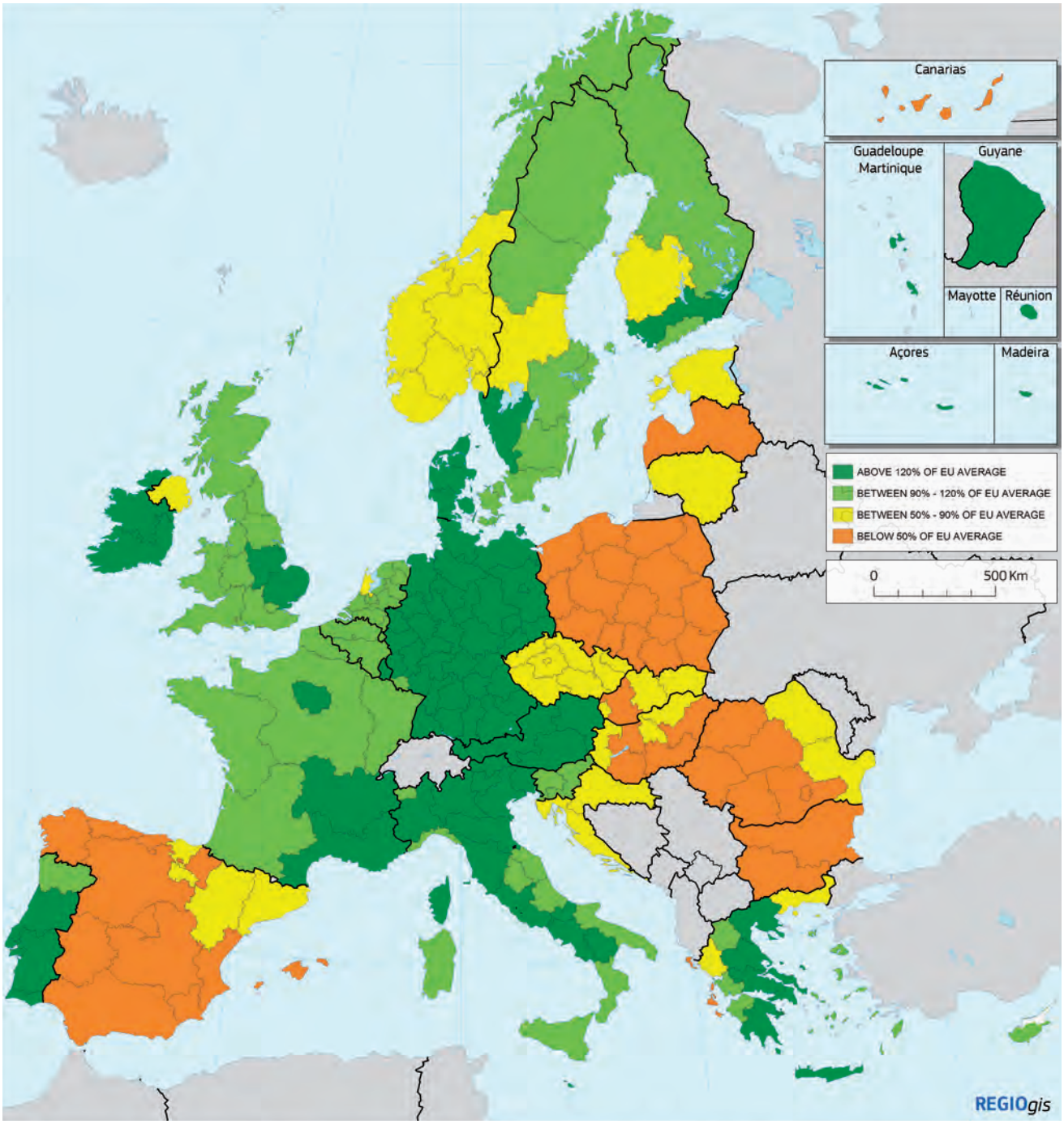
SMEs introducing product or process innovations as percentage of SMEs



Performance in the share of SMEs that introduced a product or process innovation is to some extent determined by the performance of the country. The highest shares of product or process innovators are observed in regions in Austria, Belgium, Denmark, Finland, Germany, Italy, the Netherlands, Portugal, and Sweden. The lowest shares are observed in regions in Croatia, Bulgaria, Hungary, Poland, Romania, Slovakia, and Spain.

The 20 regions with the highest scores are (in descending order) Kassel (DE73), Karlsruhe (DE12), Schwaben (DE27), Rheinhessen-Pfalz (DEB3), Niederbayern (DE22), Chemnitz (DED1), Trier (DEB2), Münster (DEA3), Berlin (DE30), Stuttgart (DE11), Oberpfalz (DE23), Darmstadt (DE71), Thüringen (DEG0), Oberfranken (DE24), Dresden (DED2), Veneto (ITH3), Freiburg (DE13), Hamburg (DE60), Lüneburg (DE93), and Saarland (DEC0). All of these regions, except Veneto (ITH3), are from Germany.

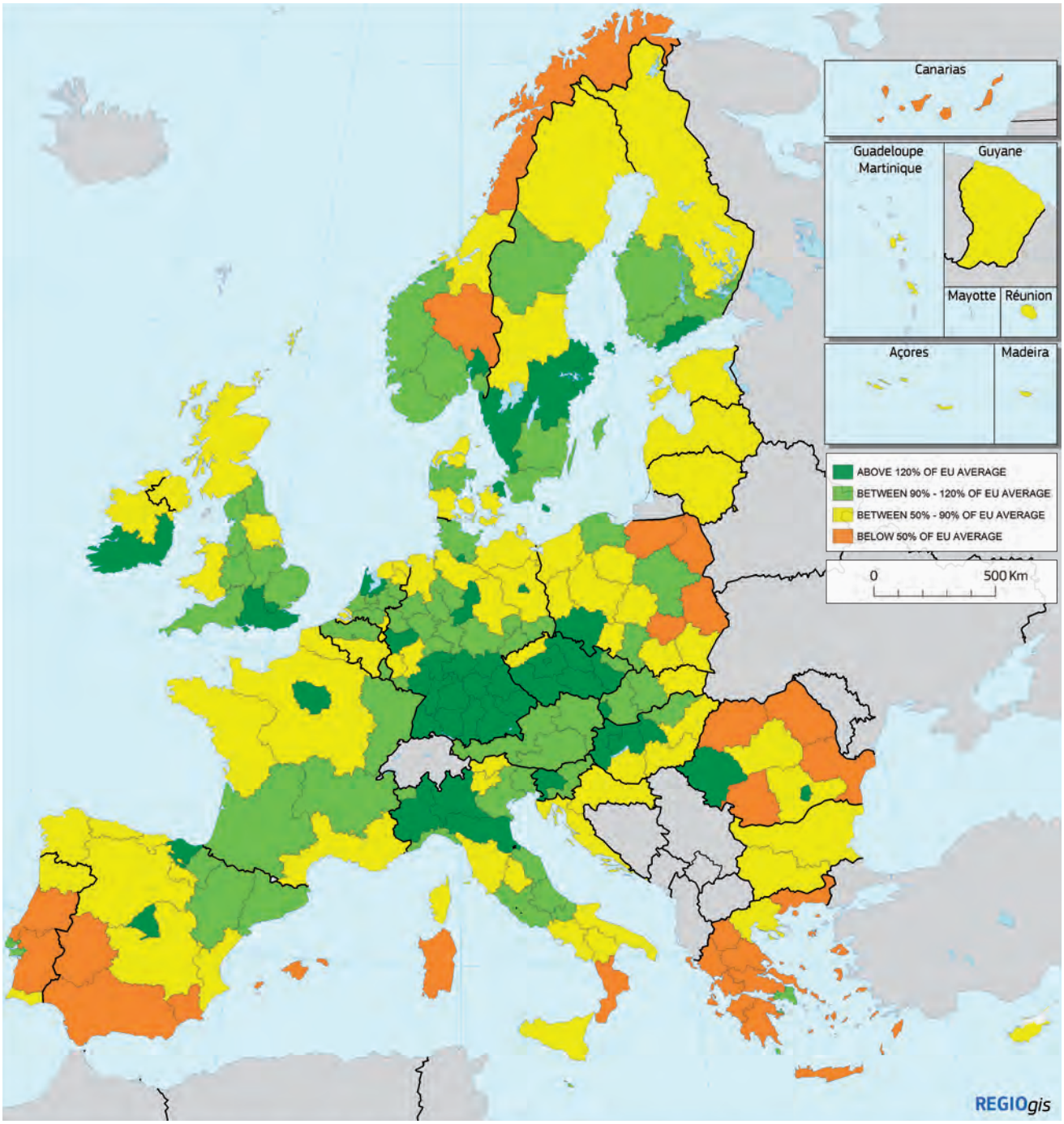
SMEs introducing marketing or organisational innovations as percentage of SMEs



Performance in the share of SMEs that introduced a marketing or organisational innovation is to some extent determined by the performance of the country. Regions where performance is at least 20% above the EU average are mostly found in Austria, France, Germany (all regions except Saarland (DEC0)), Greece, Ireland, Italy, Portugal (all regions except Norte (PT11)), and the UK. For all regions in Bulgaria and Poland and the majority of regions in Hungary, Romania, and Spain, performance is below 50% of the EU average.

The 20 regions with the highest scores only are (in descending order) Trier (DEB2), Unterfranken (DE26), Münster (DEA3), Hannover (DE92), Oberpfalz (DE23), Stuttgart (DE11), Kassel (DE73), Karlsruhe (DE12), Berlin (DE30), Schleswig-Holstein (DEF0), Tübingen (DE14), Köln (DEA2), Friuli-Venezia Giulia (ITH4), Freiburg (DE13), Lisboa (PT17), Southern and Eastern (IE02), Schwaben (DE27), Braunschweig (DE91), Arnsberg (DEA5), and Bremen (DE50). Of the top 20 best performing regions, 17 are from Germany.

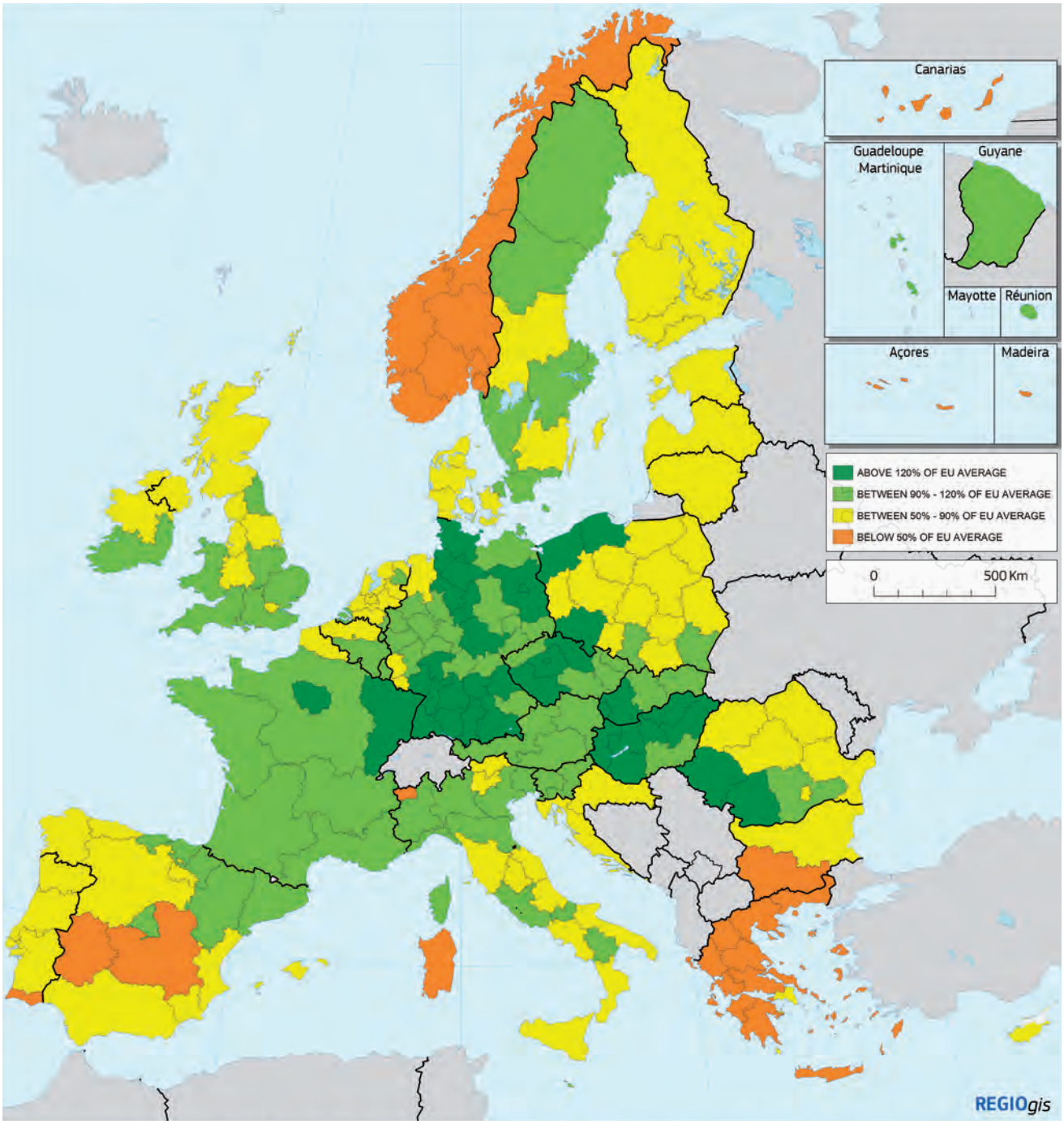
Employment in medium-high/high tech manufacturing and knowledge-intensive services as percentage of total workforce



Employment in knowledge-intensive activities, as measured in the RIS by employment in medium-high and high tech manufacturing and knowledge-intensive services, is high in regions across Europe. Regions where performance is at least 20% above the EU average are observed in as many as 17 European countries including Moderate Innovator countries as the Czech Republic (six regions), Hungary (three regions), Italy (three regions), Norway (Oslo og Akershus (NO01)), Poland (Dolnoslaskie (PL51)), Slovakia (Bratislavský kraj (SK01)), and Spain (two regions), and in Romania being a Modest Innovator country (two regions). Lowest performance shares are observed in Europe's periphery and Hedmark og Oppland (NO02) and Nord-Norge (NO07).

