ESPON

SIESTA
Spatial Indicators for a ‘Europe 2020 Strategy’ Territorial Analysis

Applied Research 2013/1/18

(Draft) Final Report | Version 10/08/2012

Report

EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

This report presents the draft final results of an Applied Research Project conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

Information on the ESPON Programme and projects can be found on www.espon.eu

The web site provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

This basic report exists only in an electronic version.

List of authors

Lead Partner (University of Santiago de Compostela)

Rubén C. Lois González – Project Coordinator

Valerià Paül Carril – Project Manager

José Carlos Macía Arce – Communication Manager

Alejandra Feal Pérez

Yamilé Pérez Guilarte

María José Piñeira Mantiñán

With the collaboration of Anxo Ramón Calvo Silvosa, Miguel Pazos Otón, Anxos Piñeiro Antelo and José Ignacio Vila Vázquez.

With the participation of:

— National Centre for Scientific Research (France): Petros Petsimeris, José Ignacio Vila Vázquez, Maria Luisa Caputo.

— Adam Mickiewicz University in Poznan (Poland): Lidia Mierzejewska.

— University Mediterranea of Reggio Calabria (Italy): Francesco Bonsinetto, Giuseppe Modica, Angelo Cannizzaro, Enzo Falco, Barbara Lino.

— Hellenic Open University (Greece): Lila Leontidou, Alex Afouxenidis, Stelios Gialis, Anastasia Stringli, Anastasia Vatsou.

— University of Bucharest (Romania): Ioan Ianos, Natasa Vaidianu, Daniela Rodica Stoian, Andrei Schvab, Florentina-Cristina Merciu.

— University College Dublin (Ireland): Niamh Moore, Delphine Ancien.

— MCRIT SL (Spain): Andreu Ulied, Oriol Biosca, Marta Calvet, Rafa Rodrigo.

Santiago de Compostela, Galicia, Spain, 10 August 2012

Table of Contents

Foreword

This is not a usual Atlas, but a document attempting to translate a written strategic plan which lacks any spatial representation into a consistent collection of maps. This policy document is the Europe 2020 Strategy (EU2020S), which was issued in 2010 by the European Commission and constitutes a growth scheme for the decade 2010-2020 that aims to help the European Union to recover from the current ongoing crisis through the so-called smart, sustainable and inclusive dimensions of growth. The first point to note is that the spatial dimension of the EU2020S is not obvious. Indeed scholars such as Böhme *et al.* (2011) have recently stated that the EU2020S is territorially blind. That has made doing this Atlas especially challenging given that the spatial derivative of the EU2020S has had to be inferred. This has been SIESTA's (Spatial Indicators for a 'Europe 2020 Strategy' Territorial Analysis) Project's main task, under the ESPON Programme, between September 2011 and August 2012. Thus, this Atlas constitutes SIESTA's major achievement, contributing to a synoptic, analytical and comprehensive summary of the EU2020S in spatial terms.

Be that as it may, it has to be said at the very beginning of this piece of work that datasets are really scarce and that means that, although a very intensive data screening has been carried out, the selection of maps is not only derived from the EU2020S itself, but also is noticeably a product of the lack of data at the appropriate scales and dates. Indeed, a first topic that the SIESTA team wants to highlight is that more effort is needed by the European institutions, especially Eurostat, in data gathering. It is impossible to explain the EU2020S in the regional or urban arena if the appropriate datasets do not exist. In any case, maps have been elaborated at the coarsest grain possible, representing urban areas when feasible, but this has been extremely difficult and there are several critical variables that are represented by countries. Methodological explanations in this respect are out of place in this Foreword and are part of SIESTA's Scientific Report.

This Atlas begins with an introductory section devoted to presenting the EU2020S, starting with the fact that the document is designed for policy-makers and a wider public audience who are not necessarily familiar with the strategic document. It then turns to consider the three dimensions of growth as envisaged by the EU2020S that have been intentionally rescheduled in order to put the very notion of growth in the forefront of the thematic contents. The Atlas concludes with an overall territorial analysis of the EU2020S. The textual contents of this Atlas partially come from thematic reports developed by SIESTA's Project Partners, but the Lead Partner has developed all them together on its own. In addition, maps have been produced by the Lead Partner with the collaboration of MCRIT. Graphics and tables are entirely SIESTA's Lead Partner development.

Böhme, K. et al. (2011): *How to Strengthen the Territorial Dimension of 'Europe 2020' and the EU Cohesion Policy*. Warsaw: Ministry of Regional Development.

1. The Europe 2020 Strategy

The Europe 2020 Strategy (EU2020S) was launched by the European Commission (EC) in November 2009 and discussed during the Spanish Presidency of the EU in the first semester of 2010 by different EU institutions (the Parliament, the Council of Ministers, etc.), with a first overall discussion held in the European Council meeting on the 25th-26th March 2010 in Brussels. The consolidated official document of the EU2020S constitutes a Communication from the Commission published in March 2010, being finally adopted by the European Council on the 17th of June 2010 in a meeting held in Brussels. If the strategic document of the EU for the decade 2000-2010 was the so-called Lisbon Strategy (also known as the Lisbon Agenda or Lisbon Process), the intended strategic document for the decade 2010-2020 is the EU2020S. Mainly, the need of a new strategic direction of the EU is motivated by the crisis context.

The EU2020S has as meaningful subtitle "a strategy for smart, sustainable and inclusive growth". The document contains a preface of the President of the EC telling that the context of "economic and financial crisis" has motivated the elaboration of this EU2020S for achieving "a sustainable future", which is "about more jobs and better lives", acknowledging that the EU "has the capability to deliver smart, sustainable and inclusive growth, to find the path to create more jobs and to offer a sense of direction to our societies"; this constitutes the basic rationale of the EU2020S. It can be said that it goes thematically beyond the previous Lisbon Strategy, as this was basically focused on economic and smart growth (competitiveness and knowledge-based economy) and included several social issues (basically employment).

The EU2020S consists of a double-folder of thematic organisation (Graphic 1.1): on the one hand, three priorities are launched; on the other, seven flagships are established. In relation to the priorities, they can be defined as the basic pillars or aims that are attempted to be attained by means of the EU2020S, in an inter-related manner, as follows:

- Smart Growth: developing an economy based on knowledge and innovation.
- Sustainable Growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive Growth: fostering a high-employment economy delivering social and territorial cohesion.

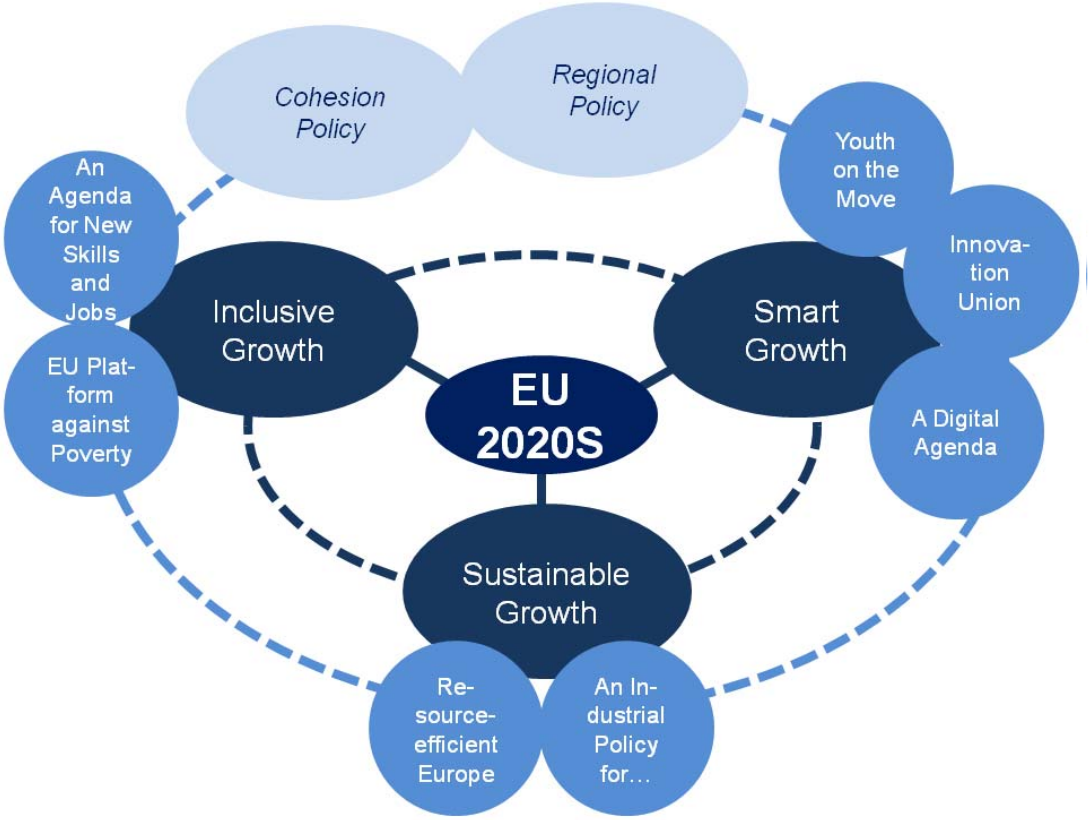
These three themes are understood to be the very basic framework of the EU2020S, and are used for structuring this Atlas. In order to catalyse progress towards each one of priorities, seven flagship initiatives are put forward. These are key programmes or tools to foster the achievement of the EU2020S. The seven flagships are listed as follows:

- Innovation Union.
- A Digital Agenda for Europe.
- Youth on the Move.
- Resource Efficient Europe.
- An Industrial Policy for the Globalisation Era.
- An Agenda for New Skills and Jobs.
- European Platform against Poverty.

The seven flagships are clearly attributed to the three major themes (Graphic 1.1). Basically, the flagship initiatives are strategic programmes encouraged by the EC itself with its own leeway. These flagship initiatives are inter-related and are structured around the three reinforcing priorities, as is represented in Graphic 1.1. Be that as it may, each flagship has been passed as an official Communication from the EC.

In Graphic 1.1 cohesion and regional policies have been included as a framework of this Atlas. Although the territorial implications of the EU2020S are not evident beyond the general statement included therein that the benefits of growth spread to all parts of the Union (indeed, this Atlas basically pretends to show this spatial dimension), it is important to note that cohesion and regional policies have several links with the EU2020S set of strategies and that means that they are usually referred to in this Atlas. In any case, it is worthwhile mentioning that the EC has adopted two specific Communications on regional policy contributing to the achievement of the EU2020S in smart growth issues (in 2010) and sustainable growth issues (in 2011). In addition, the Territorial Agenda of the European Union 2020 adopted in May 2011, constitutive part of the cohesion policy, is understood to be coherent with the EU2020S and indeed it sets the same target year.

Beyond priorities and flagship initiatives, the EU2020S consists of headline targets that are set for being achieved by 2020. In short, the EU2020S indicates the basic direction that the EU economy should follow and this direction is intended to be measurable by means of some indicators, that is, the headline targets. Again, these targets are supposed to be inter-related. All these targets will be mapped in this Atlas, at the coarser grain possible in each case. The Lisbon Strategy also set targets to be measured and indeed one target has been reiterated in



Graphic 1.1 The EU2020S from the perspective of the SIESTA Project

2010. The official list of headlines is as follows:

- 75% of the 20-64 year-old population to be employed.
- 3% of the EU's Gross Domestic Product to be invested in R&D.
- The three targets known as "20/20/20": a 20% reduction (and even 30% if possible) in greenhouse gas emissions in relation to 1990 levels, 20% of energy from renewable sources and a 20% increase in energy efficiency.
- Reducing early school leavers to below 10%.
- At least 40% of 30-34 year-old population completing third level education.
- At least 20 million fewer people in or at-risk-of-poverty and social exclusion.

It must be said that the accomplishment of these targets is being quite a controversial matter. Not only at member state level, where indeed each country is establishing its own national headline target by adapting the general orientations of the EU, but also in the sense that each individual region is able (or it makes sense to do so) to achieve the national or the EU headline targets. This is not said in the EU2020S document itself, but in late 2011 the EC, by means of the 7th Progress Report on Cohesion, has acknowledged that it is not implicit that all the regions can or should reach the national 2020 targets, accepting that for some regions, the distance to the target is simply too great. The EC has also added in this respect that for some issues it is not realistic or desirable that all regions reach the same target. The rationale for accepting that each country sets its own national target derived from the EU target is in the very own EU2020S, when it is accepted that each country has to take into account its different needs, different starting points and specificities so as to promote growth for all. However, and this Atlas will illustrate this point, the national targets are sometimes very heterogeneous and their sum country per country does not guarantee the achievement of the overall EU targets.

The EU2020S is assessed each year through progress reports on the fulfilment of the EU2020S, for the whole of the Union and for member states, which are officially called the Annual Growth Survey (to date, there are versions for 2011 and 2012 available). This survey is done in a consistent way following the EU2020S, and is supposed to be the framework on which the Annual Growth Survey is based. It typically consists of three annexes, as follows:

- Annex 1: Progress Report on Europe 2020.
- Annex 2: Macro-economic Report.
- Annex 3: Draft Joint Employment Report.

Importantly, the first one is reviewing the EU and national headline targets yearly.

2. Sustainable Growth

The EU2020S deals firstly with promoting growth. The document is unambiguous when it highlights that the strategy is delivered in order to come out from the crisis and to get back on track. The EU2020S also states that it must be able to turn the EU into a sustainable economy, but it is clear from the Strategy itself that the very idea of *sustainable* is understood as a sustainable recovery of the path of growth. That means that sustainable growth is noticeably focused on strictly economic issues, rather than environmental topics. Although it is true that the *sustainable growth* section embraces some of the typically associated notions to *sustainable development* (resource efficiency, renewable sources of energy, etc.), in practice it primarily means building an economy which leaves the crisis behind. Indeed, one of the two flagship initiatives associated to the sustainable growth section is based on manufacturing and states, word by word, that “Europe needs industry” and this industry not only consists of green manufacturing but also, and quite obviously, of non-green industries. That clearly differs from the common understanding of the notion *sustainable* in popular, academic or policy terms, but it is importantly the orientation of the EU2020S.

Be that as it may, the basic point in this section is that the approach to overcome the crisis has to be based as far as possible on an environmentally-friendly growth through the development of a low-carbon and resource-constrained economy preventing environmental degradation, biodiversity loss and unconscious use of resources. This direction is not only strategic for the development of a competitive advantage for the EU and for observing the international commitments of the EU (for instance, in terms of greenhouse gas emissions), but it is also crucial for reducing the dependency of foreign sources of energy, materials or commodities.

Basically, the sustainable growth pillar attempts to develop a more resource efficient, greener and more efficient economy. Taking into account that a greener economy must be necessarily resource efficient, these contents are located together in this Atlas, while the contents on competitiveness are capital in the subsection devoted to economic growth. For this reason, this section on sustainable growth is two-fold. On the one hand, contents devoted to competitiveness and economic growth are exposed; that means that the first maps are reflecting on economy alone, under the particular understanding of *sustainable growth* under the EU2020S. On the other hand, a green economy is considered, including issues related to combating climate change and moving towards a cleaner and more efficient energy production and consumption (where maps sustainability would be typically considered). This division is consistent with the fact that the EU2020S’ sustainable growth pillar embraces two flagship initiatives on industry (thus, economic growth) and on resource-efficiency (thus, green economy).

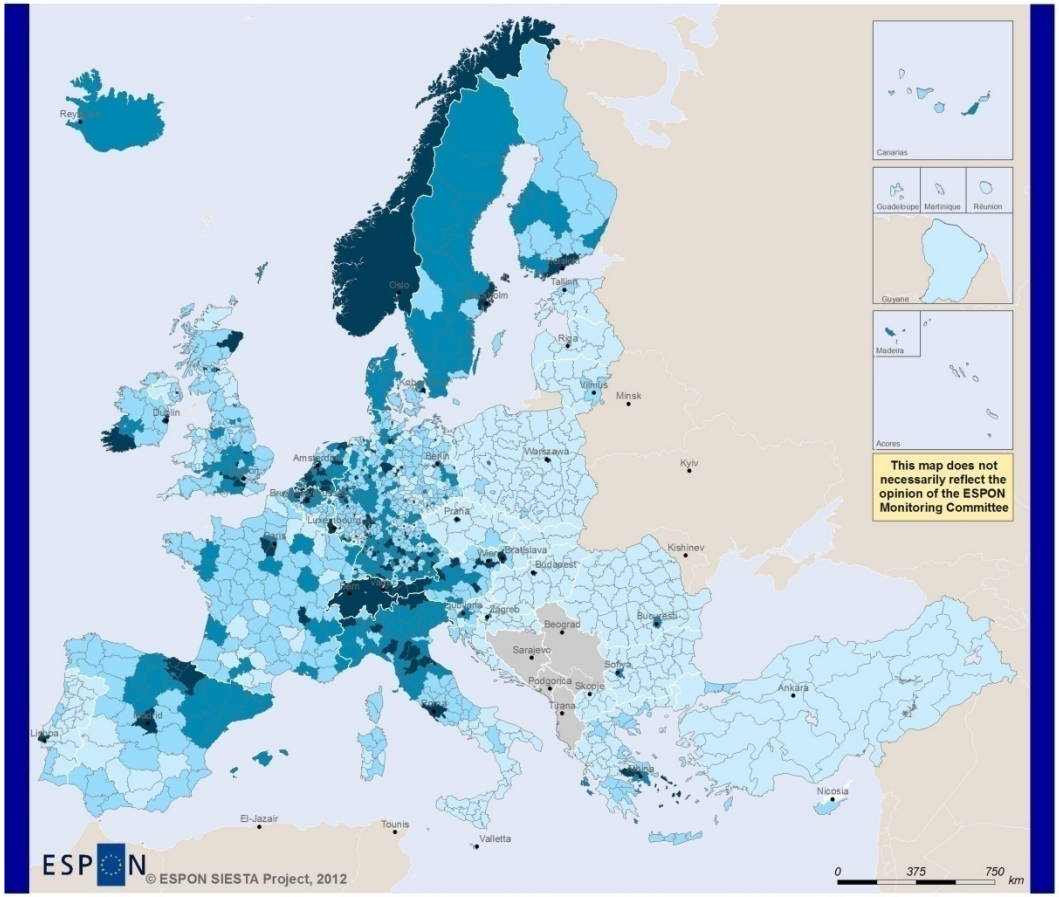
2.1. Economic Growth and Competitiveness

2.1.1. Economic Growth

Growth is the basic objective of the EU2020S as for this document recovering from the crisis means a return to the path of growth. In addition, economic growth is increasingly seen in the European civic and political arenas as the critical target for the future. In this respect, a basic purpose must be to statically consider the current performance of economies and afterwards examine which has been the rate of change, that is, to test if growth has effectively taken place through time.

In the EU there is a long-term tradition of measuring the economic imbalances through the regional gross domestic product per inhabitant (allowing the comparison of different economies and regions in demographic size), computed in purchasing power standards (pps, thus eliminating differences in purchasing power due to different price levels) and expressed as a percentage of the EU average (which scores 100). This measurement has been notably popularised in the last decades by scientific literature showing the economic and territorial imbalances of the EU and, moreover, it is the basis for the establishment of the EU policies of cohesion, with the threshold of 75% of the

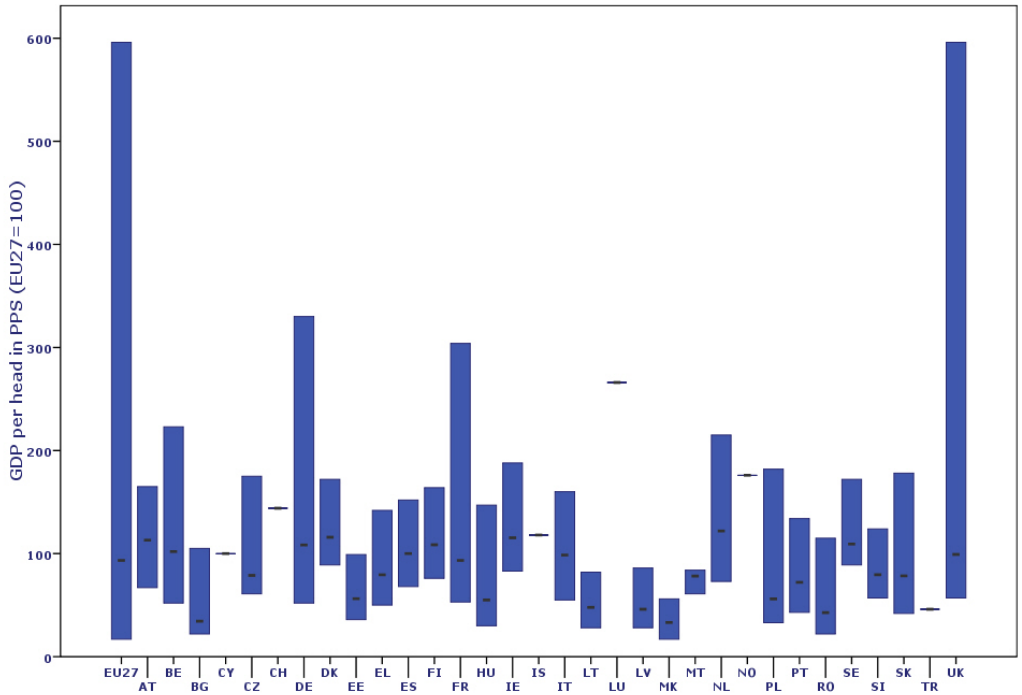
Map 2.1 Regional GDP per head measured as purchasing power standard in percentage of the EU average (EU=100), 2009



average being critical since some decades ago for virtually classifying those regions with less than this percentage as 'poor', thus receiving higher public funds. This means that this measurement of regional economic success is widespread and has been substantial for policy-making. Importantly, the EU2020S accounts itself this measurement, which is basic for grasping the geographical point of departure of a growth strategy. The EU2020S acknowledges that economic growth must spread to all parts of the EU, but obviously the economic situation of these parts differs geographically.

As it is well known, the disparities of GDP/head within the European territory are quite significant. The interpretation of these disparities starts from a somewhat clear division between the East and the West which remarkably follows the Iron Curtain, in force until 1989, as it is well reflected by Map 2.1. The poorest regions of the considered space are located in Eastern countries in relation to the Iron Curtain such as Bulgaria, Romania or Macedonia, the latter with the lowest value (17%) being recorded by the region of Pološki (Macedonia); in this Eastern bloc, a slightly better situation in this respect is obtained in the Czech Republic and Slovakia, whose regions are better ranked. In sharp contrast, the Western countries contain the wealthier regions, the top being located in West Inner London, obtaining almost 600 (exactly, 596%). That means that an average inhabitant of the highest studied region is 35 times richer than a person living in the region lagging behind: yearly, that represents 140,100 € in pps per inhabitant and 4,000 € in pps per inhabitant, respectively. This results in an important economic distance that is primarily based on the differential history of both sides of the Iron Curtain for almost five decades. Importantly, the fact that most of these Eastern countries are now members or candidate countries of the EU, it is widely understood as a facilitator for closing the gap with the Western side; this means that the potential for a more economically balanced regional Europe exists.

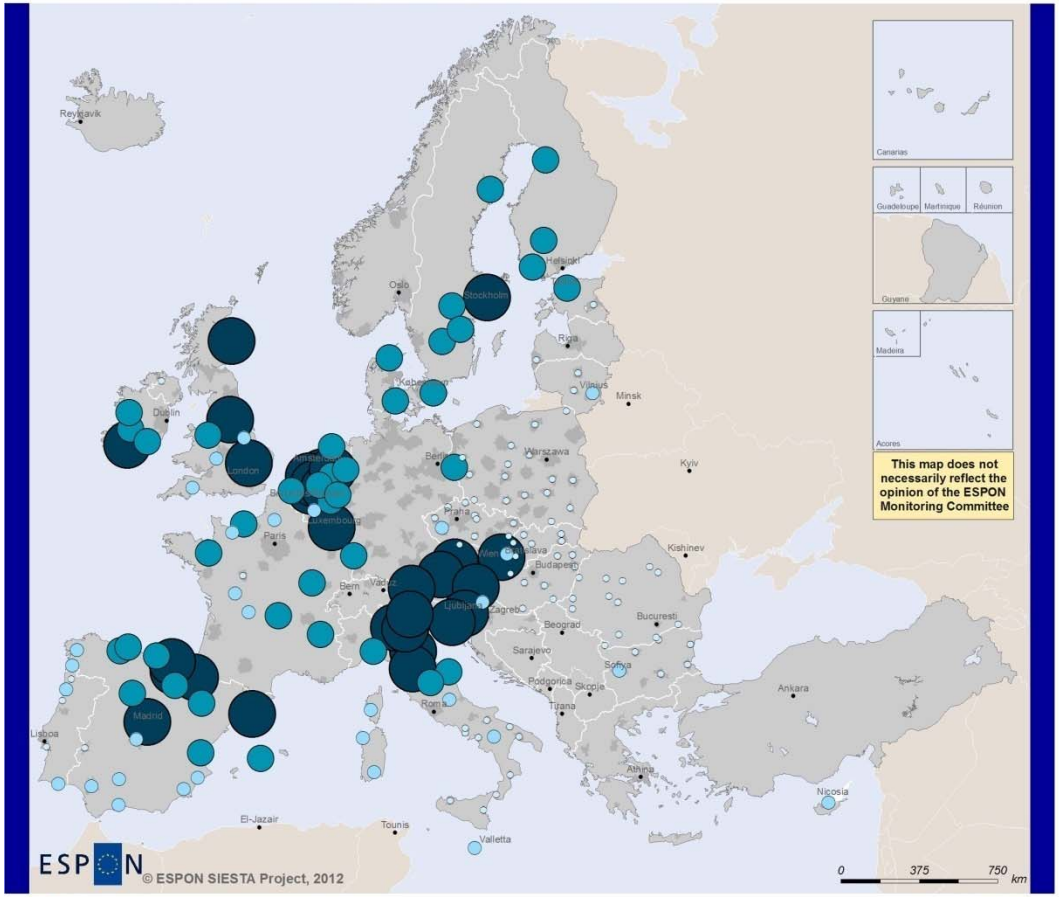
Graphic 2.1 Regional disparities (NUTS3) in GDP per head among states. Source: Eurostat, SIESTA's calculation



Be that as it may, the heterogeneity is very marked in the West as well as in the East. Firstly, capital cities and large cities and metropolitan areas are usually the regions where GDP per head is higher, a pattern which clearly highlights some urban areas in Eastern countries such as Romania, Bulgaria or the Czech Republic, but the same is applicable in Western countries (Sweden, the UK, Finland, France, Portugal, etc.); the correlation between urban regions and GDP/head is an outstanding fact, meaning that in general rural regions tend to be in a worse situation. Furthermore, in the West there are countries where several regions (and even all of them) are positioned in an affluent situation, while others present a large gap between richer and poorer regions. Indeed, substantial national differences are reported in most of the countries, especially marked in the United Kingdom, Germany and France, but also noticeable in Poland or Slovakia (Graphic 2.1).

The concentration of richer regions lays in the Alpine Arc and the Rhine Valley, including several regions of Germany and the Benelux. The obvious extension of this macro-region to the London area and to Northern Italy has been the inspiration for the well-known metaphor of the “blue banana” or area constituting the core of the European economy. In addition, other nearby regions to this “blue banana” are wealthy in comparative terms, for instance the North-East quarter of Spain (all of them above the 100% average of EU27) or particular parts of Ireland or Scotland, these latter denoting that not necessarily a peripheral location means lower economic levels. Apart from the urban character of regions, significant and positive correlations can be traced between those regions being in a better situation in economic terms and the specialisation in scientific, technological, ICT and financial activities; this shows that the development of advanced services explains a wealthier status and that this might be the appropriate strategy for the regions lagging behind.

Map 2.2 LUZ GDP per head measured as purchasing power standard, 2007



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LUZ
Source: EUROSTAT
Origin of data: EUTOSTAT, URBAN AUDIT, 2012
© EuroGeographics Association for administrative boundaries

PPS per inhabitant, 2007.

- 5,000 - 18,000
- 18,000 - 24,000
- 24,000 - 30,000
- > 30,000
- Large Urban Zones

Note:
Data for this indicator is derived from the GDP per inhabitant by NUTS 3 regions.

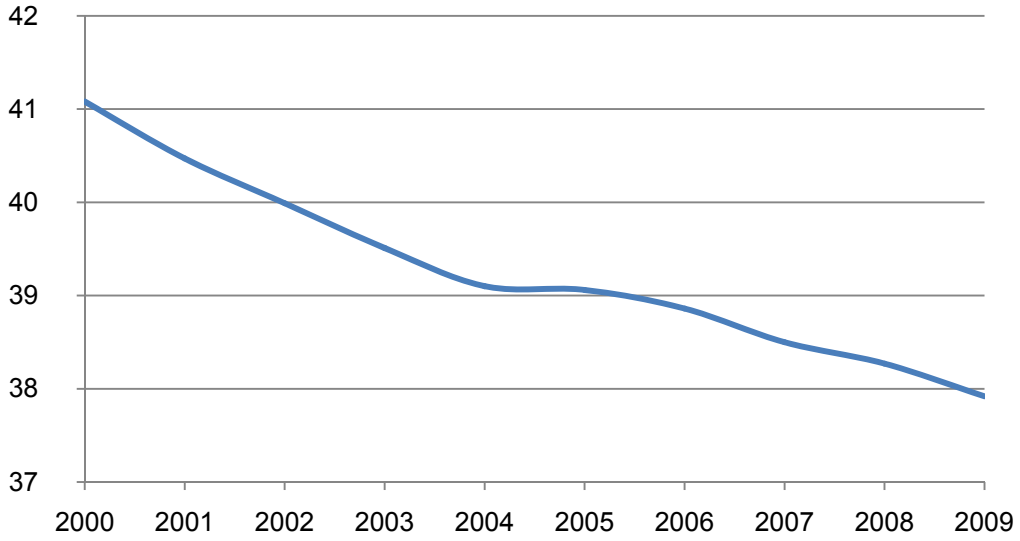
Urban Audit defines Larger Urban Zone (Label "LUZ") as an approximation of the functional urban zone centred around the town/ city.

Although in general cities are perceived as the areas concentrating more economic activities and they are definitively wealthier than their neighbouring rural areas, it is true that there are clear differences among them. The first point to note is that most of the large urban areas (LUZ) lack data, but the Map 2.2, representing only the cities with data, reveals again a divide between the East and the West of the continent. However, disparities are not as acute as in regional accounts. The wealthiest recorded urban area is Luxembourg, with 68,500 € in pps per head, while the poorest recorded is Calarasi (Romania), with 5,400 €, that is, a 13-fold difference is obtained. That is motivated by the fact that statistically LUZs include broad metropolitan areas containing heterogeneous socio-economic suburbs. The strongest cities in economical terms are not necessarily capitals (in the ten better listed Cork, Linz, Salzburg, Utrecht or Aberdeen are present) and this is an important output in terms of polycentrism of the urban system. In addition, this also supports the potential for medium-sized urban areas that clearly record favourable conditions for economic performance. In this respect, the emerging concept of the 'slow city' developed by several scholars attains importance in the sense that not only the big metropolises, which are

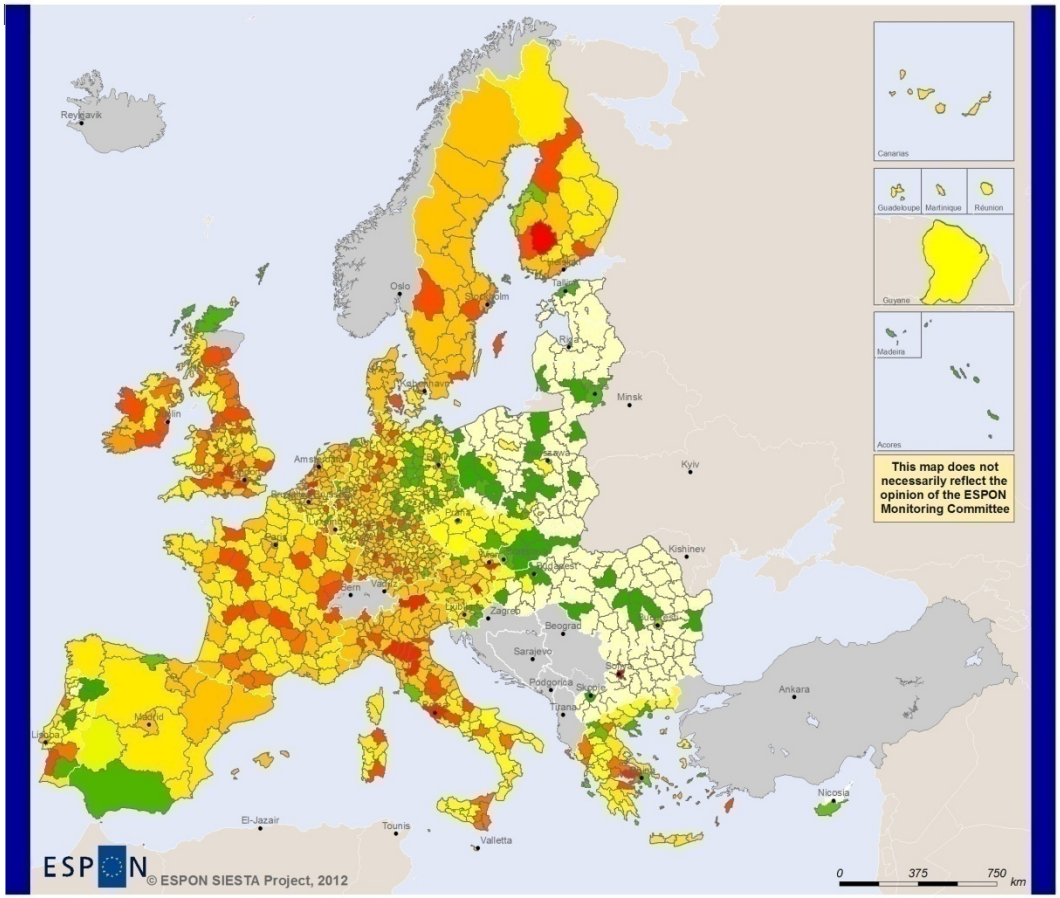
major hubs on the global scale, are able to develop economic wealth. Under the 'slow city' approach, particular attention is paid to secondary economic poles rooted in the local history and traditions, while taking advantage of their individual characteristics. In this respect, the medium-sized urban areas have an opportunity to grasp growth because not only big metropolises are outstanding. To sum up, beyond the clear East/West divide prevalent for the European urban areas, not only do the bigger metropolises offer higher levels of economic prosperity, but also do some medium-sized cities.

As well as the absolute figure of GDP per capita, it is meaningful to measure its rate of change. This has been done for the 2000-2009 decade, while earlier reports focused on previous periods. In general terms, an analysis of the evolution of the coefficient of variation for this period shows that there is a clear narrowing of disparities among regions, with this normalised measure slightly falling from 41 to 37 (Graphic 2.2). This fact might arguably mean that many regions lagging behind are catching up. Again, the detailed Map 2.3 shows the specific pattern of change in regional GDP per capita and obtains a quite heterogeneous pattern. The majority of regions remain in a similar situation, showing a quite apparent stationary general behaviour. However, it is true that in a very scattered pattern some Eastern regions clearly perform their economic situation (especially, most of the regions of the former East Germany, Poland, Slovakia, Romania and Hungary) and the same is applicable for areas in Finland, Scotland, Spain, Portugal, Italy, Greece or Cyprus; in all these areas there has been an upgrading of the rate, at least 25 points in relation to the EU average. In the meantime, wide areas of the United Kingdom, France, Italy or the former West Germany experience the opposite pattern, with a downgrading of the rate, at least 25 points in relation to the EU average. If the former variation can show a moderate progress towards convergence, the latter might be a statistical effect of the former but could also hide a real loss of economic performance. Nevertheless, the clear trend of several of the regions in less developed member states to converge, together with the fact that disparities are slowly being reduced, is an indicator that the long way towards territorial cohesion is taking place.

Graphic 2.2 Dispersion of GDP per head, EU27 NUTS2 regions through the coefficient of variation, 2000-2009. Source: Eurostat, SIESTA's calculation



Map 2.3 Change in regional GDP per head measured as purchasing power standard in percentage of the EU average, 2000-2009



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS3, NUTS2
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

Change of GDP per capita, 2000 - 2009.

		2009				
		<50	50-75	75-100	100-150	>150
2000	<50					
	50-75					
	75-100					
	100-150					
	>150					

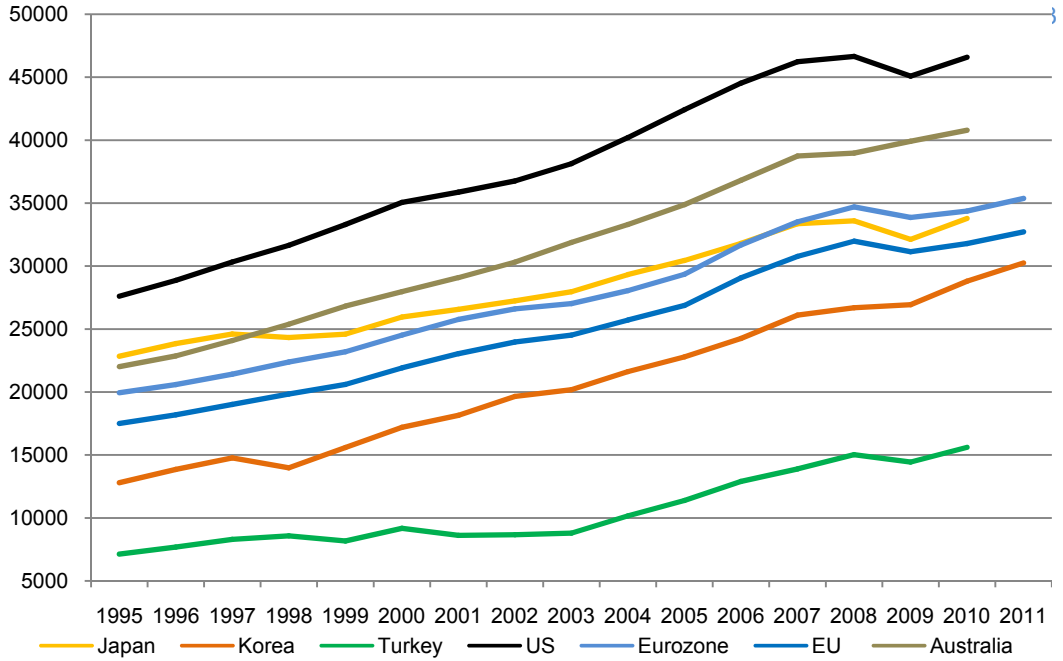
No data

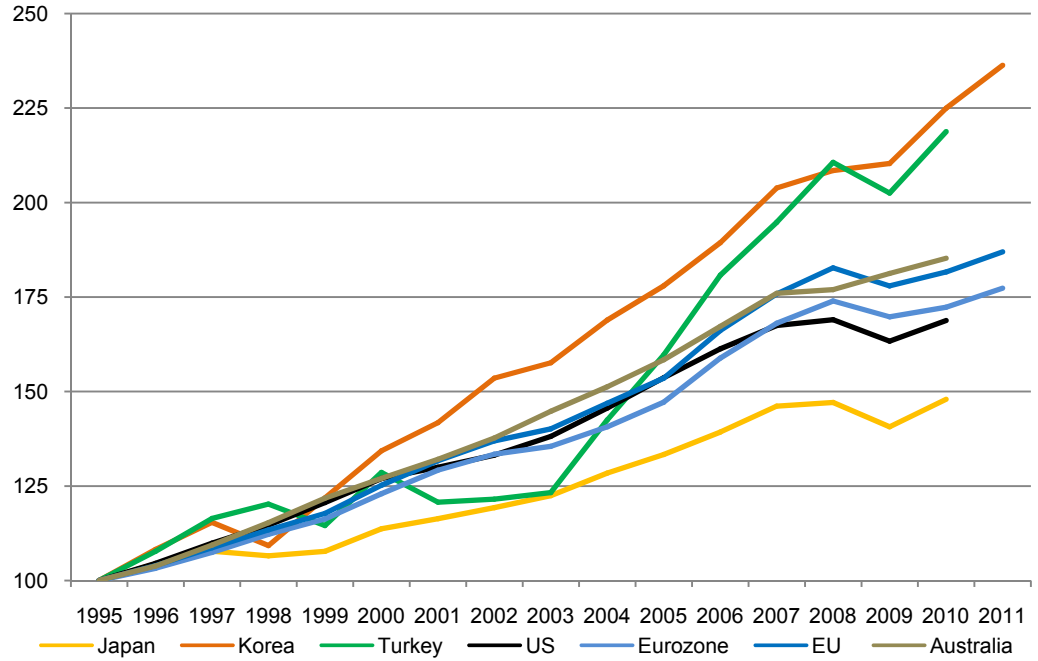
Notes:

DK change is shown for 1999 - 2009.
ES is shown at NUTS2 level.
Regional data are not available for
NO, CH, IS, TR, MK, ME, XK, BA, AL, RS, UKM62 and UKM50.

If the basic assumption of the EU regional policy in force for some decades ago is that growth differences among regions might be balanced, it can be said that there is still room for improvement, but that the direction is the right one. And, importantly, attention must be paid to different regional situations as expressed on the map in order to guarantee that growth effectively spreads to all parts of the EU, as the EU2020S envisages. The first typical situation refers to those regions which are stationary and not really making progress, a situation especially serious in Eastern Europe, where most of the regions have remained under 50 points in relation to the EU average in the last decade; these regions apparently not progressing have been the traditional target of the EU cohesion and regional policy. However, the specific circumstances of the heterogeneous regions which are downgrading should also be taken into consideration, as in some cases this trend might imply loss of competitiveness in the very notion of this concept: the ability to create more wealth than that created by others.

In the rate of change of GDP per capita, it is important to highlight that the EU as a whole is performing better than other developed countries. Although in 1995, in absolute terms, the GDP per capita of the EU was clearly below that of the US and Japan, now it is very similar to Japan and, even though it continues to be quite far away from that of the US, it is catching up at a quicker rate (expressed as an index 1995=100) (Graphics 2.3 and 2.4). In this respect, the behaviour of the EU is quite similar to that of Australia, while other OECD countries are performing better in GDP per capita rate (expressed as index 1995=100), for instance Turkey or South Korea. Notably, the EU as a whole is increasing faster its GDP per head than the eurozone, despite the GDP per capita remaining higher in the former than the latter; that means that the non-€ countries are performing better than the € counterpart. This sustains the above mentioned idea that, generally speaking, Eastern Europe is catching up with the average of the EU.



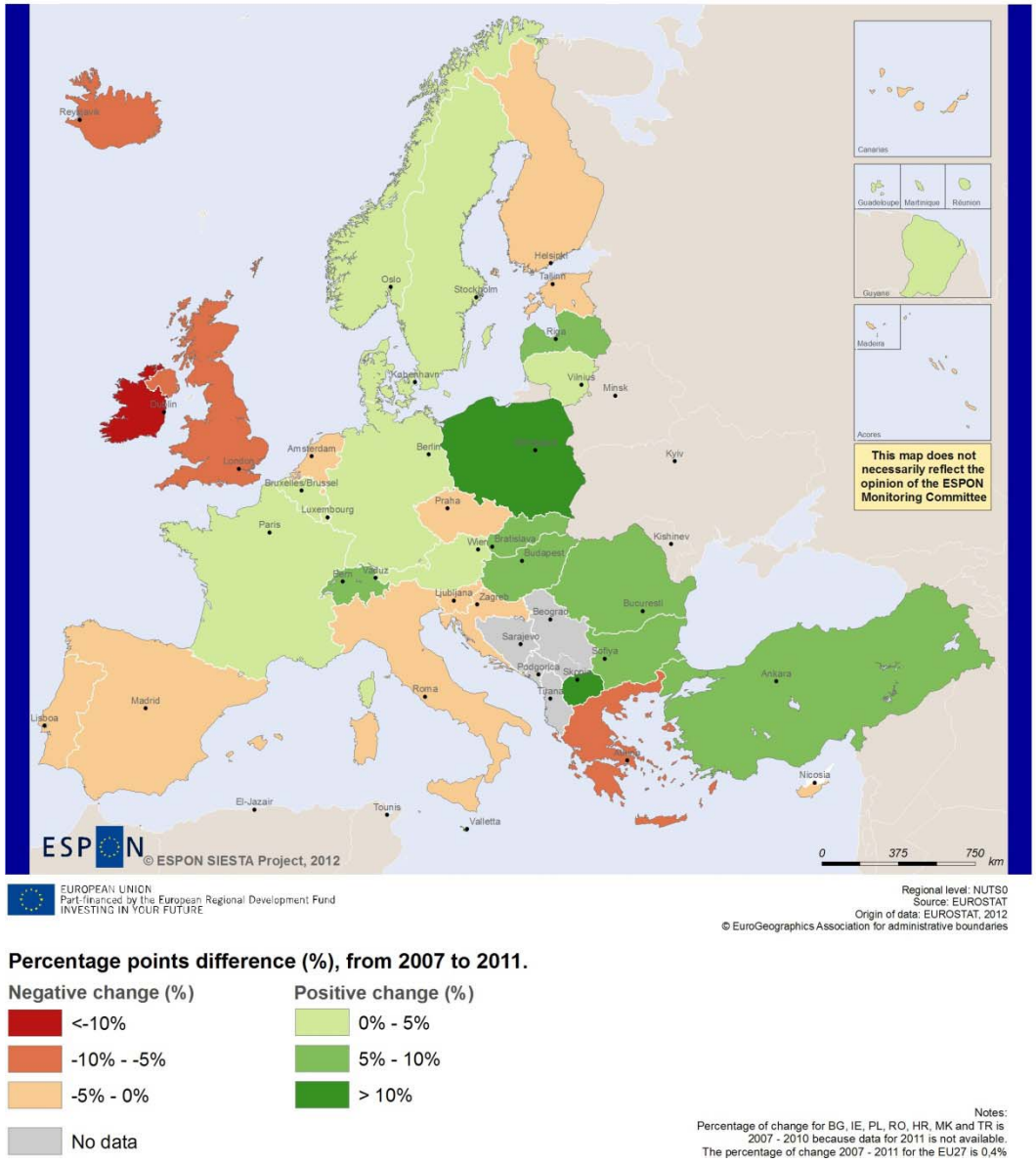


Graphic 2.3 [above] Change in GDP per head measured as purchasing power standard in US$ at current prices, 1995-2011. Source: OECD

Graphic 2.4 [below] Change in GDP per head expressed as 100 basis points, 1995-2011. Source: OECD, SIESTA's calculation

Beyond this trend of GDP per capita, it is evident that the EU2020S has been delivered because there is an ongoing crisis which is notably shaping European economies and, again, this episode is affecting differently across the space. While some areas are going forward in terms of growth and continuing with the general pre-crisis positive economic trend, others are experiencing huge constraints and indeed are clearly economically falling. Unfortunately, data for the years of the crisis (2007-2011) is not regionally available, but the Map 2.4 is meaningful as it offers insights into grasping which countries are being more affected by the crisis. In this respect, the West/East divide, which is substantial on previous maps, does not explain the pattern here. The extreme impact of the economic crisis is occurring in the British Isles and Iceland and some Mediterranean countries (Greece, Italy, Portugal, Spain and Slovenia). The best performing areas in this same 5-years period are not only in Eastern Europe, including non-EU countries such as Macedonia and Turkey, but also in Central Europe, embracing old EU members (Germany or Austria) and non-EU countries such as Switzerland and Norway. However, in Eastern Europe there are also decreases in Estonia, the Czech Republic, Croatia or the above mentioned Slovenia.

Map 2.4 Change in GDP per head measured as percentage of change in pps in the years of the crisis, 2007-2011



The underlying reasons for such a distribution of how the crisis is hitting is a matter of controversy. It has to be mentioned that both in the growing countries and those suffering economic contraction there are states traditionally well-positioned and states which used to be in a worse situation in economic terms. Apparently, there is also no direct translation of the general pattern of change for the decade 2000-2009 in comparison to the changes being experienced for 2007-2011. However, it can be said that most of the countries that were behind the average in economic terms are experiencing growth during the crisis, especially the highest increasing countries, which are Macedonia (the poorest of all the recorded countries), Poland and Malta, followed by the positive growth experienced by Romania, Hungary, Bulgaria, Latvia and Turkey (in all this cases above 5%). In the opposite situation, the countries more dependent on the real estate and construction sectors have been seriously affected and an obvious economic recession is taking place (clearly that is the case of Spain or Portugal), but these countries were not at the forefront before. It is also true that the countries sharing the euro are mainly located in the side of the 'losers' (10 out of 17) rather than the 'winners' (7 out of 17), while, on the whole, the considered countries are growing rather than decreasing (19 out of 34). Be that as it may, reasons for the crisis seem to vary state by state and this is in itself a challenge given that the circumstances for the crisis are multi-faceted; indeed, the correlations between the contraction of the GDP with other several indicators are inexistent. But the consequences are tangible given that most of the countries which have experienced a noticeable contraction of the GDP per capita for 2007-2011 are suffering, at the same time, a factual unemployment change, for instance Spain, Ireland and Estonia.

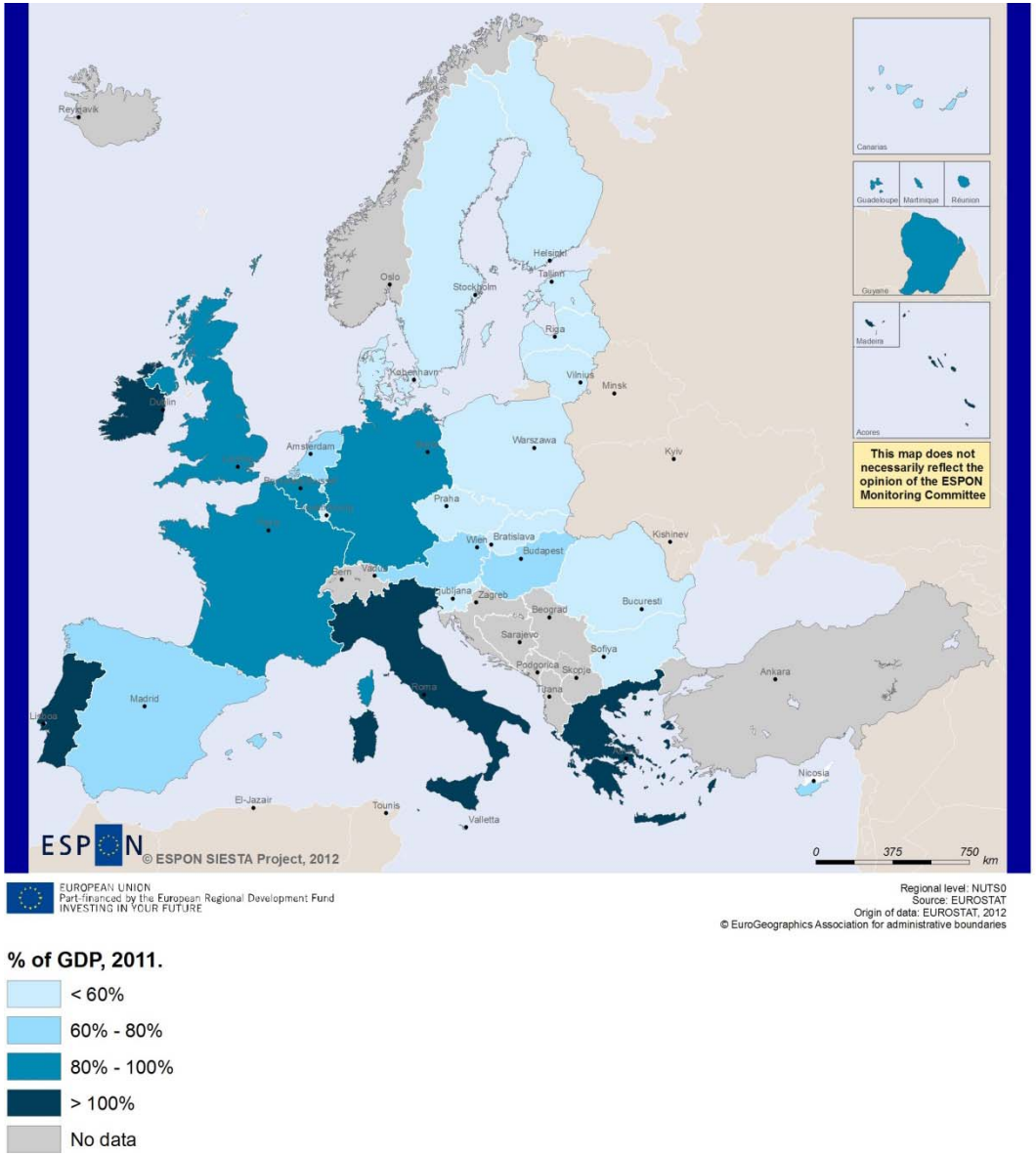
2.1.2. Debt and Growth

Among the causes of the crisis, high levels of public debt have repeatedly been invocated as a particular circumstance favouring a declining economy in the sense that government debt is seen as a threat and an indicator of poor financial conditions. The EU2020S itself does not focus on debt, but the reports aiming to assess the EU2020S fulfilment among countries (so-called Annual Growth Surveys) do contain a specific section devoted to debt, as this is understood to be a macro-economic condition with important effects and it is even considered a kind of "pre-requisite for growth".

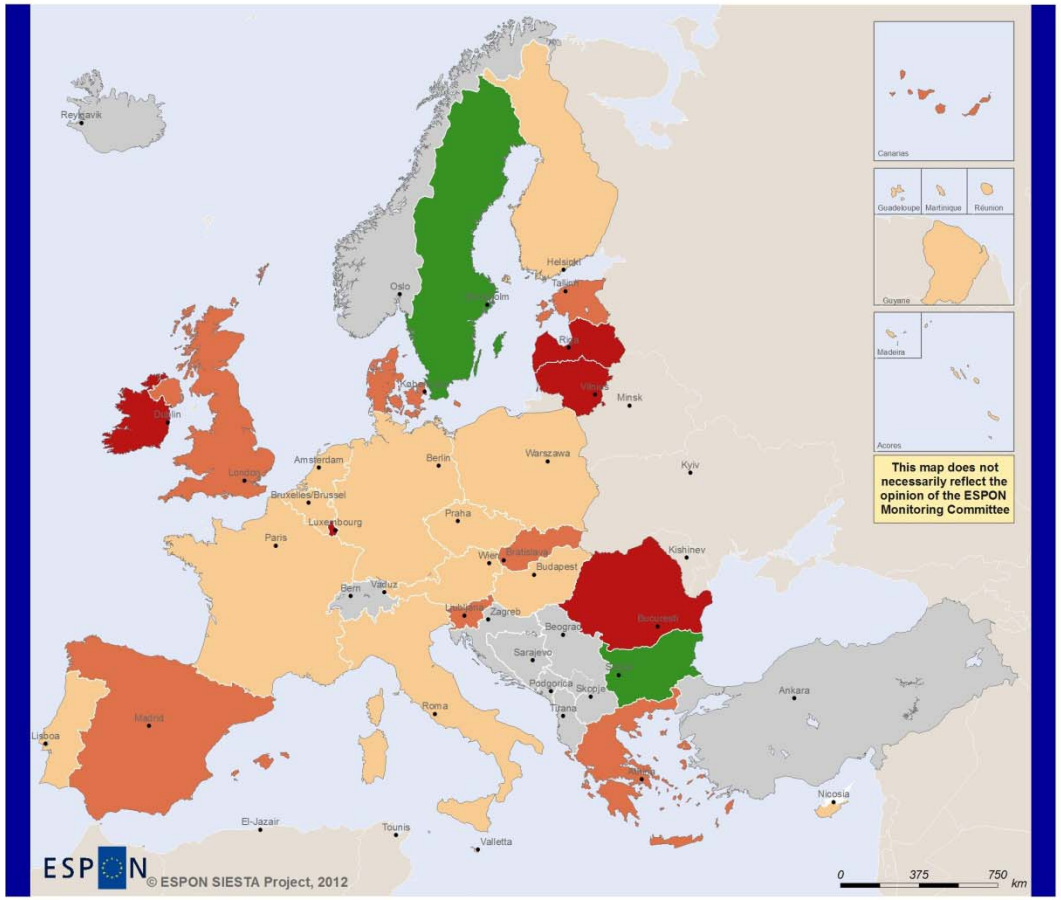
Again, unfortunately a regional scale map for this item is not available. Importantly, the debt data at country level (Map 2.5) does not maintain a direct correlation with the change of GDP per capita during the same period (Map 2.4). Debt expressed in percentage of GDP (following Maastricht criterion) is not only especially severe (over 100%) in Greece, Italy, Ireland and Portugal, but it is also noteworthy (over 80%) in Belgium, France, the UK and Germany; five of these countries have experienced a contraction, very severe in the cases of Greece or Ireland, but the remaining three have progressed in economic terms, even

at a noticeable positive rate (for instance, Germany). Spain is a country in point, as it is very affected by the crisis but does not have massive public debt in comparative terms. And Estonia is another case in point, as it has been acutely touched by a serious contraction but it is the country with the lowest government debt level of the EU. On the side of the countries which have lower levels of public debt (Bulgaria, Luxembourg, Romania, Sweden and Lithuania are below 40% of the GDP in Maastricht calculations, beyond Estonia), obvious heterogeneous economic current economic situations and backgrounds are present. Be that as it may, it can be said that the countries of the eurozone are experiencing higher rates of public debt and indeed 12 out of 17 countries with the € as currency exceeded in 2011 the 60% of threshold as defined in the Maastricht Treaty fiscal criterion, which obliges revenue and public spending balancing. In contrast, most of the countries which are not in the eurozone are below 60%. In this respect, it has to be mentioned that there is an ongoing discussion as to whether the criterion of Maastricht is not really under-valuing the real levels of debt, resulting in the production of quite confusing international statistics, especially when they have to be compared.

Map 2.5 Public gross debt (Maastricht debt) represented as percentage of GDP, 2011



Map 2.6 Change in public gross debt (Maastricht debt) represented as percentage of GDP, 2007-2011



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

Percentage of change (%), 2007 - 2011.

