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## Creative workforce in Europe: territorial patterns and effects.

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# **CREATIVE WORKFORCE IN EUROPE: TERRITORIAL PATTERNS AND EFFECTS.**

Antonio Russo, University Rovira i Virgili  
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## **INTRODUCTION**

As stated in the European Cluster Observatory report on the Creative and Cultural Industries ("Priority Sector Report: the Creative and Cultural Industries"), these industries are a sector that exhibit strong such growth (Power and Nielsén, 2010) to the point that as «regional creative and cultural specialisation explains 60% of the variance in GDP per capita» (p.4). Despite of the economic downturn, actually, world trade in goods and services from the creative industries grew on average 14 % annually in the years 2002-2008 (United Nations, 2010). In addition, it is stated in the ECO report that "regions with high concentrations of creative and cultural industries have Europe's highest prosperity levels".

This report provides rankings of the European regions (NUTS 2) allowing comparison between the European countries concerning the dimension, the growth and the weight of the creative and cultural into the local economy in terms of employment. To this end, data on 4-digit industry level mainly (and in a few cases 3-digit data) were used. Moreover, geographical mappings of the creative and cultural clusters by selected activity areas (Artistic creation and literary interpretation; Advertising; Radio and television activities; Museum activities and preservation of historical sites and buildings) are provided as well.

According to the report, Europe's creative and cultural industries employed a total of 6,576,558 persons, namely 2.71% of the whole European labour market. Given that this data covers employees whereas it doesn't include sole traders, the number of people working in Europe's creative and cultural industries is likely much higher.

A more recent report, the second "Cultural statistics" pocketbook (EUROSTAT, 2011) provides data concerning features of the employment and the enterprises of the European cultural sectors, such as external trade in cultural goods, cultural participation and private cultural expenditure.

Concerning statistics on cultural employment, the pocketbook presents these not as an aggregate, but separately for cultural sectors (NACE) and for certain cultural occupations (ISCO). In relation to the formers five 'cultural' NACE divisions at 2-digit level were selected. It has been estimated that in these five main cultural sectors over than 3.6 million people were employed in 2009, representing 1.7 % of total employment. Absolute numbers of persons employed in these sectors and the share of total employment for each EU27 country, as well as the analysis of employment by

selected characteristics (gender, educational attainment, non-employees, part-time jobs, etc.) are also provided.

Previously, the “Economy of Culture in Europe” report (KEA, 2006) provided a first systematisation of the cultural sector accounts of 25 European countries, and a detailed analysis based on 3-digit sector data. The main result was that the cultural and creative economy produced a turnover of more than 654 billions of Euros in 2003 (car manufacturing, by comparison, was at 271 billions in 2001, and ICT at 541 billions) and its added value amounted to 2.6% of the European GDP, growing faster than the rest of the economy. As many as 5.9 million people are employed in such sectors (including cultural tourism), or 3.1% of total employment in EU25.

These documents say a final word on the fact that the cultural and creative industries are presently a major economic driver of Europe, and present a systemised, detailed analysis of the performance and outlook of various sub-sectors and of the employment development across Europe and its spatial distribution and effects.

Indeed, although a global phenomenon that reflect the general trends of the economy of entire countries (Power and Nielsén, 2010, p. 12), the creative industries – or rather, the creative knowledge on which they feed – are inextricably linked to localised cultures (Scott, 1997; Santagata, 2002) and produce local and regional effects. Their prosperity may indeed be tied to a certain tradition based on shared knowledge and institutions that forward and protect that knowledge (the neo-artisan and industrial traditions of fashion and design), be the expression of the refined tastes of elites and minority groups (performing arts and literature production), or be inspired by a specific natural or cultural heritage; or they may derive from the evolution and syncretism of social structures in a given type of territory (“urban” cultures and multiculturalism, neo-rural cultures of *terroir* and gastronomy, leisure cultures in tourism spaces, etc.). Even European creative workers are relatively “place-bound” and not so mobile as the common understanding from, for instance, Florida’s production would suggest: according to Martin-Brelot et. al (2010), they face substantial cultural and institutional barriers to mobility which hamper their “footloose” character.

It comes with no surprises, then, that the spatial development of the creative industries, their differentiation, and the effects that they produce, are unevenly spread within and across territories, and this paper sets on the learn more about recent trends in this respect, according to background concepts that are illustrated in the next section.

## **THE GEOGRAPHY OF CREATIVITY (AND INNOVATION)**

Many academic studies (for instance, Du Gay, 1997; Scott, 2001; Higgs et. al, 2008) that have been addressing the geography of cultural production have found, unsurprisingly, that the epicentres of the boom of the creative economy are urban regions, and so finds the ECO report («The largest concentrations of creative and

cultural industries employees in Europe are major urban areas», Power and Nielsén, 2010, p. 4). These may be capital cities that concentrate national cultural institutions, global cities shaping and disseminating new cultural languages at world level, such as fashion, architecture and design, and music, de-industrialised urban regions re-using their idle infrastructure to host “cultural factories” and large events, middle-size heritage cities deriving status and a commercial advantage from their historical landmarks and intangibles.

According to authors such as Hall (1998) or Simmie (2005), a new ‘economic order’ has emerged that assigns culture and information a key role in regional and urban economies. It is also likely that there are differences between urban regions in Europe, as creative industries are more “mature” in business terms in core western countries, where they have gained recognition, attract venture capital, and enjoy “accumulation” advantages from the pull that these regions have been exerting for almost two decades in terms of talent due to internal and external migration from eastern, southern and peripheral regions. This has occurred in spite of the fact that the south or the east of Europe can boast important schools, cultural traditions, “territorial assets” that have inspired generations of artists and symbolic producers: the real business for them is likely to be in large cities at the core, and a micro-analysis of migration trends, supported by qualitative, almost “ethnographic” research of life careers – which is beyond the scope of this article – would reveal this trend. It should also be noted that rural and peripheral regions are not necessarily lagging behind in this trend, as it is shown by authors such as Scott (2010), in relation to rural regions, Anton Clavé and Reverté (2007), in relation to coastal tourist resorts, or Russo and Arias Sans (2009), in relation to student towns, that the tourismification of leisure landscapes throughout Europe has also carried with it the development of a localised “creative capital” which is becoming an important ingredient of the local tourist supply and a characteristic of the new populations driven into these areas not only by work opportunities but also by specific leisurely environments and lifestyles.

In any case, accounts of the real dimensions of the “cultural economy” (with the partial – and sectoral – exception of the quoted EUROSTAT 2011 report) tend to oversee that possibly a very large part of the contribution of creativity and the (re)production of the symbolic to economic performance of firms and regions is not directly related to the “cultural economy” but rather embedded in other economic sectors: from the mainstream industrial sectors, where increasingly, added value and competitiveness are crucially dependent on their capacity to produce and convey “meaning” to culture-aware consumers, to the service sectors catering for consumers and firms, who are increasingly producers of idiosyncratic knowledge and experiences.

According to this view, the leading edge of growth and innovation in the contemporary economy is constituted by sectors such as the high-technology industry, neo-artisanal manufacturing, business and financial services. Together these sectors constitute a sort of ‘new economy’ (Trip, 2007) that is strongly reliant on the creation of new symbolic meaning, something which is closely associated with situated knowledge and

its articulation with global cultural and information flows. Designers, writers, architects, performers, researchers, and the like today are notably not confined in their “parental” economic sectors but constitute valuable human resources that promote the symbolic realm within any economic sector, contributing crucially to penetrate new markets and fidelise old ones, establish new communication styles, and also promoting cohesion and sense of belonging in organisational terms.

A more complete consideration and understanding of how the cultural has infiltrated the economic, then, should not (only) look at the cultural industries but rather at the “creative” professions across the different economic sectors. In Europe, this can be done using regional (NUTS 2 level) census data that are made available regularly by EUROSTAT through its Labour Force Survey, at a sufficiently finely-grained level in terms of professional classification so as to “pick” creative professionals in the economy and monitoring their development in time and their regional distribution. This approach is similar to that developed by Higgs et al (2008) in their study of the British creative economy, only extending to the whole continent.

Such creative workforce, so accounted for, is not likely to offer a substantially different picture than what can be gathered from sector data, both in spatial terms and for its temporal development; yet we do expect to obtain a more realistic outlook at its dimension and most of all at its contribution to economic development, because we believe – as advanced in Atkinson, Servillo and Russo (2011) – that the conditions by which territorial assets and creativity (as mobilised by different groups of people for different reasons) do translate into opportunities for economic development is strongly mediated by a number of factors, such as policy and governance, geographical specificities, path dependency, etc.

In terms of the use that can be made of such knowledge, this study is grounded in the ESPON 2013 research programme of the European Commission, which aims to «support policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory by (1) providing comparable information, evidence, analyses and scenarios on territorial dynamics and (2) revealing territorial capital and potentials for development of regions and larger territories contributing to European competitiveness, territorial cooperation and a sustainable and balanced development»<sup>1</sup>.