The 20 regions with the highest scores are (in descending order) Stuttgart (DE11), Stockholm (SE11), Oberbayern (DE21), Bratislavský kraj (SK01), Braunschweig (DE91), Karlsruhe (DE12), Severovýchod (CZ05), Tübingen (DE14), Itä-Suomi (FI13), Praha (CZ01), Åland (FI2), Rheinhessen-Pfalz (DEB3), Střední Cechy (CZ02), Darmstadt (DE71), Comunidad de Madrid (ES30), Jihovýchod (CZ06), Schwaben (DE27), Vest (RO42), Piemonte (ITC1), and Hamburg (DE60).

Exports in medium-high/high technology intensive manufacturing as percentage of total exports

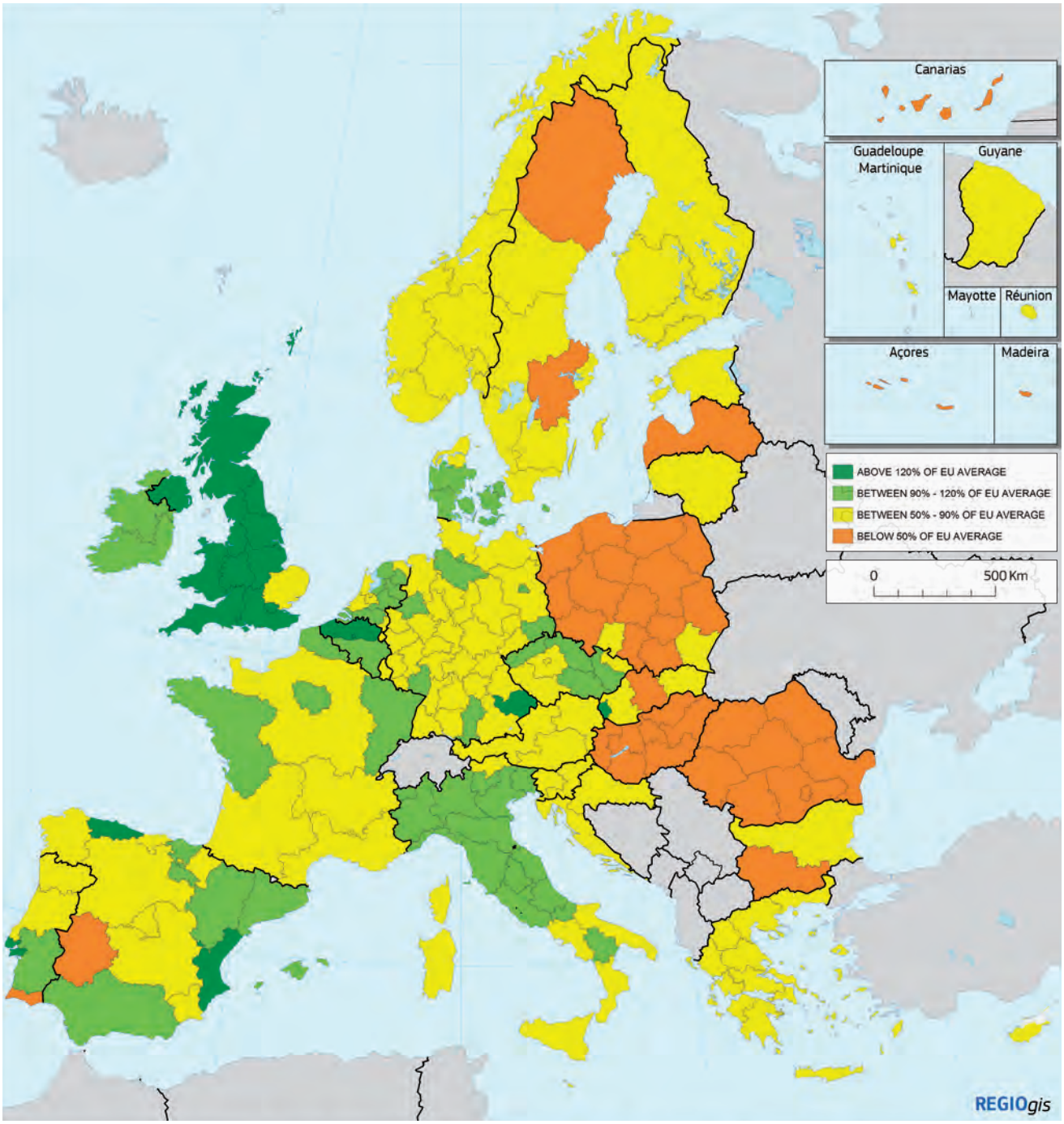


Export shares of medium-high and high technology intensive manufacturing are high in large parts of Germany, the Czech Republic, Hungary, and several other regions in Europe. Regions where performance is at least 20% above the EU average are observed in seven countries, including regions in five countries which are a Moderate or Modest Innovator in the EIS: the Czech Republic (four regions), Hungary (all regions except Dél-Alföld (HU33)), Poland (three regions), Romania (two regions) and Slovakia (two regions). Export shares of medium-high and high technology-intensive manufacturing are very low in Bulgaria, Greece (only Attiki (EL30) performs relatively well), Norway[13], and Portugal.

The 20 regions with the highest scores are (in descending order) Oberbayern (DE21), Braunschweig (DE91), Rheinhessen-Pfalz (DEB3), Berlin (DE30), Stuttgart (DE11), Bremen (DE50), Střední Čechy (CZ02), Nyugat-Dunántúl (HU22), Sud-Vest Oltenia (RO41), Karlsruhe (DE12), Hamburg (DE60), Vest (RO42), Darmstadt (DE71), Észak-Magyarország (HU31), Jihozápad (CZ03), Západné Slovensko (SK02), Dolnoslaskie (PL51), Zachodniopomorskie (PL42), Közép-Magyarország (HU10), and Freiburg (DE13).

[13] *For Norway no regional estimates are available, and for all regions the performance score is identical to that of Norway.*

Sales of new-to-market and new-to-firm innovations in SMEs as percentage of turnover



Sales shares of new-to-market and new-to-firm innovations in SMEs are high in regions in the UK (all regions except East of England (UKH)), Belgium (two regions), Germany (Niederbayern (DE22)), Portugal (Lisboa (PT17)), Slovakia (Bratislavský kraj (SK01)), and Spain (3 regions). Sales shares of new-to-market and new-to-firm innovations are very low in Bulgaria (one of the two regions), Hungary (all regions), Poland (all except two regions), and Romania (all regions), and in parts of Portugal (three regions), Slovakia (one region), and Sweden (two regions).

The 20 regions with the highest scores are (in descending order) London (UKI), Principado de Asturias (ES12), South West (UKK), East Midlands (UKF), North West (UKD), Wales (UKL), West Midlands (UKG), Vlaams Gewest (BE2), Scotland (UKM), Yorkshire and The Humber (UKE), South East (UKJ), Ciudad Autónoma de Ceuta (ES63), Bratislavský kraj (SK01), North East (UKC), Northern Ireland (UKN), Lisboa (PT17), Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest (BE1), Comunidad Valenciana (ES52), Niederbayern (DE22), and Severovýchod (CZ05).

6. RIS methodology

6.1 Missing data: imputations

For 214 regions, five years (corresponding to having regional data for five waves of the CIS) and 12 indicators, full data availability would require data for 12,840 data cells. However, 24.5% of data are not available. For several indicators, in particular the indicators using CIS data, regional data are missing for several years or even for the entire period considered. To increase data availability, a regionalization technique has been used for the indicators using CIS data, followed by a set of imputation techniques for the remaining missing CIS data and the indicators not using CIS data.

6.1.1 CIS regionalization technique

Whenever CIS data are missing for all regions, while the national-level aggregate for the country is available, a CIS "regionalization" technique will be applied using country and regional-level data on employment and number of firms at the two-digit industry level, assuming that industry intensities at the country level also hold at the regional level.

We explain the method for regionalizing the CIS data by using the share of firms with product innovations as an example:

- **Step 1:** Calculate for each country Y the share of firms with product innovations for each industry *I* using the CIS 2012 country level data: *PI_Y_I*
- **Step 2:** Identify the employment share of industry *I* for region R: *EMPL_R_I*
- **Step 3:** Calculate the estimate for the share of firms with product innovations by multiplying *EMPL_R_I* with *PI_Y_I: PI_EMPL_R_I*
- **Step 4:** Identify the share of local units (enterprises) of industry *I* for region *R: ENTR_R_I*
- **Step 5:** Calculate the estimate for the share of firms with product innovations by multiplying *ENTR_R_I* with *PI_Y_I: PI_ENTR_R_I*
- **Step 6:** Calculate the average of *PI_EMPL_R_I* and *PI_ENTR_R_I* as the estimate for the regional share of product innovators: *PI_R_I*

The same method can be applied for all indicators using CIS data.

6.1.2 General imputation techniques

The following techniques will be applied in the order as shown below.

1. At the country level, if data for both the previous and the following year are available, first the average of both years will be used $X_C^T = (X_C^{T-1} + X_C^{T+1})/2$, then, if the previous step is not possible, that of the previous year $X_C^T = X_C^{T-1}$, and finally, if the previous step is not possible, that of the following year $X_C^T = X_C^{T+1}$, where C denotes the country, T the current year, T-1 the previous year, and T+1 the following year. If data are not available for the previous and following year, missing data will not be imputed.

2. If regional data are available for the previous year, the ratio between the corresponding NUTS level and that at a higher aggregate level (NUTS1 for NUTS2 regions, country level for NUTS1 regions) for the previous year is multiplied with the current value at the higher aggregate level: $X_R^T = (X_R^{T-1} / X_C^{T-1}) * X_C^T$, where R denotes the region, C the country (as the higher aggregate level), T the current year, and T-1 the previous year.

3. If regional data for the previous year are not available, the same procedure as in step 2 will be applied using the ratio between the corresponding NUTS level and that at a higher aggregate level (NUTS1 for NUTS2 regions, country level for NUTS1 regions) for the following year: $X_R^T = (X_R^{T+1} / X_C^{T+1}) * X_C^T$, where R denotes the region, C the country (as the higher aggregate level), T the current year, and T+1 the following year.

4. If there are no regional data for neither the previous nor the following year, the higher-level aggregate will be used (NUTS1 for NUTS2 regions, country level for NUTS1 regions), first that for the current year, and, if not available, that for the previous year, otherwise that for the following year: $X_R^T = X_C^T$ or $X_R^T = X_C^{T-1}$ or $X_R^T = X_C^{T+1}$, where R denotes the region, C the country (as the higher aggregate level), t the current year, T-1 the previous year, and T+1 the following year.

5. If no regional and no country-level data are available for the current, previous or following year, missing data will not be imputed.

6.2 Composite indicators

6.2.1 Normalising data

For the calculation of composite indicators, the individual indicators should ideally follow a normal distribution. Most of the RIS indicators are fractional indicators with values between 0% and 100%, and most of these do follow a normal distribution. Some indicators are unbound indicators, where values are not limited to an upper threshold. These indicators can have asymmetrical or skewed data distributions (where most regions show low performance levels and a few regions show exceptionally high performance levels).

For all indicators, data have been transformed using a power root transformation with power N if the degree of skewness of the raw data, a measure of the asymmetry of the distribution of the data, exceeds 1, such that the skewness of the transformed data is below 1. Table 18 summarizes the degree of skewness before and after the transformation, and the power N used in the transformation. This transformation will be applied after the imputation of missing data.

Following this transformation, the data are normalized using the min-max procedure. First, the minimum score observed for all regions across all five observations is subtracted from the respective transformed score. The rest is then divided by the difference between the maximum and minimum scores observed for all regions across all five observations. The maximum normalised score is equal to 1 and the minimum normalised score is equal to 0.

6.2.2 Regional Innovation Index

Average innovation performance is measured using composite indicators. The Regional Innovation Index (RII) is calculated as the unweighted average of the normalised scores of the 12 indicators.

A comparison of the Regional Innovation Index at the country level with the Summary Innovation Index in the Innovation Union Scoreboard shows that, due to using a more restricted set of indicators in the RIS, countries' performance relative to the EU average in the RIS is different from that in the European Innovation Scoreboard. The following correction is therefore applied to the composite indicator scores:

1. Calculate the ratio of the EIS Summary Innovation Index at country level with that of the EU: EIS_index_CTR / EIS_index_EU

2. Calculate the ratio of the RIS Regional Innovation Index at country level with that of the EU: RIS_index_CTR / RIS_index_EU

3. Calculate the correction factor by dividing the ratios 1 and 2

These country correction factors are then multiplied with the Regional Innovation Index for each region in the corresponding country.