Positive variation (%)	Negative variation (%)
< 0%	0% - 50%
	50% - 100%
	> 100%
No data	

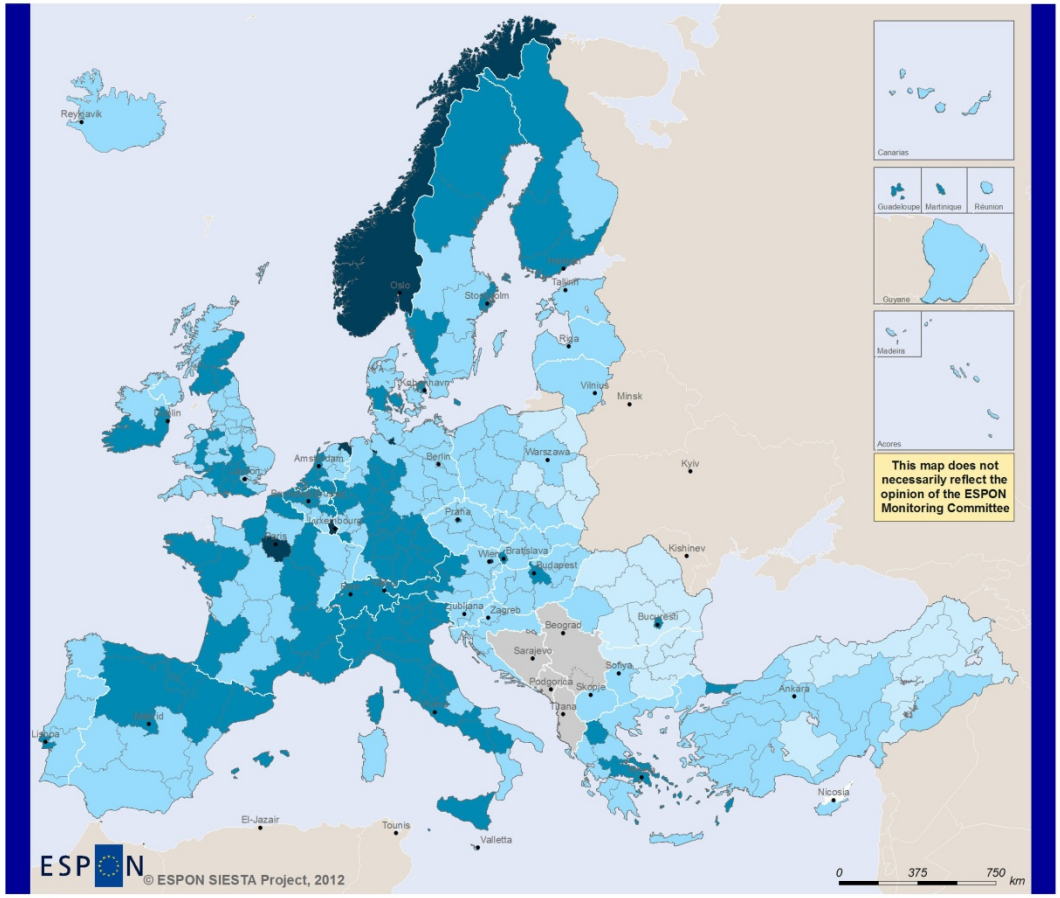
In parallel, gross debt change in the years of crisis does not seem to be clearly correlated with the crisis evolution, a situation which possibly is related with the different political approaches taken in each country for strategically managing the crisis. As it is well known, scholars, politicians, policy-makers and citizens differ in the interpretation of the public debt, as many believe that if the debt is kept or increased to ensure economic growth, that is justified, while others advocate that debt has to be reduced in any case. Logically, this discussion is substantial in the regional arena, given that those regions affected by austerity policies are likely to experience a reduction of public services, equipments and infrastructure, while those being targeted for receiving investments, even if causing an increase in the levels of debt, predictably will not experience this reduction. But unfortunately this uneven regional pattern cannot be inferred from maps done at the country level. Be that as it may, gross debt change in years of crisis constitutes an issue of major significance (Map 2.6). Only Sweden and Bulgaria have reduced the debt during the 5 years studied and they both have not experienced the contraction during this same period. Also most of the countries having a slightly public debt increment have a positive

balance in terms of GDP per capita change: Hungary, Malta, Belgium, etc. However, the countries with higher increases of public debt —from 385% in Latvia to nearly 100%— are distributed among those suffering the crisis (Ireland, Slovenia, United Kingdom, Spain) and those performing well during the same period (Latvia, Luxembourg, Romania, Lithuania) in terms of economic growth for the same period. In any case, public debt change does not depend on the current level of a country's public level, even if it is greater in countries with lower levels of debt (which has a mathematical explanation). The regional implications of the increasing levels of debt is not evident deriving from this picture but the ongoing discussion about the issue is likely to have implications in facilitating and sustaining economic growth.

2.1.3. Factors of Competitiveness and Growth

It is widely acknowledged that the main source of economic growth is labour productivity. This means that those regions in a better position in this respect are likely to be stronger in economic terms and to emerge from the crisis. In addition, when the EU2020S states that Europe must act for improving competitiveness, it acknowledges that the fundamental strategy to do so vis-à-vis our main trading partners is through higher productivity. On Map 2.7, regions are ranked according to the EU average (which is expressed as 100). Thus, if a region scores more than 100 in productivity, which basically measures the amount of goods being produced by each member of the labour force, the level of GDP produced by each worker of this region is higher than the EU average, and vice versa. Logically, the map is quite similar to the map of GDP per capita and that means that the geographical pattern above explained is here obtained again: overall the East/West divide (with the former in a worse situation that the latter), higher levels in metropolitan and urban areas than in rural areas, etc. However, several rural regions than in the GDP per capita cartography are situated under the limit (Map 2.1), on this map of labour productivity is above the 100 threshold; this might be caused by an inactive population (including pensioners) and also the unemployed population is not taken into account for the per capita calculation and that represents an logical increase. This is especially the case of some regions in Western Europe (France, Spain, Italy, the UK, etc.). In some of these cases a sort of mirage might be found in the sense that productivity might be getting better statistically (as high rates of unemployment are recorded and the unemployed do not account for productivity calculations), but not really improving on the ground level. The region which scores lower in labour productivity is Romanian Nord-East (28,5%), while the better is Inner London (302%), a rank which is narrower than the rank obtained for GDP (17 vis-à-vis 596%), a comparison which confirms that the cartography of labour productivity per head nuances the extreme results of GDP per capita. As it is widely argued, the improvement of productivity in lagging regions mainly located in Eastern Europe should come by increasing the level of technological progress and improving the quality of human capital, which are closely related factors. In this respect, it is evident that advances in competitiveness are quite dependent on the pillar of smart growth (innovation and education).

Map 2.7 Labour productivity expressed in relation to the EU27 average (EU27=100), 2008



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2, NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

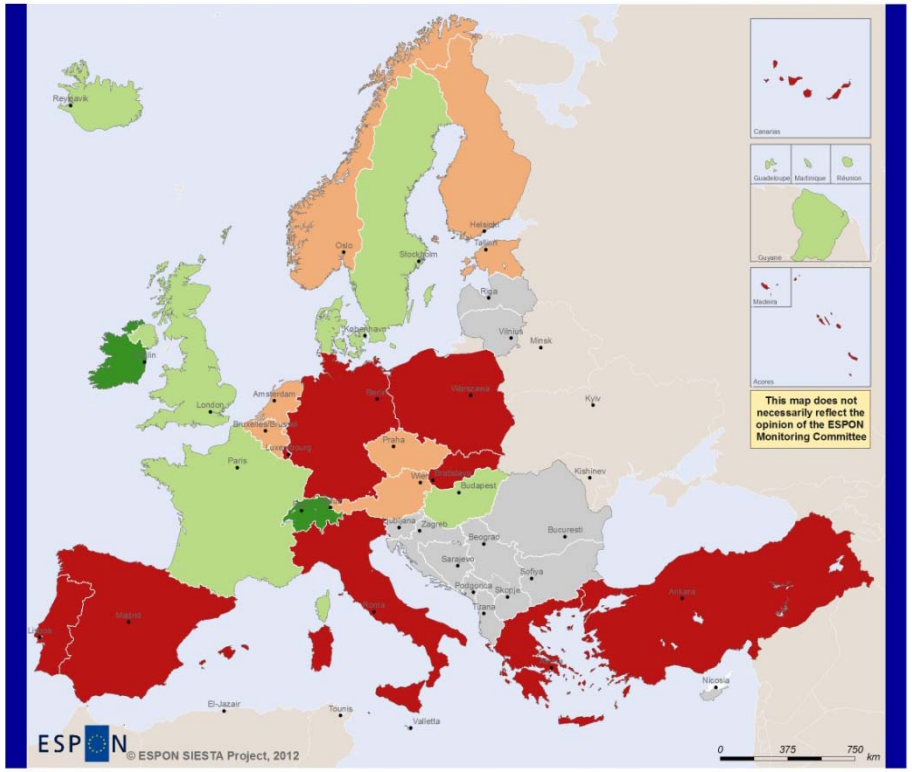
Percentage of EU27 average (%), 2008.

- 0% - 50%
- 50% - 100%
- 100% - 150%
- > 150%
- No data

Notes:
Labour productivity per person employeed was calculated as the ratio of the regional GDP in milions of PPS between the total number of employees.

The EU2020S also targets that, for improving competitiveness in a global world, it is essential that the EU prospers through international trade and that this commerce has to be strengthened through an economic basis in high technologies. Indeed, the high-tech sector, due to a high intensity of research and development processes, is a special economic sector. It gathers information on the influence of R&D in the real economy. Thus, mapping it implies obtaining information on the economic competitiveness and, moreover, the ability of the market to absorb research results. The contribution of high-tech products to the trade balance is usually accounted by the OECD, which offers data for 2007 and a comparison between 1997 and 2007 at state level; again, unfortunately, there is no regional data available for such an indicator, nor more recent data post-2007. It has to be highlighted that this indicator is directly quoted as extremely appropriate in the Innovation Union flagship of the EU2020S.

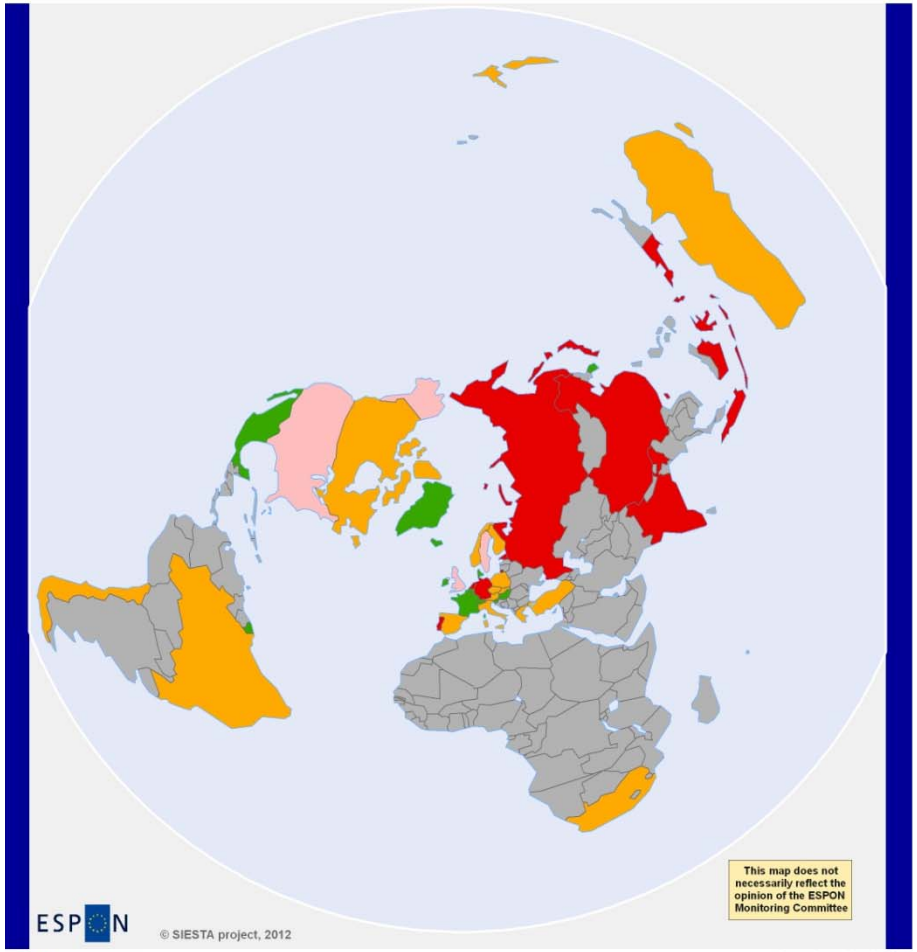
Map 2.8 High-technology trade share represented as percentage of manufacturing trade, 2007



Percentage high-technology in the manufacturing trade (%), 2007.

- <-2.5%
- -2.5% - 0%
- 0% - 2.5%
- > 2.5%
- No data

Map 2.9 Variation in the contribution of high-technology industries to the trade balance, 1997-2007



Change in contribution 2007 versus 1997

- Countries with a positive contribution and improving
- Countries with a positive contribution but worsening
- Countries with a negative contribution but improving
- Countries with a negative contribution and worsening
- No data

The European countries with a current higher specialisation in 2007 in high-technologies are Switzerland, Ireland and the UK, all them above 2% of the percentage (Map 2.8). In some European countries this share is lower than 2% (for instance, Hungary and France), but remains positive. In contrast, most of the European countries have a negative percentage (16 out of 25), meaning that they import more high-technologies than they export. The leading countries in terms of technology are commonly Western European, specifically Scandinavia and the Northern Periphery, although Hungary seems to be an exception on the Eastern side. The countries with a negative contribution are commonly Eastern European, but also some Western are included within (such as Germany or the Netherlands), and the majority of the Mediterranean countries (Portugal, Spain, Italy, Greece, Turkey, etc.).

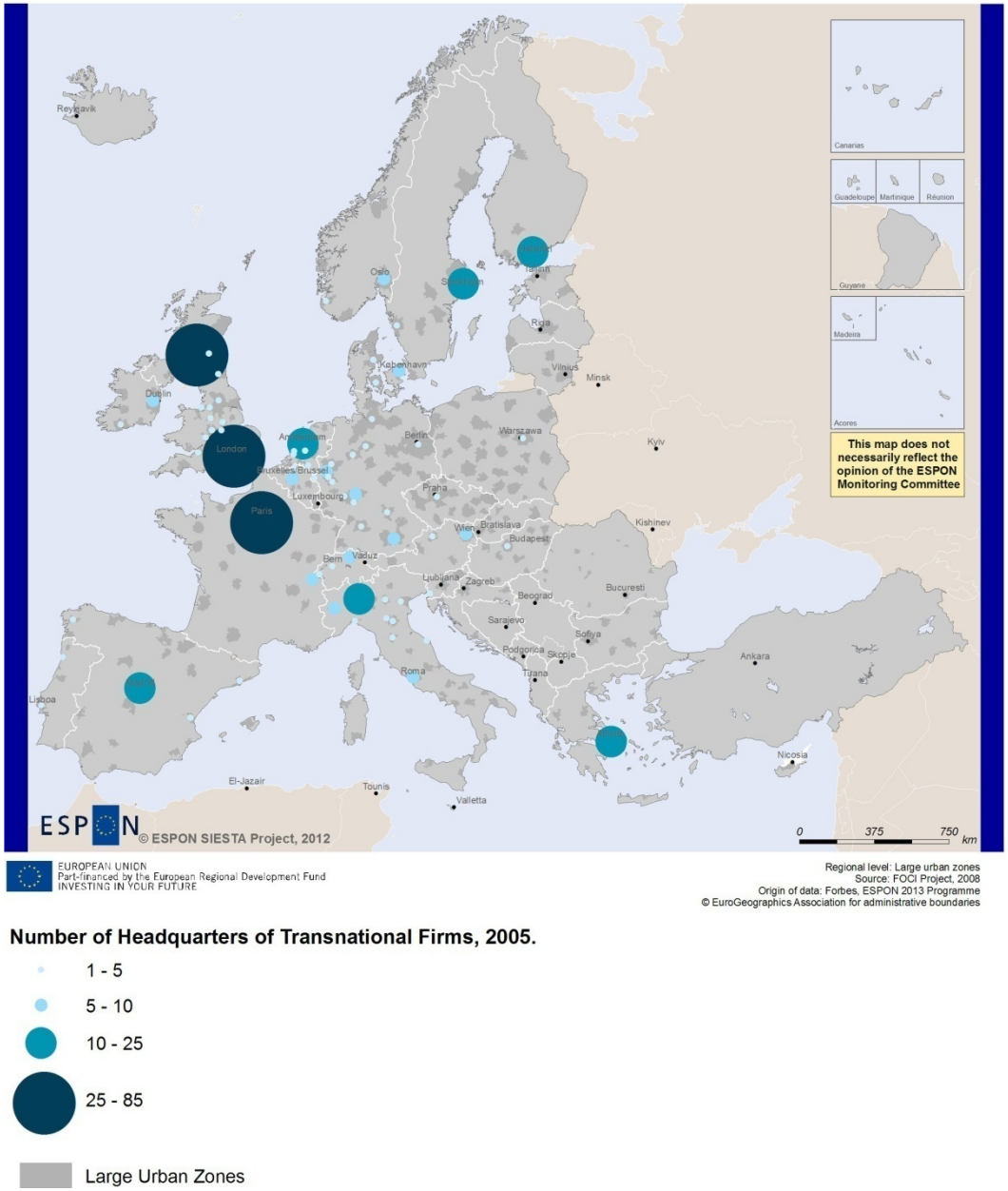
When comparing the European situation within a global perspective (Map 2.9), the position of the continent is not particularly bad, as other important international economies do not seem to perform better, including some of the BRICS. However, the European picture remains particularly heterogeneous. Some European countries lead the list of global hotspots contributing positively to the high-tech trade balance, sharing this position with other countries such as South Korea. In contrast, some countries are very dependent from international technological inputs and seem to be losing advantage, like India or Russia. Be that as it may, this cartography is reflecting the trend for 1997-2007 and the situation in 2007 and it is quite obvious that the representation has changed in the years of the crisis, despite the lack of available data in this sense.

As it is clearly noticeable, the geography obtained on the map on international trade in high-tech products does not match with the geography of the crisis (by comparing Maps 2.8 and 2.4). This means that, despite the widespread statement that those countries participating in world trade and having a positive balance in terms of technology would perform and experience major economic progress, they are not necessarily avoiding the crisis. Countries with a positive position in the former (such are Ireland or the United Kingdom) are being conspicuously hit by the crisis and, in contrast, countries with a bad share on Map 2.8 (such as Germany or Poland) are resisting well and indeed are growing in the years of the crisis. This lack of co-relation contributes to an understanding of the crisis as multi-faceted, as it has been previously said, and not dependent on the economic assumptions that have been in force until now.

As it has been previously seen (Map 2.1), it is very clear that cities are the hotspots of growth. In addition, and consistent with the need to refer to competitiveness and globalisation that the EU2020S marks, the transnational company headquarters in urban areas is an insightful map that is particularly consistent in this Atlas (Map 2.10). This was developed by a previous ESPON Project (FOCI), which created its own database. Transnational firms operate in more than one country at a time and are considered as some of the most powerful economic and political entities in the globalized world economy. The economic success of cities in conditions of growing competition depends on their capability to attract and retain investment capital of transnational corporations, which allow urban areas to be included in the network of global connections. That explains why there is a strong competition between individual cities, manifested in creating remarkable conditions in order to attract the headquarters of transnational companies in each one of them.

The map shows that 15 out of the 23 large urban areas (LUZ) highly ranked (having more than 5 companies) are national capitals; this fact outlines the importance of the political factor for explaining the distribution of transnational firms. Not surprisingly, the first one is London (85 companies), considered by all scholars as one of the global capitals, together with metropolitan areas such as New York or Tokyo. The second one is as expected Paris, with 60, and closely followed by the third, which more unexpectedly is Glasgow (55). These three are the only urban areas with more than 50 companies, the following being Stockholm, with 24. The 8 non-capital urban areas out of the 23 highly ranked are in countries with a clear polycentric urban system (mainly Germany, Switzerland and Italy, but also Glasgow in the UK and Rotterdam in the Netherlands), although Spain –which is clearly polycentric– only has Madrid (22) with more than 5 headquarters of transnational companies (Barcelona has 3). In this respect, the case of Spain is exceptional, with a monocentric behaviour in economic terms (measured in competitiveness and globalisation with regard to company headquarters) but a factual polycentric urban system.

Map 2.10 Headquarters of transnational firms (within the 2,000 biggest in the world) located in LUZs, 2005



All the 23 LUZs with more than 5 companies are in countries which were not part of the Eastern bloc until 1989. Indeed, the first Eastern capital with transnational headquarters is Prague, with 2. That means that there is still big scope for transnational firm development in Eastern Europe and that, taking into account the pattern of the Western countries which were members of the EU before 2004, the pre-existing urban system will be predictably decisive for explaining how these headquarters are distributed. Given that most of the Eastern countries do contain macrocephalies, it can be expected that the role of the capital cities will be crucial in this respect, thus they will be reinforced. Indeed, there are reasons to assume that these Eastern capitals will build up headquarters of transnational companies in the next few years thanks to the capital and financial resources growth which they are currently experiencing in general. Undoubtedly, this will contribute to their economic strength and will lead towards a more polycentric and balanced continental urban system.

2.2. Green Economy, Climate Change and Energy

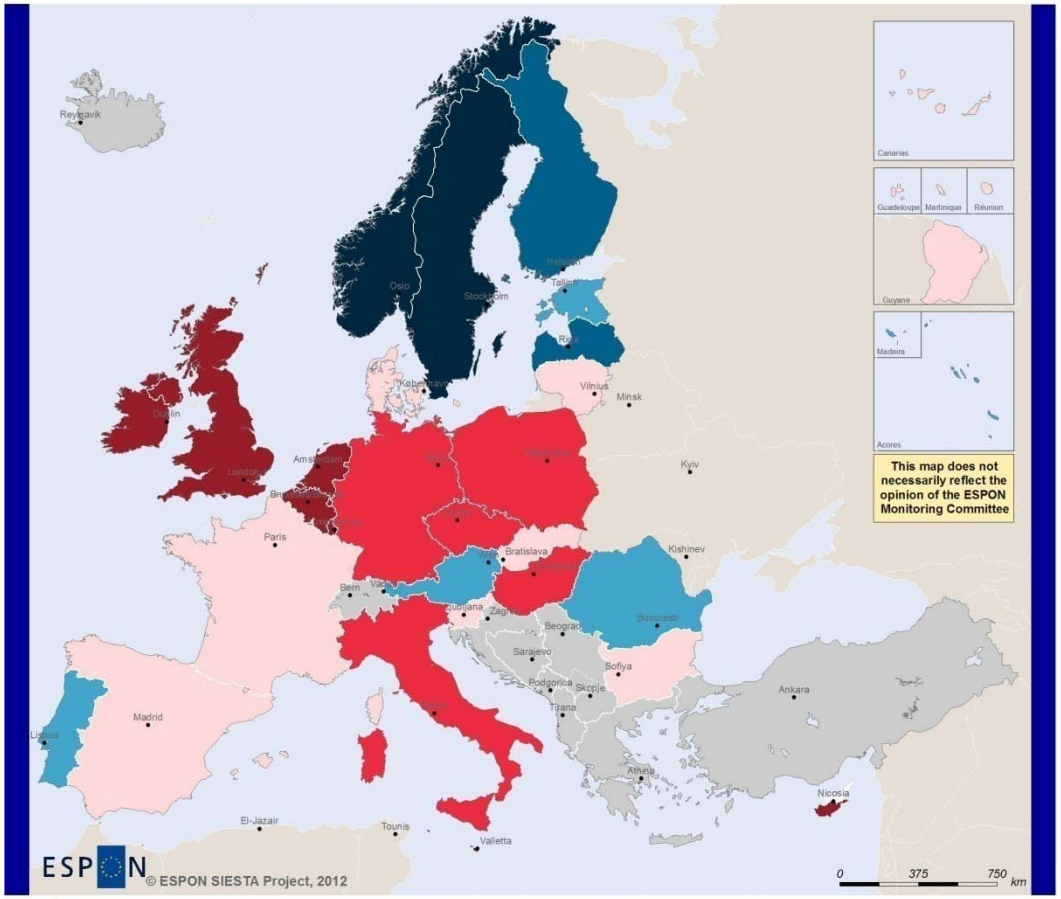
2.2.1. Energy Consumption and Development and its Further Sustainability

As it has previously been said, sustainable growth in the sense given by the EU2020S primarily envisages that the European economy maintains its leadership in the world and its competitiveness, especially through the delivery of new processes and technologies. In the documentation it is quoted that this economy might be especially focused on green technologies that allow for combating climate change (by means of low-carbon technologies) and tending to achieve energy efficiency. The EU2020S acknowledges that such an approach will prevent environmental degradation, biodiversity loss and unsustainable use of resources. In addition, it is evident that resource efficiency is substantial for financial savings for companies, the public and governments, it has obvious security and geopolitical implications that are repeatedly quoted therein (i.e. the need to reduce dependency on non-EU countries) and it has the potential to create jobs in this sector; for all these reasons there are connections between resource efficiency and economic competitiveness. In fact, resource efficiency is significant for environment, but it also carries current and potentially strong economic value. The importance given to resource efficiency is emphasised by the fact that one of the headline targets is specifically devoted to this issue, the only 1 out of 7 which is really committed to sustainability as it is commonly understood.

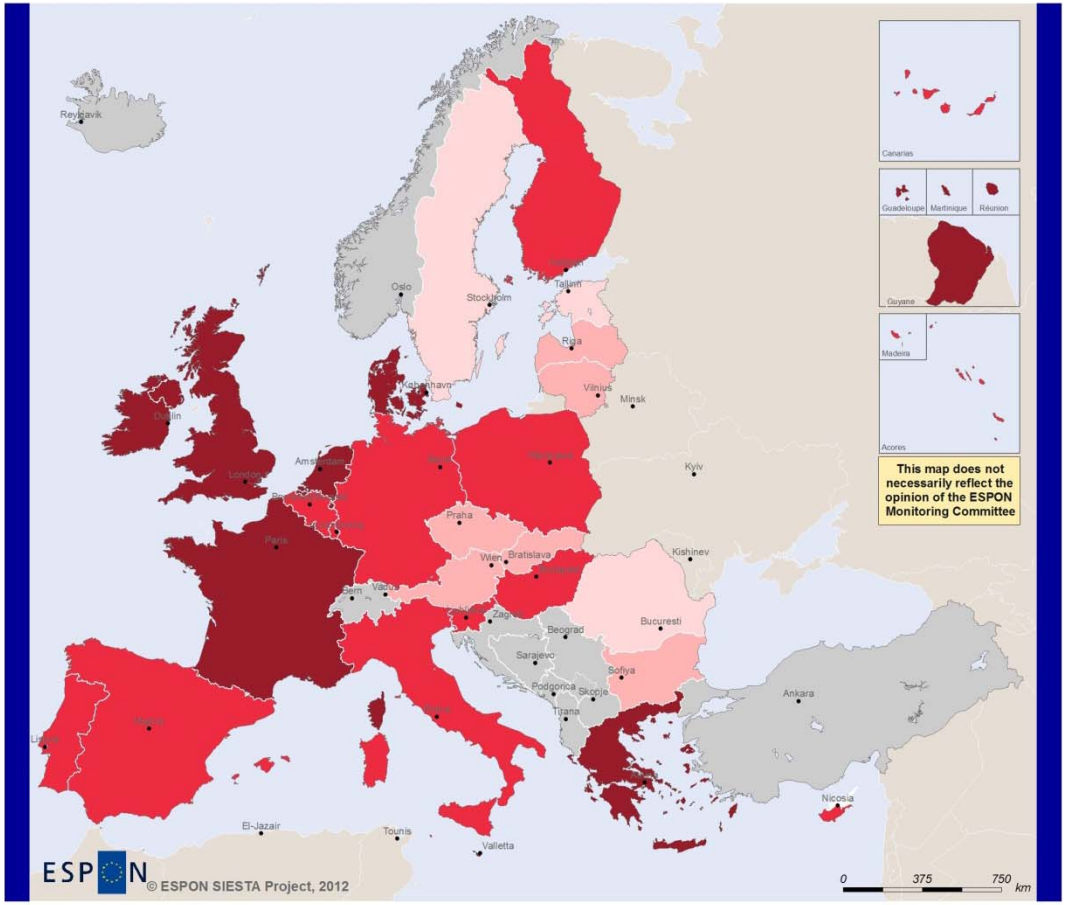
In terms of energy, one of the basic strategies is to develop renewable sources for all the motivations that have been mentioned: decrease of international energy dependency, reduction of greenhouse gas emissions, technology and research development, job niche growth, etc. Indeed, one of the headline targets of the EU2020S is on renewable sources development, particularly in the share of renewable energy in gross final energy consumption, which should reach 20% in 2020. This indicator has been taken from a previous Directive passed in 2009 on Renewable Energy, which also sets a target of a 10% share of renewable energy, specifically in transport. As it is well known, renewable energy is any energy source that derives directly or indirectly from natural processes related to sunlight, heat stored in the Earth or gravitational forces and that is constantly and naturally replenished. It usually includes hydroelectricity, biomass, wind, solar, tidal and geothermal energies. This means that, if the current

dominant energy supply is structured in such a way that it is rapidly using up resources that cannot be renewed, renewable energy can contribute to the transition from an unsustainable energy path to a more sustainable one. In this respect, and reflecting on the pattern expressed on Map 2.11, Scandinavian and Baltic countries (except Lithuania) are the most sustainable in energy consumption. Above the EU target, there are another three states in different parts of the continent (Austria, Portugal and Romania). The remaining countries are under the EU2020S headline target, with extreme situations in island-states (Malta and Cyprus) and in small countries (Luxembourg, the Netherlands, Belgium), as well as the UK. Not surprisingly, islands are very dependent on imported fuels. To sum up, it can be said that this pattern expresses heterogeneous geographical endowments (for instance, Scandinavian countries have wide available hydroelectric and geothermic sources of energy), but also depend on the ambitions of their respective policies.

Map 2.11 Share of renewable energy in gross final energy consumption represented as percentage, 2009



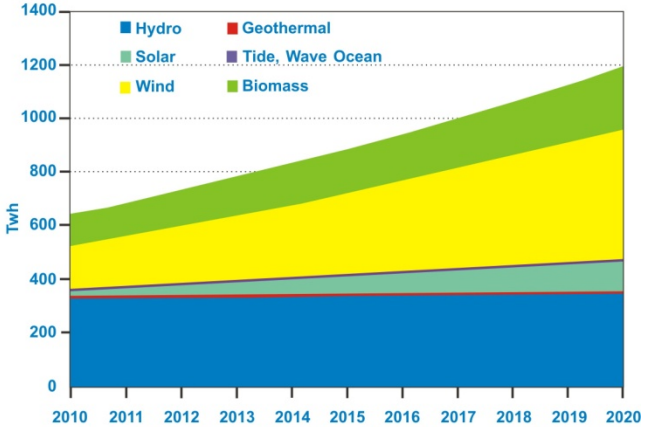
Map 2.12 Share of renewable energy in gross final energy consumption represented as distance to the 2020 national targets, 2009



These maps on the renewable energy target have to be balanced with regard to the national targets that have been set. The countries which are in a worse situation are not necessarily those which have committed themselves to perform more (indeed, the correlation between the distance to the EU target and the distance to the respective national targets is moderate, not strong). The UK is the country which has decided to make more progress towards higher share of renewable energy consumption (12% between 2009 and 2020), followed by Ireland and France (both with 11%) and Denmark (10%). This ambition is feasible, according to their possibilities in this respect (see the following maps). In contrast, the countries which have committed less are typically those which are already having a higher share of renewable energy and are conveniently above the 20% target, except in the case of Slovakia, a country that although having a 10% current share, has only committed to making a 3.7% progress. In short, it is obvious that the policy ambition of each country is what frames the Map 2.12. Globally, the 2012 Progress Report on the EU2020S has stated that the 20% renewable energy target based on the legally binding national targets should be met by 2020 if member states fully act to implement them.

The peak sources for renewable energy development are wind, solar and biomass, as defined in Graphic 2.5, according to the National Renewable Energy Action Plans that were adopted prior to the end of 2010. Providentially, ReRisk ESPON Project mapped the potential for wind and solar energy production at the regional scale and this can be understood as a clear opportunity for these regions having the appropriate natural assets. This will be especially suitable for those countries that have committed to increasing renewable energy consumption (Map 2.12) or in those that should do so (Map 2.11).

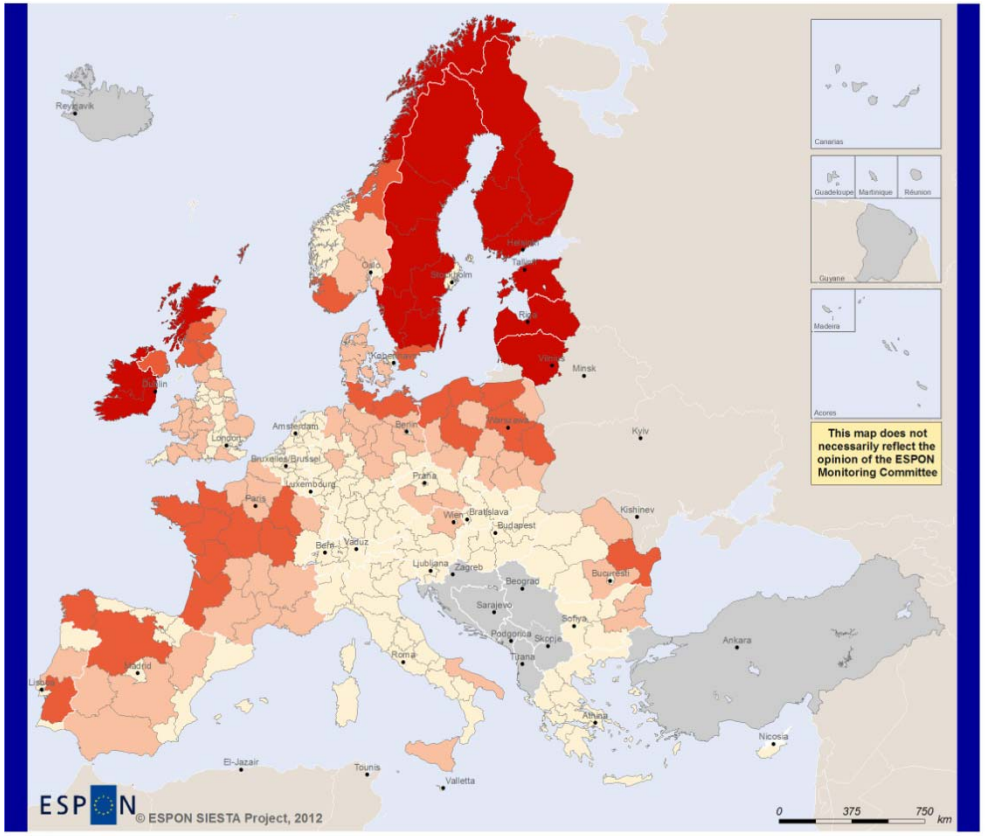
Graphic 2.5 Planned European electricity production according to national renewable energy action plans. Source: JCR, 2011



With regard to wind power potential, Map 2.13 identifies those regions in Europe which have the highest potential for producing electricity from on-shore wind power. Evidently, not only 'raw' potential has been taken into consideration, as the calculations integrate other factors as well. Not surprisingly, the regions exposed to the prevailing Westerly winds along the Atlantic coast of Europe, and including the Baltic Sea Region, are those showing the greatest potential. However, the real contribution that these regions might provide to real renewable energy progress is somewhat doubtful. Most of these regions are peripheral, low density and rural, which means that typically they are very interested in landscape and biodiversity conservation. And, taking into account the high levels of environmental impact that wind turbines engage, it is unlikely that this potential is directly transformed into real growth. In addition, these considerations should be nuanced with complex issues on the uneven geographies of energy production and consumption, the combination with other (renewable and non-renewable) sources of energy, market conditions, funding availability, private capital interest in investing in the sector, environmental conservation, etc.

With regard to solar power potential, Map 2.14 shows the potential for electricity production from photovoltaic panels among regions. The data refers to the yearly total yield of estimated solar electricity generation within the built environment. These types of installations are likely to be the first ones to become competitive. Again, the pattern is quite predictable, with the Southern regions of Europe being logically those with the highest potentials, including not only the Mediterranean Basin but also Atlantic regions in Portugal and some of the Balkan and Black Sea EU regions. This pattern is not only dependant on climate, but also on the degree of urban development, as only the built up areas have been accounted for given that the installation of plants can ensure substantial amounts of savings in urban areas rather than in remote and rural areas. Again, this map is just a picture of potentialities and it is unlikely that these regions directly benefit from factual developments in the sense that there are several factors that can prevent this development in some of these regions and that, in contrast, can advance developments in regions that, apparently, are not particularly favoured in solar energy potential.

Map 2.13 Potential for electricity production from wind power stations represented in meters/second, 2005



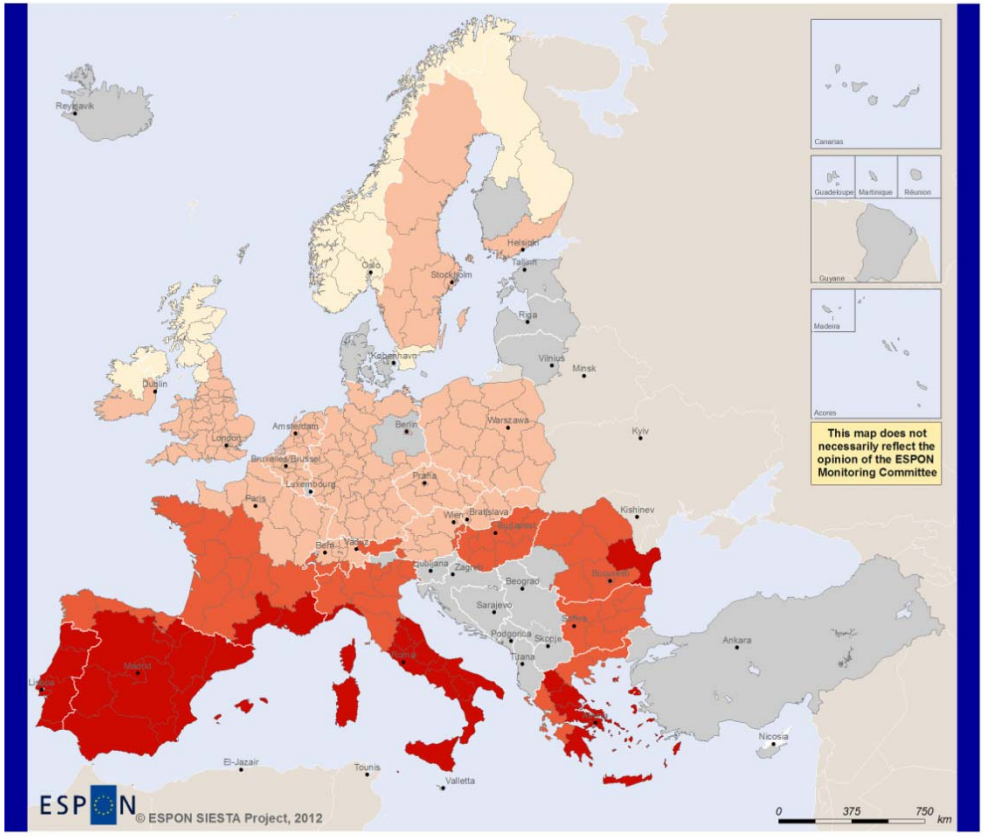
EUROPEAN UNION
Part financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2
Source: ESPON DATABASE
Origin of data: ReRisk ESPON PROJECT
© EuroGeographics Association for administrative boundaries

Meters/ second (m/s), 2005.

- < 100000
- 100000 - 250000
- 250000 - 500000
- > 500000
- No data

Map 2.14 Potential for electricity production from photovoltaic panels represented in kWh, 2005



EUROPEAN UNION
Part financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

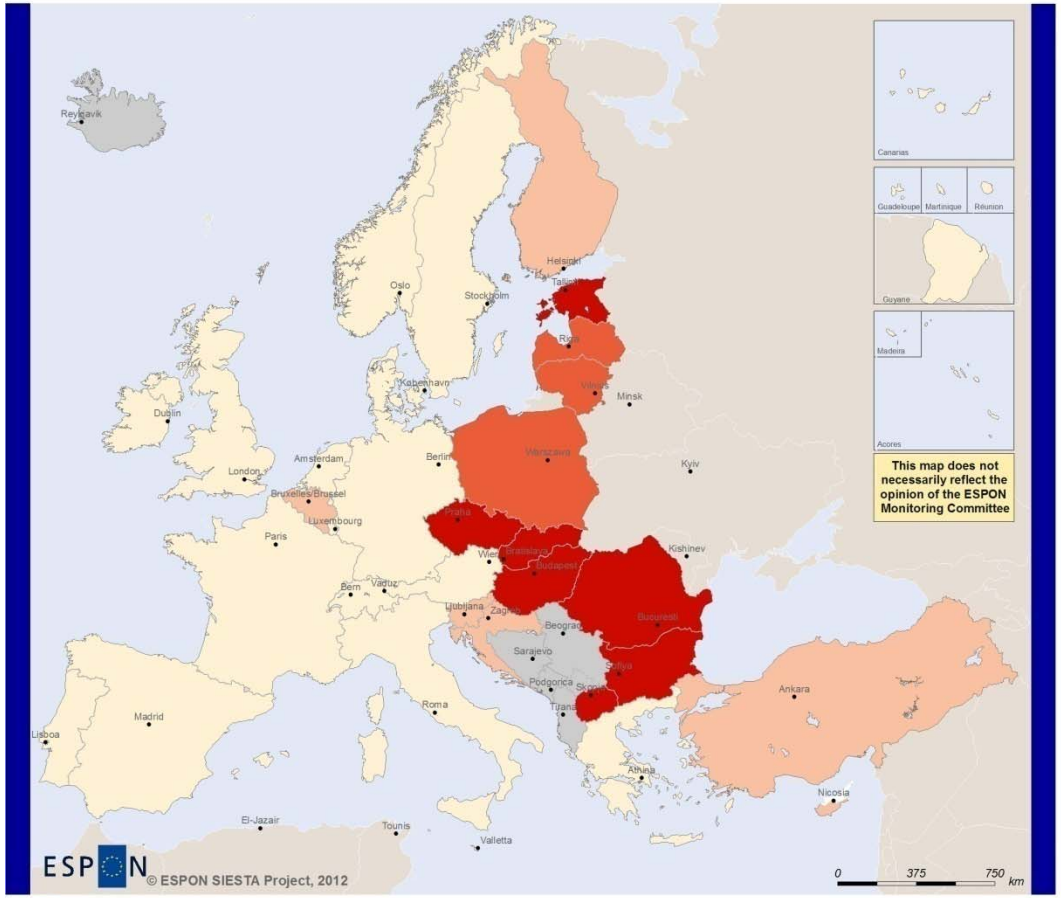
Regional level: NUTS2
Source: ESPON DATABASE
Origin of data: JRC
© EuroGeographics Association for administrative boundaries

Potential production of electricity in kWh, 2005.

- < 800
- 800 - 1000
- 1000 - 1200
- > 1200
- No data

Source:
http://re.jrc.ec.europa.eu/pvgis/apps/radmonth.php

Map 2.15 Energy intensity of the economy represented as gross inland consumption of energy divided by GDP, 2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

Kilogram of oil equivalent per 1000 Euros, 2010.

- < 200
- 200 - 300
- 300 - 400
- > 400
- No data

Notes:
EU27=167.99
This indicator is the ratio between the gross inland consumption of energy and the gross domestic product (GDP) for a given calendar year.
It measures the energy consumption of an economy and its overall energy efficiency.
The gross inland consumption of energy is calculated as the sum of the gross inland consumption of five energy types: coal, electricity, oil, natural gas and renewable energy sources.
The GDP figures are taken at chain linked volumes with reference year 2000.
Since gross inland consumption is measured in kgoe (kilogram of oil equivalent) and GDP in 1000 EUR, this ratio is measured in kgoe per 1 000 EUR.

The EU 2020 target is to improve the energy efficiency in 20%, i.e. a reduction of energy consumption in 368 Mtoe (million tonnes of oil equivalent).

The EU2020S itself proposes another specific headline target on energy which is energy intensity of the economy. Although from a theoretical point of view such an indicator is random, Eurostat has developed it by calculating gross inland consumption of energy per unit of GDP and taking into consideration only some specific economic sectors at the state level. Its measurement is supposed to show the energy efficiency of a country's economy. For the EU2020S a reduced and efficient energy consumption of energy is of paramount importance.

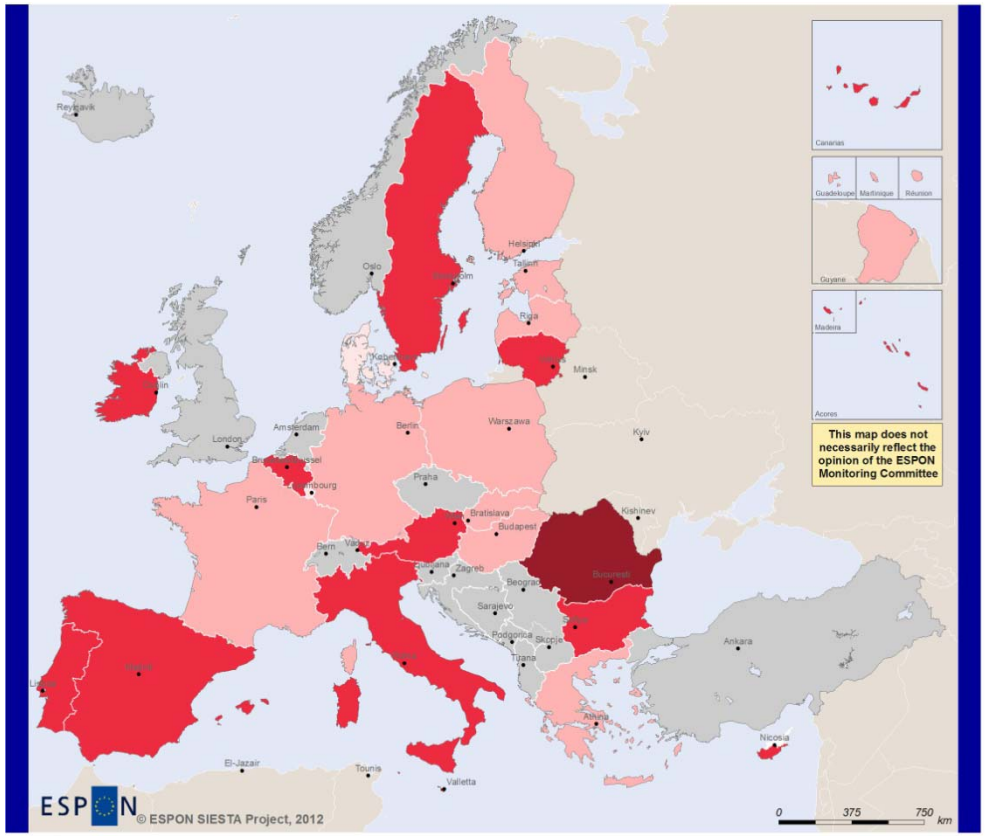
The geographical pattern of the energy intensity of the economy indicator is understandable (Map 2.15). There is a great divide between the Eastern countries which were officially socialist economies prior to 1989 and the other longstanding capitalist countries. This means that the most inefficient countries are, from worse to slightly better, Bulgaria, Estonia, Romania, Czech Republic and Slovakia. In contrast, the most efficient are countries such as Denmark, the UK, Ireland, Italy or Austria. Denmark rates 105, close to the situation of Japan or Switzerland (90), the average levels to which recommendations might aim. Bulgaria, rating 853, is 8 times more inefficient than

Denmark. Significantly, there is no direct correlation between greenhouse gas emissions and energy efficiency, with countries which have higher levels of emissions but are quite efficient (Germany or the UK), while others show high levels on both (especially, the Eastern bloc). Moreover, energy efficiency does not correlate as well with renewable energy consumption.

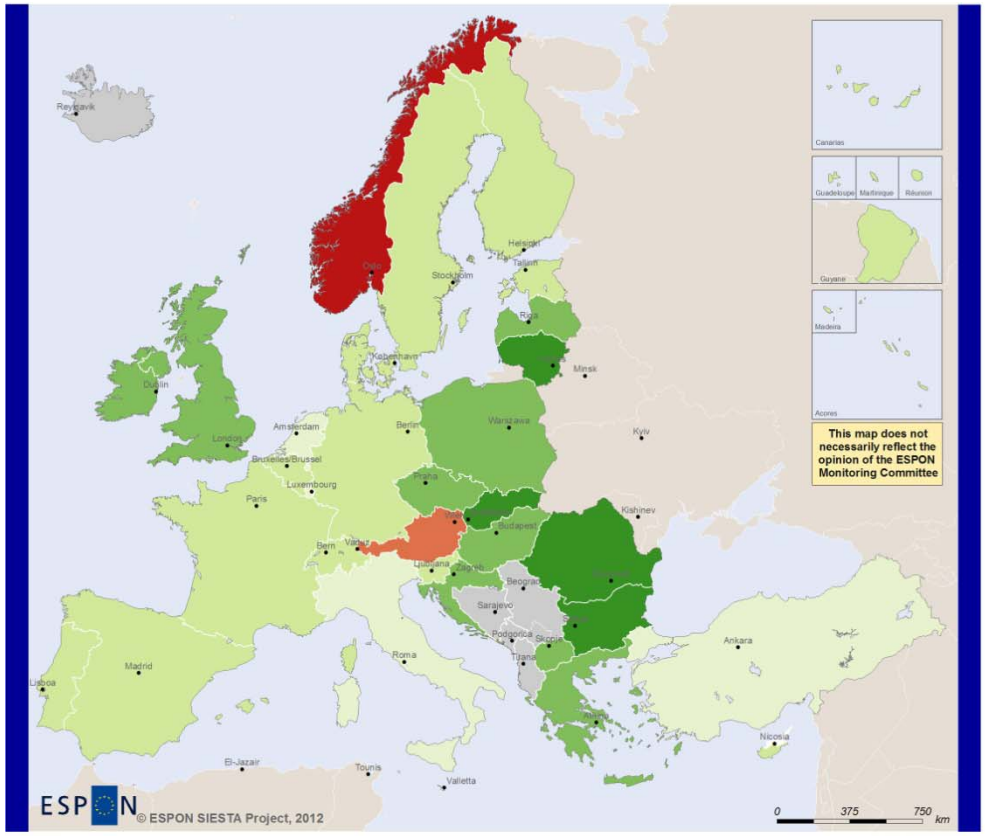
The previous indicator in relation to the targets set by each country is on Map 2.16. Again, it has to be emphasised that the pattern here shown is political sensitive in the sense that it depends on governmental decisions. Importantly, the European Commission has stated in the reports on the EU2020S progress that member states have taken limited ownership of this target (indeed, some of them do not provide their national targets) and that targets set by countries are worrying as they are completely below expectations (i.e. some countries set targets under 10% while the EU target is to reduce 20%). Beyond the countries that do not have national target, there is a clear jeopardy. The five members with a lower distance on current figures to the national targets are Luxembourg, Denmark, Slovakia, Greece and Finland, while the five members with higher distances are Romania, Malta, Portugal, Sweden and Austria. In the case of Romania, it is a praiseworthy aim, taking into account the current alarmingly bad situation on energy intensity in the economy. In general, the Northern countries have lower distances to the national targets since, in most of the cases, they have set lower targets, while in Southern and Eastern countries distances are higher; however, exceptions such as Sweden and Greece are noticeable. To sum up, this map shows that countries are not seriously dealing with this essential issue and that national headlines are insufficient to meet the EU headline target, committing the overall EU2020S implementation as competitiveness or environmental issues are directly related with energy efficiency. And, taking into account the Map 2.15, this is especially crucial for the Eastern countries.

A last map which is worth mentioning is the change in economy's energy intensity for the 2000-2010 decade in the sense that it can show if there is an effective way towards energy efficiency or not. And Map 2.17 shows that, generally speaking, almost all of Europe is making progress in the correct direction, which is good, but not at the adequate rate. If in the previous decade (2000-2010) progress has not been above minus 20, it is difficult to expect that this progress will take place for 2010-2020. Obviously, that is the place for active policy action, but, as it has been reported, the commitment from the different countries in this respect seem to be weak. The optimistic point is that the countries showing more improvement are typically Eastern countries (for instance, Slovakia, -38.4; Lithuania, -37.4; etc.), which are the countries scoring worse. This is related to the modernisation or closure of heavy manufacturing industries. However, it has to be mentioned that this trend between the years 2000-2010 does not guarantee a proper change for 2010-2020. And, taking into consideration the scarce ambition shown on Map 2.16, some Eastern countries which are still very inefficient in energy terms should consider to make real progress in this respect.

Map 2.16 Energy intensity of the economy represented as distance to the 2020 national targets, 2010

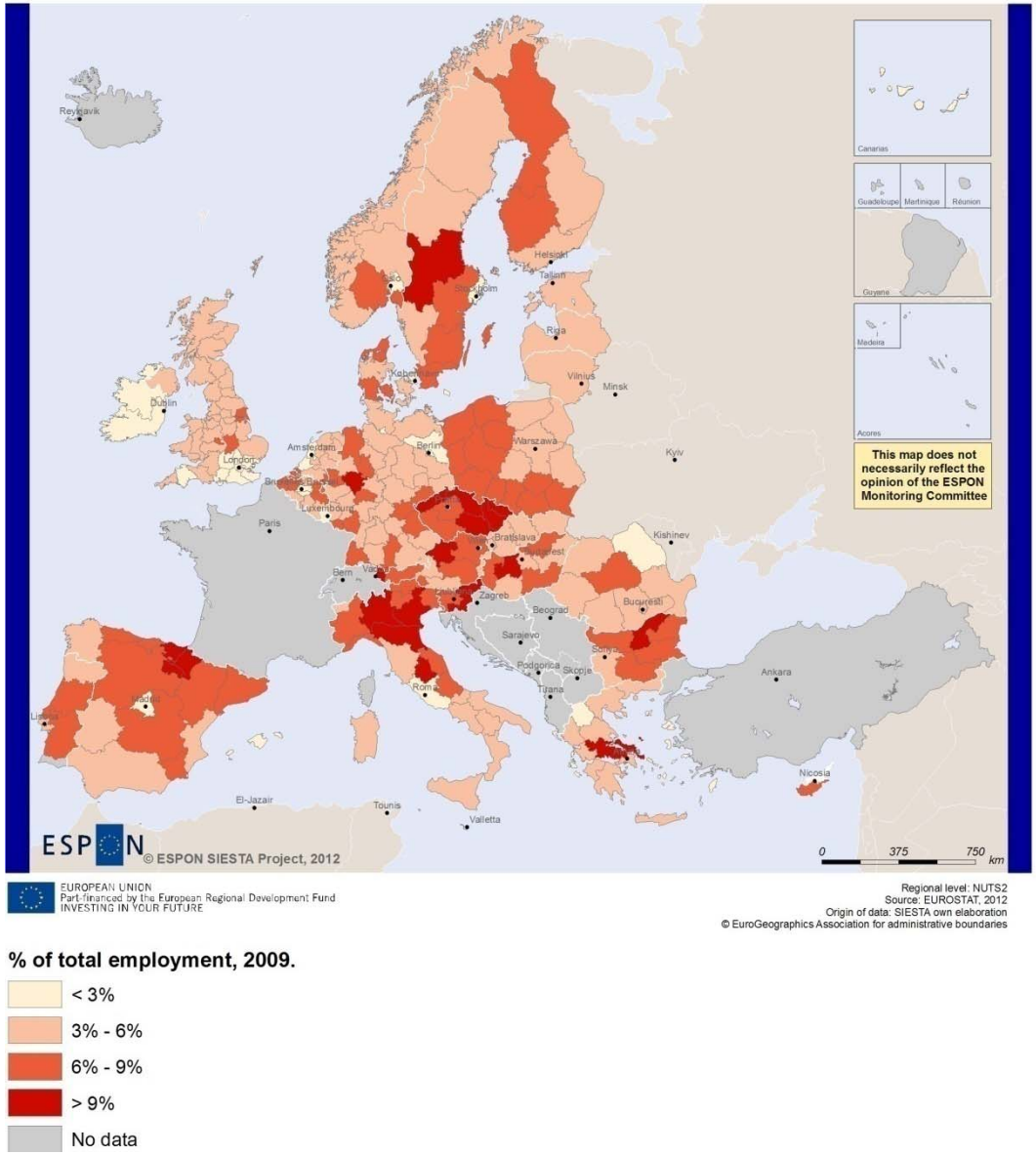


Map 2.17 Change in energy intensity of the economy represented as percentage of change, 2000-2010



A last cartography on energy is represented on Map 2.18 showing the share of regional employment working in industries with high energy spending. The methodology was elaborated by ReRisk, but the calculations for 2009 are SIESTA's. This map is especially important because it represents the regional distribution of the employment that is vulnerable to the increase in energy prices, thus compromising economic competitiveness. In addition, with such a scenario social impacts might be extreme in the sense that labour is highly dependent in some particular regions of Europe on the importation of energy and unemployment might increase as a correlate of energy prices rise. Basically, the map shows that those regions specialised in manufacturing contain more employment in sectors with high energy spending; this is particularly the case of Northern Italy, the Czech Republic and in a scattered pattern in different regions in Eastern Europe, or some Northern regions in Spain. In contrast, regions more orientated to services do not record these high levels. Be that as it may, it seems clear that some particular regions which contain an important manufacturing sector do not automatically account for high energy spending and this might reveal a progressive orientation towards greener technologies.

Map 2.18 Industrial employment dependent in sectors with high energy purchases represented as percentage of total employment, 2010



2.2.2. Greenhouse Gas Emissions

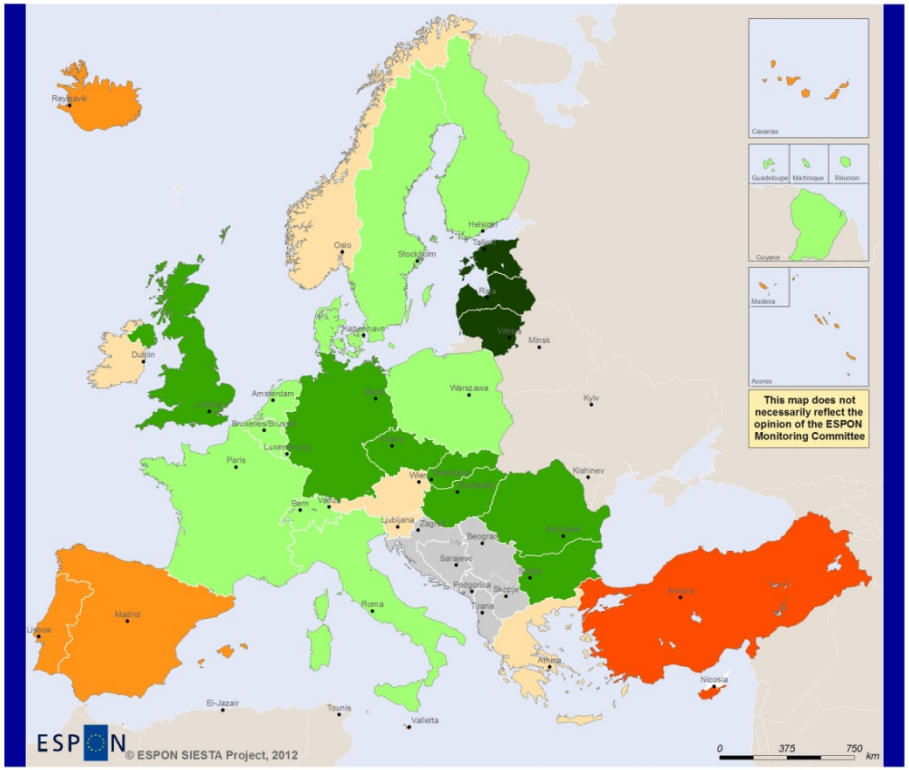
The EU2020S contains three environmental headline targets which are based on a reduction of minus 20 under the sustainable growth pillar. The third one which still has not been mentioned in this Atlas, is the target on reducing 20% of greenhouse gas (GHG) emissions by 2020 compared to 1990 (Kyoto base year), including a possible reduction until 30% if the conditions are right. This intention is consistent with the rationale of the EU2020S, stating that the economy achieving positive growth has to be based, as far as possible, on a low-carbon basis. Again, it is clear in the EU2020S that GHG reduction is not only an aim with an environmental rationale, but also it has a clear socio-economic dimension in the sense that there are increasing possibilities for new technologies (i.e. carbon capture and sequestration possibilities) and it also gives a boost for new jobs related to the development of such a sector. The numeric goals on GHG come from the international commitments acquired by the EU in the Kyoto and post-Kyoto negotiations. The reduction of GHG emissions is a critical issue reacting against the fact that climate change is becoming stronger because of human impact and that GHG are artificially generated. Climate change, including global warming, is a huge challenge being faced by Europeans and mankind alike.

