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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

My region, My Europe, Our future:
The seventh report on economic, social and territorial cohesion

{COM(2017) 583 final}

1.5.2 Innovation remains spatially concentrated

As widely documented in the economic literature, research and innovation play a crucial role in determining the economic performance of countries and regions. Innovation, understood in the broad sense to include product, process, market and organisational innovation, is identified as one of the major engines of economic growth, employment and environmental sustainability and accordingly is of critical importance for social progress as well as prosperity.

In particular, innovation is an important driver of long-run productivity growth and, as such, is crucial in maintaining the competitiveness of firms. This is particularly true for firms in Europe which have increasingly to compete with firms located in less developed parts of the world in emerging economies. The latter are not only catching up fast in terms of technology but they also still benefit from cheaper labour due in part to lower labour standards, a lack of social protection for workers and lower income expectations, though low labour costs tend to be offset by lower productivity. From this perspective, innovation, as well as the capacity to assimilate innovation produced elsewhere, is an important condition for maintaining the specific features of the European social model. In addition, contrary to growth from restructuring, growth from innovation is in principle without bounds, which is why it is central to sustaining growth over the long-term.

Measuring innovation is difficult, the number of patent applications being one of the few indicators available and the most commonly used one. Although it is imperfect because it covers only innovations which are patentable and, in the case of the EU, only those registered at the European Patent Office, there is a lack of alternatives. Over the two years 2010 and 2011 (the last data available), an average of some 113 patent applications per million people was made to the European Patent Office (Map 1-7). While there are large variations in applications across regions, there is a clear spatial pattern, with those with most applications – i.e. the most innovative - being located mostly in the Netherlands, Germany, Austria, Denmark and Sweden. At the NUTS 3 level, Eindhoven, in the Netherlands, had the highest number of applications (1 731per million inhabitants in the period), followed by Heidenheim in Germany (1 049) and Rheintal-Bodenseegebiet in Austria (832).[12]

Metropolitan areas tend to offer an environment which is particularly conducive to the introduction of new ideas, products and processes. A vast body of literature explains why urban areas are likely to be more innovative than others, such as the presence of a creative and skilled work force, specialised clusters of economic activity, universities and research institutes.[13]

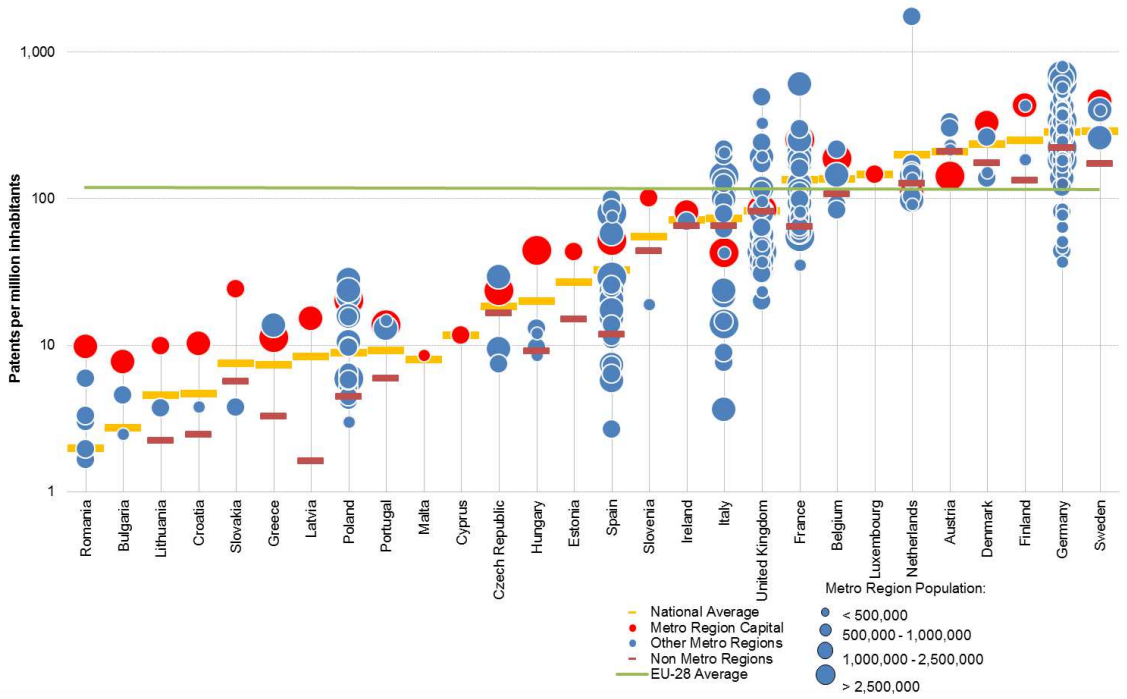
There are not only clear-cut differences in patenting activity between metro regions (around 140 applications per million inhabitants) and non-metro regions (around 86 per

[12] Note that the patent applications relate mainly to technological innovations in the manufacturing sector and do not a capture innovation in services, which are often intangible. It is therefore liable to be biased (Morrar, 2014).

[13] European Union and UN-HABITAT (2016).

million) (Figure 1-17), but there is less variation between them (as measured by the coefficient of variation), suggesting that they offer a more favourable environment.[14]

