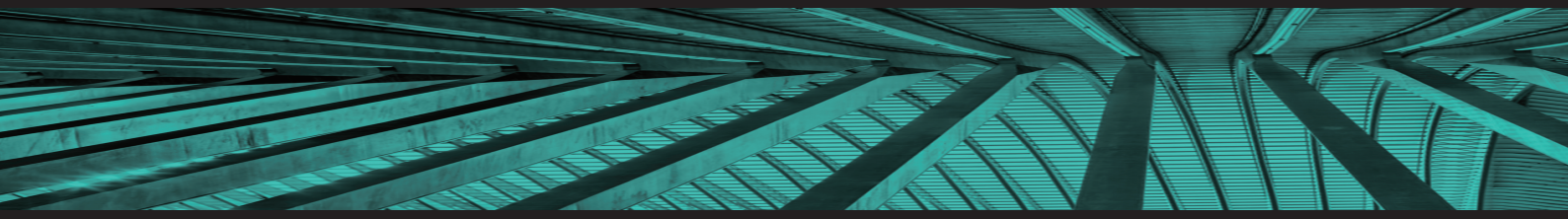
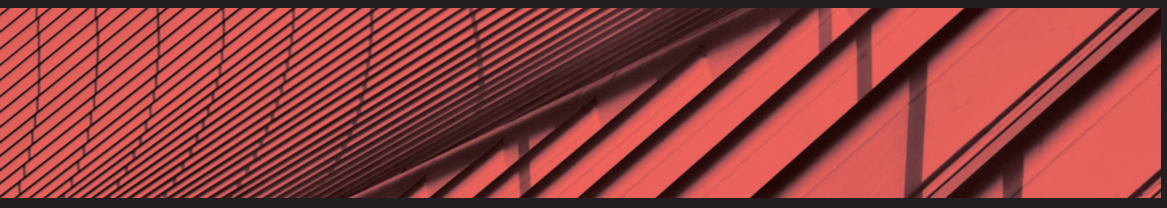
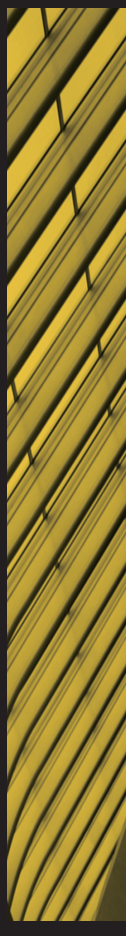
DISCE

DEVELOPING
INCLUSIVE
AND SUSTAINABLE
CREATIVE ECONOMIES



A COMPREHENSIVE DESCRIPTIVE PROFILE OF THE EUROPEAN CCIs





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DISCE DEVELOPING INCLUSIVE AND SUSTAINABLE CREATIVE ECONOMIES

Measuring creative economies: a critical review of CCIs

D.2.4 A comprehensive descriptive profile of the European CCIs

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UNIVERSITY OF TURKU
KING'S College LONDON
culture & media agency europe, AISBL CUMEDIAE
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Executive summary

Developing Inclusive & Sustainable Creative Economies (DISCE) is an interdisciplinary, mixed-methods project. The overarching research question for DISCE is: "what are inclusive and sustainable creative economies, and how can they be developed?" Since creative economies are increasingly recognised as an important component of modern economies, as part of the overall research design, WP2 has a specific role in mapping and measuring Cultural and Creative Industries (hereafter CCIs) across the EU.

European institutions are working to improve the statistical framework on CCIs, acknowledging existing limitations due to lack of harmonized data across European countries. Given that in the framework of statistical systems currently implemented, and the data generally provided by national statistical institutes often does not allow for consistent cross-country comparison due to different classifications, different sampling, different timing for data collection. These limitations are well-known by institutions, which recognize the need for harmonized statistics on CCIs.

In this open debate, the specific contribution of DISCE is developing its own conceptual and empirical assessments, including providing measurements relating to the inclusive and sustainable creative economy beyond these existing frameworks. Deliverables D2.1 and D2.2 cope with these challenges. Deliverable D2.3 advances conceptual framework and policy guidelines on improved mapping of cultural economy and CCIs. Deliverable D2.4 takes a more practical approach by providing a quantitative investigation of cultural economy and CCIs using existing and available data that are consistent with the DISCE approach. It then outlines quantitative measures for the relationship between cultural economy and CCIs and socioeconomic features that are relevant to pursue an inclusive and sustainable growth. Further, this report empirically tests the relevance of the local dimension in the investigation of cultural and creative economy, which is one of the pillars of the DISCE 'ecology' approach.

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1. Introduction

This report provides a quantitative mapping of CCIs according to the DISCE perspective.

At the heart of DISCE is the question of how the creative economies of the future can be both inclusive and sustainable. To contribute to this question, the report details descriptive evidence which accounts for existing relationships between CCIs and relevant measures for sustainable and inclusive growth. The report outlines summary evidence on the association between meaningful measures for the dimension and the evolution of CCIs across Europe and relevant measures for economic performance (DISCE, 2019). Using data from several sources, it is described how CCIs relate to other important economic characteristics, including innovation, human capital supplied by Higher Education Institutions (HEIs), Gross Value Added (DISCE, 2019), Cohesion Policy funds. Also, elements that are relevant in understanding the within-CCIs outlook are described, considering how cultural employment relates to the growth of CCIs local units and the trend of CCIs sector diversification (DISCE, 2019).

Then, according to the DISCE approach, the report broadens the scope of investigation going beyond strictly measures of economic performances, to consider also measures for sustainable and inclusive growth. In doing so, the report addresses the need to provide evidence for the relationship between CCIs, social resilience, social cohesion and wellbeing (DISCE, 2019). Referring to existing literature, the report provides descriptive evidence on the link between CCIs and trust, tolerance, openness, perceived quality of institutions, youth marginalization, gender-equality in the labour market and the overall socioeconomic sustainability.

The report maps CCIs and sustainable and inclusive growth by considering several dimensions, starting from geography, which has a crucial role in the DISCE's 'ecological approach'. By presenting evidence about the fundamental influence of geography on CCIs, the report supports DISCE both in its conceptual framework and in the qualitative evidence produced by other WPs.

Another fundamental reason in favor of the sub-national perspective is that culture is local. Culture is heavily locally produced. Specific locations offer benefits such as agglomeration effects, scale and network economies, endowments of cultural amenities (Comunian, Chapain, & Clifton, 2010). Also, culture is strongly local in its externalities, which include the creation of new values and new narratives capable of designing local identities (Guiso, Sapienza, & Zingales, 2016; Huggins & Thompson, 2015) and territorial branding (Pasquinelli, 2014). The same externalities also feed local "buzz", that is the local information ecosystem which benefits R&D, entrepreneurship and knowledge build-up (Arribas-Bel, Kourtit, & Nijkamp, 2016; Audretsch, Obschonka, Gosling, & Potter, 2017).

The report also relates DISCE to existing literature on EU socioeconomic sustainability. In fact, by mapping the links between elements of social cohesion and CCIs, the report provides evidence that adds to existing works on EU cohesion strategy (Bachtler, 2019). It is well documented that European countries have lagging-behind areas alongside economically thriving regions (Iammarino, Rodriguez-Pose, & Storper, 2019; Monfort, 2020) and that this territorial injustice is a key source for resentment, economic decline and inequality (Aurambout et al., 2021; Billing, McCann, & Ortega-Argilés, 2019). This report shows that regions display diverging trends also regarding CCIs, suggesting that CCIs should be scrutinized also by cohesion literature.

More broadly, the evidence of this report strongly supports place-sensitive policy in targeting CCIs. Spatially-blind approaches fail to account for local specificities that might be key to assure both socioeconomic growth and regional convergence (Barca, Mccann, & Rodríguez-Pose, 2012; Capello & Faggian, 2005; Iammarino et al., 2019). This further support the adoption of a strong local perspective in addressing CCIs in Europe.

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On these premises, DISCE approaches the quantitative mapping of CCIs through a geographic lens, with the aim of providing evidence on existing patterns of regional diversity (DISCE, 2019) and to illustrate quantitative approaches exploiting the CCIs indicators identified by the DISCE data operationalization (Denti, Pica and Crociata, 2022). By doing so, DISCE also provides evidence that CCIs should not be neglected in the definition of territorial cohesion at the European level.

In practical terms, addressing this question entails several issues, mainly due to poor availability of harmonized data at sub-national level, as discussed in DISCE deliverables D2.2 and D3.2 (Dent et al., 2020; Denti, Pica, & Crociata, 2022). Official statistics on CCIs which are harmonized across Europe are available only for certain variables and mainly at regional (NUTS2) level, as detailed in DISCE reports D2.2, D2.3 and D3.2 (Dent et al., 2020; Denti et al., 2022). Notwithstanding this limitation, through available data at regional level (NUTS2), this report clearly shows some relevant patterns of territorial differences with respect to the size of CCIs. For example, it shows that territorial differences in CCIs across European regions are not dynamically stable: some countries had quite homogenous territorial distribution of CCIs in 2014 that evolved into being strongly heterogeneous in 2019. The report also shows that CCIs display patterns regional specialization that evolved over time.

The report also presents novel evidence of sub-national associations between CCIs and socioeconomic features such as Gross Value Added, regional competitiveness, EU cohesion funds, tourism demand, trust in institutions, openness towards minorities, part-time employment and gender-equality in the labour market. For instance, by merging Eurostat data on cultural employment with European Social Survey data on people's attitudes towards minorities, this report outlines that region (NUTS2) with larger cultural economies have more tolerant citizens. This new quantitative evidence shows that cultural economy has a reach on social dimensions, a research question that DISCE aims to address (Crociata, 2019; Denti et al., 2022; Gross et al., 2019).

Overall, this report builds on the outcomes of reports D2.1, D2.2, D2.3, D3.2, D3.3 to provide quantitative evidence across European countries that is comprehensive of the several key points addressed by DISCE. For instance, report D3.2. explores the sub-national geographic scale as enabler of a more comprehensive understanding of sustainable and inclusive growth. Report D2.3 details the importance of the sub-national geographical for effective policy design. On these extant contributions, the present report presents several pieces of evidence that further support the DISCE rationale. For instance, using Eurostat data on regional economic outlook, the report shows that the association between cultural economy and regional Gross Value Added completely changes when regions having Creative and Cultural urban hubs are separated from regions with no such hubs.

The approach to quantitative mapping of CCIs of the present report focuses on sub-national data as follows:

1. It shows that country-level (NUTS0) data on cultural economy and CCIs fail to account for sub-national differences by comparing NUTS0 figures with NUTS2 figures.

2. Having provided evidence for the relevance of the regional scale of investigation, the report performs analysis and mapping at the sub-national level to build evidence on the European regional outlook of CCIs and emerging trends.

3. The report then analyzes the European regional outlook of CCIs with respect to other socioeconomic variables, such as human capital endowment, Gross Value Added, employment in other sectors, public policy for local development. In this way, the report provides quantitative evidence on existing trends and relationships between CCIs and the rest of the economic outlook (DISCE, 2019). By doing so, the report quantitatively corroborates relevant points developed by DISCE, such the connections between higher education and CCIs across Europe (Comunian, Dent, & Conor, 2020a) and the need of a

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comprehensive mapping of CCIs in relation to standard measures of economic performance (Crociata, 2019).

4. Variables measuring other dimensions, such as trust in institutions and openness towards minorities are added, to show their association with CCIs and to measure how much CCIs intertwine with sustainable and inclusive growth. This point provides quantitative evidence supporting the conceptual framework developed within DISCE, which links CCIs with community attitudes towards care for others (Wilson et al., 2020).

5. Finally, on the basis of the evidence provided and described, the report advances some policy recommendations for the development of an effective statistical framework to monitor CCIs at the European level.

Data available only at the country level have been discussed in details with respect to the European context in several DISCE reports (Comunian, Dent, & Conor, 2020b; Dent et al., 2020; Denti et al., 2022), aside being widely explored by existing literature (i.a. European Commission -DG Education Youth Sport and Culture, 2018; Soendermann, 2019; UNCTAD, 2019). They will be recalled in this paper in their relationship with the evidence discussed here.

The report is mainly based on EU official statistics from Eurostat and European Commission as introduced in the DISCE Description of Action (DISCE, 2019). These statistics are complemented with other sources for administrative data and survey data targeting Europe.

Some data on CCIs mentioned in the DISCE Description of Action have been substituted with other data in the present report due to several methodological concerns. First, quantitative analysis across different places needs harmonized data because the latter allow for consistent cross-country and cross-regional comparisons[1] (Eurostat, 2018). Second, European official statistics have been preferred since they are the workhorse for regional studies on socioeconomic performances of EU countries as well as the evidence-base used for EU policy design. Third, regarding survey data this report starts by acknowledging that there is no single European survey dedicated to culture (Eurostat, 2018). Starting from this recognized limitation, the report relies on other multi-wave surveys covering European countries targeting values and perceptions, since they allow to average figures across different waves to get robust data (ONS, 2020). Fourth, the report does not use data that have been discontinued along time, since they don't allow for dynamic comparison. Fifth, the report prefers existing validated administrative data from institutions rather than other types of data. In this respect, the report uses data from the European Commission Regional Competitiveness Index (Annoni & Dijkstra, 2019) to measure several aspects of sustainable and inclusive growth. This index comprises more than 70 indicators, ranging from innovation and R&D to labour market efficiency, from quality of institutions to macroeconomic stability. It addresses European countries at regional level. Clearly, the Regional Competitiveness Index represents a robust measure for many aspects that DISCE must assess with respect to CCIs. It also prevents potential bias from designing index by collecting data from national and international sources that are not based on harmonized statistics, and/or collected only for specific years. Similarly, the report relies on the European Commission European Tertiary Education Register (ETER) for data

[1] For instance, balance of payment and trade statistics on CCIs are not considered due to several acknowledged limitations. Over-value for countries having big ports at the external EU borders, fluctuations, lack of distinction between crafts and industrial manufacturing generating the impossibility of classifying traded goods as cultural, lack of coverage for digital products and contents, poor availability of some data (Eurostat, 2018). Similarly, household expenditures on culture are not fully comparable between countries, due to differences in methodologies in data collection, differences in reference years, differences in sampling methods, differences in survey instruments, different definitions of "consumption expenditures", poor classification for cultural expenditures (Eurostat, 2018). Table A1 details data used in the report and their source. Table A2 in the Appendix maps data used in the report with the proposed variables for this task detailed in DISCE Description of Action.

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on European HEIs, which represents the most comprehensive database on European HEIs with information on each individual HEI (ETER project, 2019).

The same review of existing data which has guided the selection of sources described above has also allowed to frame an empirical characterization of CCIs and of their contribution to socioeconomic performance that is consistent with the DISCE approach, at the same time exploiting robust data and figures. More into details, the report maps CCIs characterization with respect to CCIs size, concentration and spatial distribution (DISCE, 2019). Also, the quantitative mapping detailed here characterizes CCIs along wages, salaries and employment (DISCE, 2019). The report also measures how CCIs relate to relevant elements that can influence their characterization, such has the presence of cultural heritage and the size of public funding targeting CCIs-related dimensions, such as culture, tourism, urban and rural regeneration, infrastructures. Together with quantitative mapping of these CCIs characteristics, the report also maps the relation of CCIs with several socioeconomic features: GVA, innovation, human capital, social cohesion, well-being and tourism (DISCE, 2019). Some patterns that were suggested for quantitative mapping by the DISCE Description of Action cannot be explored at the present moment, due to lack of data suitable to perform cross-country and cross-regional EU investigation. This limitation applies to the skill composition within CCIs workforce, CCIs workforce intra/inter-regional commuting patterns, CCIs rural-urban characterization, demand for culture, trade patterns.

Finally, it is important to stress that in European statistics the scope of culture statistics does not match with the scope of statistics on CCIs (Eurostat, 2018). Further, CCIs statistics are determined in different ways in different countries (Eurostat, 2018). These facts imply that the descriptive profile of CCIs across Europe which is the aim of the present report must rely on statistics that convey incomplete measures of CCIs. Hence, the evidence of the report should be considered as a lower bound for the actual measures for European CCIs.

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2. The relevance of space in mapping cultural economy and CCIs

The core of DISCE approach is providing support for an 'ecological' approach to understanding (and managing) CCIs. The 'ecological' approach entails a macro-level of investigation, where cultural economy manifestations are analyzed in their geographical ecosystems (Denti et al., 2022; Gross et al., 2019). This report addresses the macro-level ecological investigation of CCIs through a quantitative approach. By doing so, the report contributes to the evidence base developed throughout DISCE Working Packages (WPs). WPs 3, 4 and 5 generate evidence through survey methods and case studies that this report complements with quantitative methods.

The first question to address in a quantitative macro-level ecological investigation of CCIs is the relevant geographic scale to consider. The report pursues a sub-national perspective, focusing on the regional (NUTS2) level, due to data availability.

The sub-national perspective is supported by several existing approaches and pieces of evidence. First, sustainable and inclusive growth has a strong spatial dimension. Existing literature shows that local variability in socioeconomic performances is associated to economically declining regions and resentment (Denti & Faggian, 2021; Dijkstra, Poelman, & Rodríguez-Pose, 2019; Iammarino et al., 2019). This spatial variability is the object of important policy efforts with the aim of pursuing cohesive development. Also, the fulfillment of Sustainable Development Goals needs a strong involvement of the local level to be accomplished (European Commission, 2015; Niestroy, Hege, Dirth, Zondervan, & Derr, 2019; UNDP, 2018). And this is again recognized by institutions. These efforts assign a central role to the regional level (Monfort, 2020).

Second, CCIs have strong spatial dimension, too (Comunian et al., 2010; R. Florida, Mellander, & Stolarick, 2008; Richard Florida, 2002; Montalto et al., 2019). Economic activities, including CCIs, benefit from agglomeration. Therefore they tend to cluster in certain areas and not in others (Faggian, Partridge, & Malecki, 2017; Imperiale, Fasiello, & Adamo, 2021; Maddah, Arauzo-Carod, & López, 2021). CCIs tend to cluster according to several location drivers: agglomeration economies, spin-off formations, institutions (Gong & Hassink, 2017). Also, CCIs are influenced by the presence of cultural amenities and Higher Education Institutions (HEIs) (Comunian et al., 2010), which are not uniformly present across countries.

Third, cultural products and activities produce sociocultural spillovers that are local. These sociocultural spillovers are capable of modifying the local structure of cultural norms and beliefs including attitudes towards minorities, propensity to collaborate, and trust (Denti, Crociata, & Faggian, 2021; Giavazzi, Petkov, & Schiantarelli, 2019; Vezzali, Stathi, Giovannini, Capozza, & Trifiletti, 2015). Through this externality channel, CCIs have the potential of transforming the local context towards more inclusiveness and sustainability.

The aforementioned strands of research corroborate the DISCE 'ecological' approach and its focus on the contextual analysis of CCIs. They also validate quantitative investigation at the sub-national level, which is the approach pursued by the present report.

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3. The country and regional outlook of CCIs in Europe

The first stage of quantitative mapping is comparing CCIs country-level figures to regional figures. Through this analysis, it is possible to detect regional variability that is not captured by country-level aggregation and to measure whether this variability is relevant. This aspect is relevant as the DISCE Description of Action suggested a strong role for regional scale in CCIs quantitative mapping (DISCE , 2019). This suggestion is corroborated by extensive literature providing for CCIs to have a strong spatial dimension, as also detailed in Deliverables D2.1 and D2.2.

Practically, this investigation addresses core dimensions of CCIs identified within DISCE: employment (Dent et al., 2020), the CCIs sectoral composition as conceptualized by the DISCE taxonomy (Pica & Crociata, 2022), Higher Education (Comunian et al., 2020a) and intellectual property and innovation (Pica & Crociata, 2022; Denti et al, 2022; Crociata, 2019). In measuring each dimensions, the report relies on the indicators proposed by deliverable D2.2 (Denti et al., 2022)[2]. For each dimension, country-level data and regional-level data across Europe are mapped and compared. Mapping and comparison are done considering yearly observations and dynamic trends.