Map 2.19 reflects the level of GHG emissions for 2009 in comparison to 1990. GHG emissions have halved in the Baltic states and there have also been significant reductions in some Danube Space countries. The main reason for this contraction has been the decline in emissions from heavy socialist manufacturing industries that have been either closed or modernised. In contrast, significant levels of GHG emission expansion are recorded in the islands of Cyprus, Malta and Iceland, and also in Turkey and the Iberian Peninsula. On the side of the countries that have substantially decreased their GHG emissions, it is important to note that countries such as Germany and the UK are included therein; and, importantly, they are both the countries that still most emit GHG (Table 2.1). The cause for such a reduction in the UK might be due to a switch from coal to natural gas, while in Germany there has not only been room for investment but also the reunification has helped in the sense that old East Germany has reduced more than the old West Germany.

Table 2.1 GHG emissions, 2009. Source: EEA, SIESTA's calculation

	GHG emissions (1,000 t in CO_2 equivalent)	*GHG emissions per capita (t in CO_2 equivalent)*
Luxembourg	11,515	23.33
Iceland	4,700	14.72
Cyprus	11,103	13.93
Ireland	61,741	13.87
Czech Republic	134,722	12.87
Finland	66,119	12.41
Estonia	16,391	12.23
Netherlands	198,931	12.07
Belgium	125,187	11.64
Germany	911,802	11.12
Greece	124,693	11.07
Denmark	60,683	11.01
Norway	51,470	10.72
Poland	381,770	10.01
Slovenia	19,469	9.58
Austria	79,739	9.54
United Kingdom	572,338	9.29
EU27	**4,609,880**	**9.23**
France	514,568	8.24
Italy	491,528	8.19
Slovakia	44,191	8.16
Spain	366,266	7.99
Bulgaria	58,895	7.74
Malta	3,016	7.29
Portugal	74,372	7.00
Liechtenstein	249	7.00
Switzerland	52,461	6.81
Hungary	66,864	6.67
Sweden	59,671	6.45
Lithuania	19,959	5.96
Romania	123,382	5.74
Latvia	10,962	4.85

Map 2.19 GHG emissions in Europe, 2009, compared to 1990



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS0
Source: EEA
Origin of data: EEA, 2011
© EuroGeographics Association for administrative boundaries

Index 1990 = 100

- < 50
- 50 - 75
- 75 - 100
- 100 - 125
- 125 - 150
- > 150
- No data

Notes:

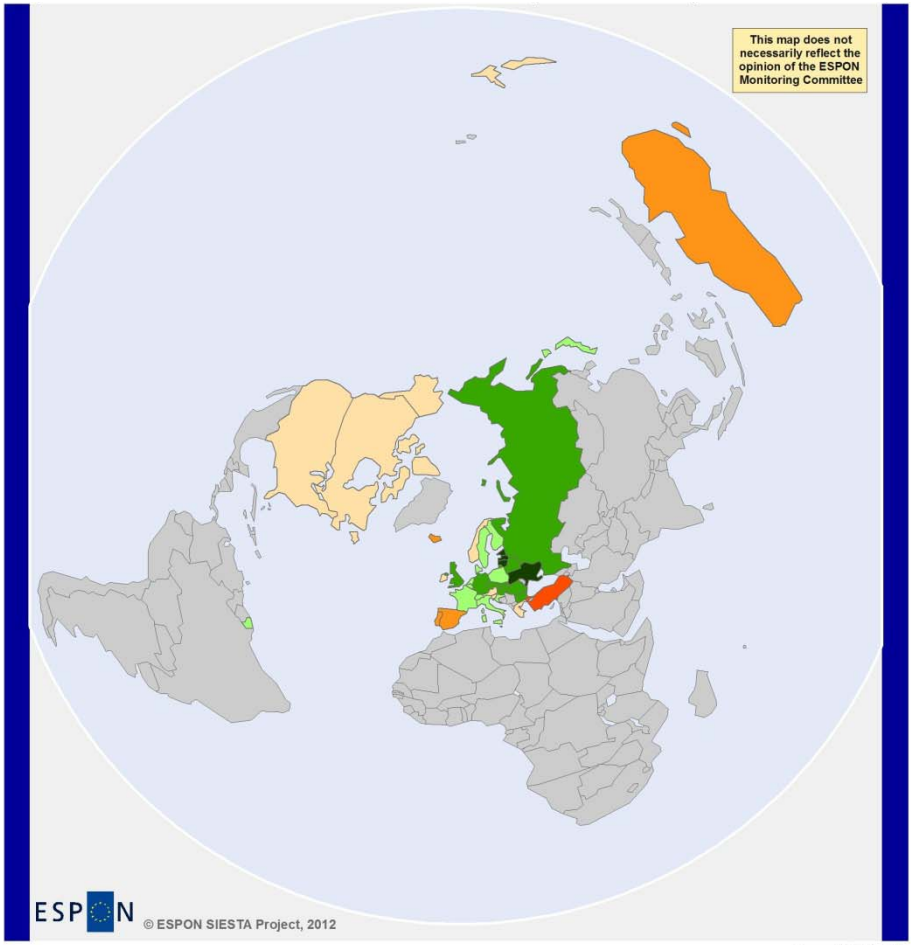
The aggregated greenhouse gas emissions are expressed in units of CO2 equivalents.

The indicator does not include emissions and removals related to land use, land use change and foresty (LULUCF); it does not include emissions from international aviation and internatinal maritime transport. CO2 emissions from biomass with energy recovery are reported as a Memorandum item according to UNFCCC Guidelines and not included in national GHG totals.

The EU as a whole is committed to achieving at least a 20% reduction of its greenhouse gas emissions by 2020 compared to 1990. This objectives implies:
- Reduction of 21% in emissions from sectors covered by the EU ETS (emissions trading scheme) compared to 2005 by 2020;
- Reduction of 10% in emissions for sectors outside the EU ETS.

To achieve this 10% overall target each Member State has agreed country-specific greenhouse gas emissions limits for 2020 compared to 2005 (Council Decision 2009/406/EC).

Map 2.20 GHG emissions in the world, 2009, compared to 1990



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

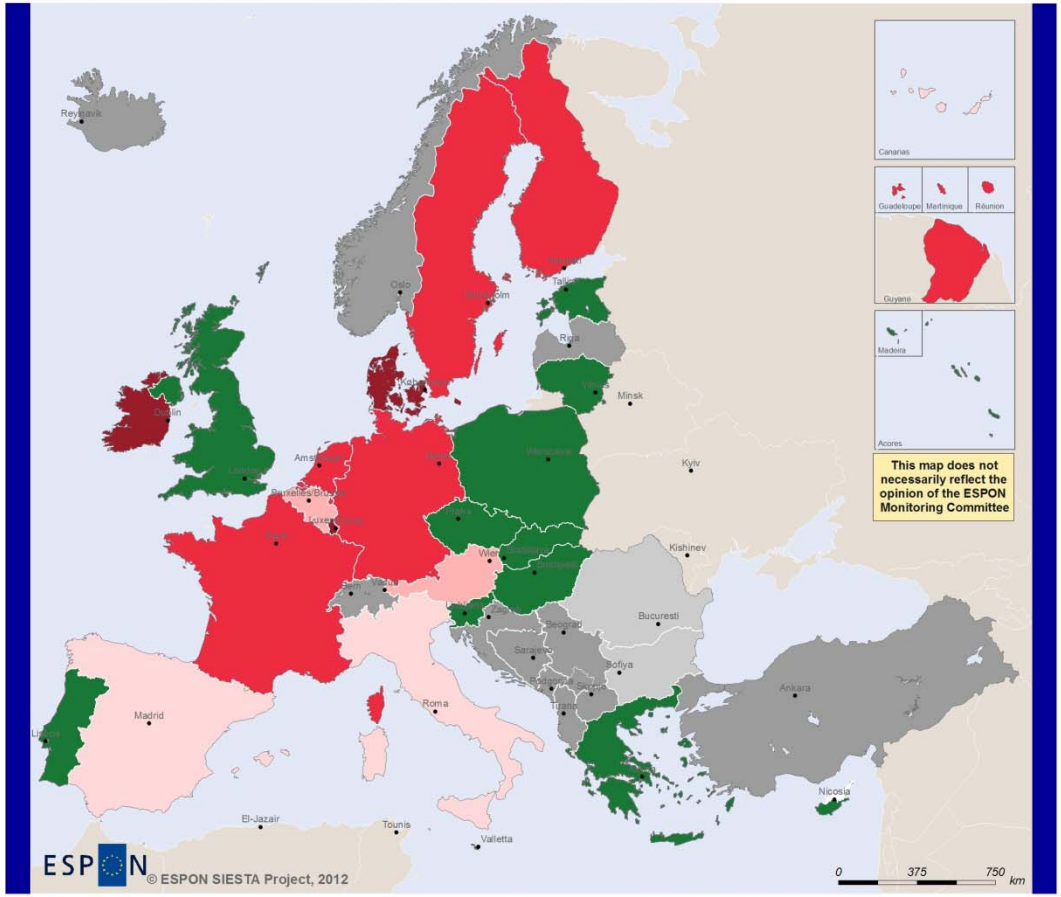
Source: UNFCCC, 2012
Origin of data:UNFCCC website
© UMS RIATE for administrative boundaries

Index 1990 = 100

- < 50
- 50 - 75
- 75 - 100
- 100 - 125
- 125 - 150
- > 150
- No data

Notes:
*GHGs excluding LULUCF.

Map 2.21 Change in greenhouse gas emissions represented as distance to the 2020 national targets, 2005-2009



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS0
Source: Seventh Report on Economic, Social and Territorial Cohesion.
Origin of data: EEA, 2011
© EuroGeographics Association for administrative boundaries

Distance in percentage of GHG emissions in relation to National Targets (%)

Below Nationa Target (%)

- < 2.5
- 2.5 - 5
- 5 - 10
- > 10
- Over National Target
- No data
- No National Target

Notes:

This indicator shows the distance to reduction targets in the total man-made emissions of greenhouse gases by sectors included in the so-called 'Effort Sharing Decision' that includes the following sectors: transport, buildings, agriculture and waste. These gas emissions are outside the EU Emissions Trade Scheme.

The EU as a whole is committed to achieving at least a 20% reduction of its greenhouse gas emissions by 2020 compared to 1990. This objective implies a 21 % reduction in emissions from sectors covered by the EU emission trading scheme (ETS) compared to 2005 by 2020; and a reduction of 10% in emissions for sectors outside the EU ETS. To achieve this 10% overall target each Member State has agreed country-specific greenhouse gas emission reduction or limits for 2020 compared to 2005 from sectors included in the 'Effort Sharing Decision': transport, buildings, agriculture and waste. The distance to this targets on the reduction of sectors included in the Effort Sharing Decision is the indicator showed in this map.

Data Source: The share of GHG emissions outside ETS was based on data on the total emissions and missions within ETS from the European Environmental Agency. Calculations have been developed by the European Comision and are included in the Seventh report on economic, social and territorial cohesion.

BG and RO no data

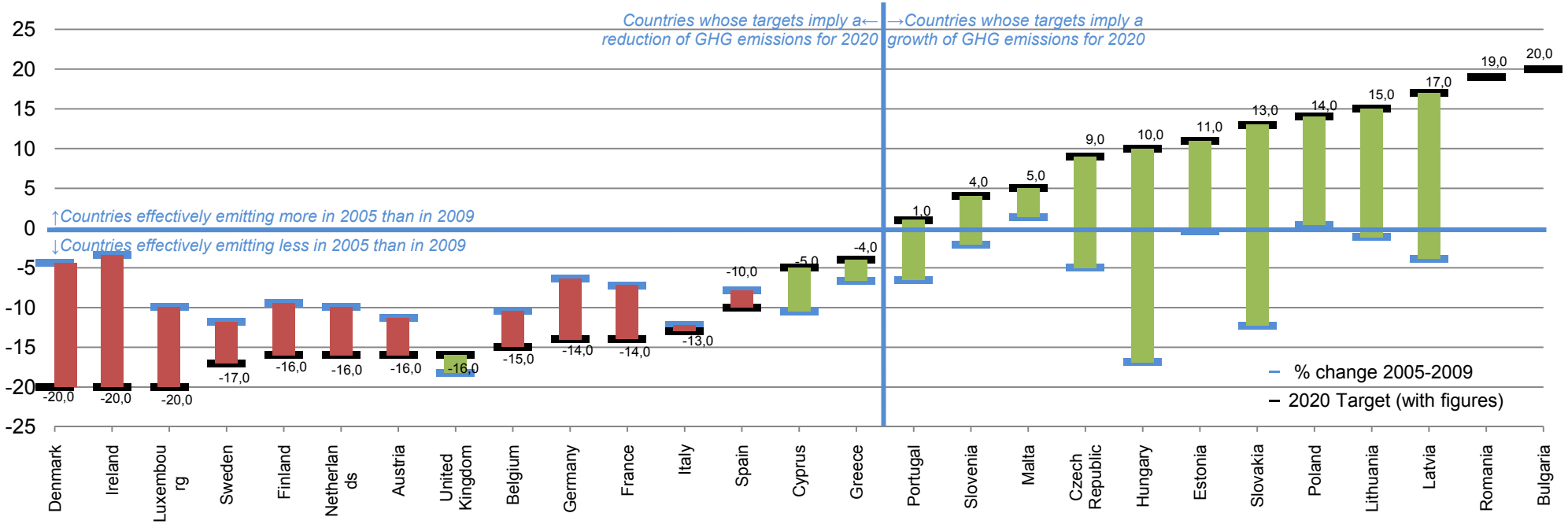
The European picture has to be situated in the global context (Map 2.20). Worldwide, several countries have increased GHG emissions: the US, Australia, etc., and also the BRICS and most of the developing countries, which unfortunately are not represented on the map because of the lack of available data. This situation underscores that the EU is one of the few world regions that is globally improving in terms of GHG reduction because of its serious political commitments in this direction. Another world region experiencing this contraction is the CIS, the cause of such a negative variation being similar to the Eastern countries within the EU.

Map 2.21 and Graphic 2.6 express the distance to the national headline targets. Importantly, it has to be mentioned that the methodology for accounting GHG herein is not consistent with the methodology used on the previous Maps 2.19 and 2.20, resulting in the fact that direct comparisons between them are not appropriate. The countries in green on Map 2.21 and Graphic 2.6 are those that have already reached the target; in these cases there are two situations: those countries that are required to reduce GHG emissions for 2020 and have already reached the objective of reduction (particularly, the UK,

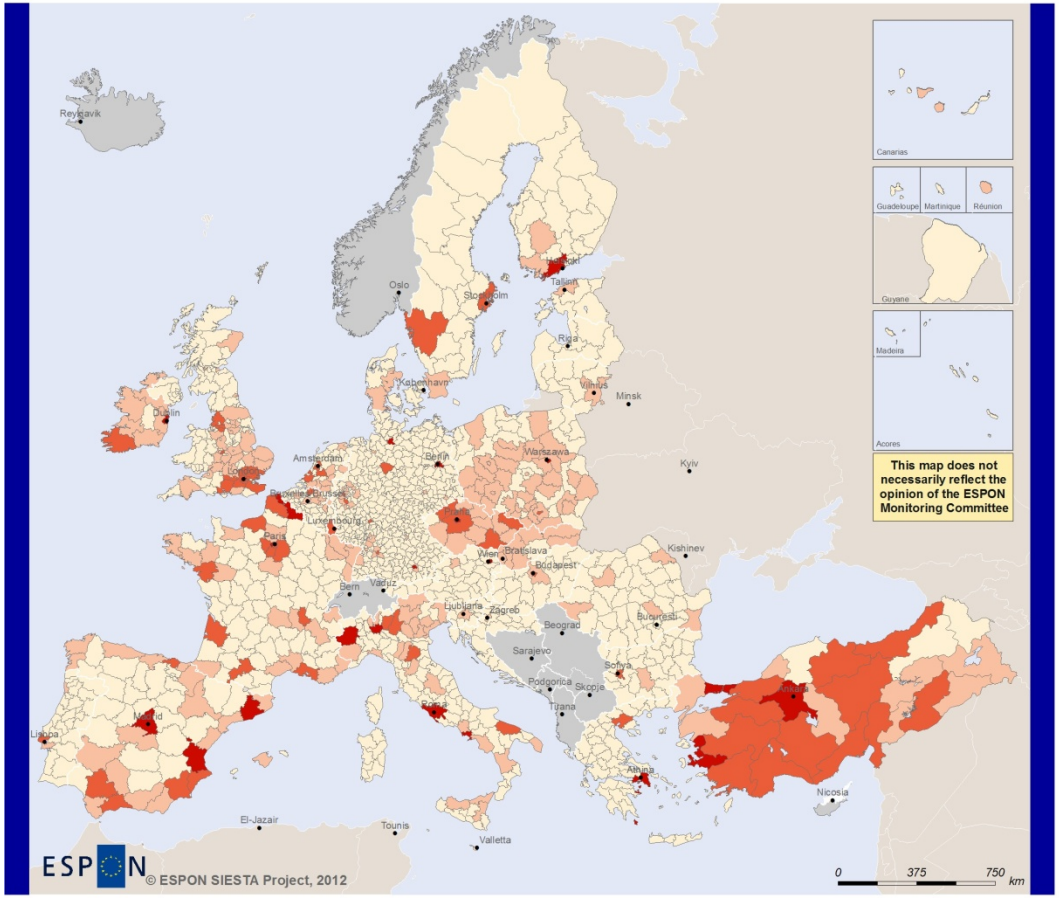
but also Greece and Cyprus) and those countries that were allowed to increase emissions (under the internal adjustment within the EU, where some particular countries are allowed to increase their emissions) but have increased less than allowed (Malta, Poland) or even have decreased them (Hungary, Slovakia, etc.). The countries in different tones of red are those that have to reduce their emissions and that, despite having effectively reduced them, have still not reached their national target. However, some of them are particularly near (Italy, Spain, etc.). The countries which are further from their respective national targets are Ireland, Luxembourg and Denmark, with more than 10 points in percentage terms of reduction still needed and having some of the highest rates of emissions per capita (Table 2.1); in these countries a particular effort will be needed to achieve the national target for 2020.

The overall interpretation of the map and the graph allows us to sustain the idea that the emission reduction target will be met and, indeed, it is even feasible (and ambitious) to state a minus 30% of GHG reduction in the 8 years until 2020, taking into account the reduction of economic activity because of the crisis. To sum up, this is probably the only target which is going to be achieved everywhere in the EU but basically that will be the consequence of the incidence of the economic contraction. In this sense, the crisis might be interpreted as an opportunity for a more sustainable economy and the policy direction should be to get onto this direction as far as possible.

Graphic 2.6 Change in GHG emissions 2005-2009 and EU2020S targets. Source: Adapted from the 7th *Progress Report on Cohesion*, 2011, based on EEA



Map 2.22 Estimated regional GHG emissions excluding LULUCF, 2008



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2 and NUTS3
Source: SIESTA CALCULATIONS
Origin of data: EUROSTAT and UNFCC, 2011
© EuroGeographics Association for administrative boundaries

GHG emissions (Gg CO2 equivalent), 2008.**

- < 5000
- 50000 - 10000
- 10000 - 20000
- > 20000
- No data

Notes:

Data for TR is shown at NUTS2 level.

*GHG data excluding land use, land use change and foresty LULUCF).

**Derived from UNFCCC GHG data at national level and allocated to NUTS3 areas in relation to population and gross value added. Population data for IT is for 2007.

On GHG emissions, a particular methodology has been developed by ESPON CLIMATE in order to estimate regional emissions deriving from national datasets. SIESTA has followed it, obtaining a regional estimation of GHG emissions. Not surprisingly, the basic underlying reason for the pattern shown by the Map 2.22 is the division between urban and metropolitan regions, on the one hand, and those that are rural, low-density and depopulated, on the other; that results in the fact that, generally speaking, the main metropolitan areas of the countries of study generate top GHG emissions. This is basically caused by the fact that one of the variables that is taken into account in the model for regionalisation GHG emissions is population, but it is obvious that GHG emissions are concentrated in the regions that are more populated. However, literature states that livestock is substantial for GHG emission; this has not been accounted for by the model but logically it would increase the GHG emission contribution of some intensive rural areas. Be it is as it may, it is true that Map 2.22 probably undervalues the contribution of GHG emissions made by several regions in countries where NUTS3 are undersized, like Germany, and overestimates GHG emissions of some rural parts of Turkey.

To sum up, GHG emissions reduction has repeatedly claimed to be a 'win-win' option, that is, a measure that contributes to both climate change mitigation and a wider development of objectives (business, efficiency, etc.). In this respect, the general performance of the EU is good news. However, the pattern differs from some states to the others and, although the regional pattern can only be estimated, it is evident that some regions should work more intensively in reducing GHG emissions. Indeed, regional strategies for mitigating climate change seem to be highly recommendable. And, taking into account that it is clear that metropolitan areas concentrate GHG emissions, it is also clear that particular urban strategies for each individual city seem to be suitable. All this has direct implications in spatial and urban planning, for instance the need to reduce sprawl and to favour a compact urban model. As it has been suggested by several scholars, the world needs a double revolution: achieving a reduction of GHG emissions and building better urban environment, given that people are concentrated in cities. They are both absolutely inter-related.

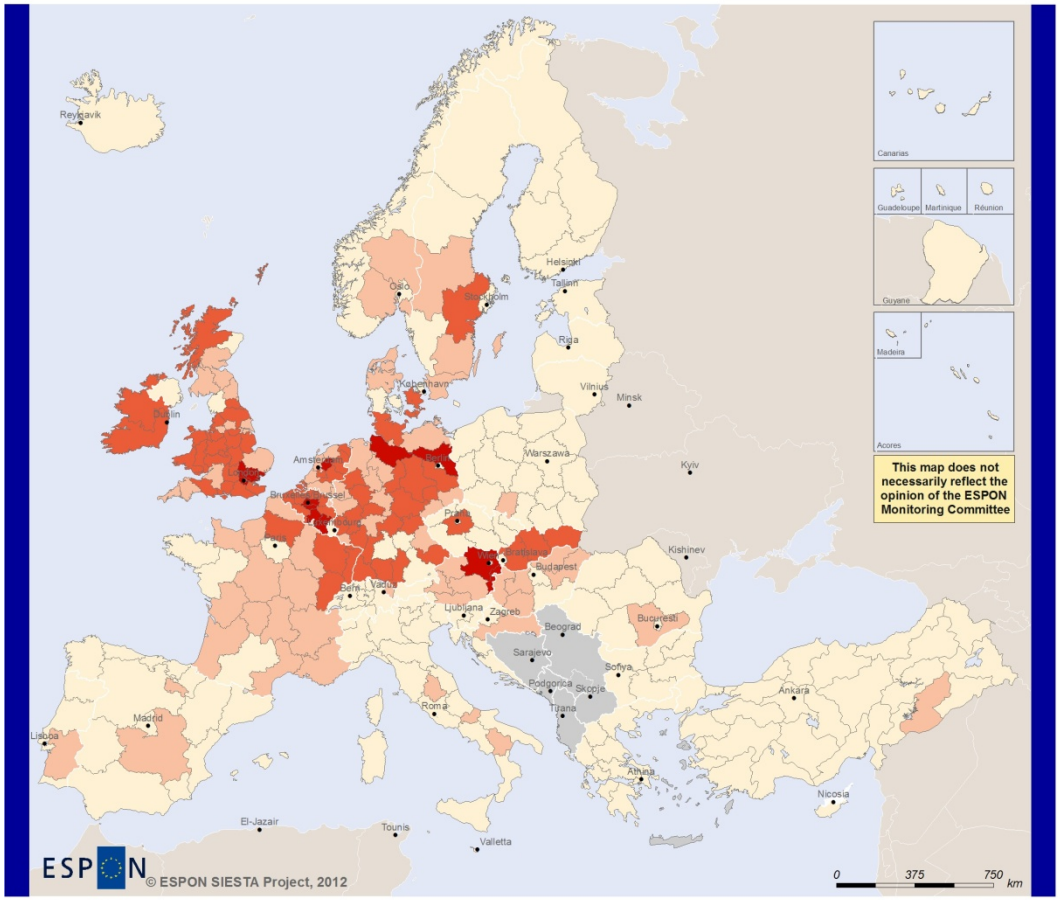
2.2.3. Challenges for Sustainable Growth

The EU2020S assumes that the economic model that is proposed in the document will help to prevent environmental degradation, biodiversity loss and unsustainable use of resources. Beyond energy efficiency and climate change issues, some specific topics are quoted in the EU2020S documentation, especially in the flagship A Resource-Efficient Europe, on the basis that resource efficiency requires action in a broad range of areas. For instance, such a document states that biodiversity conservation has to be dealt with given that land used to produce food may compete with land use for energy and both may compete with land which supports biodiversity or provides ecosystem services such as absorbing carbon from the atmosphere. This flagship also acknowledges that the EU has made major progress in the extension of recycling practices. In this respect, mapping the EU2020S also has to embrace different topics which are considered relevant. Potentially, lots of indicators might be issued, but a rather conservative understanding of the EU2020S enables the selection of three particular questions which are substantial within the sustainable growth approach of the EU2020S: transportation, pollution treatment and biodiversity protection. The specific maps for commenting on these three topics have been selected according to data availability on a regional scale.

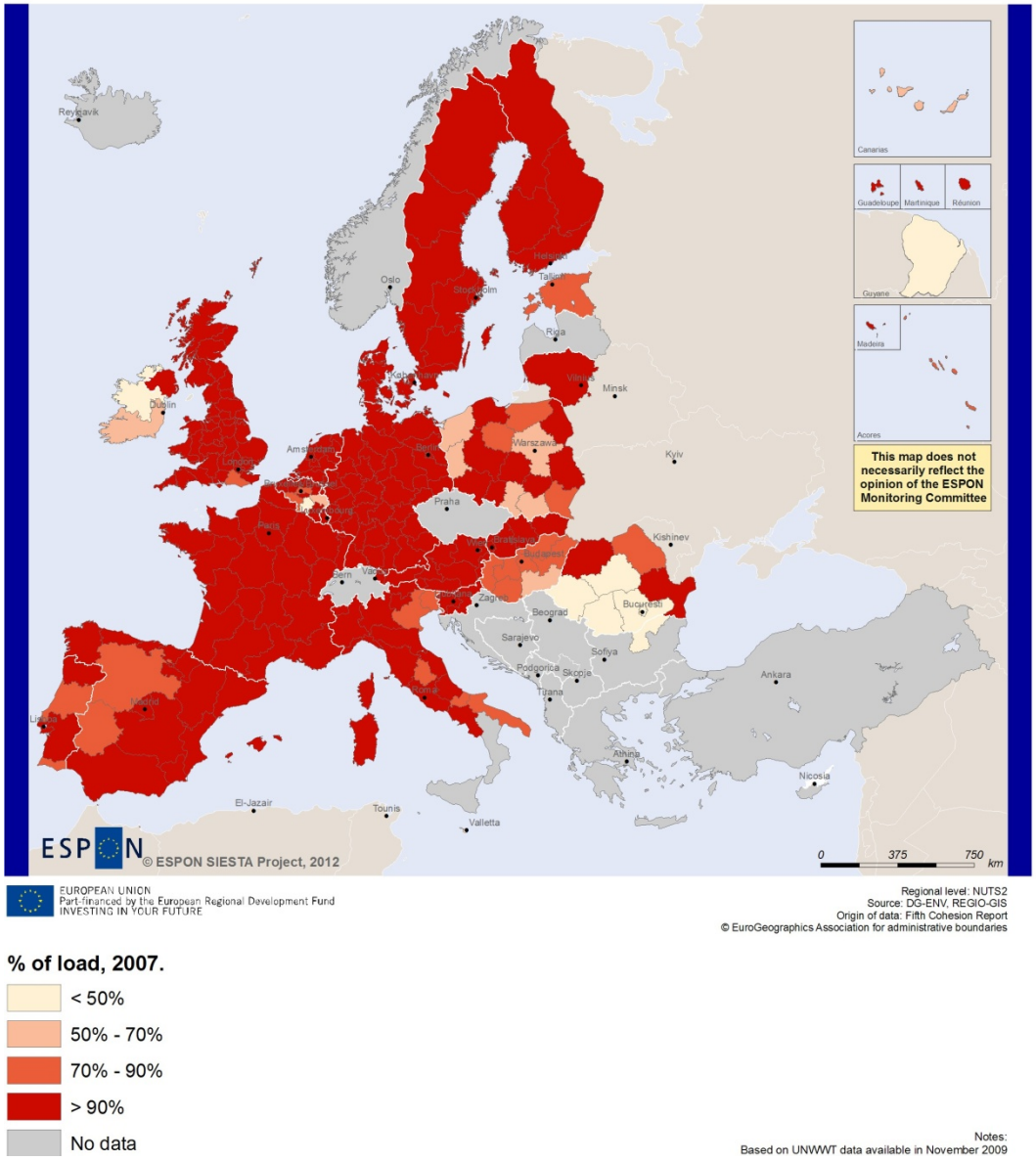
Transport is repeatedly quoted in the EU2020S documentation as a major source of GHG emissions and it is often interpreted as an obstacle to the development of energy efficiency. A map on commuting is quite important in this respect, despite aviation or the maritime sectors are also relevant sources of pollution and of energy consumption. Map 2.23 represents the share of people commuting in total employment, which is quite an important indicator as it reflects transport demand on a regional scale. It represents the ratio of people commuting to another region or to another country among total population. Generally speaking, that means that only if metropolitan areas cover more than a region at NUTS2 level commuting is represented. In addition, particularly bordering regions often score more, which means that a common challenge for these areas under the EU2020S is to deal with its transportation problems. The map shows that higher shares of people commuting are in the north-west of Europe, especially Germany, the Benelux, the UK and the north-eastern quarter of France. That is basically the Pentagon area, as

defined in previous ESPON research. In other words, the major metropolitan areas which extend beyond regional and national borders are clearly seen on the map. The same is applicable to those regions and countries which are quite small in size and do have intense contacts with neighbouring areas. In contrast, in many peripheral, rural and disadvantaged regions overall low accessibility means that commuting is scarce. Green transport policy should be implemented in the areas with higher levels of commuting, based on public transport and on the development of clean technologies. As a general reflection, the EU2020S indications suggest that, in transport policy, the focus has to be on commuting (on the urban and metropolitan scales, among others), rather than in long connections which might be of interest, but do not really contribute to a green transport agenda. In addition, there is also scope for the development of e-learning, e-government or e-commerce, which would reduce commuting, thus lessen GHG emissions; at the same time, these types of policies might carry obvious smart growth connotations.

Map 2.23 Share of people commuting in total employment, 2009



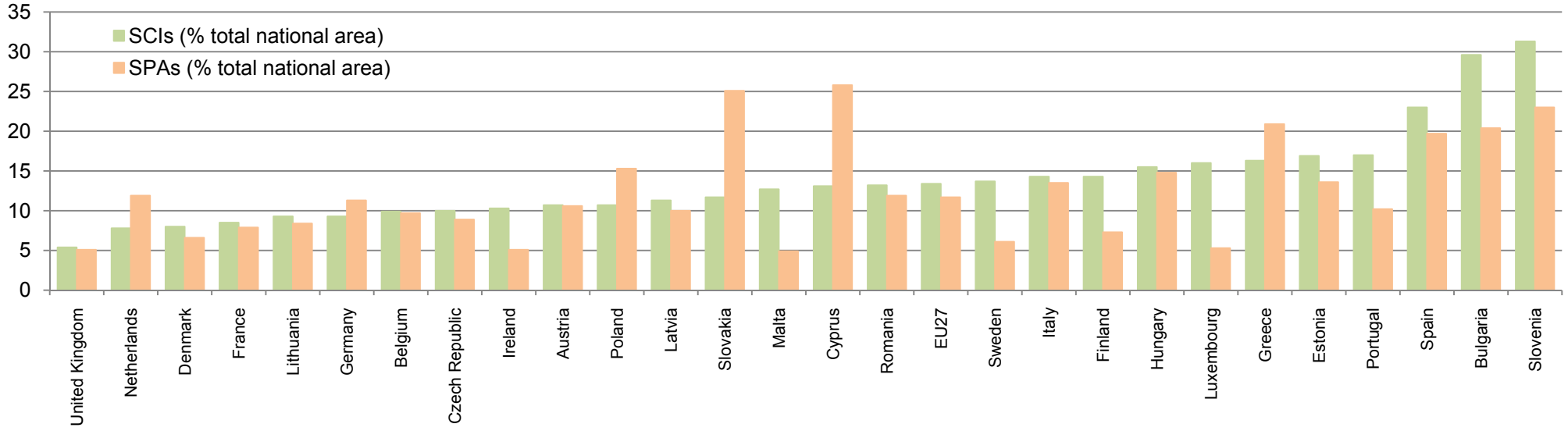
Map 2.24 Urban waste-water treatment capacity as percentage of generated load, 2007



Pollution treatment and recycling are sound measures of green economy progress as they show increasing environmental awareness which is reflected in effective policy-making and social involvement and, in addition, efficiency in resource consumption. Unfortunately, data availability is scarce and the only database which covers the ESPON territory reasonably well is on urban waste-water treatment capacity. Since the very beginnings of the 1990s a directive has been in force on this issue and it should have been applied to everywhere in Europe. In general terms that is true and in this respect the overall impression of Map 2.24 is positive, with relatively high standards reported everywhere in Europe. However, some particular regions lag behind, especially in Romania, Bulgaria, Poland and Ireland, and also the whole Malta, the French Guyana, the region of Brussels and Wallonia. These situations seem to be related to different political circumstances and this it seems to be suitable for specific actions in these areas in order to further invest in this respect. More than new legislation, what it is needed is investment. And, as it is quite obvious every time a map is shown in this Atlas, the need for data should be addressed.

The EU2020S states that biodiversity conservation is an essential issue, thus biodiversity loss must be prevented and this question has to be considered when referring to a resource-efficient and sustainable economy. Indeed, the current biodiversity strategy in force since 2012 sets 2020 as the target year, a deadline which is shared with the EU2020S. The only clear indicator available to measure biodiversity conservation currently in Europe is the Natura 2000 network. More precisely, Natura 2000 is a network of protected spaces set up to ensure Europe's most valuable species and habitats, under the so-called Habitats Directive (1992) and the Birds Directive (1979) which indeed can cover the same areas. However, Map 2.25 expressively shows that valuable biogeography is not only the fact that explains which is the pattern of the Natura 2000 network, but different political approaches which are also present in Graphic 2.7. Some countries have enthusiastically embraced the Natura 2000 network, while others have been less ambitious. And the latter is not necessarily related to lower levels of effective environmental protection, but in some cases it can be derived from the fact that national arrangements on environment, landscape or planning are perceived by the respective political authorities as more effective than the overall EU network protection. As a general pattern, it can be said that Natura 2000 is denser in Mediterranean Europe and in Slovenia and Bulgaria. Big countries such as the United Kingdom and France have not included noticeable percentages of their regions in Natura 2000 and the same is applicable for the lower regions of Sweden or Finland. In general, the Eastern regions of the EU have more protected sites in Natura 2000 network than their Western

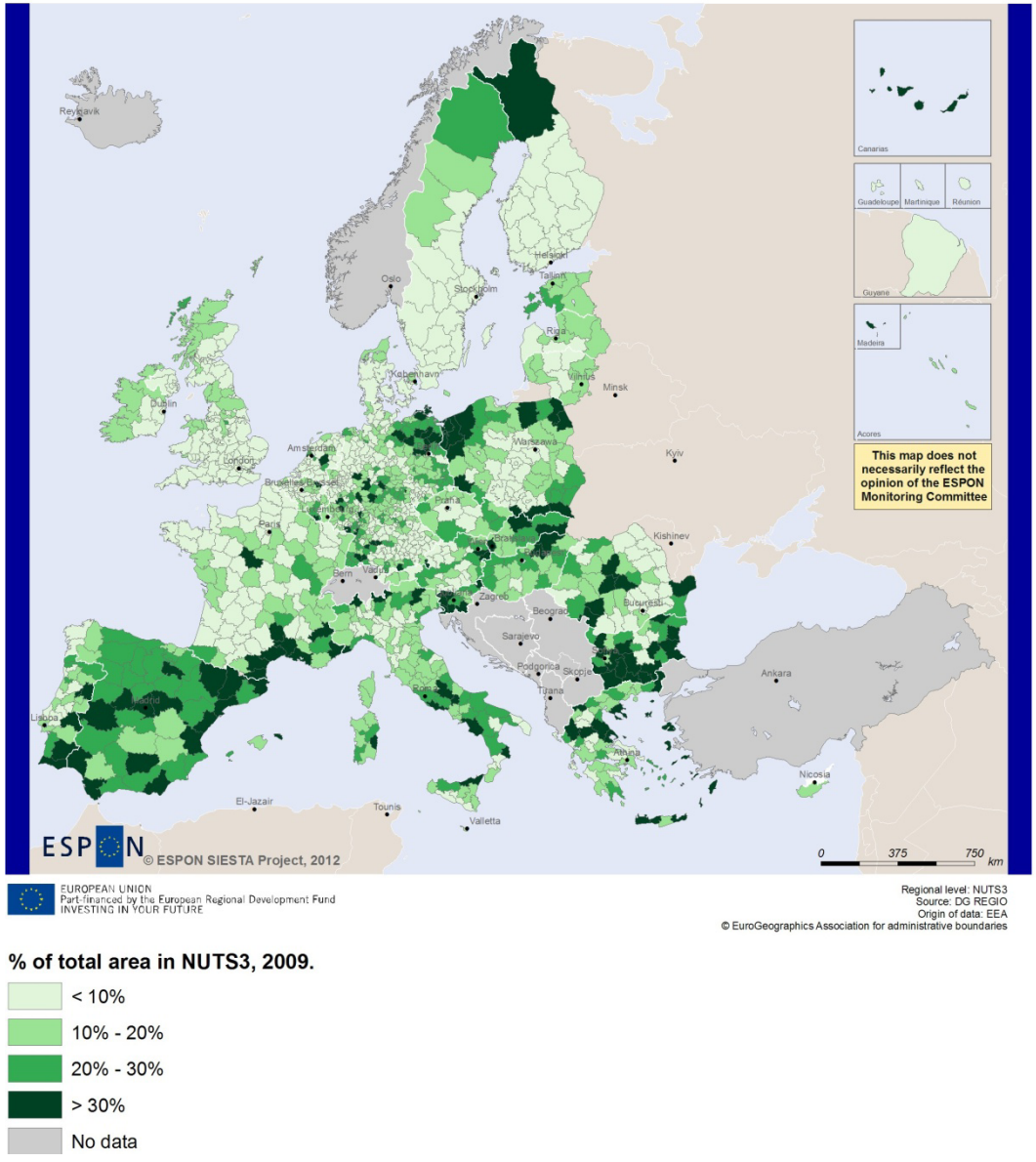
Graphic 2.7 Percentage of SCIs (Habitats Directive) and SPAs (Habitats Directive) of each country, 2011. Source: EIONET



counterparts. It is evident that an overall European approach should be set in order the Natura 2000 network would be more dependent on factual biodiversity levels on the ground. Indeed, the current strategy on biodiversity for 2020 provides a new policy context for developing new measures, including management and effective conservation of the areas that have already been protected.

Be that as it may, protected natural spaces do not only safeguard biodiversity but also play a key role in maintaining economic and social well-being; in this sense, Natura 2000 sites are not only areas to protect but also important assets for development strategies for regions, especially in rural, peripheral and remote areas. In addition, Natura 2000 plays an important role in climate change mitigation and adaptation. For all these reasons, biodiversity has to be targeted under the EU2020S as an essential topic for critically achieving the desired sustainable growth.

Map 2.25 Area under Natura 2000 network, 2009



3. Smart Growth

The *smart* approach is at the very heart of the EU2020S. Indeed, it is placed at the forefront of the document. In this Atlas it has been rescheduled to lay emphasis on the fact that the EU2020S is primarily committed with economic growth, which is overtly within the *sustainable growth* section, but *smart growth* is definitely a critical content of the Strategy that will be developed in the following pages. In this sense, it is very clear that economic growth is the basic aim of the EU2020S but this growth must be first and foremost smart. Indeed, *smart* is an expression that has been widely popularised over the last few years in Europe, for instance through the concepts of *smart cities*, *smart mobility* or *smart regions*, which have been applied in many contexts. In fact, for these stylish uses of this word it is quite obvious that there is an evident urban and regional dimension of the *smart* conception and this will be the focus of this third section of the Atlas.

Be that as it may, according to the EU2020S, smart growth deals with developing an economy based on knowledge and innovation, implying action in education, R&D promotion, innovation itself and digital society. Such a combination of hotspot fields is the driver of the EU's future growth and it is envisaged to positively contribute to the EU economy, favouring higher productivity and increasing its global market share. In addition, it is understood that smart growth will help to fuel employment and, in parallel, to improve jobs quality.

This section devoted to smart growth is divided into three inter-related subsections that are coherent with the internal division existing in the original EU2020S document, evidently translating the thematic contents of the document into maps. The first subsection is related to research performance and the promotion of innovation and knowledge transfer, in the sense that innovative ideas are effectively turned into new economic products and services. The second is focused on the quality of education, embracing issues of educational outcomes and education institutions at different learning levels, ranging from compulsory studies to university. Finally, the third subsection deals with the digital agenda, which is basically orientated to making full use of information and communication technologies (specifically, the Internet), in order to benefit the economy and society. Congruently, these three subsections are related to the three flagship initiatives which are amalgamated under the Smart Growth pillar. Firstly, Innovation Union, followed by Youth on the Move (chiefly focused on higher education institutions) and finally A Digital Agenda for Europe.

3.1. Research, Development and Innovation

3.1.1. Research and Development

The EU2020S underlines the essential role of research and development (R&D) boosting job creation and economic growth. R&D is the creative work undertaken on a systematic basis in order to increase the stock of knowledge and the use of this stock to devise new applications. The common indicator which is used in this respect is the percentage of GDP expended on R&D, commonly known with the acronym GERD (general expenditure on R&D). This measure primarily expresses the resources devoted by a particular territory to R&D. Importantly, it gathers public and private expenditures; in general, the latter is more significant than the former, but the public sector plays a crucial role, notably by supporting fundamental research, and spatially significant, in those regions that do not have a solid private sector interested in R&D. The EU2020S sets the headline target of bringing GERD to 3% of GDP by 2020. In context, the EU is below other developed countries and ahead of the developing countries (Table 3.1); this is a disquieting situation, especially if it is taken into account that some countries like the BRICS are quickly performing, while the EU is not really making progress and indeed scores modestly. That means that the EU must act urgently if it really aims to promote a smart economy.

Map 3.1 shows the spatial disparity of GERD, represented in relation to the EU target in order to measure the internal variations. Firstly, it has to be said that only 37 out of 272 considered geographical units meet the 3% target. That casts a shadow of doubt on the target as a whole being achieved in 2020, even more so if the current contraction context is considered. In addition, it is not reasonable to expect that the target is achieved everywhere in Europe as this will be impossible in a large number of regions which are poorly endowed and predictably will not be able to climb in the following years. Be it is as it may, the heterogeneity is quite significant. In general, the regions surpassing the target are located in Germany, Belgium, Sweden, Finland, the UK, Austria, France and Denmark (Table 3.2); some scholars have stated that three main corridors can be distinguished, which arguably might be seen on this map, if considering all the regions above the 2% threshold: Midi-Pyrénées to Bavaria, Styria to England and Denmark to Finland; they constitute transnational corridors which cross several internal borders and this is noteworthy in terms of economies of agglomeration and cooperation.

Table 3.1 GERD as % of GDP, 2008-2010. Source: Eurostat

	R&D expenditure as % of GDP
Japan (2008)	3.45
South Korea (2008)	3.36
United States (2008)	2.79
EU27 (2010)	**2.00**
China (except Hong Kong) (2008)	1.47
Russia (2010)	1.11

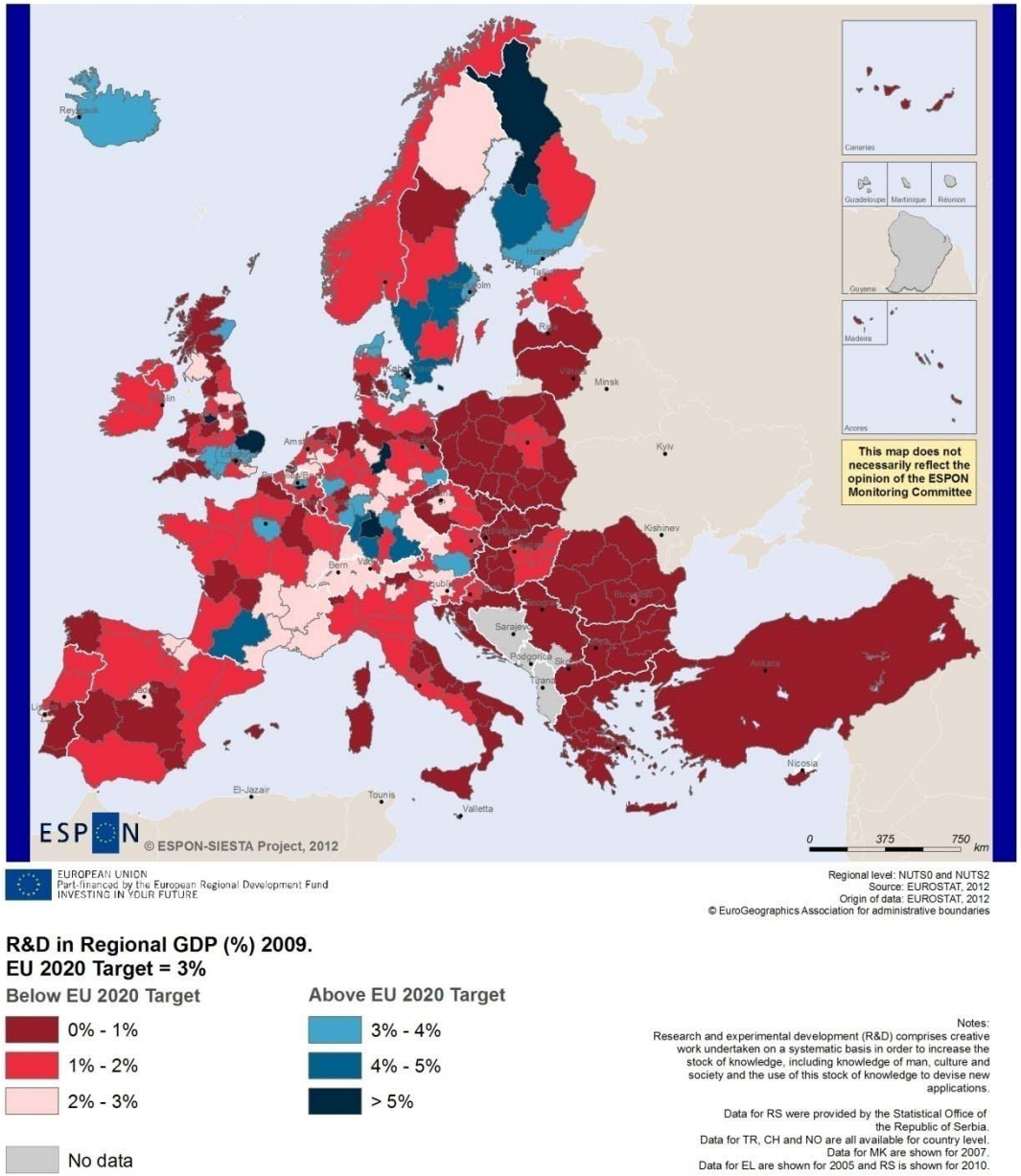
Most of these regions are urban, while not necessarily being first-ranked metropolitan areas or capitals. For instance, in Spain not only Madrid ranks high, but also the Basque Country or Navarra. However, circumstances are quite particular, for example for Midi-Pyrénées (i.e. the concentration of a specific manufacturing sector, aerospace and aviation) or Styria (where low spin-off levels are recorded and, indeed, this region is to be found under the Austrian average in GDP per capita). In fact, there is no correlation between GERD and other variables considered (except, unsurprisingly, human resources in science and technology), which means that it acts as an independent factor. In any case, the majority of the studied regions do not achieve the 3% target. Regions especially lagging behind are mainly not only located in Eastern Europe, but also in Southern parts of Italy, Portugal and Spain; other individual regions show particularly dire scores: Galicia, the Scottish Highlands, etc. Some areas invest

less than 0.2% of GDP in R&D, especially in Bulgaria, Poland and Romania, extending to non-EU regions. Although it is unlikely that all of them reach 3%, those regions ranking so poorly should be especially targeted. Research is important for all regions, whether they currently be leaders or not.

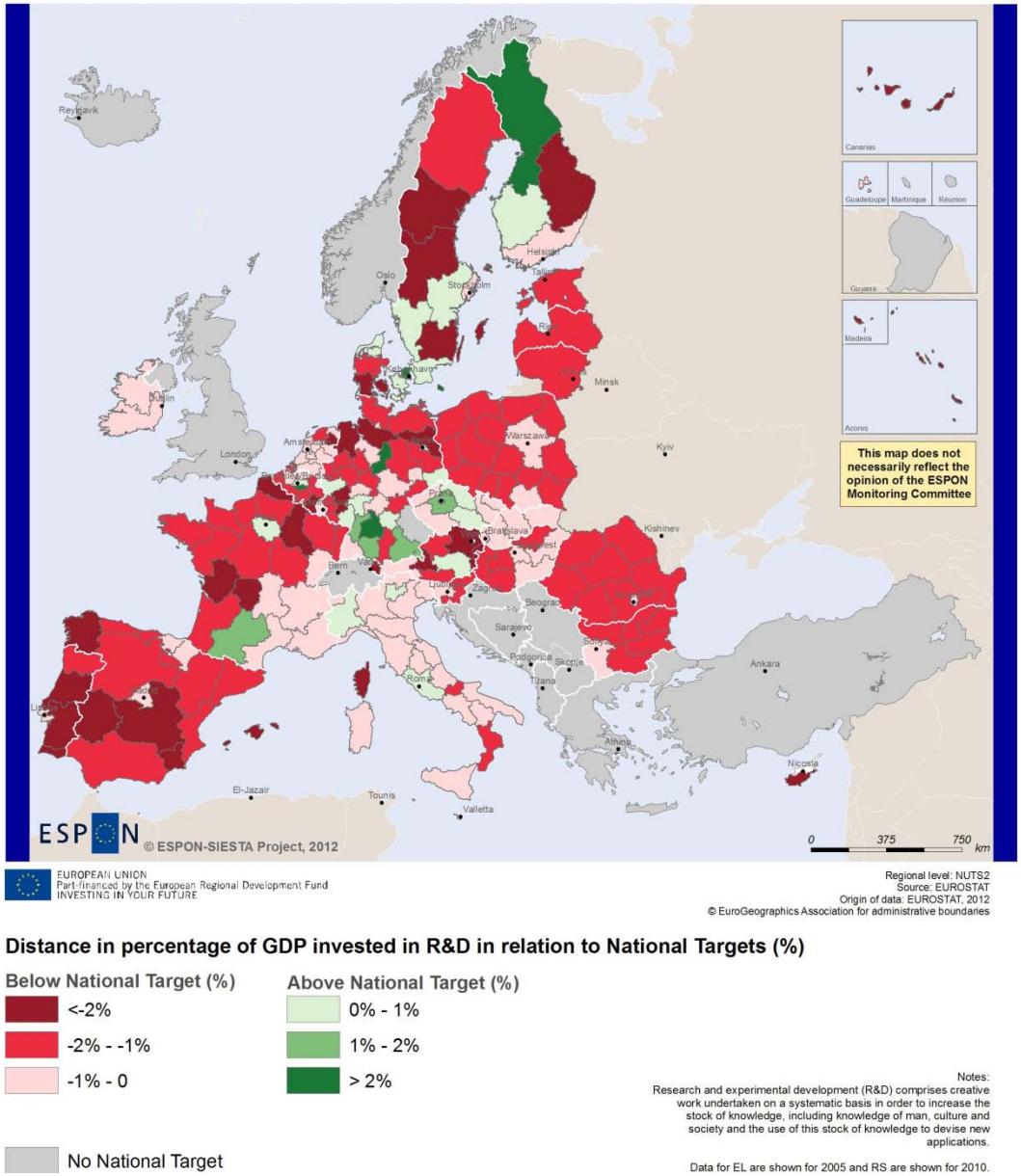
Table 3.2 Ten regions with highest and lowest GERD as percentage of GDP, 2009. Source: Eurostat

		R&D expenditures as % of GDP
DE	Braunschweig	7.93
BE	Brabant Wallon	7.63
FI	Pohjois-Suomi	6.58
UK	Cheshire	6.51
DE	Stuttgart	6.44
UK	East Anglia	5.59
DK	Hovedstaden	5.27
SE	Sydsverige	4.73
DE	Oberbayern	4.63
DE	Tübingen	4.55
EU27		**2.01**
BG	Yugoiztochen	0.18
RO	Sud-Est	0.17
FI	Åland	0.16
ES	Ceuta	0.16
BG	Severozapaden	0.16
GR	Ionia Nisia	0.13
BG	Severen tsentralen	0.13
GR	Notio Aigaio	0.12
GR	Dytiki Makedonia	0.11
PL	Lubuskie	0.10

Map 3.1 GERD as percentage of regional GDP, 2009



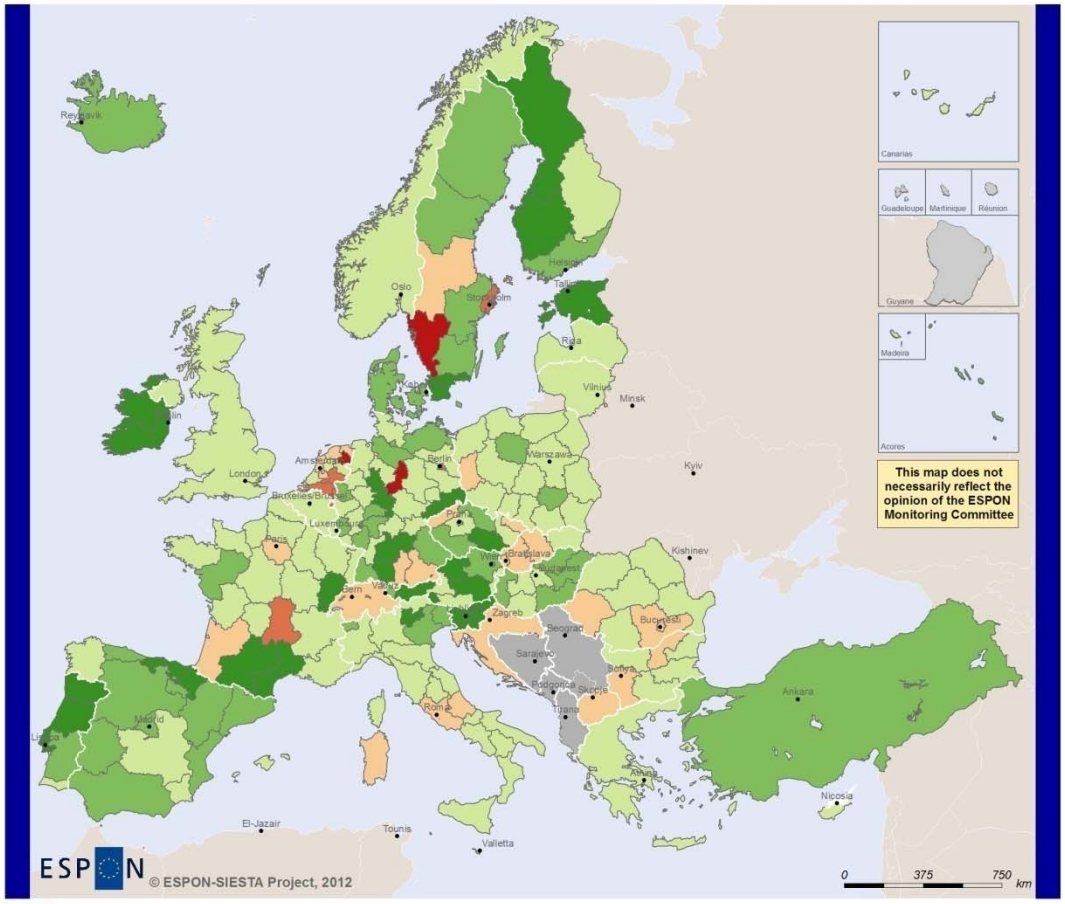
Map 3.2 GERD as percentage of regional GDP represented as distance to the 2020 national targets, 2009



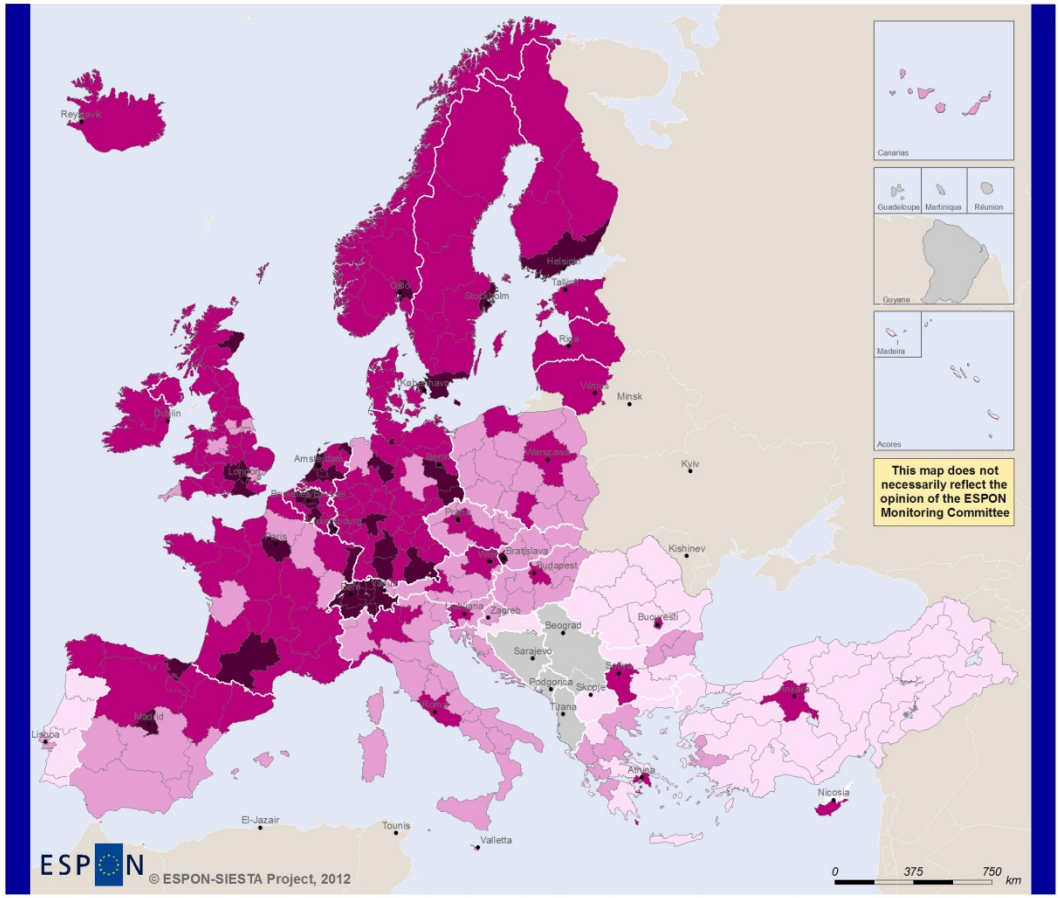
Map 3.2 illustrates how far specific regions need to progress to meet or exceed their agreed national targets on the percentage of GDP investment in R&D. Some countries like Germany, Spain or Denmark have set a national target identical to the EU. Others have been ambitious by targeting over 3% (Austria, Sweden and Finland), being clearly the leaders in this respect by aiming to perform beyond the required. Some EU countries have not set a target and logically the non-EU do not have them. Most of the countries have set targets below the EU headline and that makes this map quite heterogeneous as it is very dependent on national decisions. Significantly, the official overall estimations of the EC state that, by amalgamating current national targets, the EU target will not be achieved and that is quite worrying in terms of the global competition which is being played out in this issue (Table 3.1). For this reason, national targets are quite disappointing and indeed do not seem to be particularly useful when taking into consideration the enormous heterogeneity of Europe. In fact, what seems to be strategic is setting the EU target with particular regional strategies. In some cases, regions might win by cooperating in order to attain agglomeration economies.