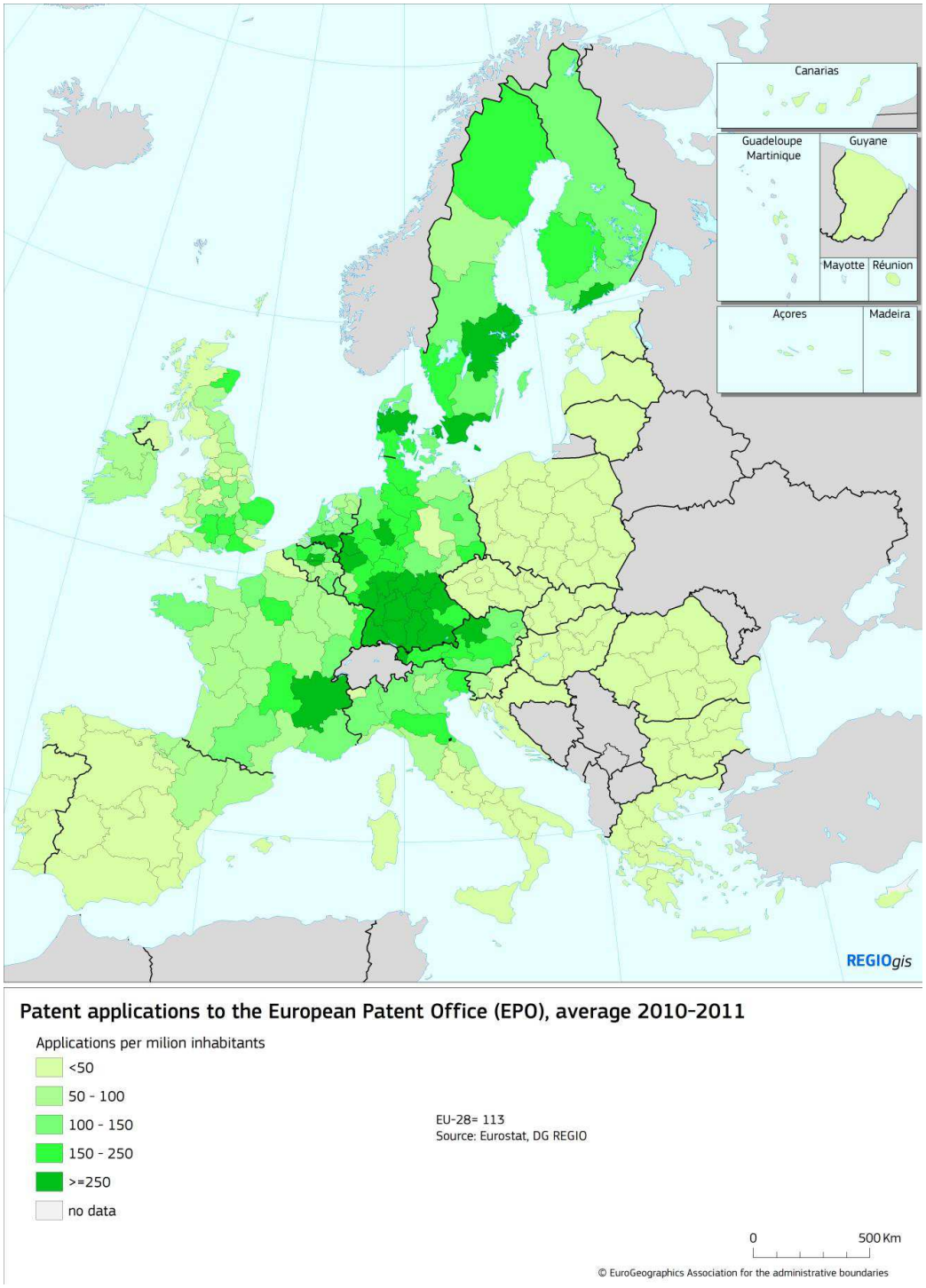
Figure 1-17: Patents by metro regions, average 2009-11



Source: Eurostat, DG REGIO calculations.

[14] The coefficient of variation calculated on the average number of patent applications in 2010 and 2011 in metro regions is 1.1, as against 1.4 for non-metro regions.

Map 1-7: Patent applications to the European Patents Office, 2010-2011



Source: Eurostat, REGIO-GIS

One of the main indicators for assessing the capacity to innovate is the level of expenditure on R&D which tends to be essential for technical progress to take place.[15]

Expenditure on R&D in the EU-28 amounted to around 2% of GDP in 2014 (the latest data available) and only marginally increased over the previous two decades (1.8% of GDP in 1995), not by nearly enough to close the gap with other highly developed economies, especially Japan (where expenditure in 2014 amounted to 3.5% of GDP) or the US (where it stood at 2.7% of GDP in 2013).

Regions in the EU-15 have on average slightly higher expenditure in R&D (2.1% of GDP in 2014) than those in the EU-13 (1.8% of GDP). There are, however, wide variations across NUTS 2 regions, from over 6% of GDP in Brabant Wallon in Belgium and Braunschweig and Stuttgart in Germany to only 0.1% of GDP in Centru in Romania and Severen Tsentralen in Bulgaria (Map 1-8 and Figure 1-18).

Expenditure on R&D in 2014 exceeded the Europe 2020 target of 3% in only 30 regions, all of them in the EU-15 (Table 1-6). In the more developed regions, it was less than 1 percentage point below the target on average – though still a significant amount given the generally slow rate of increase over recent years – while in less developed regions, it was slightly over 2 percentage points below.

Table 1-6: Total R&D expenditure and the distance to the EU2020 target, EU-28 regions, 2014

	More developed	Transition	Less developed	EU-28
R&D as % of GDP, 2014*	2.3	1.3	0.9	2.0
Distance to EU target (% point difference)	0.7	1.7	2.1	1.0
% of regions* that have reached the EU target	19	2	0	11