This paper is indeed based on the findings of a research project carried out in 2004-2006 (ESPON 1.3.3), and on their revision and upgrade carried out under the new ESPON programme 2013<sup>2</sup>. The ESPON 1.3.3 project addressed “the role and spatial effects of cultural heritage and identity” and within it, one key dimension considered has been the role of cultural producers, including those who are employed or entrepreneurs in various sectors of the cultural industries, and those who have

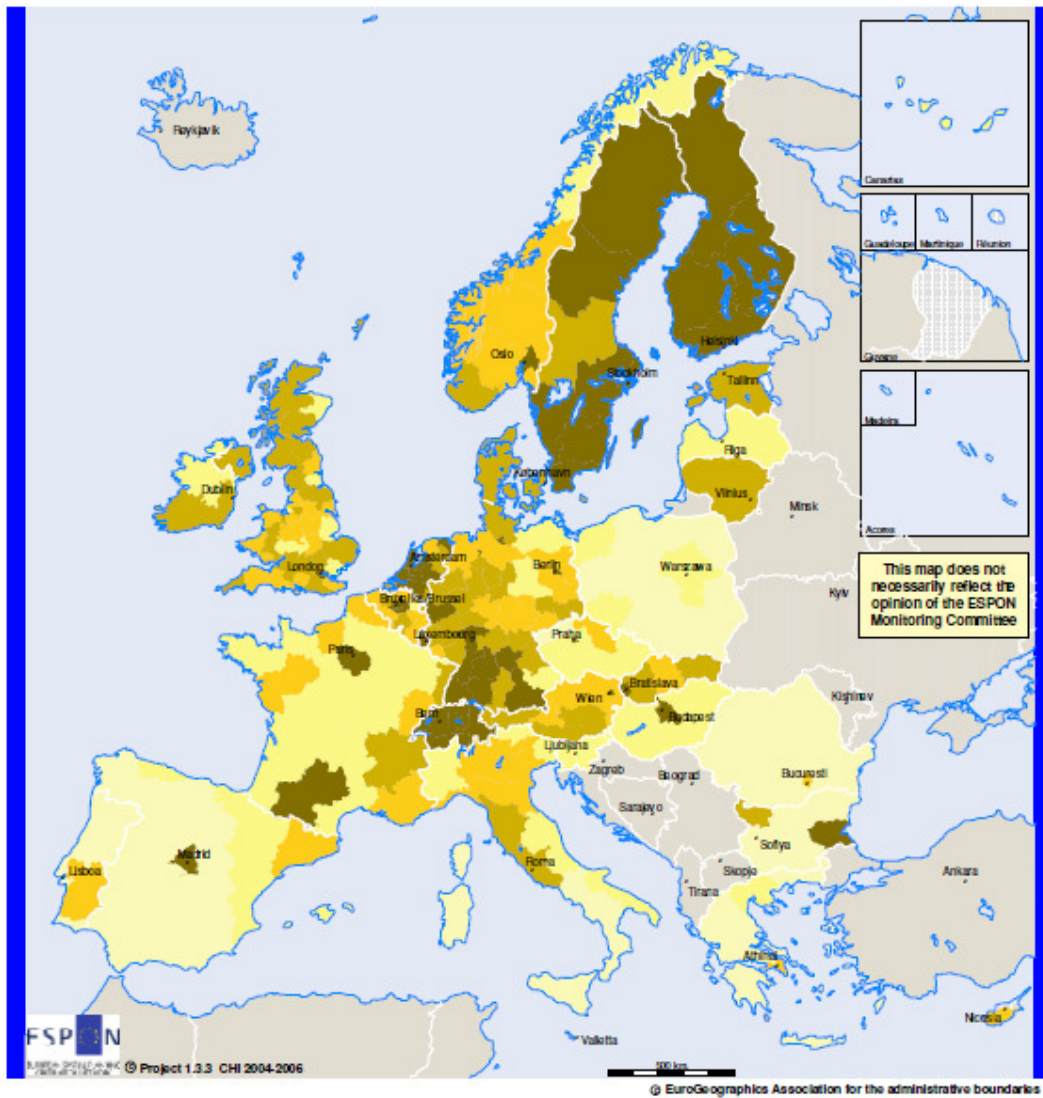
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<sup>1</sup> See [http://www.espon.eu/main/Menu\\_Programme/](http://www.espon.eu/main/Menu_Programme/)

<sup>2</sup> This author has been involved in 1.3.3 and was the principal author of the maps on the creative workforce of Europe and their spatial effects, and is in charge of the 2011 revision under ESPON 2013.

culture-oriented tasks in other industries. The share of local workers (active population) engaging in cultural professions has been taken as an indication of how “embedded” culture is in local production systems, and as such, of its importance as an axis of economic development, but also of diversification and social inclusion (ESPON 1.3.3, p. 173-175).

**Fig. 1. The creative workforce in Europe as a percentage of the active population, NUTS 2 regional detail. Source: ESPON 1.3.3 (2007), p. 121.**



Classification based on the five distribution percentiles

- Very low
- Low
- Average
- High
- Very high
- no data
- non Espo space

Indicator in database 1.3.3 - F.1

Algorithm-  
Number of workers with cultural and creative professions as a percentage of active population in 2001

Source and other metadata information:  
Labour Force Survey, years 2000-2004. Selection of ISCO-88 professional categories (see 1.3.3 final report for detailed procedure). Whenever the EUROSTAT population data in year 2001 was not available, year 2000 has been used. NUTS II

Reference year:  
2001-2004 (average values).  
Active population data: 2001 (EUROSTAT)

Using data from the 2001-2004 period, the map reproduced in Figure 1 illustrated in which regions and countries culture is more intensively used as source of material development. It highlights the importance of cultural employment in large cities, especially in Central-Northern Europe (but also in Madrid, Vienna, Rome), but also in countries which have characterised themselves with the high degree of “creativity” – or the capacity to elaborate cultural values into knowledge-based industries, like Finland (telecom), Sweden (design, electronics), the Netherlands (media, publishing),

Switzerland (design, architecture). Surprising is the emergence of a number of particularly active creative clusters in the new member countries, especially in the South-East.

The current paper revises and upgrades that research through the use of new (and better) data, introducing a number of new research questions, such as:

- What has been the spatial evolution of the creative workforce throughout the 2000 decade? Is there any clue that regions that have been lagging behind in the “culturalisation” of their economy are catching up?
- What is the degree of association between the growth in creative jobs and general economic growth, as measured by p.c. GDP? Can we test for a causal relation between these two dimensions, and its direction?
- Are there any geographical specificities in these relationships? And in particular, are urban areas growing more “creative” than rural and peripheral ones, widening the existing gap, or are the latter catching up? Is there any clear continental pattern in the evolution of the creative economy?

To address these questions, the next section will introduce the methodology of analysis and an illustration of the data used. The fourth section will carry out the analysis and illustrate the results by use of statistics and maps. The last section concludes with some final reflections.

## **METHODOLOGY**

### *Datasets on creative workforce*

Reproducing the methodology used in ESPON 1.3.3, the account of the creative workforce of Europe is based on an average of values of the population in selected ISCO-88 classes (4 digits) over the 2001-2004 and 2005-2008 period. The averaging is meant to ensure a higher level of accuracy of the data on the creative professions derived from the Labour Force Survey of EUROSTAT, which is low at the level of singular years due to the number of variables involved in the extraction. Averaging over a number of periods smoothed out the yearly oscillations.

The 2005-2008 period is the most recent timeframe to be assessed against the 2001-2004 period, which is used as a base for diachronic analysis as it was the timeline of the ESPON 1.3.3 project. Although in some countries 2009 data are also available and may be included in the analysis, we chose to delimit the analysis to 2008 for two reasons: the necessity to produce a cross-analysis with p.c. GDP data, which are available for most European regions only until 2008; and the intention to skip the “financial meltdown” years, which would disturb the analysis and moreover is likely to have produced structural effects which can only be monitored some years in the future.



The spatial unit of analysis is NUTS2 (regional level). This regional level ensures a sufficient capacity to distinguish predominantly urban from predominantly rural regions and a certain consistency in “cultural regions” with autonomous governance systems. Moreover it also guarantees that the LFS extraction is sufficiently reliable (it is estimated to be reliable for populations of over 300,000 per spatial unit, which is a reasonable dimension for NUTS 2 region, but would fail at finer spatial levels).

#### *Other datasets*

We have contrasted the data on the creative workforce in each NUTS 2 region in the two periods 2001-2004 and 2005-2008 with the dimension of the active population, by way of relativizing it, and with the p.c. GDP at current prices, both averaged over the same periods.

In order to address considerations of spatial and geographical specificities in the evolution of the creative workforce, we have used datasets regarding settlement structures (i.e. urban vs. rural settlements) and other geographical specificities (coastal regions, islands, border regions, etc.).

#### *Geographical cover*

It was possible to carry out the mapping and the diachronic analysis at the required NUTS2 spatial level and sectoral level in EU27 countries plus 3 partner countries (Island, Norway, Switzerland). Liechtenstein is not included in the LFS and cannot therefore be included in this analysis. It was also possible to include in the mapping and analysis of the most recent period the data relative to the European Candidate countries (Turkey, FYR Macedonia, Croatia).

Table I in the Annex below provides a detail of available data for the creative workforce at national level and for the different years involved.

Available data on p.c. GDP and active population, which are necessary for the delivery of the outputs indicated in the ToR, may also exhibit some data gaps, which will require estimation and approximation procedures which will be duly signalled and included in the metadata information.

#### *Estimation of 4-digit data sets*

The map on creative workforce in ESPON 1.3.3 used a LFS extraction of workers by 4 digits ISCO-88 professions at NUTS 2 level, selecting a number of 4D classes according to the most popular classifications of creative professions in the literature. In this paper we used the same classification, with only a few additional inclusions of ISCO-88 4D classes (see Table II in the Annex).

In various national cases where 4-digit data were not available, a procedure was followed to estimate 4-digit data from the share of population of selected 4-digit classes within each relevant 3-digit class in countries where the 4-digit detail was available. The resulting values of creative workers were then divided by the members of the active population to yield an indicator of the share (%) of workers with creative professions and use for maps and analysis relating this to the regional distribution of p.c. GDP. This paper follows the same method in this tender, facing similar limitations determined by the data availability situation illustrated in Table I in the Annex.

However, the better quality of the available dataset with respect to the one that was utilised in ESPON 1.3.3 yields a higher accuracy of the creative workforce dataset for both periods considered<sup>3</sup>.