Map 3.3 represents 2003-2009 progress in GERD investment. Significantly, the EU has increased 0.14%, but the rate has been higher in the US (0.19%), Japan (0.25%) or South Korea (0.87%), while the BRICS are catching up; again, the behaviour in R&D of the EU as a whole is upsetting. Internally, it is complex to understand the map, but undoubtedly the progress in GERD is an important indicator of the economic health of regions as it shows performance. It is noteworthy that 17% of the regions have no progress or, even worse, a contraction, in a very unclear scattered pattern; this non-progressing dynamic is quite shocking in the buoyant context of the years 2003 to 2008. It is also important to say that some of the regions that are especially well ranked (Map 3.1) have improved their situation, being the case, among others, of Suomi in Finland or Midi in France; this is related to the fact that returns from R&D are likely to accrue in those regions where a critical mass of R&D efforts is already concentrated. Be that as it may, the majority of the regions have shown a tiny progress, especially in the Danube Region and in general in the post-2004 members of the EU and some French or Italian regions. Ireland is a case in point as it has experienced a great progress in all its regions.

Map 3.3 Change in GERD as percentage of regional GDP, 2003-2009



Map 3.4 Human resources in science and technology as percentage of active population, 2009



Human capital is fundamental for R&D and innovation. Indeed, the only factor which correlates on a regional scale with R&D is human resources in science and technology, represented on Map 3.4. The Innovation Union flagship is particularly insistent in the fact that human 'brain power' is fundamental for R&D and innovation development and indeed it is concerning to wonder if the EU truly acts as a magnet for talented researchers compared to competitor countries, which seem to be more attractive. The geographical pattern associated to the map shows a concentration of scientists and technologists in North West Europe and Scandinavian countries, being quite similar to Map 3.1. At the very top of Europe there are basically urban areas, in the first-rank (namely London) or inferior levels of the urban system (Zürich, Utrecht, Bratislava, etc.), but almost all of them are capital cities. Some of these regions excel in advanced services, with computer scientists, network engineers, consultants in financial economy, market data analysts, etc., being clearly the case of Inner London or Luxembourg; others seem to be more specialised in manufacturing (for instance, biotechnology or electronics). Particular regions have been denoted as hotspots of science and technology development and this is clearly seen

on the map: some Scandinavian regions, South-East England, Switzerland, Midi-Pyrénées, Brabant (both the Flemish and Walloon sides, including Brussels-Capital Region), etc. It has to be said that some specific regions in Europe contain quite a high percentage of human resources working in science and technology, but their proportion of GDP invested in R&D is low; this is an important socio-economic imbalance that should be addressed in regions such as Northern Spain, Eastern France, Eastern Baltic states, etc. and that might reveal an over-qualification of human resources. In contrast, large areas of Europe (including EU and non-EU countries), especially in Eastern Europe, the South-East and the Mediterranean Basin have regional economies with low levels of human resources in R&D, coinciding with a low percentage of GERD; in general, these macro-regions are heavily dominated by agricultural production and tourism. Indeed, in countries such as Bulgaria, Greece, Portugal, Romania or Turkey only the region where the national capital lays accounts for quite an outstanding rate of human resources in science and technology.

3.1.2. Innovation

Innovation tends to emerge from R&D. Although the precise definition of innovation in relation to R&D has been debated, there is a consensus that R&D is a kind of pre-condition, but the practical advance in terms of new or almost-new products and processes is called innovation. However, innovation can also occur without R&D, emerging from practice. This means that, when referring to innovation, good ideas and scientific and technological improvements that have taken place within R&D are translated to the market. As recognised in the Innovation Union flagship, there are no specific indicators for innovation at the state scale level available, and even worse when referring to regions. Indeed, this flagship suggests measuring innovation through indicators on R&D as they give an indication; this has been done in this Atlas with the previous maps. In addition, it recommends developing an aggregate indicator on innovation (still pending) and proposes some provisional indicators, including patent applications (Map 3.6). Importantly in spatial terms, it has to be mentioned that Innovation Union urges that the benefits of innovation reach across the EU, clearly stating that an innovation divide between the strongest innovating regions and the others has to be avoided.

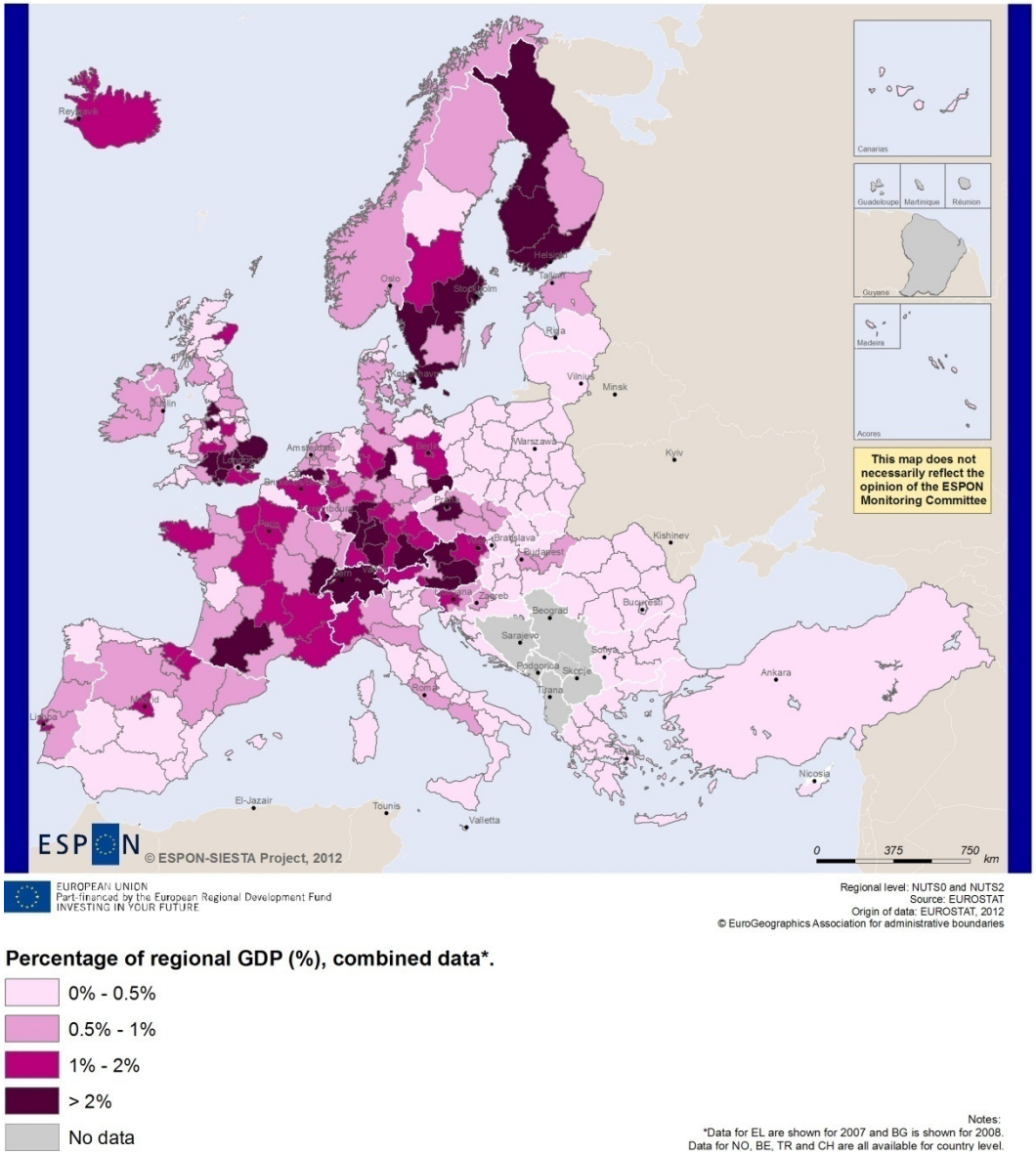
Table 3.3 BERD as % of GDP, 2008-2010. Source: Eurostat

	Business expenditure in R&D as % of GDP
Japan (2008)	2.70
South Korea (2008)	2.53
United States (2008)	2.02
EU27 (2010)	**1.23**
China (except Hong Kong) (2008)	1.08
Russia (2010)	0.67

The first cartography which is noteworthy for innovation is business expenditure in R&D or BERD (Map 3.5). A first point to retain is that the Lisbon Strategy devised in 2000 stated that the target for such an indicator should have been 2% in 2010. Taking into account that only 34 out of 274 considered geographical units met in 2009 this Lisbon target a decade later, it can be said that the Lisbon Strategy has not really been fulfilled and this poses a logical open question as to whether the EU2020S will be followed. Be that as it may, BERD gives a more precise indication of innovation in the sense that the latter has direct relevance for business operations, while GERD is wider and embraces the public sector as well. For BERD the EU scores worse than in GERD, as it lags behind global competitors such as the US or Japan and, what is more, China is close to the EU rate (Table 3.3). Again, the three main corridors in R&D are appreciable on Map 3.5, especially the Midi-Bavaria and the Copenhagen-Suomi, while

the corridor from Austria to England is lesser clear here, although South-East England scores very highly. Some of the outstanding regions of Germany are the 'cradle' of the automobile (Stuttgart and Braunschweig) and in the case of South-East England the proximity to tertiary institutions such as the University of Cambridge bears witness to the importance of spin-off effects. In contrast, almost all Eastern Europe (except the Czech Republic) has very low BERD standards and the same is applicable to Greece, Turkey, Southern Italy or Southern Spain. GERD (Map 3.1) strongly correlates with BERD (Map 3.5). This demonstrates that for the most innovative regions in terms of R&D business expenditure is the key driver. However, there are some regions which have quite a big gap between them both. If the EU average distance between them both is 0.77 percentage points, there are some regions where the distance is more than two-fold and in these cases arguably the public sector is leading R&D, rather than businesses; therein governmental investments are substantial and, notably, that is the case of some national capitals (Berlin, Wien or Madrid) and Southern France, and also in some regions in Germany, Sweden or the Netherlands.

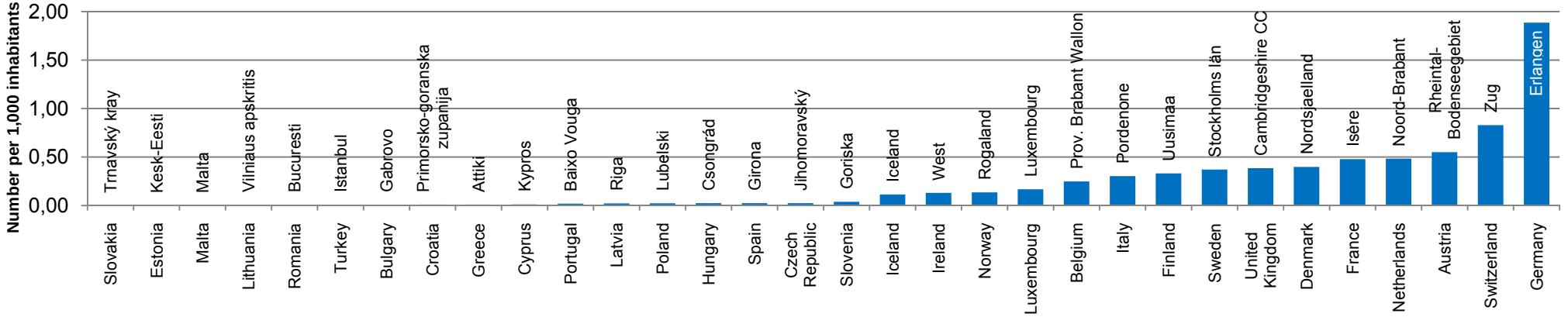
Map 3.5 Business expenditure in R&D as percentage of regional GDP, 2009



The more classical and available indicator for innovation is patents. Patents are commonly used to identify sources of economic growth, to assess rates of technological change and to understand the differentials in levels of competitiveness. Crucially, they are useful for measuring degrees of innovation and the ability of particular areas to transform R&D into innovation. Map 3.6 illustrates the ratio of patent applications expressed as the number of applications per 1,000 inhabitants. The immense majority of patents emerge in a particular area of Europe that basically includes Germany (namely, the old West Germany) and Switzerland, with piecemeal extensions to particular regions of Austria, Northern Italy, France, Benelux, South-Eastern England, Sweden and Finland. In the top performing regions (100 out of 1,352 for which there are data) only 11 are not German: 10 are Swiss and 1 is located in Austria. In contrast, 187 out of 1,352 geographical units do not have a record of filling out a patent application. Most of these regions are in Turkey, Romania, Bulgaria, Croatia, Poland and Spain, all of them with more than 10 geographical units without patent applications. Generally, most of the regions lagging behind are not only in South East Europe, the Balkans, the Danube Space and the Southern shore of the Baltic Sea, plus Turkey, but also in several areas of Central Iberian Peninsula or Southern Italy there is a lack patent applications; service and primary sectors are not particularly important in the generation of patents and these are the economic sectors dominating these arguably non-innovative areas.

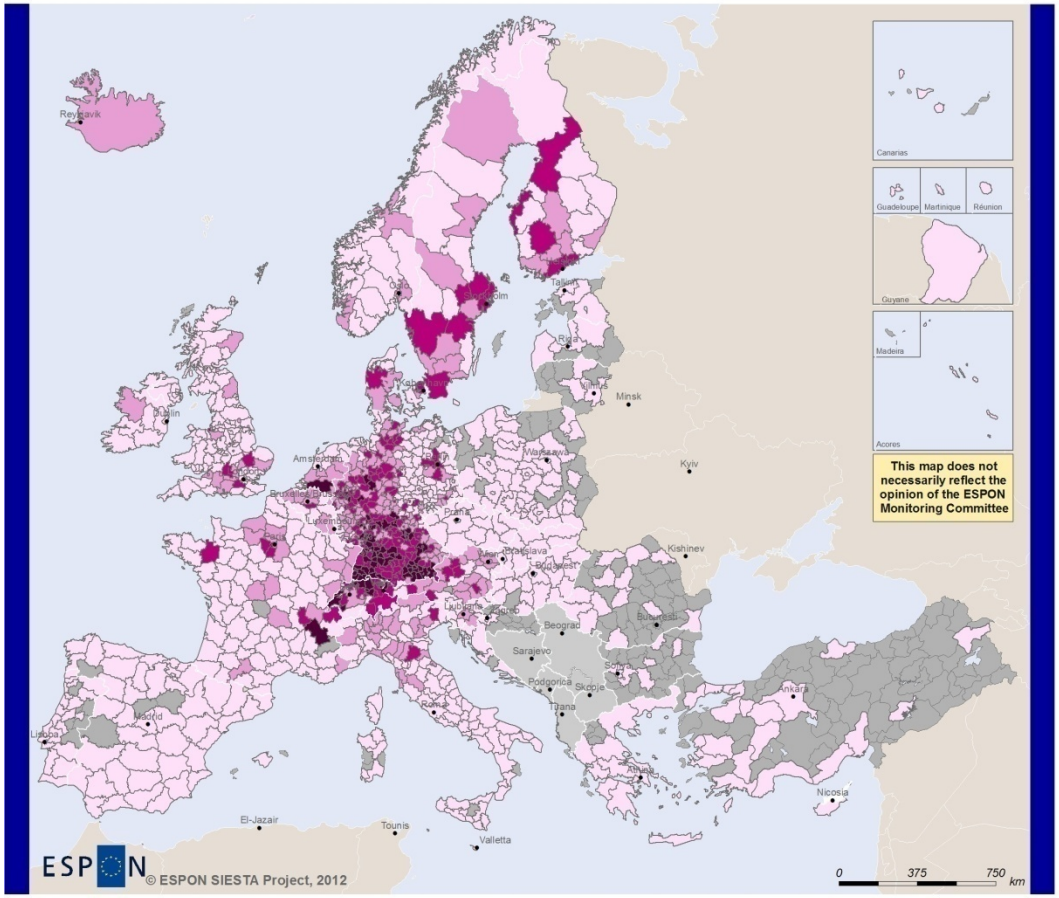
Patents do not directly correlate with other datasets shown in this Atlas (GERD, BERD, tertiary education etc.) and that makes the justification of this pattern quite complicated. Explanations have to be considered at the same time as several variables (high-quality human capital, inventiveness, universities, GERD and BERD, etc.) and the dominance of the manufacturing sector, which is more exposed to generating patents than services (even being advanced services, i.e. financial or consulting). All these factors are present in Germany, which is the country that clearly shows the maximum score (Graphic 3.1), but there are also crucial political and cultural reasons for explaining such

Graphic 3.1 Top region in each country in applications to the EPO per 1,000 inhabitants, 2008. Source: OECD Regpat, SIESTA's calculation



dominance. In fact, Germany has a strong expertise in patenting, which has been developed over time. When the Innovation Union states that one of the severe weaknesses of the EU compared to its competitors is the absence of a single, affordable and simple patent system and insists on the fact that it is necessary that the already successful patent systems in the EU be spread, it is clear that the reference to take must be Germany. Switzerland, which is also a leader in Europe, has another successful system, but based in non-competitive factors; SIESTA's research suggests that there are some particularities associated to regulation in the sense that Zug canton concentrates a lot of patent applications despite its modest size (Graphic 3.1); but therein there are almost 25,000 companies registered in 34 km^2 because of low taxation levels. Be that as it may, the uneven geography of patent applications shown by Map 3.6 is a concern and should be addressed. As reported by the KIT Project, the US has a smoother spatial distribution of patents, while developing countries such as China or India suffer a concentration; in this respect, the reference for the EU is the US and this is the only way to accomplish the EU2020S indication urging that the benefits of innovation are reached across the EU.

Map 3.6 Patent applications to the EPO per 1,000 inhabitants by inventor's region of residence, 2008



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

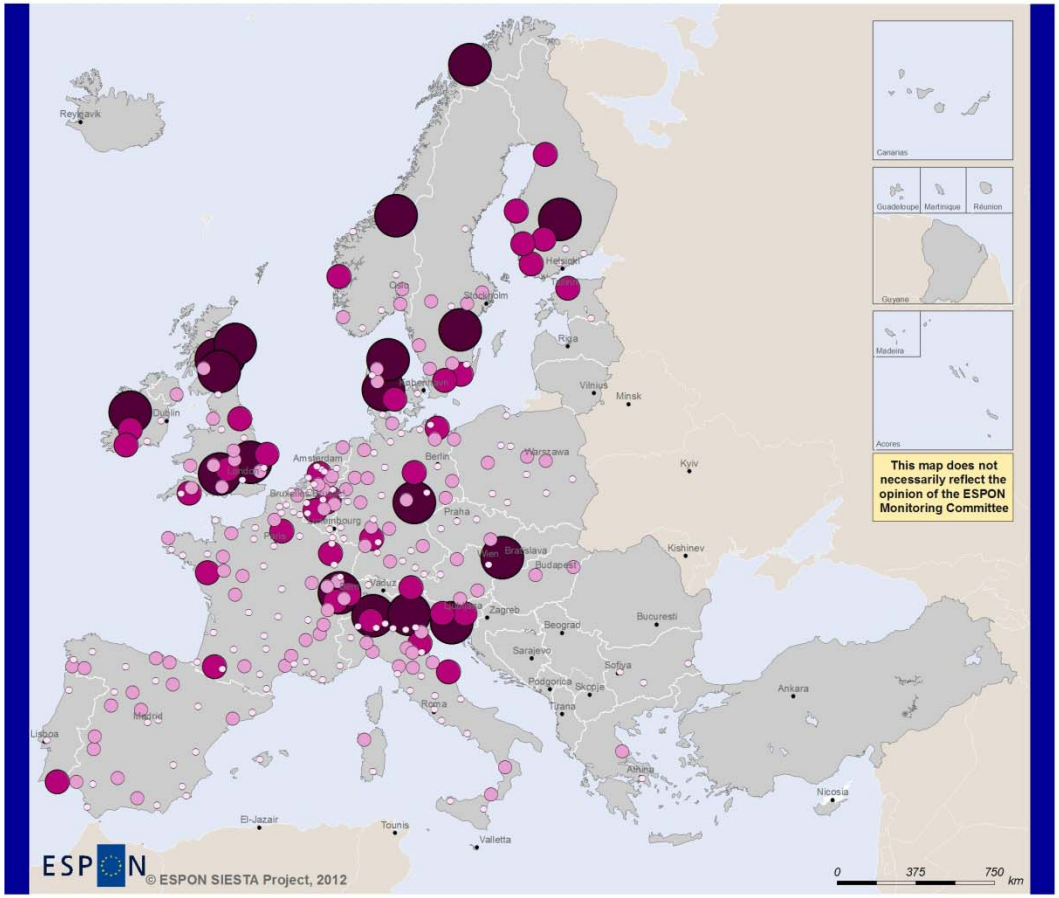
Regional level: NUTS3, NUTS2
Source: EUROSTAT and OECD Regpat database
Origin of data: EUROSTAT and OECD Regpat database
© EuroGeographics Association for administrative boundaries

Number of patent applications to the EPO per 1000 inhabitants, 2008.

- < 0.1
- 0.1 - 0.2
- 0.2 - 0.4
- > 0.4
- No data
- 0 patent applications in 2008

Notes:
NL and EL are shown at NUTS2 level.
IS is shown at country level.

Map 3.7 Research specialisation in NBIC technologies in FUAs, 1986-2006



A last map which is illustrative for innovation is on research specialisation in NBIC (nanotechnology, biotechnology, information technology and cognitive science) technologies. Although the very idea of research suggests R&D, these four fields are emerging and they are expected to drive the next innovation wave. This specialisation is measured through an index developed by the FOCI Project, focusing on cities, thus showing how successful particular urban areas are in attracting funds for research in these fields. From previous maps it is clear that urban and metropolitan areas tend to concentrate R&D and innovation, but this Map 3.7 clarifies which specific cities have been particularly thriving by accounting research project participation of an urban area per population of the given area. First of all, it has to be said that there is a clear specialisation in NBIC in urban areas in the Northern Periphery, the North-West, Scandinavia and then the Alpine Arc, while other individual cities like Bratislava (Slovakia) and Jena (Germany) have also won several projects. The Denmark-Finland corridor is again particularly clear, but it is true that the outermost Northern Periphery (Ireland, Scotland and Norway) is also present in this case. Regional specialisations are also very clear, for instance Scotland, with four cities being at the

forefront, that is, in the ten top urban areas of Europe attracting more NBIC projects: Dundee, Perth, Aberdeen and Edinburgh; this country has intensively invested in nanosciences through its university system. Not surprisingly, Cambridge and Oxford are also at the forefront, but so is Ireland (Galway, Limerick and Cork). All these locations lead to the second remark related to this map: the decisive role of universities in shaping the knowledge-base and smart growth geography of Europe. When tertiary institutions are proactive, they are crucial in this respect and they are very significant in several medium and small-sized cities, which are clearly highlighted on Map 3.7. While several big cities (national capitals and global cities) score modestly (for instance, London), cities like Poznan (Poland), Ourense (Spain) or Belfast (UK) are very close to median levels of specialisation in the EU. This pattern only shows that the latter are comparably more specialised in NBIC than London (measuring in relation to their respective demographic sizes), but it is obvious that there is scope for medium and small size cities in smart growth terms, as their universities are able to attract NBIC R&D projects, and thus carrying out innovation.

3.2. Education

3.2.1. Basic Education Achievement

The EU2020S is very explicit in stating that "A quarter of all pupils have poor reading competences, one in seven young people leave education and training too early. Around 50% reach medium qualifications level but this often fails to match labour market needs. Less than one person in three aged 25-34 has a university degree compared to 40% in the US and over 50% in Japan. According to the Shanghai index, only two European universities are in the world's top 20." The assumption derived from these sentences is that the EU education system as a whole has major weaknesses that have to be managed. Indeed, the problems seem to be present at all educational levels, but the EU2020S focus more on tertiary education because of its obvious connections with the economy, growth, research, innovation and competitiveness. However, there is also some attention paid to compulsory levels of education. For this reason we will begin in this Atlas by considering education at the early stages. Beforehand, it has to be acknowledged that education receives quite a particular attention in the EU2020S documentation as the transition towards a more knowledge-intensive economy will only be possible by increasing levels of education. In this respect, human capital is critical for growth.

The headline target that has been set for compulsory levels of education is to reduce the share of early school leavers (measured as a percentage of the population aged 18 to 24) to less than 10%. In order for all citizens to participate fully in society and economy, to prevent poverty and to improve employability, a basic level of education is required. Importantly, compulsory education varies enormously from country to country, but fortunately there is a dataset for this indicator which amalgamates the statistics from different countries on a regional scale; typically, the educational level under examination is lower secondary education. It is worthwhile mentioning that this was already a Lisbon target in 2000 and the fact that a decade later it is clearly repeated indicates that it has not succeeded: the EU has still a figure of 15% and Map 3.8 shows how the drop-out rate varies among European territories. In contrast to most of the maps of this Atlas, the pattern in this case "favours" some Eastern Europe countries, for instance regions in Croatia, Slovakia, Poland or the Czech Republic (Table 3.4). However, some Eastern countries such as Romania or Bulgaria

do not score particularly well. In addition, some regions on the Western side are doing well, for instance in Austria, Switzerland, Luxembourg or Belgium. This East/West divide where the Eastern regions tend to score better is not only attributable to cultural and historical reasons, but also to the importance of the policies in place. For instance, in Hungary in 2010 the government introduced legislation to make school attendance a condition for state support of families with children of school age. In Slovakia or the Czech Republic the combination between school and workplace courses has been successful, a flexibility that the EC has identified as important in diminishing the risk of early school leaving and that might be followed by other countries and regions.

Most of the regions that do not reach the target in countries such as Germany, France, the UK, Ireland, the Benelux, Scandinavia or the Baltic Sea Region are quite close to achieving it. That means that if a policy action is implemented and has success, regional rates would improve. In countries such as Ireland, Denmark or Norway authorities are already delivering decisions in this respect. Feasibly, the EU2020S target will be attained therein although now it is not in place.

Table 3.4 Ten regions with highest and lowest early school leavers rate, 2010. Source: Eurostat

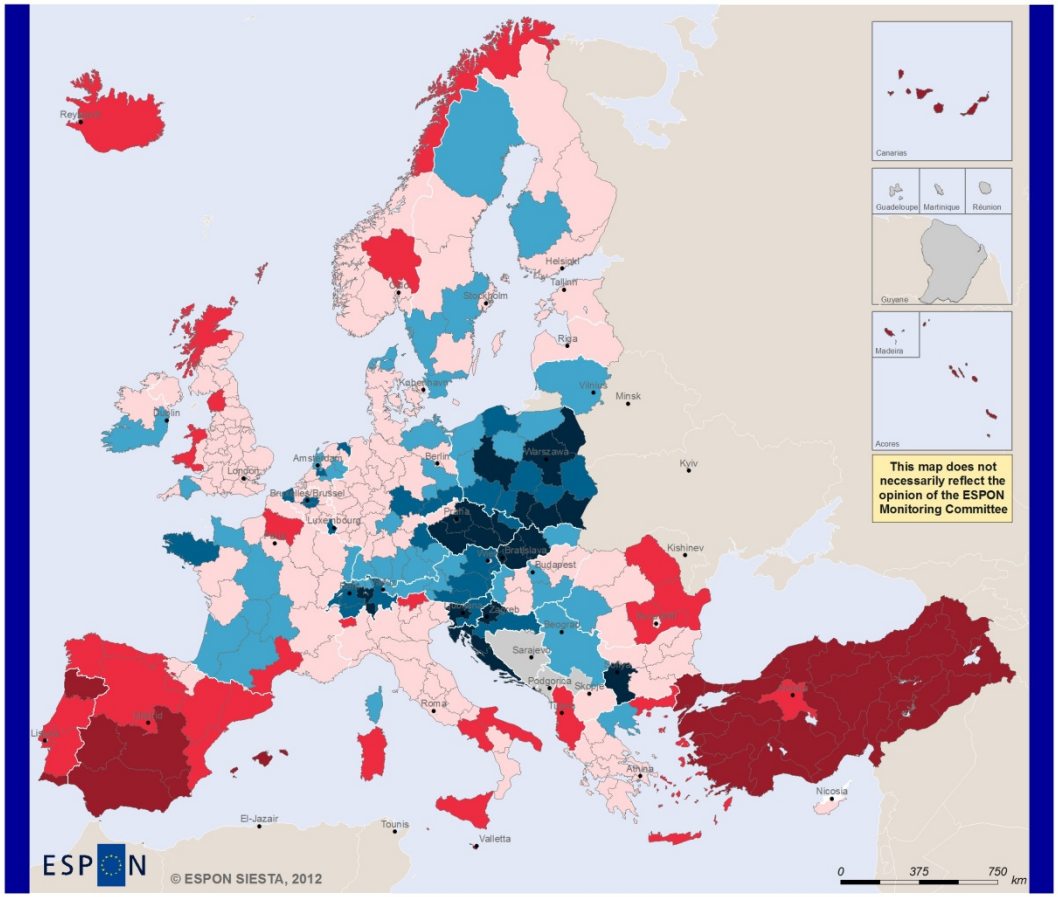
		Drop-out rate as % of 18-24 years old
HR	Sjeverozapadna Hrvatska	2.2
SK	Západné Slovensko	2.3
CZ	Praha	2.8
PL	Malopolskie	2.8
SK	Bratislavský kraj	2.8
CZ	Jihovýchod	2.9
HR	Jadranska Hrvatska	4.0
PL	Mazowieckie	4.0
CZ	Střední Morava	4.1
PL	Podlaskie	4.1
EU27		**14.1**
TR	Erzurum, Erzincan, Bayburt	46.4
TR	Samsun, Tokat, Çorum, Amasya	47.5
TR	Manisa, Afyonkarahisar, Kütahya, Usak	48.2
TR	Kastamonu, Çankiri, Sinop	48.3
TR	Hatay, Kahramanmaras, Osmaniye	51.9
TR	Gaziantep, Adiyaman, Kilis	55.2
TR	Mardin, Batman, Sirnak, Siirt	59.2
TR	Sanliurfa, Diyarbakir	63.6
TR	Van, Mus, Bitlis, Hakkari	68.7
TR	Agri, Kars, Igdir, Ardahan	69.3

But Map 3.8 also informs about the particularly worrying situation of specific areas of Europe. The regions scoring worst are in Turkey, where the majority of students do not fulfil lower secondary educational levels (Table 3.4). With very high drop-out rates (above 30%) there are also 4 Southern Spain regions (plus Ceuta, Melilla, Balears and Canarias), Malta and 4 regions in Portugal (Açores, Madeira, Norte and Algarve). Outermost regions score particularly badly. Unacceptable rates are also found in the other Spanish regions (except the Basque Country and Navarra), the other Portuguese regions, Iceland, the outermost regions of Norway, or the UK, Southern Italy, some Greek regions and the Eastern regions of Romania. The causes for these regions being so distant from the achievement of an acceptable drop-out rate are heterogeneous. For instance, in Turkey it seems a substantial fact that most of the regions are rural and the population does not perceive the need to attain education, but on top of this expenditure on education is comparatively low and most of the children in families migrating to cities have less access to education. A similar situation would exist in Albania and other South-Eastern regions of Europe. However, the case of Spain is slightly different; in Spain a high proportion of young people left school during the economic boom years (1997-2007) in order to enter the labour market when lots of low qualification jobs were created in construction, tourism and basic services; the moderate correlation between the drop-out rate and unemployment in 2010 reveals how there is an important link between them both. Indeed, tourism, construction and non-specialised

services dominating in regions such as Southern Italy, Algarve or Malta might be the reason for particularly dreadful situations in terms of youth moving out of school into unskilled jobs.

The regions that right now have a very bad scoring in early school leavers are not likely to meet the target given that, while improvements can be made, the pace at which this occurs is slow and 2020 is in 8 years time. Indeed, and taking into account that secondary education is essential for the future's economy, it can be said that the fact that one third of the examined regions are very far from the target compromises the ability of Europe to emerge from the recession: it is impossible to have a smart economy when more than 45% of children do not attain secondary education (that is the case of Açores or Ceuta, for instance), thus the future workforce is not skilled and is unable to work in knowledge-based jobs. Map 3.8 shows that there is a severe polarisation in Europe and this should be a key concern for those responsible in the EU2020S implementation. In addition, it must be stated that good educational levels *per se* do not ensure economic growth and success, as for instance is the case of Ireland, scoring well in low drop-out rate but being particularly hit by the crisis.

Map 3.8 Regional early school leavers from education and training as percentage of population aged 18 to 28 (drop-out rate), 2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2 and NUTS0
Source: EUROSTAT, MS NRPs, DG REGIO, Seventh Report on Economic, Social and Territorial Cohesion
Origin of data: EUROSTAT, 2011
© EuroGeographics Association for administrative boundaries

Percentage of population aged 18-24 (%) 2010, in relation to EU 2020 Target.

Below EU 2020 Target (10%)
- < 5%
- 5% - 7,5%
- 7,5% - 10%

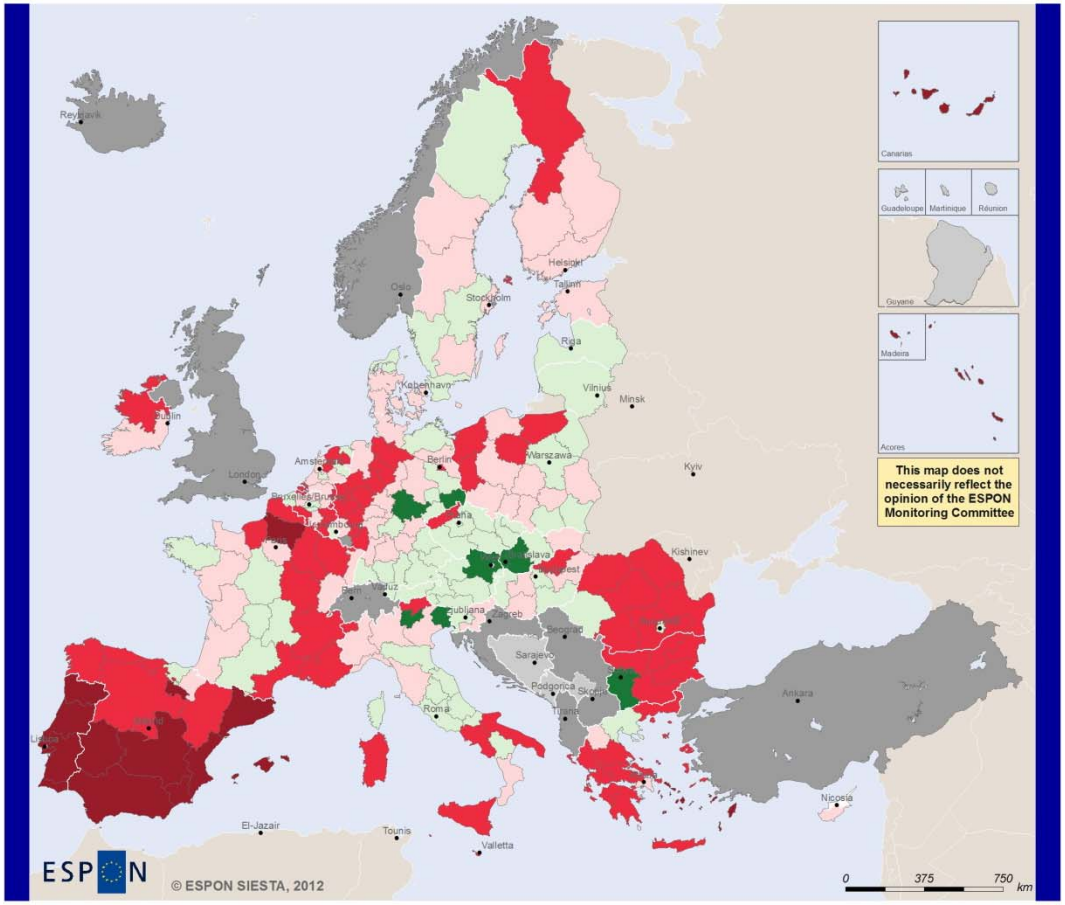
Above EU 2020 Target (10%)
- 10% - 20%
- 20% - 30%
- > 30%

No data

Notes:
Early leavers from education and training refers to persons aged 18 to 24 fulfilling the following two conditions: first, the highest level of education training attained is ISCED 0, 1, 2 or 3c short, second respondents declared not having recevied any education or training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding no answers to the questions "highest level of education or training attained" and "participation to education and training".

EU 2020 target: 10%
Data for RS, AL, and MK are shown at country level.
*Data for AL are for 2009

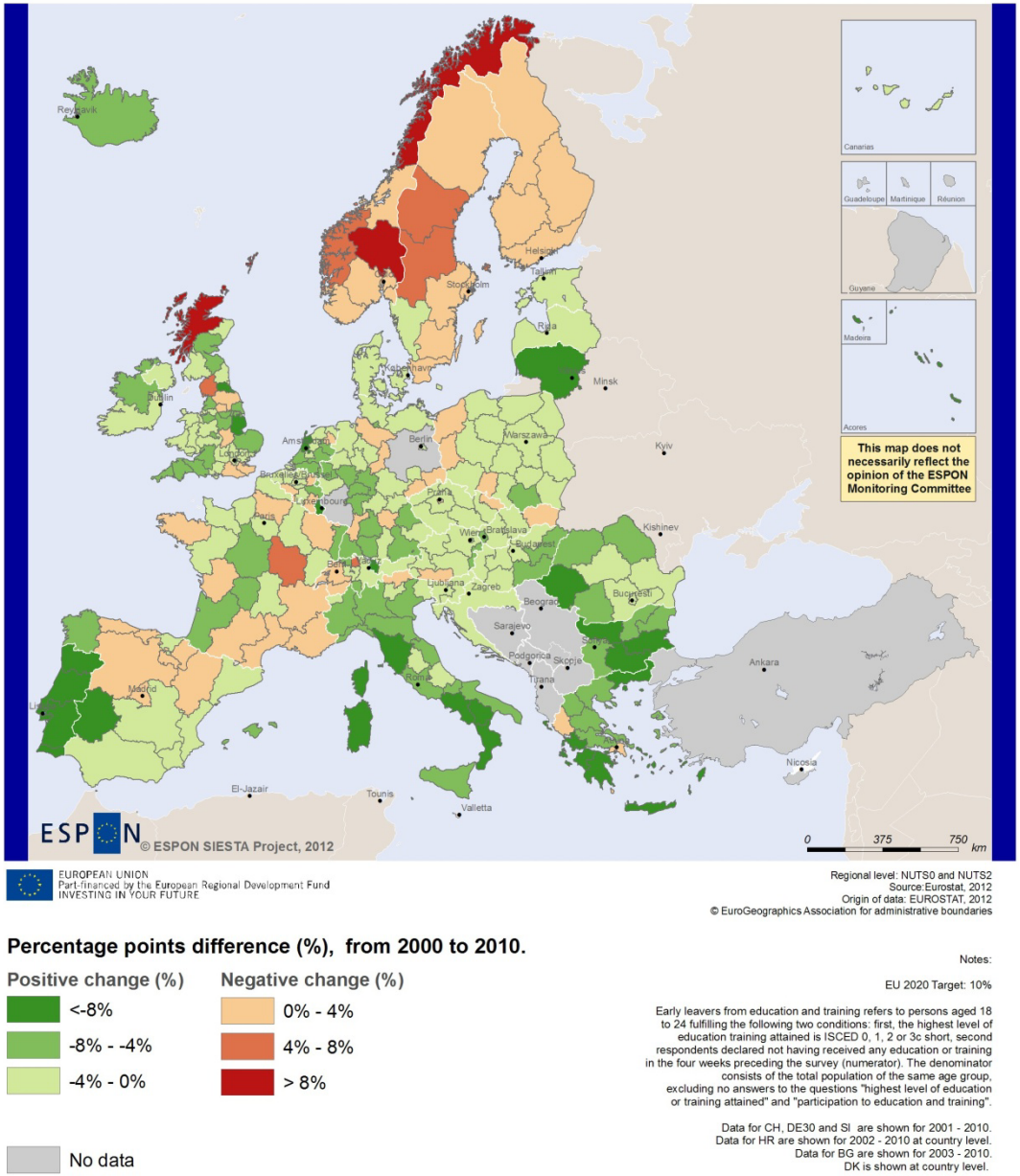
Map 3.9 Regional drop-out rate represented as distance to the 2020 national targets, 2010



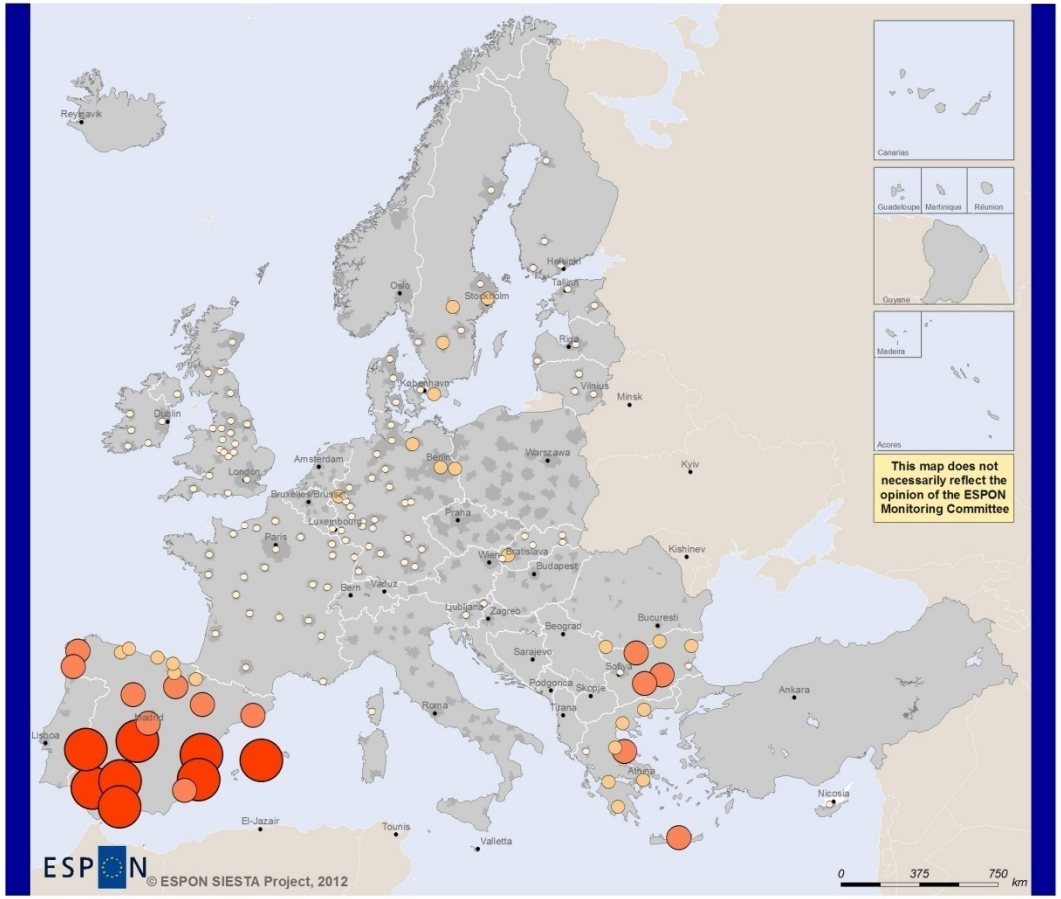
According to the European Commission, on the basis of current national targets it will be difficult to achieve the EU target as a whole, especially in some particular EU regions that have already been quoted. Some national targets have been set quite far away from the EU target (Malta, 29%; Italy, 15%; Spain, 15%; Latvia, 13.4%), while others are the European target itself (for instance, Cyprus, Hungary or Portugal). The majority, however, are below the EU target and some Eastern countries are even targeting rates below 5.5% (the Czech Republic, Poland or Slovenia). But the diversity of national targets in relation to the overall EU target makes the comment of Map 3.9 quite difficult and, in addition, again some particular countries have not set a target. In short, the map reflects the different national ambitions and they are heterogeneous. Be that as it may, the map shows that some regions will need a very strong effort in order to improve, especially in the Iberian Peninsula and in the South-East of Europe; specific interventions are essential in both these areas. Other particular regions such as Eastern France, Northern Germany or Northern Finland will be managed depending on national decisions on this issue as, in general, they are not scoring too badly at the moment.

Map 3.10 shows the variation of regional drop-out rate for the last decade. Overall, there is no real discernible geographic pattern. In general terms, EU27 is improving: from 17.6% in 2000 to 14.1% in 2010, although the momentum is not quick, thus the change needed is not likely to take place in the 2010-2020 decade. Some of the regions with high early school leaving rates are experiencing a positive change, for instance not only in Portugal, Romania, Bulgaria, Greece or Italy, but also in Corse, France (the best performing region, with -31% change of the rate in one decade); in Spain in general the change has been positive but moderate, although some Northern Spanish regions have indeed worsened and this is worrying when taking into account the very bad situation of this country. Scandinavia is a region where the drop-out rate seems to have deteriorated, especially in Norway and Sweden, together with particular regions of the UK, France, Poland or Germany; in these areas the distance to the EU target is increasing. There is not one explanation for this pattern and it is not possible to make a link between this trend and R&D or general educational levels. Most of the Eastern regions which are well ranked on Map 3.8 show a static behaviour on Map 3.10.

Map 3.10 Change in regional drop-out rate, 2000-2010



Map 3.11 LUZ drop-out rate, 2004-2008

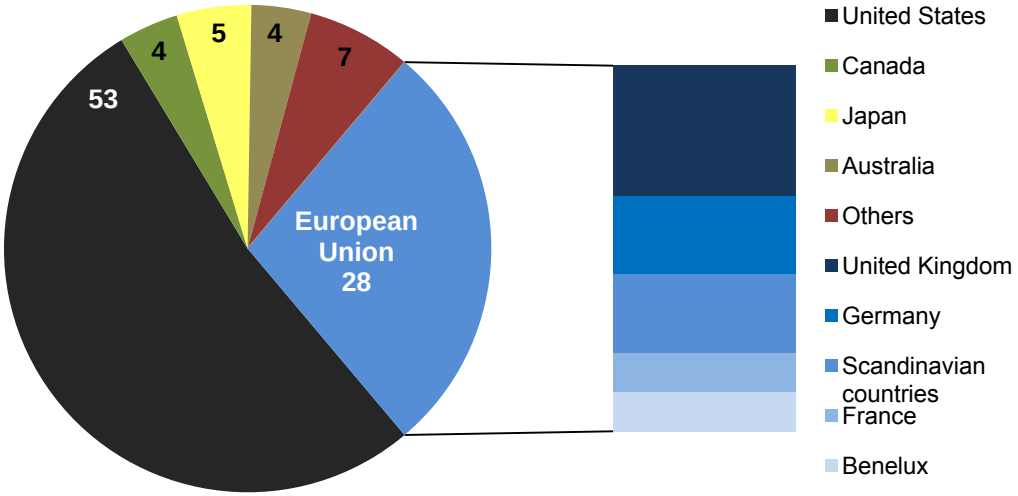


The data for early school leavers on the urban scale (through LUZs) is again uncompleted in the sense that most countries lack the respective datasets (Map 3.11). However, this representation allows the detection of two interesting issues. The first is that, in general, urban areas are doing better than regional averages shown on Map 3.8. For instance, Bratislava is better than its region, or Ljubljana and Maribor are better than Slovenia, Irish cities are performing better than Irish regions, etc. That means that non-completion of mandatory education is typically not a big city phenomenon, but a particularly rural and regional issue. The second worth a mention is that Spain is different in the sense that some particular Spanish cities score worse than their regions, in contrast to the general European pattern. That is particularly the case of LUZs of València and Alacant, scoring 37.3% and 36.9% respectively, while the Valencian Region scores 29.2%; in these cases a key explanatory factor might be immigration, with not only lower educational profiles, but also lower-skilled job opportunities offered by the pre-crisis economy in these cities (especially construction and tourism), luring students from schools.

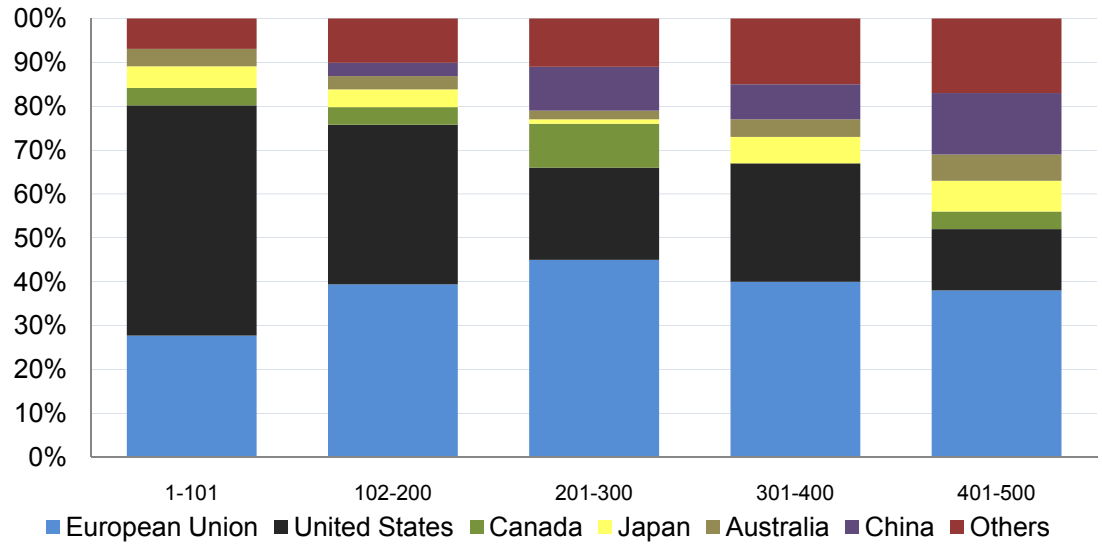
3.2.2. Tertiary Education and Youth

As it has previously been stated, the EU2020S is particularly focused on the university level. Mentions such as stating that high levels of higher education are correlated with higher levels of productivity are constant in the EU2020S documentation. Indeed, it is true that there are direct and positive correlations between regions with a high tertiary educated population and high scores of human resources dedicated to science and technology, the ICT sector, broadband penetration and advanced services development, according to SIESTA's calculations. Youth on the Move flagship deals mainly with tertiary education, conceiving it as a key factor in helping to attain the smart growth objectives. The EU2020S sets a headline target which will be examined below, but previously it has to be noted that the Strategy quotes the under-performance of the EU universities as a particular issue constraining smart growth. A specific indicator of this poor situation of the EU tertiary education institutions is Shanghai's index, despite the criticism that has received. Graphics 3.2 and 3.3 show that EU universities score lowly in comparison to the US and that countries such as France score worse than Canada or Australia, even knowing that these countries more than halve the French population. The EU improves a little bit when looking at the lower quartiles of the index. Be that as it may, and as it will be shown in the next pages, the fact that universities are particularly performing is very important for regions, but it does not guarantee *per se* that the talented youth remains in place as graduates can move to regions which are more attractive and indeed some appealing regions without top universities can attract the tertiary educated from elsewhere.

Graphic 3.2 Shanghai index's 100 top universities of the world per countries, 2011. Source: ARWU, SIESTA's calculation



Graphic 3.3 Shanghai index's 500 top universities of the world per quintiles and countries or groups of countries, 2011. Source: ARWU, SIESTA's calculation



The EU2020S is concerned about the lower percentage of people having completed tertiary education. If this rate is over 40% in the US and over 50% in Japan, the EU sets the 40% official headline target, based on the fact that it is estimated that by 2020 35% of all jobs will require high-level qualifications. The average rate in 2010 for all the EU is 33.6% and that makes the overall target very ambitious for the 2010-2020 decade. However, it is very important to note that this average masks a much more complex reality and a very uneven European geography (Map 3.12). While in some regions the rate is extremely high, in others it is under 10% (Table 3.5). Inner London has a 66% rate; this is no surprise considering that central London is Europe's leading financial hub, one of Europe's main centres for advanced services, the seat of the British government and the location of several major universities and their associated research institutions and spin-offs. Probably, this high qualification of the population does not only relate with the significant number of graduates through universities located therein, but it is also product of an attraction of talent from other regions. In contrast, not only Turkish regions score particularly low, but also the whole of the Czech Republic and Portugal.

Table 3.5 Ten regions with highest and lowest population aged to 30 to 34 with tertiary education. 2010. Source: Eurostat

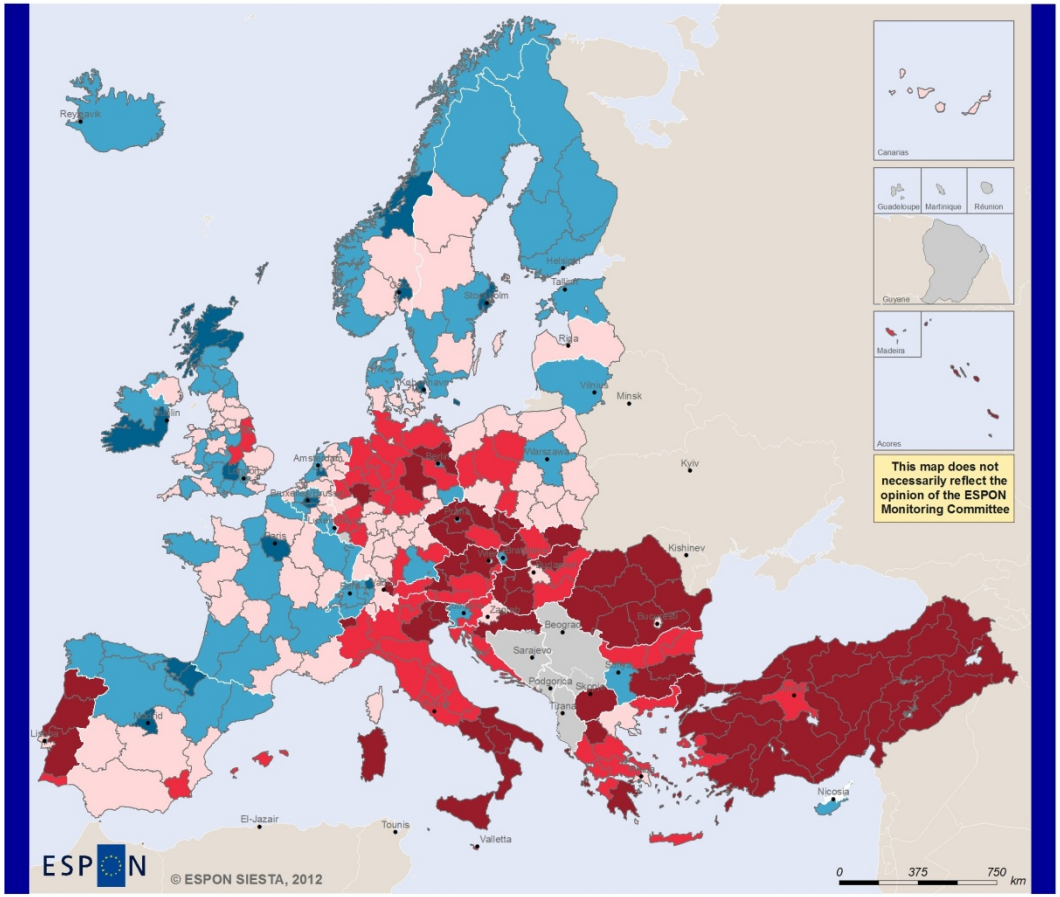
		% of 30-34 years old with tertiary education
UK	Inner London	66.0
ES	País Vasco	59.9
DK	Hovedstaden	58.6
NO	Oslo og Akershus	57.6
BE	Prov. Vlaams-Brabant	55.9
NO	Trøndelag	55.4
BE	Brabant Wallon	54.8
SE	Stockholm	53.2
FR	Île de France	52.6
NL	Utrecht	52.6
EU27		**33.6**
TR	Kastamonu, Çankiri, Sinop	12.0
TR	Malatya, Elazig, Bingöl, Tunceli	12.0
TR	Balikesir, Çanakkale	11.5
PT	Região Autónoma dos Açores	11.3
TR	Agri, Kars, Igdir, Ardahan	10.2
TR	Hatay, Kahramanmaras, Osmaniye	9.7
TR	Gaziantep, Adiyaman, Kilis	8.9
TR	Van, Mus, Bitlis, Hakkari	8.8
CZ	Severozápad	8.4
TR	Mardin, Batman, Sirnak, Siirt	8.1

As shown on Map 3.12, 86 out of 311 considered regions already attain the target. Most of these regions are located in Western Europe, but in a scattered pattern. In general, Northern Periphery countries, North-West regions and France and Spain score particularly well, over the EU target or thereabouts. Surprisingly outperforming economies such as Germany or Austria and a typically Western country like Italy score very lowly and their regions are generally quite far away from the EU target; in the case of Germany and Austria that might be related with its educational system: there are non-comparable levels of post-secondary and non-university tertiary which are polytechnic and that have possibly not been accounted for. Be that as it may, the map shows how urban and metropolitan regions tend to score better than rural. Typically, a great number of university graduates stay in the region where they have studied after completing their studies because there are professional opportunities; that is the situation of capitals (London, Copenhagen, Oslo, Stockholm, Brussels, Paris, Madrid, Dublin, etc.) that in addition attract tertiary educated population from elsewhere. That is also the case as well of regions such as the Basque Country and Navarra, Utrecht, Scotland and Northern Scandinavia, where regional universities together with adequate job opportunities play a crucial role. It is important to mention that some regions that nowadays score highly are being affected by the crisis (for instance, Northern Spain or Ireland); in these cases, predictably, there will be a 'brain drain' to other areas where there are job opportunities in accordance to their educational levels.

The above regions sharply contrast with the very low rates of several regions in Europe, especially Eastern, but also including Portugal and, as above mentioned, Italy, Germany and Austria. Beyond the national specificities of these latter countries, the general pattern for South-East Europe (plus Portugal and Turkey) might be the reliance on agricultural production and tourism. In the case of the old Eastern bloc, the Soviet economy, based on heavy manufacturing, appears to be a key element for understanding lower rates of tertiary education attainment, contrasting with the positive situation of these countries in terms of low drop-out rates.