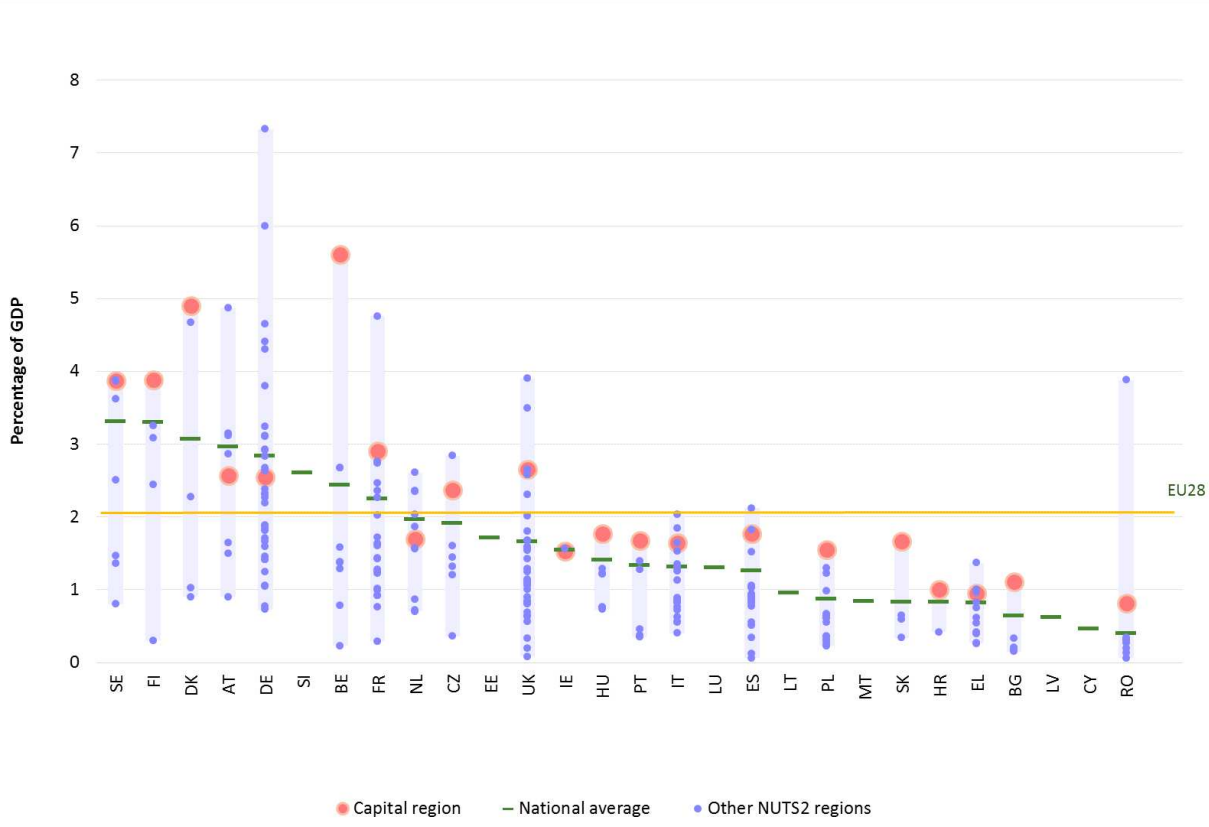
* BE, DE, EL, FR, AT, FI, SE: 2013

** includes only regions for which data are available
Source: Eurostat, DG REGIO calculations

In general, therefore, regions with the highest expenditure on R&D are the most highly developed ones, and in most cases those where the capital is located (Germany, France, and the UK are exceptions). Of the 20 regions with the highest expenditure, 19 regions have a GDP per head above 100% of the EU average and regions with low levels of expenditure tend to be either in southern, central and eastern Member States or are the low GDP per head ones in western Member States.

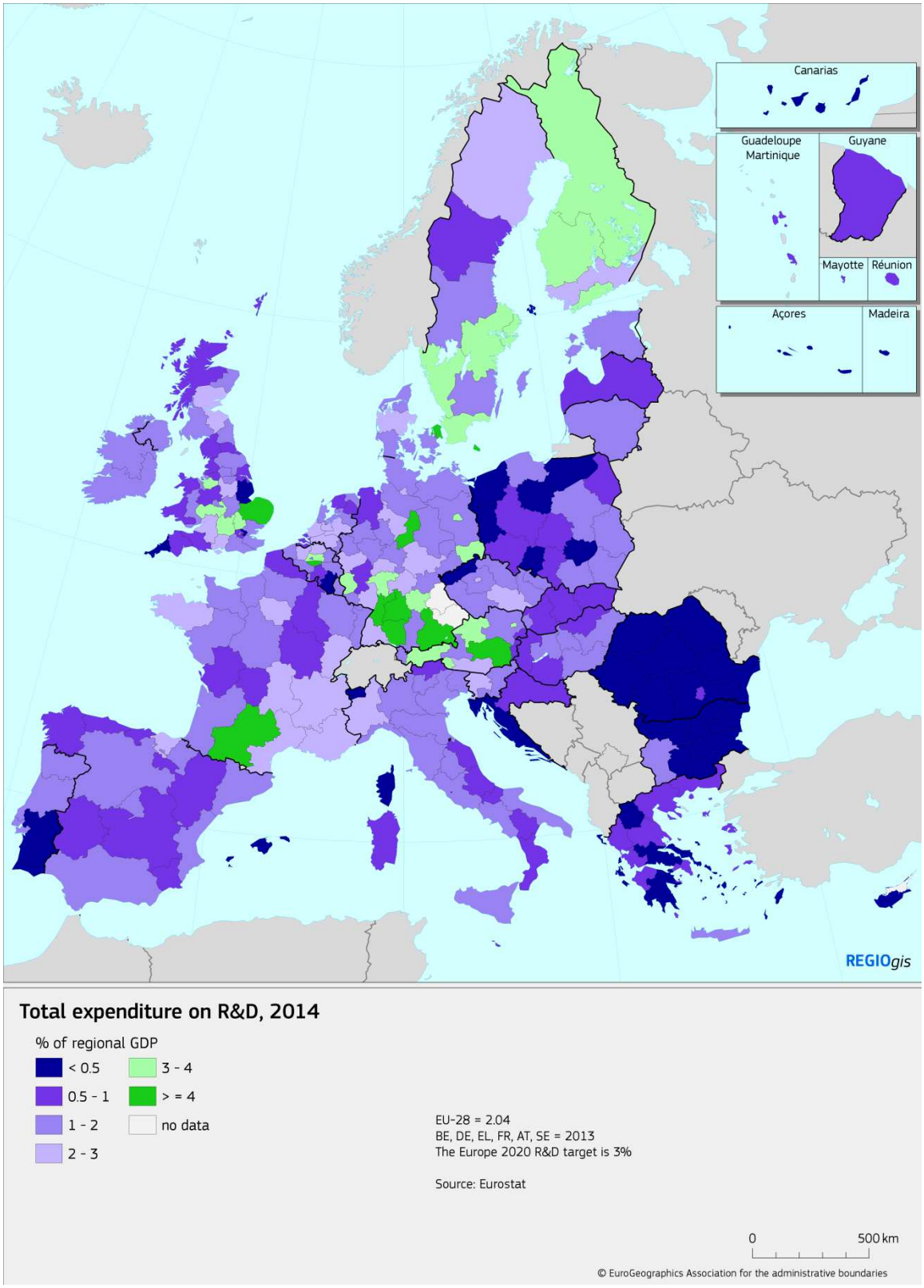
[15] One should note however that R&D expenditure is likely to underestimate innovation activities, particularly in sectors outside manufacturing where non-technological innovation is frequent.

Figure 1-18: Total expenditure on R&D, 2014



Source: Eurostat, DG REGIO calculations.

Map 1-8: Total expenditure on R&D, 2014



Source: Eurostat, REGIO-GIS.

A 2017 European Commission report highlights the key role innovation plays in the development of regions, and not only the high-tech ones.[16] The Regional Innovation Scoreboard (RIS), an extension of the European Innovation Scoreboard, assesses the performance of regions in this respect on the basis of a limited number of indicators. For 2017, it covers 220 regions across 22 EU Member States and Norway while Cyprus, Estonia, Latvia, Lithuania, Luxembourg, and Malta are covered at country level.