### *Maps*

The European maps represented in figures have been produced in the framework of a recent ESPON 2013 project “Update of Maps and Related Data on Creative Workforce as Bearer of Innovation” aimed at upgrading the knowledge from ESPON project 1.3.3, and hence they respect ESPON formats, political delimitations and disclaimers.<sup>4</sup>

## **ANALYSIS**

### *Dimension and evolution of the creative workforce in Europe*

Our dataset on the absolute number of creative workers captures the gross dimensions of the creative workforce in Europe, their spatial distribution and their

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<sup>3</sup> On one hand, the general improvement of the LFS sampling methodology in recent years made available in some countries ISCO4D data that had been estimated from 3D data in ESPON 1.3.3, implying that the procedure for estimating 4D data in the remaining countries that still only record 3D data had to be adapted to this new situation, and new estimation parameters calculated. Also, in a limited number of cases, the better quality of the available dataset allowed a better estimation of ISCO4D data as a given share of ISCO3D sectors. It also allowed the consideration of additional 4D classes which were not considered in ESPON 1.3.3 due to the non-significant sample size. Finally, the necessity of harmonising the regional data to the new NUTS2006 regional classification system implied that 2001-2004 had to be recalculated. On the other hand, the availability of a better regional data quality on the total active population over 15 y.o. at NUTS 2 level and with NUTS2006 codes required a recalculation of the indicators of the share of workers with creative professions over the reference periods.

<sup>4</sup> At the time of writing these maps have not yet been officially approved by the ESPON programme and they should be intended as provisional and not reflecting in any case the opinion of the ESPON monitoring committee.

evolution. It is no surprise that larger countries and regions have the higher share of creative workers; Germany, the UK, France, lead the ranking (see Table 1, columns 2-4) in the 2005-2008 period, just as they did in the previous reference period (see Figure 2). The distribution becomes more concentrated in the second period, with countries like Italy, Poland and Spain sensibly increasing their share. It should be considered however that for Denmark, Hungary, FYROM; Romania and Turkey data on the creative workforce are not available in the first period. In percentage terms, the largest increments are experiences by Luxembourg, Poland, Lithuania and Czech rep., all with increases of more than 30%, while Germany, the Netherlands and Malta are the only countries where the creative workforce diminishes.

A better outlook is provided by data that relativize the creative workforce dimension over the active population (see Table 1, columns 5-8). Now the countries with the highest figures of the share of creative workers in the active population are Finland, Sweden, Switzerland and the Netherlands, all with more than 10% of the active population being creative professionals.

Luxembourg, Poland, Lithuania and Czech rep. are again the countries that experience the largest increments, and Germany, the Netherlands and Malta, together with Cyprus, experience a decrease in the relative dimension of their workforce. Spain, France and the UK now experience only modest increases, and again, the distribution is more concentrated in the second period.

**Table 1 – Dimension and evolution of the creative workforce, national data, periods 2001-2004 and 2005-2008.**

| Country            | Creative workforce (abs. N. of jobs), averaged over 2001-2004 period | Creative workforce (abs. N. of jobs), averaged over 2005-2008 period | Perc. change in creative workforce from 01-04 to 05-08 | Creative workforce per 1,000 head of active population, averaged over 2001-2004 period | Creative workforce per 1,000 head of active population, averaged over 2005-2008 period | Perc. change of creative workforce per 1,000 head of active pop. from 01-04 to 05-08 |
|--------------------|--|--|--|--|--|--|
| <b>Austria</b>     | 309666.3   | 400198.4   | 29.24%   | 79.2   | 96.3   | 21.62%   |
| <b>Belgium</b>     | 404866.4   | 441404.2   | 9.02%  | 91.5   | 94.0   | 2.69%  |
| <b>Bulgaria</b>    | 186481.1   | 235904.4   | 26.50%   | 56.5   | 68.5   | 21.25%   |
| <b>Switzerland</b> | 384726.7   | 432605.1   | 12.44%   | 93.9   | 101.6  | 8.23%  |
| <b>Cyprus</b>      | 24161.8  | 27341.9  | 13.16%   | 72.0   | 71.4   | -0.96%   |
| <b>Czech Rep.</b>  | 231093.1   | 300311.4   | 29.95%   | 45.3   | 57.7   | 27.55%   |
| <b>Germany</b>     | 3266440.7  | 3238130.3  | -0.87%   | 85.0   | 77.7   | -8.61%   |
| <b>Denmark</b>     | No data  | 217682.4   | No data  | No data  | 74.2   | No data  |
| <b>Estonia</b>     | 45651.3  | 57383.1  | 25.70%   | 69.3   | 84.1   | 21.29%   |
| <b>Spain</b>       | 1068202.2  | 1268950.1  | 18.79%   | 55.8   | 58.0   | 3.93%  |
| <b>Finland</b>     | 249860.7   | 280970.2   | 12.45%   | 96.0   | 105.6  | 9.93%  |
| <b>France</b>      | 1951383.1  | 2134433.4  | 9.38%  | 71.7   | 77.1   | 7.58%  |
| <b>Greece</b>      | 285921.2   | 330400.9   | 15.56%   | 60.9   | 67.5   | 10.85%   |
| <b>Croatia</b>     | No data  | 72077.2  | No data  | No data  | 40.4   | No data  |
| <b>Hungary</b>     | 245121.8   | 272022.1   | 10.97%   | 59.3   | 64.4   | 8.58%  |

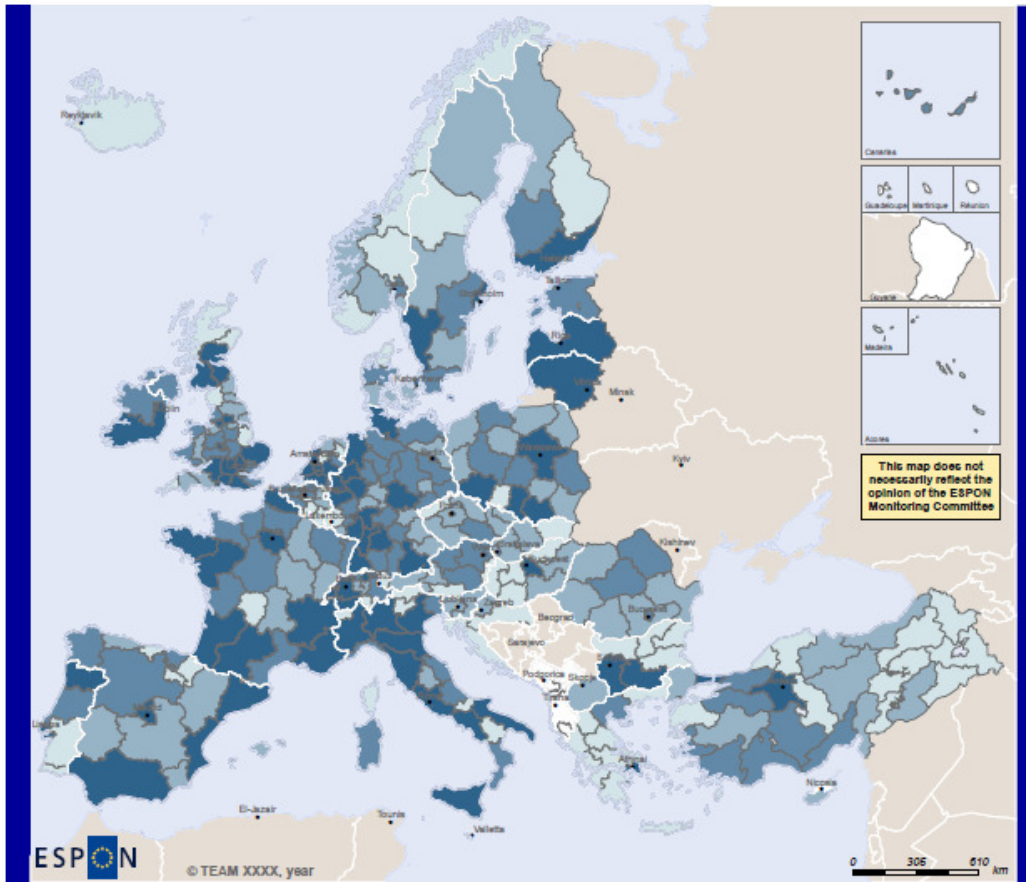
|                        |            |            |         |         |         |         |
|------------------------|------------|------------|---------|---------|---------|---------|
| <b>Ireland</b>         | 164188.3   | 188425.2   | 14.76%  | 87.2    | 87.4    | 0.24%   |
| <b>Iceland</b>         | 13108.9    | 16016.9    | 22.18%  | 81.6    | 91.7    | 12.34%  |
| <b>Italy</b>           | 1617754.4  | 2045377.9  | 26.43%  | 67.2    | 82.7    | 23.04%  |
| <b>Lithuania</b>       | 109357.7   | 144433.4   | 32.07%  | 67.0    | 90.1    | 34.44%  |
| <b>Luxembourg</b>      | 13783.2    | 20173.0    | 46.36%  | 71.2    | 97.0    | 36.23%  |
| <b>Latvia</b>          | 77218.7    | 93611.6    | 21.23%  | 68.8    | 79.6    | 15.70%  |
| <b>FYR Macedonia</b>   | No data    | 25096.6    | No data | No data | No data | No data |
| <b>Malta</b>           | 22820.0    | 13411.6    | -41.23% | 143.4   | 81.2    | -43.40% |
| <b>The Netherlands</b> | 912615.8   | 874148.5   | -4.22%  | 108.8   | 100.8   | -7.32%  |
| <b>Norway</b>          | 147376.4   | 170535.4   | 15.71%  | 62.5    | 68.9    | 10.24%  |
| <b>Poland</b>          | 702076.8   | 947576.3   | 34.97%  | 41.0    | 55.9    | 36.44%  |
| <b>Portugal</b>        | 291525.5   | 313529.9   | 7.55%   | 53.8    | 56.0    | 4.21%   |
| <b>Romania</b>         | No data    | 330891.4   | No data | No data | 33.3    | No data |
| <b>Sweden</b>          | 428378.2   | 487657.3   | 13.84%  | 93.9    | 101.6   | 8.30%   |
| <b>Slovenia</b>        | 56211.0    | 66687.0    | 18.64%  | 57.4    | 64.8    | 12.92%  |
| <b>Slovakia</b>        | 108779.4   | 118054.8   | 8.53%   | 41.4    | 44.4    | 7.16%   |
| <b>Turkey</b>          | No data    | 1157127.1  | No data | No data | 50.6    | No data |
| <b>United Kingdom</b>  | 2228125.8  | 2495014.6  | 11.98%  | 75.7    | 81.4    | 7.57%   |
| <b>TOTAL</b>           |            |            |         |         |         |         |
| <b>EU27+CEC</b>        | 15546896.6 | 19217583.4 | 23.61%  | 66.8    | 72.1    | 7.98%   |

Thus, Figure 3 provides an illustration of the spatial distribution of the “degree of creativity” in the regional employment. A sort of “blue banana” is nuanced, extending notably to the Scandinavian and Baltic countries, and to Mediterranean regions.