An additional mention has to be given in relation to tertiary education: how different regions reach the targets is highly dependent on legal and institutional contexts which vary a lot from country to country. For instance, not only the existence of fees for access to higher education must be taken into account, but also the systems of scholarships. France or Spain provide a quasi-free tertiary education, while the UK requires students to pay a lot. Again, the impact of the crisis might be severe as countries which are scoring well like Ireland or Spain are introducing higher fees and that compromises the countries' future ability to meet set targets.

Map 3.12 Regional population aged 30 to 34 with tertiary education, 2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

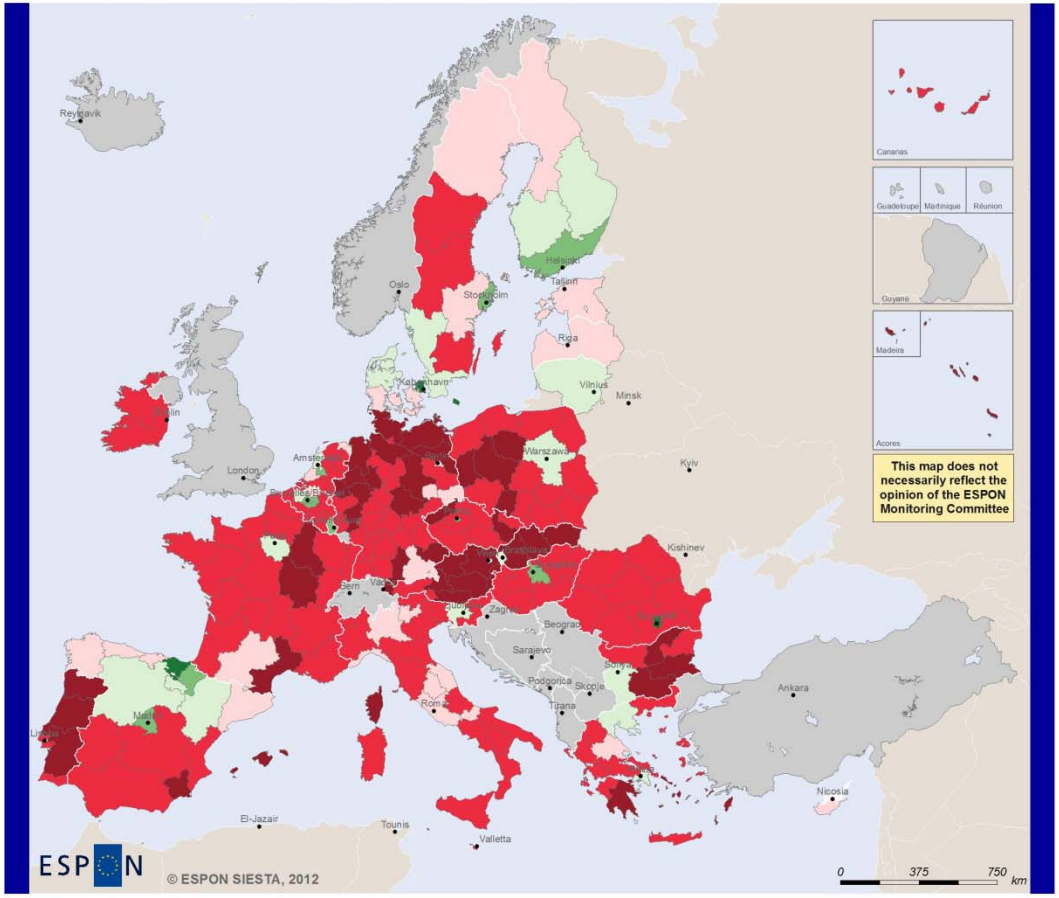
Regional level: NUTS2
Source: Seventh Report on Economic, Social and Territorial Cohesion
Origin of data: EUROSTAT, 2011
© EuroGeographics Association for administrative boundaries

Percentage of total population aged 30-34 (%) 2010.
EU 2020 Target = 40%

Below EU 2020 Target	Above EU 2020 Target
< 20%	40% - 50%
20% - 30%	> 50%
30% - 40%	
No data	

Notes:
The share of the population aged 30 - 34 years who have successfully completed university or university-like (tertiary level) education with an education level ISCED 1997 (International Standard Classification of Education) of 5-6. This indicator measures the Europe 2020 strategy's headline target to increase the share of the 30 - 34 years old having completed tertiary or equivalent education to at least 40% in 2020.

Map 3.13 Regional population aged 30 to 34 with tertiary education represented as distance to the 2020 national targets, 2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2
Source: Seventh Report on Economic, Social and Territorial Cohesion
Origin of data: EUROSTAT, 2011
© EuroGeographics Association for administrative boundaries

Distance in percentage of population with tertiary education in relation to National Targets (%)

Below National Target (%)	Above National Target (%)
<-15%	0% - 5%
-15% - -5%	5% - 10%
-5% - 0%	> 10%

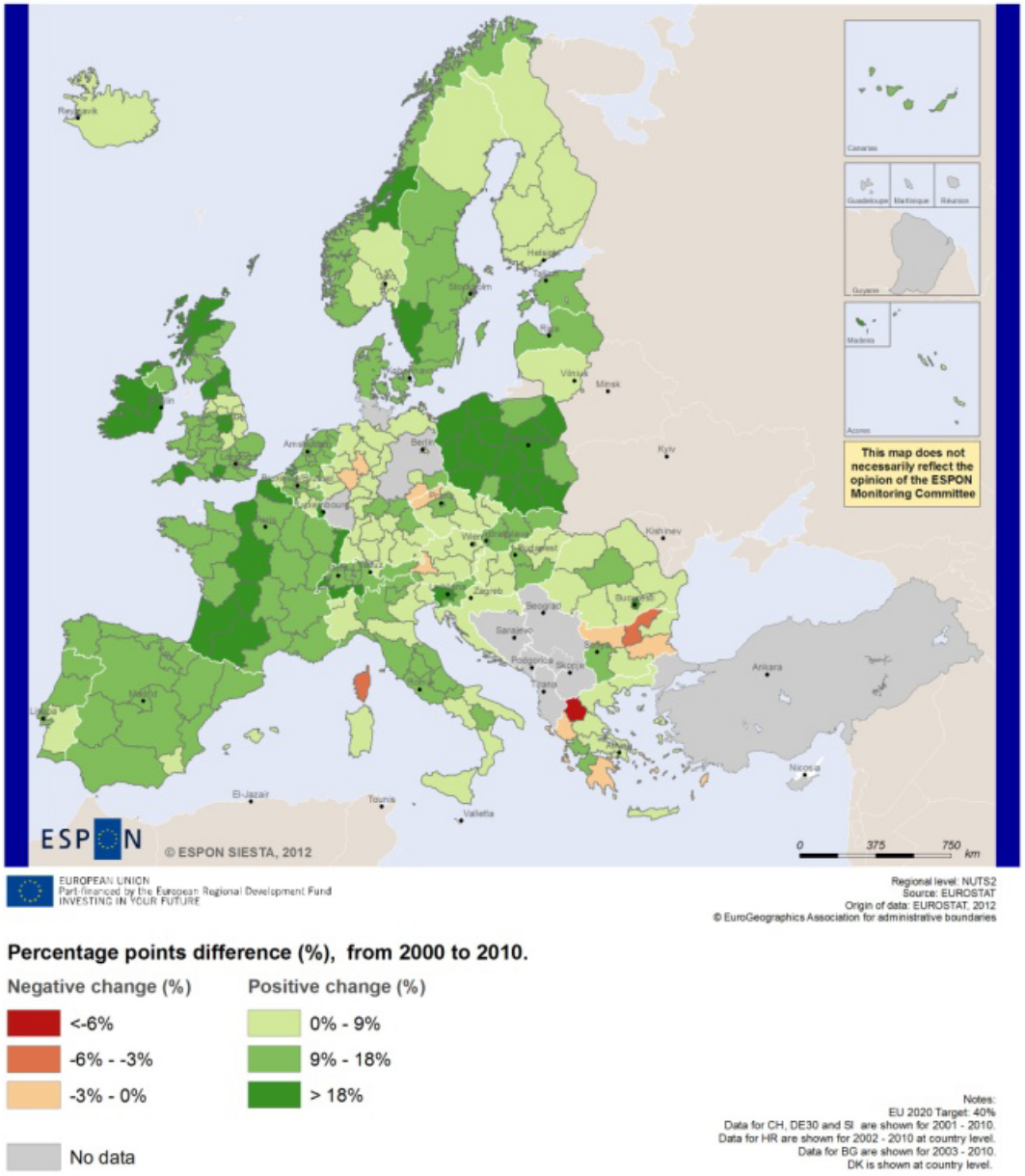
No National Target

Notes:
EU 2020 Target: 40%
The share of the population aged 30 - 34 years who have successfully completed university or university-like (tertiary level) education with an education level ISCED 1997 (International Standard Classification of Education) of 5-6. This indicator measures the Europe 2020 strategy's headline target to increase the share of the 30 - 34 years old having completed tertiary or equivalent education to at least 40% in 2020.

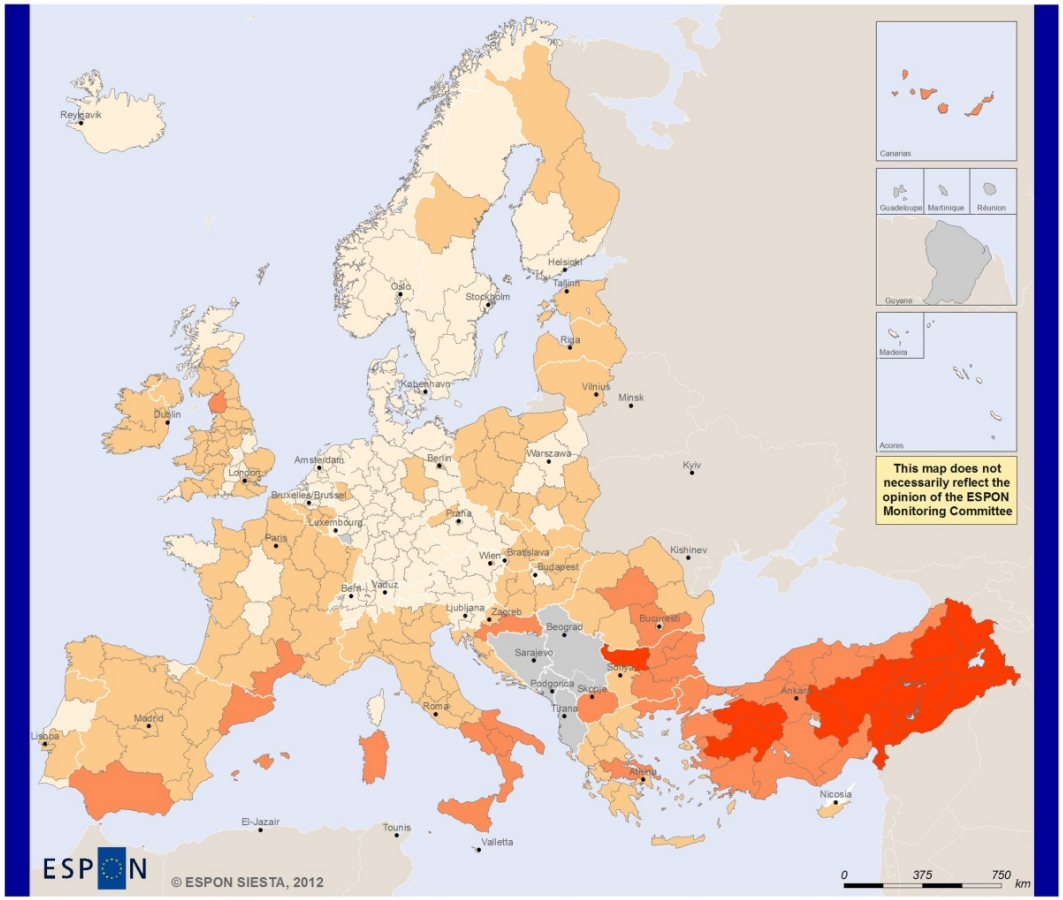
Like in the other headline targets, national targets have been set. Again, there are valid reasons for setting up different national targets. However, this is not to say that national targets are entirely satisfactory indicators as how, and by whom, they are defined is a very political issue. For instance, the range of national targets dramatically varies from 60% in Ireland to 26.7% in Romania and, typically, countries reaching or already reaching the EU target have set ambitious national targets, while countries farther away have set targets below the 40% threshold. In addition, there are countries without their own targets and there are specificities such as Germany and Austria, countries which include in the target post-secondary and non-tertiary levels that are not accounted for on Map 3.12 (making Map 3.13 data partially inconsistent for German and Austrian regions). For these reasons, the top achievers on Map 3.13 are widely dispersed and the same might be applicable for the regions lagging further behind their national targets. According to the Commission, the current national commitments expressed for countries' targets do not favour the achievement of the overall EU target because, as a whole, this would result in 37.5 by 2020, that is, below the EU2020S target.

In general terms, EU27 is improving in the direction of increasing tertiary education attainment for the 30-34 years old group: from 22.4% in 2000 to 33.5% in 2010. This means that, although the national targets mentioned above do not guarantee that the EU target for 2020 of 40% is reached, if the increase of more than 10% in the decade 2000-2010 is projected, the EU target might be achieved by 2020. Be that as it may, Map 3.14 reveals that in some particular countries the trend has been positive or very positive (France, Poland, Sweden, Ireland, etc.), following the general pattern of the EU; a case in point is Poland, where 4 regions have increased more than 20%, especially the Warsaw region of Mazowieckie (30%, from 18% to 48%, which constitutes an impressive increase that probably implies an attraction of talent from elsewhere). However, in other areas the change has been modest and indeed some regions have decreased the indicator; the latter is particularly the case of 5 regions in Greece, highlighting the case of Dytiki Makedonia. In general, the change seems to be dependent on national contexts rather than regional specificities and that might be related to the pivotal role of each national administration in delivering upper educational policy.

Map 3.14 Change in regional population aged 30 to 34 with tertiary education, 2000-2010



Map 3.15 Young people not in work, education or training (as percentage of people aged 15 to 24), 2010



Last in this point, the specific consideration of youth by the EU202S through the Youth on the Move flagship deserves a particular attention in terms of mapping. Youth on the Move is devoted to tertiary education under the smart growth pillar, and it is also dedicated to youth unemployment on the basis of the inclusive pillar. In short, it not only aims to enhance the performance of tertiary educational systems, but also to facilitate the entry of young people onto the job market. In this respect, this document quotes the phenomenon that has become widely referred to as NEET, considering those young people who are not in work, education or training. The flagship says that the figure in the EU in 2010 was 15% (16.7% at the end of 2011) and coins it as “astonishing” as this population is considered to be at risk of being permanently excluded from the labour market and dependent on social services, resulting in long term effects on its well-being. Indeed, there is a moderate correlation between regions experiencing high levels of NEET and long-term unemployment. The current crisis is exacerbating this problem as research indicates that young people are the first to lose their jobs and the last to gain employment during a recession.

Map 3.15 informs of regional distribution of NEET across the European space. In 2010 there were only 9 regions that had less than 5% of NEET and a total of 78 with less than 10%. Among these performing regions, the Netherlands has impressive records. In general, regions of the Benelux, Scandinavia, Germany, the Alps and the Czech Republic score well. In contrast, the Mediterranean regions and the South-East plus Turkey score badly, with some Turkish regions having an alarming 50% or more NEET rate (Van and Şanlıurfa). In general, Eastern Turkey has dreadful figures in the context of remote, non-industrial and rural areas. Most of these regions, especially in Turkey, correlate with high levels of early school leaving and low levels of tertiary education attainment.

It has to be added that Map 3.15 also suggests that there are important variations within some countries, for instance in the UK, Spain, Italy or France. In Italy or Spain the region having maximum percentage of NEET is three-fold the minimum: in Spain, Ceuta scores 31.4 while Euskadi scores 9.6; in Italy, Campania scores 29.0 while Bolzano scores 8.9. This indicates that regional rather than national policies and targets with respect to tackling the issue of NEET may be most appropriate.

3.3. Digital Society

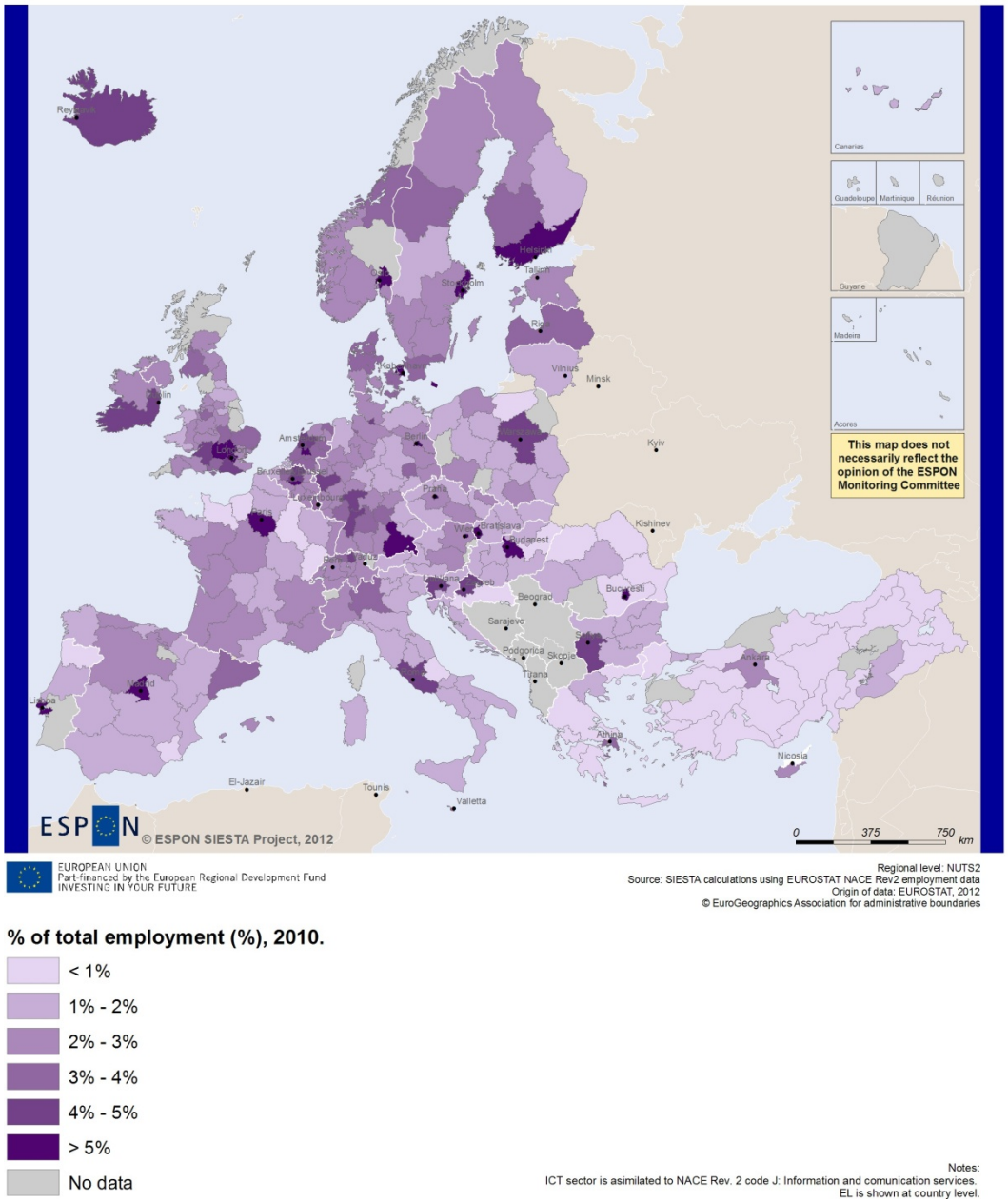
Digital society agenda is basically understood by the EU2020S as the promotion of information and communication technologies (ICT) in general and, a case in point, the Internet, specifically through high-speed and high-quality connections (broadband). Both aspects are assessed as weaknesses of the EU in comparison to other countries or regions of the world where the Internet works better or the ICT sector is stronger. Thus, the digital society is perceived as a crucial topic for European competitiveness where there is room for improving the current situation, like other issues that have been mentioned before in this Atlas. Importantly, space is deliberatively quoted in this subject in the EU2020S documentation, as rural and remote regions and some particular countries of the EU are understood as areas especially lagging behind in terms of coverage, speed or utilisation of the digital networks. Specific considerations on the digital society are included in the flagship initiative A Digital Agenda for Europe, which is a comprehensive document devoted to the development of a single digital market for the whole Union. In addition, it contains a wide annex of targets consisting of specific indicators, whose associated datasets, unfortunately, are not available on a regional scale and even on a state scale level.

In order to assess ICT implementation, the first appropriate measurement is the figure of ICT practitioners. In the flagship document it is said that a large amount of ICT practitioners will be required in the coming years, acknowledging that in the EU there is a shortage in this respect, thus constituting a clear job niche. In addition, this indicator allows for the detection of the size of a high value-added activity and estimation of the significance of ICT within and across geographical entities. Map 3.16 shows that the regional distribution of ICT employment is highly uneven. There are certain regions, many near capital cities (Lisbon, Madrid, Paris, Budapest, Bucharest, Sofia, etc.), that exhibit high values. In contrast, other regions, mostly in Eastern and Southern Europe, lag behind. Data missing in the Balkans and other South-East regions is also an indirect, though insufficient, sign of low penetration of the ICT in these areas. 2 out of the 3 corridors repeatedly used for showing the concentration of innovation are also seen on this map: England to Switzerland (extending to Northern Italy) and Denmark to Finland.

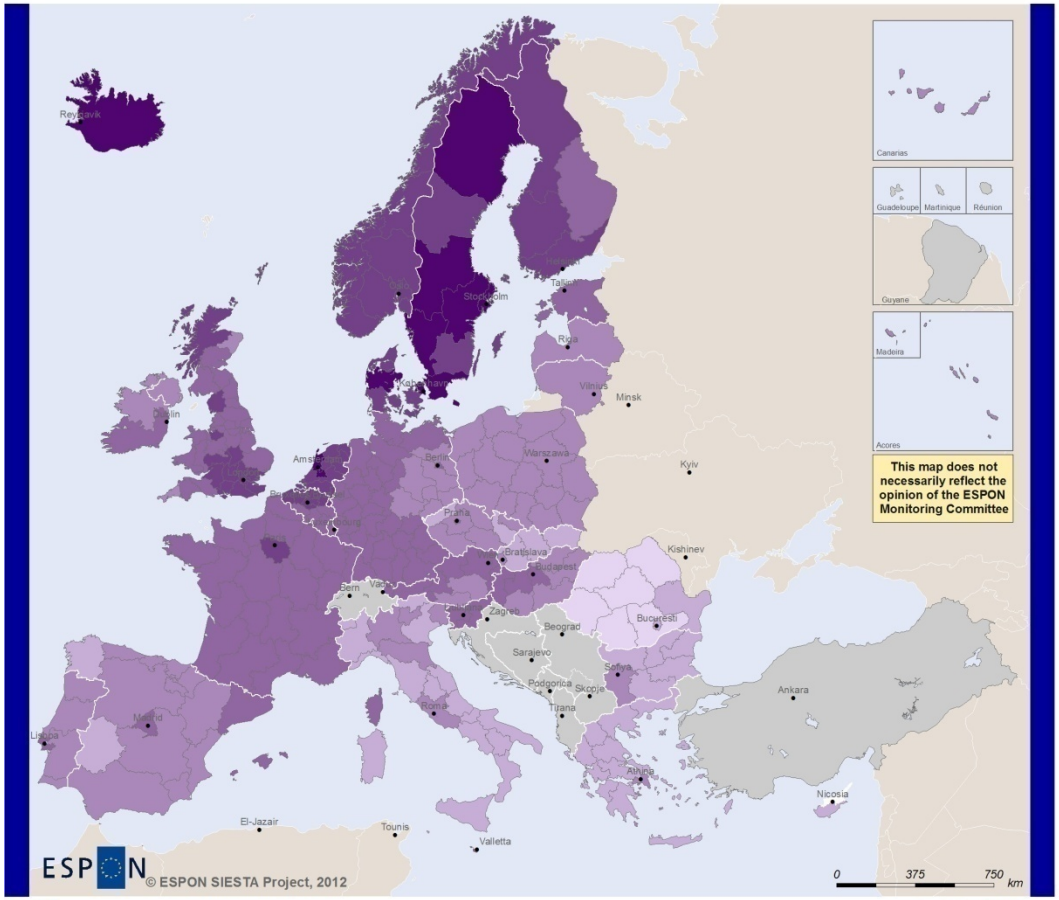
In general, the urban-rural divide is evident. This map shows the classical concentration of the

ICT sector in more innovative areas and where economies of agglomeration are possible, thus creating cumulative effects, that is, not only in the corridors that have been reported before, but also in the national capitals. In addition, the map also expresses emerging regional growth poles like Cork. In fact, the new ICT regional growth poles are very important for the recommendation of promoting through a coherent policy framework, so as to move beyond the current ICT concentration. Indeed, there are particular regions such as Attica-Athens or the wider Zagreb area where important though insufficient ICT employment already exists and this should be impelled.

Map 3.16 People working in the ICT sector as percentage of total employment, 2010



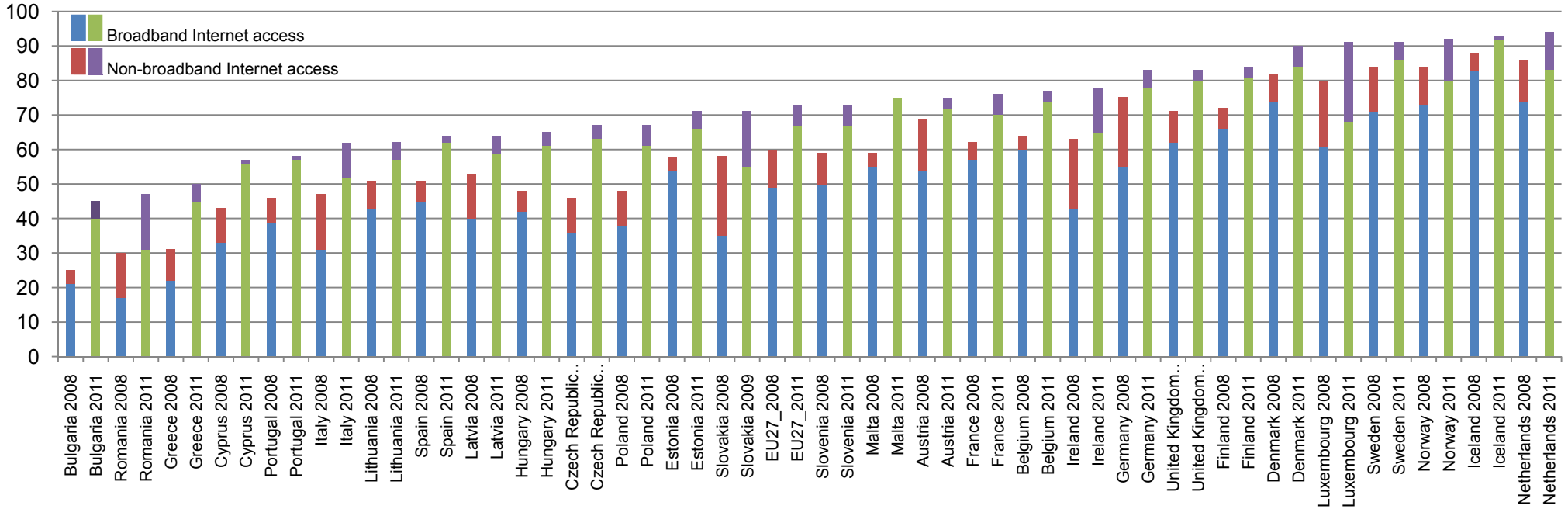
Map 3.17 Broadband penetration rate as percentage of total households, 2006-2009



Broadband penetration rate describes the percentage of households having high-speed connections to the Internet. Internet access is directly quoted in A Digital Agenda for Europe as a necessary social development in order to grow strongly, to create jobs and prosperity and to ensure citizens access the content and services they want. In short, the flagship document considers that the Internet is having the same revolutionary impact as the development of electricity and transportation networks had a century ago. Broadband is defined herein not only as a capacity of connection in terms of speed, but also as when an 'always-on' capability works (the user does not need to dial for a connection). Access to the Internet is at the core of the digital divide, the geographical location being just one aspect of this divide but it is the one that can obviously be shown in a map. On Map 3.17 the spatial differences are considerable. They range from some Swedish regions and Iceland above 75% of broadband penetration to less than 15% in some Romanian regions. The digital divide between the Northern Periphery (including Iceland), Scandinavia and the North-West, on the one hand, and the rest of Europe, on the other, is tangible. Indeed, regions scoring worse are located in Eastern Europe and the Mediterranean Basin, especially Romania

with very low standards. It is important to emphasise that in most performing countries both rural and urban areas are well covered by broadband facilities, as is very clear in Sweden, Finland, Denmark or the Netherlands. That implicitly means that national frameworks are critical on this map and, for this reason, it makes sense that there is a strong EU initiative that obliges that broadband spreads. In fact, in the worse scoring countries there are sometimes big disparities between regions (for instance, in Spain or Italy) and that might mean a poor policy approach in this issue and an excessive market-dependency. According to A Digital Agenda for Europe flagship targets, by 2013 broadband should reach 100% of EU citizens and high-speed in 2020; although the latter target is quite delayed in time, the first is clearly not reachable in 1 year bearing in mind Map 3.17 and Graphic 3.4, especially in countries such as Bulgaria, Romania or Greece. However, it is true that the expansion of the Internet seems to have been very quick in the last 3 years (Graphic 3.4). Usually it is easier to achieve high roll-out rates at a lower level (for instance, households with the Internet have grown 20% in Bulgaria in 2008-11), whereas these rates tend to decrease when reaching higher levels (Denmark, Sweden, Norway or Iceland have grown less than 10% in the same period), but in countries such as the Czech Republic (21%), Poland (19%) or Hungary (18%) the expansion has been noticeable and they are really catching up.

Graphic 3.4 Level of Internet access and of broadband Internet access per countries, change 2008-2011. Source: Eurostat, SIESTA's calculation

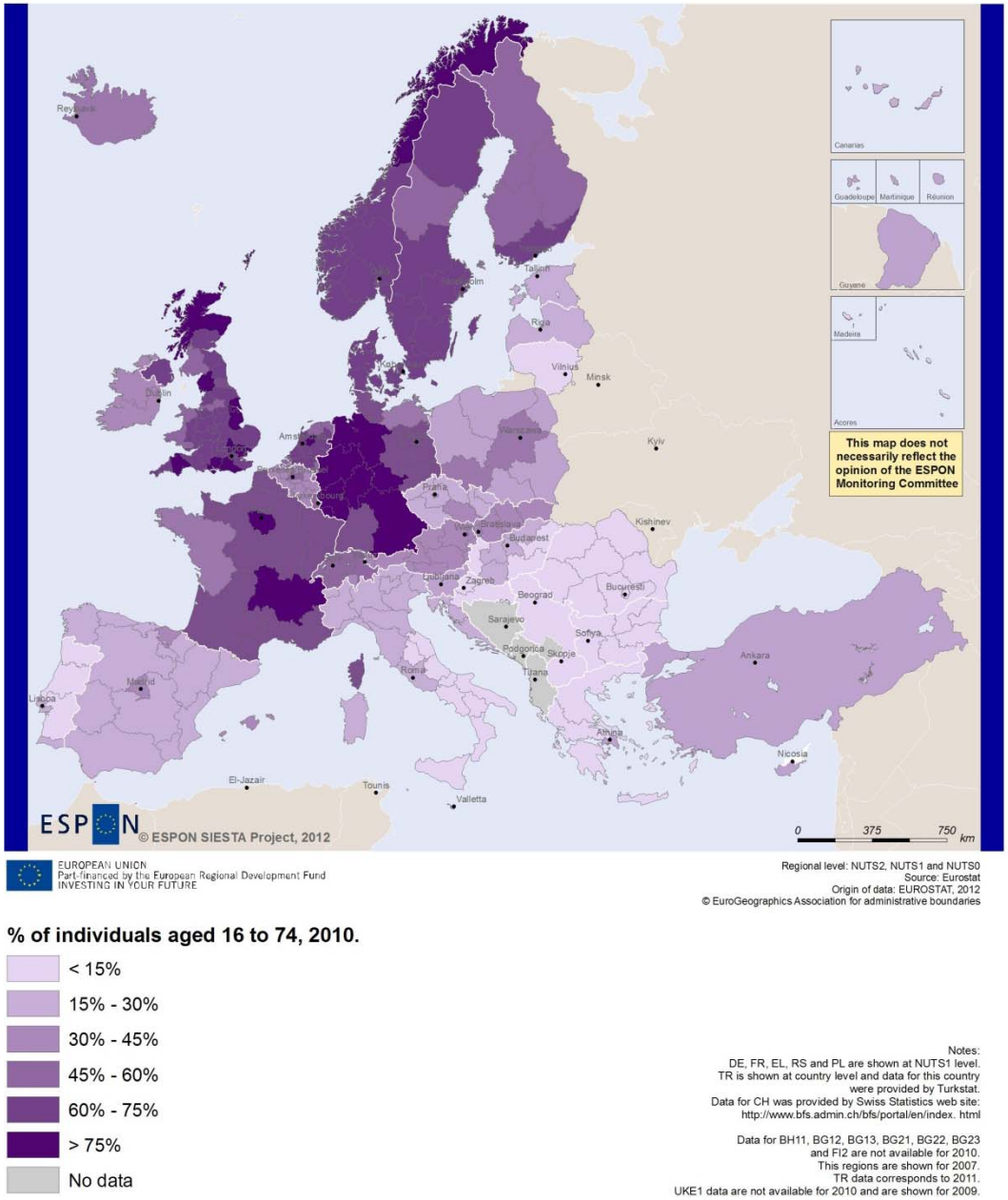


These latter countries are probably performing because of their relatively positive economic progress, despite the general situation of the crisis in the European countries.

Be that as it may, it cannot be ignored that broadband is a step beyond the strict rough availability of Internet facilities. Still nowadays less than half of the households in Bulgaria, Romania or Greece do not have the Internet and that means that it is difficult that there is broadband therein. In addition, the fact that in Graphic 3.4 there are some countries where all the Internet or almost all is broadband (i.e. Cyprus, Malta or Iceland) and others where there is quite a big distance between them both (i.e. Romania, Slovakia or Luxembourg) shows the lack of consistency between the different national regulations. To sum up, more effort needs to be made to ensure the roll-out and take-up of broadband for all, at increasing speeds, through both fixed and wireless technologies, and to facilitate investment in the new very fast open and competitive Internet networks that will be the arteries of a future economy.

For the EU2020S, the expansion of the digital economy and the information society is crucial. In order to compute this roll-out, a proper

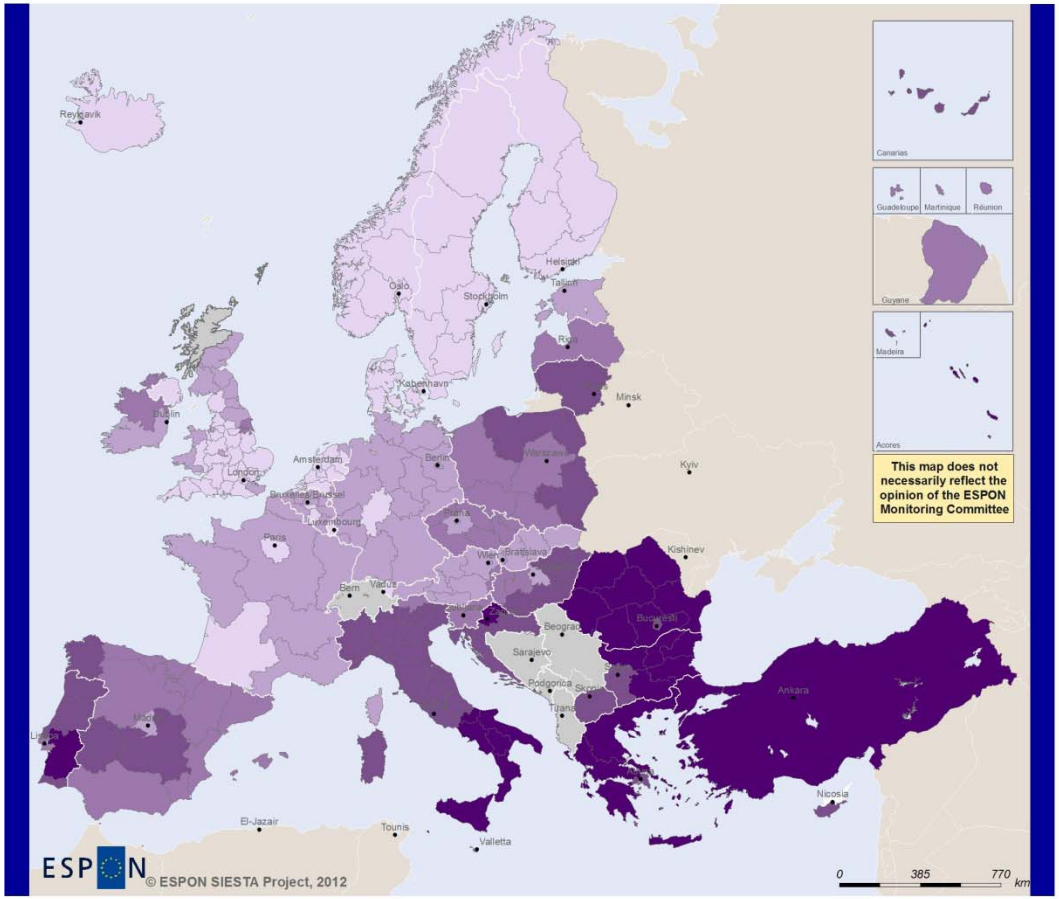
Map 3.18 E-commerce or individuals (aged 16 to 74) who ordered goods or services over the Internet for private use as a percentage, 2010



indicator is e-commerce measured through individuals who ordered goods or services over the Internet for private use as percentage (Map 3.18). This map also informs indirectly whether the Internet is being used for commercial purposes, that is, how it is effectively penetrating in businesses across the EU space. According to the A Digital Agenda flagship's own targets, this should reach 50% of the population in 2015, while the current EU average is 34% (2011). Logically, e-commerce is closely related to the uneven access of families and enterprises to Internet facilities. That links e-commerce with the so-called digital divide. However, it should be added that other factors such as intellectual property legislation, security or privacy rules are of major importance in the sense that is not only available Internet access that matters, but also confidence and so on. A parting observation of Map 3.18 is that e-commerce regional differences are relatively lower within the national framework, at least when compared to the differences between different countries. For example, e-commerce exploitation is low across the regions of the Mediterranean countries (Greece, Spain, Portugal, Italy, etc.); even e-commerce is not widely utilised in the capital cities and the metropolitan regions of these countries. The same occurs across the regional formations of the UK, Norway, Finland, Germany or other countries where the Internet is widely accepted and used. As reported in other sections of this Atlas, there is quite a clear divide between the East and West and between the North and South, being the South and East behind the West and North's further development, but in this case the West has to be circumscribed to the North West, thus excluding the Iberian Peninsula, among other regions. Countries like Bulgaria, Romania, Serbia or Macedonia score particularly low, but Turkey scores slightly better. All this means that national conditions explain more than regional specificities and in this sense A Digital Agenda flagship proposes leaving country approaches, causing fragmented digital markets and lack of interoperability, and to tend towards an overall EU strategy in digital society development.

A last cartography which is significant for the digital society is related to a particular concern of A Digital Agenda flagship: digital illiteracy. ICT skills shortage and digital literacy deficit exclude many citizens from the digital society and economic progress. The indicator on the individuals who have never used a computer is useful in this respect, but it could also be valuable to measure the proportion of population that have never used the Internet; A Digital Agenda sets the objective of halving this figure by 2015, to 15%, with a baseline in 2009 of 30%. However, the latter dataset does not exist on a regional scale. Be that as it may, mapping the percentage of individuals who have never used a computer expresses as well the geography of digital illiteracy. On Map 3.19 South-Eastern countries, plus Turkey, Southern Italy and Alentejo in Portugal, score particularly low and lag behind the most computerised populations of the Northern portion of Europe, especially Scandinavian countries plus Iceland. In an intermediate position regions of countries such as Poland or Spain are located. On this Map 3.19, the usual East/West division is not as easily seen because countries such as Slovakia or regions such as Közép-Magyarország (the region of Budapest) are well ranked. And in the Western context Southern Italy or the Alentejo share very low scores. Underlying factors for explaining such a geography are unemployment (unemployed people have a higher probability of never having used a computer), educational attainments, population density and income. Be that as it may, the clear digital divide among regions needs to be clearly targeted. A full digital society is impossible if there is a large number of people who have never used a computer and

Map 3.19 Individuals who have never used a computer as percentage of individuals, 2011



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2, NUTS1 and NUTS0
Source: Eurostat
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

% individuals who have never used a computer, 2011.

- < 10%
- 10% - 20%
- 20% - 30%
- 30% - 40%
- > 40%
- No data

Notes:
IE, UK, SE, FI, NO, EE, LV, LT, BE, NL, PT, ES, CZ, AT, HU, HR, PL, RO are shown at NUTS2 level.
FR, DE and EL are shown at NUTS1 level.
IS, MK, SI and TR are shown at country level.
BO, HR, TR, MK, DK, NL, SE, UK, ES63 are shown for 2010.
BG is shown for 2007.

the relevant finding of this map is that there are substantial areas of Europe where more than half the population is in this situation. With such a departure point, the digital society is unlikely to be extended across European space. It is true that the digital society is also increasingly expressed through PDAs, cell phones or other specially designed devices that unfortunately cannot be mapped on a regional scale, but arguably they are not so widespread in these lagging regions as in their most developed counterparts.

4. Inclusive Growth

The third aim of the EU2020S deals with employment creation, skills and labour market reform and, furthermore, the reduction of poverty and social exclusion. The basic intention is to increase employment rates and the quality of jobs, especially for those collectives particularly in trouble (women, young people, migrants, older workers, etc.), thus maintaining social cohesion. This is expected to result in building and maintaining a cohesive society that ensures access and opportunities for all throughout the lifecycle. Ultimately, the emphasis on these issues is based on an economic verification: Europe needs to make full use of its labour potential to face the challenges of an ageing population and rising global competition. In this sense, it is stated that there is a strong risk that people away from or poorly attached to the world of work lose ground concerning the labour market. Taking into consideration the longer working lives that have been achieved because of increased life expectancy, lifelong learning is essential in order to develop new skills throughout the lifetime. In relation to poverty, the prediction is that the number of poor people will increase because of the crisis, with a particular factor of risk associated with unemployment. In fact, structural unemployment is quoted as a problem that has to be reduced to avoid higher levels of poverty. Importantly, under the inclusive growth priority it is the only moment in the EU2020S that space is openly quoted as it is mentioned that economic growth has to deliver territorial cohesion, beyond social cohesion; however, no clear indication is derived from this praiseworthy intention. In any case, this Atlas is a territorial understanding of the EU2020S and that means that territorial cohesion principles can be attached to the EU2020S when the latter is translated into maps.

The section devoted to inclusive growth is divided into two subsections: the first is basically dedicated to employment, whereas the second is focused on poverty and exclusion. This is consistent with the thematic organisation of the EU2020S, but it is also correlated with the allocation of two flagship initiatives to this pillar: An Agenda for New Skills and Jobs, which is devoted to the former, and European Platform against Poverty, which is attached to the latter. Furthermore, the two headline targets set for inclusive growth correspond with both subsections and inform about the direction which is envisaged by 2020: 75% of the population aged 20-64 should be employed and 20 million less should be at risk of poverty in the EU.

4.1. Employment, Skills and Jobs

4.1.1. Employment and Unemployment

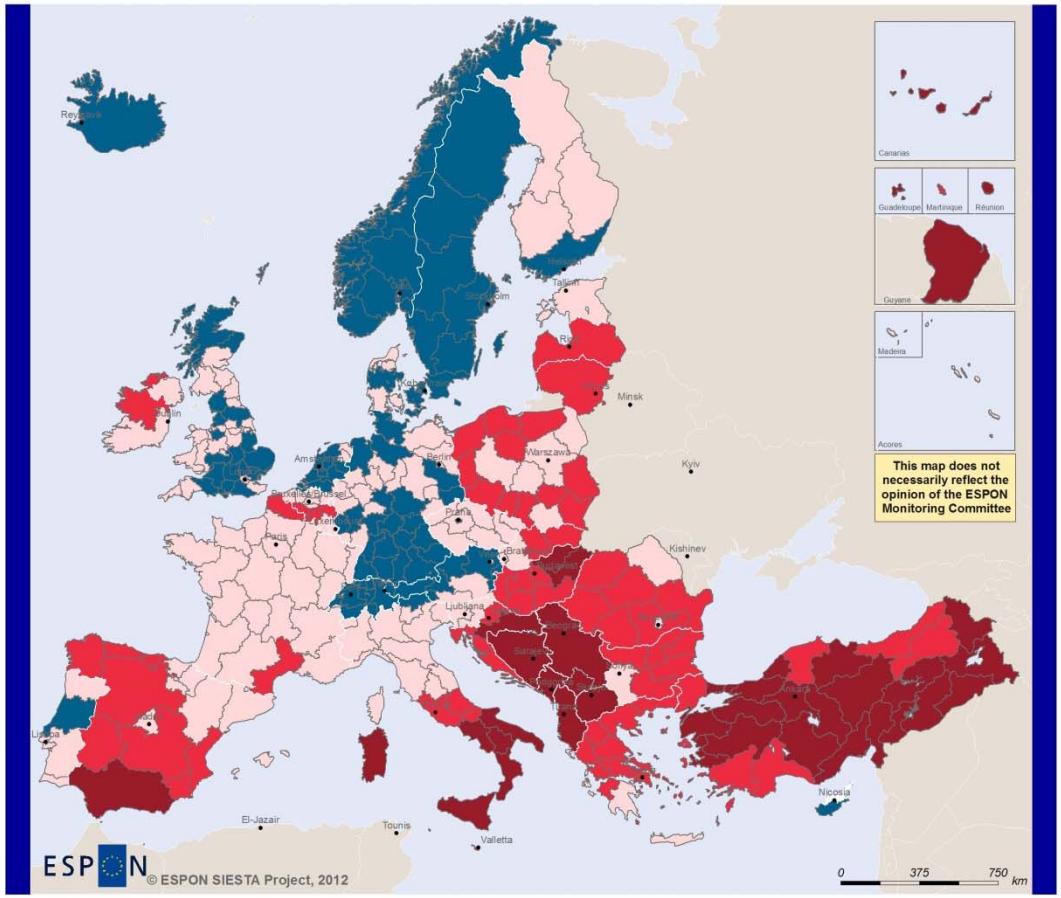
Employment is intended to raise the European economy, to reduce poverty and exclusion and to address the cost of ageing through the pension system in several countries. The commitment to the headline target of an employment rate of 75% for the 20-64 year-old age group by 2020 is ambitious, but it is critical for the sustainability of Europe's social model, welfare, growth and public finances. Taking into account that in 2011 the EU scored 68.6%, to achieve this target is not an easy task, especially in the current contract period, where destruction of employment is severe in several countries and unemployment is increasingly becoming worrying, but also because of structural factors and problems associated with the unskilled workforce. The latter is particularly important in several countries and does not allow us to make an appropriate transition towards a competitive, sustainable and innovative economy according to the EU2020S. Indeed, although the link might seem blurred, according to SIESTA's calculations for the whole of the regions considered there is a moderate correlation between employment (as a rate of those aged 20-64) and human resources in science and technology, on the one hand, and between employment and broadband penetration, on the other; that means that in general smart growth takes place when employment is high. All these questions will be examined concerning this point, with a particular focus on the analysis of employment and unemployment for particular social profiles which are targeted by the EU2020S (women and youth), but considerations will begin with the territorial dimension of the headline target on employment.

Once again, the EU2020S compares the current EU situation of the headline target with the US and Japan and the EU is worse: in 2011 the US scored 70.4% and Japan, 74.9%; although them both are below the headline target, they are better positioned than the EU. But the overall EU figure masks an enormous variation, with several regions surpassing the threshold, thus performing better than both counterparts, as shown on Map 4.1. This is the case of all Swedish, Norwegian and Swiss regions, plus Iceland. Other countries have the majority of its regions above 75%, for instance the Netherlands, and others have a large amount of them in this situation: Austria, Denmark, Finland, Germany and the UK. The fulfillment of the target is concentrated in these areas, typically Western and Central European, although it is important to mention that the Northern Periphery is in a good situation. There are two exceptions outside this pattern that also fulfill the EU headline target: Cyprus and the Central region of Portugal. The remaining regions of all these countries typically are near the target, which is also the case of most of the regions in metropolitan France or the Czech Republic. In contrast, Eastern Europe (especially the Balkan countries) and Southern Europe score very badly in relation to the target. Regions in countries such as Turkey, Serbia, Kosovo and Italy have the rate below 50%, the minimum (halving the EU target) being in Şanlıurfa (Turkey) and Kosovo (Table 4.1). Indeed, in Southern Europe Spain and Italy show a dramatic internal disparity which is very geographical: their Northern regions are very near the EU average and some of them even close to the headline target but, progressively towards the South, the rate worsens, with Campania as a bottom extreme (43.7%) of the regions of the EU. If in general it can be argued that states are important for explaining the pattern in the sense that regions within them score approximately the same, the cases of Italy and Spain are particularly perplexing. In any case, there is no clear correlation between the

rural and the urban/metropolitan character of regions and employment rate: rural areas in Scandinavian countries score very well, while urban areas in Eastern Europe have low values. In Eastern Europe some of the regions scoring worse have experienced manufacturing restructuring, but others suffering the same process in the old Eastern bloc (or in countries such as the UK or France) have overcome and indeed score nowadays near or even beyond the target.

To sum up, this headline target on employment varies enormously from country to country and region to region and that means that a spatial consideration of this issue is pertinent. Thus, an overall approach of the EU that for instance actively considers the issue of labour mobility is pertinent, but also regional strategies (i.e. regional jobs pact). Therefore, there is an immanent territorial cohesion interpretation of this map. In addition, there is also a social cohesion derivative: according to SIESTA's calculations for all the regions with data, when the employment rate is lower, NEET and long-term unemployment are higher. That means that employment prevents severe issues which undermine social cohesion and it has to be understood as strategic in this respect, as well.

Map 4.1 Employment rate as percentage of active population aged 20 to 64, 2010



Map 4.2 Regional employment rate (percentage of active population aged 20 to 64) represented as distance to the 2020 national targets, 2010

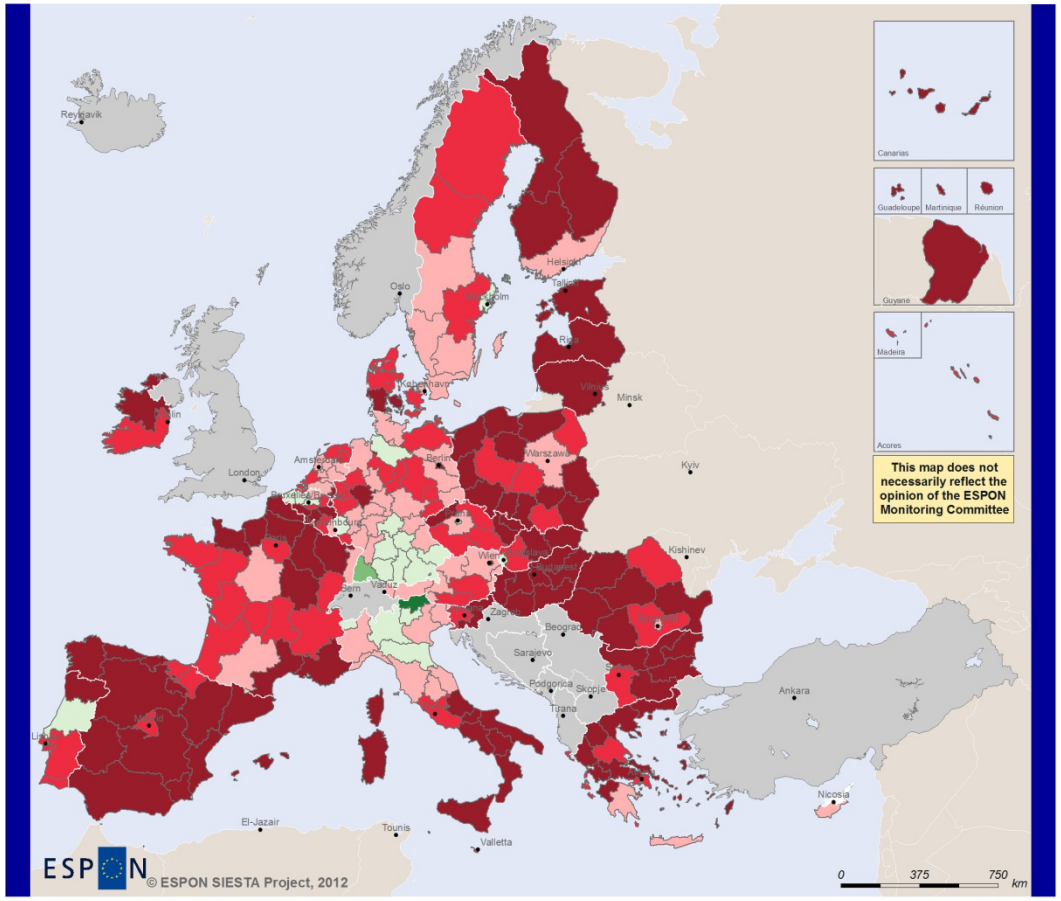


Table 4.1 Ten regions with highest and lowest employment rate for population aged 20 to 64, 2010. Source: Eurostat

		Employment rate 20-64 years old
FI	Åland	83.60
CH	Ostschweiz	83.30
CH	Zentralschweiz	83.20
CH	Zürich	82.90
CH	Espace Mittelland	81.80
SE	Stockholm	81.70
NO	Oslo og Akershus	81.10
CH	Nordwestschweiz	81.10
NO	Vestlandet	80.90
IS	Iceland	80.40
EU27		**68.50**
IT	Sicilia	46.60
IT	Calabria	46.10
TR	Kayseri, Sivas, Yozgat	45.70
TR	Gaziantep, Adiyaman, Kilis	45.70
IT	Campania	43.70
TR	Van, Mus, Bitlis, Hakkari	43.20
BA	Bosnia and Herzegovina	39.03
TR	Mardin, Batman, Sirnak, Siirt	38.80
TR	Şanlıurfa, Diyarbakir	34.40
XK	Kosovo	26.10

As in every headline target, each member state has set its own targets. Non-EU countries and countries without targets are not represented on Map 4.2. Overall, the Commission has calculated that, by amalgamating national targets, the EU target as a whole will not be achieved and would result in an estimated 73.7-74%. For the adequate comprehension of this

Map 4.2, it is very important to reiterate that national targets are always very heterogeneous. In this case, they range from 80% in Denmark, Sweden and the Netherlands to 62.9% in Malta. These targets depend basically on the starting point of each country, but also result on a map where variations are politically based. Internal variations in different countries (beyond Spain and Italy) are noticeable on this map and this makes it still more evident that regional strategies are pertinent and that national approaches do not necessarily encompass the internal variation. Be that as it may, it is logical to think that the situation concerning this issue has worsened in 2011 and is worsening in 2012 taking into account the crisis aggravation. That makes the fulfilment of the EU target still more difficult and the same is applicable for most of the national targets. Unfortunately in terms of mapping, the last available dataset at the regional scale and specifically for the considered age group is for 2010.

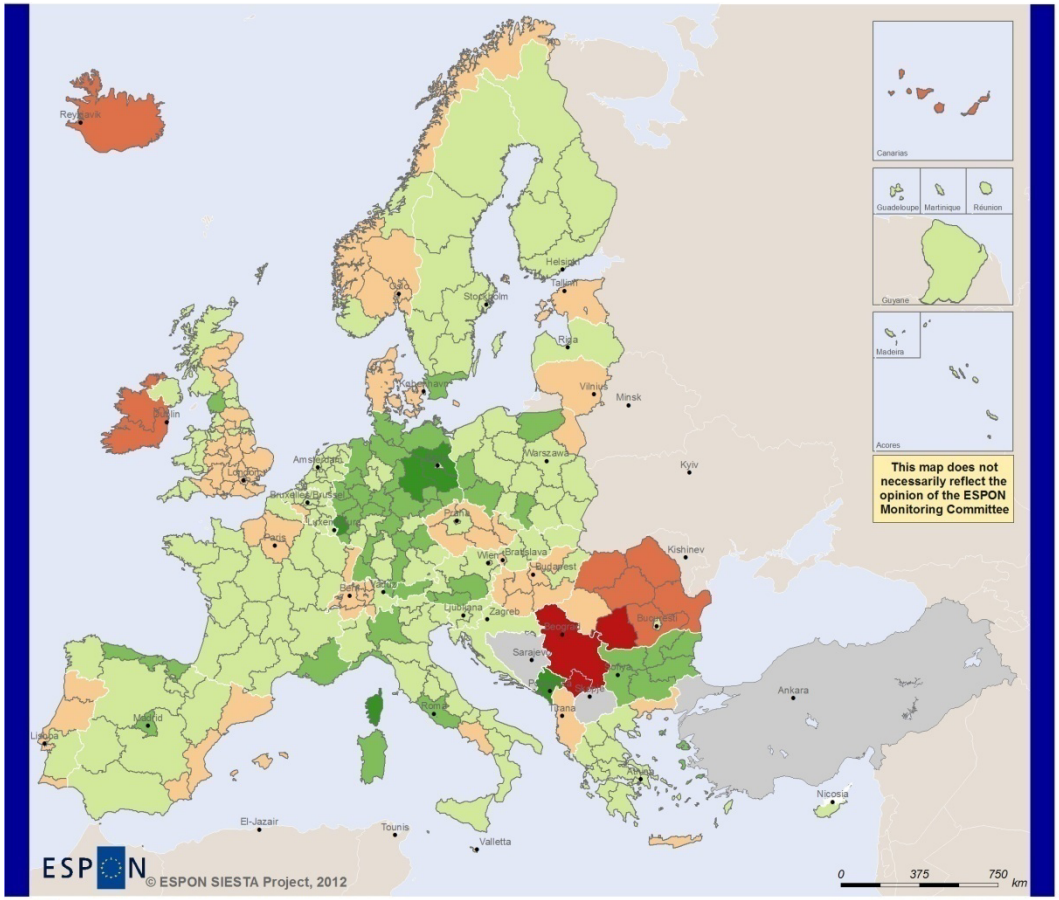
In relation to the same headline target, it is possible to map the change experienced in the last decade (2000-2010), as has been done on Map 4.3. Before referring to the pattern, it has to be said that the employment rate is considered both a structural indicator and a short-term indicator. That makes the explanation quite difficult as there are several underlying reasons. As a structural indicator, it may shed light on the structure of labour markets and economic systems, or the quality of employment. As a short-term indicator, employment follows business cycles, although it is usually considered a lagging indicator — especially when there is a recovery: employment rate tends not to grow until the remainder of the economy has recovered because of the supposed high risks and costs of creating new jobs. For instance, the high rates of employment creation experienced in the old East Germany might be related to structural changes in the economy of this area, while the performance of several regions in Eastern Spain (and the whole of Ireland or Iceland) in employment creation from 2000 to 2008 is clouded as the map reflects the period until 2010 and we know that the employment reduction from 2008 to 2010 (and ongoing) has been severe because of the current crisis. Indeed, one of the problems associated with the interpretation of this map is the fact that there are different dynamics in this decade for every single region of Europe and for this reason the regional change cannot be understood as unidirectional. The analysed period includes the pre-2008 economic boom that affected most of the continent and the crisis experienced since then, which, as has been explained previously in this Atlas, has dissimilar consequences in the European territory.