Table 18: Degree of skewness and transformation

	DEGREE OF SKEWNESS BEFORE TRANSFORMATION	POWER USED IN TRANSFORMATION	DEGREE OF SKEWNESS AFTER TRANSFORMATION
Population having completed tertiary education	0.299	1	--
R&D expenditure in the public sector	1.683	0.75	0.811
R&D expenditure in the business sector	2.042	0.5	0.697
Non-R&D innovation expenditure in SMEs	3.004	0.5	0.842
SMEs innovating in-house	-0.036	1	--
Innovative SMEs collaborating with others	0.734	1	--
EPO patents	1.855	0.5	0.743
SMEs with product or process innovations	0.269	1	--
SMEs with marketing or organisational innovations	0.477	1	--
Employment in medium-high/high tech manufacturing and knowledge-intensive services	0.223	1	--
Exports of medium-high/high tech manufacturing	-0.584	1	--
Sales of new-to-market and new-to-firm innovations in SMEs	1.463	0.75	0.766

6.3 Performance group membership

For determining performance group membership, the Regional Innovation Scoreboard adopts the classification scheme used in the European Innovation Scoreboard:

- Innovation Leaders are those regions with a relative performance of 20% or more above that of the EU28;
- Strong Innovators are those regions with a relative performance less than 20% above and less than 10% below that of the EU28;
- Moderate Innovators are those regions with a relative performance more than 10% below but less than 50% below that of the EU28;
- Modest Innovators are those regions with a relative performance of 50% or more below that of the EU28.

6.4 Effect of including the indicator on medium-high and high tech exports

The number of indicators in this year's report has been increased to 12 by adding regional data on the export share of medium-high and high tech manufacturing. Including data on one more indicator has an impact on the relative performance of several regions. As the EU average export share is relatively high, there is a negative impact on the relative-to-EU performance for the average region and thus also on the average Regional Innovation Index.

In the most recent reference year, six regions have moved to a higher performance group as a result of including data on the export share of medium-high and high tech manufacturing, whereas 11 regions have moved to a lower performance group (Table 19). Two regions each in Hungary, Poland and Slovakia 'benefit' from adding one more indicator. Regions 'suffering' from adding one more indicator include one region each in Belgium, Denmark, France, and the Netherlands, two regions each in Portugal and Finland, and three regions in Norway.

Table 19: Impact on group performance of including data for exports of medium-high and high tech manufacturing

NUMBER OF REGIONS WHICH ...	RII2008	RII2010	RII2012	RII2014	RII2016
... group membership has 'worsened'	10	9	11	15	11
... group membership has 'improved'	9	10	9	9	6

Annex 1: RIS indicators

POPULATION AGED 30-34 HAVING COMPLETED TERTIARY EDUCATION (%)	
Numerator	Number of persons in age class with some form of post-secondary education (ISCED 5 and 6)
Denominator	The reference population is all age classes between 30 and 34 years inclusive
Rationale	This is a general indicator of the supply of advanced skills. It is not limited to science and technical fields, because the adoption of innovations in many areas, in particular in the service sectors, depends on a wide range of skills. The indicator focuses on a narrow share of the population aged 30 to 34, and will relatively quickly reflect changes in educational policies leading to more tertiary graduates.
Included in EIS	Yes
Data source	Eurostat, regional statistics
Data availability	NUTS2, 2006-2014

R&D EXPENDITURES IN THE PUBLIC SECTOR (%)	
Numerator	All R&D expenditures in the government sector (GOVERD) and the higher education sector (HERD)
Denominator	Regional Gross Domestic Product
Rationale	R&D expenditure represents one of the major drivers of economic growth in a knowledge-based economy. As such, trends in the R&D expenditure indicator provide key indications of the future competitiveness and wealth of a region. Research and development spending is essential for making the transition to a knowledge-based economy as well as for improving production technologies and stimulating growth.
Included in EIS	Yes
Data source	Eurostat, regional statistics
Data availability	NUTS2, 2003-2013

R&D EXPENDITURES IN THE BUSINESS SECTOR (%)	
Numerator	All R&D expenditures in the business sector (BERD)
Denominator	Regional Gross Domestic Product
Rationale	The indicator captures the formal creation of new knowledge within firms. It is particularly important in the science-based sector (pharmaceuticals, chemicals and some areas of electronics), where most new knowledge is created in or near R&D laboratories.
Included in EIS	Yes
Data source	Eurostat, regional statistics
Data availability	NUTS2, 2003-2013

NON-R&D INNOVATION EXPENDITURES (%)	
Numerator	Sum of total innovation expenditure for SMEs only, excluding intramural and extramural R&D expenditures
Denominator	Total turnover for SMEs only (both innovators and non-innovators)
Rationale	This indicator measures non-R&D innovation expenditure as percentage of total turnover. Several of the components of innovation expenditure, such as investment in equipment and machinery and the acquisition of patents and licenses, measure the diffusion of new production technology and ideas.
Included in EIS	Yes
Data source	Community Innovation Survey – Eurostat in collaboration with individual Member States
Data availability	NUTS1 • 2004-2006-2008-2010-2012: BE, BG • 2004-2008-2010-2012: FR • 2008-2010-2012: AT NUTS2 • 2004-2006-2008-2010-2012: CZ, ES, PL, PT, RO, SI, SK • 2004-2008-2010-2012: NO • 2006, 2012: EL • 2006-2008-2010-2012: HU • 2008-2010-2012: IT, SE • 2010-2012: HR • 2012: DE

SMES INNOVATING IN-HOUSE (%)	
Numerator	Number of SMEs with in-house innovation activities. Innovative firms with in-house innovation activities have introduced a new product or new process either in-house or in combination with other firms. The indicator does not include new products or processes developed by other firms.
Denominator	Total number of SMEs (both innovators and non-innovators).
Rationale	This indicator measures the degree to which SMEs that have introduced any new or significantly improved products or production processes have innovated in-house. The indicator is limited to SMEs, because almost all large firms innovate.
Included in EIS	Yes
Data source	Community Innovation Survey – Eurostat in collaboration with individual Member States
Data availability	NUTS1 • 2004-2006-2008-2010-2012: AT, BE, BG • 2004-2006-2012: UK • 2004-2008-2012: FR NUTS2 • 2004-2006-2008-2010-2012: CZ, FI, PL, PT, RO, SI, SK, NO • 2004-2006-2008-2012: ES • 2004-2008-2010-2012: IT • 2006-2012: EL • 2006-2008-2010-2012: HU • 2008-2010-2012: SE • 2010-2012: HR • 2012: DE

INNOVATIVE SMES COLLABORATING WITH OTHERS (%)	
Numerator	Number of SMEs with innovation co-operation activities. Firms with co-operation activities are those that have had any co-operation agreements on innovation activities with other enterprises or institutions.
Denominator	Total number of SMEs
Rationale	This indicator measures the degree to which SMEs are involved in innovation co-operation. Complex innovations often depend on companies' ability to draw on diverse sources of information and knowledge, or to collaborate on the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms, and between firms and other firms. The indicator is limited to SMEs, because almost all large firms are involved in innovation co-operation.
Included in EIS	Yes
Data source	Community Innovation Survey – Eurostat in collaboration with individual Member States
Data availability	NUTS1 • 2004-2006-2008-2010-2012: AT, BE, BG, FR • 2004-2006-2010-2012: UK • 2004-2008-2010-2012: FR NUTS2 • 2004-2006-2008-2010-2012: CZ, ES, FI, PL, PT, RO, SI, SK, NO • 2004-2008-2010-2012: IT • 2006-2012: EL • 2006-2008-2010-2012: HU • 2008-2010-2012: SE • 2010-2012: HR • 2012: DE

EPO PATENT APPLICATIONS (PER BILLION GDP)	
Numerator	Number of patents applied for at the European Patent Office (EPO), by year of filing. The regional distribution of the patent applications is assigned according to the address of the inventor.
Denominator	Regional Gross Domestic Product
Rationale	The capacity of firms to develop new products determines their competitive advantage. One indicator of the rate of new product innovation is the number of patents. This indicator measures the number of patent applications at the European Patent Office.
Included in EIS	No, EIS uses PCT patent applications
Data source	Eurostat
Data availability	NUTS2: 2003-2011

PRODUCT OR PROCESS INNOVATORS (%)	
Numerator	Number of SMEs that introduced a new product or a new process to one of their markets
Denominator	Total number of SMEs
Rationale	Technological innovation as measured by the introduction of new products (goods or services) and processes is key to innovation in manufacturing activities. Higher shares of technological innovators should reflect a higher level of innovation activities.
Included in EIS	Yes
Data source	Community Innovation Survey – Eurostat in collaboration with individual Member States
Data availability	NUTS1 • 2004-2006-2008-2010-2012: AT, BE, BG, FR • 2004-2006-2012: UK NUTS2 • 2004-2006-2008-2010-2012: CZ, ES, FI, PL, PT, RO, SI, SK, NO • 2004-2008-2010-2012: IT • 2006-2012: EL • 2006-2008-2010-2012: HU • 2008-2010-2012: SE • 2010-2012: HR • 2012: DE

MARKETING OR ORGANISATIONAL INNOVATORS (%)	
Numerator	Number of SMEs that introduced a new marketing innovation and/or organisational innovation to one of their markets
Denominator	Total number of SMEs
Rationale	Many firms, in particular in the service sectors, innovate through non-technological forms of innovation. Examples of these are organisational innovations. This indicator tries to capture the extent to which SMEs innovate through non-technological innovation.
Included in EIS	Yes
Data source	Community Innovation Survey – Eurostat in collaboration with individual Member States
Data availability	NUTS1 • 2004-2006-2008-2010-2012: AT, BE, BG, FR • 2004-2006-2012: UK NUTS2 • 2004-2006-2008-2010-2012: CZ, ES, FI, PL, PT, RO, SI, SK, NO • 2004-2008-2010-2012: IT • 2006-2012: EL • 2006-2008-2010-2012: HU • 2008-2010-2012: SE • 2010-2012: HR • 2012: DE

EMPLOYMENT IN MEDIUM-HIGH/HIGH TECH MANUFACTURING AND KNOWLEDGE-INTENSIVE SERVICES (%)	
Numerator	Number of employed persons in the medium-high and high tech manufacturing sectors include chemicals (NACE24), machinery (NACE29), office equipment (NACE30), electrical equipment (NACE31), telecommunications and related equipment (NACE32), precision instruments (NACE33), automobiles (NACE34) and aerospace and other transport (NACE35). Number of employed persons in the knowledge-intensive services sectors include water transport (NACE 61), air transport (NACE 62), post and telecommunications (NACE64), financial intermediation (NACE 65), insurance and pension funding (NACE 66), activities auxiliary to financial intermediation (NACE 67), real estate activities (NACE 70), renting of machinery and equipment (NACE 71), computer and related activities (NACE72), research and development (NACE73), and other business activities (NACE 74).
Denominator	Total workforce including all manufacturing and service sectors
Rationale	The share of employment in high technology manufacturing sectors is an indicator of the manufacturing economy that is based on continual innovation through creative, inventive activity. The use of total employment gives a better indicator than using the share of manufacturing employment alone, since the latter will be affected by the relative decline of manufacturing in some countries. Knowledge-intensive services can be provided directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, in particular those based on ICT.
Included in EIS	No (EIS uses indicator on employment in knowledge-intensive activities for which regional data are not available)
Data source	Eurostat
Data availability	NUTS2: 2006-2014, break in time series between 2007 and 2008 due to revision of NACE classification

EXPORTS OF MEDIUM-HIGH/HIGH TECH TECHNOLOGY-INTENSIVE MANUFACTURING INDUSTRIES (%)	
Numerator	Sum of exports in Chemicals and chemical products (NACE Rev. 1.1 category 24), Machinery and equipment (NACE Rev. 1.1 category 29), Office machinery and computers (NACE Rev. 1.1 category 30), Electrical machinery and apparatus (NACE Rev. 1.1 category 31), Radio, television and communication equipment (NACE Rev. 1.1 category 32), Medical, precision and optical instruments (NACE Rev. 1.1 category 3), Motor vehicles, trailers and semi-trailers, and Other transport equipment (NACE Rev. 1.1 category 34)
Denominator	Total exports
Rationale	The indicator measures the technological competitiveness of a region, i.e. its ability to commercialise the results of research and development (R&D) and innovation in the international markets. It also reflects product specialisation. Creating, exploiting and commercialising new technologies are vital for the competitiveness of a region in the modern economy. Medium and high technology products are key drivers of economic growth, productivity and welfare, and are generally a source of high value added and well-paid employment.
Included in EIS	No (EIS uses indicator on exports in medium/high tech products for which regional data are not available)
Data source	Study for European Commission, DG GROW
Data availability	NUTS2: 2003-2011

SALES OF NEW-TO-MARKET AND NEW-TO-FIRM INNOVATIONS (%)	
Numerator	Sum of total turnover of new or significantly improved products for SMEs only
Denominator	Total turnover for SMEs only (both innovators and non-innovators)
Rationale	This indicator measures the turnover of new or significantly improved products to the firm as a percentage of total turnover. These products are not new to the market. Sales of new-to-the-firm but not new-to-the-market products are a proxy of the use or implementation of products (or technologies) already introduced elsewhere. This indicator is a proxy for the degree of diffusion of state-of-the-art technologies.
Included in EIS	Yes
Data source	Community Innovation Survey – Eurostat in collaboration with individual Member States
Data availability	NUTS1 • 2004-2006-2008-2010-2012: BE, BG • 2004-2008-2010-2012: FR • 2008-2010-2012: AT NUTS2 • 2004-2006-2008-2010-2012: CZ, ES, PL, RO, SI, SK, NO • 2006-2012: EL • 2006-2008-2010-2012: HU, PT • 2008-2010-2012: SE • 2010-2012: HR • 2012: DE