3.1. Cultural employment

Employment is a relevant factor for the DISCE project and it has been extensively discussed in reports D2.1 (Pica & Crociata, 2022) and D3.2 (Dent et al., 2020). In applied research, employment is established proxy for:

- how much a country is investing in a sector
- how much a sector is contributing to overall economic performance (Dijkstra et al., 2019; Duranton, Rodríguez Pose, & Sandall, 2009).

This report measures cultural employment using available Eurostat statistics. These statistics are designed using the EU's Labour Force Survey (EU-LFS), which covers people aged 15 years or more (Eurostat, 2021a). On these survey data, Eurostat compiles data that are labelled 'cultural employment' according to the field of economic activity in which the employed person works and according to their occupation, using a matrix to create an aggregate for all cultural employment. More into details, Eurostat measures cultural employment considering all persons employed having either a cultural profession or working in the cultural sector[3]. These statistics are based on the methodology proposed by the European Statistical System Network on Culture (Bina et al., 2012). They provide for a more comprehensive account of cultural employment compared to existing measures which use a more restrictive silo perspective.

[2] Table A3 in the Appendix provides the detailed mapping between the variables used in this report with the proposed indicators detailed in deliverable D2.2.

[3] Cultural employment includes all persons working in economic activities that are deemed cultural, irrespective of whether the person is employed in a cultural occupation. It also covers persons with a cultural occupation, irrespective of whether they are employed in a cultural economic activity (Eurostat, 2021a). It covers employees in the following NACE Rev2 economic activities (Dent et al., 2020): Publishing activities, Motion picture, video and television programme production, sound recording and music publishing activities, Programming and broadcasting activities, Creative, arts and entertainment activities, Libraries, archives, museums and other cultural activities

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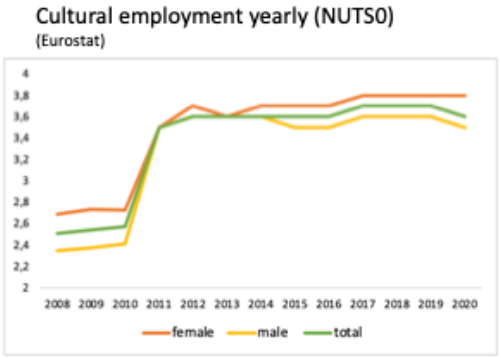
However, it should be reminded that the Eurostat measure for cultural employment is still designed with a conservative approach, since it fails to account for the actual 'cultural' part of some activities and occupations which are only partially cultural (Dent et al., 2020). At the same time, cultural employment as measured by Eurostat encompasses occupations and industries that are widely labelled as creative (Dent et al., 2020) and it comprehends employment figures on cultural industries. Therefore, it appears as the most comprehensive measure for CCIs employment at the present moment. It is also important to add that there are no other data on the spatial distribution of creative employment which are harmonized at the European level (Dent et al., 2020). Clearly, cultural employment figures do not entirely cover the 'creative workforce', which was one of the core elements addressed by DISCE. The report considers this data limitation at the same time acknowledging that both Eurostat and other national statistical agencies and organizations rely on cultural employment (instead of creative employment) and that specific research on the creative workforce within DISCE has provided for the relevance of Eurostat cultural employment statistics (Dent et al., 2020).

Figure 1 shows the 2008-2020 trends in cultural employment across EU countries, UK and all the candidate countries for which data are available (Montenegro, North Macedonia, Serbia and Turkey). Figure 1 also breaks down trends in cultural employment by gender. Through this classification, it appears that the share of female cultural employment is steadily greater than the share of male cultural employment when data are aggregated at the European level. This might prompt the interpretation that cultural employment does not display gender-discrimination. However, further data are needed to draw conclusions on gender-equality in cultural employment, since relevant elements are missing and unfortunately not available. For instance, data on the share of women in top-medium and low positions are needed to credibly assess the degree of gender-equality in cultural employment, as well as data on the precariousness of jobs by gender (Bertocchi & Bozzano, 2019; European Institute for Gender Equality, 2020).

From Figure 1, it appears that cultural employment grew by 47% between 2008 and 2017. In the same time span, male employment had a growth rate 12% higher than female employment.



EU 27			
	Average % '08-'17	Growth '08-'17	Growth '08-'20
Female	3,38	41,34	12,27
Male	3,20	53,44	9,26
Total	3,28	47,55	9,70

Data source: Eurostat (cult_emp)

Figure 1 Trends in cultural employment across EU countries, UK and all the candidate countries for 2008-2020

The growth rate of cultural employment does not only differ between men and women. Data show relevant differences across countries, as portrayed by Figure 2. Southern countries (Greece, Italy, Spain, Portugal, Malta, Cyprus) had growth rates of cultural employment mainly below EU27 average, while the opposite applies to northern countries (Denmark, Finland, Sweden, Norway, Iceland). Eastern countries display the greatest variability in growth rate, with Romania having the lowest one. Accounting for gender differences gives a different picture, which is summarized in Figure 3. The growth of cultural employment in Baltic

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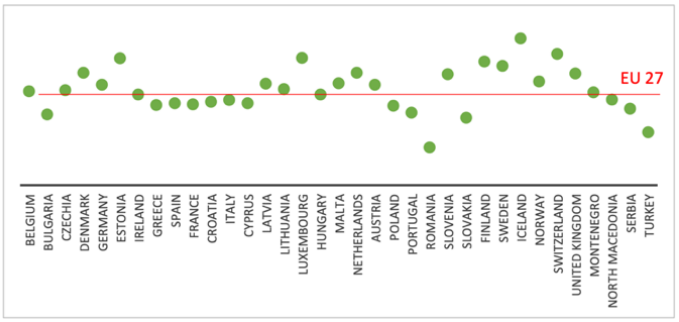
countries is driven by women as in Bulgaria and Turkey, while in Netherlands, Austria, Belgium, Malta, Norway and UK the opposite applies.

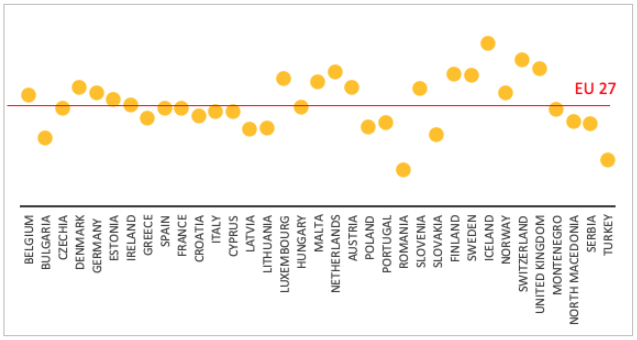


Cultural employment total 2008-2017 (NUTS0)
(Eurostat)

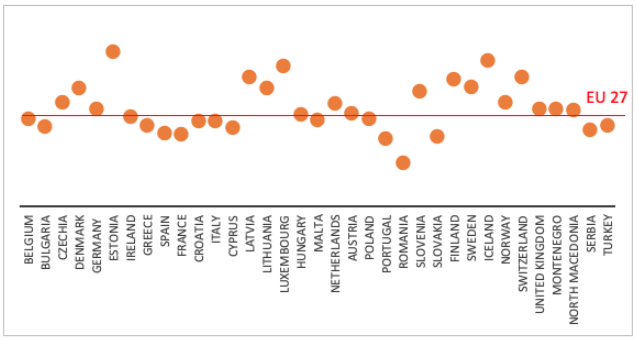
Data source: Eurostat (cult_emp)

Figure 2 Average growth rate of cultural employment for EU27 countries, UK and candidate countries (2008-2017)

Cultural employment Male 2008-2017 (NUTS0)
(Eurostat)



Cultural employment Female 2008-2017 (NUTS0)
(Eurostat)



Data source: Eurostat (cult_emp)

Figure 3 Average growth rate of cultural employment by gender for EU27 countries, UK and candidate countries (2008-2017)

Available data on cultural employment allow to show the importance of analyzing data at sub-national level. This point is a key element of the DISCE approach, which stresses the importance of mapping and analyzing indicators through a spatial lens. Just a simple comparison between country-level and regional-level data on cultural employment is enough to show that the country level fails to account for sizeable differences across regions. This is clearly outlined by Figures 4 and 5. Figure 4 maps cultural employment across regions (NUTS2)[4] in 2014 and in 2019. Figure 5 maps country-level aggregates of cultural employment across countries (NUTS0) in 2014 and in 2019. It is straightforward to see that country-level figures are not paralleled with homogeneous regional ones.

[4] Detailed codes and names of European regions according to NUTS2 classification are provided in Table A5 in the Appendix

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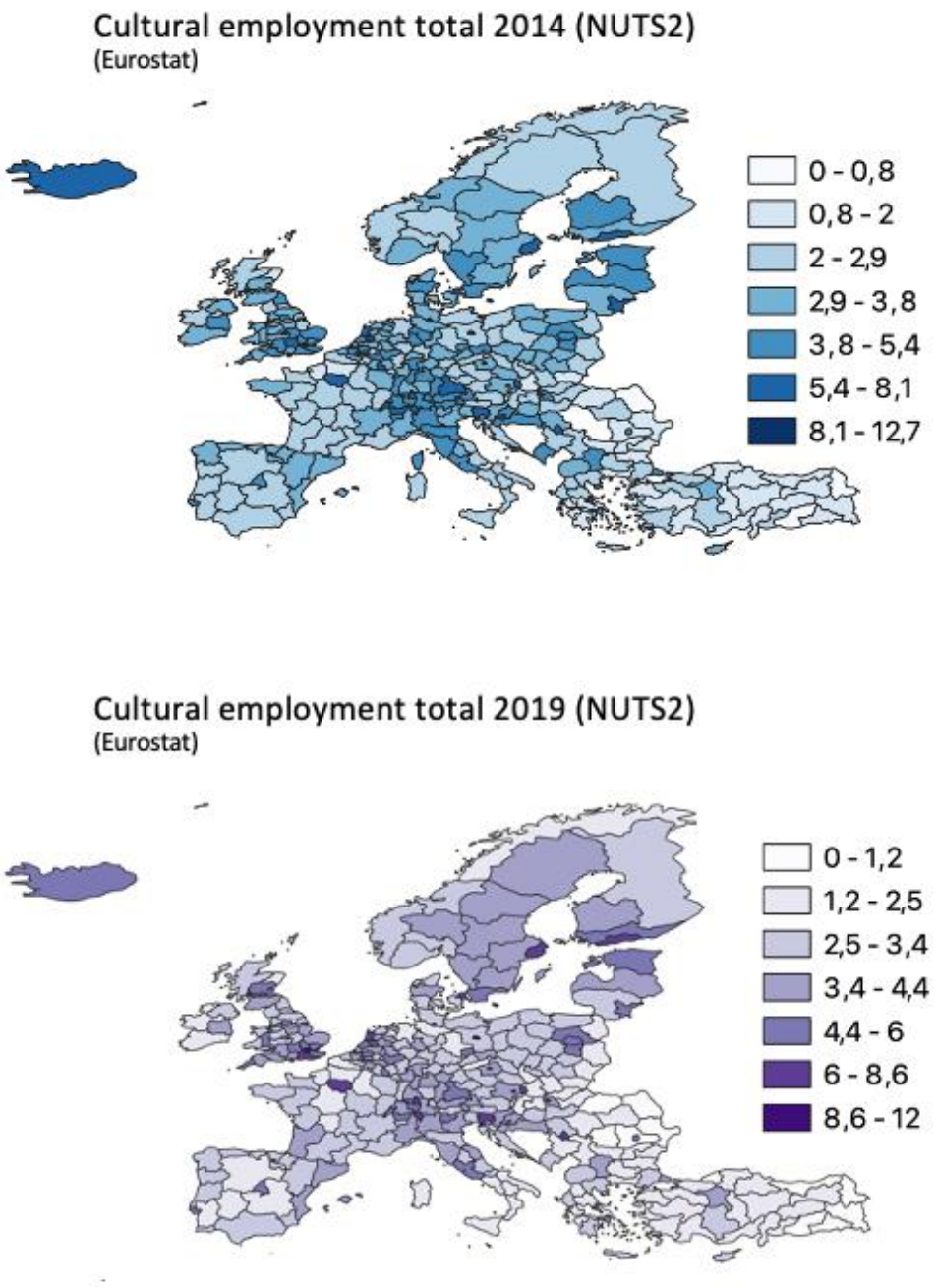

Data source: Eurostat (cult_emp_reg)

Figure 4 Mapping cultural employment between 2014 and 2019 across regions (NUTS2). Regions belong to EU27 countries, UK and candidate countries. Cultural employment as percentage of total employment

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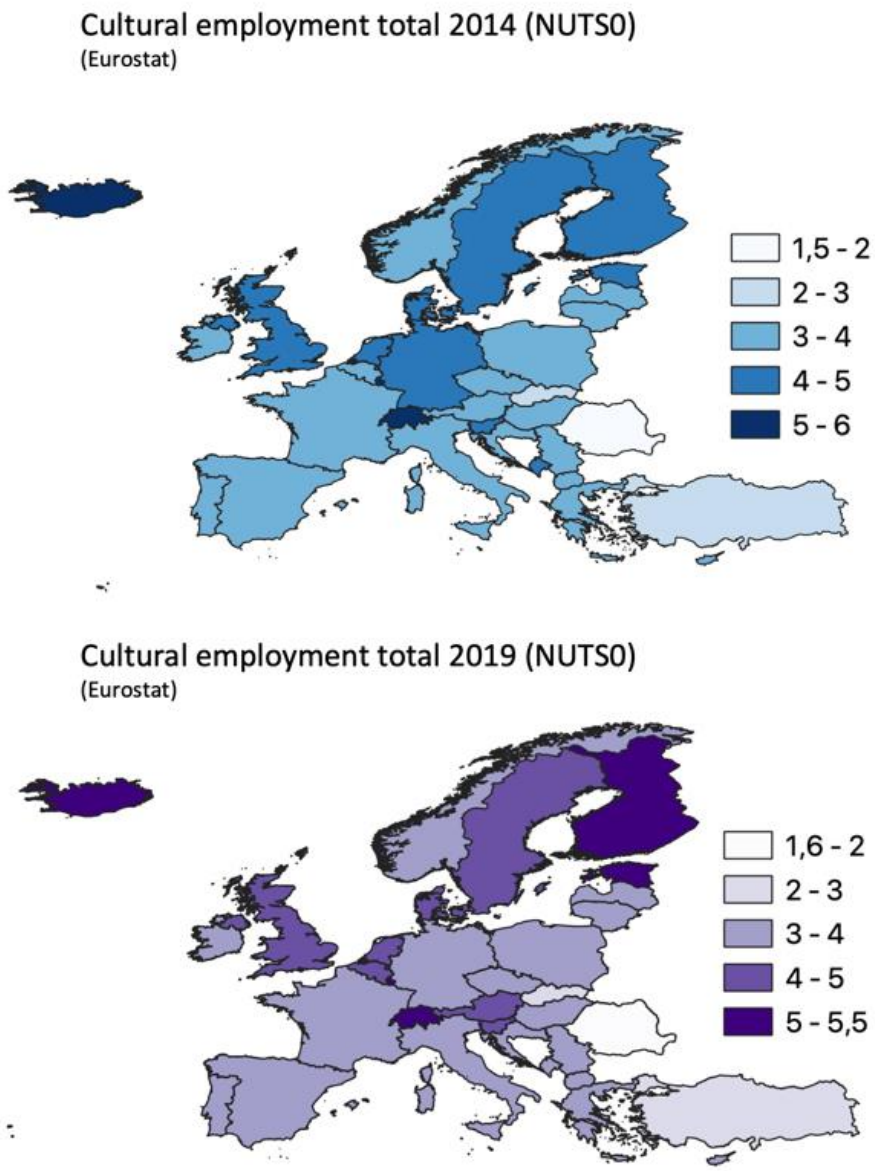

Data source: Eurostat (cult_emp)

Figure 5. Mapping cultural employment between 2014 and 2019 across countries (NUTS0). EU27 countries, UK and candidate countries. Cultural employment as percentage of total employment

From Figure 4 other interesting facts emerge:

- Each country has relevant differences in cultural employment across regions both in 2014 and in 2019.
- Regional differences in cultural employment are not stable over time. For instance, in 2014 French regions were quite homogeneous in their share of cultural employment, as outlined by the close color nuances in the top map of Figure 4. In 2019 the same regions had more variability, as showed by the more scaled shades in the bottom map. The contrary applies to Swedish regions, which differed more in 2014 than in 2019. From Figure 4, it is also clear that differences across Spanish regions remained stable between 2014 and 2019. Similarly, also regions with the national capital display strong stability along time: they are characterized by the highest shares of cultural employment both in 2014 and 2019.

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Overall, this provides for local culture economies to contribute to the country-level culture economy with weights that differ both spatially and temporally. These two dimensions of variability are quantitatively relevant, yet they are not captured by country-level figures. Further, they are not accounted for in spatially blind policy design.

This evidence supports the DISCE approach in assigning a central role to an 'ecological' perspective when investigating cultural economy and CCIs. The same evidence also corroborates the alignment of the DISCE approach to existing works about inclusive growth at the European level. To this regard, on the one hand policy for inclusive growth has a strong focus on geography, pursuing local development strategies aimed at leaving no place behind (Rodríguez-Pose, 2018). On the other hand, policy for inclusive growth assigns a crucial role to culture (European Commission, 2020). Through this report, DISCE contributes to bridge these two sides of policy for inclusive growth. Mapping the relevance of the geography of cultural economy gives information that could contribute to the understanding of existing patterns of inclusiveness.

The size and the evolution of local variability in cultural employment

The sizeable regional variability in cultural employment can be further analyzed, to provide a measure of the strength of this variability. Using Eurostat data on cultural employment at NUTS2 level (regions) and NUTS0 level (country) between 2014 and 2019, the coefficient of variation[5] allows to get a measure of the variability of cultural employment across regions. This methodology is used in research and policy papers addressing regional convergence and inclusive growth at the European level (Monfort, 2020), hence it appears useful to use it in the assessment of territorial convergence regarding cultural economy. The higher the coefficient of variation, the greater the dispersion of cultural employment across regions[6]. In practical terms, countries with a high value for the coefficient of variation are characterized by high variability of cultural employment at the regional level. With available data, it is possible to measure the coefficient of variation for each country in different years. This first measure conveys yearly snapshots on the different regional level of cultural employment. These snapshots show the yearly level of territorial unbalance in cultural employment across regions in a country. Columns 4 and 5 in Table 1 outline the coefficients of variation in 2014 and 2019 for EU countries and all the candidate countries for which data are available (Montenegro, North Macedonia, Serbia and Turkey).

[5] The coefficient of variation of a variable is the ratio of the standard deviation to the mean. It is an established indicator to measure territorial convergence (Monfort, 2020)

[6] More into details, if the coefficient of variation has value zero, the share of cultural employment is the same in all regions

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Table 1[7] Dynamic and spatial evolution of cutural employment for regions (NUTS2), EU27 countries, UK and candidate countries.