In general, Map 4.3 shows that the country whose regions have significantly improved in the employment rate is Germany, especially the Eastern ones, but it has to be mentioned that in this area unemployment remains comparatively high (Map 4.5). Bulgaria and Montenegro also experience appreciable growth in the employment rate. In general, most of the countries have increases, but at a moderate rate, showing that structural factors are important or that the last 2 years of crisis in the studied period are counter-balancing the previous positive behaviour; only exceptionally are there regions with important expansion of the employment rate (for instance, Corsica, the highest expansion of all the considered regions: 26.6% in 10 years). In contrast, Northern Periphery countries (from Norway to Ireland, including almost all the UK regions and Iceland) experience a notorious contraction in employment; the decrease in Iceland has been a serious -9% but it must be stated that the rate was still 80% in 2010, that is, above the EU headline target and indeed the modest

population size of this nation (over 300,000 inhabitants) partially explains high fluctuations in its statistics. Another area of Europe which is particularly worsening in employment rate is Eastern Europe, with the exceptions of Bulgaria, Slovakia and Poland. In particular, Serbia, Kosovo and Romania show an extreme diminution of the rate in 10 years; for instance, the Romanian region of South-Vest Oltenia has had a contraction of -12% in this period of time.

When the EU2020S documentation states that the headline target of 75% of the population aged 20-64 should be employed by 2020 sometimes it is clarified that this employment rate refers individually to both women and men. That means that gender imbalances are understood as unacceptable for the EU2020S and that job creation should embrace both genders, making full use of the labour potential without gender distinctions. In a deeper dimension, this reflects a general principle of the EU, which is equality, as expressed in the very beginning of the Treaty on the European Union: “[the EU] shall promote [...] equality between women and men” (art. 3.3 of the consolidated version).

Map 4.3 Change in regional employment rate (percentage of active population aged 20 to 64), 2000-2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

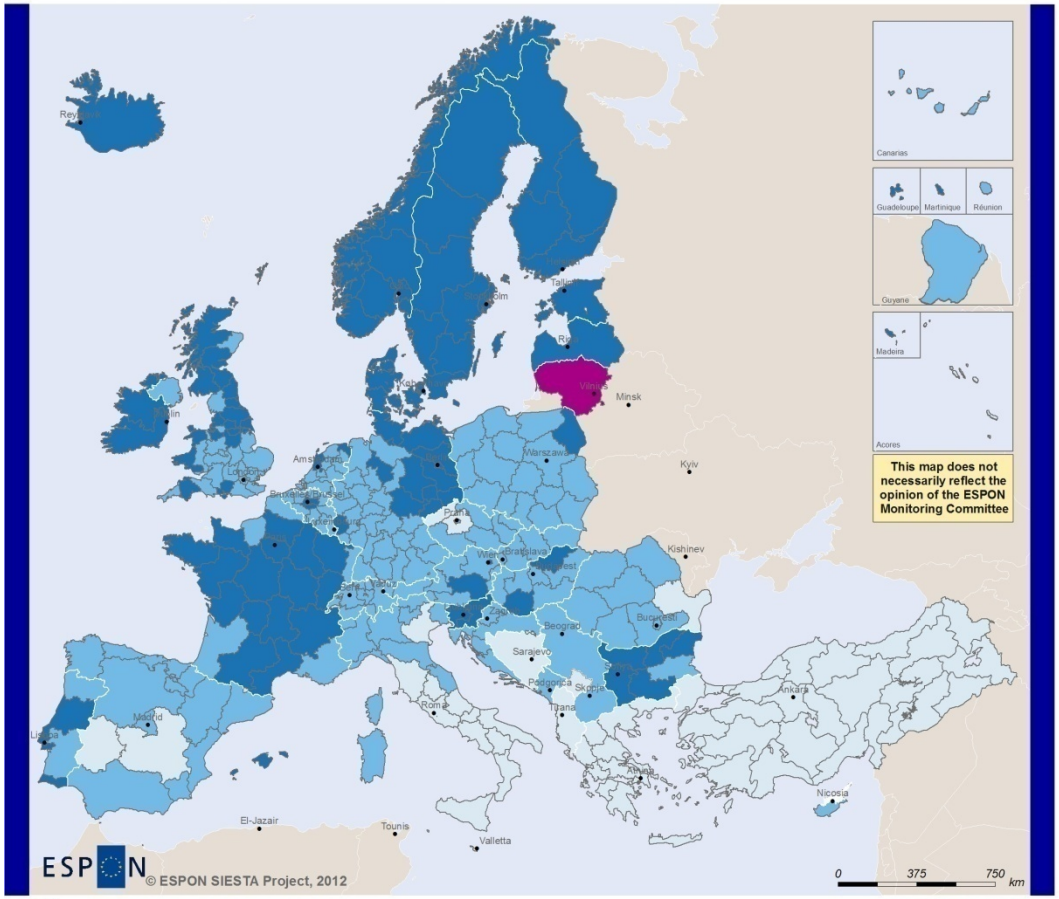
Regional level: NUTS3, NUTS2, NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

Percentage points difference (%), from 2000 to 2010.

Negative change (%)	Positive change (%)
<-10%	0% - 5%
-10% - -5%	5% - 10%
-5% - 0%	> 10%
No data	

Notes:
The employment rate is defined as the number of persons aged 20 to 64 in employment by the total population of the same age group.
Data for BG correspond to 2003 - 2010 change.
Data for DE41 and FE42 correspond to 2002 - 2010 change.
Data for DEB1, DEB2 and DEB3 correspond to 1999 - 2010 change.
Data for HR are shown at country level and correspond to 2002 - 2010 change.
Data for XK correspond to 2001 - 2009 change.
Data for ME correspond to 2001 - 2010 change.
Data for AL correspond to 2000 - 2009 change.
DK data are shown at country level.

Map 4.4 Gender balance in regional employment rate (percentage of active population aged 20 to 64), 2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2, NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

Percentage points difference (%), 2010.

- <-20
- -20 - -10
- -10 - 0
- > 0

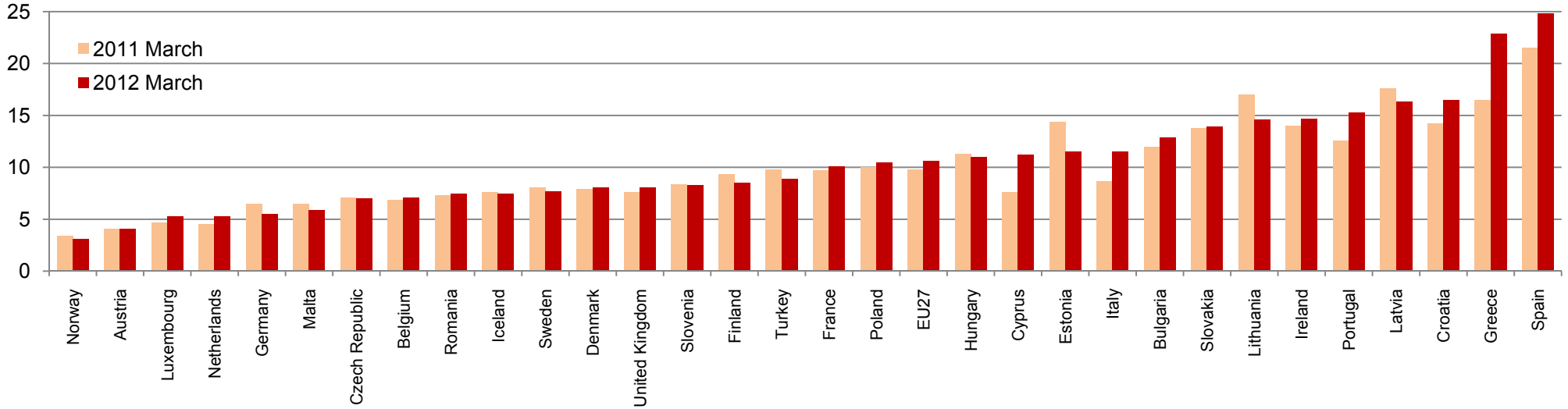
Notes:
The indicator shows the balance between male and female employment rate. It was obtained by subtracting the percentage of male employment to the female employment percentage, both expressed in terms of total population aged 20-64.

Map 4.4 informs about the difference between male and female employment rate. The current gap is -13% at EU27 level, which is an overall revealing figure of inequality. Although important progress has been made, still in many regions women are disadvantaged due to education, career paths, working arrangements, religion or social issues. Indeed there is only 1 territory in Europe where women have higher employment rate than men: Lithuania. This alerts us again about inequality. The other Eastern Baltic republics have slight gender inequality, but unfortunately these countries are far from reaching the 75% headline target (Map 4.1) and most of their regions have bad records of unemployment (Map 4.5), denoting that gender equality is not in line with an overall satisfactory situation of employment. Be that as it may, the gender gap is also small in Scandinavian regions and in the Northern Periphery. French regions, Slovenia and the old East Germany *Länder* also have slight gender inequalities, plus other individual regions across Europe (for instance, in Bulgaria or in Portugal). However, the vast majority of regions contain severe imbalances. The situation is particularly worrying in the Mediterranean Basin, including two inland regions of Spain, Bosnia and Herzegovina, Kosovo and all Turkish regions, with the worst

gap of all the studied regions in Mardin (-59.3%), where female employment is only 10.6%. These severe cases require a rigorous policy approach removing gender barriers. The gender gap is still in force in Europe and it can be argued that only when there is a clear strategy for assisting women in work-life balance and childcare facilities that it might be overcome, together with zero tolerance for the unequal salaries between genders that still remains. In Scandinavia or France, where there are unambiguous and sustained policies in this respect, the Map 4.4 clearly shows the results in the regional arena.

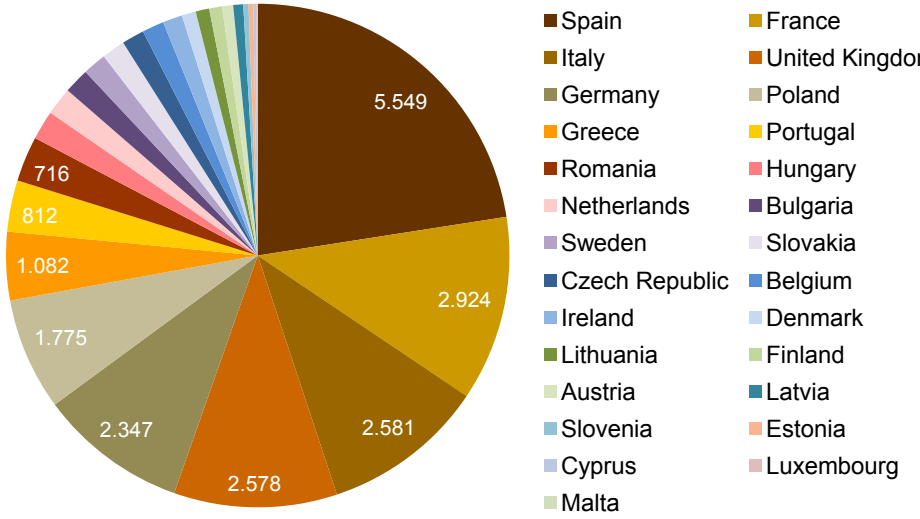
The opposite of employment is unemployment, which is mapped as follows. However, the latter is not statistically the negative image of the former and that means that Map 4.5 is not strictly the opposite of previous Map 4.1. Unemployment is surveyed between 15 and 74 year-olds fulfilling specific requirements: those who are without work during the reference week of the survey, are available to start work within the next 2 weeks and have been actively seeking work in the past 4 weeks or have already found a job to start within the next 3 months. Unfortunately this can only be regionally mapped for 2009, that is, at an early stage of the crisis (Map 4.5); in addition, SIESTA wants to state that these data are very problematic in several senses that are out of place to analyse herein. In Graphic 4.1 there is a complementary vision of unemployment, updated, but at the state level and through a different dataset. In an overall analysis, Map 4.5 shows how unemployment is affecting especially specific groups of regions. The first group is the Balkans, with the record of Kosovo (45.4%), because of the transition from centrally planned to market oriented economies and probably the terrible effects of the war in some of these countries. The second group is Southern and Eastern Spain, extending to the Canary Islands; in these Spanish regions there used to be structural unemployment but now the situation is stifling and is even worsening according to Graphic 4.1 because of the impact of the crisis in the more important job sectors therein (construction and basic services) and, in addition, the cuts in jobs dependant on public entities; Spain has 1 out of 4 unemployed people in the EU (Graphic 4.2). A

Graphic 4.1 Recent harmonised unemployment rates per country, monthly data (not seasonally adjusted). Source: Eurostat

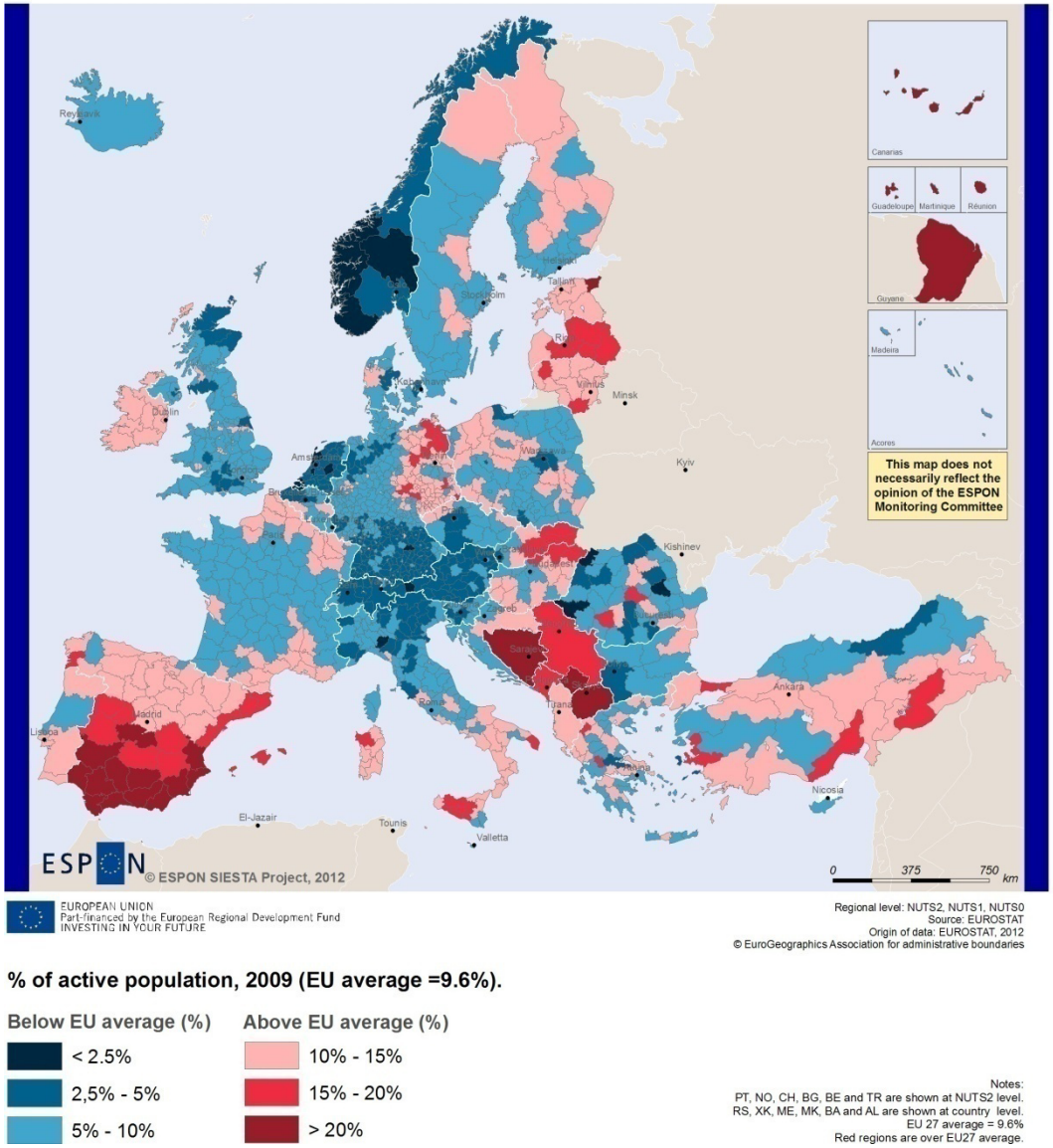


third group of regions with striking unemployment is in the Eastern Baltic states, but it seems to be dropping (Graphic 4.1). However, there is evidence that this is only a virtual upgrading in the sense that in some of the cases a strong workforce emigration is taking place. Furthermore, in a scattered pattern different regions in the old Eastern bloc have high rates of unemployment, probably because of the long-term effects of manufacturing restructuring. A case in point is Greece, whose unemployment levels are radically increasing (Graphic 4.1) but this is still not evident on Map 4.5. Finally, the French outermost regions score badly as well.

Graphic 4.2 Unemployed people per country of the EU in March 2013 (not seasonally adjusted) in thousands of people. Source: Eurostat, SIESTA's calculation



Map 4.5 Regional unemployment rate (percentage of active population aged 15 to 74), 2009



To sum up, unemployment shows unacceptable rates in several locations in Europe and, taking into account that this is one of the most important incentives for people to leave their regions, it is likely that migrations are going to occur therein in the short-term. Moreover, the strong correlation between unemployment and long term unemployment at the regional scale suggests that, when we have the former, it is quite difficult to decrease the latter. What is more, unemployment is associated to poverty and lower levels of economic growth. Taking into account the fact that policies are not reducing unemployment (indeed, in countries such as Greece or Spain policies themselves are causing more unemployment), the EU2020S is not followed by the same institutions that should be committed to its effective development in the three dimensions that were envisaged and dealt with in 2010. In fact, the EU2020S is insistent on the global competition for each field, and in 2011-2012, while the EU27 has increased unemployment from 9.8 to 10.6%, an appreciable diminution has taken place in the US (from 9.2 to 8.4%) and Japan, which has very low unemployment rates (from 4.9 to 4.7%). If the inclusive dimension of the EU2020S is really a serious aim, a radical shifting is necessary in employment creation and strategic planning in unemployment prevention.

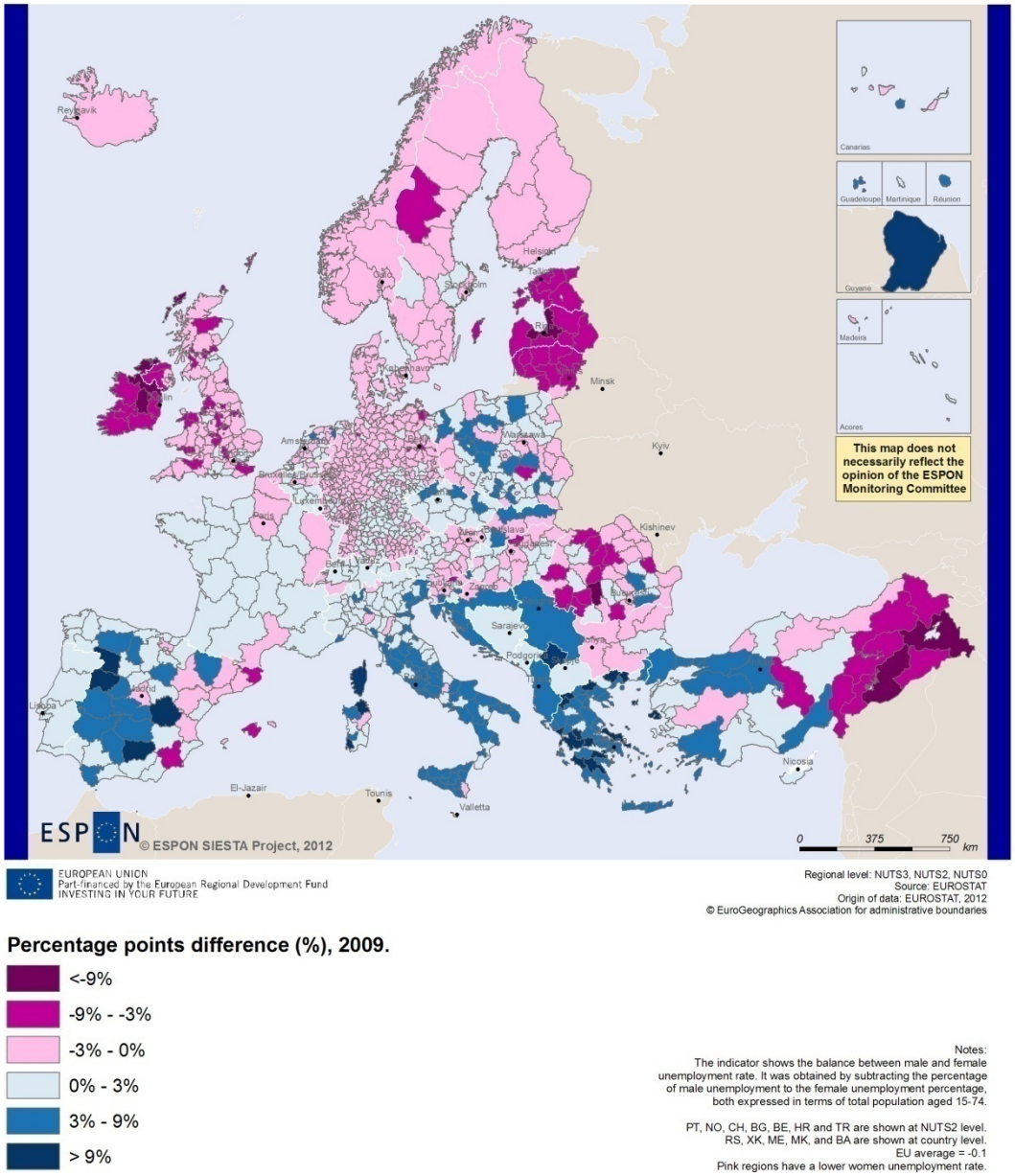
Through Urban Audit, there is an available dataset on unemployment for LUZs which has been used for elaborating Map 4.7. However, it is not for a consistent year, but for combined dates, which makes difficult to analyse if urban areas perform better than their regions and what the causes are of the variation among cities across Europe. In general, urban areas tend to correlate with the unemployment recorded in their respective regions. Some of the imbalances between the regional map (Map 4.5) and the urban map (Map 4.7) for the same indicator and particular areas may be due to the time gap; for instance, in Ireland urban areas are represented in 2004, when the economy was booming, while the worse regional picture offered by the previous map is in 2009; an opposite balance might be the cause for the particularly severe unemployment shown by Croatian and Romanian urban areas, as this is referred to 2004 but hopefully there has been positive progress since then, at least at the regional scale (Map 4.7). Be that as it may, in the Eastern Baltic member states and Spain (whose datasets are for 2008) urban areas have really less unemployment than their regions in 2009; this might show that urban areas perform better than rural areas in terms of unemployment. In any case, the Eastern urban areas of Europe tend to suffer higher rates of unemployment than their Western counterparts, probably because of the effects of the obsolescence of the traditional dominating manufacturing sector.

Like previously done with employment, a gender understanding of the differences in the unemployment rate is of interest. Map 4.6 subtracts the percentage of male unemployment from the female unemployment percentage. When the value is negative there are more unemployed men than women and this is represented in purple; when the value is positive there are more unemployed women than men and this is represented in blue. In the Northern Periphery, Scandinavia and the Baltic Sea Region female unemployment seems to be lower than male unemployment. That means that there is quite a better situation in terms of gender equity. Moving beyond the South, and especially in some Greek regions or Kosovo, the situation is the opposite: the unemployment rate is higher for women than for men. In a general interpretation, that means that gender inequality is a more problematic issue in Southern and Mediterranean regions than on the Northern side

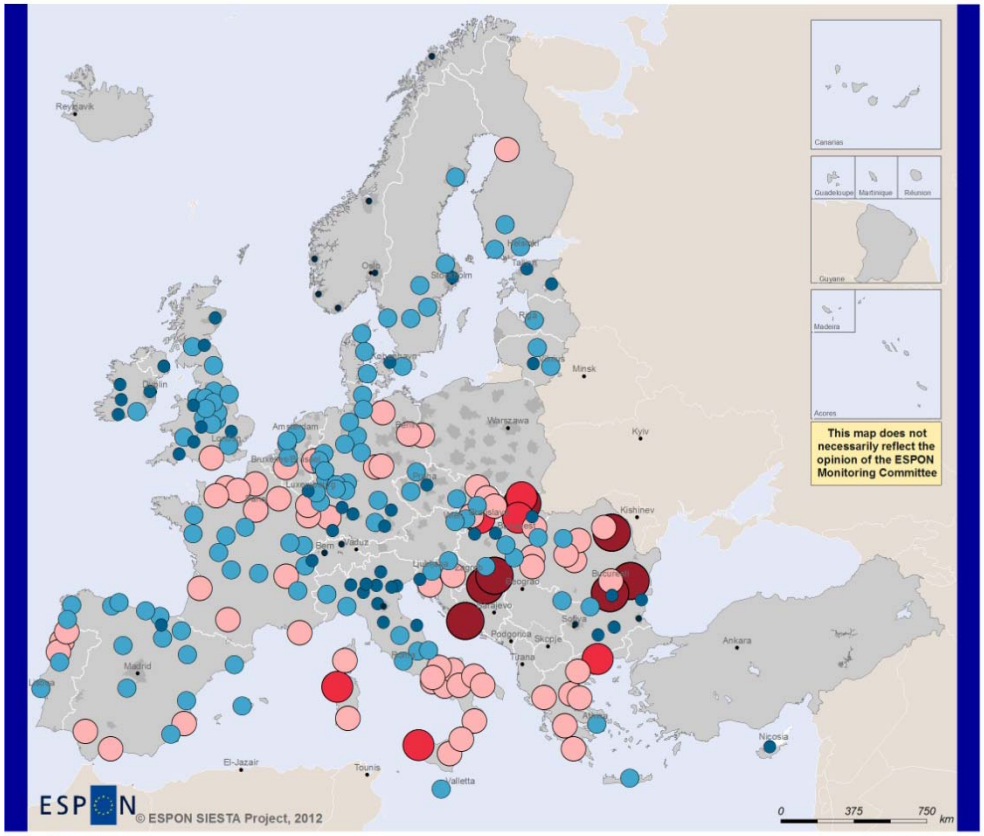
of the continent. However, there are several exceptions to this general pattern: some Polish regions are in the 'Southern' situation, while Eastern Turkish regions score apparently well for women, the latter being possibly attributed to the fact that the female population is registered as housewives and results in a lower score in the unemployment rate.

Map 4.8 represents gender balance in unemployment rate for LUZ; like on Map 4.7, the dates of the datasets vary from country to country. The pattern on Map 4.8 is quite similar to Map 4.6 in the sense that Southern urban areas have higher unemployment rates for women in relation to men, while Northern urban areas have higher male unemployment rates than female unemployment rates. Both Map 4.6 and Map 4.8 suggest that in several Southern European regions and urban areas women are more likely to be affected by unemployment than men, correlating with a previous map on gender gaps in employment rate (Map 4.4). This alarming inequality is against the EU2020S, which states that employment has to benefit both genders, and needs to be intensively targeted in those regions and urban areas where it is especially unfair.

Map 4.6 Gender balance in regional unemployment rate, 2009



Map 4.7 Unemployment rate in LUZs, 2004-2008



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LUZ
Source: Eurostat, 2012
Origin of data: EUROSTAT, URBAN AUDIT CITIES 2012.
© EuroGeographics Association for administrative boundaries

Percentage of total active resident population (%), combined years*.

Below EU average (9.6%)
- < 2,5
- 2,5 - 5
- 5 - 10

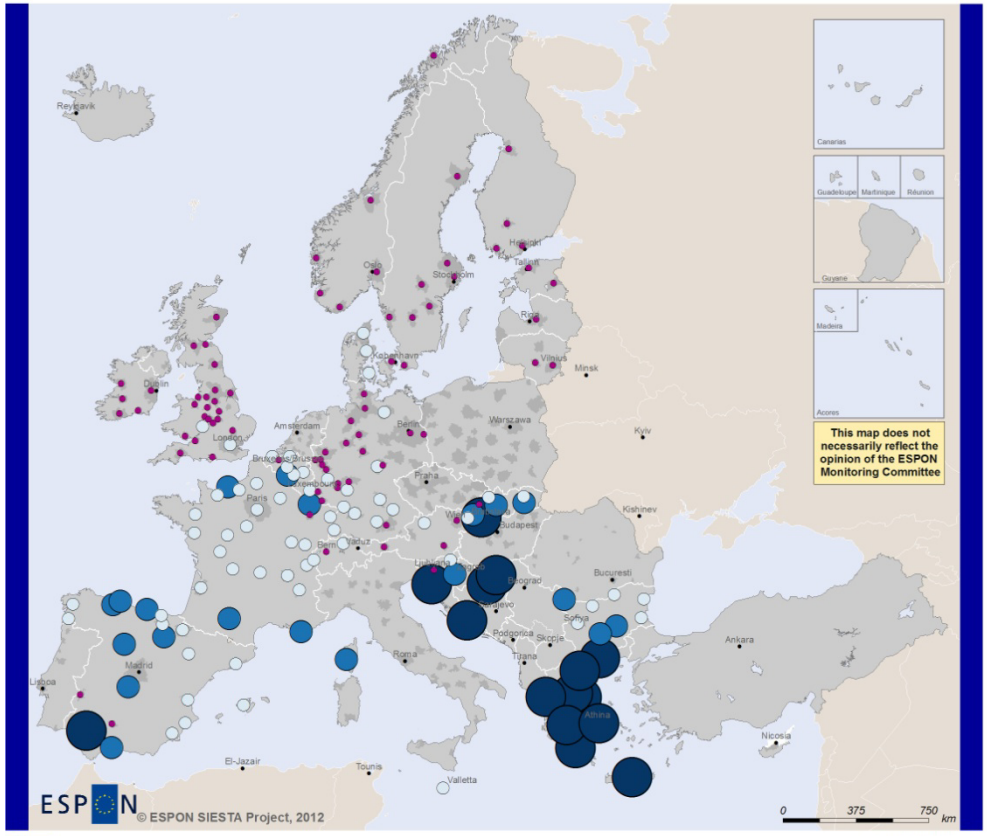
Above EU average (9.6%)
- 10 - 15
- 15 - 20
- > 20

Large Urban Zones

Notes:
Data are not available for the following countries: PL and TR
*Data for BG, CY, DE, LV, LT, LU, MT, FI, SE, UK, NO, CH, EE, ES, IT are shown for 2008.
Data for FR are shown for 2006.
Data for IE and HU are shown for 2005.
Data for AT, BE, CZ, CY, DK, IE, EL, HR, IT, LV, NL, PT, RO, SI and SK are shown for 2004.

Urban Audit defines Larger Urban Zone (Label "LUZ") as an approximation of the functional urban zone centred around the town/ city.

Map 4.8 Gender balance in unemployment rate in LUZs, 2004-2008



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LUZ
Source: EUROSTAT, 2012
Origin of data: EUROSTAT, URBAN AUDIT, 2012
© EuroGeographics Association for administrative boundaries

Percentage points difference (%), combined years*.

- <0
- 0 - 3
- 3 - 6
- > 6

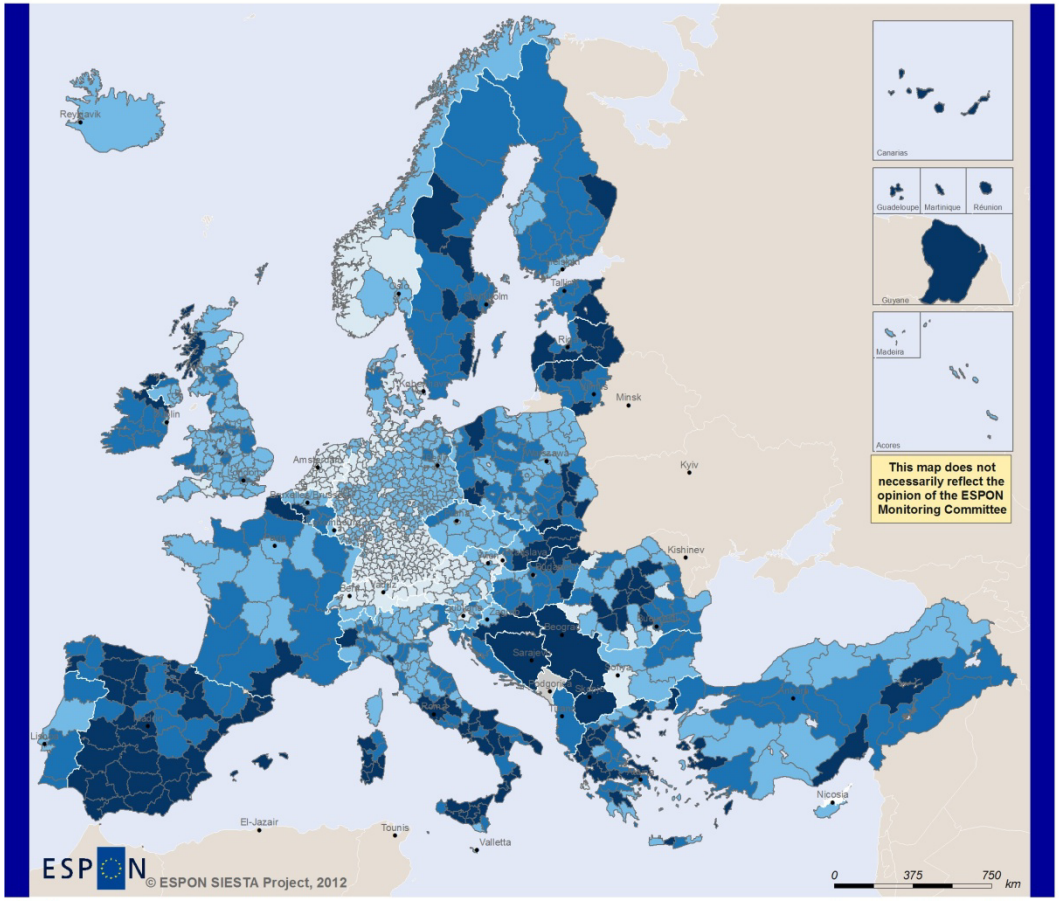
Large Urban Zones

Notes:
*Data for UK, SE, NO, MT, LV, LU, LT, FI, ES, DE, CH, BG, BE and AT are shown for 2008.
Data for FR are shown for 2006.
Data for SK, IE, HR, GR, SI and DK are shown for 2004.

Urban Audit defines Larger Urban Zone (Label "LUZ") as an approximation of the functional urban zone centred around the town/ city.

The indicator shows the balance between male and female unemployment rate. It was obtained by subtracting the percentage of male unemployment to the female unemployment percentage, both expressed in terms of total population aged 15-74.

Map 4.9 Regional youth unemployment rate as percentage of total labour force aged 15 to 24, 2009



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS3, NUTS2, NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012
© EuroGeographics Association for administrative boundaries

Percentage of total active population aged 15-24 (%), 2009.

- < 10%
- 10% - 20%
- 20% - 30%
- > 30%
- No data

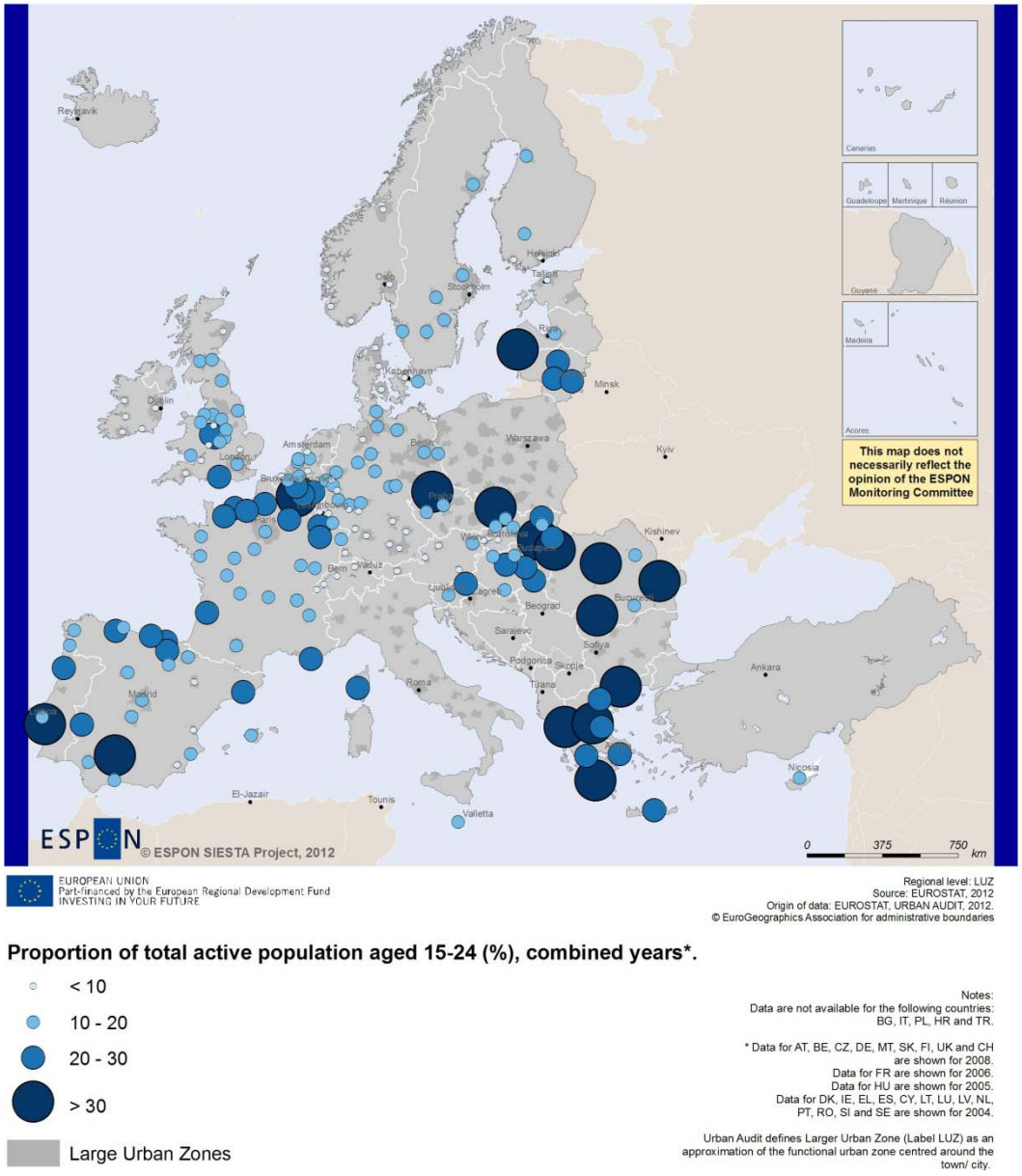
Notes:
NO, BG, FR, HR, TR and PT are shown at NUTS2 level.
AL, BA, RS, XK and MK are shown at country level.
Youth unemployment rate is the percentage of the unemployed in the age group 15 to 24 years old compared to the total labour force (both employed and unemployed) in that age group.

Beyond gender imbalances, the EU2020S is especially concerned about unemployment for young generation as it is being severely hit by the crisis and excluded from the labour market. In general, young people are more likely to be unemployed than adults, even in economies with strong economic growth. As previously said in this Atlas, the Commission has issued specific policies for young people, especially through the flagship Youth on the Move, trying to remove obstacles to youth employability by means of greater educational attainments. Map 4.9 informs about the variation of youth unemployment across the space. It mainly correlates with general unemployment, but, importantly, there are some significant differences. The map depends on economic factors, including the structure of the labour market, but it is also dependant on the socio-cultural and political context. In general, there is a contrasting pattern between the early passage to adulthood in the North of Europe influenced by the comprehensive support from the universalistic state and the delayed transition of young people in the South of the continent based on the “long family” tradition and the absence of state mechanisms to truly support youth. Youth unemployment is particularly low in German, Austrian, Swiss, Norwegian and Dutch

regions, but also in the capital regions of the Czech Republic, Slovenia and Slovakia and in other scattered regions in Eastern Europe; these regions have developed a specialisation of young people in technical skills allowing for labour enrolment. In contrast, the Baltic Sea Region (including Sweden and Finland) and, especially, Southern Europe and the Balkan countries have high youth unemployment rates.

Typically, urban areas tend to score better than their rural counterparts in youth unemployment given that migration to urban centres to find a better job is a frequent option taken by young people. Map 4.10 shows the pattern for urban areas, denoting variations among them. Again, it has to be mentioned that data reflect different years and this creates lack of consistency. In addition, the source is statistically different than Map 4.9, thus there are discrepancies between datasets. Be that as it may, Eastern and Southern cities are more likely to suffer higher rates of youth unemployment, while towards the North cities tend to score better. As repeatedly mentioned in this section on employment and unemployment, particular regions and cities require urgent strategic decision-making in order to curb their disquieting rates in this field which indeed are worsening because of the crisis.

Map 4.10 Youth unemployment rate as percentage of total active population aged 15 to 24 in LUZs, 2004-2008



4.1.2. Skills and Lifelong Learning

Livelong learning and skills development is essential to sustain a competitive, innovative, green and smart workforce that is adapted to the constant challenges throughout the workers' lifetime in the context of a very changing and globalised world. And it is also particularly vital in a time where unemployment is extremely high in several European regions and part of the labour force needs to reinvent itself in order to find a job, namely low-skilled old workers who are being especially affected by joblessness. Indeed, according to SIESTA's calculations, there is a positive correlation at the regional scale between lifelong learning participants and employment rate. Lifelong learning is designed to cover learning in all contexts (whether formal, non-formal or informal) and at all levels: from early childhood education and schools through to higher education, vocational education and training (VET) and adult learning, but usually lifelong learning refers to adults (more than 25 years old). The flagship An Agenda for New Skills and Jobs has the basic strategy to develop and improve the workforce in Europe through the concept of *flexicurity*, which consists of flexible contractual arrangements, active labour market policies, modern social security systems and, this is substantial, lifelong learning. The importance of the latter was already highlighted by the Lisbon Strategy, that stated as a target that 12.5% of the 25-64 years-old population should participate in these activities. By 2010 (the target year of the Lisbon Strategy) the real figure was 9.1%, showing that the target had not been reached. Indeed, in 2009 this issue was reiterated by setting 15% of adults participating in lifelong learning as a target by 2020 (through the Strategic Framework for European Cooperation in Education and Training, commonly the so-called ET2020).

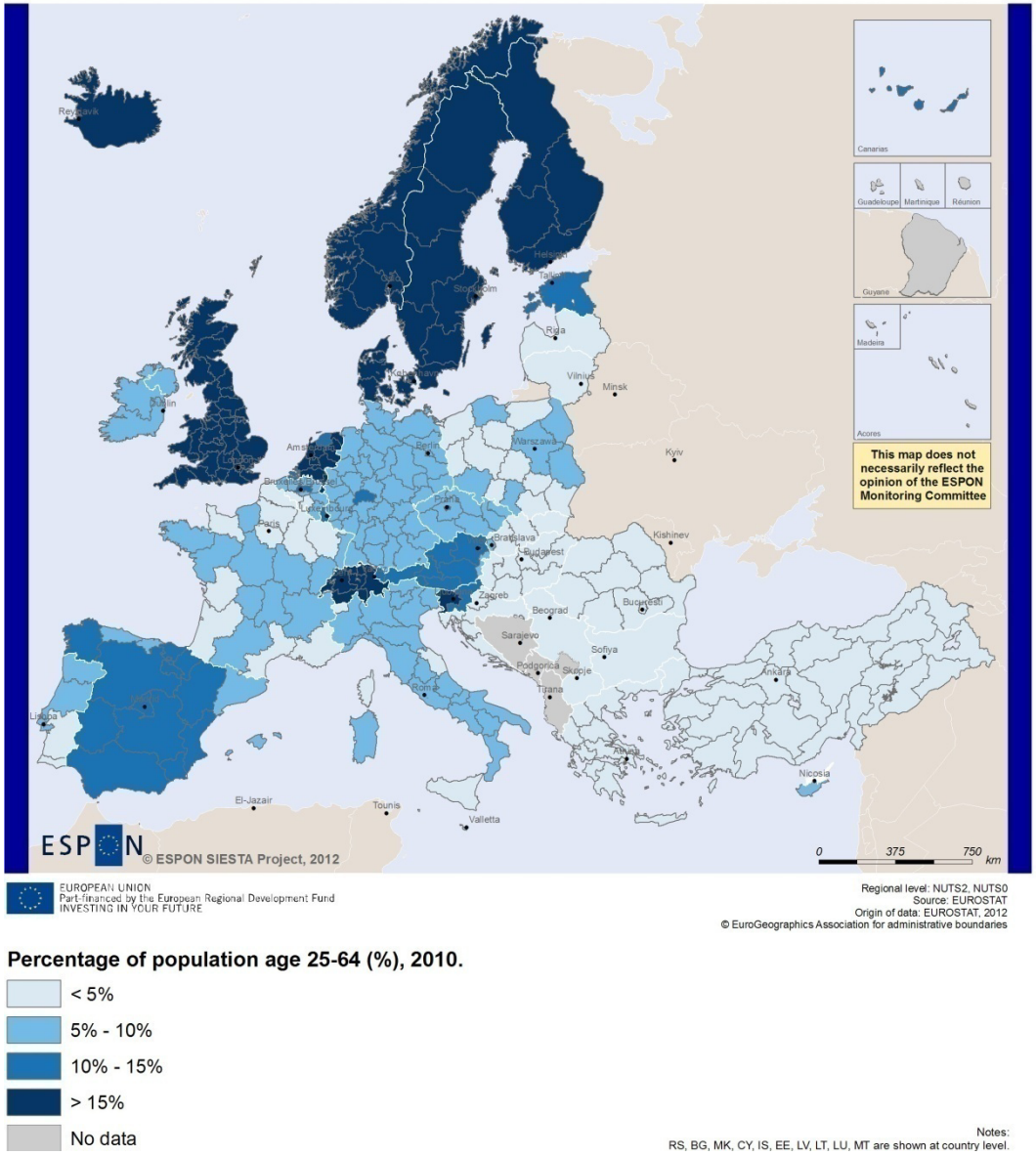
Map 4.11 expresses the territorial variation of lifelong learning for 2010, measured as participation of adults in education and training. As it is clearly seen on the map, the representation is highly dependant on the state scale level. That means that the policy context is fundamental for understanding the disparities, together with the socio-cultural background of each nation. In the forefront, the Scandinavian countries, plus Iceland, the UK, Switzerland and the Netherlands, score particularly well, that is, above the target set for 2020 by the ET2000; typically, in these countries adults can access education fairly easily for different types of learning. A second group of countries basically covers the remaining regions of Western Europe, with median values, but it is true that most of the regions of Spain and Austria score high; these countries usually have less tradition in adult learning than the first ones, but the socio-economic context does not impose great difficulties in developing the sector. In Western Europe in general there are several training programmes with partnerships with the private sector (associations of companies, unions, etc.) and universities.

The last position in the ranking is for Eastern Europe regions, where there have not been lifelong learning activities until very recently and there was a lack of funding in this respect; these activities are commonly not spread among Eastern regions, being marginal in most of the cases (less than 5% of adults). Indeed, it can be forecasted that this participation will increase in Eastern Europe because the accumulated impact in most of these countries (new members of the EU) of the European Social Fund (ESF), which is usually devoted to lifelong learning and whose impact is arguably the cause of the high scoring of Spain or Slovenia on Map 4.11. In addition, the accession to the EU itself has impelled a reorganisation of learning levels in these new members and, for instance, for the case of Romania there has been a reform of

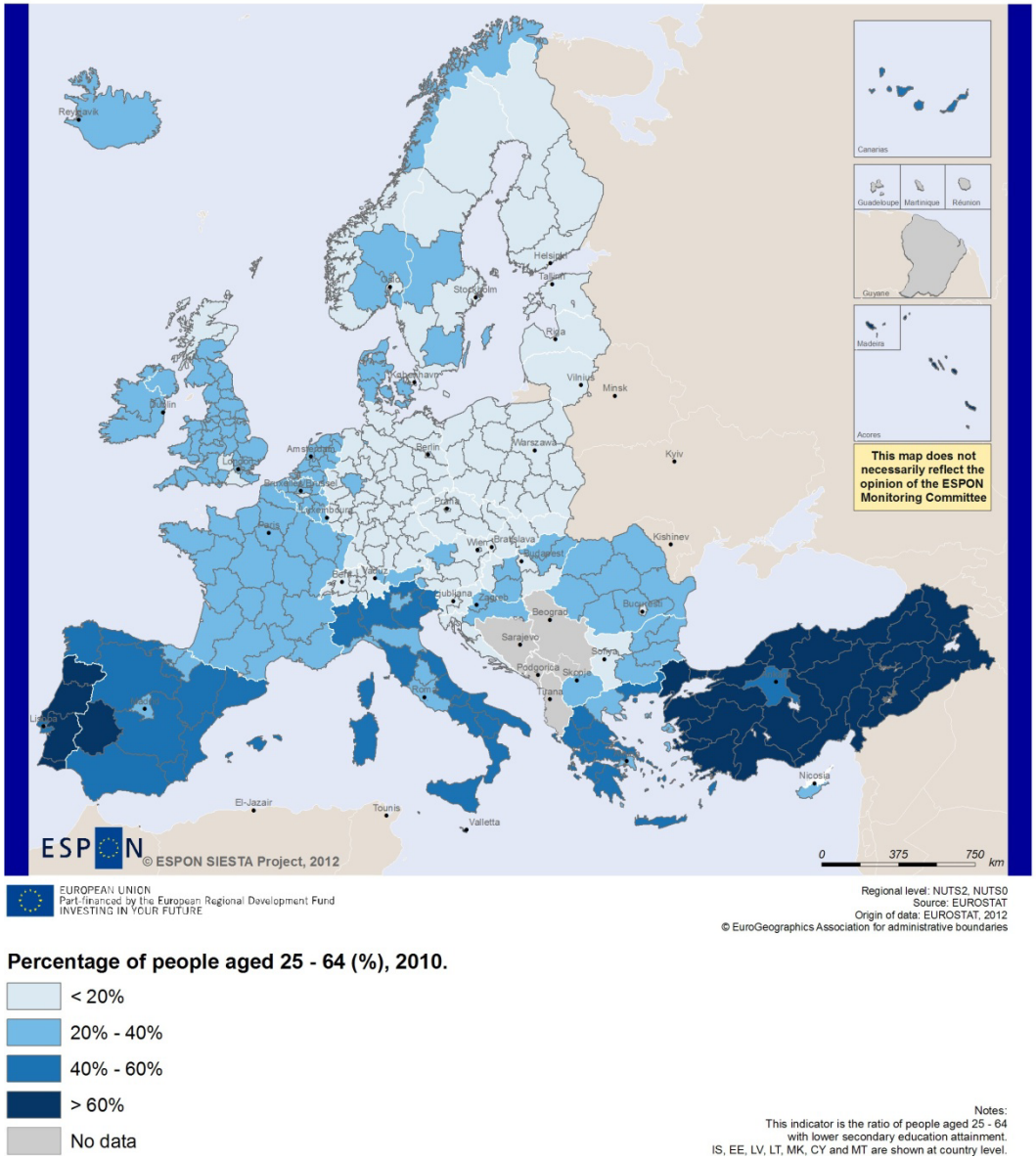
professional learning level which noticeably affects lifelong learning. In conclusion, Eastern Europe seems to be already on the right path to improving workers' skills, although progress still cannot be perceived on Map 4.11.

A last issue to mention in relation to this Map 4.11 is that there is a moderate correlation between lifelong learning and tertiary educated population (both in total and for the age group 30-34, as previously expressed in this Atlas). This correlation is logical as tertiary education itself is part of lifelong learning. In addition, it also proves that lifelong learning mostly benefits the more educated people. And that means that the countries with higher educational levels are more likely to have higher participation of adults in education and training, and that is again another underlying reason for such cartography.

Map 4.11 Participation of adults (aged 25 to 64) in education and training, 2010



Map 4.12 Persons (aged 25 to 64) with low educational attainment (level 2 ISCED) by regions, 2010

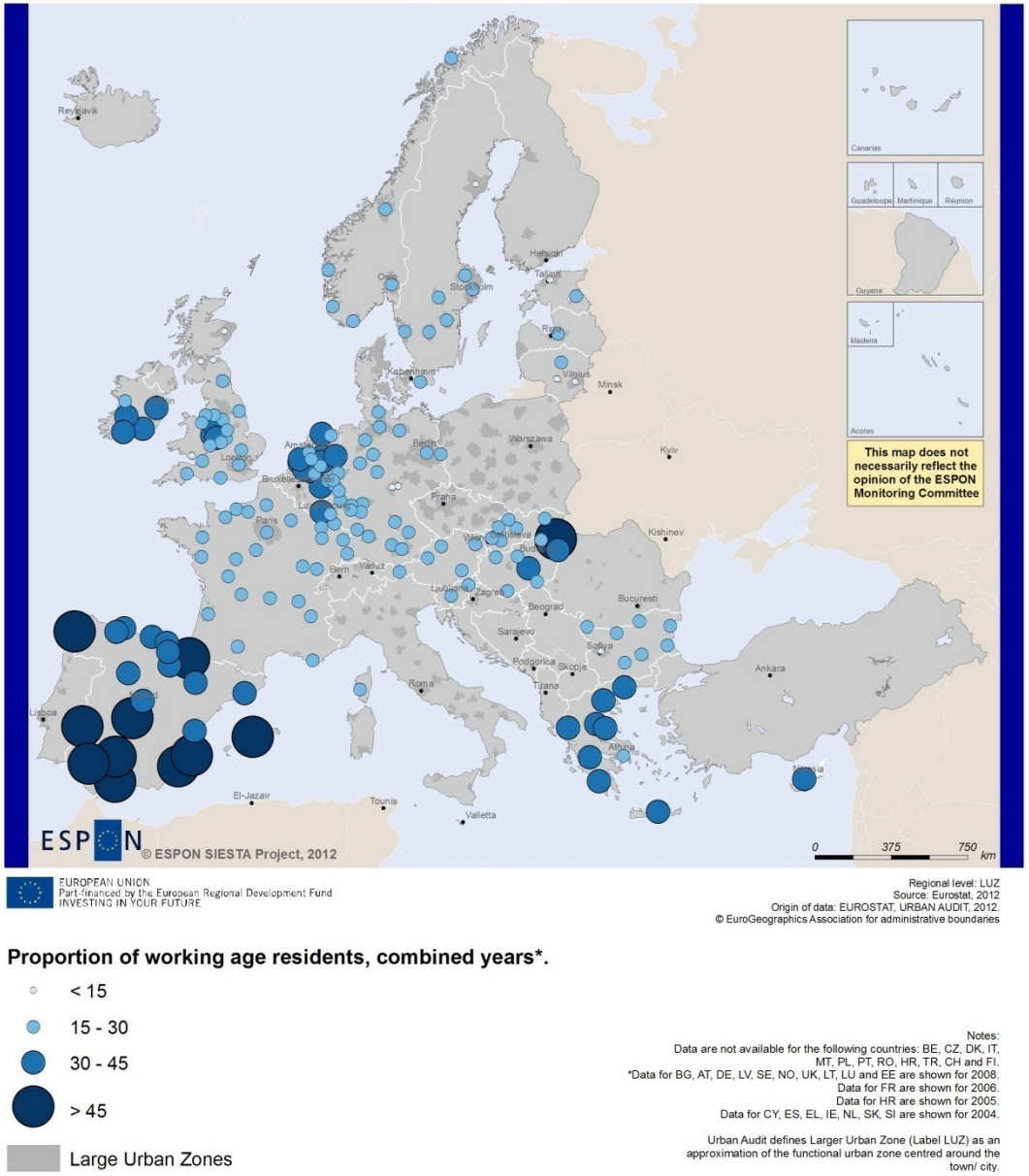


As previously said, low-skilled workforce is a big issue that needs to be faced in order to promote a smart, sustainable and inclusive growth economy, basically through flexicurity. In order to effectively measure low-skilled people, the representation of lower educated population across the European space at the regional scale makes sense. This is done through Map 4.12, where people aged 25-64 with low secondary attainment is represented. Secondary education represents a critical stage of the system that not only links initial education to higher education, but also connects the school system to the labour market. This indicator is linked with the drop-out rate that has been mapped before. However, this refers to the total adult population. The map shows an unexpected pattern in the sense that it is not the West/East difference that matters, but more the opposition between Central Europe and Scandinavia in an outstanding position, on the one hand, and the Southern countries in a worse situation, especially Turkey, Portugal, Extremadura (Spain) and outermost Portuguese and Spanish archipelagos, on the other. In the middle, Western countries such as the UK and France have median values. As on previous maps, the ratio tends to be uniform at the national scale due to the importance of the type of policies that

are developed in each country. However, there are countries with a wide range of situations (i.e. Spain). In any case, the rural/urban opposition does not seem to play a role: rural regions in Scandinavia score very well, while urban regions in the Southern countries score badly (i.e. Istanbul). Again, a particular effort needs to be made in the areas especially lagging behind, especially in countries such as Turkey, Greece or Portugal, where this low-skilled population does not have access to adult education and training (Map 4.11).

Map 4.13 shows the same issue but for urban areas. However, the statistical dataset is different and it covers people with low secondary education attainment and inferior levels at different years. That means that both maps are not directly comparable and it is not inferable if urban areas perform better than their regions. Be that as it may, the pattern is arguably similar in the sense that Southern countries tend to score worse than their Northern counterparts and that Eastern Europe plays well (the city with the best rate is Sofia, with 11.4%). The case of Spain is particularly alarming and reveals one of the reasons for unemployment in this country, as repeatedly reported before: workforce is really very low-skilled therein.

Map 4.13 Persons (aged 25 to 64) with low educational attainment (level 1 or 2 ISCED) by LUZs, 2010



4.1.3. Two Challenging Working Sectors

The flagships related to the EU2020S quote some sectors which constitute opportunities in terms of job creation across Europe. For instance, in An Integrated Industrial Policy for the Globalisation Era there are 5 big sectors which are considered promising, while in An Agenda for New Skills and Jobs there are several mentions on sectors that are worthwhile. Being out of place to consider all these sectors in-depth, at this point in the Atlas there will be a reflection on two important ones for understanding the EU2020S orientations.