Among regions that experienced the highest growth rates of the creative workforce relative indicator between the two reference periods (Figure 4), it is remarkable that none of the largest urban regions in Europe are present. Instead, we find sensible growth in predominantly rural or mountain regions like Basilicata (60%), La Rioja (59%), Lincolnshire (49%) and West Macedonia (43%); some popular island tourist destinations like Corsica (+74%), Madeira (51%), the Balearic Islands (47%) and Sardinia (31%); a few regions including second cities in their national systems, like Dolnoslaskie (the region of Breslau, with 76%, the highest growth rate in Europe among all NUTS2 regions), Malopolskie (the region of Krakow, +59%); and a number of regions including small universities cities, like Olomuc (46%) or Durham (38%).

Among the regions with the worst negative growth rates, there are industrial regions in Germany, the Netherlands, and the north of France.

**Fig. 2 – Dimension of the creative workforce. Abs. n. of jobs, 2005-2008 period.**




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

Regional level: NUTS 02  
 Source: Own elaboration on EUROSTAT/LFS data  
 Origin of data: EUROSTAT/LFS data  
 Authors: A.P. Russo, A. Cugliari, F. Brandeje  
 © EuroGeographics Association for administrative boundaries

N. of jobs

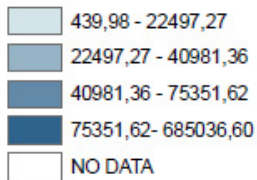


Fig. 3 – Dimension of the creative workforce. N. of jobs per 1,000 head of active population, 2005-2008 period.

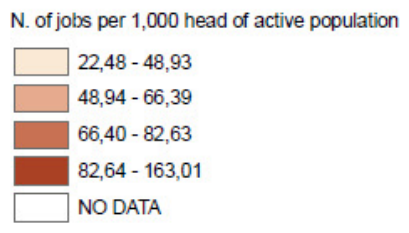
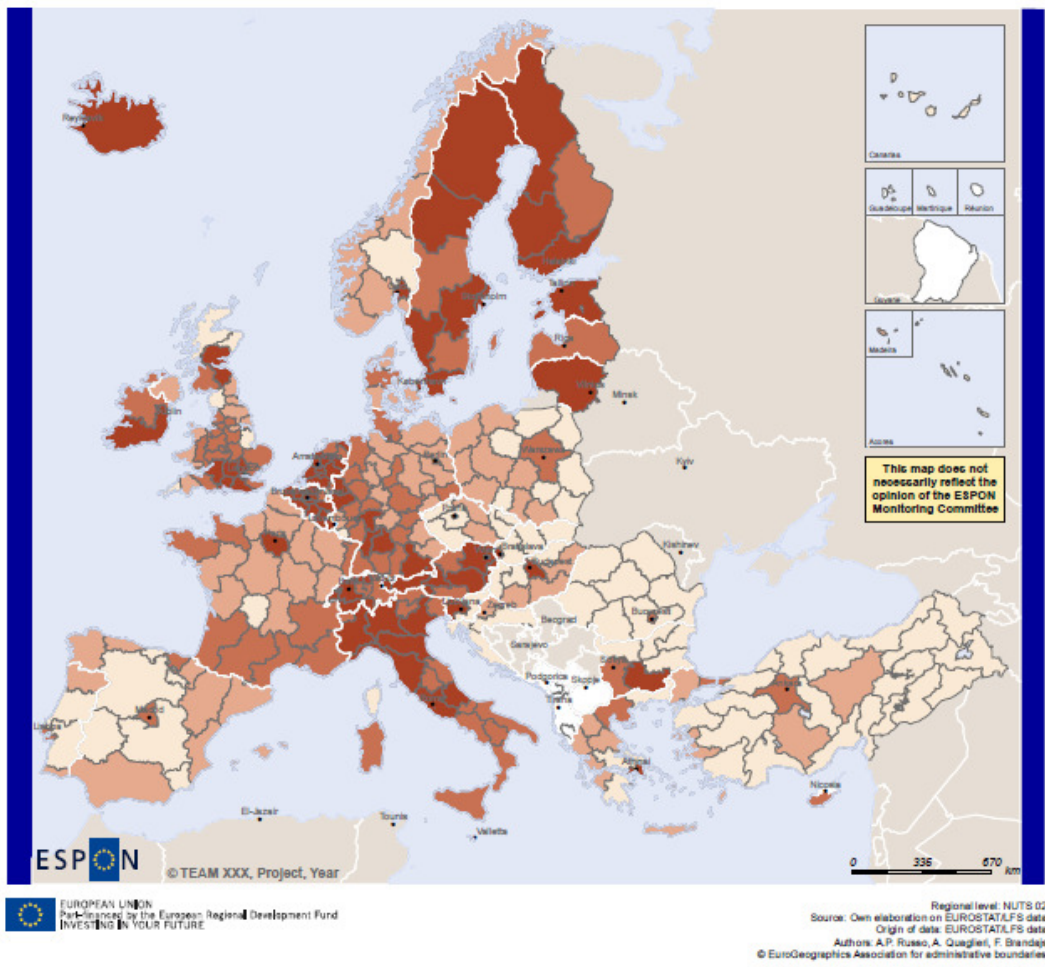
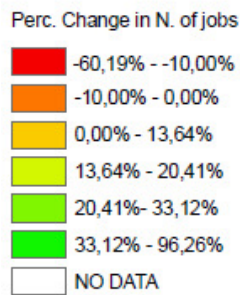
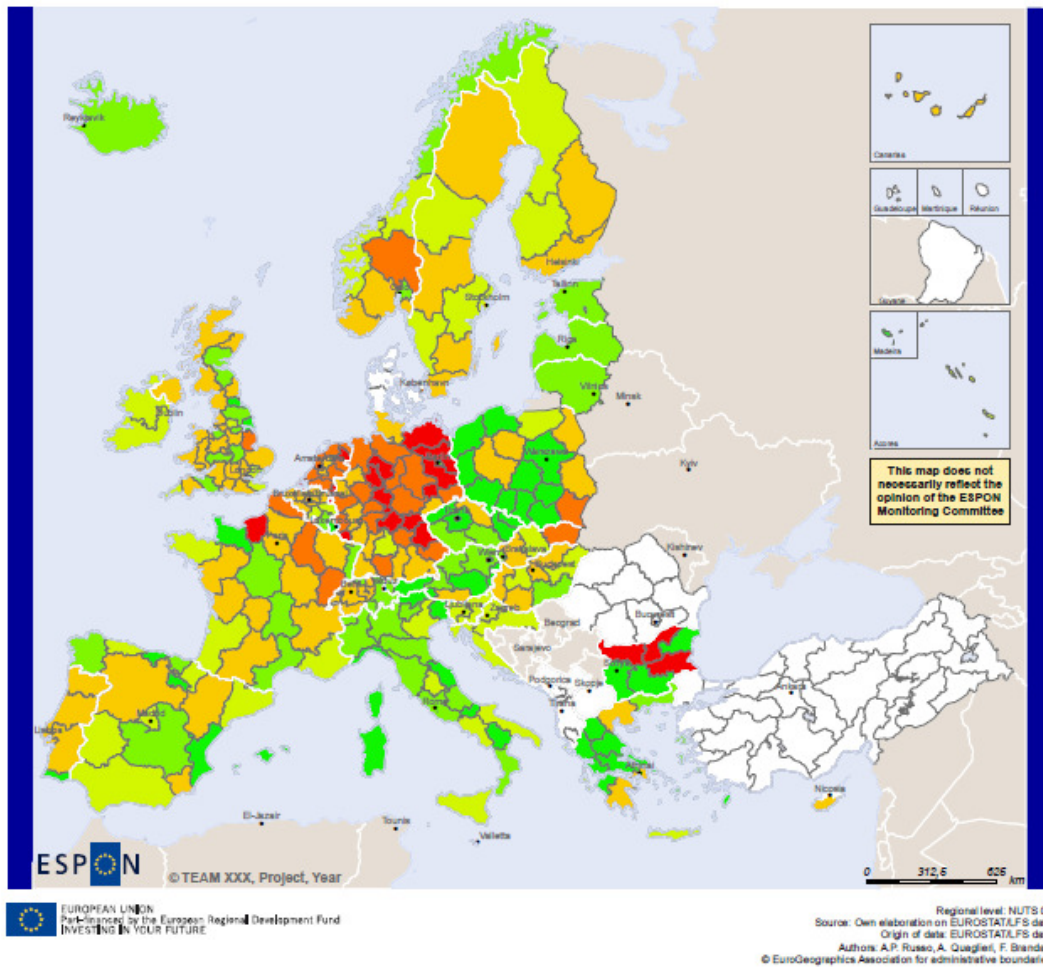


Fig. 4 – Evolution of the creative workforce. Perc. change in the N. of jobs per 1,000 head of active population, 2001-2004 to 2005-2008.