Annex 2:
Regional innovation performance groups

		RII2008	RII2010	RII2012	RII2014	RII2016
BE	Belgium					
BE1	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	Strong	Strong	Strong	Strong	Strong
BE2	Vlaams Gewest	Strong	Strong	Strong	Strong	Strong
BE3	Région Wallonne	Strong	Strong	Strong	Strong	Strong
BG	Bulgaria					
BG3	Severna i yugoiztochna Bulgaria	Modest	Modest	Modest	Modest	Modest
BG4	Yugozapadna i yuzhna tsentralna Bulgaria	Modest	Modest	Modest	Modest	Modest
CZ	Czech Republic					
CZ01	Praha	Moderate	Strong	Moderate	Moderate	Moderate
CZ02	Střední Čechy	Moderate	Moderate	Moderate	Moderate	Moderate
CZ03	Jihozápad	Moderate	Moderate	Moderate	Moderate	Moderate
CZ04	Severozápad	Moderate	Moderate	Moderate	Moderate	Moderate
CZ05	Severovýchod	Moderate	Moderate	Moderate	Moderate	Moderate
CZ06	Jihovýchod	Moderate	Moderate	Moderate	Moderate	Moderate
CZ07	Střední Morava	Moderate	Moderate	Moderate	Moderate	Moderate
CZ08	Moravskoslezsko	Moderate	Moderate	Moderate	Moderate	Moderate
DK	Denmark					
DK01	Hovedstaden	Leader	Leader	Leader	Leader	Leader
DK02	Sjælland	Strong	Strong	Leader	Strong	Leader
DK03	Syddanmark	Strong	Strong	Strong	Strong	Strong
DK04	Midtjylland	Strong	Strong	Strong	Leader	Leader
DK05	Nordjylland	Strong	Strong	Strong	Strong	Leader
DE	Germany					
DE11	Stuttgart	Leader	Leader	Leader	Leader	Leader
DE12	Karlsruhe	Leader	Leader	Leader	Leader	Leader
DE13	Freiburg	Leader	Leader	Leader	Leader	Leader
DE14	Tübingen	Leader	Leader	Leader	Leader	Leader
DE21	Oberbayern	Leader	Leader	Leader	Leader	Leader
DE22	Niederbayern	Leader	Leader	Leader	Leader	Leader
DE23	Oberpfalz	Leader	Leader	Leader	Leader	Leader
DE24	Oberfranken	Leader	Leader	Leader	Leader	Strong
DE25	Mittelfranken	Leader	Leader	Leader	Leader	Leader
DE26	Unterfranken	Leader	Leader	Leader	Leader	Leader
DE27	Schwaben	Leader	Leader	Leader	Leader	Leader
DE30	Berlin	Strong	Strong	Leader	Leader	Leader
DE41	Brandenburg – Nordost	Strong	Strong	Strong	Strong	Strong
DE42	Brandenburg – Südwest	Strong	Strong	Strong	Strong	Strong
DE50	Bremen	Strong	Strong	Strong	Strong	Strong
DE60	Hamburg	Strong	Strong	Strong	Leader	Leader
DE71	Darmstadt	Leader	Leader	Leader	Leader	Leader
DE72	Gießen	Leader	Leader	Leader	Leader	Strong
DE73	Kassel	Strong	Strong	Strong	Strong	Leader
DE80	Mecklenburg-Vorpommern	Strong	Strong	Strong	Strong	Strong
DE91	Braunschweig	Leader	Leader	Leader	Leader	Leader
DE92	Hannover	Strong	Leader	Strong	Strong	Strong
DE93	Lüneburg	Strong	Strong	Strong	Strong	Strong
DE94	Weser-Ems	Strong	Strong	Strong	Strong	Moderate

		RII2008	RII2010	RII2012	RII2014	RII2016
DEA1	Düsseldorf	Strong	Strong	Strong	Strong	Strong
DEA2	Köln	Leader	Leader	Leader	Leader	Leader
DEA3	Münster	Strong	Strong	Strong	Strong	Strong
DEA4	Detmold	Strong	Strong	Strong	Strong	Strong
DEA5	Arnsberg	Strong	Strong	Strong	Strong	Strong
DEB1	Koblenz	Strong	Strong	Strong	Strong	Strong
DEB2	Trier	Strong	Strong	Strong	Strong	Strong
DEB3	Rheinhessen-Pfalz	Leader	Leader	Leader	Leader	Leader
DEC0	Saarland	Strong	Strong	Strong	Strong	Strong
DED2	Dresden	Leader	Leader	Leader	Leader	Leader
DED4	Chemnitz	Leader	Leader	Leader	Strong	Leader
DED5	Leipzig	Strong	Strong	Strong	Strong	Strong
DEE0	Sachsen-Anhalt	Strong	Strong	Strong	Strong	Strong
DEF0	Schleswig-Holstein	Strong	Strong	Strong	Strong	Strong
DEG0	Thüringen	Strong	Leader	Leader	Strong	Strong
IE	Ireland					
IE01	Border, Midland and Western	Strong	Strong	Strong	Strong	Strong
IE02	Southern and Eastern	Strong	Strong	Strong	Leader	Strong
EL	Greece					
EL11	Anatoliki Makedonia, Thraki	Moderate	Moderate	Moderate	Moderate	Modest
EL12	Kentriki Makedonia	Moderate	Moderate	Moderate	Moderate	Moderate
EL13	Dytiki Makedonia	Moderate	Moderate	Moderate	Moderate	Moderate
EL14	Thessalia	Moderate	Moderate	Moderate	Moderate	Moderate
EL21	Ipeiros	Moderate	Moderate	Moderate	Moderate	Modest
EL22	Ionia Nisia	Modest	Moderate	Moderate	Moderate	Modest
EL23	Dytiki Ellada	Moderate	Moderate	Moderate	Moderate	Moderate
EL24	Sterea Ellada	Moderate	Moderate	Moderate	Moderate	Moderate
EL25	Peloponnisos	Moderate	Moderate	Moderate	Moderate	Moderate
EL30	Attiki	Moderate	Moderate	Moderate	Moderate	Moderate
EL41	Voreio Aigaio	Moderate	Moderate	Moderate	Moderate	Modest
EL42	Notio Aigaio	Moderate	Moderate	Moderate	Moderate	Moderate
EL43	Kriti	Moderate	Moderate	Moderate	Moderate	Moderate
ES	Spain					
ES11	Galicia	Moderate	Moderate	Moderate	Moderate	Moderate
ES12	Principado de Asturias	Moderate	Moderate	Moderate	Moderate	Moderate
ES13	Cantabria	Moderate	Moderate	Moderate	Moderate	Moderate
ES21	País Vasco	Strong	Strong	Strong	Strong	Strong
ES22	Comunidad Foral de Navarra	Strong	Strong	Strong	Strong	Moderate
ES23	La Rioja	Moderate	Moderate	Moderate	Moderate	Moderate
ES24	Aragón	Moderate	Moderate	Moderate	Moderate	Moderate
ES30	Comunidad de Madrid	Moderate	Moderate	Moderate	Moderate	Moderate
ES41	Castilla y León	Moderate	Moderate	Moderate	Moderate	Moderate
ES42	Castilla-la Mancha	Moderate	Moderate	Moderate	Moderate	Moderate
ES43	Extremadura	Moderate	Modest	Modest	Modest	Modest
ES51	Cataluña	Moderate	Moderate	Moderate	Moderate	Moderate
ES52	Comunidad Valenciana	Moderate	Moderate	Moderate	Moderate	Moderate
ES53	Illes Balears	Moderate	Moderate	Modest	Modest	Modest

		RII2008	RII2010	RII2012	RII2014	RII2016
ES61	Andalucía	Moderate	Moderate	Moderate	Moderate	Moderate
ES62	Región de Murcia	Moderate	Moderate	Moderate	Moderate	Moderate
ES63	Ciudad Autónoma de Ceuta	Moderate	Moderate	Modest	Modest	Modest
ES64	Ciudad Autónoma de Melilla	Moderate	Moderate	Modest	Modest	Modest
ES70	Canarias	Modest	Modest	Modest	Modest	Modest
FR	France					
FR1	Île de France	Leader	Leader	Leader	Leader	Leader
FR2	Bassin Parisien	Moderate	Moderate	Strong	Strong	Moderate
FR3	Nord - Pas-de-Calais	Moderate	Moderate	Moderate	Strong	Moderate
FR4	Est	Strong	Strong	Strong	Strong	Strong
FR5	Ouest	Strong	Strong	Strong	Strong	Strong
FR6	Sud-Ouest	Strong	Strong	Strong	Strong	Strong
FR7	Centre-Est	Strong	Strong	Strong	Strong	Strong
FR8	Méditerranée	Strong	Strong	Strong	Strong	Strong
FR9	Départements d'outre-mer	Moderate	Moderate	Moderate	Moderate	Moderate
HR	Croatia					
HR03	Jadranska Hrvatska	Moderate	Moderate	Moderate	Moderate	Modest
HR04	Kontinentalna Hrvatska	Moderate	Moderate	Moderate	Moderate	Moderate
IT	Italy					
ITC1	Piemonte	Strong	Strong	Moderate	Strong	Strong
ITC2	Valle d'Aosta/Vallée d'Aoste	Moderate	Moderate	Moderate	Moderate	Moderate
ITC3	Liguria	Moderate	Moderate	Moderate	Moderate	Moderate
ITC4	Lombardia	Moderate	Moderate	Moderate	Strong	Moderate
ITH1	Provincia Autonoma Bolzano/Bozen	Moderate	Moderate	Moderate	Moderate	Moderate
ITH2	Provincia Autonoma Trento	Moderate	Moderate	Moderate	Moderate	Moderate
ITH3	Veneto	Moderate	Moderate	Moderate	Moderate	Moderate
ITH4	Friuli-Venezia Giulia	Moderate	Moderate	Moderate	Strong	Strong
ITH5	Emilia-Romagna	Moderate	Moderate	Moderate	Strong	Moderate
ITI1	Toscana	Moderate	Moderate	Moderate	Moderate	Moderate
ITI2	Umbria	Moderate	Moderate	Moderate	Moderate	Moderate
ITI3	Marche	Moderate	Moderate	Moderate	Moderate	Moderate
ITI4	Lazio	Moderate	Moderate	Moderate	Moderate	Moderate
ITF1	Abruzzo	Moderate	Moderate	Moderate	Moderate	Moderate
ITF2	Molise	Moderate	Moderate	Moderate	Moderate	Moderate
ITF3	Campania	Moderate	Moderate	Moderate	Moderate	Moderate
ITF4	Puglia	Moderate	Moderate	Moderate	Moderate	Moderate
ITF5	Basilicata	Moderate	Moderate	Moderate	Moderate	Moderate
ITF6	Calabria	Modest	Moderate	Moderate	Moderate	Moderate
ITG1	Sicilia	Moderate	Moderate	Moderate	Moderate	Moderate
ITG2	Sardegna	Modest	Modest	Moderate	Moderate	Modest
HU	Hungary					
HU10	Közép-Magyarország	Moderate	Moderate	Moderate	Moderate	Moderate
HU21	Közép-Dunántúl	Moderate	Moderate	Moderate	Moderate	Moderate
HU22	Nyugat-Dunántúl	Moderate	Moderate	Moderate	Moderate	Moderate
HU23	Dél-Dunántúl	Moderate	Moderate	Moderate	Moderate	Moderate
HU31	Észak-Magyarország	Moderate	Moderate	Moderate	Moderate	Moderate
HU32	Észak-Alföld	Moderate	Moderate	Modest	Moderate	Moderate
HU33	Dél-Alföld	Modest	Moderate	Moderate	Moderate	Moderate
NL	Netherlands					
NL11	Groningen	Strong	Strong	Strong	Strong	Strong
NL12	Friesland	Moderate	Strong	Strong	Strong	Strong
NL13	Drenthe	Strong	Strong	Strong	Strong	Strong