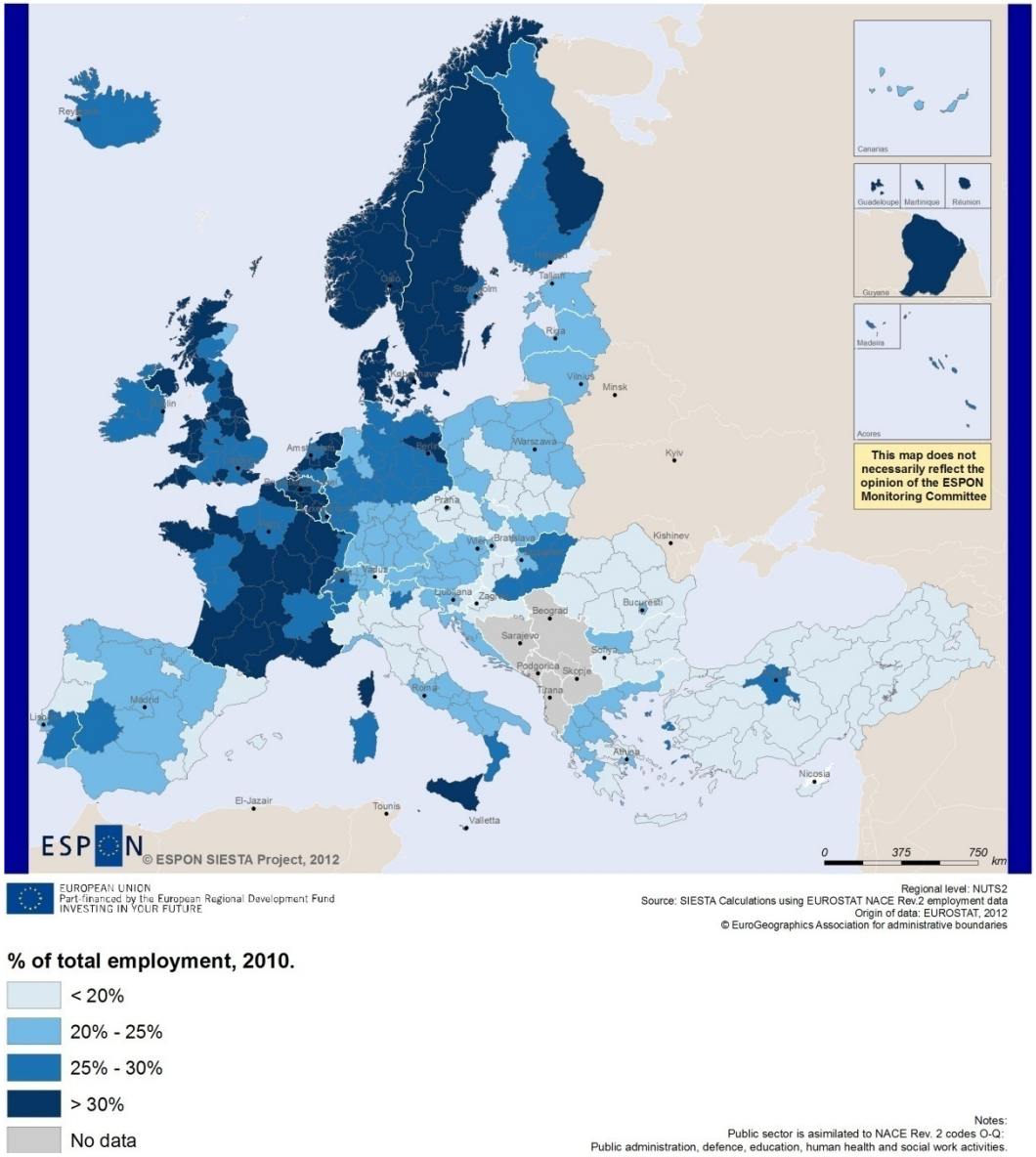
Firstly, people working in the public sector are not directly quoted in any EU2020S document, although the flagship on employment mentions the importance of accounting for public servants in different subsectors (public employment services, health, etc.). The public sector differs strongly from country to country but typically includes services such as the police, military, public works, transport, education and healthcare. However, in the current economic crisis, and coming from liberal and neoliberal political ideologies, the belief in the need to reduce public sector employees is widespread. Some politicians, economists or the media have reported in each country that the public sector workforce is too large and, in several cases, have applied reforms and cuts causing an apparent reduction in its size. For instance, in Greece the 2010 IMF/EU bailout has meant severe public sector employment reduction and the agreement of the IMF with Romania in 2009 has caused a reduction of people working in the public sector.

Map 4.14 shows public sector employment across regions. Taking into account that this distribution is moderately correlated to regional GDP per capita, the conclusion is that public sector employment is highly dependent on the level of growth of each region. In general, richer regions such as those in Scandinavia, the UK or Benelux are in the forefront. That means that in general the Western more advanced countries are the ones accounting for high rates of public sector servants. The division between the top regions and the rest of Europe can be set on the threshold of 25% of total population working in the public sector. It is important to note that public employment in each region depends in general on the average economic level of the whole state in the sense that the government spreads services (thus, workers) throughout its territory, guaranteeing an homogenous coverage. Typically, there are no great internal variations within countries, except in the case of those countries where the region of the capital clearly stands out: Bucharest in Romania, Ankara in Turkey, etc. Another exception consists of Italy, Spain and Portugal, with wide internal disparities and which tend to concentrate their public sector workers in the poorer regions, while the richer ones usually account for less public workers (Northern Italy, Eastern Spain or Portugal's Norte and Centro). In the opposite situation from the above-mentioned top regions, Eastern Europe records in general regions with very low percentages of population working in the public sector, with the bottom regions with less than 10% of employees in Turkey and Romania. However, it has to be pointed out that there are regions with particularities. For instance, the region with the highest percentage of public employment of all the studied cases is Ceuta (with almost 50%) and this is related to the presence of the Spanish Army, several public offices and other agencies and the same is applicable to Melilla or to other Spanish, Portuguese and French outermost regions such as Réunion.

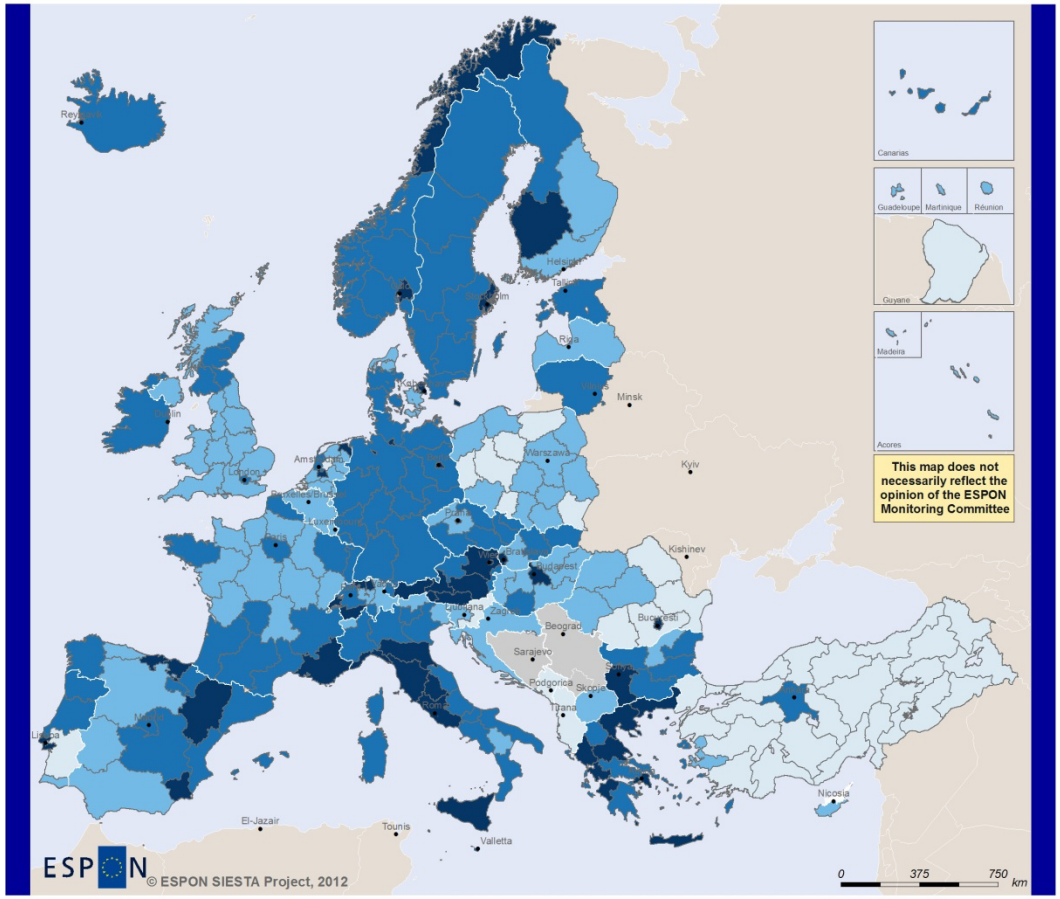
This map deserves a last reflection which is quite important in the current recession context. Most of the countries which are at this time

adjusting the public sector, with massive dismissals, indeed have tiny percentages of public employment as shown on Map 4.14. That means that, if the public sector was feeble, most of the current cuts are seriously affecting this precarious structure. And that obviously compromises the delivery of basic services facilitated by the state. In addition, SIESTA's calculations have shown that regional public sector employment correlates strongly with regional employment in knowledge-intensive activities and human resources in science and technology and correlates moderately with regional tertiary educated population and lifelong learning. That means that smart growth as defined in the EU2020S tends to take place when public employment is more robust.

Map 4.14 People working in the public sector by regions represented as percentage of total employment, 2010



Map 4.15 Professionals in health sector represented as health staff per 100,000 inhabitants, 2008



Secondly, the health sector is quoted as a field where there will be a shortage of 1 million professionals in the EU by 2020. This means that by then it will be necessary for physicians to come from abroad, especially taking into account the needs in ancillary healthcare because of increasing ageing. In addition, the health sector is also important to be mapped in the sense that it is one of the common symbols of the European social model. Map 4.15 informs about this pattern. In general, the cartography explains that Eastern regions are served worse than their Western counterparts, but there are large differences between regions and some particular countries have extreme internal variations and they do not necessarily correlate with the centralised or decentralised decision-making in health. On this map there is no clear divide between rural and urban regions and indeed several typically rural regions seem to be better served than agglomerations; this can be related to adaptation to ageing, particular national arrangements or personal decisions of the practitioners. A case in point is Italy, which registers high rates probably because every drugstore has to have a doctor on staff. Again, the impact of the crisis on this map is notorious because it notably affects health staff.

4.2. Poverty, Exclusion and Ageing

4.2.1. Poverty and Exclusion

The EU2020S places the fight against poverty in the agenda at the same time as economic growth, employment or smart economy principles are sought. Fighting against poverty is the main contribution of the EU2020S in the direction of inclusive growth, which basically means that growth has to spread to all society and that excluding people in this process is not acceptable. This very idea is especially important in the current crisis context, when the situation is worsening and the most vulnerable people are being affected. Of course, the causes of poverty are multi-faceted and include a wide range of possibilities. Usually poverty is related to low incomes or even the absence of salaries, but there are the "working-poor", with very low salaries or relying on temporary and low-paid jobs. Indeed, in general it can be argued that higher rates of employment are positively related to reducing the levels of poverty, but this is not always true. There are also social groups which are not active population and that effectively are more at risk of poverty — i.e. children, elderly. Women, young people or third-country migrants also tend to be more at risk, together with specific groups such as Roma people, people with mental health problems, people with disabilities or the homelessness. The so-called flagship initiative The European Platform against Poverty and Social Exclusion identifies five areas of action in this field, but as is well known the topics which can be effective in targeting poverty and social exclusion are basically in hands of each state rather than the Commission: social care, housing, health, family policies, education, etc.

Because of its complex nature, a common problem in referring to poverty is how to define it. Conventionally, the EU has adopted a specific statistical definition that will be followed in the next pages as it is related to the headline target that has been set. People at risk of poverty or social exclusion are persons who are at least in one of the following three conditions: at-risk-of-poverty, severely materially deprived, or living in households with very low work intensity; each one of these indicators has its specific definition, as is explained in Table 4.2. The specific Eurostat mechanism for calculating such an aggregate indicator is the European Union Statistics on Income and Living Conditions (EU-SILC), which has been used for elaborating maps herein.

Table 4.2 Definition of at-risk-of-poverty or social exclusion rate. Source: EU-SILC

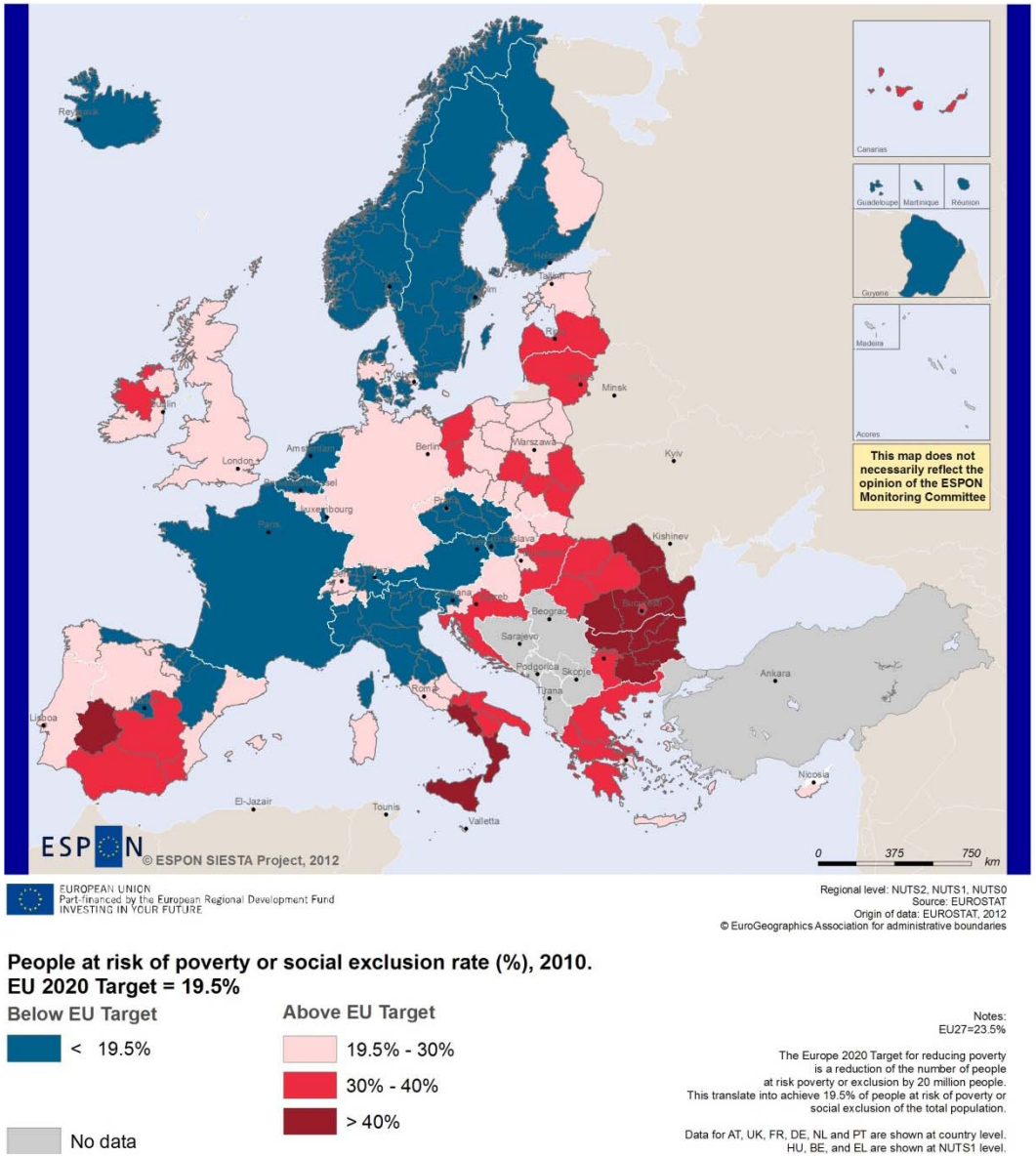
At-risk-of-poverty or social exclusion rate expresses the % of population at least in one of the following three conditions		
At-risk-of-poverty: having an income below the 60% threshold of the national median equivalised disposable income after social transfers	**Severe material deprivation**: experiencing at least 4 out of 9 following deprivations items: cannot afford i) to pay rent or utility bills, ii) keep home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) a week holiday away from home, vi) a car, vii) a washing machine, viii) a colour TV, or ix) a telephone	**People living in households with very low working intensity**: people aged 0-59 living in households where adults work less than 20% of their total work potential during the past year

As a target, the EU2020S envisages reducing the number of people at risk of poverty or social exclusion at least by 20 million by 2020. This is the only headline target that is not a percentage, but a global figure. In 2010 there were more than 115 million people officially considered poor, corresponding to 23.5% of total population, and the reduction of at least 20 million might mean moving below 19.5%. In this sense, SIESTA has roughly understood 19.5% as a percentage target. Map 4.16 shows how regions are positioned in relation to 19.5%. In reality, no region has achieved the target as each region

might reduce poverty, but this map assumes that the European aim is to attain at least 19.5% and there are regions which are already below this target and this is what this map shows. Another comment which must be made in relation to this map is that there are several countries which do not have an associated regional dataset as they do not account for the mentioned definition of people at-risk-of-poverty or social exclusion.

In any case, 84 out of 142 analysed geographical entities (60%) do not reach the EU27 target of 19.5%. In the more extreme situation, there are different Bulgarian, Romanian and Italian regions, plus Extremadura (Spain); three regions in Bulgaria and Romania which account for more than 50% of the population statistically defined as at risk of poverty or excluded (Table 4.3). In general, more poverty density is registered in Eastern Europe (in countries joining the EU post-2004) and in Southern and Mediterranean regions (in this case in countries that already were members of the EU before the 1990s). There is a marked contrast in the cases of Italy and Spain, whose Northern regions are below the threshold (indeed, some of them are among the best ranked in the EU, as shown in Table 4.3), while Southern regions have unacceptable

Map 4.16 Regional/national population at-risk-of-poverty or social exclusion (as a percentage), 2010



levels of poverty or social exclusion. In contrast, Western and Northern countries tend to be below the 19.5% threshold, except in the cases of Ireland (29.9%) and the UK (23.1%). There are important considerations to raise with regard to some particular geographical areas. First of all, Germany appears on Map 4.16 as above the threshold, but indeed it is very near it (19.7%); again, the 19.5% is just an average reference rather than a target and unfortunately there is no available dataset for showing German internal variation on poverty. Secondly, it is important to note that the Czech Republic and Western Slovakia, despite not being classifiable as Western and Northern nations, rank particularly well, especially the region of Praha (the top region of Europe in less poverty, according to Table 4.3). Thirdly, when there are internal datasets on this rate the Northern regions show appreciable variation: this is the case of Switzerland, Belgium, Denmark or Finland; in general these countries account for low rates of poverty and social exclusion, but there is an outstanding internal heterogeneity. All this means that poverty has a very clear spatial dimension that cannot be omitted when developing the EU2020S and that logically has clear links with the long-term cohesion policy of the EU, when applicable.

Table 4.3 Ten regions with highest and lowest population at-risk-of-poverty or social exclusion rate. 2010. Source: Eurostat

		At-risk-of-poverty or social exclusion rate
CZ	Praha	7.10
ES	Comunidad Foral de Navarra	9.70
IT	Provincia Autonoma Bolzano/Bozen	9.80
IT	Provincia Autonoma Trento	10.30
SE	Mellersta Norrland	10.90
CZ	Ostschweiz	11.40
CH	Nordwestschweiz	11.80
CH	Zürich	12.20
NO	Vestlandet	12.30
SE	Stockholm	12.30
EU27		**23.50**
BG	Severoiztochen	43.90
BG	Yugoiztochen	43.90
BG	Severozapaden	44.00
IT	Campania	44.10
BG	Yuzhen tsentralen	45.30
IT	Sicilia	45.90
RO	Sud-Vest Oltenia	48.00
RO	Nord-Est	51.00
RO	Sud-Est	51.80
BG	Severen tsentralen	53.20

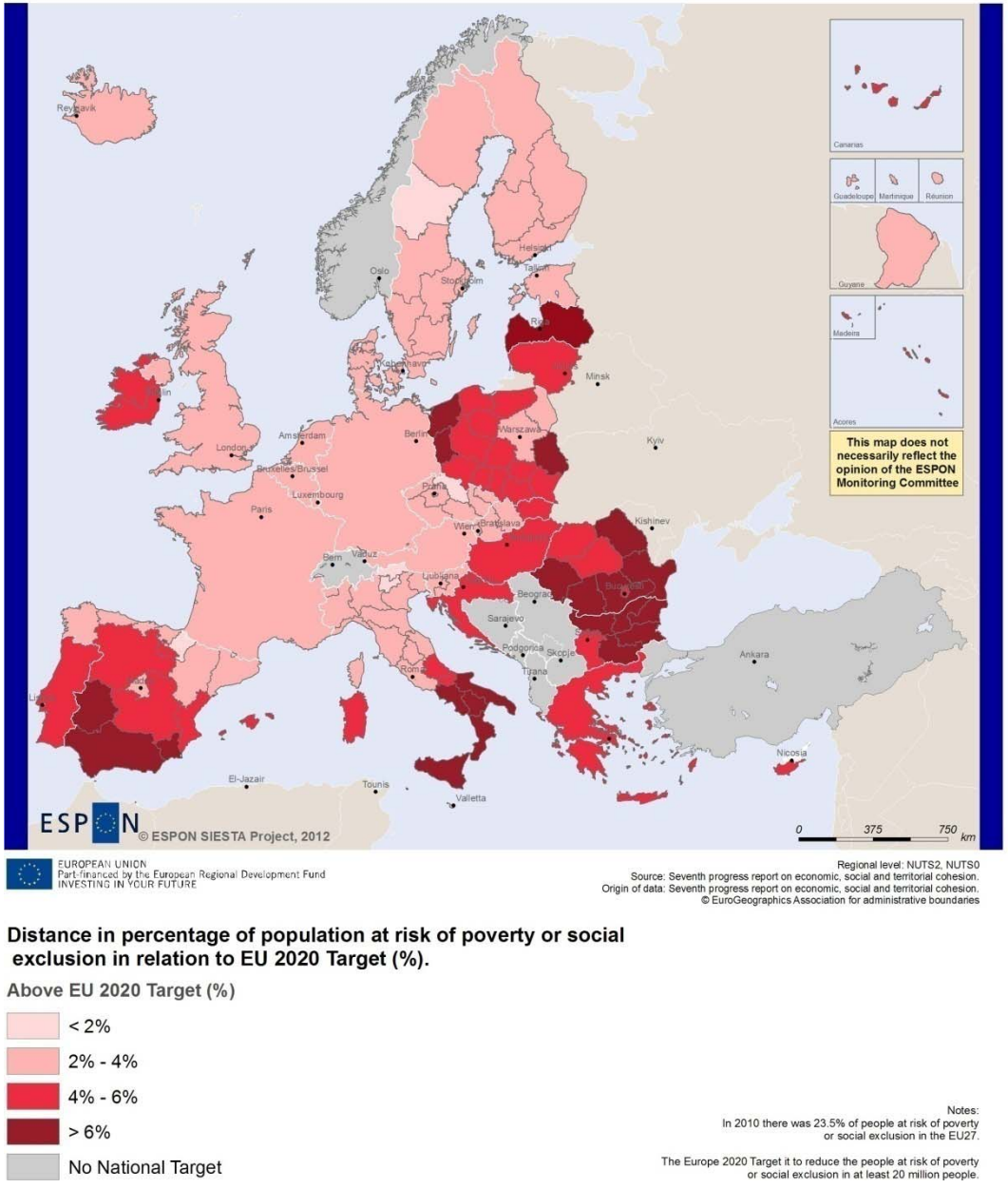
If the EU target is unclear in terms of mapping, the difficulty increases when taking into consideration national targets. First of all, in this case there are 2 countries without a target (as in previous cases) but in addition there are 7 countries with a target that is not comparable to the headline (as it is expressed in relation to another indicator). In addition, and as repeatedly reported for all previous maps calculated with targets set by countries, the variation of national targets is extremely surprising (Table 4.4) and, arguably, is based on political decisions that strongly differ from the direction expressed by the Commission when delivering the EU2020S. This means that a map with national targets would be unsatisfactory because of the wide range of them and the fact that one-third of the countries do not have a set target or this target is not analogous. In this sense, in this Atlas Map 4.17 is the only case of headline target representation where the distances are calculated to the target set by the EC, rather than by countries. Unsurprisingly, regions and countries scoring worse on Map 4.15 should make a bigger effort to reduce their poverty and contribute actively (in a higher proportion) to the 20 million person reduction, while regions and states scoring better on the previous map should make less effort as they have less poor people. The EC has not officially reported whether all the national targets together would mean that the EU target is achieved, probably because of the lack of set targets (or comparable set targets) for 9 countries, but Map 4.16 and Table 4.4 inform that the target will predictably not be achieved by 2020. Be that as it may, Table 4.4 expresses how the commitment of the countries with a

headline target set by the EU2020S is feeble: no country forecasts to make the necessary effort to reduce the percentage which is necessary to nationally contribute to the overall achievement of the headline target. This clearly acknowledges that the implementation of inclusive growth pillar, and the whole EU2020S, remains dubious.

Table 4.4 Available national targets for the reduction of people at-risk-of-poverty or social exclusion. Source: SIESTA's calculations based on Annual Growth Survey 2012 and Eurostat

	Official figure of the national target (thousands)	*Target translated into % of persons*
EU27	**20,000**	**17.28**
Austria	235	17.12
Belgium	380	17.00
Finland	150	16.85
Bulgaria	500	15.90
Lithuania	170	15.33
Hungary	450	15.26
Slovakia	170	15.21
Italy	2,200	14.92
Greece	450	14.85
Poland	1,500	14.41
Cyprus	27	14.36
Latvia	121	14.30
Spain	1,500	12.85
Slovenia	40	10.93
Malta	7	7.81
Portugal	200	7.43
Netherlands	93	3.75

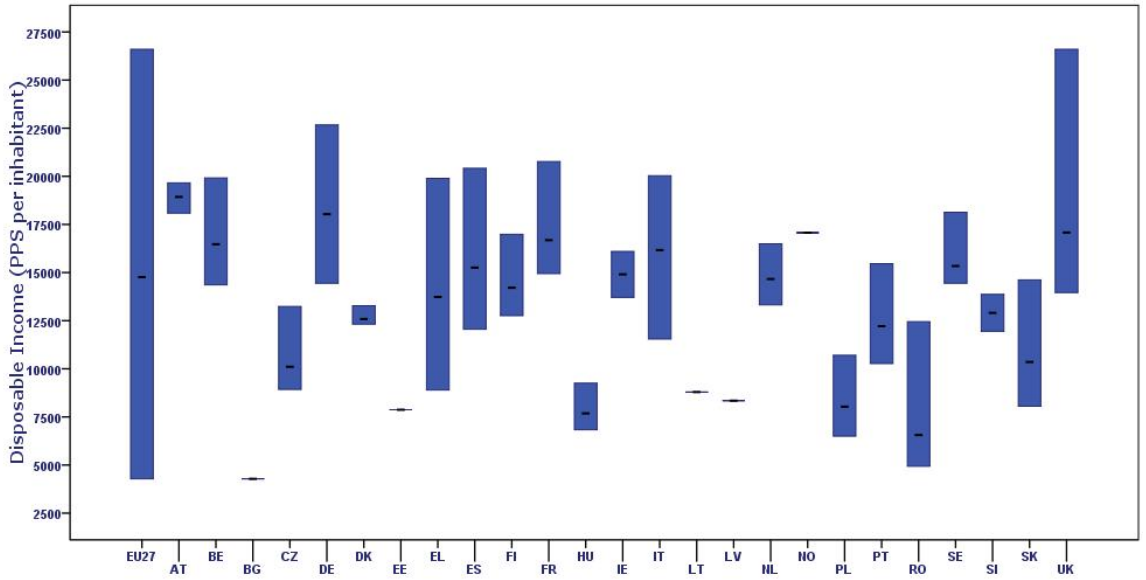
Map 4.17 Regional/national population at-risk-of-poverty or social exclusion represented as distance to the EU2020 target, 2010



As explained in Table 4.2, one of the three indicators which is amalgamated into the at-risk-of-poverty or social exclusion indicator calculations is disposable income expressed in relation to the 60% threshold. As is well known, at a regional level GDP per capita levels (represented on Map 2.1 at NUTS3) do not automatically correlate to levels of disposable income. On the one hand, yearly generated capital may be transferred out of the region, for instance when there are extractive industries, and this capital will not remain in the region. On the other hand, state transfers will contribute to per capital levels of disposable income, but are not shown in regional GDP figures. Disposable income as a concept is closer to the concept of income generally understood as GDP per capita, although the latter is more widely used in the EU context. On Map 4.18 the regional disposable income in pps has been represented based on final consumption per inhabitant.

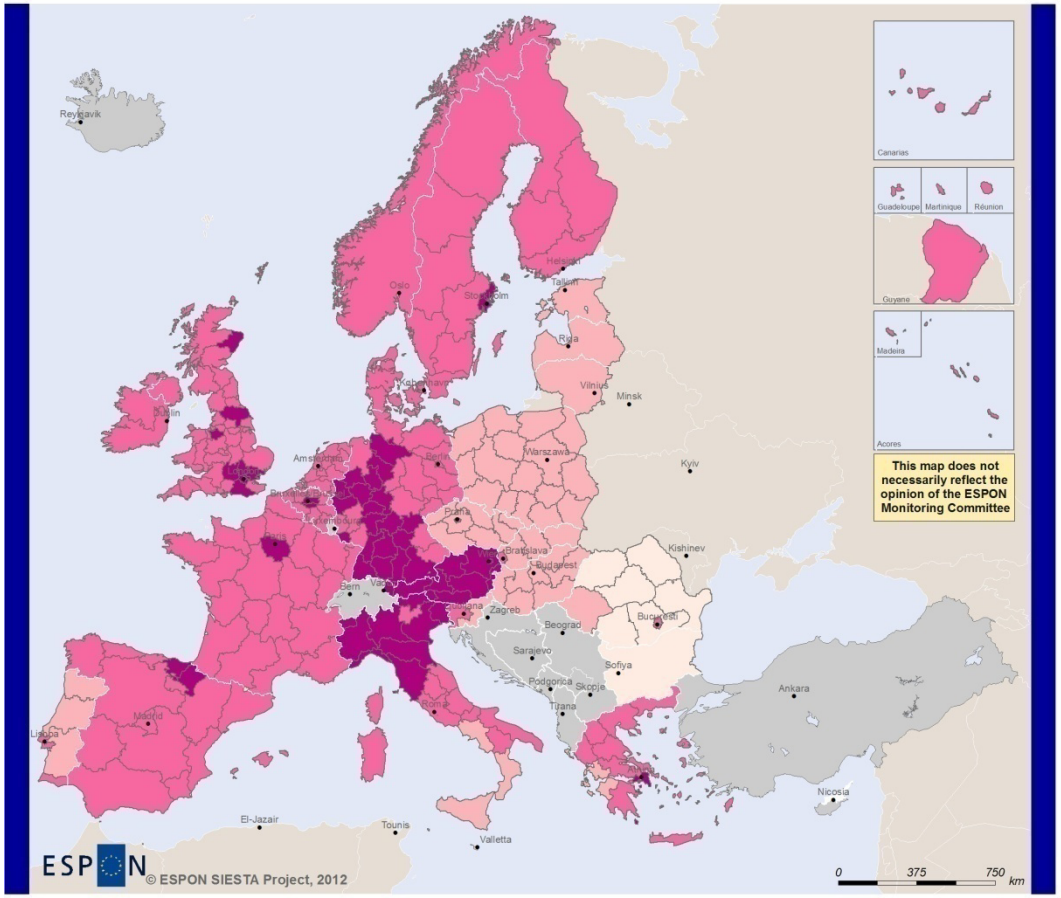
If the rank of GDP per capita is between 140,100 € in pps in West Inner London and 4,000 € in pps in Pološki (Macedonia), in disposable income it is between 26,599 € in pps in Inner London (again) and 4,935 € in pps in Romania Nord-East (Graphics 2.1 and 4.3). That means that the rank is clearly narrower in the latter than in the former, but still one person living in the most affluent region has an average disposable income on final consumption five-fold more than one living in the region lagging more behind. And this gap is crucial for measuring poverty. As on Map 2.1, the Iron Curtain in force for decades explains the broad differences of Map 4.18 in terms of a division between the East and the West. In general, Eastern countries joining the EU post-2004 have regions with an average disposable income between the bottom figure and median values of the EU (the EU average is 14,777 € in pps), while regions on the Western side are between these median values and the top. On the Eastern side only the regions of the national capitals (Bucharest, Bratislava, Prague, etc.) are close to the EU average. In the Western countries some countries show strong internal imbalances. In Southern Italian regions, all of Portugal (except the archipelagos, Lisbon and Algarve) and some Greek regions the disposable income is comparable to Eastern Europe (Graphic 4.3).

Graphic 4.3 Regional disparities (NUTS3) in GDP per head among states. Source: Eurostat, SIESTA's calculation

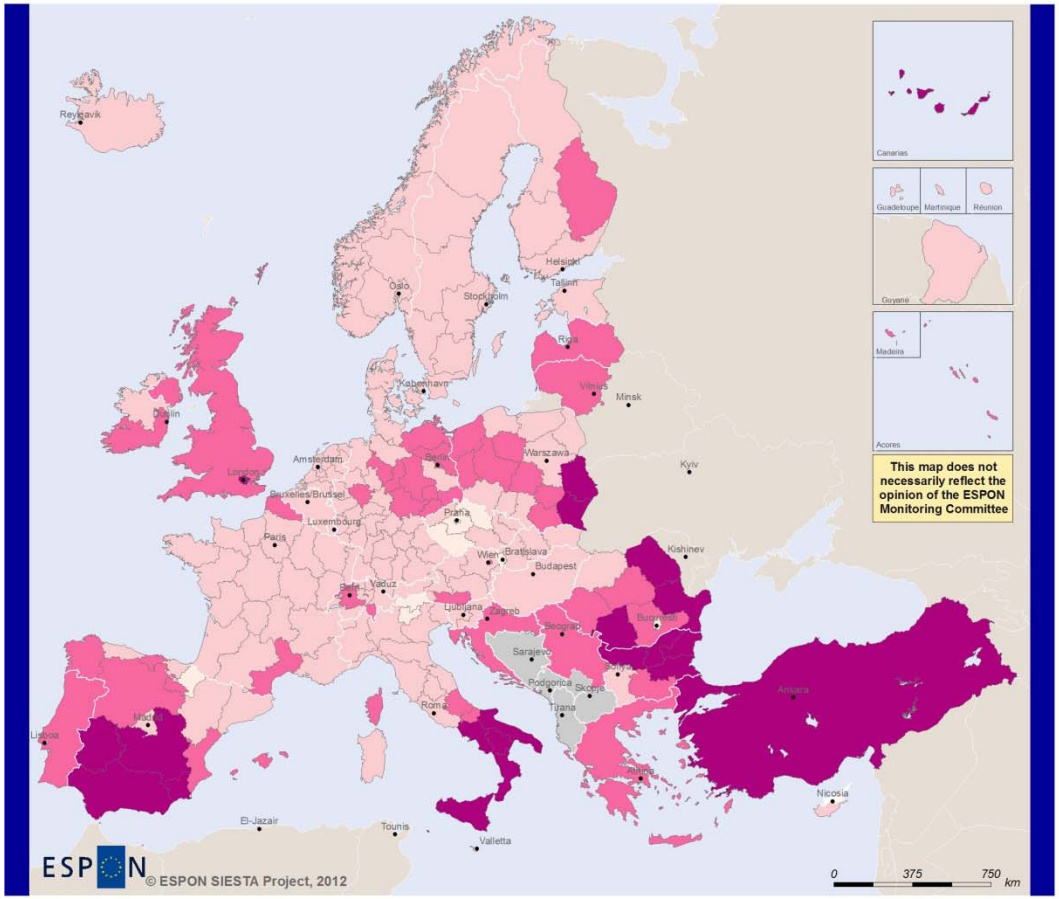


As on Map 2.1, Map 4.18 expresses that the area of the EU concentrating higher levels of disposable income per capita is shown in the well-known metaphor of the “blue banana” extending from Northern Italy to London and embracing Austria, Germany and the Benelux (although on this map only the Brussels region stands out). Beyond this core area, Île-de-France (Paris region) in France, Stockholm capital region and Attiki (Athens region) in Greece score particularly high; they three are capital regions, but there are some regions in the UK and the Basque Country and Navarra (Spain) that are also in the top levels of disposable income per capita. In general, it is clear that urban areas tend to score better than rural areas, but notably if these urban areas are the capital cities of each country, accounting for the importance of the state financial flow for explaining the map. In terms of poverty, and taking into account the calculation based on pps, it can be inferred that those regions with lower disposable income are more likely to contain poor people. For a real inclusive agenda development according to the EU2020S, Eastern European regions need to be especially targeted and the fact that current cohesion policy is being mainly directed at these regions is a clear opportunity in this respect.

Map 4.18 Regional disposable income per capita in pps based on final consumption, 2008



Map 4.19 People at-risk-of-poverty after social transfers, 2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2, NUTS1 and NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012.
© EuroGeographics Association for administrative boundaries

At risk of poverty rate, 2010.

- < 8
- 8 - 16
- 16 - 24
- > 24
- No data

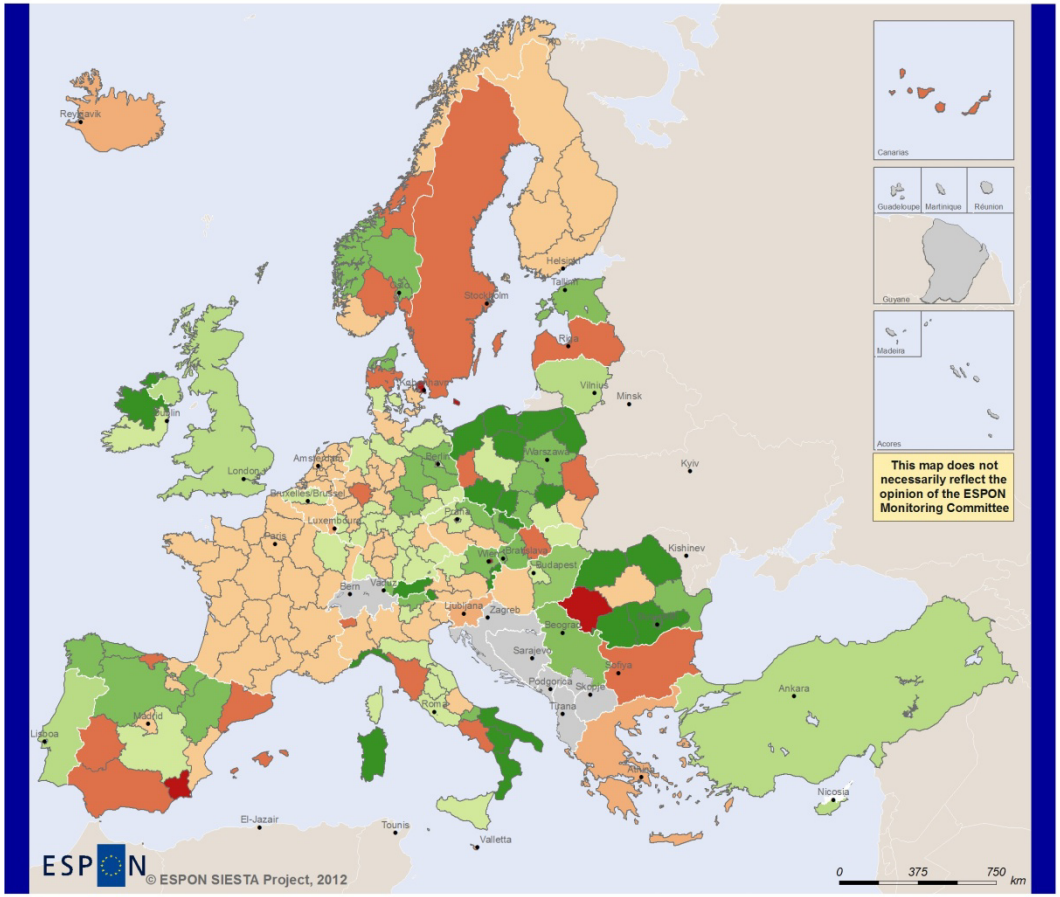
Notes:
BE, EL, NO, and UK are shown at NUTS1 level.
HR, RS, TR and PT are shown at country level.
Data for FR, TR, UK, NL and RS are for 2009.

Indicator definition: The share of persons with an equivalised disposable income below the risk of poverty threshold, which is set at 60% of the national median equivalised disposable income (after social transfers).

Map 4.19 represents specifically regions with the regional share of persons with an equivalised disposable income below the risk of poverty threshold, which is set at 60% of the national median equivalised disposable income after social transfers. This is commonly known as at-risk-of-poverty rate. Be that as it may, it is important to report that this is a state-based indicator of poverty showing social inequalities in regions in relation to a state-based income trend. This makes the comment quite blurred, as regions are referred to as national values, rather than the EU. In this sense, the map shows that there are not considerable variations within the most developed countries (towards the North and the West), while in the Eastern and Southern countries internal heterogeneity is marked, i.e. Italy, Spain, Bulgaria, Romania or Poland. This suggests that poverty is a very territorial issue in several countries, especially those more peripheral, while poverty is distributed more equally in 'central' countries. This provides a substantial evidence for cohesion policies in the sense that poverty needs to be territorially targeted in several countries, while in others poverty depends more on social variations rather than on territorial issues.

On Map 4.20 the change in at-risk-of-poverty for 2005-2010 is represented. Again, it is diverse and reflects several processes. In general, regions in Eastern Europe, accounting for more poor people as reported, are experiencing a positive change in terms of reduction of people classified as at-risk-of-poverty, for instance the Baltic regions of Poland. In contrast, most of the Western or Scandinavian regions are experiencing negative changes, although these changes tend to be soft, with some extreme values in Wien (5.4%), Copenhagen (4.6%) and Murcia (4.2%). However, there are exceptions in both sides. It is necessary to point out that there are countries with severe imbalances in terms of change and, taking into account that this map makes sense internally for each country, this is quite surprising. For instance, in Romania there have been positive variations everywhere, but in Transylvania and Banat the change has been negative, with increasing levels of poverty. In Spain, the South and some of the most developed regions (Catalonia, the Basque Country or Madrid) are apparently becoming impoverished, while others are improving their situation, thus poverty diminishes. To sum up, poverty has to be assessed at the regional scale and changes can take place very quickly, so they need to be properly managed.

Map 4.20 Change in people at-risk-of-poverty after social transfers, 2005-2010



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2, NUTS1 and NUTS0
Source: EUROSTAT EU-SILC
Origin of data: EUROSTAT, 2012.
© EuroGeographics Association for administrative boundaries

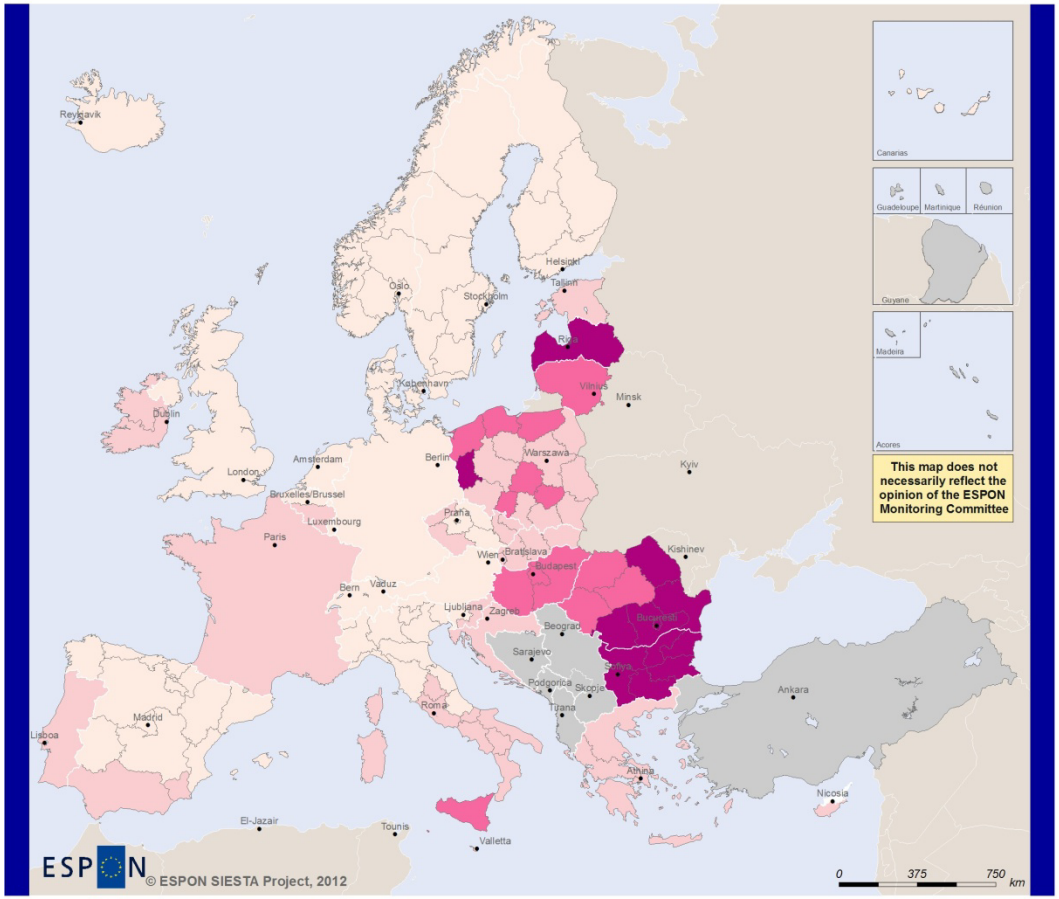
Percentage points difference (%), from 2005 to 2010.

Positive change (%)	Negative change (%)
< -4%	0% - 2%
-4% - -2%	2% - 4%
-2% - 0%	> 4%
No data	

Notes:
BE and EL are shown at NUTS1 level.
BG, TR, SE and UK are shown at country level.
Data for TR, FR and RS show the change 2005 - 2009.
Data for FR, NL and RS show the change 2006 - 2009.
Data for DK and RO regions show the change 2007 - 2010

Regions in green colours show a reduction in its poverty rates between 2005 and 2010.
Regions in brown colours have suffered an increase in its poverty rates between 2005 and 2010.

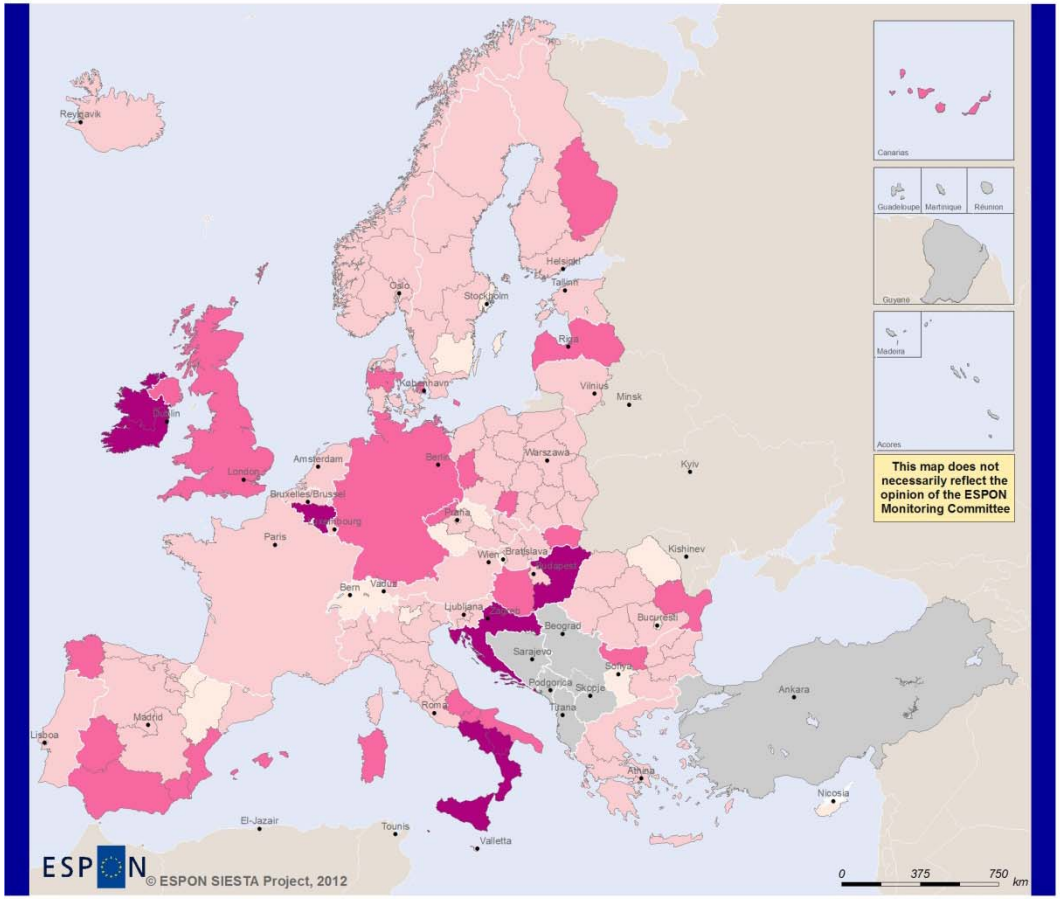
Map 4.21 Severe material deprivation rate as percentage of total population, 2010



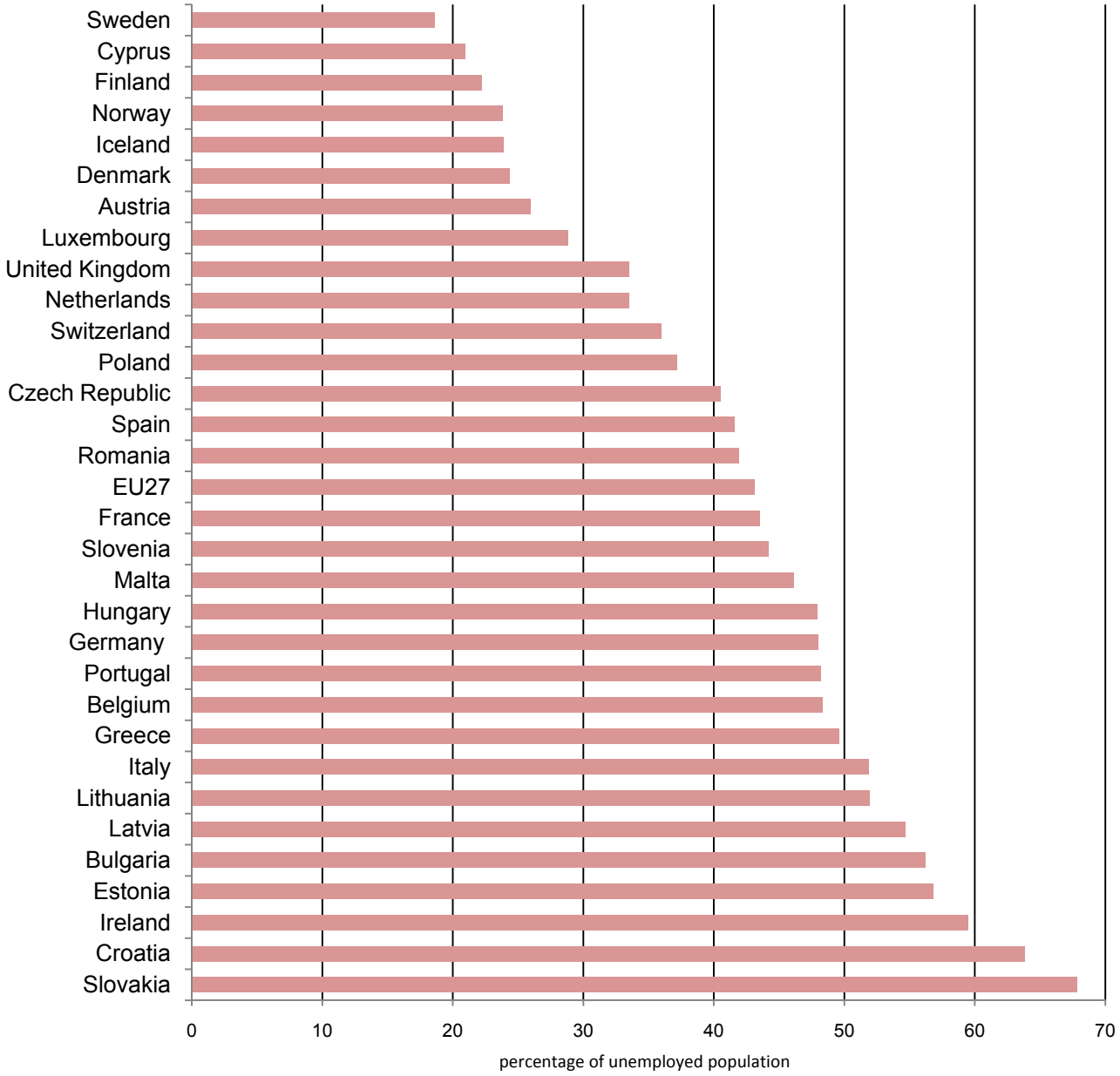
As explained in Table 4.2, the calculation of the at-risk-of-poverty or social exclusion rate consists of three indicators. One of them is material deprivation, which takes into account the definition which is also available in Table 4.2. Map 4.21 shows the distribution of this indicator and the most outstanding conclusion of the pattern is that Eastern Europe, that is, the countries joining the EU post-2004 clearly tend to score worse. In Romanian and Bulgarian regions more than 30% of the population suffers severe deprivation, the highest value scored by Severen tsentralen (44.2%). In contrast, Western Europe, but also the Czech Republic and Slovakia, perform better, with very low values of material deprivation. The geographical unit with the lowest value is Luxemburg (only 0.5% of its population suffers material deprivation). The worst value in the Western context is Sicilia (16.2%), comparable with Eastern European standards. It can be argued that this map is one of the most appreciable bases for understanding the geography of poverty in Europe because of its palpable material implications, thus Eastern Europe, and especially Romania and Bulgaria, require strong action in this respect if the inclusive agenda is to be truly pursued.

The third indicator specified in Table 4.2 is people living in households with very low work intensity, assuming that poor working conditions contribute to poverty, as repeatedly reported by The European Platform against Poverty and Social Exclusion flagship initiative, which directly states word for word that “unemployment is the main cause of poverty for the working-age population”. Map 4.22 represents this indicator and it is logically related to previous cartographies on employment and unemployment. However, two comments can be introduced in this respect. On the one hand, there are regions with high rates of unemployment that do not score particularly bad on Map 4.22, for instance Southern and Eastern Spain; that might be evidence that, despite unemployment being important, in average households there are still persons working; nevertheless, the increasing levels of unemployment in Spain might be making this indicator worse (in fact, Ceuta is the worst geographical unit on this Map 4.22, with a rate of 27.4%, but the other Southern Spanish regions do not score so badly). On the other hand, specific regions which do not account for high rates of unemployment appear on this Map 4.22 as having high rates of people living in households with very low intensity (for instance,

Map 4.22 People living in households with very low work intensity as percentage of population aged 0 to 59, 2010



Graphic 4.4 Long-term unemployment as percentage of unemployed population by countries, 2011. Source: Eurostat

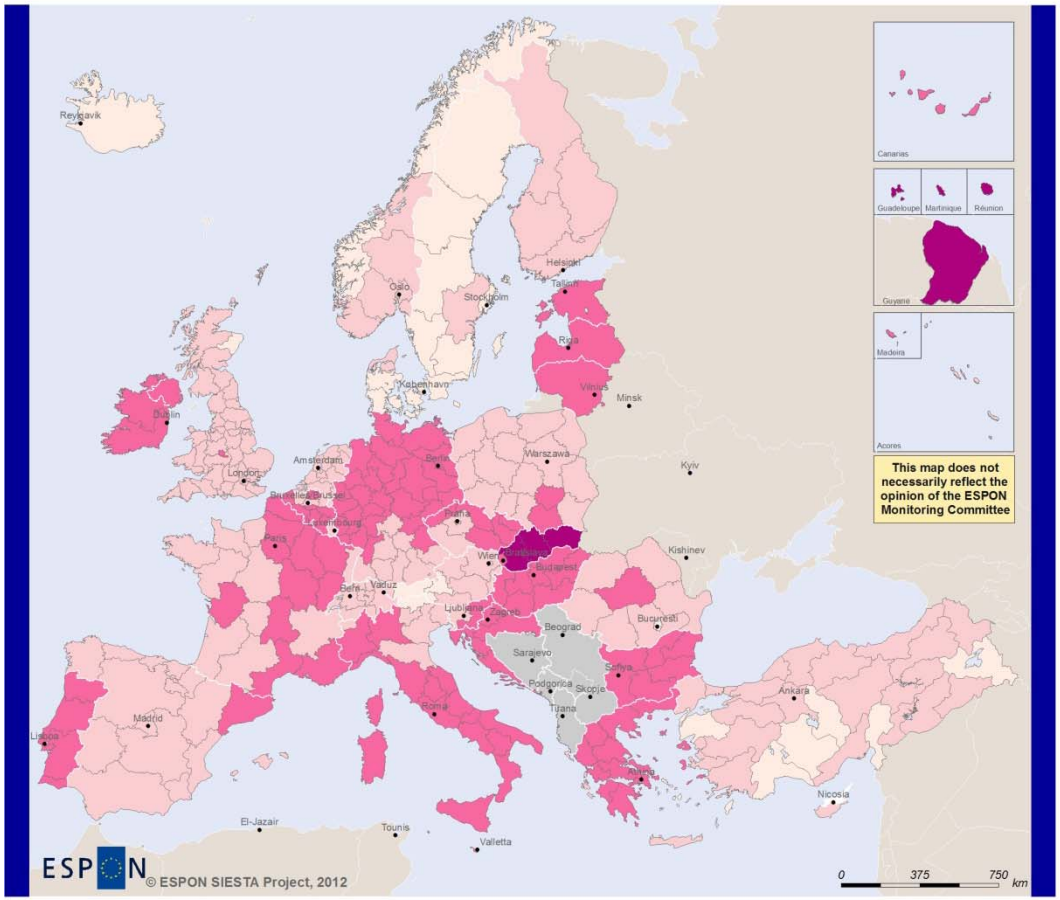


Wallonia or Ireland); this might express that in these regions unemployment is comparatively low but it affects especially familiar units of particular social classes. As on previous maps, the fact that there is only available data for particular countries at the state level (for instance, Germany, the UK or France) masks internal worthwhile variations.

In close relation with low work intensity, there is a common understanding that long-term unemployment is a particular situation which creates poverty conditions and implies an unacceptable loss of human capital. Long-term unemployment is defined as the share of unemployed people for 12 months or more among the total number of unemployed persons. Surprisingly, long-term unemployment as a percentage of unemployment correlates only slightly moderately with unemployment, according to SIESTA's calculation for NUTS2 regions. That means that in general they work together, but there are exceptions. A region having top unemployment does not necessarily have top long-term unemployment. For instance, as shown on Map 4.23 and Graphic 4.4 Slovakia has all its regions (except Bratislava) with high levels of long-term unemployment (almost 70%), while the countries and regions with top

unemployment are mainly located in Southern Spain and the Balkans. In contrast, Scandinavian regions tend to account for very low long-term unemployment, even in regions with unemployment above the EU average (for instance, Upper Norrland in Sweden or Vestjylland in Denmark). That means that in these territories it is likely for an unemployed person to find another job. Be that as it may, there are specific countries and regions with high shares of long-term unemployment (Ireland, the Eastern Baltic states, Northern Germany, Southern Italy, Greece, etc.) which are worrying, although in some of these cases there are low unemployment rates (for instance, in North-West Germany). Importantly, it has to be pointed out that this map is for 2010, but a more recent representation of this dataset for 2011 by countries in Graphic 4.4 suggests that it is rapidly increasing in countries where unemployment is growing; that is the case of Spain, where long-term unemployment was (except in Catalonia and the Canary Islands) below 30% in 2010 but the Spanish average was 42% in 2011. In any case, long-term unemployment needs to be particularly targeted as becomes structural for regions and for people involved in it.