The most innovative region in the EU by this measure is Stockholm, followed by Hovedstaden in Denmark, and South East England (Map 1-9).

Despite regional variations within countries, the ranking of regions largely matches that of countries. Most of the regional Innovation Leaders are in countries also identified as Innovation Leaders and almost all of the regional Moderate and Modest Innovators are located in countries categorised in the same way. However, regional 'pockets of excellence' are evident in some Moderate Innovator countries (such as, Praha in the Czech Republic, Bratislavsky kraj in Slovakia, and Pais Vasco in Spain), while some regions in strong innovation countries lag behind.

The assessment of regions in terms of innovation has changed over time. Between 2011 and 2017, 128 regions (60% of the total) improved their performance, while for 88, performance worsened. Although 75% of Innovation Leaders improved their performance, only 30% of Modest Innovators did so, implying a widening gap between them.

Performance declined in particular in more peripheral regions, in all regions in Romania and for more than half of those in Denmark, Finland, Germany, the Czech Republic, Hungary, Portugal, and Spain. It increased in all regions in Austria, Belgium, France, the Netherlands, Norway, Slovakia, Switzerland, and the UK and in more than half of those in Greece, Italy, Poland, and Sweden.

Regional Innovation Scoreboard (RIS) methodology

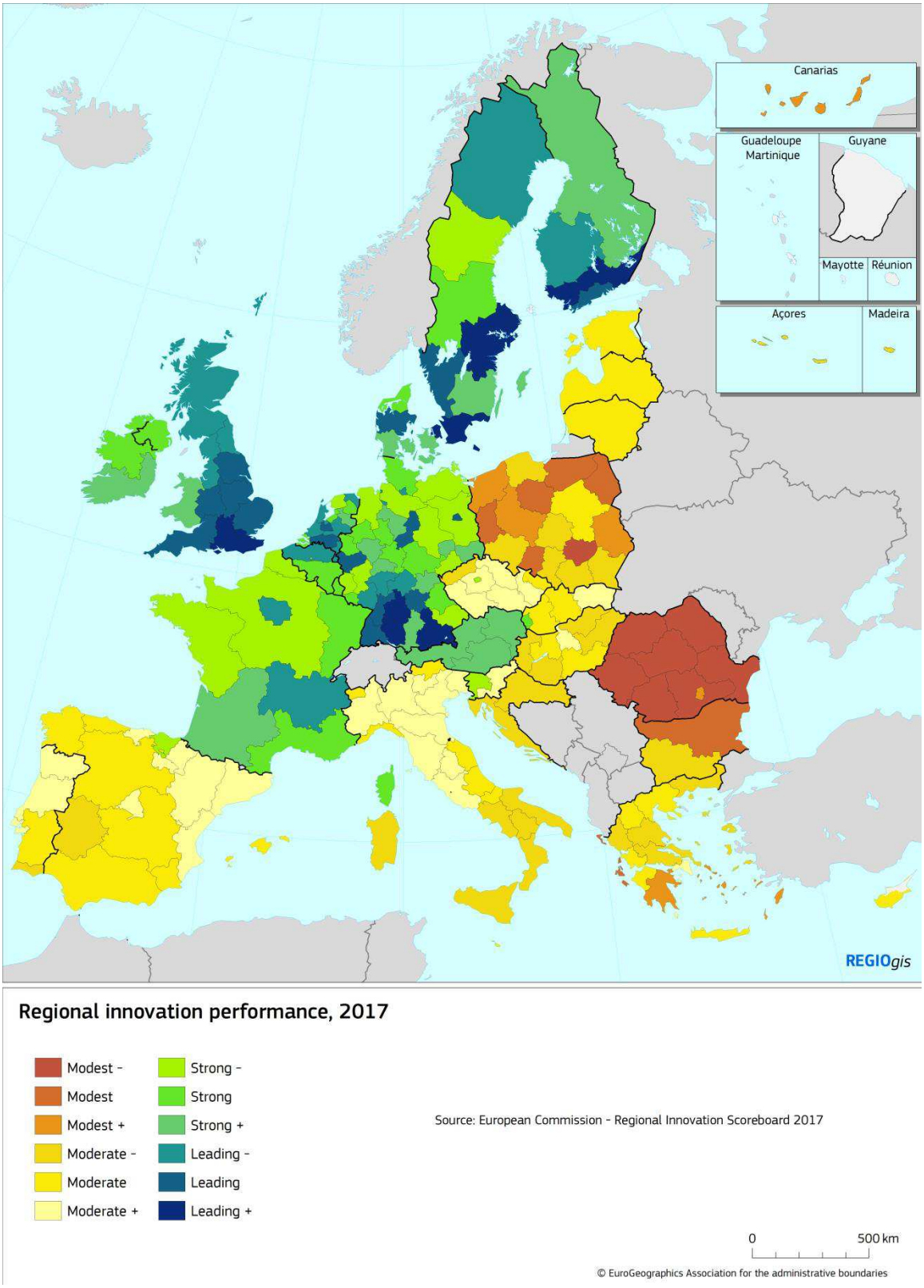
The 2017 edition of the Regional Innovation Scoreboard (RIS) classifies regions into four innovation performance groups: Innovation Leaders (53 regions), Strong Innovators (60 regions), Moderate Innovators (85 regions), and Modest Innovators (22 regions).

The RIS for 2017 is based on data for 18 of the 27 indicators used in the European Innovation Scoreboard for the same year. In the same way as the latter, the indicators for RIS 2017 have been refined and expanded as new regional data have become available. In addition, whereas previous RIS reports only divided regions into groups, the 2017 report ranks them individually.

For more details, see: http://ec.europa.eu/growth/industry/innovation/facts-figures/regional_en

[16] Regional Innovation Scoreboard 2017, available at: : http://ec.europa.eu/growth/industry/innovation/facts-figures/regional_en .

Map 1-9: Regional Innovation Scoreboard, 2017



Source: Regional Innovation Scoreboard 2017, REGIO-GIS.

In general, the RIS confirms the wide diversity of regions in terms of innovation performance, so highlighting the fact that innovation has a strong regional dimension. Given this wide

variation, measures for supporting innovation, including Cohesion Policy programmes, need to take explicit account of the regional or local context when devising the kind of support to provide. The smart specialisation approach is helping in this regard.