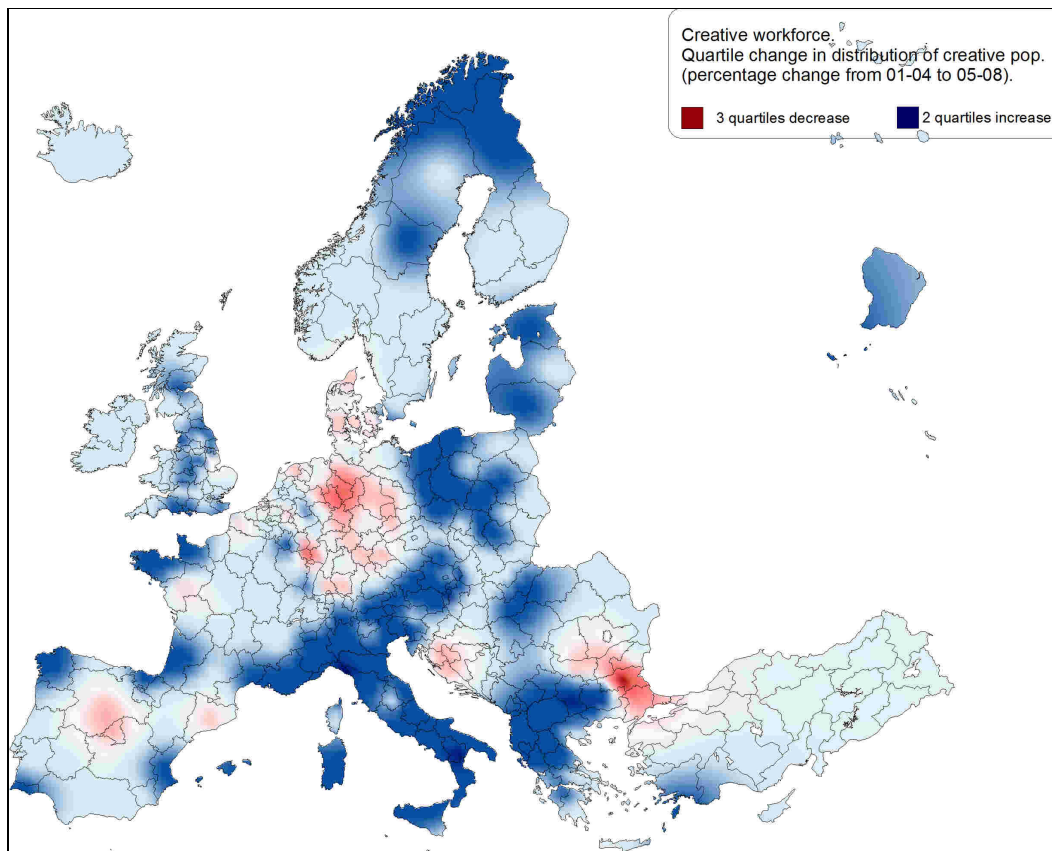


The map in Figure 5 “distils” this analysis picking regions that experienced a sensible change, captured by a change in the quartile of the distribution of the creative workforce indicator, and averages over neighbouring regions to highlight the main territorial trends. In this figure, contrasting with the “blue banana” trend of Map 2, we have clues of a progressive catch-up of regions that are lagging behind in terms of creative professions; both geographically, as will be seen below, and in terms of region

typologies, with non-core and peripheral regions doing best. Another factor standing out from these two maps is the good performance of tourist coastal regions and islands, such as the Balearic Islands, and the Valencia coast, Algarve, Galicia, the Basque coast, Sardinia, continental coastal regions of Greece and the island Rhodos, and Brittany. This seems to confirm Anton Clavé and Reverté's (2007) argument of presenting coastal tourist regions as new areas of "creative urbanisation".

These territorial trends will be commented upon in further detail in the last part of this section.

**Fig. 5 – Evolution of the creative workforce. Quartile change in the distribution of creative jobs per 1,000 head of active population, 2001-2004 to 2005-2008.**



#### *Relation between creative workforce and economic growth*

We now look at the relation between the evolution of the creative workforce and economic growth, captured by a simple per capita GDP indicator. The diagram in Figure 6 illustrates the degree of correlation between the two indicators ( $R^2$ : 0.37) in the 2001-2004 period. The sign of the indicator confirms that the general trend is that



richest countries have a higher share of creative workers among their active population.

Fig. 6 – Cross-plot of creative workforce (per 1,000 head of active pop.) and P.C. GDP, 2001-2004

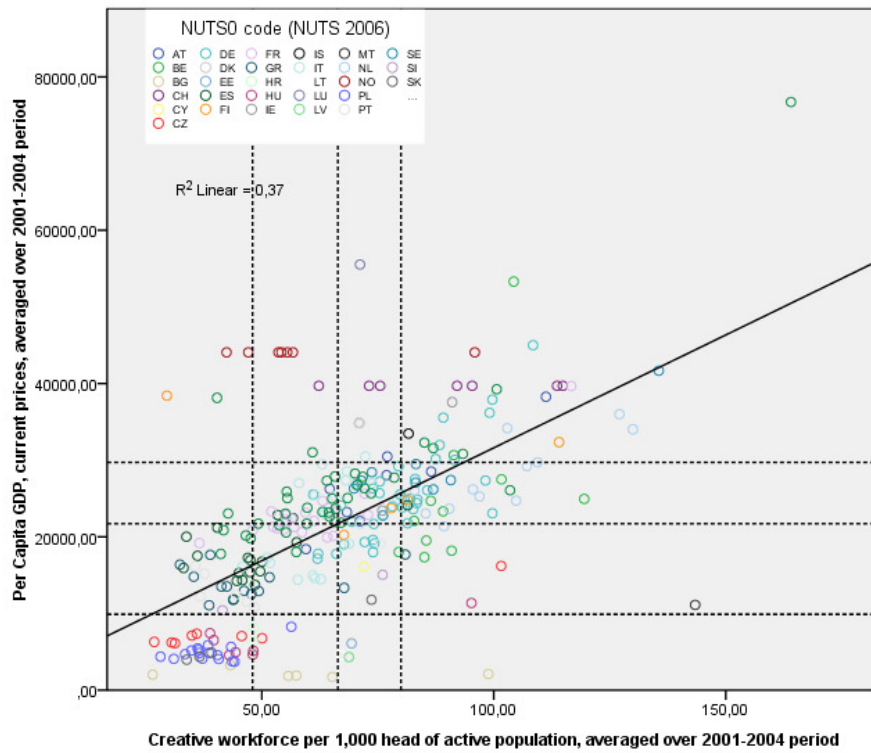
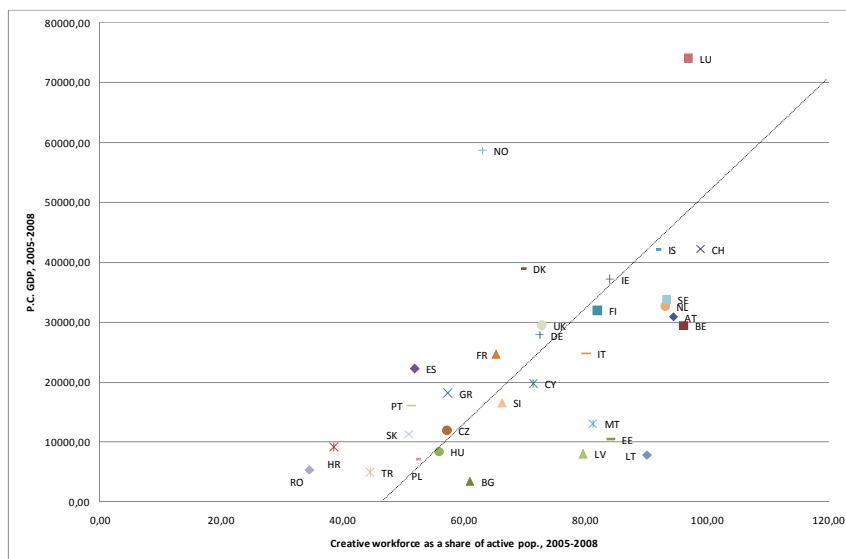
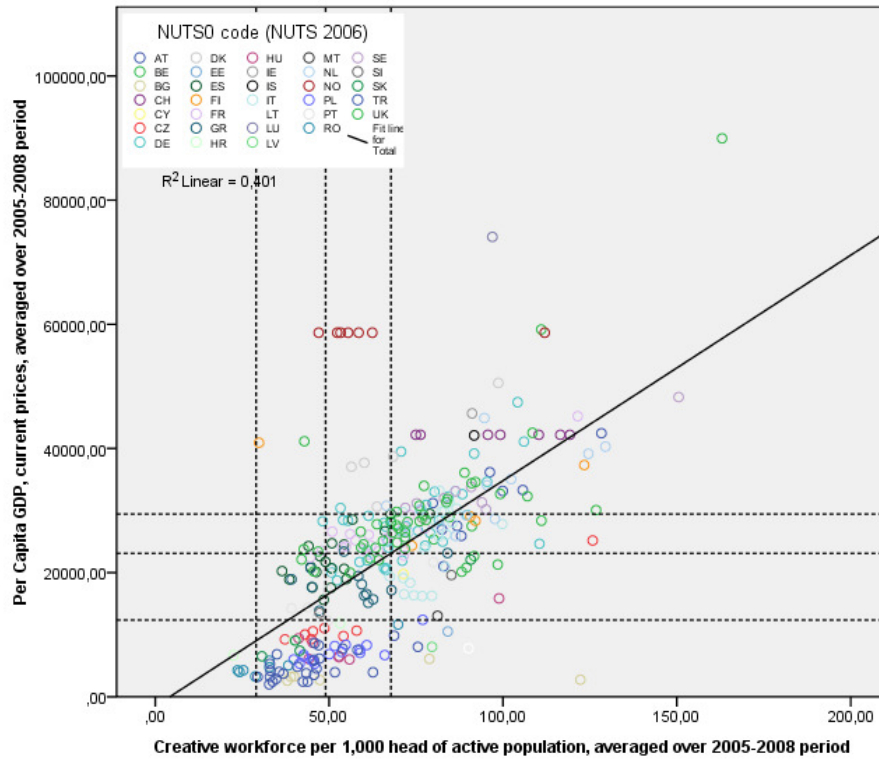


Fig. 7 – Cross-plot of creative workforce (per 1,000 head of active pop.) and P.C. GDP, 2001-2004. National averages.