		RII2008	RII2010	RII2012	RII2014	RII2016
NL21	Overijssel	Strong	Strong	Strong	Strong	Strong
NL22	Gelderland	Strong	Strong	Strong	Strong	Strong
NL23	Flevoland	Strong	Strong	Strong	Strong	Strong
NL31	Utrecht	Strong	Strong	Strong	Leader	Leader
NL32	Noord-Holland	Strong	Strong	Strong	Strong	Strong
NL33	Zuid-Holland	Strong	Strong	Strong	Strong	Strong
NL34	Zeeland	Strong	Strong	Strong	Strong	Strong
NL41	Noord-Brabant	Leader	Leader	Leader	Leader	Leader
NL42	Limburg	Strong	Strong	Strong	Strong	Strong
AT	Austria					
AT1	Ostösterreich	Strong	Strong	Strong	Strong	Strong
AT2	Südösterreich	Strong	Strong	Strong	Strong	Strong
AT3	Westösterreich	Strong	Strong	Strong	Strong	Strong
PL	Poland					
PL11	Łódzkie	Moderate	Modest	Modest	Modest	Moderate
PL12	Mazowieckie	Moderate	Moderate	Moderate	Moderate	Moderate
PL21	Małopolskie	Moderate	Moderate	Moderate	Moderate	Moderate
PL22	Śląskie	Moderate	Moderate	Moderate	Moderate	Moderate
PL31	Lubelskie	Moderate	Moderate	Modest	Modest	Modest
PL32	Podkarpackie	Moderate	Moderate	Moderate	Moderate	Moderate
PL33	Świętokrzyskie	Moderate	Moderate	Modest	Modest	Modest
PL34	Podlaskie	Moderate	Moderate	Modest	Modest	Moderate
PL41	Wielkopolskie	Moderate	Modest	Moderate	Moderate	Modest
PL42	Zachodniopomorskie	Modest	Moderate	Modest	Moderate	Moderate
PL43	Lubuskie	Modest	Modest	Modest	Modest	Modest
PL51	Dolnośląskie	Moderate	Moderate	Moderate	Moderate	Moderate
PL52	Opolskie	Moderate	Moderate	Modest	Modest	Modest
PL61	Kujawsko-Pomorskie	Moderate	Modest	Moderate	Modest	Modest
PL62	Warmińsko-Mazurskie	Modest	Modest	Modest	Modest	Modest
PL63	Pomorskie	Moderate	Moderate	Moderate	Moderate	Moderate
PT	Portugal					
PT11	Norte	Moderate	Moderate	Moderate	Moderate	Moderate
PT15	Algarve	Moderate	Moderate	Moderate	Moderate	Moderate
PT16	Centro	Moderate	Moderate	Moderate	Moderate	Moderate
PT17	Lisboa	Strong	Strong	Strong	Moderate	Moderate
PT18	Alentejo	Moderate	Moderate	Moderate	Moderate	Moderate
PT20	Região Autónoma dos Açores	Moderate	Moderate	Moderate	Moderate	Modest
PT30	Região Autónoma da Madeira	Moderate	Modest	Modest	Modest	Modest
RO	Romania					
RO11	Nord-Vest	Modest	Modest	Modest	Modest	Modest
RO12	Centru	Modest	Modest	Modest	Modest	Modest
RO21	Nord-Est	Modest	Modest	Modest	Modest	Modest
RO22	Sud-Est	Modest	Moderate	Moderate	Modest	Modest
RO31	Sud - Muntenia	Modest	Modest	Modest	Modest	Modest
RO32	Bucuresti - Ilfov	Moderate	Moderate	Moderate	Moderate	Modest
RO41	Sud-Vest Oltenia	Modest	Modest	Modest	Modest	Modest
RO42	Vest	Modest	Modest	Modest	Modest	Modest
SI	Slovenia					
SI01	Vzhodna Slovenija	Moderate	Moderate	Moderate	Moderate	Moderate
SI02	Zahodna Slovenija	Strong	Strong	Strong	Strong	Strong
SK	Slovakia					
SK01	Bratislavský kraj	Moderate	Moderate	Moderate	Strong	Strong

		RII2008	RII2010	RII2012	RII2014	RII2016
SK02	Západné Slovensko	Moderate	Moderate	Moderate	Moderate	Moderate
SK03	Stredné Slovensko	Moderate	Moderate	Moderate	Moderate	Moderate
SK04	Východné Slovensko	Moderate	Moderate	Modest	Moderate	Moderate
FI	Finland					
FI13	Itä-Suomi	Leader	Leader	Leader	Leader	Leader
FI18	Etelä-Suomi	Leader	Leader	Strong	Strong	Strong
FI19	Länsi-Suomi	Leader	Leader	Leader	Leader	Strong
FI1A	Pohjois-Suomi	Strong	Leader	Strong	Leader	Strong
FI20	Åland	Strong	Moderate	Strong	Strong	Strong
SE	Sweden					
SE11	Stockholm	Leader	Leader	Leader	Leader	Leader
SE12	Östra Mellansverige	Leader	Leader	Leader	Leader	Leader
SE21	Småland med öarna	Strong	Strong	Strong	Strong	Strong
SE22	Sydsverige	Leader	Leader	Leader	Leader	Leader
SE23	Västsverige	Leader	Leader	Leader	Leader	Leader
SE31	Norra Mellansverige	Strong	Strong	Strong	Strong	Strong
SE32	Mellersta Norrland	Strong	Strong	Strong	Strong	Strong
SE33	Övre Norrland	Strong	Leader	Leader	Strong	Leader
UK	United Kingdom					
UKC	North East	Strong	Strong	Strong	Strong	Strong
UKD	North West	Strong	Strong	Strong	Strong	Strong
UKE	Yorkshire and The Humber	Strong	Strong	Strong	Strong	Strong
UKF	East Midlands	Strong	Strong	Strong	Strong	Leader
UKG	West Midlands	Strong	Strong	Strong	Strong	Strong
UKH	East of England	Strong	Leader	Leader	Leader	Strong
UKI	London	Strong	Strong	Strong	Strong	Leader
UKJ	South East	Strong	Leader	Leader	Leader	Leader
UKK	South West	Strong	Strong	Strong	Strong	Leader
UKL	Wales	Strong	Strong	Strong	Strong	Strong
UKM	Scotland	Strong	Strong	Strong	Strong	Strong
UKN	Northern Ireland	Strong	Moderate	Strong	Strong	Strong
NO	Norway					
NO01	Oslo og Akershus	Strong	Strong	Strong	Strong	Strong
NO02	Hedmark og Oppland	Moderate	Moderate	Moderate	Moderate	Moderate
NO03	Sør-Østlandet	Moderate	Moderate	Moderate	Moderate	Moderate
NO04	Agder og Rogaland	Moderate	Moderate	Moderate	Moderate	Moderate
NO05	Vestlandet	Moderate	Moderate	Moderate	Strong	Moderate
NO06	Trøndelag	Strong	Strong	Strong	Strong	Strong
NO07	Nord-Norge	Moderate	Moderate	Moderate	Moderate	Moderate

Annex 3: RIS normalised database

		POPULATION WITH TERTIARY EDUCATION	R&D EXPENDITURE PUBLIC SECTOR	R&D EXPENDITURE BUSINESS SECTOR	NON-R&D INNOVATION EXPENDITURES	SMES INNOVATING IN-HOUSE	INNOVATIVE SMES COL-LABORATING WITH OTHERS
BE	Belgium						
BE1	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	0.725	0.269	0.342	0.352	0.462	0.697
BE2	Vlaams Gewest	0.677	0.269	0.536	0.404	0.634	0.818
BE3	Région Wallonne	0.594	0.195	0.624	0.279	0.542	0.527
BG	Bulgaria						
BG3	Severna i yugoiztochna Bulgaria	0.339	0.050	0.122	0.252	0.216	0.063
BG4	Yugozapadna i yuzhna tsentralna Bulgaria	0.519	0.144	0.295	0.160	0.165	0.084
CZ	Czech Republic						
CZ01	Praha	0.681	0.478	0.386	0.220	0.418	0.419
CZ02	Střední Cechy	0.335	0.131	0.552	0.285	0.455	0.375
CZ03	Jihozápad	0.287	0.230	0.393	0.414	0.453	0.345
CZ04	Severozápad	0.169	0.036	0.203	0.583	0.373	0.368
CZ05	Severovýchod	0.356	0.154	0.412	0.368	0.479	0.410
CZ06	Jihovýchod	0.480	0.437	0.481	0.434	0.460	0.344
CZ07	Střední Morava	0.358	0.207	0.347	0.419	0.458	0.417
CZ08	Moravskoslezsko	0.279	0.201	0.320	0.321	0.375	0.312
DK	Denmark						
DK01	Hovedstaden	0.933	0.457	0.760	0.246	0.479	0.459
DK02	Sjælland	0.513	0.095	0.325	0.268	0.559	0.672
DK03	Syddanmark	0.436	0.224	0.428	0.189	0.534	0.461
DK04	Midtjylland	0.617	0.247	0.510	0.208	0.441	0.375
DK05	Nordjylland	0.513	1.000	0.250	0.122	0.473	0.550
DE	Germany						
DE11	Stuttgart	0.540	0.182	0.988	0.357	0.710	0.361
DE12	Karlsruhe	0.552	0.476	0.652	0.294	0.811	0.434
DE13	Freiburg	0.467	0.317	0.535	0.401	0.721	0.308
DE14	Tübingen	0.478	0.340	0.777	0.435	0.663	0.301
DE21	Oberbayern	0.690	0.345	0.758	0.404	0.689	0.355
DE22	Niederbayern	0.337	0.340	0.376	0.396	0.727	0.283
DE23	Oberpfalz	0.473	0.340	0.586	0.396	0.695	0.357
DE24	Oberfranken	0.316	0.193	0.458	0.300	0.650	0.291
DE25	Mittelfranken	0.481	0.331	0.669	0.365	0.559	0.169
DE26	Unterfranken	0.450	0.255	0.524	0.496	0.628	0.279
DE27	Schwaben	0.418	0.076	0.429	0.297	0.798	0.212
DE30	Berlin	0.617	0.576	0.495	0.381	0.715	0.358
DE41	Brandenburg – Nordost	0.252	0.176	0.235	0.415	0.631	0.451
DE42	Brandenburg – Südwest	0.252	0.447	0.267	0.393	0.628	0.431
DE50	Bremen	0.582	0.491	0.401	0.310	0.665	0.288
DE60	Hamburg	0.640	0.327	0.466	0.291	0.719	0.311
DE71	Darmstadt	0.533	0.238	0.657	0.357	0.731	0.278
DE72	Gießen	0.360	0.317	0.421	0.124	0.562	0.232
DE73	Kassel	0.356	0.147	0.454	0.331	0.796	0.491
DE80	Mecklenburg-Vorpommern	0.286	0.415	0.269	0.401	0.662	0.364
DE91	Braunschweig	0.423	0.620	0.955	0.241	0.649	0.391

		POPULATION WITH TERTIARY EDUCATION	R&D EXPENDITURE PUBLIC SECTOR	R&D EXPENDITURE BUSINESS SECTOR	NON-R&D INNOVATION EXPENDITURES	SMES INNOVATING IN-HOUSE	INNOVATIVE SMES COL-LABORATING WITH OTHERS
DE92	Hannover	0.411	0.312	0.463	0.310	0.633	0.265
DE93	Lüneburg	0.282	0.071	0.364	0.439	0.707	0.353
DE94	Weser-Ems	0.291	0.127	0.263	0.331	0.514	0.235
DEA1	Düsseldorf	0.399	0.170	0.462	0.307	0.588	0.328
DEA2	Köln	0.526	0.516	0.457	0.351	0.636	0.275
DEA3	Münster	0.369	0.219	0.263	0.300	0.750	0.359
DEA4	Detmold	0.259	0.167	0.462	0.325	0.586	0.238
DEA5	Arnsberg	0.309	0.225	0.359	0.426	0.679	0.249
DEB1	Koblenz	0.337	0.079	0.288	0.256	0.590	0.257
DEB2	Trier	0.478	0.182	0.330	0.354	0.658	0.446
DEB3	Rheinhessen-Pfalz	0.395	0.306	0.630	0.331	0.799	0.443
DEC0	Saarland	0.303	0.296	0.290	0.455	0.618	0.491
DED2	Dresden	0.489	0.621	0.532	0.391	0.715	0.464
DED4	Chemnitz	0.430	0.277	0.405	0.331	0.756	0.572
DED5	Leipzig	0.430	0.513	0.234	0.351	0.639	0.248
DEE0	Sachsen-Anhalt	0.247	0.330	0.250	0.404	0.686	0.384
DEF0	Schleswig-Holstein	0.325	0.255	0.342	0.401	0.705	0.483
DEG0	Thüringen	0.286	0.367	0.410	0.354	0.713	0.151
IE	Ireland						
IE01	Border, Midland and Western	0.688	0.141	0.455	0.245	0.621	0.354
IE02	Southern and Eastern	0.843	0.173	0.426	0.242	0.621	0.402
EL	Greece						
EL11	Anatoliki Makedonia, Thraki	0.270	0.173	0.134	0.313	0.253	0.303
EL12	Kentriki Makedonia	0.559	0.230	0.122	0.405	0.434	0.424
EL13	Dytiki Makedonia	0.511	0.170	0.035	0.503	0.294	0.335
EL14	Thessalia	0.547	0.189	0.060	0.322	0.319	0.585
EL21	Ipeiros	0.471	0.288	0.095	0.327	0.267	0.133
EL22	Ionia Nisia	0.284	0.110	0.019	0.253	0.203	0.289
EL23	Dytiki Ellada	0.439	0.272	0.134	0.475	0.288	0.381
EL24	Sterea Ellada	0.351	0.063	0.211	0.638	0.500	0.387
EL25	Peloponnisos	0.423	0.124	0.102	0.288	0.365	0.225
EL30	Attiki	0.693	0.189	0.259	0.323	0.461	0.445
EL41	Voreio Aigaio	0.383	0.272	0.017	0.082	0.145	0.144
EL42	Notio Aigaio	0.316	0.110	0.017	0.702	0.348	0.114
EL43	Kriti	0.395	0.401	0.079	0.561	0.577	0.228
ES	Spain						
ES11	Galicia	0.665	0.182	0.240	0.132	0.258	0.258
ES12	Principado de Asturias	0.792	0.164	0.259	0.114	0.234	0.203
ES13	Cantabria	0.661	0.218	0.215	0.189	0.287	0.204
ES21	País Vasco	0.919	0.198	0.507	0.160	0.359	0.424
ES22	Comunidad Foral de Navarra	0.691	0.210	0.446	0.143	0.278	0.262
ES23	La Rioja	0.700	0.160	0.240	0.141	0.404	0.300
ES24	Aragón	0.635	0.164	0.272	0.140	0.317	0.233
ES30	Comunidad de Madrid	0.840	0.266	0.397	0.142	0.221	0.192
ES41	Castilla y León	0.637	0.170	0.292	0.166	0.256	0.189
ES42	Castilla-la Mancha	0.464	0.099	0.211	0.150	0.249	0.188
ES43	Extremadura	0.631	0.221	0.144	0.184	0.154	0.124
ES51	Cataluña	0.716	0.236	0.366	0.159	0.266	0.192
ES52	Comunidad Valenciana	0.603	0.224	0.247	0.144	0.250	0.187