The regional distribution of expenditure under the EU Research and Innovation (R&I) programme

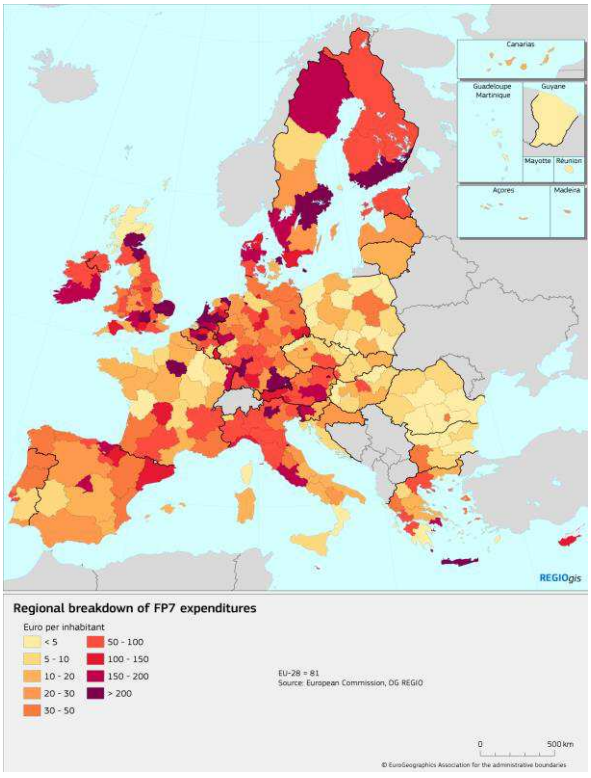
The objective of the EU R&I Framework Programme Horizon 2020 is to support research excellence wherever it takes place. Therefore, it does not differentiate between regions, group or territory.

Nevertheless, a ring-fenced budget is allocated to Part IV of Horizon 2020 'Spreading Excellence and Widening Participation' (SEWP) which includes specific support for tackling the innovation divide in the EU.

In addition, the development of synergies between Horizon 2020 and the European Structural and Investment (ESI) Funds is intended to make an important contribution to the complementary use of the two funding sources. The Seal of Excellence is a practical manifestation of this. It is a high-quality label awarded to projects submitted to Horizon 2020 which were deemed to deserve funding but did not receive it because of a limited budget, which can be used to give credence to projects when approaching other funding sources. It also helps funding bodies ((including national and regional authorities receiving ESI fund support) to identify promising projects more easily

The map below illustrates the EU financial contribution to NUTS 2 regions by the 7th Framework Programme for Research and Innovation (2007-2013). The top 5 NUTS 2 regions are Brussels, Vlaams-Brabant, Inner London, Hovedstaden and Oberbayern, which all received EUR 400 per inhabitant. On average, regions in the EU-15 received more than those in the EU-13, with capital city regions, in most cases, receiving the largest amounts in each country.

Regional breakdown of FP7 expenditure per inhabitant by NUTS 2 regions, 2007-2013



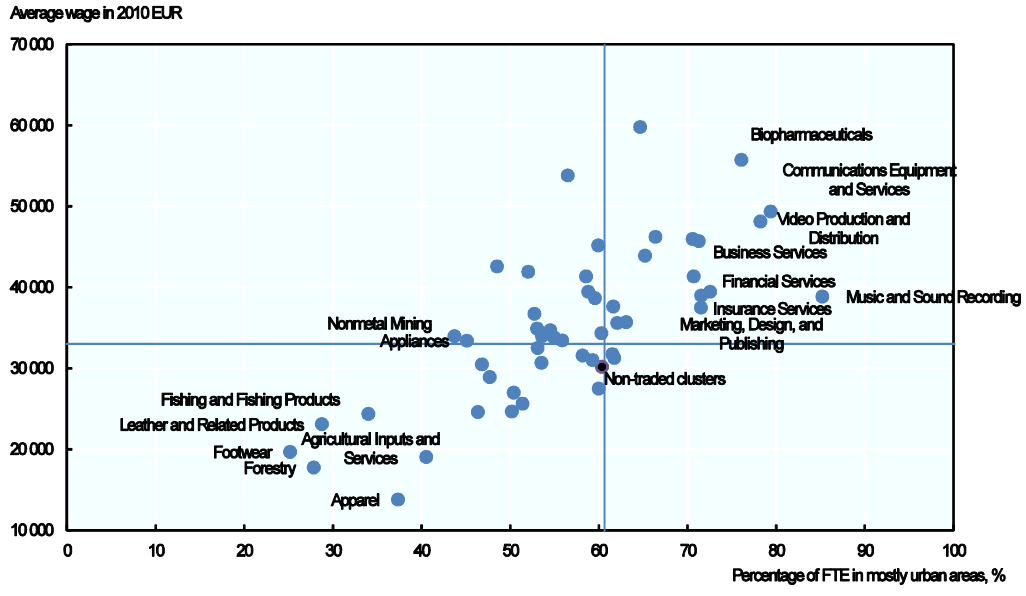
Tradable clusters in low-density and high-density economies in OECD countries.

Productivity in larger cities is higher than in smaller cities or rural areas with lower population densities. This is, in part, due to differences in the characteristics of the local work force, which, on average, is more educated with skills that would make the workers concerned more productive no matter where they lived or worked (OECD, 2015).

Large metropolitan areas, like London, New York or Tokyo, are home to some of the most productive and innovative enterprises, mostly engaged in services, especially business services, but also in ICT, healthcare and higher education (OECD, 2014). Manufacturing firms located in large cities are typically involved in innovation and skill-intensive production. Indeed, often only the headquarters or research centres of large firms are situated in cities. Unsurprisingly, the wages paid by firms in tradable clusters located in urban areas tend to be higher than those in less-densely populated areas (Figure B2).

Rural economies are at the other end of the spectrum to large cities. They are often concentrated in agricultural production or the exploitation of natural resources (OECD 2016b). Manufacturing in these areas tends to be in the more 'mature' parts of the production process using well-established technologies. The relatively small work force in low population-density areas tends to mean specialisation in a few activities in contrast to large agglomerations. This requires a careful assessment of local strengths and weaknesses and support of activities that can give rise to growth.

Figure B3. Average wage and share of total full-time equivalent (FTE) employment in traded clusters located in mostly urban areas, 2014



Note: The data identify 51 tradable clusters and a residual "non-tradable cluster" that includes all other firms. Regions with over 70% of population living in functional urban areas, or some of their population living in a large metropolitan area with over 1.5 million inhabitants, are classified as mostly urban. Average wage is the total wage bill of the cluster in EUR at 2010 prices divided by the number of FTE employees.