	(1)	(2)	(3)	(4)	(5)	(6)
	cultural employment (%)					
Country	2014	2019	trend employment 2014 2019	coefficient of variation NUTS2 2014	coefficient of variation NUTS2 2019	trend coefficient of variation NUTS2 2014 2019
Austria	4	4,2	↗	0,41	0,38	↘
Belgium	4	4,2	↗	0,35	0,34	↘
Bulgaria	2,7	2,7	=	0,40	0,32	↘
Croatia	3,8	3,6	↘	0,47	0,48	↗
Cyprus	3,1	3,4	↗			
Czechia	3,8	3,6	↘	0,77	0,67	↘
Denmark	4,6	4,4	↘	0,38	0,39	↗
Estonia	4,6	5,1	↗			
Finland	4,8	5,1	↗	0,44	0,33	↘
France	3,4	3,5	↗	0,32	0,29	↘
Germany	4,1	4	↘	0,38	0,39	↗
Greece	3,3	3,3	=	0,26	0,28	↗
Hungary	3,7	3,6	↘	0,43	0,59	↗
Iceland	5,9	5,5	↘			
Ireland	3,8	3,3	↘	0,36	0,31	↘
Italy	3,5	3,6	↗	0,25	0,23	↘
Latvia	4	3,5	↘			
Lithuania	4	3,9	↘	0,46	0,44	↘
Luxembourg	6	5,1	↘			
Malta	4,5	5,2	↗			
Netherlands	4,6	4,8	↗	0,33	0,30	↘
Norway	4	3,9	↘	0,47	0,39	↘
Poland	3,2	3,3	↗	0,31	0,28	↘
Portugal	3,1	3,4	↗	0,41	0,39	↘
Romania	1,5	1,6	↗	0,44	0,42	↘
Slovakia	2,6	2,9	↗	0,86	0,89	↗
Slovenia	4,7	4,9	↗	0,35	0,39	↗
Spain	3,4	3,6	↗	0,20	0,18	↘
Sweden	4,7	4,9	↗	0,34	0,29	↘
Switzerland	5,3	5,4	↗	0,21	0,20	↘
United Kingdom	4,5	4,6	↗	0,50	0,46	↘
average	**4,00**	**4,00**	=	**0,47**	**0,46**	↘

Data source: Eurostat (cult_emp , cult_emp_reg)

Using the difference in coefficients of variation between 2014 and 2019 for each country, it is then possible to measure if the regional differences in cultural employment have increased or decreased over time. The larger the difference in coefficients of variation between 2014 and 2019, the more regions are diverging in their trajectories of cultural employment along time. This could be a signal for unbalanced territorial development and the consequent threats of lagging regions and regional inequality (Iammarino et al., 2019). Column 6 in Table 1 presents the difference in coefficients of variation between 2014 and 2019 for each country. For most countries, the coefficient of variation decreases between 2014 and 2019, suggesting that regions are converging towards similar outlooks for cultural development. However, many eastern European

[7] Countries with only one region do not have the coefficient of variation

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countries, Denmark, Germany and Greece display an increasing coefficient of variation, meaning that regional differences in cultural employment are growing.

The coefficient of variation can be analyzed together with country-level trends in cultural employment, which are outlined in columns 1 and 2 in Table 1. By doing this, it is possible to have information on the direction and the inclusiveness of cultural employment growth for each country. For instance, Finland has positive growth of cultural employment at the country level which combines a 0.11 decrease in the coefficient of variation. This decrease means that Finland had a 11 percentage-point reduction in regional differences between 2014 and 2019. This suggests that Finland is on a growth path for cultural employment that is territorially balanced and inclusive. The same applies to Sweden, whose positive country-level trend in cultural employment between 2014 and 2019 combines with 5% reduction in regional differences. On the other hand, Slovenia and Slovakia have positive country-level trend in cultural employment between 2014 and 2019 and increasing regional differences, which could be a hint of unbalanced and non-inclusive growth. Hungary displays declining cultural employment with 16% increase in regional disparities. This could suggest that the overall reduction in cultural employment is supplemented with increasing regional disparities, opening to growing territorial non-inclusiveness.

So, evidence highlight that cultural employment might be increasing at the country level, while having diverging trends between regions. If this happens, then the country might face the threat of uneven spatial growth of cultural economy, with some regions lagging and other thriving. This territorial imbalance could open to discontent and subsequent socioeconomic negative outcomes (Dijkstra et al., 2019; Iammarino et al., 2019). Countering the observed geography of territorial injustice alleviates negative socioeconomic outcomes such as discontent (McCann, 2020), hate (Denti & Faggian, 2021) and economic stagnation (Martin, Tyler, Storper, Evenhuis, & Glasmeier, 2018). Hence, looking at the sub-national geography of cultural economy appears to matter from an inclusive-policy perspective.

In Table 1, the relationship between country-level and regional level has been analyzed without considering that regions might be grouped into clusters according to specific features that can be meaningful with respect to culture economy and inclusiveness. More into details, it is possible to move from the basic measure of regional variability captured by the coefficient of variation to consider differences across regions that are grounded in specific characteristics.

Table 2 describes patterns of spatial convergence in cultural employment when regions are grouped according to a specific characteristic. For each country, regions are clustered depending on having a creative and cultural urban hub or not. This classification appears interesting, since creative and cultural urban hub might have a relevant role in explaining the regional figures on cultural employment, as argued by the literature on the 'creative class' (Comunian et al., 2010; Richard Florida, 2002). The presence of creative and cultural hubs in the region is assessed using data on creative and cultural city as defined by The Cultural and Creative Cities Monitor[8] (Montalto et al., 2019). Regions (NUTS2) are divided in two groups for each country (NUTS0):

- group a. contains regions (NUTS2) with at least one creative and cultural city as defined by The Cultural and Creative Cities Monitor (Montalto et al., 2019)
- group b. contains all the other regions (NUTS2) for a given country.

Table 2 summarizes the results of this investigation. For each group, column 2 presents the share of cultural employment over total employment for 2014. Column 3 shows the difference in cultural employment shares

[8] The Cultural and Creative Cities Monitor lists European cities with a minimum of 50 000 inhabitants which have been European Capitals of Culture, or which have been shortlisted to become an European Capital of Culture up to 2023; UNESCO Creative Cities, cities hosting at least two international cultural festivals running until 2018 or 2017 for biennal festivals.

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between regions with at least one creative and cultural city (group a.) and regions without (group b.) for 2014. If this gap is positive, then regions with at least one creative and cultural city have a higher share of people employed in cultural economy than regions with no creative and cultural city.

Column 4 presents shares of cultural employment over total employment for 2019. Column 5 shows the difference between the percentage of cultural employment between regions with at least one creative and cultural city and regions without for 2019. Column 6 highlight the 2014-2019 trend in the cultural employment gap between regions, whose value is given by the difference between column 5 and column 3. The upward-pointing red arrow outlines a growing gap, while the downward-pointing green arrow outlines a narrowing gap. Finally, column 7 summarizes the 2014-2019 trend in the cultural employment for the country (NUTS0). In this case, upward-pointing green arrow outlines growing employment, while the downward-pointing red arrow outlines declining employment. Columns 6 and 7 describe relevant trends in cultural employment, whose combination further supports the importance of the sub-country level to better understand inclusiveness with respect to cultural economy.

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Table 2[9] Dynamic and spatial trends in cutural employment for regions (NUTS2) with and withouth Creative and Cultural Cities according to the Cultural and Creative Cities Monitor. Levels and trends in cutural employment at the coutnry level and levels and trends in cutural employment variability across regions. Regions belong to EU27 countries, UK and candidate countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country	Type of NUTS2	cultural employment 2014 (%)	difference in cultural employment between NUTS2 in the same country	cultural employment 2019 (%)	difference in cultural employment between NUTS2 in the same country	trend in difference in cultural employment between NUTS2	trend in cultural employment NUTS0
Austria	a. NUTS2 with CC City*	4,17	0,29	4,47	0,94	↗	↗
	b. other NUTS2	*3,88*		*3,53*			
Belgium	a. NUTS2 with CC City	4,14	0,81	4,35	1,05	↗	↗
	b. other NUTS2	*3,33*		*3,30*			
Bulgaria	a. NUTS2 with CC City	2,63	0,93	2,60	0,90	↘	=
	b. other NUTS2	*1,70*		*1,70*			
Switzerland	a. NUTS2 with CC City	5,78	1,14	5,63	0,36	↘	↗
	b. other NUTS2	*4,63*		*5,27*			
Croatia	a. NUTS2 with CC City	3,50	-0,80	3,50	-0,30	↘	↘
	b. other NUTS2	*4,30*		*3,80*			
Czechia	a. NUTS2 with CC City	3,95	0,70	3,62	0,37	↘	↘
	b. other NUTS2	*3,25*		*3,25*			
Denmark	a. NUTS2 with CC City	4,97	1,72	4,60	1,50	↘	↘
	b. other NUTS2	*3,25*		*3,10*			
Finland	a. NUTS2 with CC City	5,10	2,30	5,40	2,00	↘	↗
	b. other NUTS2	*2,80*		*3,40*			
France	a. NUTS2 with CC City	3,06	0,33	3,30	0,65	↗	↗
	b. other NUTS2	*2,73*		*2,65*			
Germany	a. NUTS2 with CC City	4,84	1,72	4,63	1,62	↘	↘
	b. other NUTS2	*3,11*		*3,01*			
Greece	a. NUTS2 with CC City	2,88	0,35	3,13	1,03	↗	=
	b. other NUTS2	*2,52*		*2,10*			
Italy	a. NUTS2 with CC City	3,34	0,56	3,43	0,69	↗	↗
	b. other NUTS2	*2,78*		*2,73*			
Hungary	a. NUTS2 with CC City	3,35	-0,95	3,35	-0,75	↘	↘
	b. other NUTS2	*4,30*		*4,10*			
Netherlands	a. NUTS2 with CC City	4,69	1,53	4,76	1,26	↘	↗
	b. other NUTS2	*3,16*		*3,50*			
Norway	a. NUTS2 with CC City	5,35	2,59	4,90	2,08	↘	↘
	b. other NUTS2	*2,76*		*2,82*			
Poland	a. NUTS2 with CC City	2,83	-0,43	2,94	-0,53	↗	↗
	b. other NUTS2	*3,25*		*3,46*			
Portugal	a. NUTS2 with CC City	3,37	1,27	3,50	1,60	↗	↗
	b. other NUTS2	*2,10*		*1,90*			
Romania	a. NUTS2 with CC City	2,25	1,35	2,08	1,28	↘	↗
	b. other NUTS2	*0,90*		*0,80*			
Slovakia	a. NUTS2 with CC City	3,43	1,13	3,80	1,40	↗	↗
	b. other NUTS2	*2,30*		*2,40*			
Spain	a. NUTS2 with CC City	3,32	0,37	3,52	0,45	↗	↗
	b. other NUTS2	*2,95*		*3,07*			
Sweden	a. NUTS2 with CC City	4,50	1,30	4,74	1,07	↘	↗
	b. other NUTS2	*3,20*		*3,67*			
UK	a. NUTS2 with CC City	4,58	0,76	4,83	0,85	↗	↗
	b. other NUTS2	*3,81*		*3,97*			
average	**a. NUTS2 with CC City**	**3,91**	**0,86**	**3,96**	**0,89**	↗	=
	b. other NUTS2	***3,05***		***3,07***			
Column 3: difference between column 2.a and column 2.b							
Column 5: difference between column 4.a and column 4.b							
Column 6: difference between column 5 and column 3							

Data source: Eurostat (cult_emp , cult_emp_reg, Montalto et al (2019))

[9] Countries with only one region and countries where all regions belong to a single group are not considered.

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From Table 2, five spatially-based patterns of cultural employment trend emerge:

1. Cultural employment is diverging between different types of regions while it is growing at country level. Hence, the country-level growth of cultural employment is not benefitting regions equally. Regions with at least one creative and cultural city are growing at fastest rate compared to other regions and this gap is growing along time. This happens for Austria, Belgium, Spain, France, Italy, Portugal, Slovakia, and the UK. From Table 1 we know that Austria, Belgium, Spain, France, Italy, Portugal, and the UK had declining regional differences on average. Results from Table 2 show that these average values are not representative of the trends between regions with CCIs hubs and other regions. By showing that averaged figures fail to capture relevant trends, these findings further support the need for spatial investigation.
2. Cultural employment is converging between regions while it is growing at country level. In this case, the country-level growth of cultural employment is complemented with a reduction in regional gaps, suggesting a territorial inclusive growth. This happens for Switzerland, Finland, Netherlands, Romania, Sweden, and Poland.
3. Cultural employment is converging between regions while it is declining at country level. In this case it could be that the shirking of cultural employment hits harder regions where cultural employment was higher. This happens for Croatia, Czechia, Denmark, Germany, Hungary, and Norway.
4. Cultural employment is converging between regions while it is steady at country level. In this case, there are no changes at the country level while regions are converging in their share of cultural employment. This happens in Bulgaria.
5. Cultural employment is diverging between regions while it is steady at country level. Here there are no changes at the country level while regions are diverging in their share of cultural employment. This territorial imbalance outlook applies to Greece.

Table 3 summarizes these five scenarios. It also lists the potential threats associated and maps the countries accordingly using the information summarized in Table 2. The evidence presented in this section strongly corroborates the relevance of the spatial dimension in addressing cultural economy. Analyzing cultural employment data at the regional level consents to get the following insights, that have been detailed above:

- Cultural employment has strong spatial variability across European regions, which is not captured by country-level aggregate figures.
- Spatial variability across regions changes along time. For instance, regional geography of cultural employment in 2014 differs from regional geography of cultural employment in 2019.
- Countries differ in their spatial variability of cultural employment, with some countries having more territorial unbalance than others.
- Patterns of spatial variability can be detected by grouping regions according to relevant features, such has the presence of cultural and creative hubs, that can contribute to explain why some regions perform better than others.
- Regional figures can be combined to country-level ones to get insights on the inclusiveness of cultural trends with respect to local communities.
- Figures at smaller geographic scale (NUTS3) could further improve the understanding of cultural economy, allowing to consider degrees of urban ranking, metropolitan areas, decentralized areas.

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Table 3 Summary of spatially-based trends in cultural employment for EU27 countries, UK and candidate countries having more than one regions

trend in difference in cultural employment between NUTS2	trend in cultural employment NUTS0	Combined trends	Potential threat to cultural employment	Country (NUTS0)
↗	↗	1. Regional gap in cultural employment increases 2. Cultural employment is growing	Spatially unbalancing growth	Austria, Belgium, Spain, France, Italy, Portugal, Slovakia, UK
↘	↗	1. Regional gap in cultural employment decreases 2. Cultural employment is growing	Spatially balancing growth	Switzerland, Finland, Netherlands, Romania, Sweden, Poland
↘	↘	1. Regional gap in cultural employment decreases 2. Cultural employment is declining	Spatially balancing decline	Czechia, Germany, Denmark, Norway, Hungary, Croatia
↘	=	1. Regional gap in cultural employment decreases 2. Cultural employment is stable	Spatially balancing steady	Bulgaria
↗	=	1. Regional gap in cultural employment increases 2. Cultural employment is stable	Spatially unbalancing steady	Greece

3.2. CCIs enterprises

Together with cultural employment, other variables contribute to describe the socioeconomic geography of cultural economy and CCIs in Europe. This section outlines the spatial outlook of CCIs enterprises and their characteristics, providing figures on several aspects: the degree of sectoral diversification and the geography of local business units, the volume of wages and salaries, and new job creations.

As before, first country-level aggregate measures are compared to regional one to assess the relevance of spatial heterogeneity. Then descriptive evidence is presented to provide for relevant aspects in the spatial distribution and dynamic evolution of CCIs across Europe.

In practical terms, CCIs firms are defined considering the NACE Rev.2 categories detailed in D.2.2 (Denti et al., 2022). This classification is applied to Eurostat data on Structural Business Statistics at country (NUTS0) and region (NUTS2) level. More into details, this section presents statistics referring to firms belonging to the NACE Rev.2 categories summarized in Table 4[10].

[10] Eurostat Structural Business Statistics consider market-oriented enterprises. Non-profit companies, foundations, charities, and public services are generally not included. Structural Business Statistics do not currently include figures for two NACE Rev.2 codes that are relevant for CCIs: 90 (Creative, arts and entertainment activities) and 91 (Libraries, archives, museums and other cultural activities). At the same time, they convey the most comprehensive available data source for CCIs-related enterprises. Switching to national statistical sources would pose a great limitation to European comparability as Member States have different approaches in assigning enterprises to NACE Rev.2 codes

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Table 4 Available data on Cultural and creative sectors (economic activities — NACE Rev. 2) at NUTS2 level

C18	Printing and reproduction of recorded media
J58	Publishing of books, periodicals and other publishing activities
J59	Motion picture, video and television programme production, sound recording and music publishing activities
J60	Programming and broadcasting activities
J62	Computer programming, consultancy and related activities
J63	Information service activities
M71	Architectural and engineering activities; technical testing and analysis
M72	Scientific research and development
M73	Advertising and market research
M74	Specialised design activities, Photographic activities, Translation and interpretation activities

The evolution of wages and salaries in CCIs is mapped considering two points in time: 2008[11] and 2017. Figure 6 provides for cross-country static and dynamic differences in wages and salaries in CCIs:

- wages and salaries in CCIs at country level (NUTS0) for 2008
- wages and salaries in CCIs at country level (NUTS0) for 2017
- 2017-2008 differential between wages and salaries at country level (NUTS0).

In 2008, Germany, Italy, UK, Netherlands, and Spain had the highest volume of wages and salaries in CCIs compared to the other European countries. In 2017, the leading countries were Germany, Spain and the UK. Looking at the 2017-2008 dynamic trend (bottom map in Figure 6), it appears that countries had quite different growth of CCIs wages and salaries, with Germany, Spain, Sweden and the UK experiencing the biggest growth.

[11] Before 2008, NACE classification was different, hence firms were grouped through different criteria

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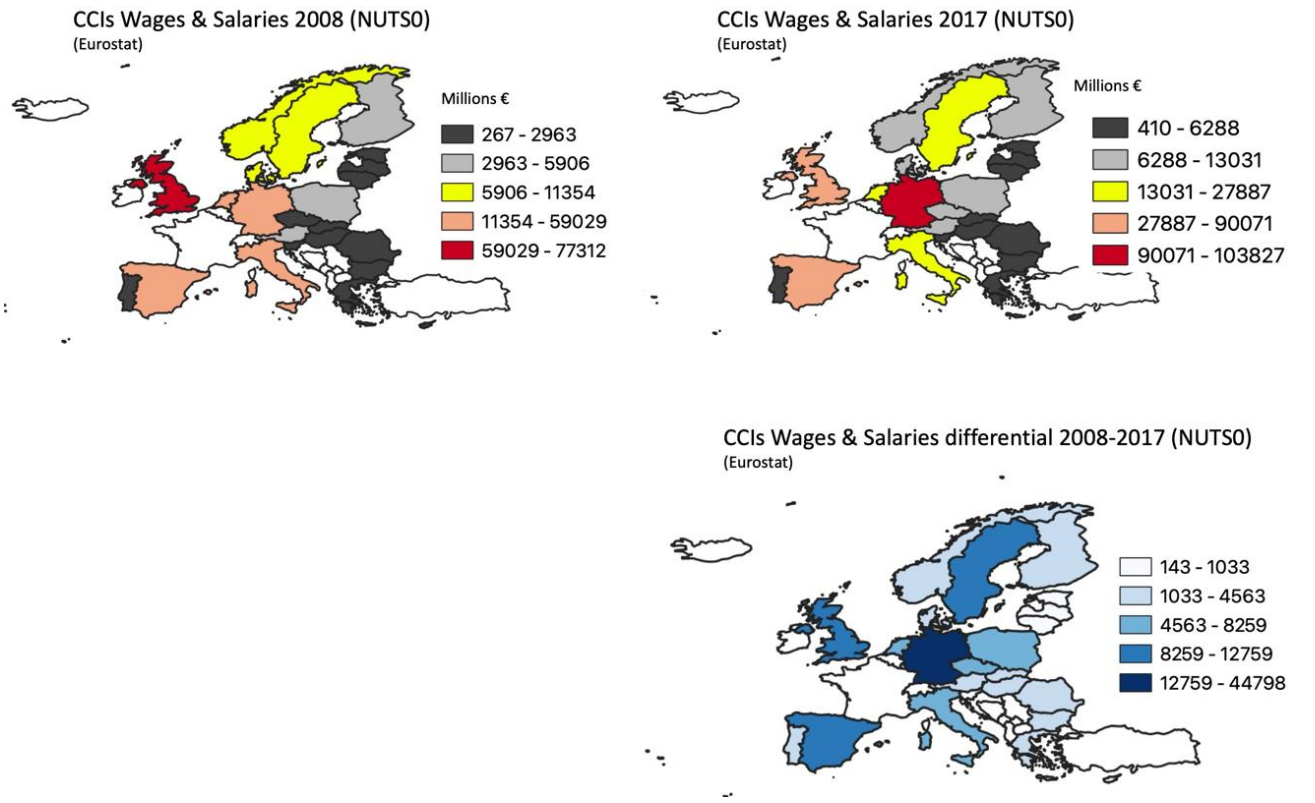

Data source: Eurostat (LC_RCOST_R2)

Figure 6 CCIs Wages and salaries across European countries (NUTS0) in 2008 and 2017[12]

As done before with cultural employment, wages and salaries in CCIs are now mapped at regional (NUTS2) level, to evaluate the relevance of sub-national spatial heterogeneity. Figure 7 shows the results of this exercise. Again, evidence corroborates the importance to address the regional perspective in analyzing cultural economy and CCIs. For instance, comparing figures on wages and salaries in CCIs between Spain as a country (Figure 6) and Spanish regions (Figure 7), it is easy to grasp how country-level aggregates fails to capture sizeable local differences. The same applies to the UK and Sweden, while Portugal does not display relevant regional variability with respect to wages and salaries in CCIs. Through this mapping exercise, data further support the DISCE 'ecological' approach, adding another core economic dimension of CCIs which can be better understood through a contextual lens.