Map 4.23 Regional long-term unemployment as percentage of the unemployed population, 2010



4.2.2. Ageing

When considering poverty and exclusion, the ageing demographic is quoted by the EU2020S as a phenomenon with wide-range impacts. The European Platform against Poverty and Social Exclusion flagship explains that elderly people are exposed to a higher risk of poverty compared to the overall population and in a number of areas they are particularly exposed to material deprivation. Obviously, the scale of the demographic challenge facing the EU will only intensify the problem, even if the immigration flow which has occurred in the last decades —spatially very selective— is sustained. In addition, taking into account that the number of pensioners in the EU is increasing, pressure on the adequacy and long-term sustainability of pension systems is escalating, with obvious implications on health and elderly care systems. These issues are going to be mapped in this point, but firstly it is worthwhile mentioning that ageing is quoted transversally across the EU2020S: with regard to poverty, but also with regard to innovation, in the sense that more research is needed on ageing and elderly care systems, as well as with regard to industries, because specific economic activities related to ageing constitute an emerging cluster (i.e. ancillary healthcare professions).

Table 4.5 Ageing index by world regions, 2010. Source: UN Demographic Yearbook, Eurostat

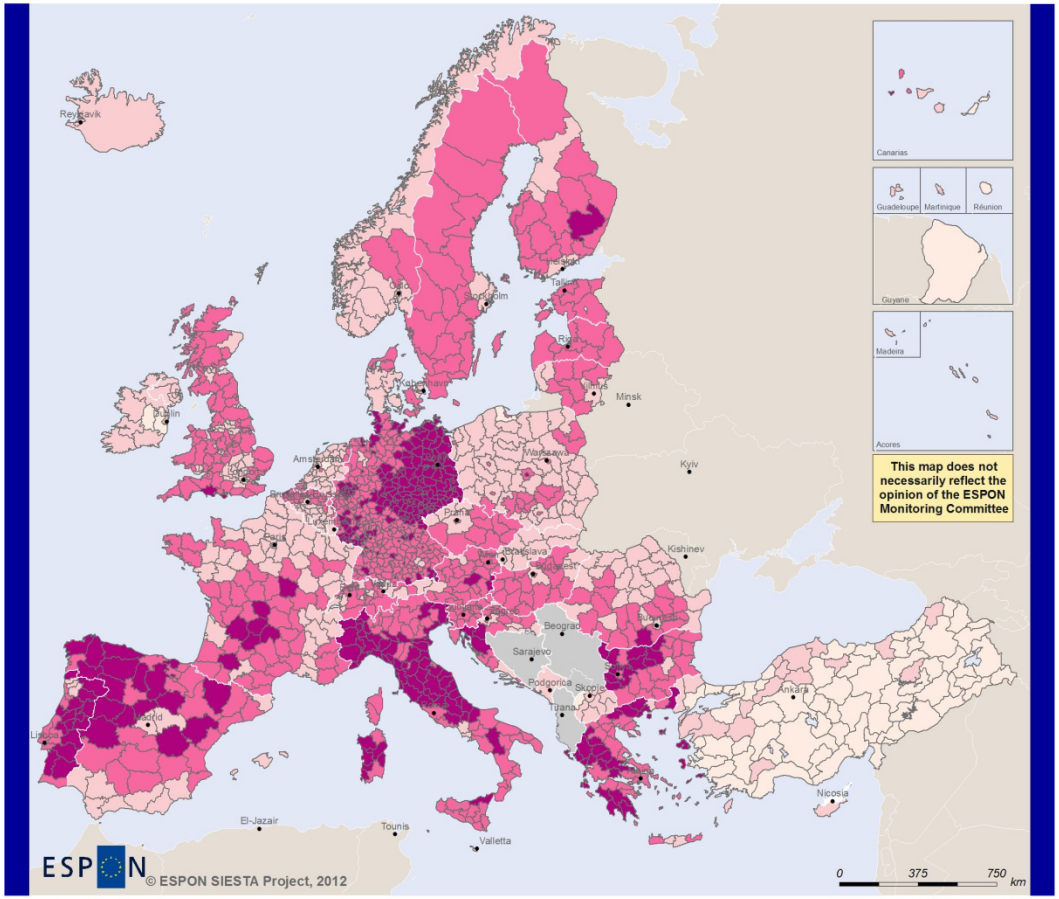
	People >65 divided by people <15
Africa	0.09
Central America	0.19
Asia	0.26
South America	0.27
Caribbean	0.36
Oceania	0.44
Northern America	0.66
Europe	1.04
EU27	**1.11**

As it is widely known, the current rate of the ageing population is unprecedented and poses major challenges to those societies experiencing severe ageing. European population structure is the world's oldest (Table 4.5), but ageing within Europe is far more complex than the continental average suggests. Maps 4.24 and 4.25 have been calculated with the standardised ageing index, which is defined as the share of people aged more than 65 among people aged less than 15. It is a relative measurement in the sense that ageing is not expressed in an isolated manner (in absolute or percentage terms) but it also takes into account young population. This is an important distinction because across the world, but in Europe and other developed countries this is noticeable, life expectancy is lengthening and this actively contributes to ageing. In relation to this, the significant issue is more whether this ageing is demographically compensated by a young generation; typically, when ageing is increasing, there are less youth and children but this can be compensated for through migration or specific policies, for instance in gender equity or birthrate incentives.

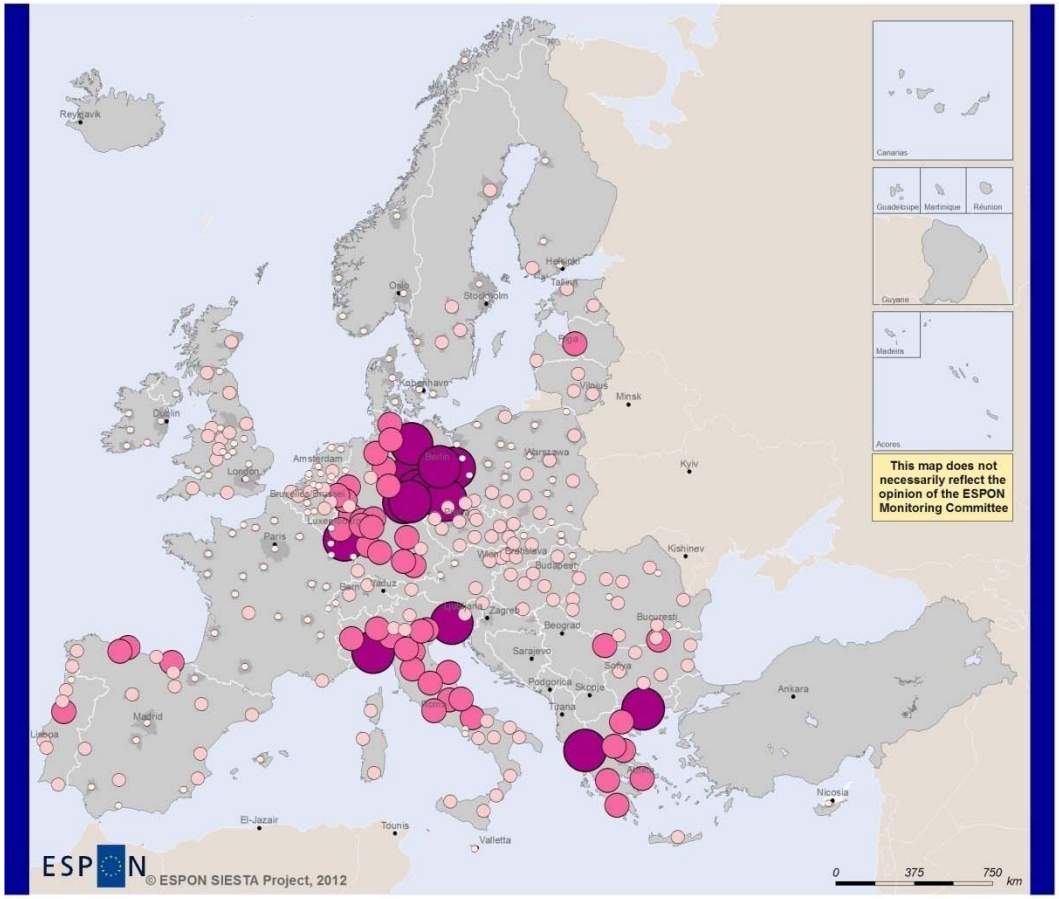
Map 4.24 shows that the ageing index varies enormously from region to region and in some particular countries it expresses strong and sustained policy orientations in particular directions. In general, Eastern Europe tends to have less ageing. A case in point is Turkey, with several regions scoring below 0.1. In contrast, Western Europe is likely to have more ageing, with several regions in Germany, Spain and Portugal scoring above 2.5. But this is only a very general pattern, because there are a large number of exceptions in both sides. Within Western Europe, Northern Europe (Northern Periphery, North-West Europe and Scandinavia) has a lower average ageing when compared to Western and Southern European regions (Portugal, North-West Spain, Northern Italy, etc.). This divide is because of higher levels of migration, but also because of specific policies set in countries like Sweden and France in favour of birthrate; also the case of Ireland

responds to cultural legacy. Germany is exceptional in the sense that ageing levels in most of its regions, especially in the old East Germany, are very high, with the region of all of Europe scoring the worst therein (3.7 in Hoyerswerda). In Eastern Europe several regions such as those in North-West Bulgaria and South Romania have high rates of ageing compared to the majority of Eastern Europe regions, for instance Polish, Slovakian or Macedonian ones. Some Southern countries have an uneven pattern, for instance Spain, Italy, Greece or France; in Spain and Italy there is a divide between North and South, but in France a particular central area is more aged. In general for the whole of Europe, rural areas tend to be more aged than urban, as is very clear on Map 4.24 with regions in and around London, Madrid, Stockholm or Dublin. This regional picture has implications in poverty, according to the EU2020S, but it also shows which areas need to be particularly targeted for delivering specific policies related to ageing. It is likely that labour shortages and financial pressures (pension systems) will increase in these regions and in the respective countries where these regions are placed, compromising not only inclusive growth, but also smart growth and sustainable growth.

Map 4.24 Regional ageing index (share of people aged more than 65 divided by people aged less than 15), 2010



Map 4.25 Ageing index in LUZs, 2004-2008



EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: LUZ
Source: EUROSTAT
Origin of data: EUROSTAT, URBAN AUDIT, 2012.
© EuroGeographics Association for administrative boundaries

Ageing index, combined years*.

- 0.25 - 0.50
- 0.50 - 0.75
- 0.75 - 1.00
- > 1.00
- Large Ubran Zones

Notes:

*Data are not available for the following countries:
PT, FR, IT, NO, DK, NL, LV, RO, BG, CY and CZ.
Data for HU are shown for 2005.
UK, IE, ES, SE, EE, SI and HR are shown for 2004.
Data for EL, DE, PL, FI, LT, PL and BE are shown for 2008.

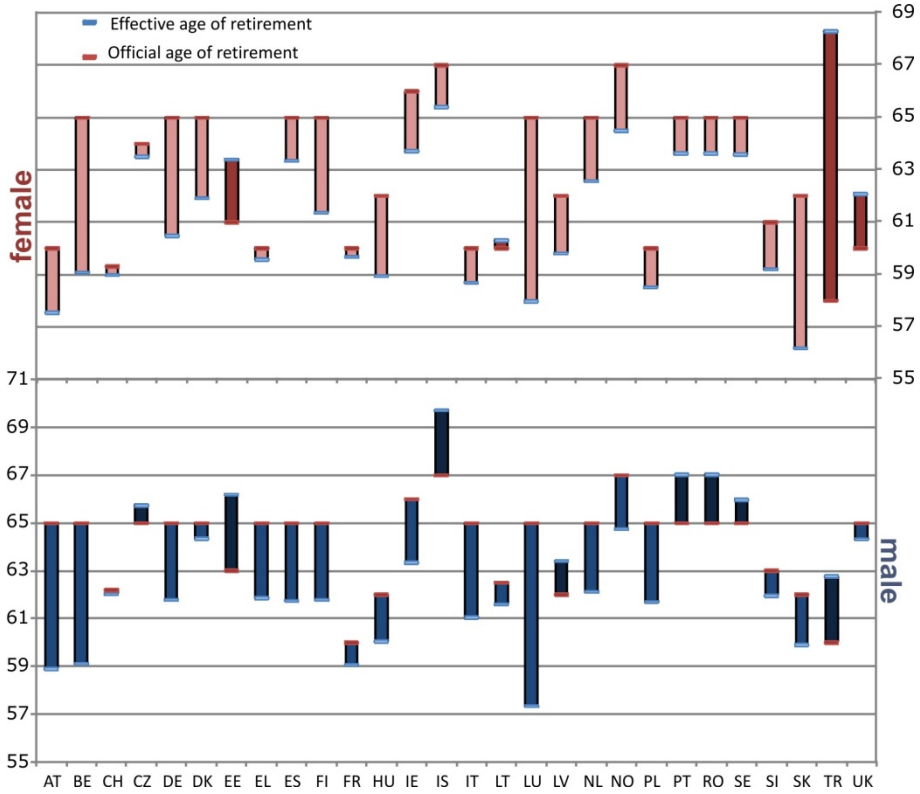
Urban Audit defines Larger Urban Zones (Label "LUZ") as an approximation of the functional urban zone centred around the town/ city.

Map 4.25 shows the same indicator as the previous one, but for LUZs. As usual for urban areas representations, unfortunately the dataset is inconsistent in time, but it covers almost all the European space. In general, cities in regions with higher rates of ageing experience more ageing, with urban areas especially aged in North-East Germany, Northern Italy, Greece or Bulgaria. In contrast, the majority of the urban areas in countries such as Poland or in France have very low ageing values, consistent with their regions. However, Spanish urban areas tend to show noticeably less ageing than their respective regions; this is caused by the huge incidence of immigration in Spain in the early first decade of the 21st century, which has affected especially urban areas and has resulted in an aggravation of the demographic differences between urban and rural areas. To sum up, this map shows that cities are better prepared than rural areas for the ageing challenges, that are and will be mainly a rural and regional issue.

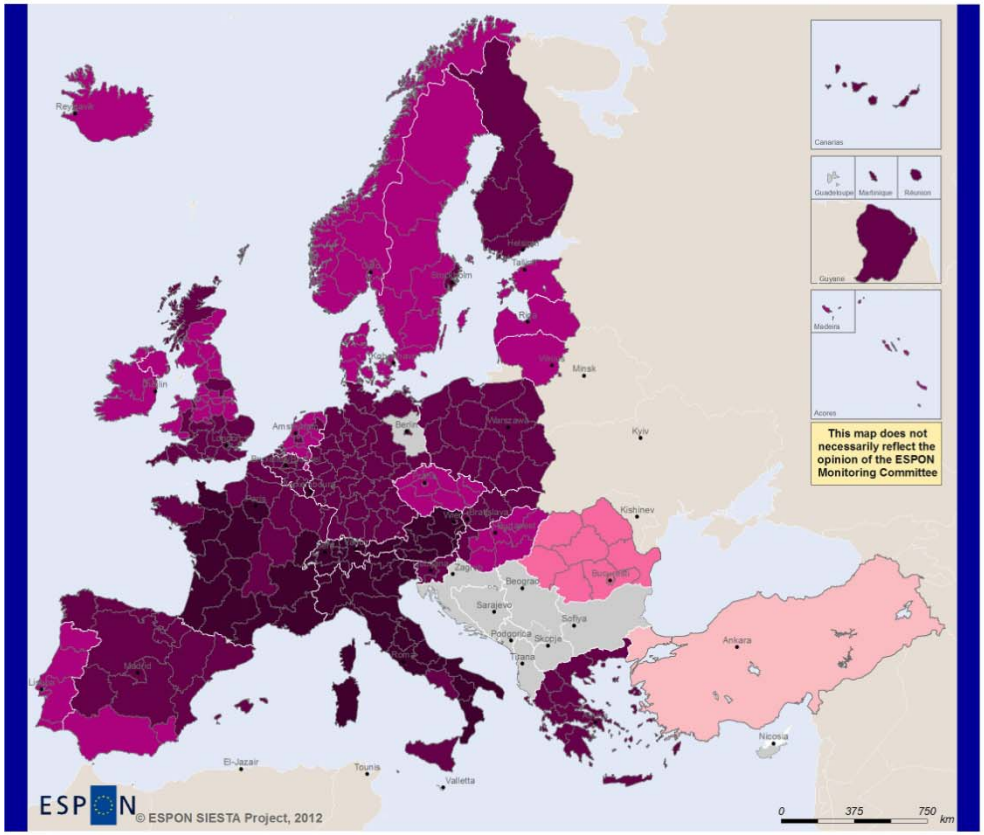
A last question on ageing which requires attention is pension system sustainability. Taking into account ageing and the extension of life expectancy, pension schemes are being stressed in all countries, but obviously more in

those intensively suffering ageing and being more affected by the crisis. The EC believes that the future is 'active ageing' concept, which implies creating conditions that allow older workers to remain longer on the labour market. In addition, it cannot be omitted that, given the present situation of increasing unemployment or the above mentioned phenomenon of the 'working poor', future retirees are likely to become increasingly dependent on minimum pensions and minimum income provisions for older people, thus creating future elderly poverty. In this Atlas Maps 4.26 and 4.27 provide insights on this discussion through showing life expectancy at the effective age of retirement. For information on the differences between effective and official age of retirement, Graphic 4.5 has been elaborated. There is the classical difference in terms of gender between Maps 4.26 and 4.27, given that women have a longer life expectancy than men everywhere in the continent (for EU27 the average surplus is 6 years, ranging from 11.3 in Lithuania to 3 in Flevoland, the Netherlands, data for 2008). That means that in general women enjoy a longer retirement period that men. However, there are huge differences among territories. On the one hand, a Turkish woman enjoys 7.5 years of retirement, while a women in Ticino (Switzerland) enjoys 27.6 years. On the other hand, a Sud-Est Romanian man enjoys 2.1 years of retirement, while a Luxembourgian man 20.8. Differences are national, according to the country's pension systems, but also are regional because of the different regional life expectancies. In this respect, it is important that, beyond the European scheme (the EC has launched in February 2012 the White Paper "An Agenda for Adequate, Safe and Sustainable Pensions") and the national regulations, there is a regional consideration of the topic in order to guarantee that the territorial understanding of the inclusive growth pillar under the EU2020S is satisfied.

Graphic 4.5 Difference between effective and official ages of retirement by countries, 2004-2009. Source: OECD, Eurostat, SIESTA's calculation



Map 4.26 Female life expectancy at the effective age of retirement in years, 2008



EUROPEAN UNION
Part financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2 and NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2012.
© EuroGeographics Association for administrative boundaries

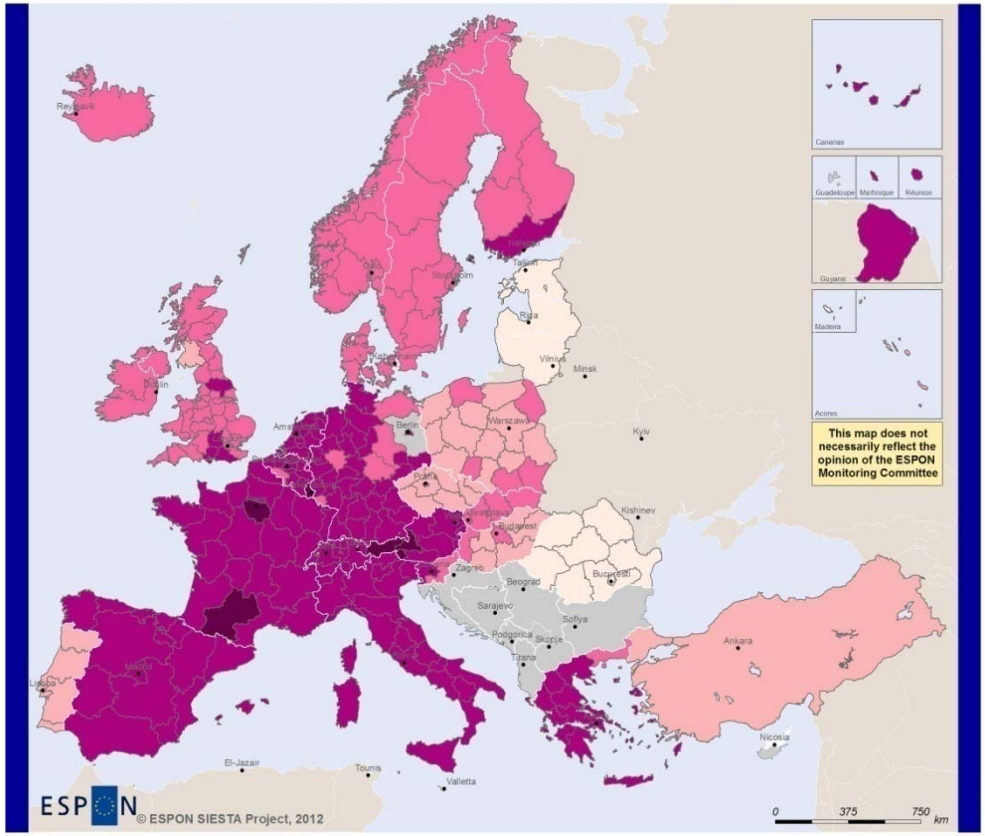
Years alive after the effective retirement age, 2008.

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- > 25
- No data

Notes:
Average effective age of retirement 2004 - 2009: The average effective age of retirement is defined as the average age of exit from the labour force during a 5 year period. Labour force (net) exits are estimated by tacking the difference in the participation rate of each 5 year age group (40 and over) at the beginning of the period and the rate for the corresponding age group aged 5 years older at the end fo the period.

The official age corresponds to the age at which a pension can be recived irrespective of whether a worker has a long insurance record of years of contributions. This data come from the OCDE with the exception of Lativia and Lithuania which data comes from EUROSTAT document "The transition of women and men from work to retirement".
TR is shown at country level.

Map 4.27 Male life expectancy at the effective age of retirement in years, 2008



EUROPEAN UNION
Part financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Regional level: NUTS2 and NUTS0
Source: EUROSTAT
Origin of data: EUROSTAT, 2011
© EuroGeographics Association for administrative boundaries

Years alive after the effective retirement age, 2008.

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- No data

Notes:
Average effective age of retirement 2004 - 2009: The average effective age of retirement is defined as the average age of exit from the labour force during a 5 year period. Labour force (net) exits are estimated by tacking the difference in the participation rate of each 5 year age group (40 and over) at the beginning of the period and the rate for the corresponding age group aged 5 years older at the end fo the period.

The official age corresponds to the age at which a pension can be recived irrespective of whether a worker has a long insurance record of years of contributions. This data come from the OCDE with the exception of Lativia and Lithuania which data comes from EUROSTAT document "The transition of women and men from work to retirement".
TR is shown at country level.

5. Conclusion

This Atlas has shown the regional and, when possible, urban dimension of the EU2020S. The conclusion that stands out most is that achieving the smart, sustainable and inclusive growth which is envisaged through the EU2020S is far from near, not only in terms of time but also in terms of space. In relation to the temporal dimension, the different headline targets that have been shown are not going to be achieved in a majority of regions or member states and indeed the national targets are in general disappointing in the sense that they do not guarantee that the EU2020S overall aims are attained. It is true that, as reported at the beginning of this Atlas, the EC has acknowledged in late 2011 that not all the regions can or should reach the EU2020S targets that have been set, but in practice the current gap in a large number of regions means that the EU2020S implementation is truthfully not feasible even by 2020 in the EU as a whole. In relation to the spatial dimension, this Atlas has demonstrated how smart, sustainable and inclusive dimensions of growth are territorially uneven and dissimilarities across the European space are noticeable and, with regard to several variables, dramatic. An essential inference derived from these very general verifications is that policy-makers have to take into account that required policies differ enormously between regions and cities, not only for the general scoring or ranking of each individual geographical unit in each one of the topics that are embraced by the EU2020S, but also because of the combination of all of them.

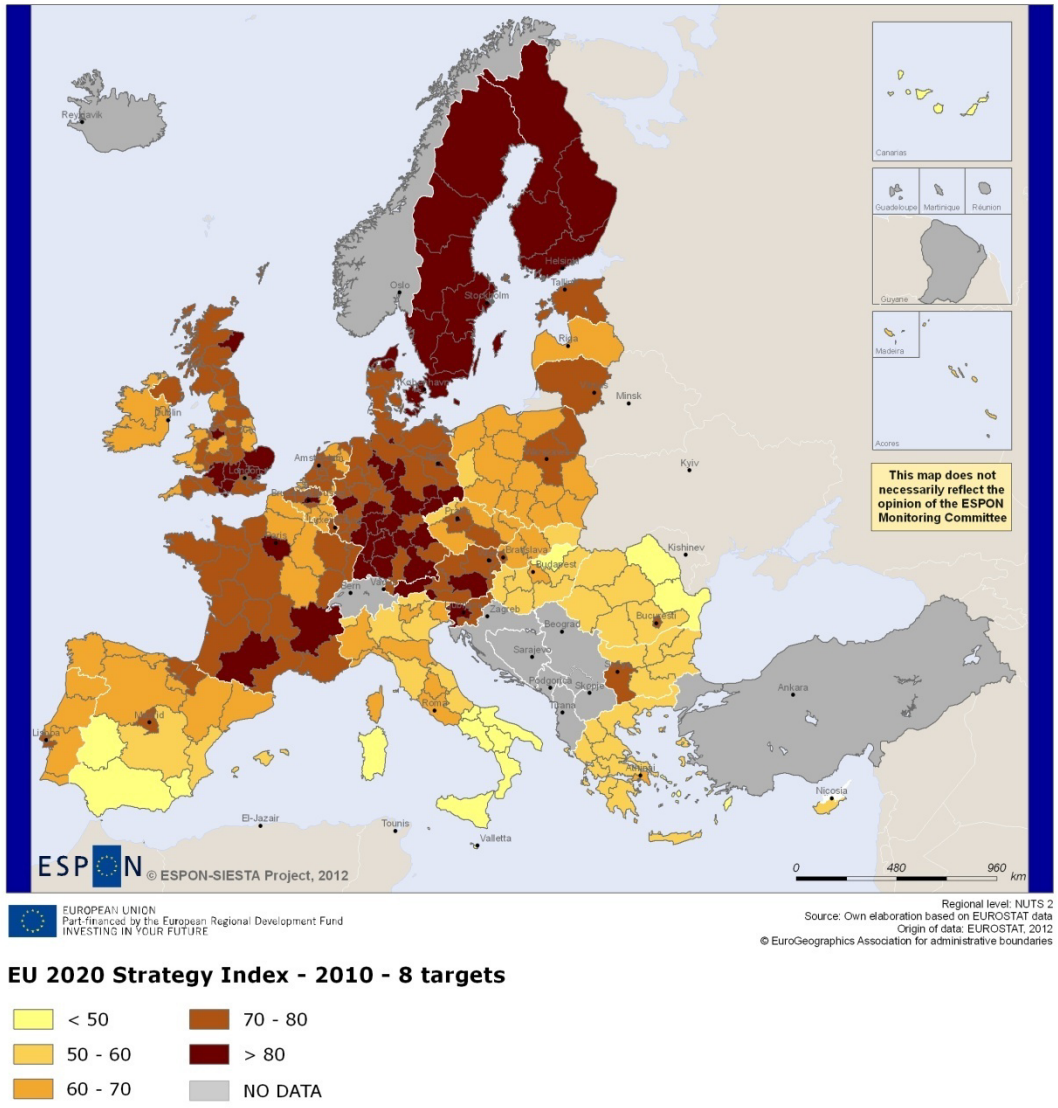
In order to assess the overall fulfilment of the EU2020S, an aggregate index has been developed by SIESTA. This aggregate index measures the distance of regions from eight EU2020S headline targets. A region would score 100 if it had reached all eight targets, while a region farthest away from all eight targets would score 0. The targets are obviously those officially set by the EC, given that the targets nationally set are highly inconsistent as shown across this Atlas. This aggregate index is represented on Map 5.1 for 2009-2010, taking into account that there are three headlines which are only available at the member state level (the “20/20/20”) and a fourth one has different scales depending on the country (people at-risk-of-poverty or social exclusion). The first point to retain is that the index is strongly stressed due to the fact that the EU2020S covers a wide range of topics, a range that has been specifically translated into headline targets. That means that, although the regions scoring more are typically accomplishing or almost accomplishing the eight targets, all the regions in intermediate positions are in very different situations which vary from case to case and imply different reasons for their position in the ranking, thus implicitly must be managed through different policies and should be the object of different recommendations. In fact, two regions scoring the same might account for very different realities. This is true, but the EU2020S is plural in its very nature and the objective of the aggregate index is to reflect its general fulfilment at the regional scale, rather than scoring each one of its constitutive topics as has been done across the Atlas.

Table 5.1 Ten regions with highest and lowest EU2020S aggregate index, 2009-2010. Source: SIESTA's calculation

		EU2020S aggregate index
SE	Östra Mellansverige	93.35
SE	Sydsverige	93.35
SE	Västsverige	93.35
SE	Stockholm	93.21
SE	Övre Norrland	92.58
FI	Etelä-Suomi	90.74
FI	Länsi-Suomi	89.99
DE	Oberbayern	89.59
DE	Dresden	89.59
FI	Pohjois-Suomi	88.16
EU27		**73.67**
HU	Észak-Magyarország	46.71
IT	Sardegna	44.87
IT	Basilicata	43.22
ES	Melilla	39.35
IT	Puglia	38.11
IT	Calabria	37.54
IT	Campania	34.40
ES	Ceuta	34.00
MT	Malta	33.81
IT	Sicilia	32.68

Map 5.1 shows that top positions in the achievement of the regional EU2020S aggregate index for 2009-2010 are all Scandinavian regions, plus Southern Germany, several French regions and South England (basically, North of London, but also Hampshire). In Sweden five regions register an index above 90% (Table 5.1). This pattern broadly coincides with two of the

Map 5.1 EU2020S aggregate index, 2009-2010



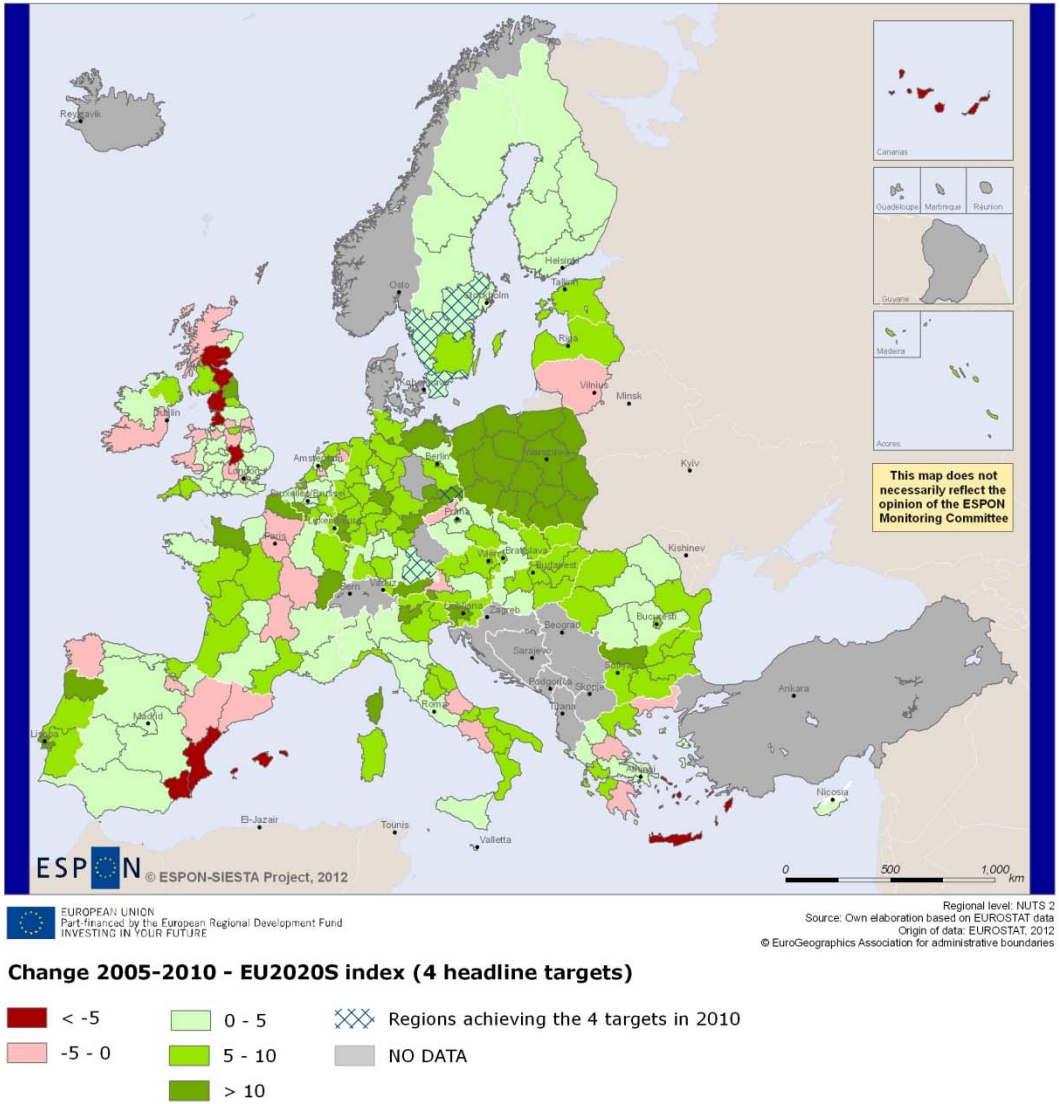
three corridors repeatedly defined in relation to R&D performance: Midi-Pyrénées to Southern Germany and Denmark to Finland. Some capital regions (Île-de-France, Greater London, Berlin, Brussels, Copenhagen, Ljubljana) score particularly high as well and are included in the group of regions above 80%. The third corridor which is usually defined (between Austria and London) is less clear herein, because there are regions scoring relatively poor in relation to their neighbouring geographical units (i.e. Wallonie in Belgium and Picardie or Nord-Pas-de-Calais in France).

In contrast, bottom positions lay in Eastern Romania, Észak-Magyarország (Hungary), Southern Italy and Southern Spain, plus Spanish outermost regions; some of these regions lagging behind score less than 40% (Table 5.1). In Spain or Romania, there are dramatic imbalances between regions, with high figures (Madrid, the Basque Country and Navarra in Spain, Bucuresti-Ilfov in Romania) in countries dominated by low figures. In general, Eastern Europe tends to score worse than Western Europe and the Iron Curtin seems to still be quite easily appreciable on the map, although the Eastern capital regions in general score better and have already attained average EU values: Mazowieckie-Warsaw in Poland, Közép-Magyarország-Budapest in Hungary, Yugozapaden-Sofia in Bulgaria, Bucuresti-Ilfov in Romania, etc.

In order to grasp the regional change experienced in the last few years with available data (2005-2010), Map 5.2 has been prepared. Importantly, this map avoids the non-regionalised data. That means that the change in the aggregate index is based on the four headline targets for which there are datasets (on employment, GERD, drop-out rate and tertiary educated population), excluding the three on environment and energy and the one on poverty. Although the pattern is not evident, the important issue to retain is that Eastern and Central European regions (plus Portugal) progress, notably Poland, while Scandinavian and Southern European regions remain stable, but it has to be highlighted that the former are on top and that means that progress is statistically difficult to take place, while the latter are scoring poorly (Map 5.1). It is worthwhile mentioning that in 2010 there are 5 regions that score 100%, meaning that the 4 considered targets have been already reached therein: Västsverige, Sydsverige and Östra Mellansverige in Sweden, and Dresden and Oberbayern in Germany.

The regions that are decreasing their position are mainly in Greece, Eastern Spain (plus Galicia and the Spanish outermost regions), France, Lithuania and the British Isles. The causes associated with this upgrading are diverse; for instance, in Eastern Scotland, Lancashire and Leicestershire, Rutland and Northamptonshire (UK) in 2005 the four targets were reached or almost reached, but in 2010 the figures are getting further from the target (that is, worsening) because of several reasons: in Eastern Scotland and Lancashire because GDP invested in R&D has dramatically decreased, but in Leicestershire, Rutland and Northamptonshire the reason is the decrease in this issue, but also worsening levels of drop-out rates and tertiary educated population rates. In Illes Balears, Comunitat Valenciana and Murcia (Spain), the drop in employment is clearly the underlying cause for worsening conditions, but also the worrying increase of the early leavers rate; and employment is the same key reason for the diminution in Greek regions such as Kriti, together with the fall of tertiary educated people. Ceuta and Melilla (Spain), which are the regions scoring worse in 2010 accounting for the four variables (19 and 24%, respectively), have suffered a severe decrease as well in young tertiary educated population. If in the UK regions

Map 5.2 Regional change in the EU2020S aggregate index (4 headline targets with available regionalised datasets), 2005-2010



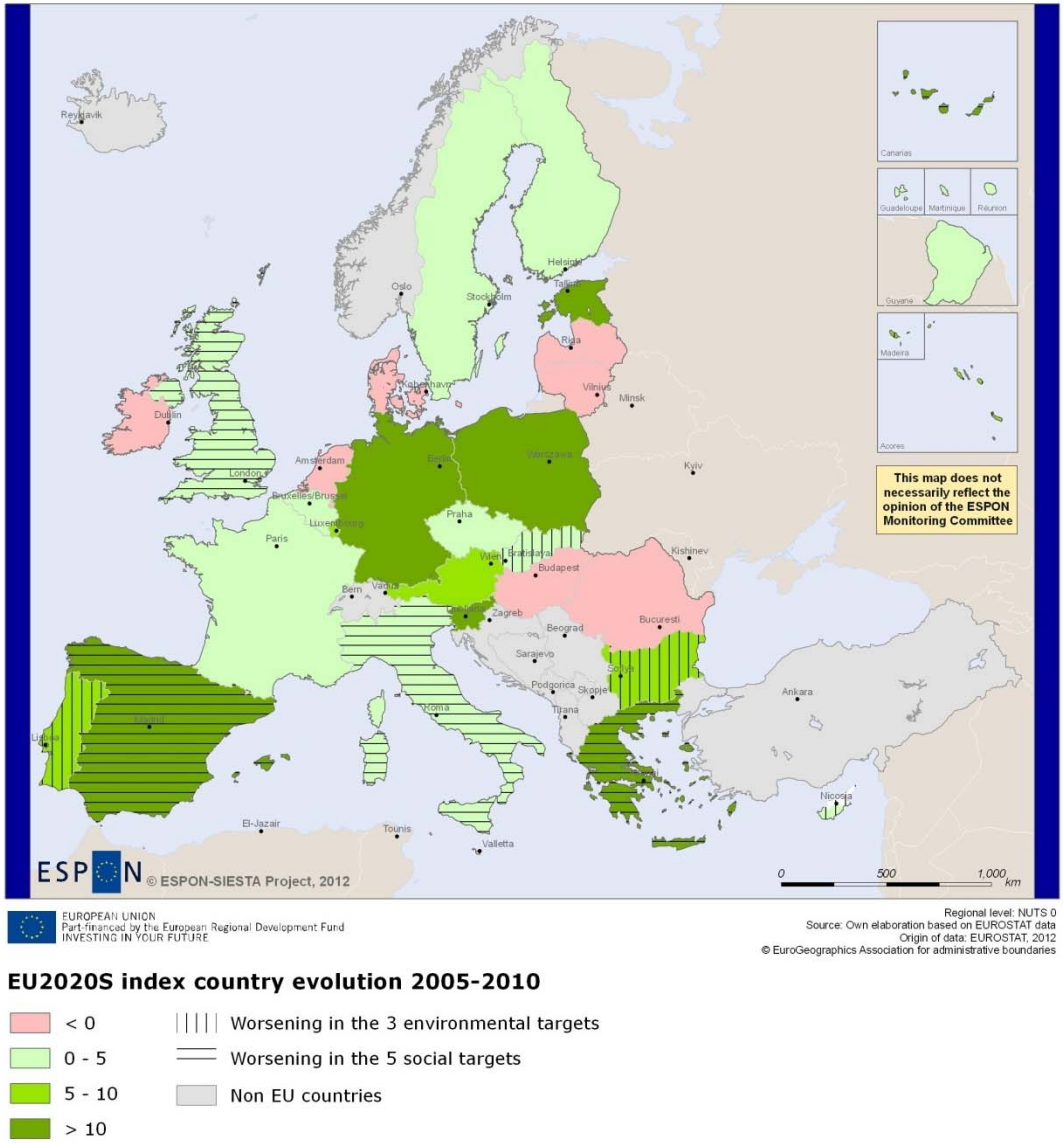
the EU2020S is almost accomplished in 2010 by each region and the increase only changes the overall positive situation a little bit with regard to the EU2020S at the regional scale (Map 5.1), in Spain or Greece the EU2020S implementation remains substantially very poor and for this reason the diminution is frustrating.

The spatial change from 2005-2010 for all the smart, sustainable and inclusive topics of the EU2020S through the 8 headline targets can only be assessed at the state scale (Map 5.3). The overall picture suggests that the EU2020S is going well in the sense that the majority of countries seem to be improving (19 out of 27). However, it has to be pointed out that 4 countries have an overall positive behaviour but in fact worsen in the 5 socio-economic headlines and 4 countries have an overall improvement but in their cases the 3 environmental headlines worsen. The latter is the case of Slovakia, Cyprus, Bulgaria and Portugal and the headlines that change are different in every nation. The case of the countries worsening in the socio-economic targets is more crucial, because three countries especially (Spain, Greece and Italy) show a dramatic diminution in these issues, particularly because of a substantial rise in unemployment. In these 3 countries

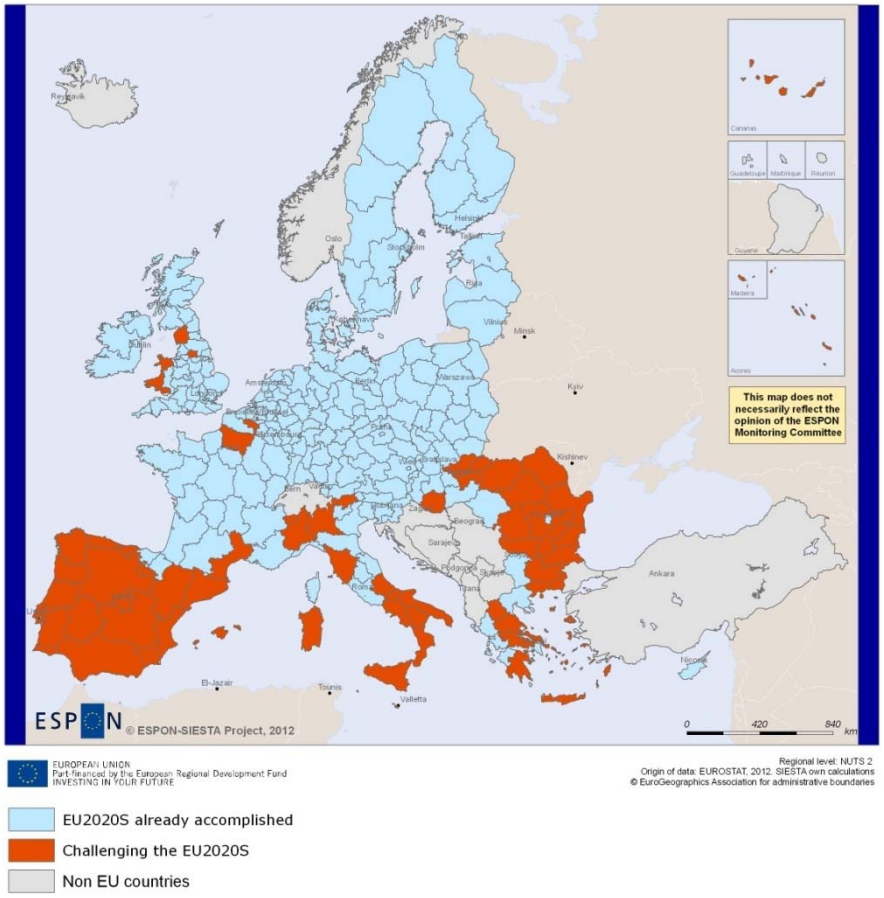
improvement in environmental issues of the EU2020S statistically compensates the distance that is being generated in relation to the EU2020S due to socio-economic topics. But this environmental advance is artificial in the sense that it is motivated by the decreasing levels of economic activity that are automatically reflected in a decline of energy consumption and of GHG emissions, so they cannot be truly considered sustainable growth, following the EU2020S standards. Because of these comments, the overall picture of Map 5.3 has to be changed and clarified in the sense that the EU2020S is not really successful in each one of the countries, but in fact far from being achieved.

Beyond the aggregate index, a cluster analysis has been carried out by SIESTA. While the aggregate index appraises the territorial ranking in relation to the EU2020S understood as a monolithic block, clustering detects groups of regions which are close to each other in the sense that variables themselves combine. Again, clustering is only possible with data available regionally, that is, the four headline targets used for Map 5.2 (2009-2010). In addition, GDP per capita in pps (2009) has been incorporated because of its obvious implications for measuring growth.

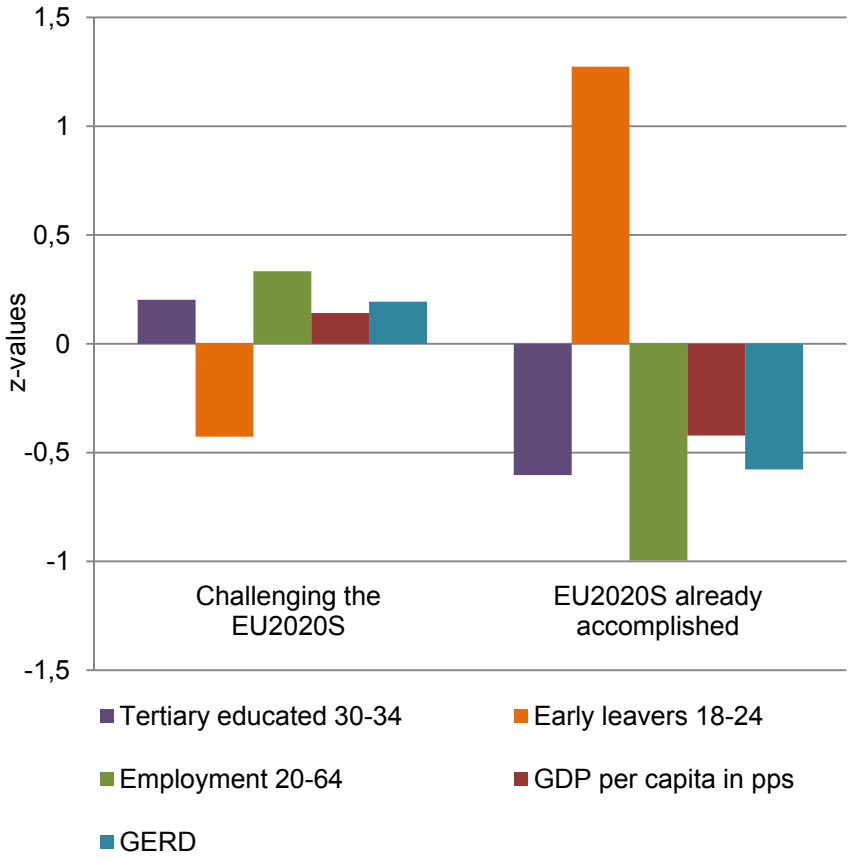
Map 5.3 Change in the EU2020S aggregate index by countries, 2005-2010



Map 5.4 First regional cluster analysis: 'two blocks' result



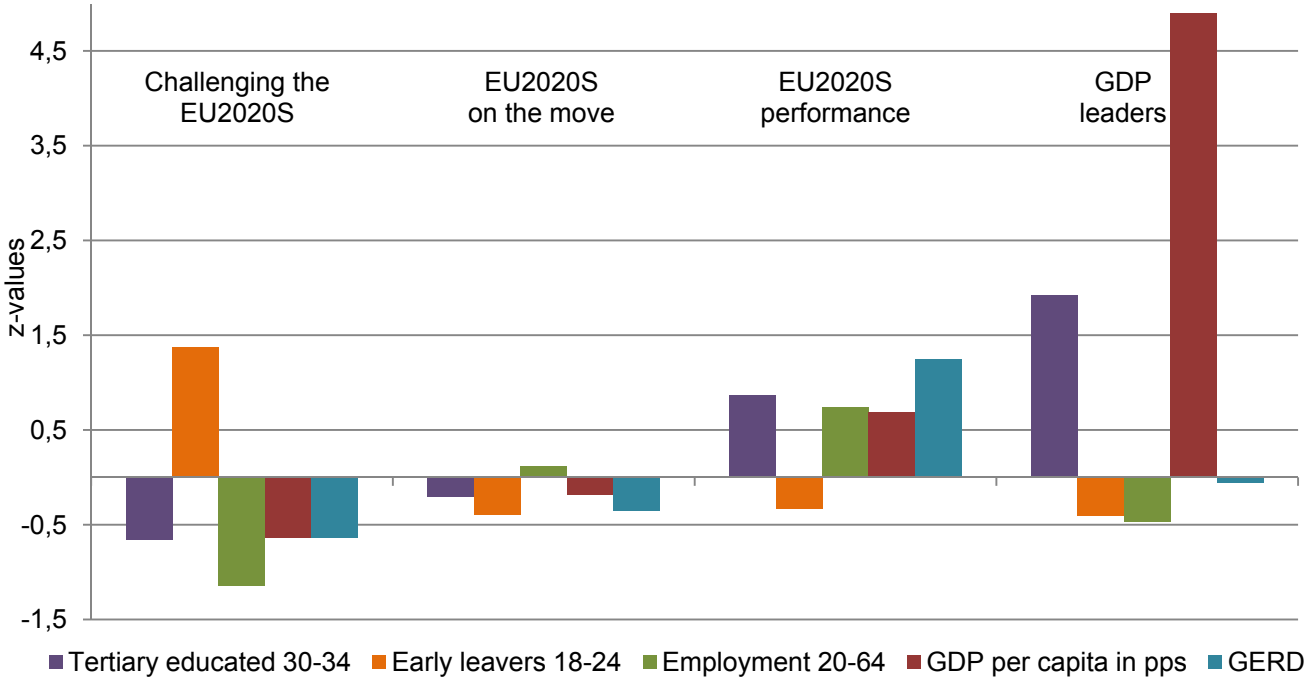
Graphic 5.1 First regional cluster analysis: 'two blocks' result



The first map of clusters is Map 5.4, which reflects a basic divide in the EU between two blocks. Elaborated through PCA, it suggests that with regard to the EU2020S development the basic distinction in the EU has to be made mainly between the North and the South. Throughout the Atlas, usually a division has been made between Eastern and Western Europe, but when the four available headlines according to the EU2020S are mixed together, then the basic divide is between the North and the South. The former is in general already accomplishing the EU2020S, while the latter is challenging this strategic document of the EU. This is substantial, because it proposes that the EU2020S does not have to consider the distinction between the member states pre-2004, on the one hand, and post-2004, on the other. It rather implies that regional scale matters and the attention must be paid to the Southern and Mediterranean Europe, plus the South-East, as

a ‘problematic’ macro-region that needs to be addressed in order for the EU2020S to be achieved across Europe. Obviously, if the sustainable growth items were included, the picture might be different (poverty probably would not modify this analysis too much), but it has to be reiterated that there are no available datasets at regional scale for these issues. As suggested in Graphic 5.1 and Map 5.4, Southern regions have low shares of higher educated population and very high rates of early school leavers, display very low levels of employment, expend poorly their GDP for R&D and account for a low GDP per capita. In contrast, Northern regions score comparatively better in all these items. Importantly, the regional scale is essential because in several countries there are important variations, for instance in Italy or in Hungary. In France, Picardie and Languedoc-Roussillon are in the Southern cluster, but the rest of the country is in the Northern. In Spain the situation is the opposite: the Basque Country and Navarra are in the Northern cluster, but the rest of the country is in the Southern. In Bulgaria, Romania or Greece, the respective capital regions escape exceptionally from the Southern pattern, but the contrast between South and North does not seem to generally correlate in any case with the urban-rural reality of the EU.

Graphic 5.2 Second regional cluster analysis: four clusters of regions



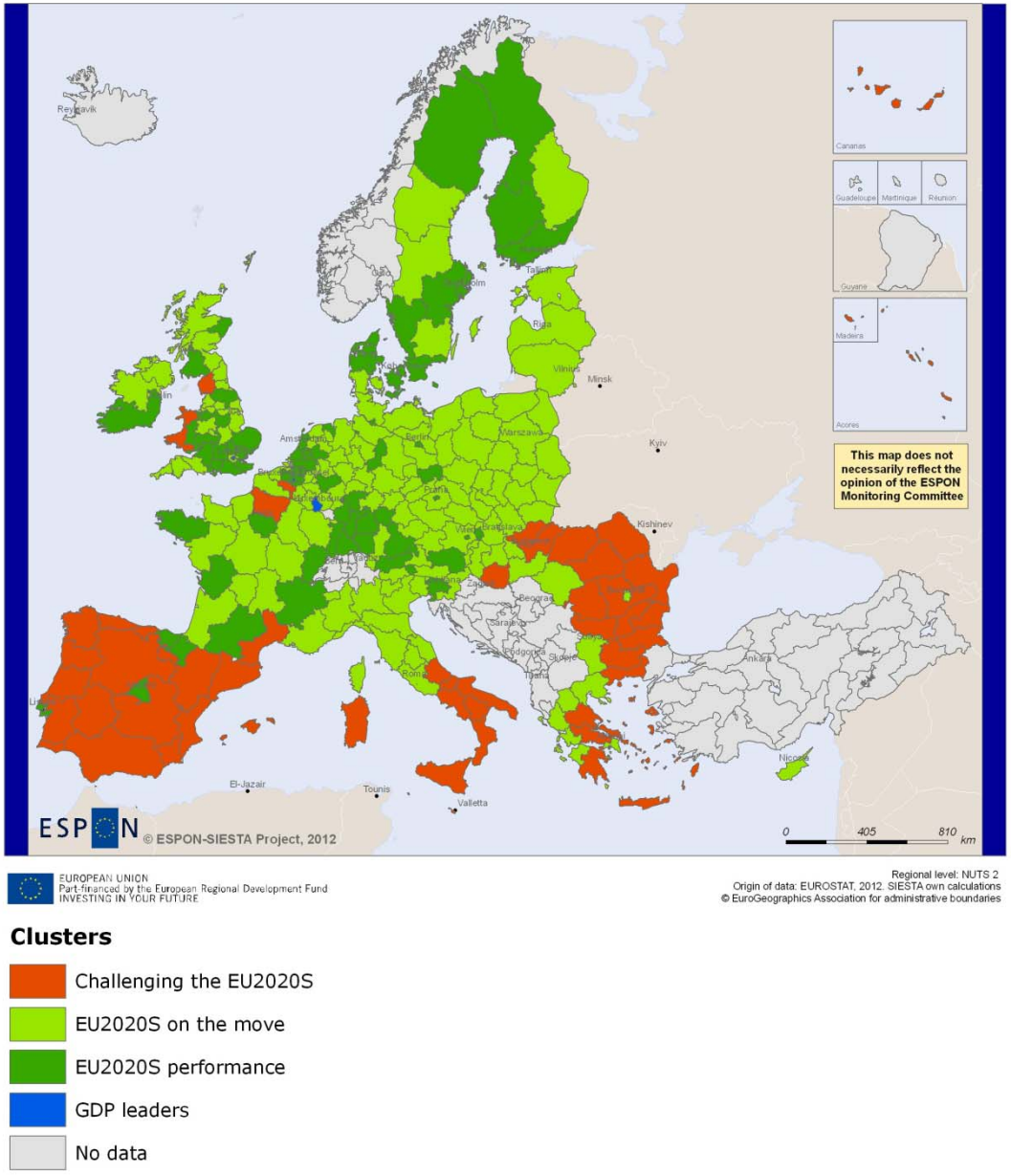
This early and rough EU2020S division of Europe can be refined with a second cluster analysis, with the same variables as the previous one (four EU2020S headline targets and GDP per capita in pps) but obtaining four clusters of regions (Graphic 5.2 and Map 5.5). The first cluster is mostly the same as the previous one and coincides with the same items expressed before: bad scoring in education, unemployment, GERD and GDP per capita, that is, seriously experiencing the current crisis and with several problems that tend to be accumulated and that move these territories far away from the EU2020S, thus challenging its implementation. In relation to the previous cluster analysis, most of the specific regions that ‘escape’ from this first cluster are capitals (Lisbon, Madrid, Rome) and Northern Italy; these regions are comparatively better, but in a first approach they were amalgamated within. In any case, this cluster masks the fact that there are regions scoring quite well in some specific

items, for instance most of the Northern Spanish regions in tertiary educated population.

The second cluster consists of regions that do not tend to perform in most of the headline targets, except employment. That means that they are quite weak in tertiary education, early school drop-out, GDP per capita and/or GERD investment, being close to average levels, but in employment they score slightly better than the average. This second cluster is a kind of transition between the performing regions and the regions experiencing severe problems. They are a kind of intermediate situation in terms of the EU2020S implementation and they might advance if proper policies are put in place. The Eastern Baltic States and all Polish regions or all the regions of the Czech Republic and Slovakia (except their respective capitals) are clustered herein, at the same level as most of the typically Western regions or rural regions in Scandinavia or the British Isles; this is substantial as it shows that, according to the EU2020S, they are in quite a comparable situation.

The third cluster consists of the performing regions scoring well in the headline targets set by the EU2020S. Arguably, these regions are the most dynamic and competitive in the EU economy and ready to compete globally.

Map 5.5 Second regional cluster analysis: four clusters of regions



Unsurprisingly, the outstanding capital regions (London, Île-de-France, Madrid, Berlin, Wien, Prague, etc.) are comprised therein. Again, the three corridors that previous researchers have suggested for high levels of R&D are appreciated on Map 5.5: Midi-Pyrénées to Bavaria, Austria to London and Copenhagen to Helsinki; even the well-known metaphor of the "blue banana" is easily seen, embracing most of the regions of the Benelux. The fact that these regions tend to score well cannot mask the fact that there are internal variations, with some regions having specific problematic issues according to the EU2020S.

The fourth cluster is defined specifically depending on high levels of GDP per capita: Inner London, Brussels and Luxembourg. These might be considered the best performing territories of Europe in terms of economic growth, but Graphic 5.2 suggests that they follow the EU2020S in an uneven manner. Indeed, and except for the data on GDP per capita and tertiary educated population, they are more similar to the second cluster than to the third.

To sum up, the aggregate index and the cluster analyses have shown how the EU2020S as a whole has an uneven geography, a conclusion that reinforces the previous sections of the Atlas that have been repeatedly reporting the complex territorial dimension of each one of the constitutive topics under the sustainable, smart and inclusive pillars of the EU2020S that have been reviewed. In this sense, the Atlas provides important insights as it sets out which is the regional/urban starting point for implementing the EU2020S and, importantly, it clearly demonstrates that this regional/urban understanding of the EU2020S is very relevant. The open question that remains is how policies, especially the cohesion policy, will be able to face the challenges highlighted herein. However, what is also needed is that the spirit of the EU2020S is spread beyond the EU institutions and reaches each one of the regions and cities that have been analysed throughout these pages.

www.espon.eu

The ESPON 2013 Programme is part-financed by the European Regional Development Fund, the EU Member States and the Partner States Iceland, Liechtenstein, Norway and Switzerland. It shall support policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory.

ISBN