Source: Calculations based on OECD Regional Statistics and data used in and provided by Ketels and Protsiv (2016)

1.5.3 The number of people with tertiary education keeps increasing, but large disparities persist

A well-educated work force is the key to economic development and prosperity. Higher education boosts upward social mobility and improves employment prospects. In 2016, people aged 25-29 with a tertiary education had an employment rate of 81%, compared to 74% for those with an upper secondary education and 54% for those without an upper secondary education.[6]

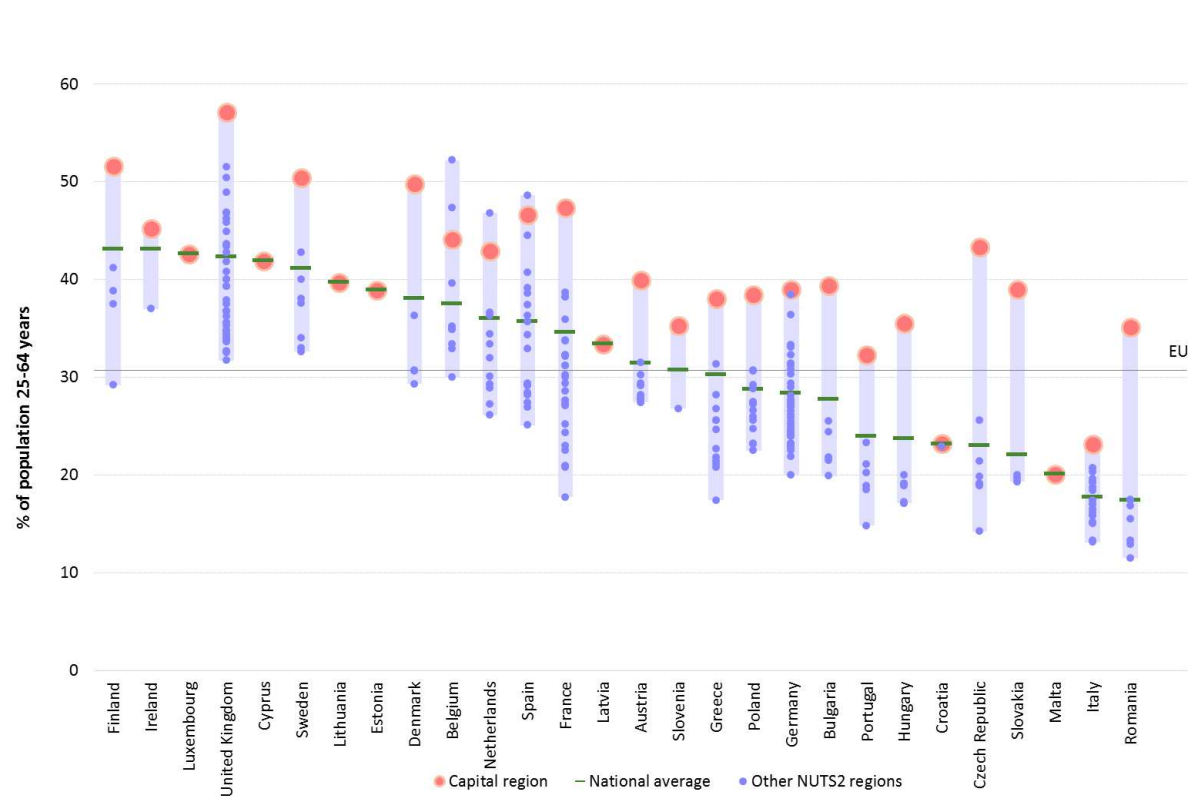
The link between educational attainment and employment rates is also strong for the population aged 25-64. Only 54% of those without an upper secondary education are employed in 2016 as against 75% of those with upper secondary qualifications and 85% of those with tertiary education. Moreover, the gap in employment rates between those with tertiary education and those with only basic schooling has widened over time (from 28 percentage points in 2006 to 31 percentage points in 2016).[7]

The share of people aged 25-64 with tertiary education, however, varies markedly across regions (Map 1-10 and Figure 1-19).

Metropolitan areas, especially larger ones, tend to have a more highly educated population than other areas.[8] Demand for highly skilled labour attracts those with such qualifications and makes it easier for them to find a job matching their skills. At the same time, firms are also more likely to find the skills they need in such areas. In 2016, around 41% of those aged 25-64 had tertiary education in capital metro regions and 32% in metro regions generally, as compared with an average of 30% in the EU as a whole. The highest figures were in Inner London, Brabant Wallon in Belgium and Helsinki, the lowest (below 20%) in regions in Italy and Romania (Map 1-10).