The association between positions in quartiles of the two distributions (quartile breaks are shown by dotted lines) is also moderately strong, with 36% of regions positioning in the same quartile of distributions for both distributions, and only 8.5% of cases of regions with more than one quartile difference between the two distributions.

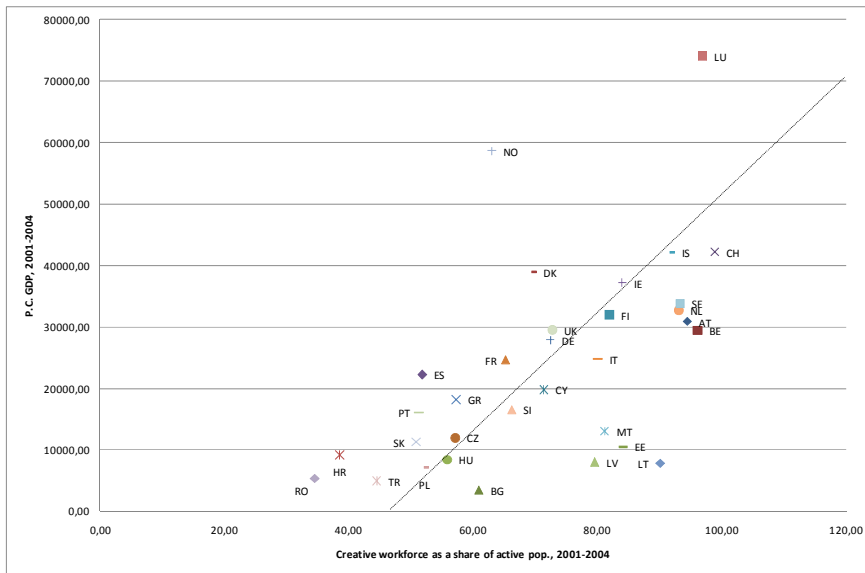
**Fig. 8 – Cross-plot of creative workforce and p.c. GDP, 2005-2008**



We can highlight the position of different countries in this chart by taking the national averages of the two indicators, and this is displayed in Figure 7, where the fit line ideally separated regions that are on the whole relatively stronger in economic terms (at the left) with those that are relatively stronger in “creativity” terms (on the right).

Next we will look into the 2005-2008 situation. The diagram in Figure 8 illustrates the degree of correlation between the two indicators in the 2005-2008 period, which has now a slightly higher fit at  $R^2$ : 0.41. National averages are shown in Figure 9.

**Fig. 9 – Cross-plot of creative workforce and p.c. GDP, 2005-2008. National averages.**

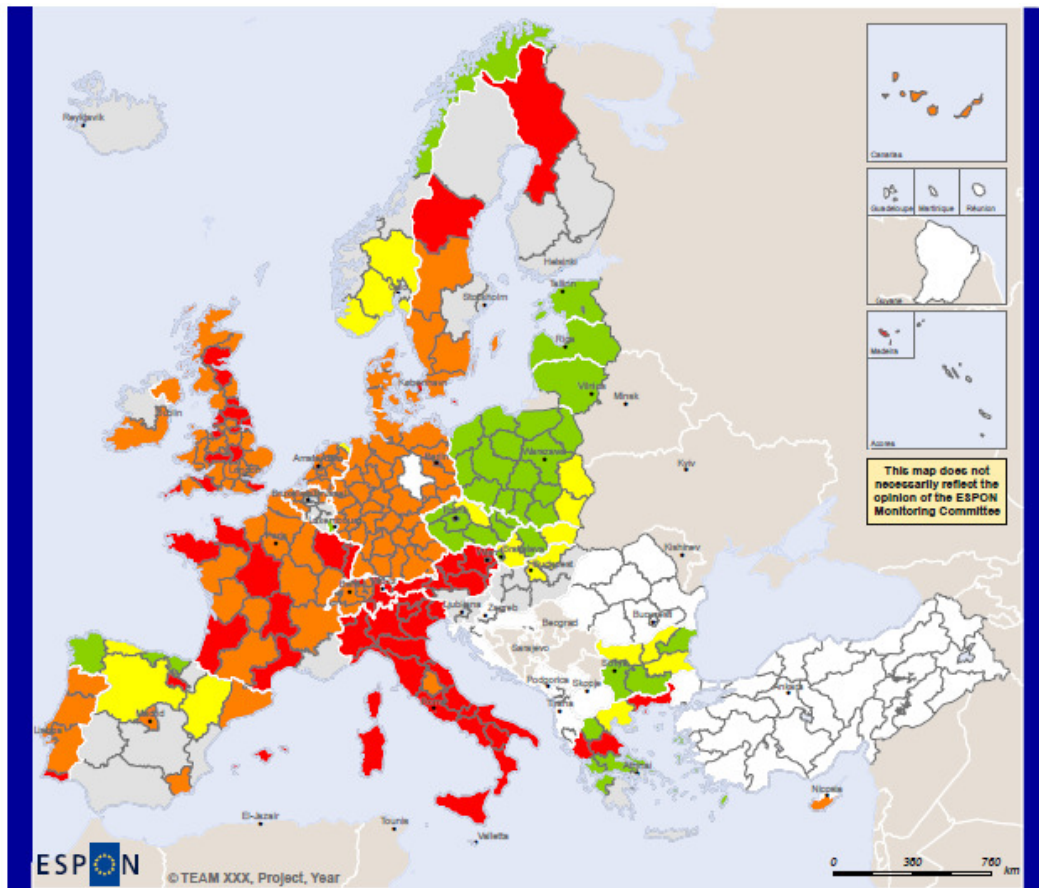


The association between changes in the creative workforce and in the per capita GDP can also be analysed cross-plotting change rates. In Figure 10 we chart these two variables. While the fit is low (but with a significant Pearson index at 1% significance range), indicating that changes in one variable are not strongly related with changes in the other (at least at regional level), it is interesting to map this chart to understand how these combined changes are spatially clustered.

**Fig. 10 – Cross-plot of creative workforce and p.c. GDP growth rates, 2001-04 to 2005-08**



Fig. 11 – Co-evolution of the creative workforce and p.c. GDP from 2001-004 to 2005-2008. Normalised distributions.



Regional level: NUTS 02  
 Source: Own elaboration on EUROSTAT/IFS data  
 Origin of data: EUROSTAT/IFS data  
 Authors: A.P. Ruivo, A. Quaglini, F. Brandão  
 © EuroGeographics Association for administrative boundaries

Crossplot quartiles of creative workforce (as a share of the active pop), perc. change from 01-04 to 05-08, and p.c. GDP, perc. change from 01-04 to 05-08. Normalised distributions, threshold value 0.25.

- 0 No significant variation
- 1 Growth in p.c. GDP; growth in share of creative workforce
- 2 Growth in p.c. GDP; decrease in share of creative workforce
- 3 Decrease in p.c. GDP; decrease in share of creative workforce
- 4 Decrease in p.c. GDP; growth in share of creative workforce
- NO DATA

Figure 11 classifies regions according to the sign of changes in both variables. We have isolated a class of regions where changes in both variables are small<sup>5</sup> (coloured in grey): in these regions, it is very difficult to find a significant diachronic association between creative workforce and economic growth. Regions coloured in green and

<sup>5</sup> For these normalised variables, we have set a threshold value of the covariance at 0.5. Thus, regions falling in these class fit the condition  $x^2+y^2<0.5$ , where  $x^2$  is the normalised value of the change in creative workforce as a share of the active pop. between 01-04 and 05-08, and  $y^2$  is the normalised value of changes of p.c. GDP in that period.

orange exhibit “expected” change signs in the two variables. In green regions, a positive change of the GDP (relative to the distribution mean, as this is a normalised variable) is accompanied by a positive relative change in the creative workforce, while in red regions, the opposite occurs. We expect these effects from the research and conceptualisations on the mobile character of the creative class, as for instance in Florida (2000): growing places attract symbolic workers, while places experiencing an economic downturn, tend to lose them to more thriving places, triggering a “global competition for talent” and to some extent making economic cycles endogenous (place with problems lose out those human resources that are more important for economic and social innovation, and would thus represent a primary asset for breakthroughs allowing these regions to catch up).

The explication of these effects can be very complex and obviously the contribution of creative work to economic development is only one between many factors that influence it. Moreover, the diachronic character of our analysis is somewhat flawed: in fact we only use two reference periods, whereas a straightforward analysis of cause-effects relationship and also an insight into the direction of causality (are thriving places better at attracting and retaining mobile creative workers, or are regions with more “localised” creative assets and human resources more likely to develop a strong economy?) would require more complete time series and a more sophisticated enquiry into migration issues, which is beyond the scope of this paper (though it is being carried out, to some extent, by another ESPON 2013 project “ATTREG”<sup>6</sup>).

In any case, it is interesting to notice that regions that have been catching up in economic terms during the 2005-2008 period have also experienced a sensible growth in their creative workforce, which should guarantee that their growth is more resilient according to the theory.

It is the case among others, of most Polish and Czech regions and of the whole three Baltic countries, which by 2008 are positioned as one among the most dynamic regions of creativity in Europe, such as the Basque Countries which have successfully managed to accomplish their transformation from a declining industrial region to a thriving innovative region, strongly focused on higher education and innovation networks.