		POPULATION WITH TERTIARY EDUCATION	R&D EXPENDITURE PUBLIC SECTOR	R&D EXPENDITURE BUSINESS SECTOR	NON-R&D INNOVATION EXPENDITURES	SMES INNOVATING IN-HOUSE	INNOVATIVE SMES COL-LABORATING WITH OTHERS
ES53	Illes Balears	0.510	0.124	0.060	0.119	0.109	0.084
ES61	Andalucía	0.457	0.238	0.236	0.164	0.236	0.164
ES62	Región de Murcia	0.420	0.198	0.215	0.162	0.239	0.135
ES63	Ciudad Autónoma de Ceuta	0.286	0.069	0.024	0.092	0.000	0.000
ES64	Ciudad Autónoma de Melilla	0.423	0.107	0.019	0.175	0.484	0.159
ES70	Canarias	0.501	0.157	0.115	0.080	0.145	0.094
FR	France						
FR1	Île de France	0.806	0.314	0.578	0.229	0.471	0.440
FR2	Bassin Parisien	0.503	0.137	0.391	0.230	0.409	0.307
FR3	Nord - Pas-de-Calais	0.608	0.182	0.256	0.312	0.399	0.311
FR4	Est	0.561	0.238	0.410	0.376	0.475	0.353
FR5	Ouest	0.586	0.207	0.377	0.283	0.465	0.378
FR6	Sud-Ouest	0.787	0.306	0.577	0.281	0.451	0.366
FR7	Centre-Est	0.758	0.298	0.543	0.367	0.531	0.436
FR8	Méditerranée	0.598	0.362	0.442	0.301	0.465	0.359
FR9	Départements d'outre-mer	0.400	0.233	0.079	0.281	0.301	0.245
HR	Croatia						
HR03	Jadranska Hrvatska	0.436	0.075	0.191	0.288	0.200	0.166
HR04	Kontinentalna Hrvatska	0.464	0.198	0.269	0.422	0.343	0.267
IT	Italy						
ITC1	Piemonte	0.314	0.170	0.503	0.380	0.593	0.320
ITC2	Valle d'Aosta/Vallée d'Aoste	0.304	0.095	0.165	0.258	0.490	0.136
ITC3	Liguria	0.439	0.224	0.322	0.215	0.454	0.112
ITC4	Lombardia	0.344	0.157	0.373	0.300	0.623	0.151
ITH1	Provincia Autonoma Bolzano/Bozen	0.287	0.113	0.236	0.337	0.639	0.185
ITH2	Provincia Autonoma Trento	0.369	0.332	0.364	0.317	0.588	0.184
ITH3	Veneto	0.302	0.151	0.342	0.429	0.737	0.169
ITH4	Friuli-Venezia Giulia	0.363	0.241	0.359	0.378	0.648	0.246
ITH5	Emilia-Romagna	0.330	0.207	0.420	0.335	0.534	0.106
ITI1	Toscana	0.325	0.233	0.309	0.331	0.615	0.154
ITI2	Umbria	0.422	0.218	0.178	0.428	0.549	0.119
ITI3	Marche	0.326	0.157	0.256	0.309	0.376	0.090
ITI4	Lazio	0.444	0.365	0.275	0.227	0.608	0.249
ITF1	Abruzzo	0.333	0.212	0.215	0.326	0.535	0.115
ITF2	Molise	0.358	0.176	0.219	0.280	0.496	0.145
ITF3	Campania	0.208	0.274	0.284	0.274	0.435	0.135
ITF4	Puglia	0.261	0.233	0.178	0.402	0.508	0.107
ITF5	Basilicata	0.236	0.198	0.070	0.305	0.518	0.089
ITF6	Calabria	0.298	0.204	0.060	0.339	0.418	0.128
ITG1	Sicilia	0.199	0.241	0.195	0.409	0.496	0.043
ITG2	Sardegna	0.194	0.269	0.060	0.156	0.451	0.084
HU	Hungary						
HU10	Közép-Magyarország	0.746	0.198	0.451	0.246	0.208	0.229
HU21	Közép-Dunántúl	0.346	0.117	0.393	0.453	0.126	0.117
HU22	Nyugat-Dunántúl	0.392	0.083	0.298	0.712	0.166	0.231
HU23	Dél-Dunántúl	0.354	0.157	0.236	0.326	0.180	0.206
HU31	Észak-Magyarország	0.335	0.075	0.301	0.367	0.169	0.184
HU32	Észak-Alföld	0.356	0.164	0.371	0.317	0.137	0.106
HU33	Dél-Alföld	0.339	0.189	0.342	0.566	0.145	0.163

		POPULATION WITH TERTIARY EDUCATION	R&D EXPENDITURE PUBLIC SECTOR	R&D EXPENDITURE BUSINESS SECTOR	NON-R&D INNOVATION EXPENDITURES	SMES INNOVATING IN-HOUSE	INNOVATIVE SMES COL-LABORATING WITH OTHERS
NL	Netherlands						
NL11	Groningen	0.753	0.453	0.218	0.155	0.624	0.476
NL12	Friesland	0.443	0.007	0.367	0.137	0.624	0.482
NL13	Drenthe	0.543	0.045	0.231	0.141	0.624	0.547
NL21	Overijssel	0.582	0.243	0.408	0.139	0.624	0.481
NL22	Gelderland	0.624	0.392	0.398	0.144	0.624	0.494
NL23	Flevoland	0.441	0.332	0.339	0.147	0.624	0.475
NL31	Utrecht	0.919	0.418	0.307	0.167	0.624	0.514
NL32	Noord-Holland	0.801	0.301	0.382	0.144	0.624	0.435
NL33	Zuid-Holland	0.675	0.340	0.401	0.153	0.624	0.481
NL34	Zeeland	0.392	0.035	0.359	0.128	0.624	0.481
NL41	Noord-Brabant	0.681	0.163	0.615	0.137	0.624	0.491
NL42	Limburg	0.511	0.238	0.442	0.135	0.624	0.469
AT	Austria						
AT1	Ostösterreich	0.681	0.362	0.508	0.184	0.512	0.525
AT2	Südösterreich	0.529	0.314	0.745	0.308	0.541	0.497
AT3	Westösterreich	0.517	0.198	0.594	0.345	0.493	0.474
PL	Poland						
PL11	Łódzkie	0.610	0.195	0.144	0.419	0.167	0.150
PL12	Mazowieckie	0.885	0.304	0.320	0.261	0.160	0.136
PL21	Małopolskie	0.596	0.263	0.290	0.202	0.161	0.155
PL22	Śląskie	0.584	0.124	0.215	0.310	0.165	0.142
PL31	Lubelskie	0.637	0.189	0.122	0.289	0.167	0.140
PL32	Podkarpackie	0.589	0.102	0.395	0.387	0.174	0.127
PL33	Świętokrzyskie	0.610	0.095	0.134	0.235	0.199	0.140
PL34	Podlaskie	0.677	0.167	0.122	0.479	0.190	0.144
PL41	Wielkopolskie	0.527	0.164	0.169	0.267	0.126	0.090
PL42	Zachodniopomorskie	0.511	0.079	0.073	0.352	0.165	0.119
PL43	Lubuskie	0.559	0.027	0.073	0.270	0.184	0.095
PL51	Dolnośląskie	0.642	0.127	0.222	0.324	0.171	0.154
PL52	Opolskie	0.601	0.071	0.095	0.206	0.184	0.156
PL61	Kujawsko-Pomorskie	0.393	0.087	0.122	0.206	0.181	0.089
PL62	Warmińsko-Mazurskie	0.483	0.124	0.087	0.276	0.163	0.113
PL63	Pomorskie	0.596	0.182	0.278	0.268	0.121	0.087
PT	Portugal						
PT11	Norte	0.422	0.244	0.340	0.385	0.480	0.166
PT15	Algarve	0.305	0.137	0.060	0.293	0.549	0.100
PT16	Centro	0.393	0.250	0.304	0.425	0.639	0.283
PT17	Lisboa	0.594	0.301	0.350	0.237	0.587	0.313
PT18	Alentejo	0.326	0.110	0.165	0.325	0.541	0.222
PT20	Região Autónoma dos Açores	0.439	0.127	0.070	0.234	0.388	0.024
PT30	Região Autónoma da Madeira	0.413	0.113	0.102	0.213	0.399	0.192
RO	Romania						
RO11	Nord-Vest	0.300	0.117	0.070	0.118	0.032	0.033
RO12	Centru	0.323	0.030	0.087	0.157	0.062	0.031
RO21	Nord-Est	0.222	0.099	0.095	0.250	0.092	0.045
RO22	Sud-Est	0.198	0.030	0.017	0.330	0.265	0.092
RO31	Sud - Muntenia	0.199	0.014	0.215	0.182	0.075	0.039

		POPULATION WITH TERTIARY EDUCATION	R&D EXPENDITURE PUBLIC SECTOR	R&D EXPENDITURE BUSINESS SECTOR	NON-R&D INNOVATION EXPENDITURES	SMES INNOVATING IN-HOUSE	INNOVATIVE SMES COL-LABORATING WITH OTHERS
RO32	Bucuresti - Ilfov	0.727	0.224	0.155	0.139	0.064	0.048
RO41	Sud-Vest Oltenia	0.312	0.075	0.035	0.009	0.013	0.011
RO42	Vest	0.265	0.083	0.095	0.101	0.022	0.010
SI	Slovenia						
SI01	Vzhodna Slovenija	0.586	0.071	0.566	0.298	0.373	0.448
SI02	Zahodna Slovenija	0.637	0.319	0.577	0.252	0.450	0.503
SK	Slovakia						
SK01	Bratislavský kraj	0.840	0.290	0.364	0.207	0.317	0.302
SK02	Západné Slovensko	0.243	0.063	0.169	0.358	0.224	0.205
SK03	Stredné Slovensko	0.296	0.170	0.174	0.321	0.196	0.193
SK04	Východné Slovensko	0.335	0.160	0.160	0.425	0.214	0.162
FI	Finland						
FI13	Itä-Suomi	0.824	0.288	0.630	0.305	0.568	0.475
FI18	Etelä-Suomi	0.557	0.399	0.672	0.181	0.627	0.478
FI19	Länsi-Suomi	0.663	0.269	0.520	0.393	0.548	0.417
FI1A	Pohjois-Suomi	0.608	0.350	0.580	0.340	0.551	0.489
FI20	Åland	0.686	0.014	0.195	0.260	0.584	0.467
SE	Sweden						
SE11	Stockholm	0.910	0.332	0.684	0.271	0.595	0.391
SE12	Östra Mellansverige	0.697	0.457	0.633	0.328	0.477	0.349
SE21	Småland med öarna	0.601	0.110	0.444	0.343	0.558	0.412
SE22	Sydsverige	0.790	0.404	0.658	0.305	0.519	0.508
SE23	Västsverige	0.778	0.309	0.678	0.398	0.611	0.445
SE31	Norra Mellansverige	0.557	0.110	0.420	0.288	0.434	0.332
SE32	Mellersta Norrland	0.573	0.131	0.272	0.474	0.528	0.456
SE33	Övre Norrland	0.741	0.546	0.292	1.000	0.511	0.549
UK	United Kingdom						
UKC	North East	0.517	0.189	0.306	0.315	0.294	0.654
UKD	North West	0.649	0.173	0.424	0.388	0.292	0.781
UKE	Yorkshire and The Humber	0.582	0.201	0.292	0.295	0.239	0.717
UKF	East Midlands	0.605	0.160	0.472	0.551	0.318	0.748
UKG	West Midlands	0.557	0.127	0.472	0.265	0.288	0.771
UKH	East of England	0.651	0.285	0.683	0.124	0.282	0.745
UKI	London	0.968	0.233	0.226	0.309	0.274	0.749
UKJ	South East	0.748	0.272	0.518	0.152	0.332	0.879
UKK	South West	0.753	0.210	0.428	0.450	0.310	0.693
UKL	Wales	0.630	0.204	0.312	0.244	0.285	0.721
UKM	Scotland	0.882	0.324	0.306	0.319	0.237	0.466
UKN	Northern Ireland	0.621	0.167	0.440	0.179	0.218	0.572
NO	Norway						
NO01	Oslo og Akershus	0.991	0.450	0.523	0.184	0.347	0.266
NO02	Hedmark og Oppland	0.621	0.120	0.246	0.233	0.252	0.268
NO03	Sør-Østlandet	0.598	0.117	0.433	0.305	0.294	0.231
NO04	Agder og Rogaland	0.757	0.131	0.321	0.237	0.341	0.216
NO05	Vestlandet	0.783	0.345	0.313	0.231	0.325	0.259
NO06	Trøndelag	0.861	0.572	0.648	0.287	0.377	0.415
NO07	Nord-Norge	0.780	0.418	0.206	0.412	0.238	0.236