[12] Data are not available for: Belgium, France, Ireland, Croatia, Luxemburg, Malta, Montenegro, North Macedonia, Serbia, Turkey

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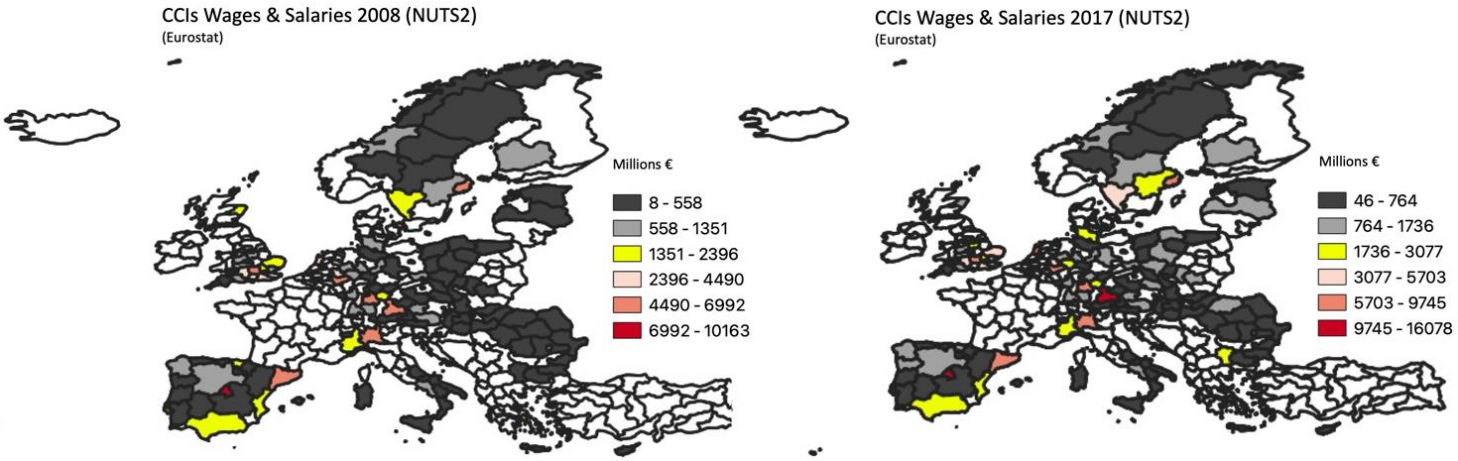

Data source: Eurostat (SBS_R_NUTS06_R2)

Figure 7 CCIs Wages and salaries across European regions (NUTS2) in 2008 and 2017[13]

The size and the evolution of local variability in CCIs statistics: wages, industry composition, and new job creation

Local diversity is easily detected also mapping the evolution of wages and salaries in CCIs as share of total wages and salaries. Figure 8 maps the share of wages and salaries in CCIs on total wages and salaries across Europe macro-regions (NUTS1) in 2008 and 2017. It is straightforward to detect spatial variability in both years. Further, spatial variability evolves along time. In 2008 spatial differences are mainly characterizing UK, Spain and Sweden in 2008. In 2017 they appear to be more pronounced and affecting more countries.

Through regional (NUTS2) data, it is also possible to map the degree of sectoral diversity within CCIs. CCIs comprise several sectors, from printing to broadcasting. Available data (Eurostat, 2018) allow to map all sectors listed in Table 4 across regions (NUTS2) using data on local units for each sector. An entropy index is then applied to these data to provide a measure of local structural diversity. The lower that value of the entropy index, the more diversified is the regional sectoral composition of CCIs[14]. Higher diversification could be beneficial in terms of sustainability, given existing evidence supporting diversified industries as enablers of the composite transformation processes associate to achieving sustainability (Steen & Weaver, 2017). Findings are outlined in Figure 9. In 2008 CCIs sectoral composition displayed regional variability, while in 2017 CCIs appears more uniform. Spain and Italy display the strongest trend towards a reduction of sectoral diversity.

[13] Data are not available for NUTS2 in white
[14] The entropy index is the Hirschman-Herfindahl diversity index. See Tabner (2007) for more details.

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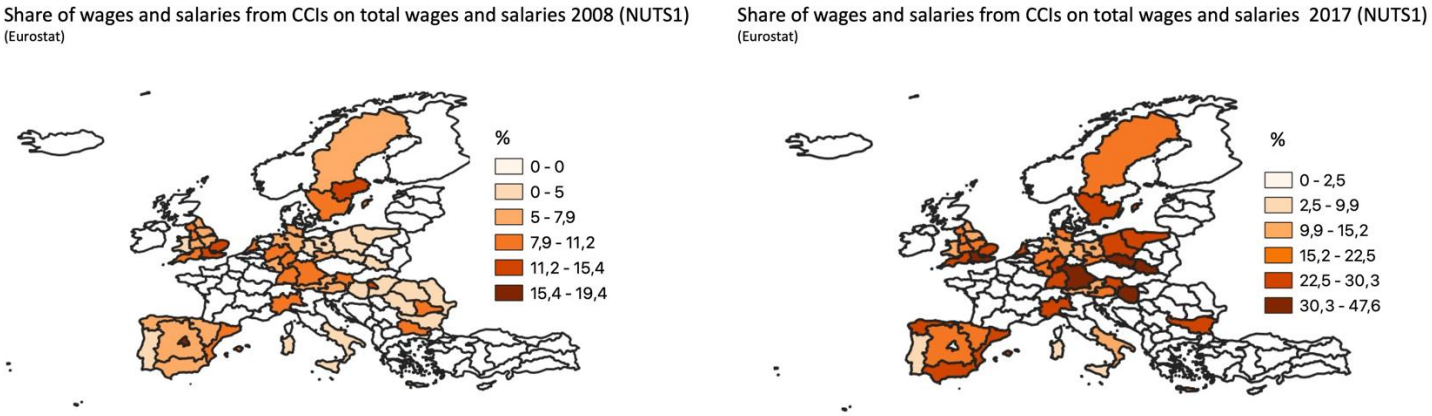
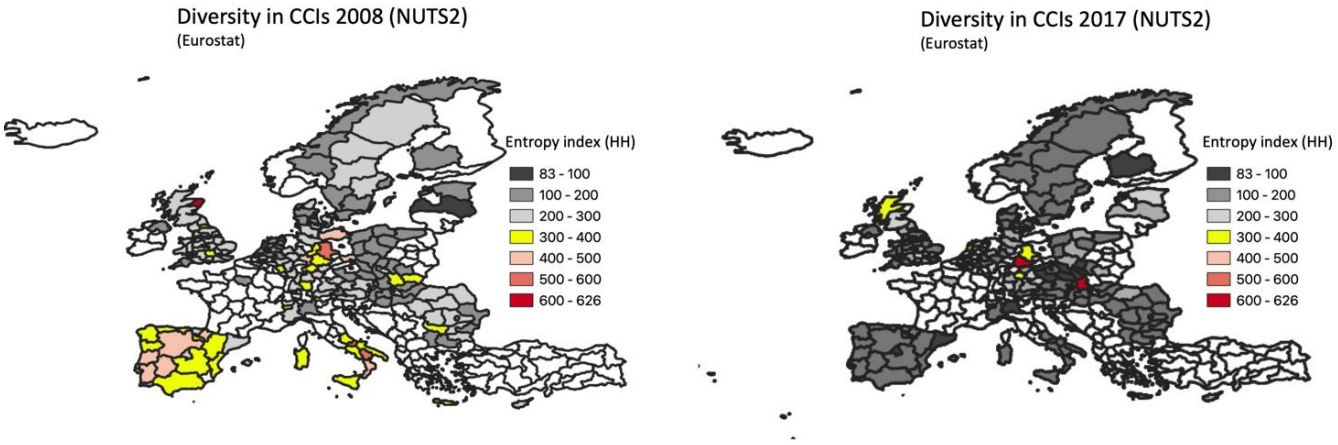


Data source: Eurostat (SBS_R_NUTS06_R2, lc_rcost_r2, reg_lcs_r2)

Figure 8 Spatial and dynamic evolution of wages and salaries in CCIs on total wages and salaries across Europe macro-regions (NUTS1) 2008-2017[15]



Data source: Eurostat (SBS_R_NUTS06_R2)

Figure 9 Sector diversity in CCIs across regions (NUTS2) in 2008 and 2017[16]

Finally, also data measuring new job creation in CCIs enterprises across Europe show strong pattern of spatial variability. Figure 10 maps new job creation across CCIs enterprises at the regional level (NUTS2) between 2009 and 2017[17]. This map shows sizeable spatial variability within all countries for which data are available. In UK, Spain, Germany, Poland and the Netherlands there are regions where new job creation in CCIs enterprises grew significantly which are neighboring with region in which new job creation in CCIs enterprises heavily dropped. Clearly, country-level aggregate measures fail to account for this pattern of territorial imbalance, since they are designed to average across the entire country.

[15] Data are not available for NUTS2 in white
[16] Data are not available for NUTS2 in white
[17] For 2008 many data were missing, hence comparison in growth rates is done between 2009 and 2017

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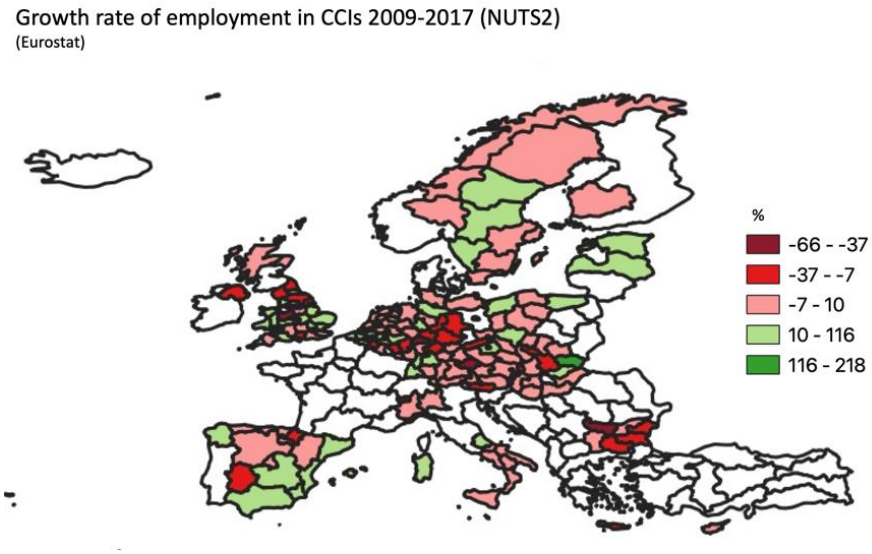

Figure 10 Growth rate in jobs in CCIs across European regions (NUTS2) [18]

As in section 3.1, the evidence presented in section 3.2 supports the relevance of the spatial dimension in addressing CCIs. The main aspects characterizing business demography have been analyzed: contribution to earnings through wage and salaries, and industry diversification. They all display important geographic variability at the sub-country level. Some insights are:

- Regional variability is relevant in characterizing CCIs economic outlook.
- Spatial variability changes along time.
- Countries differ in their spatial variability of CCIs, with some countries having more territorial unbalance than others.
- Patterns of spatial variability are available only for a subset of countries and a limited timespan. This lack of data could hinder to fully grasp the salience of the spatial dimension and should be fixed.
- Data at smaller geographical scale should be made available. The evidence presented thus far has used regional figures to corroborate the relevance of addressing the sub-country level. Regions are a relevant spatial unit to consider as they are addressed by a broad array of European policy initiatives. At the same time, regions could be characterized by internal variability that should be assessed. For instance, the intra-regional rural/urban divide could be interesting to analyze, given established literature providing for different threats and opportunities for CCIs depending on a urban/rural location (Daniel, 2014; Daniel, Fleischmann, & Welters, 2018). Thus, data at province (NUTS3) level should be collected across Europe.

Considering the existing debate opposing measuring cultural economy and CCIs through employment figures to measuring cultural economy and CCIs through business demographics, sections 3 and 4 shows that both

[18] Data are not available for NUTS2 in white

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perspectives should adopt a geographic approach to get meaningful measures. This point corroborates the DISCE 'ecological' approach, which puts geography at the core of a thorough understating of CCIs.

Having extensively illustrated the geography of cultural economy and CCIs across European countries and their regions, the report will then investigate whether several important characteristics of cultural economy and CCIs are associated to other features that contribute to the economic performance of places and other features that contribute to social inclusion and sustainability.

3.3. The geographic dimension of other socioeconomic elements associated to CCIs

The previous sections have detailed the importance of mapping CCIs taking into account that CCIs display important regional variations in terms of employment size, firm density, diversification. Also, figures at country level have been compared to figures at regional level to show that country-level aggregate fail to consider important differences among regions that are within the same country.

It is not only CCIs having regional variation. Economic value creation, innovation, human capital have important geographic patterns too. This point is widely supported by existing literature (Comunian, Taylor, & Smith, 2014; Cortinovis, Xiao, Boschma, & van Oort, 2017; Faggian, Rajbhandari, & Dotzel, 2017; Marrocu, Paci, & Usai, 2013). Figure 11 outlines the geography of total R&D expenditure as share of GDP across European regions (NUTS2), as an example of how this knowledge applies to the European context. It is clear that regions are characterized by different shares of GDP devoted to R&D both across Europe and within countries. UK, Sweden, France and Belgium have the highest regional variability. As with CCIs, the uneven geography of R&D across European regions opens to challenges to inclusive and sustainable growth, since underperforming regions face the risk of being left behind.

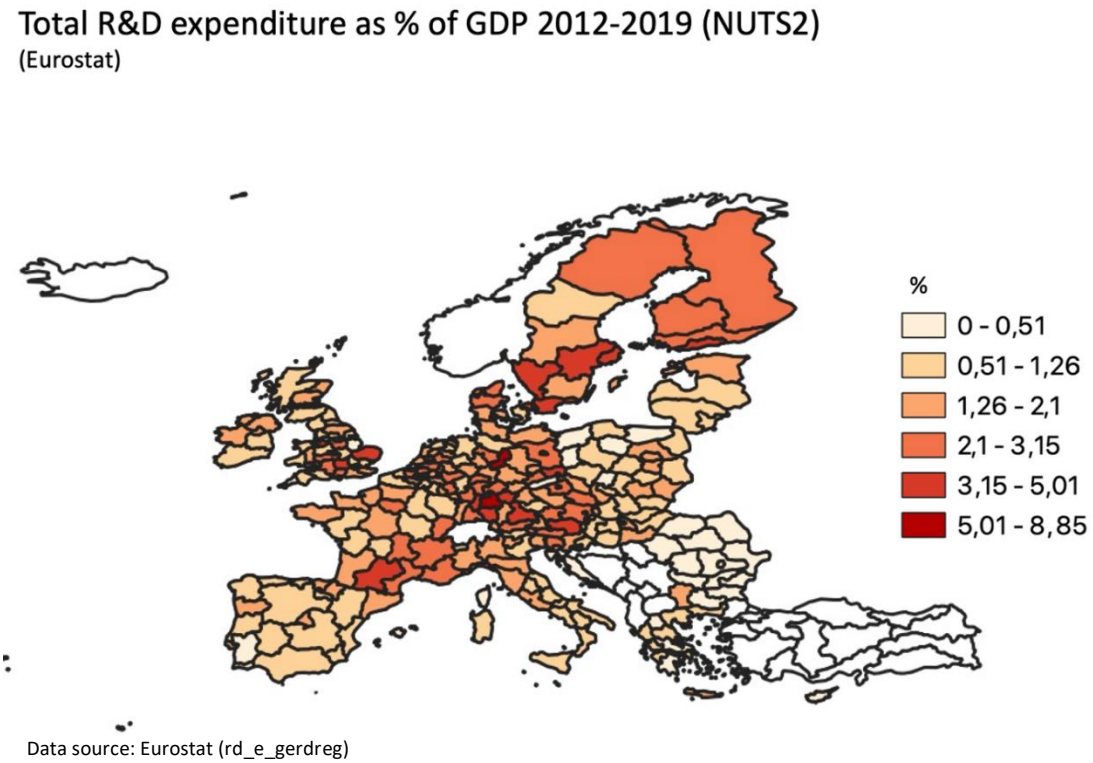

Figure 11 R&D expenditure as share of GDP European regions (NUTS2) [19]

[19] Data are not available for NUTS2 in white

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R&D intertwines with CCIs because of knowledge transfers and complementarities (Innocenti & Lazzeretti, 2019). New ideas generated through R&D might stimulate new CCIs enterprises or new CCIs products. By the same token, new ideas and products created by CCIs could benefit innovation in other sectors or could contribute to adding value to new product through hedonic components such as design. The mutual association between R&D and CCIs couples with the relevant role of geography, further reinforcing the rationale for sub-country mapping as the appropriate lens for assessing the role of CCIs in stimulating sustainable and inclusive growth.

Other key dimensions relating CCIs with sustainable and inclusive growth within DISCE have important spatial differences across Europe. For instance, Higher Education Institutions are not uniformly available across European regions. And the same applies to cultural heritage (Espon, 2020). Public funding differs across places (Crescenzi & Giua, 2020). Attitudes towards the others have a strong local dimension (Huggins & Thompson, 2019) that must be accounted for in measuring the contribution of CCIs to inclusiveness. Hence, the next chapters will present evidence on how CCIs correlates with these key dimensions considering European regions (NUTS2) as units of observation.

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4. Correlation evidence between CCIs and socioeconomic elements

This section details quantitative evidence on the relationship between cultural employment and socioeconomic characteristics that are relevant with respect to the DISCE approach. Correlation measures are assessed at regional level (NUTS2), given the extensive conceptual support to the role of geographical contexts detailed in several DISCE reports (Crociata, 2019; Gross et al., 2019) and the quantitative evidence proving the relevance of existing spatial variability detailed in section 3 above.

The investigation starts in sub-section 4.1, by addressing correlation between cultural employment and other economic features that refer to the economic dimension. Cultural employment has been chosen among the different dimensions of CCIs by drawing on CCIs literature which uses cultural employment as the established measure for the economic performance of CCIs (Innocenti & Lazzeretti, 2019). This approach aligns with literature on economic growth, which uses employment as proxy for growth (Duranton et al., 2009). Considered variables for measuring their correlation with cultural employment are:

- Growth of CCIs firms
- Trend in the structural composition of CCIs
- Gross Value Added (GVA)
- employment in knowledge-intensive sectors
- R&D and patents
- Higher Education Institutions (HEIs) and human capital
- Endowment of cultural amenities
- Tourism demand
- European Structural and Investment Funds (ESIF) for regional and local development, which are a core pillar of EU Cohesion Policy aimed at fostering economic growth and employment and amounting to huge shares of total EU budget (Crescenzi & Giua, 2020).