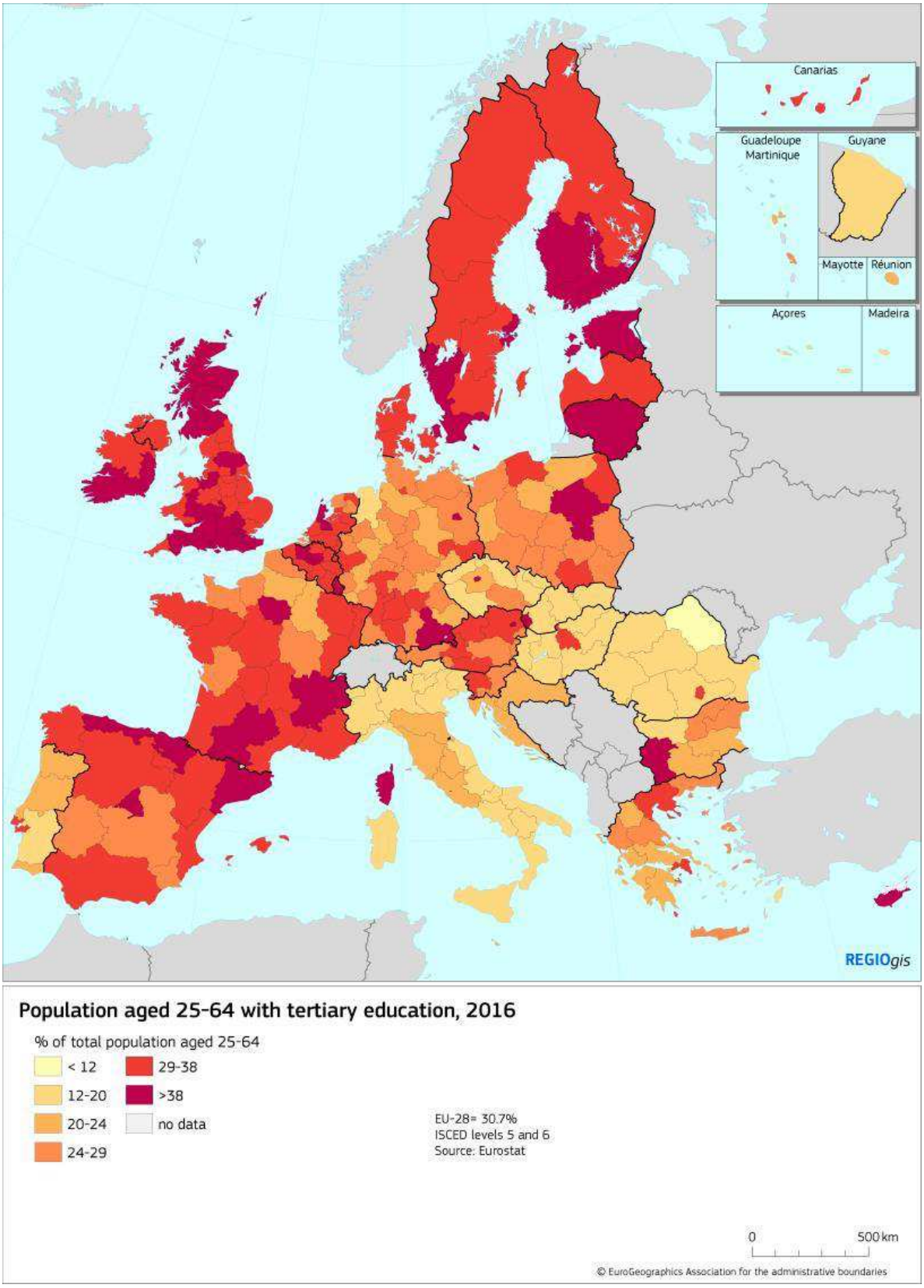
6 COM(2016), Education and Training Monitor 2016 .
7 COM(2016), Education and Training Monitor 2016, page 27.
8 European Union and UN-HABITAT (2016).

Figure 1-19: Population aged 25-64 with tertiary education, 2016



Source: Eurostat, DG REGIO calculations. Note: the region of london corresponds to the NUTS1 region of London.

Map 1-10: Population aged 25-64 with tertiary education, 2016



The Europe 2020 strategy has a target of increasing the share of the population aged 30-34 with tertiary education to 40% by 2020. The situation in 2016, however, varies markedly

between regions, largely according to their level of economic development. Over half the 81 more developed regions had already achieved the target (some before it was set in 2010). Some 22% of transition regions had also achieved the target (as compared with none up to 2013), while 29% of less developed regions had done so (Table 1**-7**).[9]

Table 1**-7: Population aged 30-34 with a tertiary education, by regional groups, 2016 ***

	More developed	Transition	Less developed	EU-28
Population aged 30-34 with a tertiary education, 2016 (%)	43.2	32.7	33.0	39.1
% point change 2008-2016	6.8	1.0	12.3	8.0
% point change 2000-2008	9.7	9.3	8.0	8.8
Distance to EU-2020 target (% point difference)	0.0	7.3	7.0	0.9
% of regions that have reached the EU target	53	22	29	41

Note * includes only regions for which data are available
Sources: Eurostat, DG REGIO calculations

Ensuring that everyone has the right skills for an increasingly digital and globalised world is essential for an inclusive labour market and to spur innovation, productivity and growth (OECD, 2016). In 2015, around 25% of those aged 25-64 reported having a low level of digital skills and 29% a basic level, while 28% reported having a higher level than basic. The situation at EU level, however, hides marked differences between Member States, particularly between those with different levels of economic development, digital skills tending to increase with the latter (Figure 1**-**20). Whereas 35% of those in highly developed Member States reported their digital skills to be above basic, in less developed Member States, the figure was only 21%.

[9] European Union (2014a).

Measuring Digital Skills across the EU

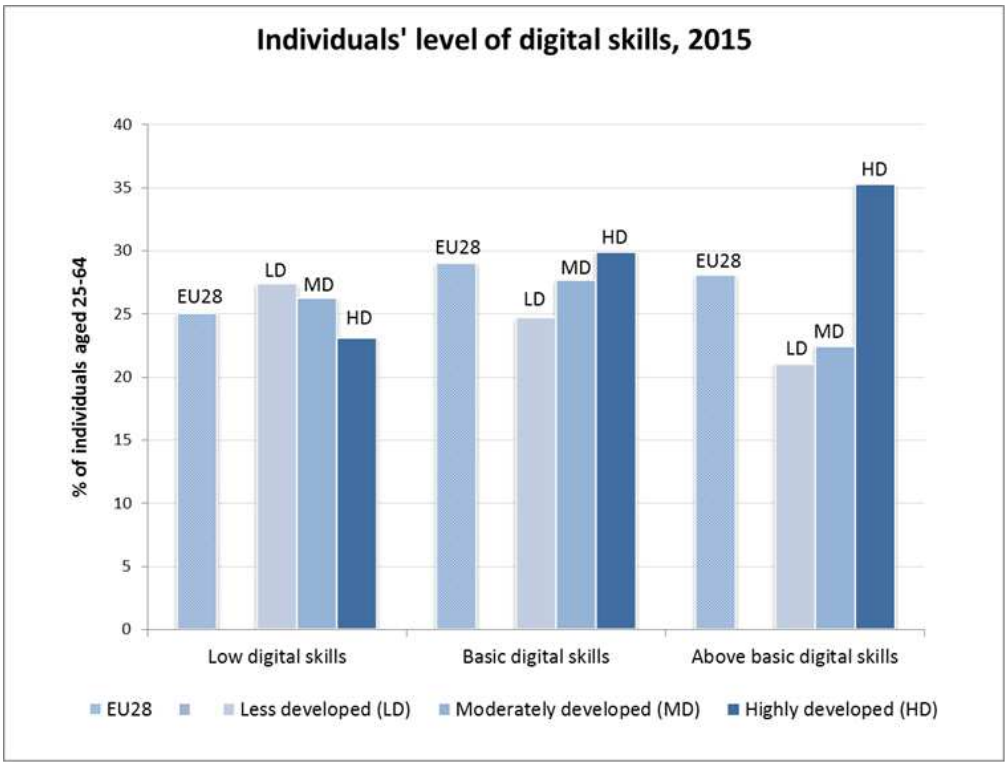
Digital skills are measured by a composite indicator which attempts to capture the competence of those aged 16-74 in performing selected activities relating to internet and computer software use. The activities concerned are finding information, communicating, problem-solving and using software. People are asked whether they have performed a given activity and if they have, it is assumed they have the skills to do so.