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BE	Belgium						
BE1	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	0.289	0.510	0.331	0.574	0.536	0.448
BE2	Vlaams Gewest	0.470	0.663	0.365	0.538	0.517	0.557
BE3	Région Wallonne	0.460	0.538	0.343	0.576	0.430	0.413
BG	Bulgaria						
BG3	Severna i yugoiztochna Bulgaria	0.085	0.222	0.082	0.307	0.273	0.183
BG4	Yugozapadna i yuzhna tsentralna Bulgaria	0.158	0.170	0.096	0.271	0.430	0.158
CZ	Czech Republic						
CZ01	Praha	0.197	0.445	0.308	0.808	0.733	0.298
CZ02	Střední Cechy	0.219	0.439	0.278	0.901	0.729	0.288
CZ03	Jihozápad	0.157	0.446	0.235	0.847	0.631	0.313
CZ04	Severozápad	0.196	0.393	0.206	0.724	0.438	0.368
CZ05	Severovýchod	0.277	0.491	0.257	0.780	0.803	0.426
CZ06	Jihovýchod	0.237	0.479	0.257	0.747	0.713	0.412
CZ07	Střední Morava	0.212	0.479	0.285	0.630	0.615	0.358
CZ08	Moravskoslezsko	0.169	0.388	0.240	0.592	0.548	0.239
DK	Denmark						
DK01	Hovedstaden	0.630	0.512	0.384	0.648	0.678	0.350
DK02	Sjælland	0.474	0.595	0.398	0.545	0.410	0.424
DK03	Syddanmark	0.516	0.504	0.421	0.413	0.371	0.332
DK04	Midtjylland	0.701	0.445	0.427	0.449	0.458	0.326
DK05	Nordjylland	0.472	0.475	0.460	0.360	0.387	0.295
DE	Germany						
DE11	Stuttgart	0.848	0.727	0.608	0.936	0.969	0.303
DE12	Karlsruhe	0.789	0.811	0.595	0.867	0.807	0.296
DE13	Freiburg	0.782	0.713	0.560	0.821	0.658	0.230
DE14	Tübingen	0.825	0.659	0.582	0.808	0.788	0.235
DE21	Oberbayern	0.774	0.663	0.466	0.988	0.886	0.262
DE22	Niederbayern	0.547	0.790	0.514	0.757	0.666	0.436
DE23	Oberpfalz	0.835	0.724	0.616	0.771	0.701	0.277
DE24	Oberfranken	0.643	0.715	0.505	0.682	0.611	0.266
DE25	Mittelfranken	0.883	0.555	0.508	0.811	0.658	0.292
DE26	Unterfranken	0.706	0.606	0.651	0.718	0.689	0.195
DE27	Schwaben	0.706	0.808	0.543	0.791	0.709	0.356
DE30	Berlin	0.545	0.734	0.589	0.940	0.650	0.339
DE41	Brandenburg – Nordost	0.443	0.678	0.521	0.779	0.367	0.286
DE42	Brandenburg – Südwest	0.443	0.671	0.526	0.779	0.367	0.290
DE50	Bremen	0.332	0.663	0.536	0.917	0.540	0.233
DE60	Hamburg	0.444	0.709	0.535	0.862	0.705	0.353
DE71	Darmstadt	0.600	0.718	0.507	0.855	0.729	0.269
DE72	Gießen	0.620	0.529	0.487	0.754	0.536	0.243
DE73	Kassel	0.483	0.877	0.596	0.734	0.520	0.274
DE80	Mecklenburg-Vorpommern	0.302	0.666	0.438	0.655	0.324	0.315
DE91	Braunschweig	0.565	0.645	0.540	0.986	0.819	0.293
DE92	Hannover	0.580	0.650	0.623	0.806	0.501	0.267
DE93	Lüneburg	0.557	0.698	0.430	0.789	0.418	0.322
DE94	Weser-Ems	0.474	0.519	0.474	0.556	0.406	0.249

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DEA1	Düsseldorf	0.578	0.609	0.490	0.589	0.536	0.211
DEA2	Köln	0.582	0.636	0.580	0.765	0.627	0.250
DEA3	Münster	0.554	0.755	0.624	0.666	0.442	0.351
DEA4	Detmold	0.643	0.584	0.532	0.652	0.501	0.195
DEA5	Arnsberg	0.576	0.674	0.539	0.575	0.536	0.243
DEB1	Koblenz	0.557	0.611	0.452	0.660	0.438	0.252
DEB2	Trier	0.420	0.772	0.861	0.453	0.269	0.306
DEB3	Rheinhessen-Pfalz	0.756	0.799	0.522	0.958	0.729	0.391
DEC0	Saarland	0.460	0.695	0.354	0.460	0.513	0.290
DED2	Dresden	0.557	0.715	0.516	0.679	0.505	0.295
DED4	Chemnitz	0.457	0.775	0.536	0.679	0.528	0.323
DED5	Leipzig	0.457	0.671	0.493	0.679	0.528	0.261
DEE0	Sachsen-Anhalt	0.285	0.666	0.469	0.670	0.363	0.285
DEF0	Schleswig-Holstein	0.530	0.663	0.585	0.775	0.442	0.231
DEG0	Thüringen	0.496	0.718	0.494	0.773	0.458	0.316
IE	Ireland						
IE01	Border, Midland and Western	0.396	0.502	0.518	0.564	0.422	0.338
IE02	Southern and Eastern	0.321	0.530	0.544	0.601	0.599	0.342
EL	Greece						
EL11	Anatoliki Makedonia, Thraki	0.056	0.231	0.231	0.140	0.108	0.284
EL12	Kentriki Makedonia	0.126	0.466	0.449	0.141	0.253	0.300
EL13	Dytiki Makedonia	0.090	0.257	0.382	0.084	0.131	0.261
EL14	Thessalia	0.046	0.356	0.464	0.181	0.108	0.288
EL21	Ipeiros	0.049	0.249	0.274	0.041	0.112	0.274
EL22	Ionia Nisia	0.061	0.174	0.154	0.023	0.186	0.261
EL23	Dytiki Ellada	0.121	0.310	0.336	0.147	0.157	0.289
EL24	Sterea Ellada	0.047	0.487	0.431	0.177	0.131	0.280
EL25	Peloponnisos	0.047	0.402	0.468	0.151	0.139	0.289
EL30	Attiki	0.133	0.464	0.528	0.340	0.552	0.279
EL41	Voreio Aigaio	0.128	0.120	0.379	0.137	0.241	0.272
EL42	Notio Aigaio	0.119	0.330	0.401	0.153	0.123	0.290
EL43	Kriti	0.151	0.543	0.517	0.121	0.127	0.283
ES	Spain						
ES11	Galicia	0.184	0.279	0.124	0.521	0.320	0.307
ES12	Principado de Asturias	0.170	0.233	0.136	0.432	0.324	0.843
ES13	Cantabria	0.196	0.283	0.029	0.595	0.363	0.278
ES21	País Vasco	0.324	0.368	0.201	0.574	0.595	0.340
ES22	Comunidad Foral de Navarra	0.338	0.294	0.159	0.583	0.524	0.308
ES23	La Rioja	0.145	0.404	0.208	0.304	0.273	0.362
ES24	Aragón	0.386	0.351	0.192	0.666	0.469	0.383
ES30	Comunidad de Madrid	0.269	0.241	0.151	0.669	0.717	0.227
ES41	Castilla y León	0.128	0.278	0.133	0.508	0.277	0.251
ES42	Castilla-la Mancha	0.120	0.267	0.174	0.292	0.265	0.304
ES43	Extremadura	0.073	0.198	0.100	0.272	0.112	0.178
ES51	Cataluña	0.328	0.282	0.222	0.733	0.564	0.333
ES52	Comunidad Valenciana	0.221	0.263	0.156	0.387	0.316	0.448
ES53	Illes Balears	0.116	0.125	0.129	0.492	0.210	0.336

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ES61	Andalucía	0.135	0.253	0.167	0.389	0.237	0.340
ES62	Región de Murcia	0.166	0.231	0.129	0.366	0.218	0.278
ES63	Ciudad Autónoma de Ceuta	0.139	0.130	0.046	0.384	0.233	0.488
ES64	Ciudad Autónoma de Melilla	0.139	0.438	0.014	0.384	0.210	0.046
ES70	Canarias	0.097	0.154	0.139	0.225	0.175	0.094
FR	France						
FR1	Île de France	0.503	0.486	0.471	0.821	0.638	0.364
FR2	Bassin Parisien	0.378	0.423	0.370	0.649	0.351	0.307
FR3	Nord - Pas-de-Calais	0.277	0.402	0.361	0.528	0.344	0.383
FR4	Est	0.438	0.496	0.417	0.801	0.469	0.332
FR5	Ouest	0.400	0.476	0.420	0.580	0.340	0.334
FR6	Sud-Ouest	0.390	0.472	0.408	0.652	0.450	0.264
FR7	Centre-Est	0.655	0.540	0.440	0.587	0.458	0.310
FR8	Méditerranée	0.410	0.464	0.447	0.621	0.351	0.290
FR9	Départements d'outre-mer	0.085	0.373	0.433	0.666	0.320	0.246
HR	Croatia						
HR03	Jadranska Hrvatska	0.062	0.209	0.186	0.506	0.351	0.187
HR04	Kontinentalna Hrvatska	0.117	0.344	0.295	0.506	0.336	0.235
IT	Italy						
ITC1	Piemonte	0.389	0.597	0.444	0.681	0.705	0.361
ITC2	Valle d'Aosta/Vallée d'Aoste	0.179	0.462	0.327	0.299	0.509	0.327
ITC3	Liguria	0.299	0.443	0.376	0.744	0.473	0.325
ITC4	Lombardia	0.380	0.604	0.477	0.630	0.686	0.343
ITH1	Provincia Autonoma Bolzano/Bozen	0.398	0.625	0.485	0.375	0.265	0.305
ITH2	Provincia Autonoma Trento	0.325	0.569	0.458	0.539	0.430	0.331
ITH3	Veneto	0.378	0.713	0.529	0.571	0.520	0.348
ITH4	Friuli-Venezia Giulia	0.504	0.675	0.563	0.631	0.505	0.347
ITH5	Emilia-Romagna	0.430	0.524	0.461	0.672	0.623	0.347
ITI1	Toscana	0.328	0.599	0.497	0.446	0.410	0.360
ITI2	Umbria	0.236	0.530	0.415	0.547	0.406	0.336
ITI3	Marche	0.342	0.363	0.369	0.439	0.501	0.355
ITI4	Lazio	0.222	0.583	0.498	0.730	0.560	0.327
ITF1	Abruzzo	0.253	0.564	0.388	0.564	0.465	0.348
ITF2	Molise	0.118	0.478	0.431	0.624	0.442	0.352
ITF3	Campania	0.146	0.406	0.442	0.554	0.387	0.316
ITF4	Puglia	0.179	0.493	0.417	0.372	0.351	0.316
ITF5	Basilicata	0.130	0.476	0.444	0.621	0.430	0.353
ITF6	Calabria	0.106	0.384	0.330	0.372	0.241	0.299
ITG1	Sicilia	0.106	0.471	0.419	0.459	0.253	0.299
ITG2	Sardegna	0.114	0.441	0.325	0.275	0.218	0.299
HU	Hungary						
HU10	Közép-Magyarország	0.316	0.215	0.291	0.822	0.701	0.138
HU21	Közép-Dunántúl	0.186	0.131	0.143	0.810	0.654	0.150
HU22	Nyugat-Dunántúl	0.133	0.185	0.190	0.900	0.686	0.159
HU23	Dél-Dunántúl	0.135	0.206	0.167	0.818	0.363	0.141
HU31	Észak-Magyarország	0.204	0.180	0.199	0.847	0.568	0.132
HU32	Észak-Alföld	0.162	0.137	0.144	0.815	0.328	0.110
HU33	Dél-Alföld	0.267	0.170	0.134	0.693	0.292	0.114