Notably, the majority of these features can be proxied referring to related indicators developed in Deliverable D2.2. More into details, the growth of CCIs firms can be proxied considering the evolution along time of the indicator "size of CCIs". Similarly, the trend in the structural composition of CCIs is conveyed by the dynamic evolution of the indicator "CCIs diversification". Employment in knowledge-intensive sectors can be measured referring to two indicators developed in Deliverable D2.2: "workforce employed in S&T" and "knowledge workers". R&D and patents are proxied using two indicators developed in Deliverable D2.2: "R&D expenditure" and "Scientific Publications". HEIs are accounted for the relevant dimensions of: supply of skilled labor, research in CCIs related fields and preservation of cultural products through three indicators designed in Deliverable D2.2: "Local Supply of CCIs skills", "Local Research in CCIs fields" and "Local Availability of CCIs-related knowledge infrastructure". Finally, endowment of cultural amenities is proxied using the indicator "territorial stock of cultural heritage". Regional GVA, tourism demand and ESIF do not pertain the CCIs operationalization that is addressed in Deliverable D2.2, while representing relevant dimensions in the measurement of the socioeconomic outlook of CCIs (DISCE, 2019). They are measured referring to extant literature that is detailed in sub-section 4.1.

Subsection 4.2 introduces correlation between cultural employment and geographical features pertaining sustainable and inclusive growth (DISCE, 2019). By doing so, the report provides quantitative evidence corroborating the conceptual framework developed within DISCE linking CCIs to human development and care (Wilson et al., 2020). The considered measures for sustainable and inclusive growth target

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marginalization of vulnerable groups, several dimensions of trust, local community livelihood and quality of institutions. More into details, considered measures are:

- youth marginalization
- trust in people
- trust in institutions
- tolerance towards different minority groups
- territorial capital
- quality of institutions and corruption
- inclusiveness in the labour market.

Also the quantitative assessment of the association between CCIs and sustainable and inclusive growth refers to the indicators developed in Deliverable D2.2. More into details, youth marginalization is proxied by the indicator "Share of young cohorts affected by socioeconomic vulnerability". Trust in people and trust in institutions respectively by the indicators "Trust: people" and "Trust in institutions". Tolerance towards minority groups is measured through the indicators "Openness & Tolerance towards migrants" and "Openness & Tolerance towards LGBTQ+". Territorial capital is proxied by the indicator proposed in Deliverable D2.2 "Regional Competitiveness Index (RCI)". RCI has been developed by the European Commission as composite indicator designed by the European Commission to provide a synthetic picture of territorial competitiveness for each of the NUTS 2 regions of the 27 EU Member States. Territorial competitiveness envisioned by RCI can be defined as the ability to offer an attractive and sustainable environment for firms and residents to live and work (Dijkstra, Annoni, & Kozovska, 2011). Hence, it represents an encompassing measure for territorial capital, a key acknowledged factor for assessing socioeconomic performance of places (Camagni & Capello, 2013). Quality of institutions and corruption are proxied using indicators "Quality of Institutions" and "Corruption". Measuring the relationship between CCIs and regional labour market disparities was among the aims of DISCE (DISCE, 2019). This point is addressed using metrics detailed in sub-section 4.2.

4.1. Economic outlook and cultural employment

In this subsection, the analysis focuses on the correlation between cultural employment and several metrics of economic performance.

First, cultural employment displays a positive association with the growth of the number of CCIs local units[20], as summarized by Figure 12 (left graph). Hence, the more CCIs grow in a region, the more people are employed in cultural activities. Second, cultural employment rises where CCIs cover fewer sectors from the list detailed in Table 4 (right graph).

[20] Local Unit is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place (Eurostat, 2021b).

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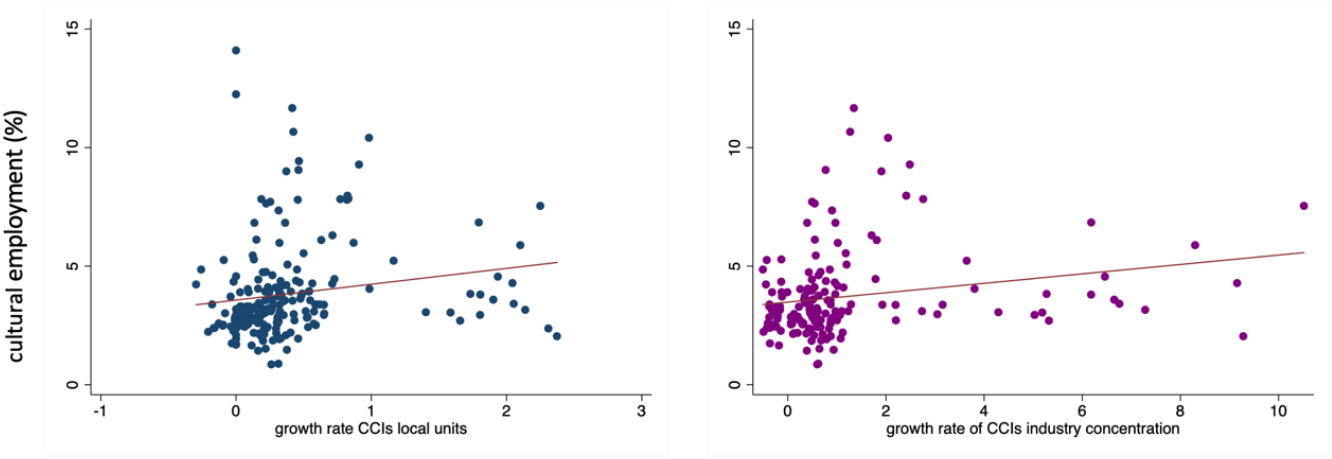

Data source. Eurostat (cult_emp_reg; SBS_R_NUTS06_R2)

Figure 12 Cultural employment and the evolution of CCIs firms' demography across European regions (NUTS2). Cultural employment averaged between 2014 and 2019. Growth rate of CCIs local unit between 2017 and 2008. Growth rate of CCIs industry sectoral concentration[21] between 2017 and 2008[22].

This second aspect seems to suggest that regions which specialize in a subset of specific CCIs have larger rates of people employed in cultural activities. Findings do not change when regions are grouped depending on having creative and cultural cities or not.

Considering the association between cultural employment and the growth rate of Gross Value Added[23] (GVA), data show two interesting findings, outlined in Figure 13. First, there is a negative association between cultural employment and locally produced GVA when all regions are considered (left graph). However, when regions are grouped depending on having a creative and cultural city or not, findings change. Regions with creative and cultural city display a positive association between local GVA and cultural employment: the more GVA is created, the higher the share of people employed in cultural economy and CCIs. The opposite holds for regions with no creative and cultural city. Although preliminary, these results suggest that the association between cultural employment and GVA is influenced by local factors. Once more, there is support for a sub-national approach to cultural economy and CCIs, since country-level data do not allow to see these differences.

[21] Industry sectoral concentration is measured through entropy index. The lower that value of the entropy index, the more diversified is the regional sectoral composition of CCIs. The entropy index is the Hirschman-Herfindahl diversity index. See Tabner (2007) for more details.

[22] For detailed information on correlation coefficients and their statistical significance, see Table A4 in the Appendix.

[23] Gross value added (GVA) is defined by Eurostat as output (at basic prices) minus intermediate consumption (at purchaser prices); it is the balancing item of the national accounts' production account.

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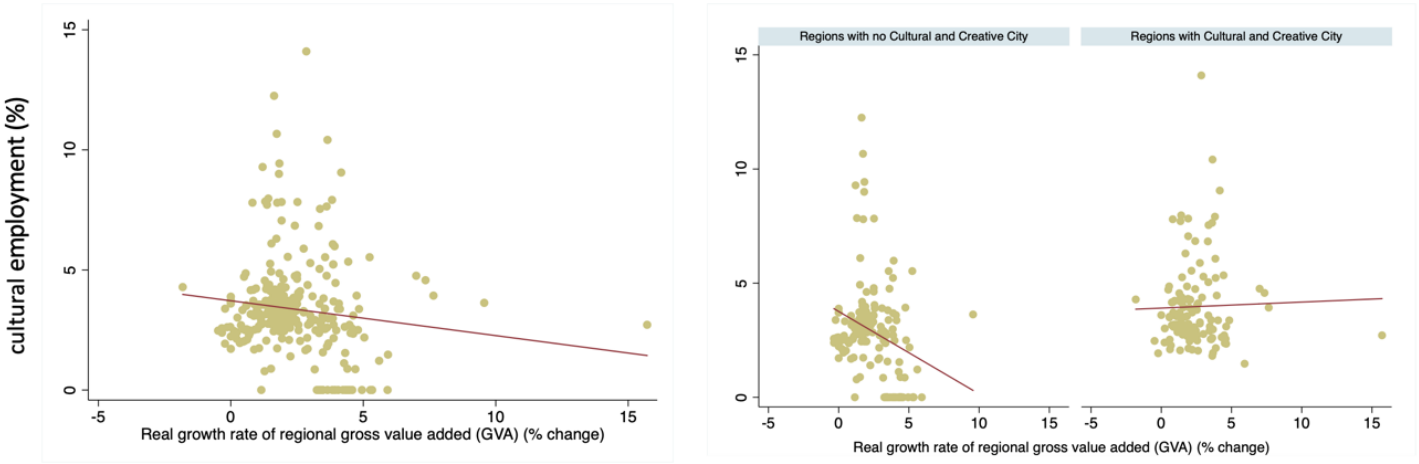

Data source. Eurostat (cult_emp_reg, nama_10r_2gvagr)

Figure 13 Association between cultural employment across European regions (NUTS2) and GVA. All variables are averages of yearly data between 2014 and 2019. All European regions (left graph). Regions grouped depending on having a Creative and Cultural city or no (right graph).

A core element to analyse is the association between CCIs and knowledge. A context that is rich in human capital, creative capabilities and skills should have a positive effect on innovation (DISCE, 2019). To this respect, four measures are considered as they provide for different aspects of knowledge in economic terms:

- Knowledge workers. This measure accounts for existing works on high-skilled workers and their locational preferences for places with many opportunities for interaction with other high-skilled workers (Faggian, Rajbhandari, et al., 2017; Kerr, Kerr, Özden, & Parsons, 2017).
- Human Resources employed in Science and Technology[24]. This measure is introduced to account for recent evidence on US providing for the combination of creative workers and scientific workers to be positive for economic growth (Rodríguez-Pose & Lee, 2020).
- R&D expenditures and Scientific publications. These indicators allow to measure the association between CCIs and the innovation intensity, relating to existing works showing that the concentration of creative workers allows new ideas and information that support knowledge diffusion and innovation (Innocenti & Lazzeretti, 2019). R&D expenditure provide a measure of the input side of innovation, while Scientific publications give a measure of the output side.

These indicators contribute to describing the degree of innovativeness of regions (DISCE, 2019). Eurostat Regional Science and Technology statistics, Labour Force Survey and Science Metrix data on scientific publication contain appropriate data to design the aforementioned described measure at regional (NUTS2) level for European countries between 2013 and 2018.

Figure 14 summarizes the measures for correlation between cultural employment and each one of the considered measures for innovation. It emerges that cultural employment is positively associated to each measure for innovation. This aligns with the existing bulk of literature that supports a mutually positive effect

[24] Given that Eurostat data harmonized at regional (NUTS2) level are available, it appears appropriate to use these official statistics instead of the OECD figure on knowledge-intensive employment preliminary suggested by DISCE Description of Action.

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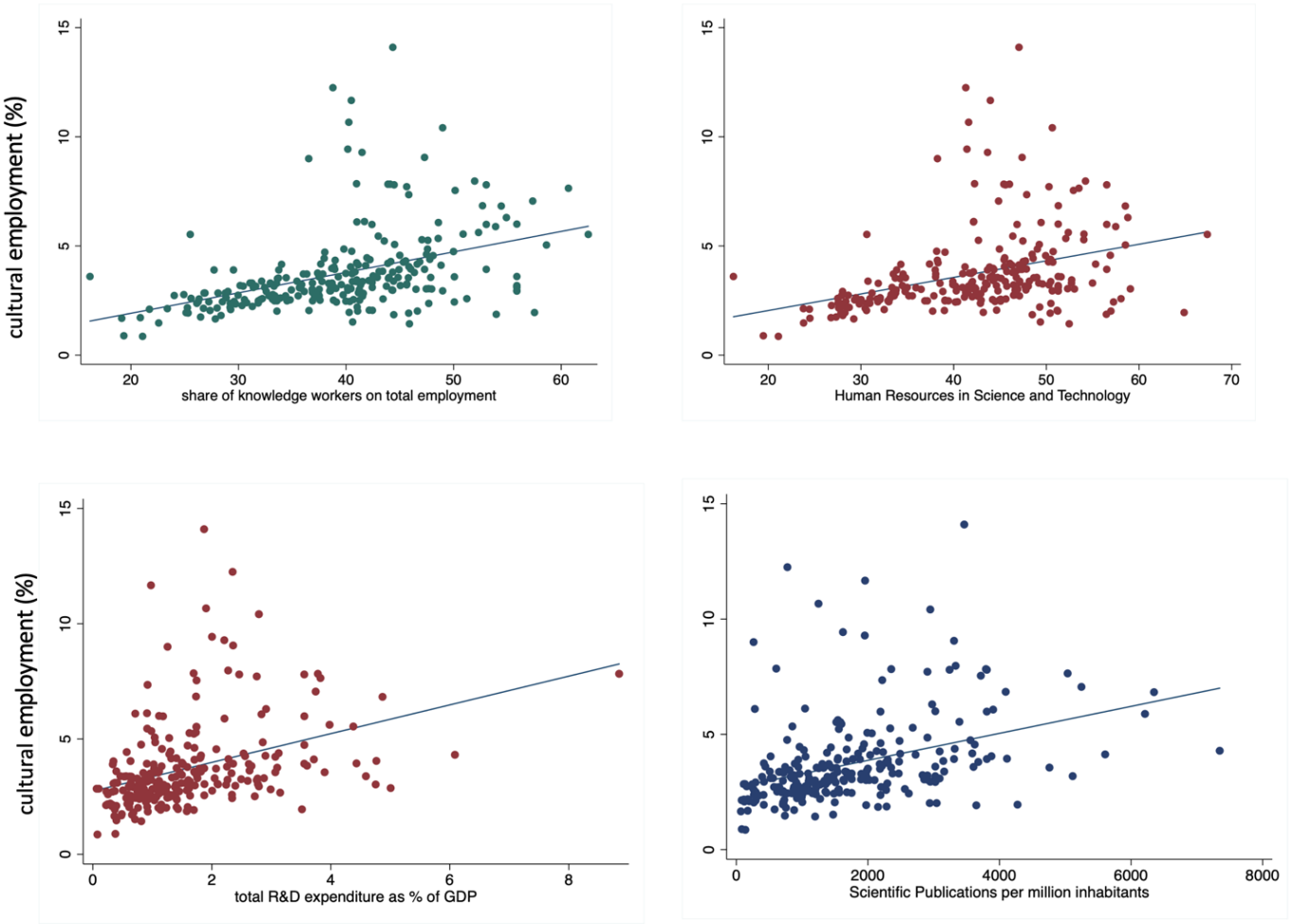
of creative workers on innovation in general and innovation in Science and Technology (Faggian, Rajbhandari, et al., 2017; Innocenti & Lazzeretti, 2019; Rodríguez-Pose & Lee, 2020).



Data source. Eurostat (cult_emp_reg, hrst_st_rcat, rd_e_gerdreg), Labour Force Survey, Science Metrix

Figure 14 Association between cultural employment and measures for innovation: the share of knowledge workers, people employed in Science and Technology as of % labor force, total R&D expenditure as share of GDP, number of scientific publications per millions inhabitants. Measures averaged between 2013-2018.

Figure 15 summarizes the relationship between the growth of CCIs local units and the same measures for innovation, showing that each considered measure for innovation has a positive association with the growth of CCIs in terms of new establishments. This evidence relates to the positive spillover effect of innovation on entrepreneurship (Howells & Bessant, 2012), showing that this effect happens also when the focus is on CCIs entrepreneurship.

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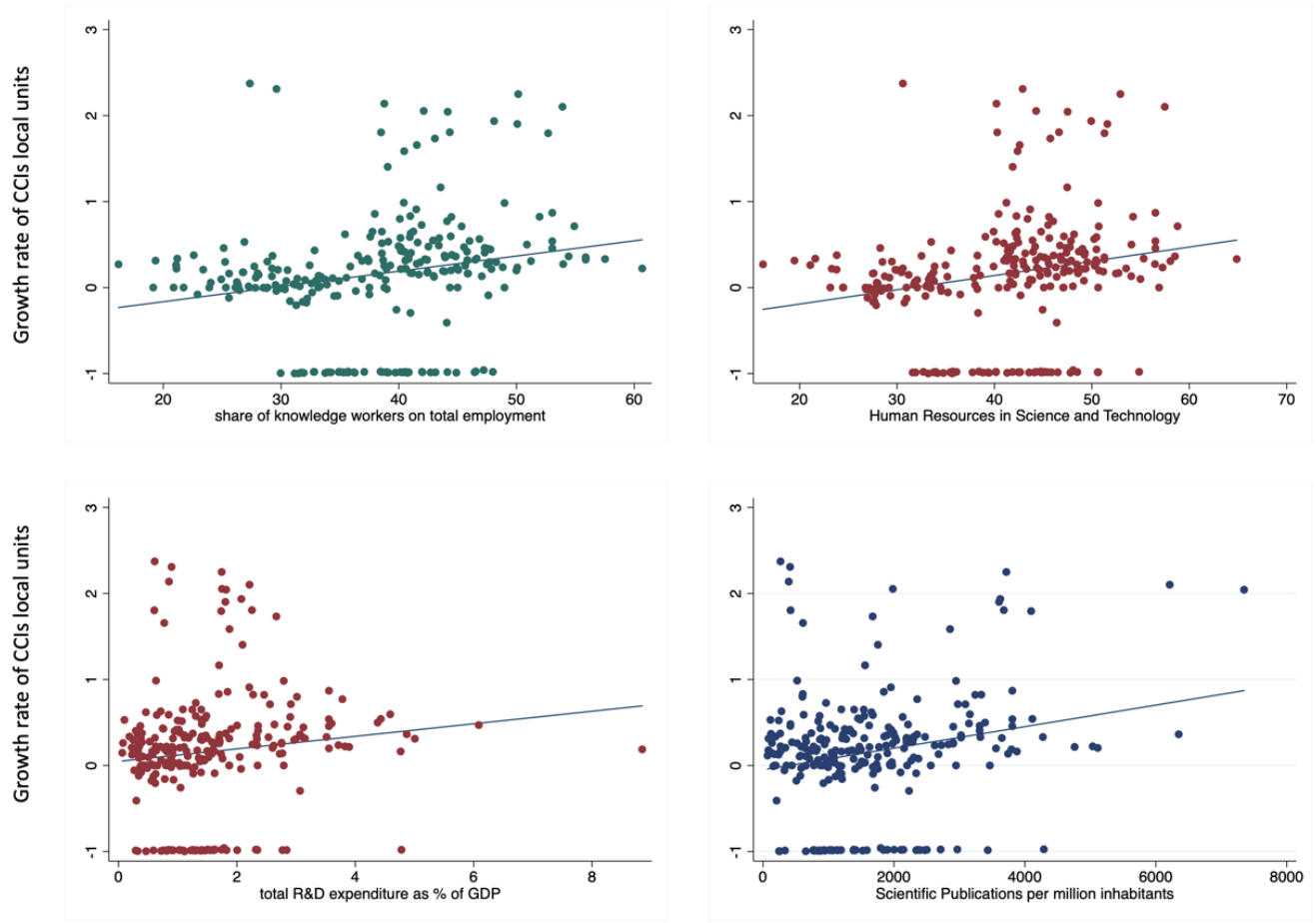

Data source. Eurostat (SBS_R_NUTS06_R2, hrst_st_rcat, rd_e_gerdreg), Labour Force Survey, Science Metrix

Figure 15 Association between growth of CCIs Local Units and measures for innovation: the share of knowledge workers, people employed in Science and Technology as of % labor force, total R&D expenditure as share of GDP, number of scientific publications per millions inhabitants.