On the other hand, “orange” regions are economically thriving regions that have seen a relative deceleration of growth have also lost a bit of their primacy in terms of creative resources. Possibly the reasons for this are to be sought in the loss of urban and environmental quality that accompany “mature” economic regions, where rising property prices, agglomeration disadvantages and a certain orientation to “mainstream” socioeconomic pathways may start to deplete their attractiveness and capacity of retention for young creative talents in search of convenient and inclusive location to start a new career, as is suggested in Russo and Van der Borg (2010). Russo and Chilese (2008) also analyse the case of Catalunya as a region that after having based its economic success on a string territorial branding and innovation in small and

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<sup>6</sup> [http://www.espon.eu/main/Menu\\_Projects/Menu\\_AppliedResearch/attreg.html](http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/attreg.html).

medium companies, and with its capital Barcelona made an attractive centre for creative talent and cultural workers, has not been capable of fully “anchoring” this capital, which remains, in times of economic downturn, a “transient” population enjoying leisure opportunities rather than a real “life career”. In this group there are also a few “tigers” whose economy boomed in the 2000s, like Cyprus and some Irish regions, where probably the first effects of the crisis were already taking their toll by the last part of the reference period.

At the other end of the spectrum, in this map there are also many yellow and red spots: respectively, regions where a relative growth in p.c. GDP has been accompanied by a relative decrease of the creative workforce, and regions where the opposite has occurred – in spite of having nurtured or attracted a larger than average share of creative workers, this has not prevented a downturn in economic growth.

Regarding “yellow” regions, the interpretation of this trend is that economic growth in the last decade has been mainly driven by “non-innovative” sectors. Disregarding Norwegian regions, whose value are probably biased from the fact that regional data on p.c. GDP growth had to be estimated from national data, this odd trend seems to be limited to a few non-core Spanish regions (whose economic exploit in the 2000s has been notoriously driven by the construction sector, with a subsequent “bubble burst” at the end of the decade aggravating the effects of the economic crisis) and lagging rural and industrial regions at the eastern border of Europe. The most immediate, though very general message from this type of growth in the post-crisis economic situation is that it is hardly a resilient one: economic development that is not accompanied by investments and other public policy initiative to attract and retain a creative workforce is doomed to be short of innovative capacity and thus subject to economic downturns and declines in competitiveness.

Finally, “red” regions – where the creative workforce has grown at a faster pace than the economy, or even with opposite signs – may be seen as regions that have not been able to fully capitalise on their creative workforce, because of lack of institutional capacity or a certain “impermeability” between the cultural sphere and the mainstream economic sectors, that are not capable of taking full advantage of the economic potential represented by the creative class. This is for example the case of many Italian regions, that for Tinagli and Florida (2005) is a very creative country but with important “capacity building” problems, or Austria and many regions of France. Not surprisingly, these are regions that cluster a very important cultural heritage and cultural institutions: the creative workforce seems to be relegated in “cultural industries” with a very important symbolic role for their countries but with a suboptimal effect in terms of economic development.

### *Spatial patterns in the creative workforce and its effects*

As a last line of enquiry, we have looked into the association of the endowment and change of creative workforce with specific territorial features.

Table 2 reports the results of a correlation test between the relative dimension of the creative workforce in 2005 and 2008 and a number of territorial features, such as the “urban” character of the regions<sup>7</sup>, including the national capital city, being a border, coastal, mountain or island regions, and the geographic location distinguishing 5 zones: Central Europe, South-eastern Europe, South-western Europe, Northern Europe and Western Europe.

**Table 2 – Correlation between relative dimension of creative workforce and specific territorial features (Sperman’s Rho).**

|  |                         | Urban areas | Capital city dummy variable | Border regions | Island regions | Coastal regions | Mountain regions | Location |
|--|-------------------------|-------------|-----------------------------|----------------|----------------|-----------------|------------------|----------|
| Creative workforce per 1,000 head of active population, averaged over 2005-2008 period | Correlation Coefficient | ,325        | ,356                        | .024           | -,132          | -.054           | -,196            | -,102    |
|  | Sig. (1-tailed)         | .000        | .000                        | .337           | .010           | .173            | .000             | .037     |
|  | N                       | 266         | 311                         | 311            | 311            | 311             | 285              | 311      |

In the table we observe a strong and significant level of clustering of the creative workforce in urban areas and especially capital cities. Island regions and mountain regions are relatively disadvantaged in their creative workforce endowments, and also location matters: the share of creative workers among the active population is at 79,3 in the total of regions of Western Europe and 78,3 in Northern Europe, but only gets to 48,5 in South-eastern Europe, whereas it has values of 63 and 64,9 in Central Europe and South-western Europe respectively.

Coming back to the settlement structure, predominantly urban areas have 86.9 creative workers per active citizen, compared to 65,5 of predominantly rural areas; urban regions concentrate the 32% of the creative workforce with only the 25% of the active population. Again, this comes with no surprise confirming the intuitions and research carried out by sociologists, urban geographers and economists on “urban milieus of innovation”. However, looking at change rates in the next Table 3 smoothens slightly this picture.

<sup>7</sup> We have used an elaboration at NUTS2 level of the “urban typology” developed by ESPON, and available in the ESPON 2013 database:  
[http://www.espon.eu/main/Menu\\_ScientificTools/ESPO2013Database/](http://www.espon.eu/main/Menu_ScientificTools/ESPO2013Database/)

**Table 3 – Correlation between change in the creative workforce from 2001-04 to 2005-08 and specific territorial features (Sperman’s Rho).**

|  |                         | Urban areas | Capital city dummy variable | Border regions | Island regions | Coastal regions | Mountain regions | Location |
|--|-------------------------|-------------|-----------------------------|----------------|----------------|-----------------|------------------|----------|
| Perc. change of creative workforce per 1,000 head of active pop. from 01-04 to 05-08 | Correlation Coefficient | -.033       | .046                        | .094           | .036           | .070            | .121             | -.013    |
|  | Sig. (1-tailed)         | .300        | .222                        | .061           | .278           | .126            | .023             | .417     |
|  | N                       | 257         | 273                         | 273            | 273            | 273             | 273              | 273      |

Now urban areas seems to be on the waning side, although the correlation coefficient is not significant, while all the disadvantaged regional types in the previous table seem to gain creative workers, with mountain regions doing so significantly. Predominantly rural areas experienced an average growth of their creative workforce (as a share of active pop.) of 10.7% compared to the 7.8% registered by urban areas; regions having borders with EU as well as non-EU countries grow 20% in this respect, doubling the European average; coastal regions grow slightly more than inland regions; and regions with remote mountainous areas grow decidedly more than non-mountain regions or also regions with mountainous area close to urban areas. Finally, Central European regions and South-eastern European regions grow decidedly more (at 26% and 19,9% respectively) than regions in Northern Europe (7%) and South-western Europe (12%), while Western European regions have a very low growth rate at 0,4%.

## CONCLUSIONS

The recently approved “Territorial Agenda of the European Union 2020. Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions”, agreed at the Informal Ministerial Meeting of Ministers responsible for Spatial Planning and Territorial Development on 19th May 2011 in Gödöllő, Hungary<sup>8</sup>, identifies accelerating globalisation and growing vulnerability to external shocks experienced by local and regional communities as well as the still present challenge of the core-periphery division even on the national scale as among the most important challenges faced by the European Union for the sustainable development of the European society. Countering these trends, it proposes and encourages, among other things, polycentric territorial development, which should foster the territorial competitiveness of the EU territory also outside the core Pentagon area, and the development of innovation and smart specialisation strategies in a place-based approach making the best use of social capital and territorial assets to achieve greater and integrated competitiveness

<sup>8</sup> Available online at <http://www.eu2011.hu/document/territorial-agenda-european-union-2020-towards-inclusive-smart-and-sustainable-europe-diver>



The mapping and analysis of opportunities and spatial effects produced by the creative workforce of Europe is a necessary step forward in the implementation of these directives and their translation into regional policies.

The epicentre of the “cultural economy” revolution during the past decades has been the city (or urban region), which also through its role of a “symbolic production milieu” has acquired a fundamental role as the main node of global networks and flows (Amin Thrift, 2007). In many cases, the success of western metropolitan areas not only in nurturing and especially attracting creative talent, but also in leading the creative economic sectors to become drivers of innovation for the broader regional economies within a global positioning strategy, have also implied the subtraction of equal opportunities to disadvantaged areas at the geographical or economic periphery of Europe, or in rural regions progressively transformed into “dormitory” towns.

Our analysis, though necessarily carried out at the regional scale which blurs some of the more “local” phenomena, and also probably excessively superficial as far as the effects of creative workers on economic development are concerned (for instance not really solving the conundrum of the causal relationship between the two variables) discloses a somewhat more promising picture. On one hand, in the second reference period many eastern European and Mediterranean regions seem to have been “catching up” with respect to the creative workforce compared to core regions. Possibly, the increasing levels of quality of life, and successful policies focused on valorizing and branding localised place assets (be it environmental quality, cultural heritage, social diversity, or the quality of their tourism and leisure infrastructure) have started to invert the trend of migration of creative talents to economically thriving regions, and have managed to make the best of their creative workforce as a strategically fundamental component of their transforming economies. On the other hand, both geographically disadvantaged regions, such as border and mountain regions, and peri-urban or rural areas in core regions have started to catch up with urban areas, possibly a reflection of “agglomeration disadvantages” which in large cities may make life especially hard for starting creative workers.

The analysis and related maps on the relation between the evolution of the creative workforce and economic growth also show that the picture is complex and spatially uneven. While in some regions the positive correlation between the two variables is clear, which calls for a further strengthening of the creative economy and its institutional foundations in order to keep on developing in a resilient way or to invert the downturn produced by the economic crisis, in regions where this association is negative, which are interestingly spatially clustered as discussed above, the consequences that one may draw policy-wise seem to go hand in hand with the recommendation of the Territorial Agenda 2020: a more integrative and “smart” development for regions that have grown leaving behind their creative class, and a greater capacity to capitalise on territorial assets for regions that have lagged behind economically in spite of the dimensions and quality of their creative workforce, to be

spurred through finely designed “capacitation” and networking policies within a multi-scale governance framework.