Two skill levels, 'basic' and 'above basic' are defined for each of the four activities and an overall indicator is calculated from this, people being divided into four groups: those with 'no skills', 'low skills, 'basic skills' and 'above basic skills.

For more details:

http://ec.europa.eu/eurostat/cache/metadata/en/tepsr_sp410_esmsip.htm

Figure 1-20: People's levels of digital skills, by level of economic development, 2015



Source: Eurostat, DG REGIO calculations.

1.5.4 Improving market access does not always generate growth

Investment in transport infrastructure is widely used to promote economic development, but its actual impact on the economy is complex and hard to predict. In a number of cases across the EU, projections of transport demand made before the infrastructure had been built to justify the investment concerned have proved to be too optimistic. This is demonstrated by several severely under-used motorways, airports and high-speed railway lines (Flyvbjerg et. a1., 2003, European Union, 2014b).

In principle, lowering transport costs should boost trade and economic growth. The new economic geography theory of regional development, however, warns that improving transport connections between two cities may not necessarily help both even if it improves overall productivity. For example, if a city with less efficient firms is connected to one with more efficient firms, the latter might capture the market in the other city, leading to a reduction of economic activity there.

Regional access to markets by road is mainly determined by the spatial distribution of population. A remote region will always have a small market even with large-scale road investment. Accordingly, transport investment, especially in areas with a mature network, cannot radically alter market access. Potential accessibility by road is the highest in regions and cities in the centre of the EU (European Union and UN-HABITAT, 2016). Many regions in central and eastern Member States, however, are not yet connected by an efficient road network and will only have better access to markets after the completion of the Trans-European Transport Network (Map 1-11).[10]

The speed and frequency of trains is also much lower in central and eastern EU countries (Poelman and Ackermans, 2016). While some countries, such as the Czech Republic and Hungary, have a relatively dense rail network, the frequency and speed of service on many of the lines makes it an unattractive alternative to travel by car (Map 1-12).

Accessibility by rail is very high in the areas in and around the highly urbanised parts of the UK, the Netherlands, Belgium, northern France and the Rhine-Ruhr region in Germany. This is due to the combination of a high concentration of population, a dense rail network, high-speed rail connections and relatively high frequency of service (Map 1-13). Accessibility is still high in and around cities in western and eastern France, many parts of Germany, the north of Italy and some parts of Spain. It is relatively low in Austria and Switzerland due to the mountainous terrain and lower still in more peripheral western parts of the EU, in Ireland, Portugal and Spain, and in the Nordic countries, where there are longer distances between cities and low population density. In most of the eastern parts of the EU, as noted above, accessibility is low because of low frequency of service and slow speeds.

By 2050, the EU intends to complete a European high-speed rail network, the aim being for rail, both high and normal speed, to account for at least 50% of all medium-distance passenger

[10] The map depicts expected changes relative to the situation in 2012.

travel.[11] This will require substantial investment, especially in countries where the network is not very dense and the service tends to be slow and infrequent.

The Connecting Europe Facility

The main source of funding for implementing the EU transport policy is the Connecting Europe Facility (CEF), which complements the ESI Funds by focussing support on cross-border connections (including maritime ones) and interoperability between national transport networks. Funding for the Facility amounts to EUR 24 billion for 2014-2020.

The CEF calls for proposals in 2014, 2015 and 2016 provided support to 604 projects with grants amounting to EUR 22 billion and with ca. EUR 41.6 billion of investment being mobilised. With the funding extended under the 2016 call, 96.3% of the budget for grants available from the Facility will have been allocated.

Financing for the TEN-T Comprehensive network mainly comes from the ESI Funds which also co-finance the TEN-T Core network, particularly non-cross-border parts and roads.

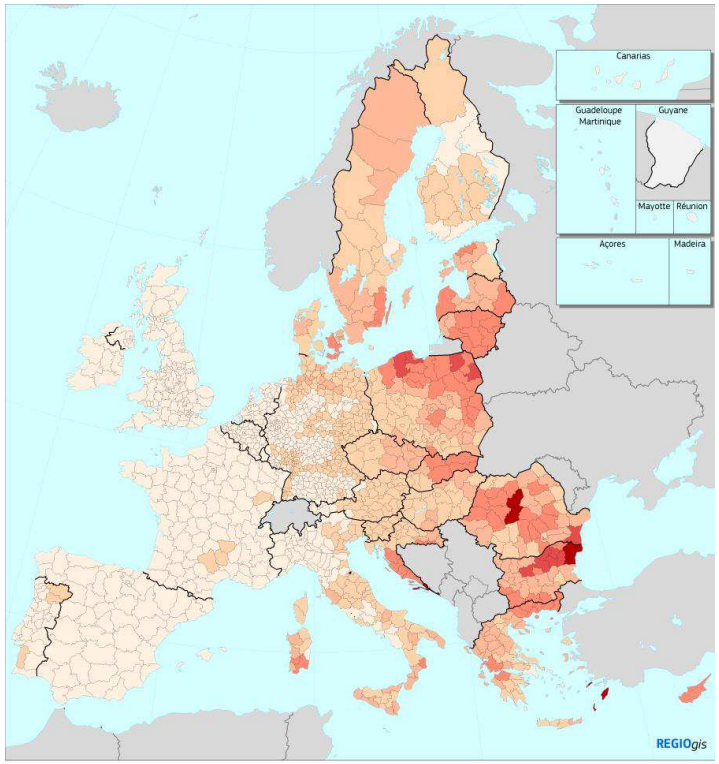
Current investment in the TEN-T amounts to around EUR 50 billion; though estimates suggest that EUR 607 billion is needed by the end of 2030 to complete the TEN-T Core Network Corridors alone.

For more details: https://ec.europa.eu/transport/themes/infrastructure/ten-t-guidelines/project-funding/cef_en

Access to passenger flights is highly uneven across the EU, ranging from London and surrounding areas where people have access to over 3000 flights a day to regions in eastern Poland and Romania without any flights within 90 minutes driving time (Map 1-14).

[11] European Commission 'White Paper, Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system.' COM(2011) 144 of 28.3.2011.

Map 1-11: Expected change in road accessibility due to TEN-T network composition, by NUTS3 region



Map 1-12: Average speed of direct rail connections, 2014