The relationship between CCIs and Higher Education Institutions (HEIs) is relevant in the DISCE approach for many reasons. HEIs are established key cultural players, with a strong spatial dimension (Comunian, Gilmore, & Jacobi, 2015). Universities generate cultural products and they also preserve them through art collections, museums and onsite galleries (Comunian et al., 2015). HEIs also generate knowledge transfers (England & Comunian, 2016) that can benefit CCIs and viceversa. Finally, HEIs generate creative human capital (Comunian et al., 2020a), i.e. graduates in academic fields that are related to CCIs, which can influence supply of skilled labour as well as new entrepreneurs. To provide for evidence on the association between HEIs and CCIs, several measures are considered:

- the share of students in CCIs-related fields at regional level (NUTS2),
- the share of research in CCIs-related fields at regional level (NUTS2)
- the number of HEIs at NUTS2 level.

The first two measures relate to the creative human capital concept developed within DISCE. The latter measure refers to literature on the role of cultural facilities and universities in stimulating growth (Comunian et al., 2014).

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Operationally, the report uses data from the European Commission European Tertiary Education Register (ETER). ETER is a database providing information on European HEIs at regional level regarding their basic characteristics, geographical position, educational and research activities and finances (ETER project, 2019). These data appear more suitable for DISCE compared to the national graduates data indicated in the DISCE Description of Action, since they detail figures at regional level which avoid to lose important information.

Regarding the share of students in CCIs-related fields at regional level (NUTS2), ETER data draw on the International Standard Classification of Education (ISCED 2011) developed by UNESCO (OECD, 2018) which is the international statistical standard for education statistics. Tertiary education is detailed through 5 ISCED classes:

- ISCED 5 Short diplomas (less than 3 years) below the bachelor level. These programmes are typically practically based, occupationally specific and prepare for labour market entry. These programmes may also provide a pathway to other tertiary programmes
- ISCED 6 Bachelor or equivalent. Programmes designed to provide intermediate academic and/or professional knowledge, skills and competencies leading to a first tertiary degree or equivalent qualification.
- ISCED7 Master or equivalent. Programmes designed to provide advanced academic and/or professional knowledge, skills and competencies leading to a second tertiary degree or equivalent qualification.
- ISCED 7 long degrees or equivalent. Degrees at master level without intermediate qualification (4-5 years duration)
- ISCED8 Doctorate or equivalent. Programmes designed primarily to lead to an advanced research qualification, usually concluding with the submission and defense of a substantive dissertation of publishable quality based on original research.

ISCED also classifies fields of education and training, using subject matter taught in an education programme. Regarding CCIs, the following fields are considered:

- ISCED-F 02 Humanities and Arts
- ISCED-F 03 Social Sciences, Journalism and Information
- ISCED-F 06 Information and communication technologies

Then, applying these classifications on data from ETER, it is possible to design measures for:

- The share of students in CCIs-related faculties over total students at regional (NUTS2) level
- The share of research in CCIs-related faculties over total research at regional (NUTS2) level.

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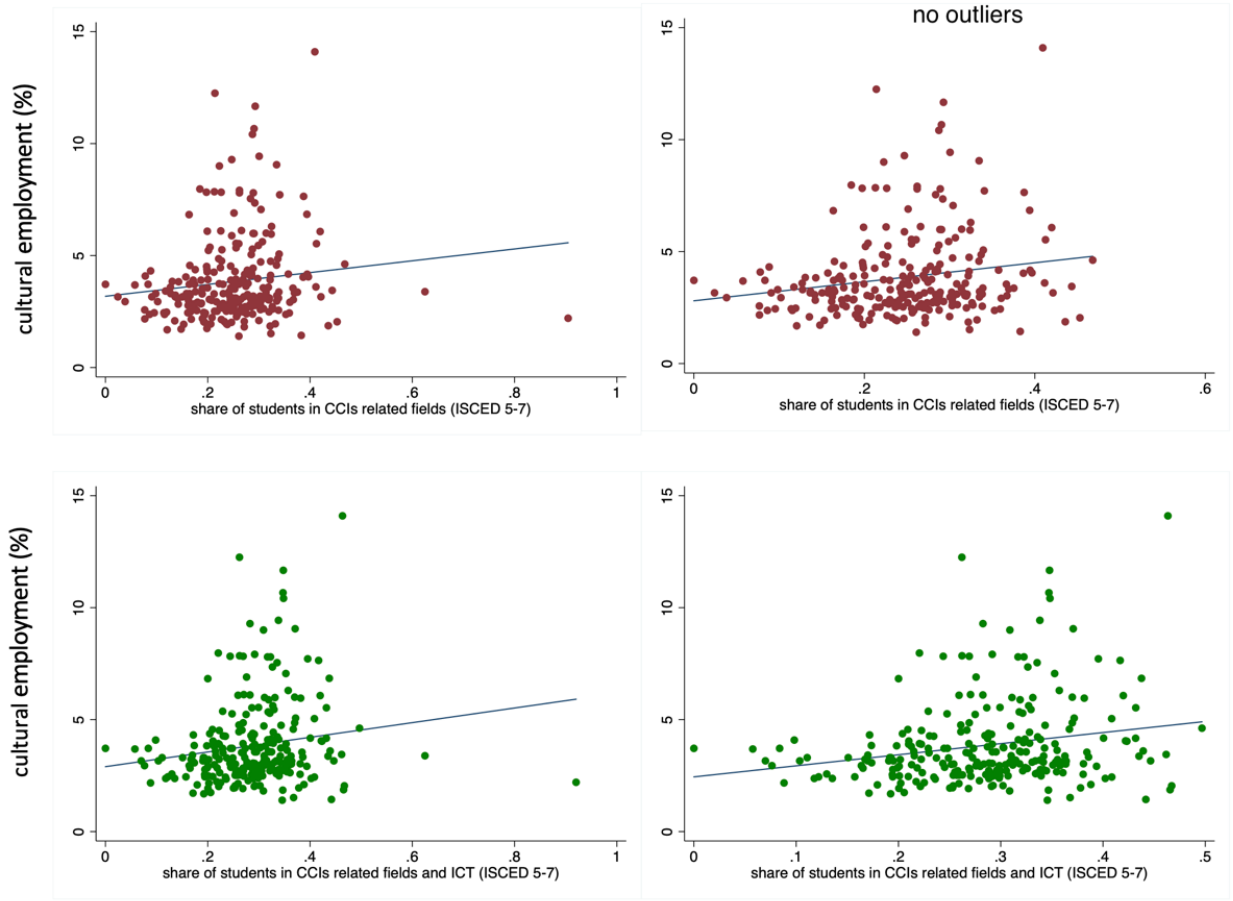

Data source. Eurostat (cult_emp_reg), ETER (STUD.ISCED5_7FOE02, STUD.ISCED5_7FOE03, STUD.ISCED5_7FOE06, STUD.TOTALISCED5-7)

Figure 16 Association between cultural employment and students enrolled in CCIs-related fields across European regions (NUTS2). Measured are averaged between 20011 and 2016.

Figure 16 show the association between the share of cultural employment and the share of students enrolled in CCIs related fields across European regions (NUTS2) averaged between 2011 and 2016, which is the time span covered by ETER database. Data are averaged since there are yearly missing observations distributed across different years between 2011 and 2016.Two measures for students enrolled in CCIs related fields are considered and both refer to the creative human capital (Comunian et al., 2020a). The first measure is more conservative in defining creative human capital, since it considers the share of students enrolled in Humanities, Arts, Social Sciences, Journalism and Information on total students for ISCED 5-7. This measure displays a positive association with the size of cultural employment (Figure 16 top graphs). The second measures add students enrolled in ICT, since digital technologies are relevant for the CCIs taxonomy advanced by DISCE. Again, evidence provides for a positive association between this measure for creative human capital and the size of cultural employment (Figure 16 bottom graphs).

Notably, the correlational plots do not change when ICT students are added to students in Humanities, Arts, Social Sciences, Journalism and Information. This could suggest that the relevant association between skill supply by HEIs and cultural employment is the one coming from CCIs-related faculties.

Another aspect that is measured is the association between cultural employment and the size of research in CCIs-related field done by HEIs. This aspect is relevant as it provides evidence relating to patterns of

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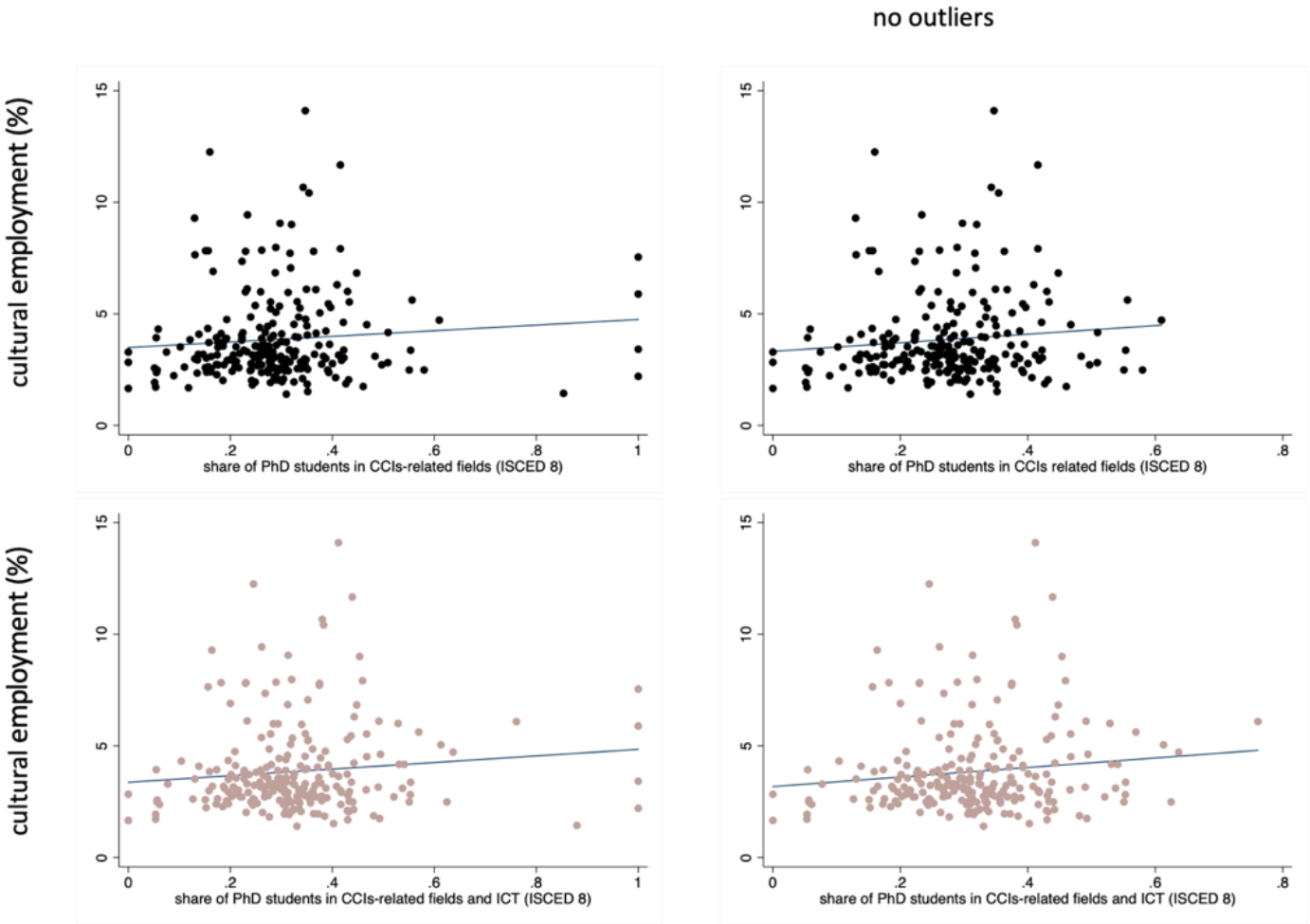
knowledge-transfer. EDER data provide a measure for research in CCIs-related fields through the number of PhD students (ISCED class 8) in:

- ISCED-F 02 Humanities and Arts
- ISCED-F 03 Social sciences and journalism
- ISCED-F 06 Information and communication technologies

These figures are used to calculate the share of PhD students in these fields with respect to the total number of PhD students.

Figure 17 shows the measures of association between research in CCIs-related field done by HEIs and cultural employment. The higher the HEIs commitment to research in CCIs-related fields, the higher cultural employment across European regions (NUTS2) (Figure 17 top graphs). The same pattern applies when PhD students in ICT are added to PhD students in Humanities, Arts, Social Sciences and journalism. As before, the correlational plots do not change when ICT PhD researchers are added to PhD researchers in Humanities, Arts, Social Sciences, Journalism and Information. This could suggest that the relevant knowledge-transfer between HEIs and CCIs are the one involving CCIs-related faculties.



Data source. Eurostat (cult_emp_reg), ETER (RES TUDISCED8FOE02, RES TUDISCED8FOE03, RES TUDISCED8FOE06, RES TUDISCED8TOTAL)

Figure 17 Association between cultural employment and PhD students engaged in research in CCIs-related fields across European regions (NUTS2). Measured are averaged between 20011 and 2016.

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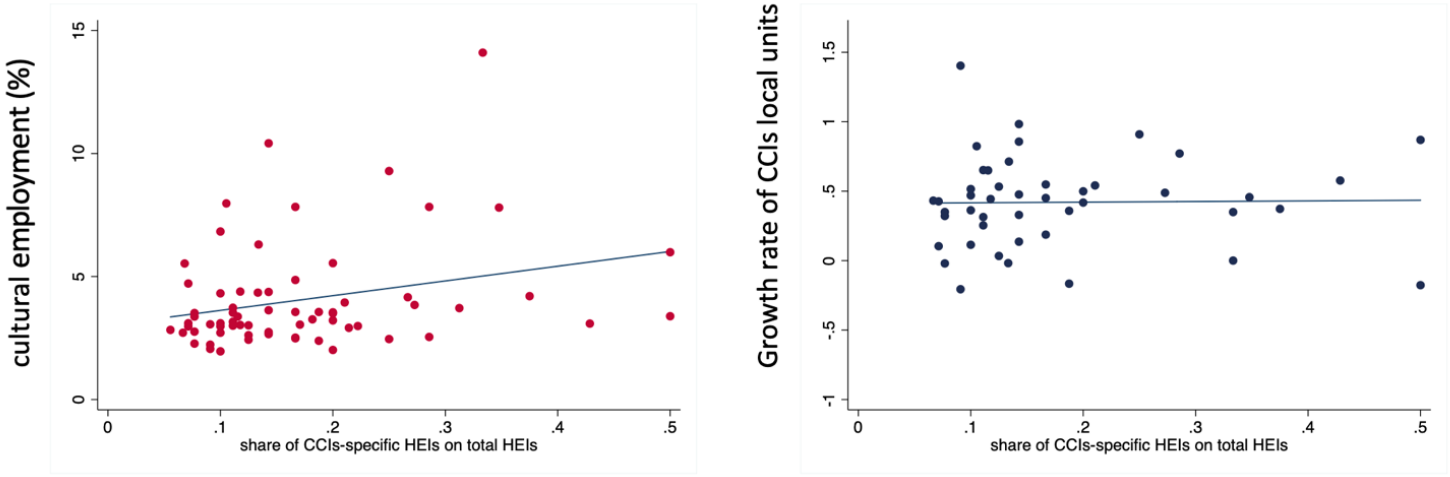
Another explorative measure for knowledge transfers between HEIs and CCIs is conveyed the correlation between cultural employment and the share of HEIs at regional level whose core activities pertain CCIs. It appears reasonable that HEIs having both teaching and research activities focusing on CCIs fields should have a positive transfer of both knowledge and skills, resulting in higher relevance of CCIs in the local economy. Operationally, the ETER database provides details on the type of HEI: university, technical university, academy of arts, etc. This information allows to calculate the share of HEIs that are strictly CCIs related on total HEIs. Figure 18 shows that regions with higher presence of HEIs strictly related to CCIs have larger cultural employment (left graph). This suggests that HEIs whose main activities pertains CCIs might have higher benefits to CCIs in the regional economy. At the same time, regions with higher presence of HEIs strictly related to CCIs appear not to influence the growth rate of CCIs Local Units larger cultural employment (right graph). Overall, these results suggest that the local presence of HEIs strictly focusing on CCIs relates to larger CCIs sector in term of people employed but not in term of more firms.



Data source. Eurostat (cult_emp_reg, SBS_R_NUTS06_R2), ETER (BAS.INSTCATENGL)

Figure 18 Association between CCIs-related HEIs and: cultural employment and growth rate of CCIs local units across European regions (NUTS2)

It is then investigated how cultural employment relates to the local endowment of cultural amenities. To this respect, the considered measure for cultural amenities is designed using ESPON data at regional level for a subset of European countries[25](Lykogianni et al., 2019). More into details, the measure for cultural amenities is given by the sum of historical (pre-1919) dwellings and material cultural heritage in per capita terms. Figure 19 shows that local cultural amenities are positively associated to cultural employment. This evidence aligns with existing works supporting a positive nexus between CCIs and cultural heritage (Jelinčić, 2021).

The DISCE Description of Action proposed to explore how CCIs relate to tourism (DISCE, 2019). Interestingly, looking at the data, it appears that the size of CCIs declines as the demand for tourist services declines. Figure 20 shows that the size of CCIs is negatively associated to the number of nights spent at tourist accommodation establishments in each NUTS2 region as percentage of total nights at country level.

[25] Austria, Belgium, Italy, Netherlands, Norway, Portugal, Romania, Sweden, Slovenia, Slovakia

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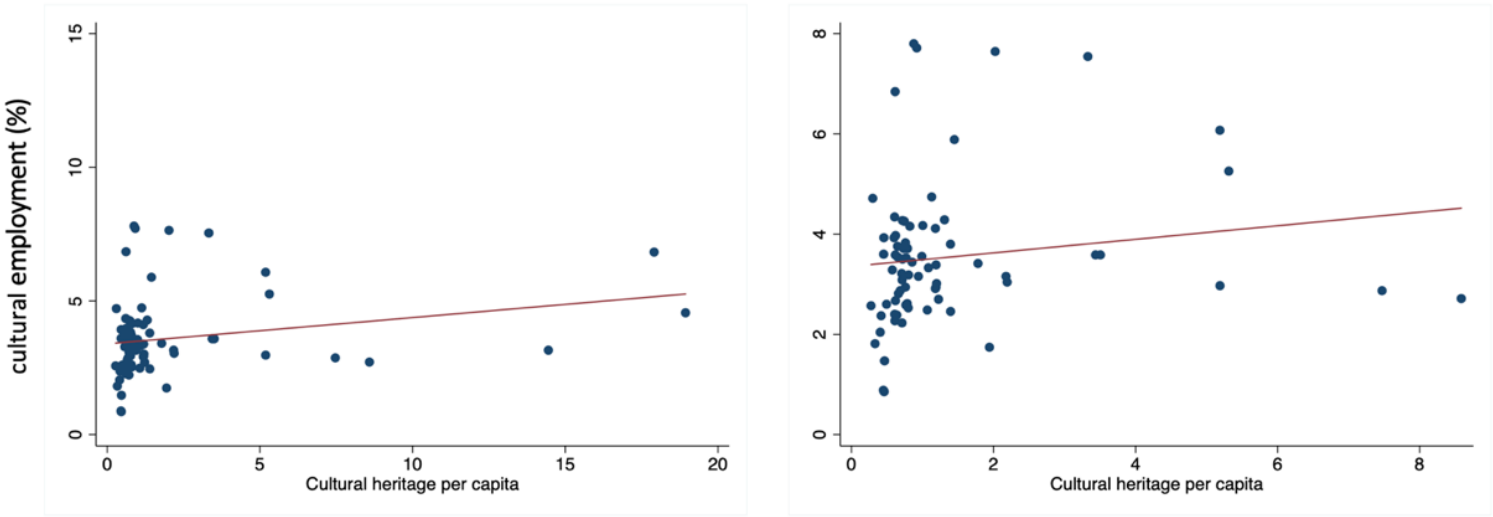
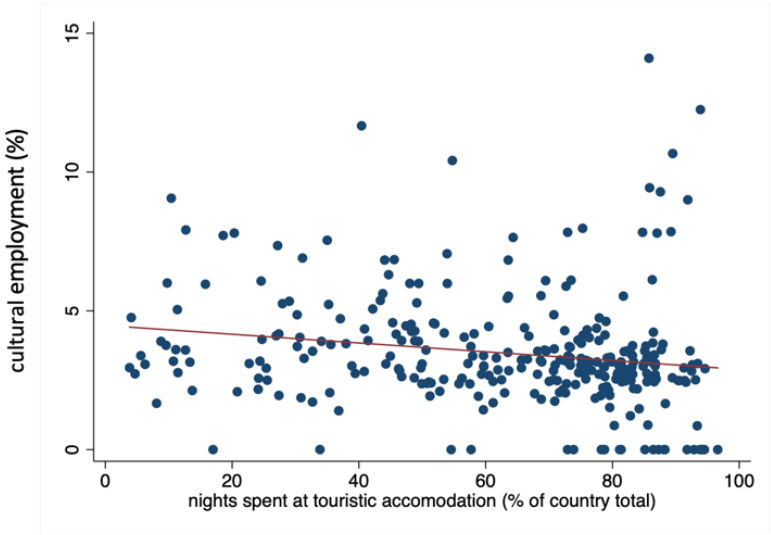


Data source. Eurostat (cult_emp_reg), ESPON (ALLMCHN2, PRE1919D)

Figure 19 Association between regional (NUTS2) cultural employment (averaged between 2014 and 2019) and cultural amenities endowments for the whole sample of regions (left graph) and when outliers are removed (right graph).