The issue of the mobility of the creative class and their propensity to “migrate” to economically thriving regions should also be reconsidered in the light of the findings of Martin-Brelot et. al (2010), who find that the strong embeddedness of European talent workers in the local labour markets through personal networks, or the particular functioning of the housing market, hindering mobility, may also be a factor contributing to ‘rooted territoriality’ which is what the Territorial Agenda 2020 would like to achieve. In the light of our research, “homebrew” creative talent in core areas has certainly deepened spatial divergences in years of economic boom, but the actual situation of crisis could present an opportunity for lagging regions to focus policy to their advantage.

## REFERENCES

Amin, A., and Thrift, N. (2007). Cultural-economy and cities. *Progress in human geography* 31(2): 143-161.

Anton Clavé, S., and González Reverté F., eds. (2007). *A propósito del turismo. La construcción social del espacio turístico*, Editorial UOC, Barcelona.

Martin-Brelot, H., Grossetti, M., Eckert, D., Gritsai, O. And Kovács, Z. (2010). The Spatial Mobility of the ‘Creative Class’: A European Perspective. *International Journal of Urban and Regional Research* 34(4): 854-870.

Chilese, E. and Russo, A.P. (2008). Urban fashion policies: lessons from the Barcelona catwalks. Ebla Center Working Paper No. 3/2008. [Online]. Available from [http://www.eblacenter.unito.it/WP/2008/3\\_WP\\_Ebla.pdf](http://www.eblacenter.unito.it/WP/2008/3_WP_Ebla.pdf). [accessed 8 June 2011].

Du Gay P, ed. (1997). *Production of Culture: Cultures of Production*. London: Sage

ESPON project 1.3.3 (2007). The role and spatial effects of cultural heritage and identity (2004-2006). Final report. [online]. Available from [http://www.espon.eu/main/Menu\\_Projects/Menu\\_ESPON2006Projects/Menu\\_ThematicProjects/culturalheritage.html](http://www.espon.eu/main/Menu_Projects/Menu_ESPON2006Projects/Menu_ThematicProjects/culturalheritage.html), [accessed 8 June 2011]. [accessed 8 June 2011].

EUROSTAT (2001). Cultural statistics. Pocketbook edition. [online]. Available from [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-32-10-374/EN/KS-32-10-374-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-10-374/EN/KS-32-10-374-EN.PDF). [accessed 8 June 2011].

Florida, R. (2000). *Competing in the age of talent: Quality of place and the new economy*. Pittsburgh: Carnegie Mellon University.

Hall, P. (1998). *Cities in civilization*. New York: Pantheon.

Higgs, P., Cunningham, S. and Bakhshi, H. (2008). Beyond the Creative Industries: Mapping the Creative Economy in the United Kingdom. [online]. Available from <http://www.nesta.org.uk/beyond-the-creative-industries/>. [accessed 8 June 2011].

KEA European Affairs (2006). The Economy of Culture in Europe. Bruxelles. [Online]. Available from <http://www.kernnet.com/kea/Ecoculture/ecoculturepage.htm> [accessed 1 august 2010].

Power, D., and Nielsén, T. (2010). Priority Sector Report: Creative and Cultural Industries. Europe Innova, European Cluster Observatory. [online]. Available from [http://lerondpointdici.fr/\\_oneclick\\_uploads/2010/05/rapport-eco-creative-2010-cee.pdf](http://lerondpointdici.fr/_oneclick_uploads/2010/05/rapport-eco-creative-2010-cee.pdf). [accessed 8 June 2011].

Russo, A.P. and Arias Sans, A. (2009). "Student communities and landscapes of creativity: how Venice – 'the world's most touristed city' – is changing. *European Urban and Regional Studies* 16(2): 175-189.

Russo, A.P. and van der Borg, J. (2010). An urban policy framework for culture-oriented economic development: lessons from Holland. *Urban Geography* 31(5): 668-690.

Santagata, W. (2002). Cultural Districts, Property Rights and Sustainable Economic Growth. *International Journal of Urban and Regional Research* 26(1): 9-23.

Scott, A.J. (1997). The cultural economy of cities. *International Journal of Urban and Regional Research* 21(2): 323-339.

Scott, A.J. (2001). Capitalism, cities, and the production of symbolic forms. *Transactions of the Institute of British Geographers* 26(1): 11-23.

Scott, A.J. (2010). Cultural Economy of Landscape: Development Pathways in the English Lake District. Ebla centre working paper No. 15/2010. [Online]. Available from [http://www.eblacenter.unito.it/WP/2010/15\\_WP\\_Ebla\\_CSS.pdf](http://www.eblacenter.unito.it/WP/2010/15_WP_Ebla_CSS.pdf). [accessed 8 June 2011].

Simmie, J. (2005). Innovation and space: A critical review of the literature. *Regional Studies* 39(6): 789–804.

Tinagli, I., and Florida R. (2005). *L'Italia nell'era creative*. Creativity Group Europe, Milano.

Trip, J.J. (2007). Assessing Quality of Place: a Comparative Analysis of Amsterdam and Rotterdam. *Journal of Urban Affairs* 29(5): 501–517.

United Nations (2010). The Creative Economy Report 2010. [Online]. Available from [http://www.unctad.org/en/docs/ditctab20103\\_en.pdf](http://www.unctad.org/en/docs/ditctab20103_en.pdf). [accessed 8 June 2011].

## ANNEX

**Table I: Regional (NUTS 2) data availability on cultural workforce data sourced by EUROSTAT (LFS) per year (4D: 4-digit ISCO-88 data available; 3D: 3-digit ISCO-88 data available)**

|    | av. 2001-2004  | av. 2005-2008 | 2009    |
|----|----------------|---------------|---------|
| AT | 4D             | 4D            | 4D      |
| BE | 3D             | 3D            | 3D      |
| BG | 3D             | 3D            | 3D      |
| CH | 4D             | 4D            | 4D      |
| CY | 3D             | 3D            | 3D      |
| CZ | 4D             | 4D            | 4D      |
| DE | 3D             | 3D            | 3D      |
| DK | <sup>(1)</sup> | 3D            | 3D      |
| EE | 4D             | 4D            | 4D      |
| ES | 3D             | 3D            | 3D      |
| FI | 4D             | 4D            | 4D      |
| FR | 3D             | 3D            | 3D      |
| GR | 3D             | 3D            | 3D      |
| HR | no data        | 4D            | 4D      |
| HU | 4D             | 4D            | 4D      |
| IE | 3D             | 3D            | 3D      |
| IS | 4D             | 4D            | 4D      |
| IT | 3D             | 3D            | 3D      |
| LI | no data        | no data       | no data |
| LT | 4D             | 4D            | 4D      |
| LU | 4D             | 4D            | 4D      |
| LV | 3D             | 3D            | 3D      |
| MK | no data        | 4D            | 4D      |
| MT | 4D             | 4D            | 4D      |
| NL | 3D             | 3D            | 3D      |
| NO | 4D             | 4D            | 4D      |
| PL | 4D             | 4D            | 4D      |
| PT | 4D             | 4D            | 4D      |
| RO | <sup>(2)</sup> | 4D            | 4D      |
| SE | 4D             | 4D            | 4D      |
| SI | 4D             | 4D            | 4D      |
| SK | 4D             | 4D            | 4D      |
| TR | no data        | 3D            | 3D      |
| UK | 4D             | 4D            | 4D      |

**Notes:**

- (1) In Denmark, cult.-workforce data are only available at NUTS0 level in the 2001-2004 period. A procedure of regionalisation has been deployed.
- (2) In Rumania, 1-digit data only are available for the 2001-2004 period. A procedure of estimation of 4-digit data with a lower degree of accuracy has been deployed.

**Table II: List of ISCO-88 4D codes included in cultural workforce statistics**

|      |  |
|------|--|
| 2131 | Computer systems designers and analysts                            |
| 2132 | Computer programmers   |
| 2139 | Computing professionals not elsewhere classified                   |
| 2141 | Architects, town and traffic planners                              |
| 2310 | College, university and higher education teaching professionals    |
| 2320 | Secondary education teaching professionals                         |
| 2431 | Archivists and curators  |
| 2432 | Librarians and related information professionals                   |
| 2442 | Sociologists, anthropologists and related professionals            |
| 2443 | Philosophers, historians and political scientists*                 |
| 2444 | Philologists, translators  |
| 2451 | Authors, journalists and other writers                             |
| 2452 | Sculptors, painters and related artists                            |
| 2453 | Composers, musicians and singers                                   |
| 2454 | Choreographers and dancers   |
| 2455 | Film, stage and related actors and directors                       |
| 3131 | Photographers and image and sound equipment operators              |
| 3429 | Business service agents and trade brokers not elsewhere classified |
| 3460 | Social work associate professionals                                |
| 3471 | Decorators and commercial designers                                |
| 3472 | Radio, television and other announcers                             |
| 3473 | Street, night club and related musicians, singers and dancers      |
| 3474 | Clowns, magicians, acrobats and related associate professionals    |
| 3475 | Athletes, sportspersons and related associate professionals*       |
| 3480 | Religious associate professionals                                  |
| 5113 | Travel guides  |
| 5210 | Fashion and other models   |
| 7311 | Precision-instrument makers and repairers                          |
| 7312 | Musical instrument makers and tuners                               |
| 7313 | Jewellery and precious-metal workers                               |
| 7321 | Abrasive wheel formers, potters and related workers                |
| 7322 | Glass makers, cutters, grinders and finishers                      |
| 7323 | Glass engravers and etchers  |
| 7324 | Glass, ceramics and related decorative painters                    |
| 7331 | Handicraft workers in wood and related materials                   |
| 7332 | Handicraft workers in textile, leather and related materials       |
| 7341 | Compositors, typesetters and related workers                       |
| 7342 | Stereotypers and electrotypers                                     |
| 7343 | Printing engravers and etchers                                     |
| 7344 | Photographic and related workers                                   |
| 7345 | Bookbinders and related workers                                    |
| 7346 | Silk-screen, block and textile printers                            |

\* ISCO4D sectors not included in ESPON 1.3.3