		EPO PATENT APPLICATIONS	SMES WITH PRODUCT OR PROCESS IN-NOVATIONS	SMES WITH MARKETING OR ORGANI-SATIONAL INNOVATIONS	EMPLOYMENT MEDIUM-HIGH/ HIGH TECH MANUFACTURING & KNOWLEDGE-INTENSIVE SERVICES	EXPORTS IN MEDIUM-HIGH/ HIGH TECH MANUFACTURING	SALES OF NEW-TO-MARKET AND NEW-TO-FIRM INNOVATIONS
NL	Netherlands						
NL11	Groningen	0.300	0.600	0.350	0.395	0.418	0.297
NL12	Friesland	0.304	0.613	0.354	0.405	0.355	0.338
NL13	Drenthe	0.257	0.650	0.391	0.641	0.434	0.350
NL21	Overijssel	0.441	0.612	0.352	0.486	0.454	0.325
NL22	Gelderland	0.444	0.614	0.361	0.411	0.442	0.327
NL23	Flevoland	0.299	0.614	0.319	0.519	0.599	0.322
NL31	Utrecht	0.331	0.651	0.370	0.529	0.552	0.311
NL32	Noord-Holland	0.371	0.560	0.301	0.433	0.603	0.267
NL33	Zuid-Holland	0.421	0.615	0.341	0.460	0.532	0.303
NL34	Zeeland	0.325	0.625	0.333	0.598	0.359	0.324
NL41	Noord-Brabant	0.927	0.619	0.357	0.549	0.532	0.328
NL42	Limburg	0.578	0.603	0.331	0.692	0.434	0.304
AT	Austria						
AT1	Ostösterreich	0.422	0.527	0.498	0.600	0.517	0.271
AT2	Südösterreich	0.538	0.542	0.470	0.692	0.461	0.244
AT3	Westösterreich	0.630	0.513	0.443	0.635	0.489	0.251
PL	Poland						
PL11	Lódzkie	0.207	0.163	0.035	0.477	0.355	0.112
PL12	Mazowieckie	0.185	0.198	0.068	0.542	0.513	0.125
PL21	Malopolskie	0.306	0.197	0.051	0.534	0.383	0.067
PL22	Slaskie	0.137	0.186	0.064	0.678	0.485	0.097
PL31	Lubelskie	0.201	0.189	0.051	0.516	0.167	0.120
PL32	Podkarpackie	0.113	0.193	0.021	0.632	0.312	0.309
PL33	Swietokrzyskie	0.160	0.189	0.007	0.385	0.147	0.128
PL34	Podlaskie	0.089	0.203	0.035	0.541	0.167	0.092
PL41	Wielkopolskie	0.125	0.144	0.009	0.528	0.351	0.102
PL42	Zachodniopomorskie	0.143	0.187	0.036	0.833	0.328	0.140
PL43	Lubuskie	0.226	0.193	0.020	0.478	0.292	0.137
PL51	Dolnoslaskie	0.187	0.224	0.099	0.836	0.623	0.122
PL52	Opolskie	0.025	0.213	0.035	0.436	0.324	0.190
PL61	Kujawsko-Pomorskie	0.128	0.189	0.034	0.529	0.245	0.110
PL62	Warminsko-Mazurskie	0.080	0.186	0.038	0.301	0.155	0.131
PL63	Pomorskie	0.192	0.127	0.015	0.771	0.485	0.147
PT	Portugal						
PT11	Norte	0.142	0.504	0.351	0.357	0.296	0.238
PT15	Algarve	0.077	0.632	0.526	0.236	0.249	0.121
PT16	Centro	0.142	0.651	0.510	0.441	0.214	0.283
PT17	Lisboa	0.143	0.608	0.559	0.561	0.517	0.448
PT18	Alentejo	0.170	0.563	0.443	0.526	0.127	0.368
PT20	Região Autónoma dos Açores	0.118	0.417	0.455	0.023	0.316	0.108
PT30	Região Autónoma da Madeira	0.078	0.453	0.465	0.000	0.316	0.127
RO	Romania						
RO11	Nord-Vest	0.126	0.028	0.000	0.363	0.237	0.028
RO12	Centru	0.079	0.050	0.091	0.516	0.344	0.067
RO21	Nord-Est	0.071	0.074	0.273	0.460	0.068	0.065
RO22	Sud-Est	0.038	0.249	0.267	0.453	0.206	0.099
RO31	Sud - Muntenia	0.057	0.065	0.097	0.649	0.406	0.066

		EPO PATENT APPLICATIONS	SMES WITH PRODUCT OR PROCESS IN-NOVATIONS	SMES WITH MARKETING OR ORGANI-SATIONAL INNOVATIONS	EMPLOYMENT MEDIUM-HIGH/ HIGH TECH MANUFACTURING & KNOWLEDGE-INTENSIVE SERVICES	EXPORTS IN MEDIUM-HIGH/ HIGH TECH MANUFACTURING	SALES OF NEW-TO-MARKET AND NEW-TO-FIRM INNOVATIONS
RO32	Bucuresti - Ilfov	0.185	0.056	0.058	0.560	0.591	0.081
RO41	Sud-Vest Oltenia	0.017	0.000	0.115	0.881	0.178	0.000
RO42	Vest	0.180	0.012	0.024	0.857	0.709	0.034
SI	Slovenia						
SI01	Vzhodna Slovenija	0.290	0.386	0.317	0.645	0.560	0.195
SI02	Zahodna Slovenija	0.369	0.448	0.373	0.640	0.615	0.252
SK	Slovakia						
SK01	Bratislavský kraj	0.212	0.336	0.301	0.779	0.835	0.486
SK02	Západné Slovensko	0.148	0.221	0.166	0.836	0.572	0.195
SK03	Stredné Slovensko	0.105	0.202	0.192	0.606	0.477	0.134
SK04	Východné Slovensko	0.193	0.254	0.188	0.587	0.403	0.241
FI	Finland						
FI13	Itä-Suomi	0.893	0.577	0.339	0.490	0.780	0.205
FI18	Etelä-Suomi	0.356	0.640	0.425	0.490	0.497	0.229
FI19	Länsi-Suomi	0.668	0.538	0.267	0.559	0.524	0.301
FI1A	Pohjois-Suomi	0.506	0.556	0.366	0.361	0.324	0.192
FI20	Åland	0.502	0.590	0.362	0.345	0.730	0.228
SE	Sweden						
SE11	Stockholm	0.700	0.655	0.412	0.753	0.898	0.236
SE12	Östra Mellansverige	0.700	0.506	0.323	0.669	0.595	0.159
SE21	Småland med öarna	0.466	0.596	0.388	0.511	0.469	0.209
SE22	Sydsverige	0.788	0.587	0.374	0.678	0.552	0.202
SE23	Västsverige	0.595	0.625	0.465	0.645	0.670	0.191
SE31	Norra Mellansverige	0.455	0.455	0.240	0.467	0.387	0.225
SE32	Mellersta Norrland	0.362	0.550	0.355	0.599	0.450	0.199
SE33	Övre Norrland	0.478	0.525	0.318	0.567	0.359	0.146
UK	United Kingdom						
UKC	North East	0.379	0.417	0.389	0.618	0.442	0.482
UKD	North West	0.322	0.420	0.354	0.509	0.485	0.633
UKE	Yorkshire and The Humber	0.295	0.337	0.378	0.541	0.371	0.529
UKF	East Midlands	0.429	0.452	0.433	0.596	0.524	0.689
UKG	West Midlands	0.325	0.411	0.395	0.562	0.513	0.621
UKH	East of England	0.423	0.409	0.423	0.688	0.520	0.229
UKI	London	0.238	0.394	0.391	0.433	0.701	1.000
UKJ	South East	0.428	0.473	0.418	0.754	0.646	0.495
UKK	South West	0.430	0.440	0.409	0.613	0.524	0.695
UKL	Wales	0.306	0.411	0.397	0.577	0.296	0.630
UKM	Scotland	0.309	0.349	0.351	0.528	0.363	0.554
UKN	Northern Ireland	0.244	0.314	0.315	0.493	0.328	0.461
NO	Norway						
NO01	Oslo og Akershus	0.327	0.347	0.301	0.115	0.650	0.210
NO02	Hedmark og Oppland	0.327	0.255	0.300	0.115	0.190	0.182
NO03	Sør-Østlandet	0.327	0.341	0.291	0.115	0.442	0.296
NO04	Agder og Rogaland	0.327	0.327	0.228	0.115	0.473	0.190
NO05	Vestlandet	0.327	0.326	0.298	0.115	0.465	0.225
NO06	Trøndelag	0.327	0.347	0.270	0.115	0.434	0.282
NO07	Nord-Norge	0.327	0.256	0.340	0.115	0.237	0.299

Annex 4: Regional profiles

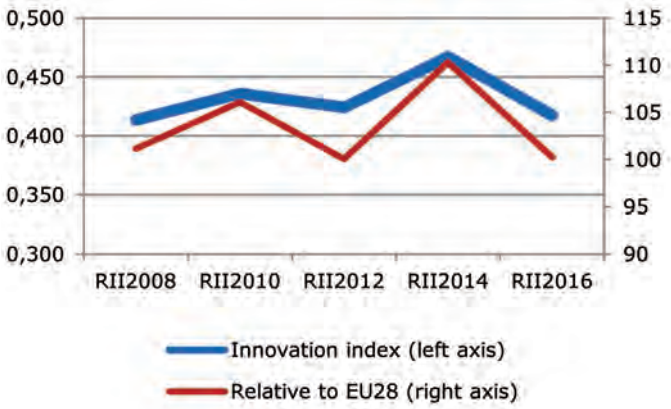
This annex shows an example of a regional profile for the Brussels region. Profiles for all regions included in the RIS 2016 are available on the European Innovation Scoreboards website: *http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/index_en.htm*

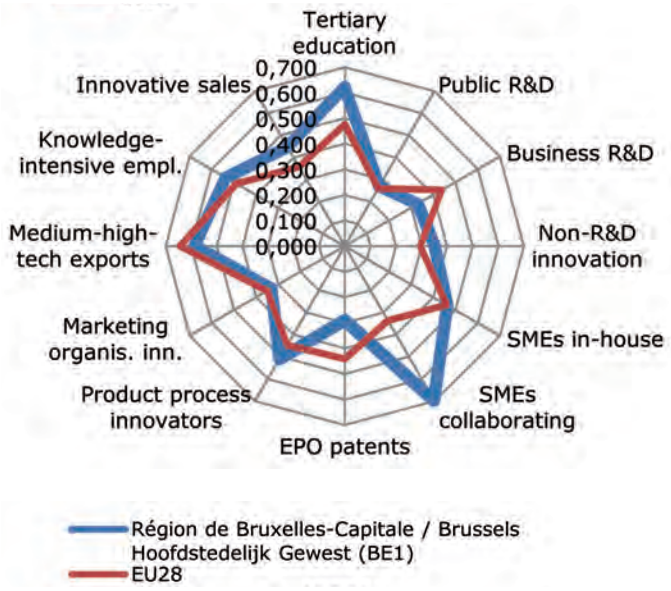
Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest (BE1)

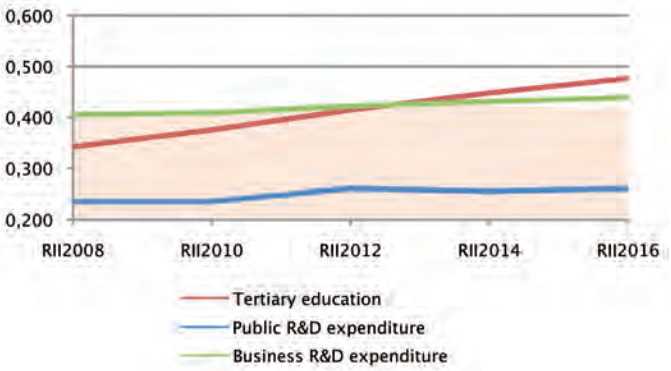
The Brussels region is a Strong Innovator. Innovation performance has declined compared to two years ago.

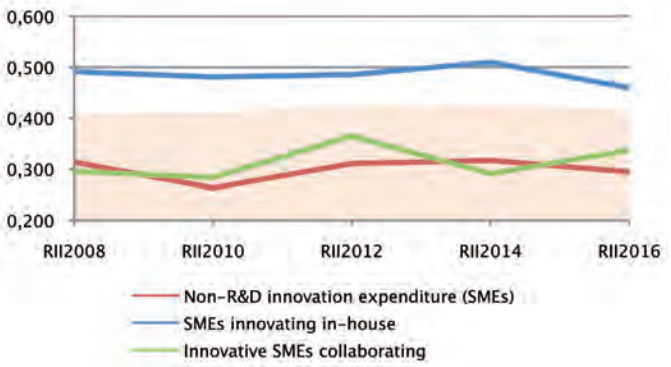
The radar graph shows that relative strengths compared to the EU28 are in Innovative SMEs collaborating with others and in Tertiary education.

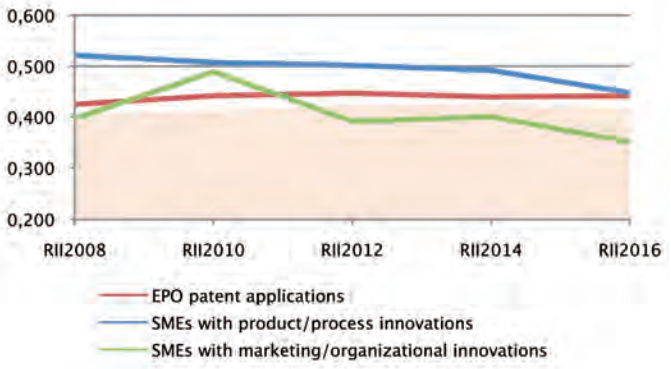
The trend graphs on the right show that indicators contributing most to the region's performance (i.e. the indicators which are significantly above the shaded area showing the region's Regional Innovation Index) are SMEs innovating in-house, SMEs with product/process innovations, and Medium /high tech exports.

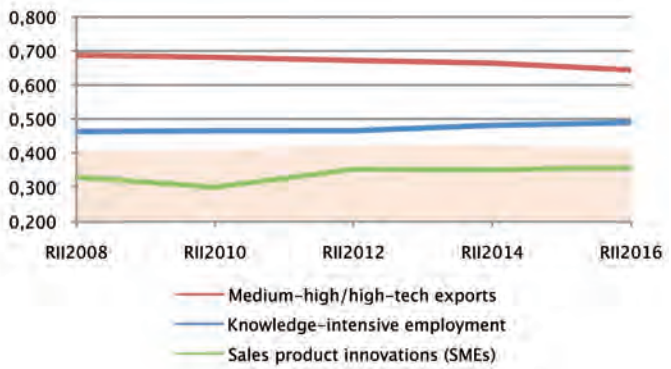












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