Data source. Eurostat (cult_emp_reg, TOUR_OCC_NIN2)

Figure 20 Association between regional (NUTS2) cultural employment (averaged between 2014 and 2019) and demand for touristic accommodations (averaged between 2014 and 2018)

Considering policy interventions that impact on socioeconomic performance, a key initiative is the EU European Structural and Investment Funds, aimed at fostering economic growth and employment in an inclusive and sustainable way. The crucial role of this policy in EU agenda and budget supports an investigation of their association with CCIs.

The implementation stage of cohesion policy programmes using European Structural and Investment Funds implies reporting on the location of the projects using NUTS codes. Data for the 2006-2014 period are available at regional level (NUTS2) through the Cohesion Data Platform of the European Commission

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(European Commission, 2022). Using these data, three measures for European Structural and Investment Funds are considered to assess their correlation with respect to cultural employment:

1. Tourism and Culture (in per capita terms)
2. Tourism and Culture + Urban and Rural regeneration (in per capita terms)
3. Tourism and Culture + Urban and Rural regeneration + Infrastructure[26] (in per capita terms)

Measure 1 accounts for the European funding benefitting the regional level for projects strictly related to tourism and culture. Measure 2 broadens the range of European funding on the assumption that projects targeting urban and rural regeneration might have some association with cultural economy, such as by contributing to the start-up of new creative places. Measure 3 adds funding supporting infrastructure, since the latter is an enabler also for cultural economy.

Figure 21 outlines the correlational evidence between culture employment and the three measures for European Structural and Investment Funds. Evidence suggests a negative association between culture employment and European Structural and Investment Funds for each considered measure. The negative association remains both when regions behaving as outliers are removed and when regions are clustered in two group depending on having a creative and cultural city or not, following the classification done by the Cultural and Creative City Monitor (Montalto et al., 2019). Although preliminary and simply correlational, this evidence suggests that regions having the bigger funding for culture and tourism between 2006 and 2014 are regions with current low cultural employment. This could suggest that the European Structural and Investment Funds were not effective in stimulating economic opportunities in CCIs.

[26] IT infrastructure and services, Social infrastructure, Transport infrastructure

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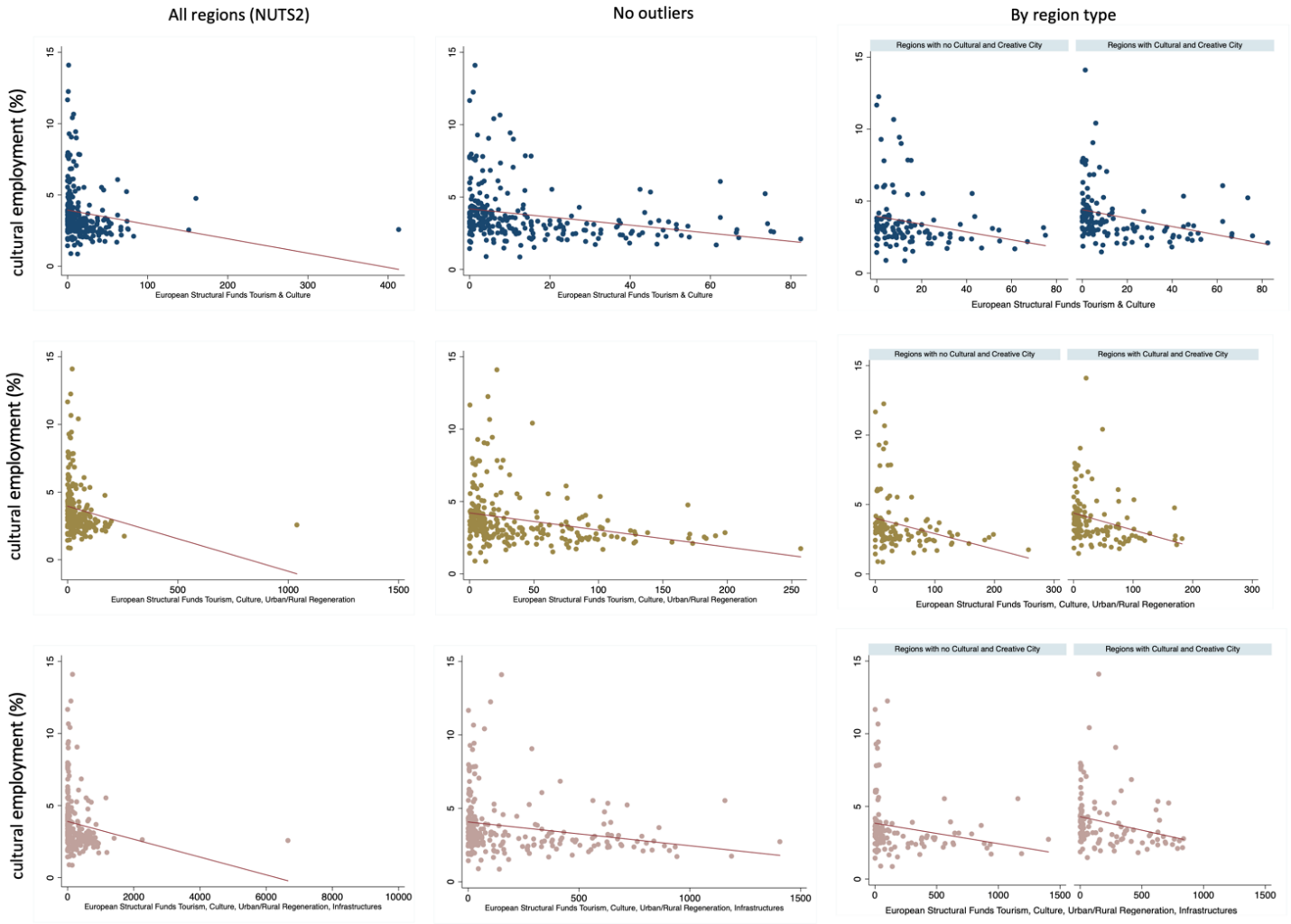

Data source. Eurostat (cult_emp_reg) European Commission (wp13_db_nuts2_cs_v1)

Figure 21 Association between regional (NUTS2) cultural employment (averaged between 2014 and 2019) and European Structural and Investment Funds averaged between 2006 and 2014.

4.2. Sustainable and inclusive growth and cultural employment

Figure 22 illustrates the correlation patterns between the average percentage of cultural employment between 2014 and 2019 at regional level (NUTS2) and several regional socioeconomic features pertaining inclusive and sustainable growth:

- the share of NEETs (young people aged 15-24 that are neither in employment nor in education or training) averaged between 2014 and 2019
- the share of adult population aged 25-64 with tertiary education (level 5-8) between 2014 and 2019
- the Regional Competitiveness Index (RCI), designed by the European Commission to measure the major factors of competitiveness over the past ten years for all the NUTS-2 level regions across the European Union (Annoni & Dijkstra, 2019). The Index exploits more than 70 comparable indicators to measure the ability of a region to offer an attractive and sustainable environment for firms and residents to live and work. The indicators used to compute the RCI cover

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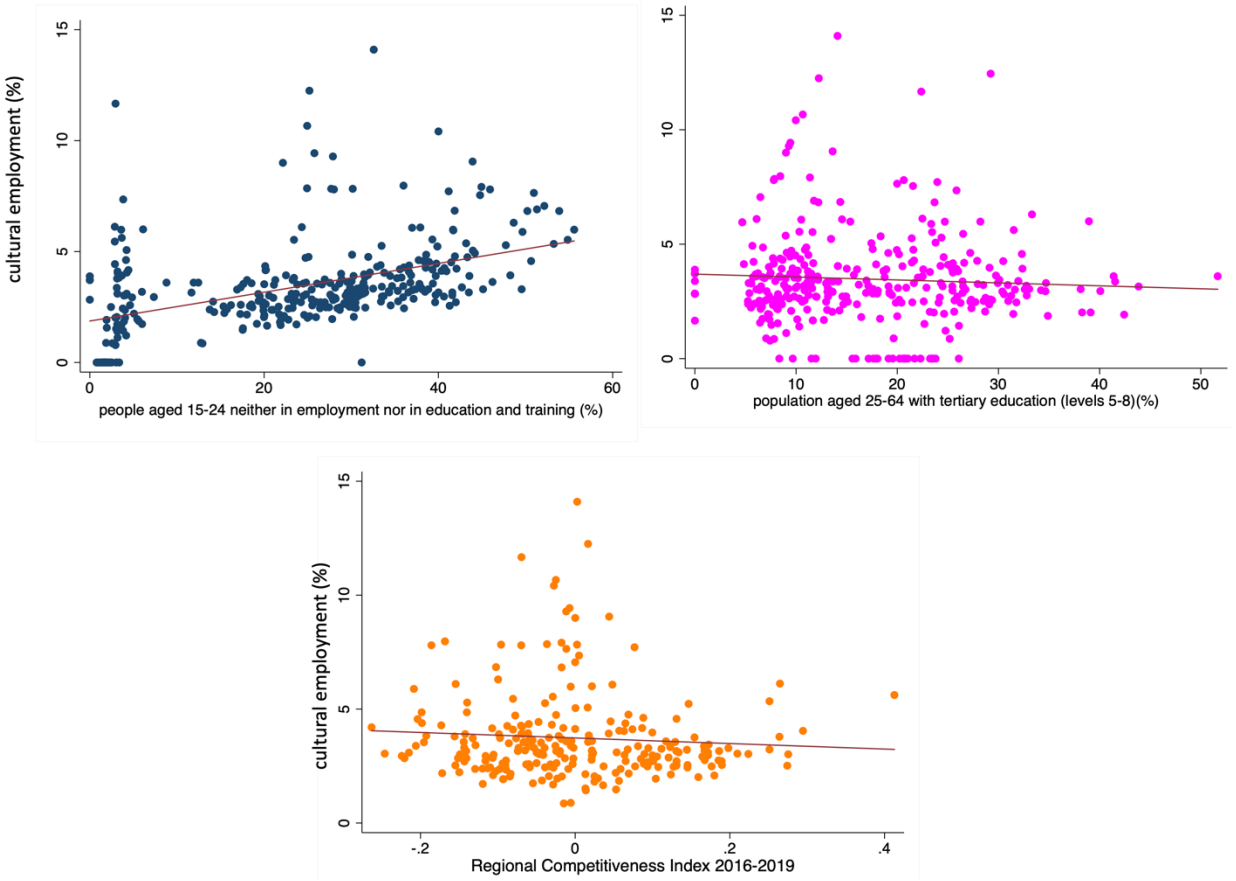
institutions, macroeconomic stability, infrastructures, health, basic education, Higher Education and Lifelong Learning, labour market efficiency, market size, technological readiness, business sophistication, innovation.



Data source. Eurostat (cult_emp_reg; EDAT_LFSE_04, EDAT_LFSE_0,RCI, REGIO-B1-PAPERS)

Figure 22 Association between cultural employment across European regions (NUTS2) and young people aged 15-24 that are neither in employment nor in education or training, adult population aged 25-64 with tertiary education, Regional Competitiveness Index (RCI). All variables but RCI are averages of yearly data between 2014 and 2019. RCI is measured by the 2016-2019 evolution of yearly RCIs.

From Figure 22, it appears that regions with higher share of NEETS also have higher shares of cultural employment (graph on the left). Further, there a mild negative association between regional endowment of human capital and the share of cultural employment (graph in the middle). Finally, there seems to be no association between regional competitiveness and cultural employment (graph on the right)[27].

Recalling established literature and evidence on the 'creative class' (R. Florida et al., 2008), the same investigation is done clustering regions in two groups depending on the local presence of at least on urban hubs for culture and creativity using data from the Cultural and Creative City Monitor (Montalto et al., 2019). Results are summarized in Figure 23.

[27] Regions with the highest shares of cultural employment are London, Berlin, Praha, Budapest, North Holland, Stockholm, Wien. Graphs do not change when these regions are removed.

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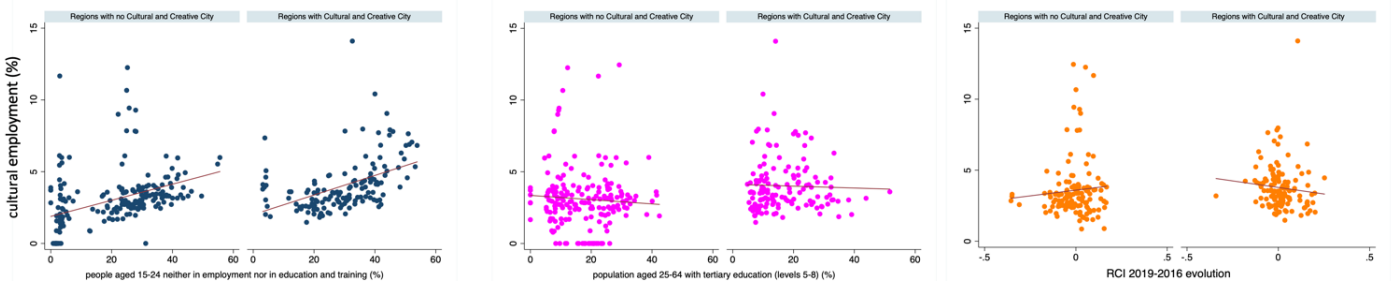

Data source. Eurostat (cult_emp; EDAT_LFSE_04, EDAT_LFSE_0, REGIO-B1-PAPERS)

Figure 23 Association between cultural employment across European regions (NUTS2) and other socioeconomic features, when regions are grouped depending on having a Creative and Cultural city or not. Considered socioeconomic features: young people aged 15-24 that are neither in employment nor in education or training, adult population aged 25-64 with tertiary education, Regional Competitiveness Index (RCI). All variables but RCI are averages of yearly data between 2014 and 2019. RCI is measured by the 2016-2019 evolution of yearly RCIs.

This more detailed evidence provides a more nuanced picture. The positive correlation between the size of cultural employment and the size of NEET is confirmed. The correlation between the size of cultural employment and the regional endowment of human capital changes depending on the type of region. It is negative for regions without urban hubs for culture and creativity. It is nearly zero for regions with urban hubs for culture and creativity. The relationship between cultural employment and regional competitiveness changes depending on the type of region. Regions without urban hubs for culture and creativity have a positive relationship between cultural employment and regional competitiveness while the opposite applies for regions with urban hubs for culture and creativity. This latter evidence suggests that the competitiveness of places with a strong hub for culture and creativity is positively influenced by this hub.

Within the DISCE approach, it is key to measure whether cultural economy relates to social features that are relevant to achieve a sustainable and inclusive growth (Crociata, 2019; Denti et al., 2022) and promote social resilience. Among the aims of this report, there is providing a quantitative borad characterization of the association between CCIs and recovery of local socioeconomic systems (DISCE, 2019 p.13) (DISCE, 2019). to this regard, the report refers to the literature highlighting that culture should promote tolerance and inclusiveness (Denti et al., 2021; Richard Florida & Gates, 2003; Giavazzi et al., 2019), helping people overcoming existing prejudices and stereotypes (Glaeser, 2005; Vezzali et al., 2015). This perspective is investigated using measures for trust in people, openness towards LGBTQ+ and openness towards immigrants designed exploiting regional data (NUTS2) from the European Value Survey waves 6 and 8 (ESS-NSD - Norwegian Centre for Research Data, 2016; ESS-NSD - Norwegian Centre for Research Data Norway, 2012).

The following data from the European Value Survey are considered:

- Trust in people is proxied through answer to the following question ‘would you say that most people can be trusted, or that you can't be too careful in dealing with people? Please tell on a score of 0 to 10, where 0 means you can't be too careful and 10 means that most people can be trusted’.
- Openness towards LGBTQ+ is measured using answers to the following question ‘to what extent you agree or disagree with this statement. Gay men and lesbians should be free to live their own life as they wish. Where 1 means you agree strongly and 6 means that you strongly disagree’.

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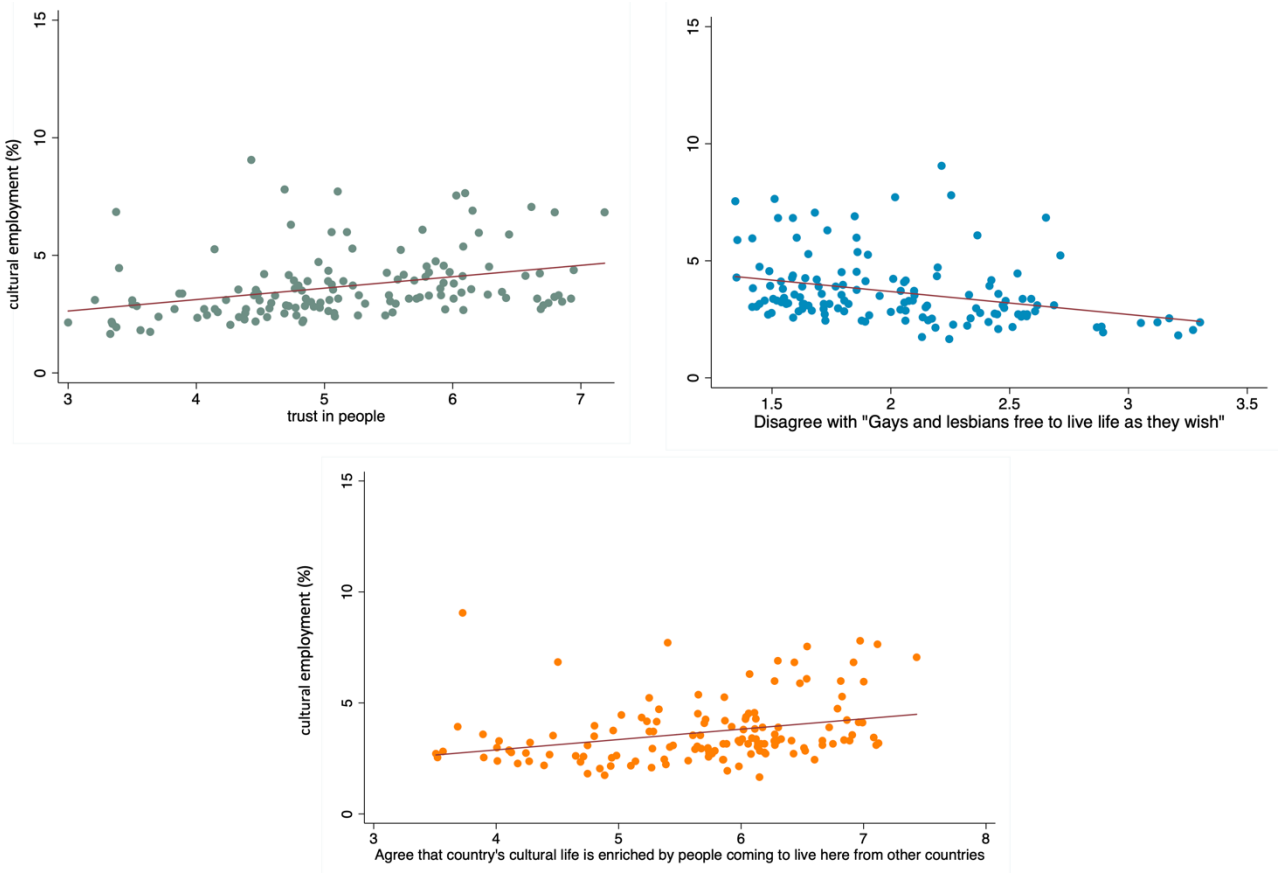
- Openness towards immigrants is measured through answers to the question 'would you say that your country's cultural life is generally undermined or enriched by people coming to live here from other countries? Where 0 means that the cultural life is undermined and 10 means that the cultural life is enriched.'

Figure 24 describes the association between the regional size of cultural economy proxied by the average size of cultural employment between 2014 and 2019 and the selected measures for tolerance and openness. From Figure 23, it appears that across Europe larger cultural economy relates to higher openness towards minorities and trust in people. The graph on the left provides for a positive association between cultural employment and the level of trust in other people. The graph in the middle shows that higher intolerance towards LGBTQ+ people relates to smaller size of cultural economy. Finally, the graph on the right outlines how regions with larger cultural economy display a positive attitude towards the different cultures brought by immigrants. The latter evidence supports existing perspectives arguing that a thriving cultural ecosystem favors the assimilation of diverse information and knowledge (Arribas-Bel et al., 2016; Cerisola, 2019; R. Florida et al., 2008).



Data source. Eurostat (cult_emp_reg) European Social Survey Rounds 6&8 (ppltrst, freehms, imueclt)

Figure 24 Size of cultural economy and attitudes towards people and minorities across regions (NUTS2): trust in people, openness towards LGBTQ+ and openness towards cultural diversity brought by immigrants. Regions belong to EU27 countries, UK and candidate countries.

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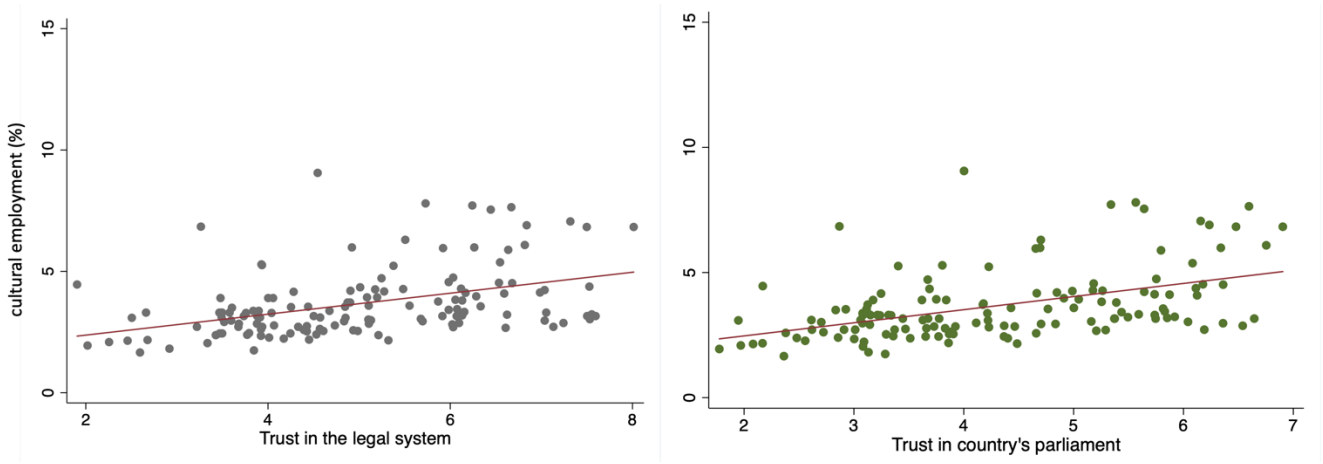
The literature recognizes another positive socioeconomic externality associated to cultural economy: trust in institutions (Alesina & Giuliano, 2015; Crociata, Agovino, & Sacco, 2015; Guiso et al., 2016). Cultural activities are capable of generating intended and unintended stimuli prompting people towards pro-social attitudes towards institutions (Kaasa & Andriani, 2022). This is in turn fundamental to have inclusive communities as well as to have economic growth, as higher trust in institutions determines higher propensity to invest, more collaborative behaviours, higher social trust (Alesina & Giuliano, 2015).

The point is relevant for the DISCE approach since it contributes to assess the role of cultural economy in supporting inclusive growth. To convey a measure of the association between trust in institutions and cultural economy across European regions (NUTS2), two measures for institutional trusts are designed using regional data (NUTS2) from the European Value Survey waves 6 and 8 (ESS- NSD - Norwegian Centre for Research Data, 2016; ESS-NSD - Norwegian Centre for Research Data Norway, 2012). In particular, the focus is on European Value Survey data about trust in two pillars of formal institutions: the legal system and trust in the political system. The regional level of trust in the legal system is measured through the answers to the question 'On a score of 0-10 how much you personally trust your legal system', where 0 means no trust at all, and 10 means complete trust. Similarly, the regional level of trust in the country's parliament is measured through the answers to the question 'On a score of 0-10 how much you personally trust your country's parliament', where 0 means no trust at all, and 10 means complete trust.

Figure 25 describes the relationship between each proposed measure for trust in institutions and the size of cultural economy, where the latter is again proxied by the share of cultural employment on total employment (Eurostat, 2021a). Figure 23 clearly displays a positive association between cultural employment and trust in institutions across European regions (NUTS2). Notably, from Figure 25 it appears that cultural employment relates to the two different forms of trust in institutions in the same way.



Data source. Eurostat (cult_emp_reg) European Social Survey Rounds 6&8 (trstlgl, trstprlt)

Figure 25 Size of cultural economy and attitudes towards institutions across regions (NUTS2): trust in the legal system and trust in the country's parliament. Regions belong to EU27 countries, UK and candidate countries.

Perception of corruption is another interesting measure for sustainable and inclusive growth. Corruption has the potential to damage the effective implementation of all 17 Sustainable Development Goals (United Nations, 2017), by fostering inequality and deteriorating social cohesion. PERCEIVE is a recently introduced survey by the Quality of Government Institute specifically addressing people's perception about the level of

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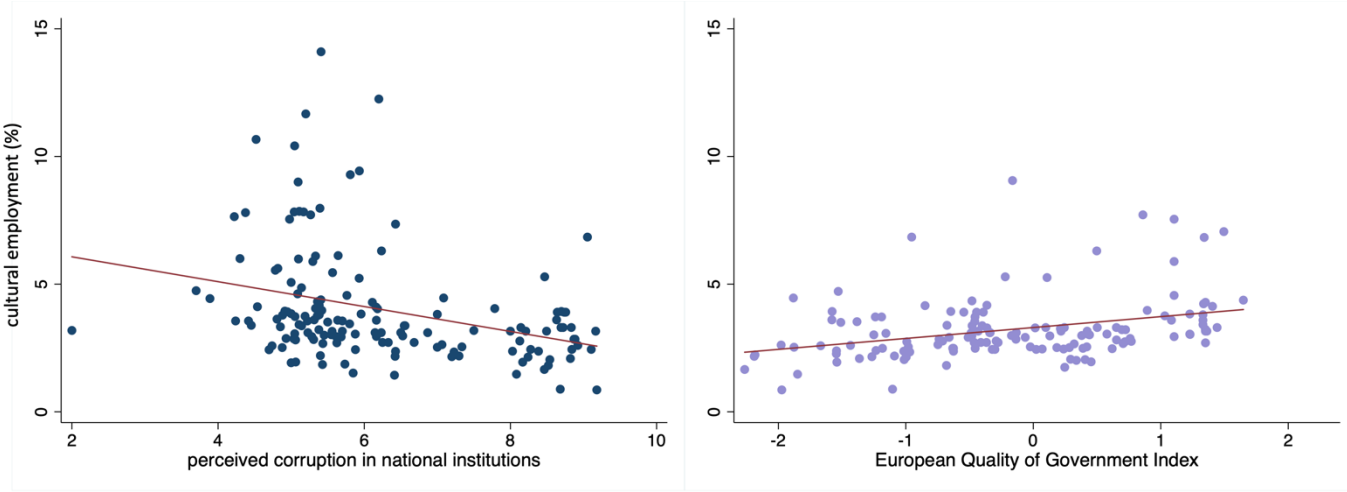
corruption using regional data (NUTS2). More into details, we consider respondents' answers to the question 'On a 0-10 scale, with '0' being that 'there is no corruption' and '10' being that corruption is widespread, how would you rate national governing institutions?' (Bauhr & Charron, 2020). Figure 26 (left graph) shows the relationship between perception of corruption and the size of cultural economy, where the latter is again proxied by the share of cultural employment on total employment (Eurostat, 2021a). Data provide for a negative association between the size of CCIs and the perception of corruption. The larger the CCIs sector, the less citizens think that institutions are corrupted.



Data source. Eurostat (cult_emp_reg) The Quality of Government Institute: EQI index; PERCEIVE survey (Q16_3)

Figure 26 Size of cultural economy and perception of corruption across regions (NUTS2)

Another interesting dimension to analyze is the relationship between CCIs and the overall quality of institutions. Using data from the European Quality of Government Index (EQI) (Charron, Dijkstra, & Lapuente, 2015; Charron, Lapuente, & Annoni, 2019), it is possible to design a comprehensive measure for institutional quality. The index is recognized source of data to compare the quality of institutions at the European level and it gives a synthetic measure for perceptions and experiences with public sector corruption, along with the extent to which citizens believe various public sector services are impartially allocated and of good quality. Figure 26 (right graph) shows a positive correlation between how many people are employed in CCIs and institutional quality. This evidence suggests that regions where the cultural economy is larger have citizens with a more positive perception of their institutions.

Finally, this section provides measures of association between CCIs employment and measures characterizing inclusiveness and sustainability in the labour market. More into details, it is measured how employment in CCIs relates to the following measures:

- Employment Rate Gender difference, which is given by the difference between female and male employment rate.
- Participation Rate Gender difference, which is given by the difference between female labour force divided by female working-age population and male labour force divided by male working-age population.
- Part-Time Employment Incidence, measured as the percentage of part-time employees over total employment.

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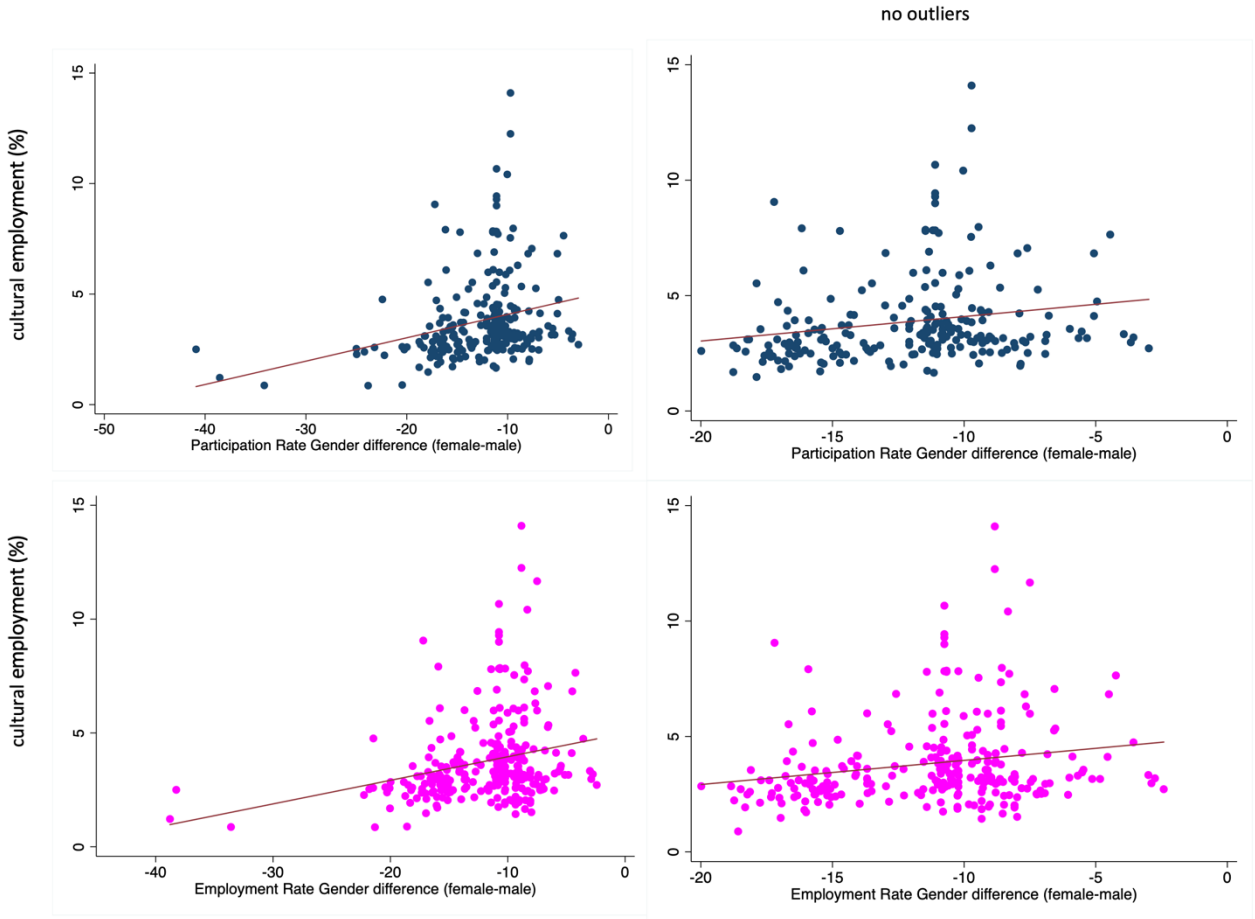
CCIs employment is measured using Eurostat data on cultural employment at NUTS2 level. Employment Rate Gender difference, Part-Time Employment Incidence and Participation Rate Gender difference are measured using OECD Regional Labour statistics at TL2 and TL3 level to match them with the corresponding NUTS2 regions[28].

Figure 27 displays correlation patterns between CCIs employment and Participation Rate Gender difference and Employment Rate Gender difference, respectively. Figure 27 provides for a positive correlation between CCIs employment and higher equality between male and female in both labour participation and employment. Hence regions where the CCIs sector is larger also have reduced gender inequality in both labour participation and employment. Since several Turkish regions have relevant gender gaps in both labour participation and employment, Figure 27 displays the correlation patterns when these regions are removed from the sample, to show that the positive correlations still hold.



Data source. Eurostat (cult_emp_reg) OECD Regional Labour statistics

Figure 27 Size of CCIs employment and degrees of gender equality in the labour market across European NUTS2 regions, Values are averaged between 2014 and 2019.

[28] OECD TL2 regions represent the first administrative tier of subnational government and they are largely consistent with the Eurostat NUTS, with the exception of France, Germany, Belgium, Norway and the UK. For these countries, OECD figures have been considered at TL3 level and consolidated on the corresponding NUTS2 geography. OECD TL3 regions are smaller spatial units compared to TL2 (OECD, 2021).

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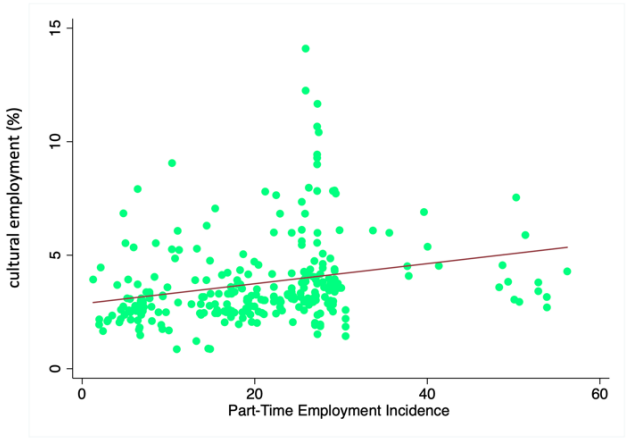
It would be interesting to assess the same correlations within CCIs across Europe. However, data on employment rate gender differences and participation rate gender differences are not available for CCIs. Nonetheless, with available data it is possible to provide interesting information that could be further investigated once adequate data are accessible.

Figure 28 outlines the correlation between CCIs employment and the incidence of part-time work on total employment across European regions. From the figure, it appears that regions with larger share of people employed in CCIs are also regions with high incidence of part-time work. With available data it is not possible to measure the share of regional part-time work that happens within CCIs



Data source. Eurostat (cult_emp_reg) OECD Regional Labour statistics

Figure 28 Size of CCIs employment and incidence of part-time employment (% of part-time employees over total employment) across European NUTS2 regions, Values are averaged between 2014 and 2019.

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5. Regression evidence between cultural economy and CCIs and socioeconomic elements

This section presents some preliminary regression evidence measuring the association between CCIs and specific socioeconomic outcomes. Chapter 4 has detailed extensive evidence on meaningful correlations between CCIs and different features, from innovation to quality of institutions. This chapter moves one step further by showing some regression results in which it is estimated what happens to one variable when other variables change. The regression analysis focuses on dimensions that are relevant for performing a regional diagnosis of the relationship between CCIs and (i) innovation performance and (ii) social inclusiveness according to DISCE (DISCE, 2019). More into detail, it is estimated how regional CCIs size and diversification are associated to regional innovation, since these dimensions relate to new idea creation and dissemination, which in turn might enable sustainable transitions (Steen & Weaver, 2017). Also, the association between CCIs and measures for openness and trust is estimated, given the role of CCIs in stimulating social capital creation (OECD, 2018). Finally, the chapter estimates the significance of association within measures for regional labour market disparities and CCIs (DISCE, 2019), by looking at how CCIs employment relates to two important measures for inclusiveness and sustainability in the labour market: part-time employment and gender differences in employment rates.

Through regression estimates, the chapter also shows the significance and the strength of the association between CCIs and other socioeconomic features when potential confounders are accounted for. The variables used in the chapter are the ones introduced in chapters 3 and 4 and they are described in the tables presenting the regression results. Table A1 in the Appendix provides the variable outline and the data sources.

Starting from the economic dimension, it is estimated the association between the size of CCIs, proxied by the share of employment, and the R&D dimension. Averaging data for the 2014-2019 for all NUTS2 with available figure, findings show a positive influence of higher R&D on people employed in CCIs, as summarized in column 1 of Table 5.

Table 5 Regression estimates for the relation between research and the size of CCIs across European regions (NUTS2).

Dependent variable: CCIs employment	(1)	(2)	(3)
Total R&D expenditure as % of GDP	**0.623***** **(0.0899)**	**0.595***** **(0.0946)**	**0.589***** **(0.0953)**
Share PhD students in CCIs		1.428* (0.802)	1.431* (0.797)
City(es) being CCIs hub(s)			0.0748 (0.259)
Obs	258	222	222
R sq	0.14	0.13	0.13

CCIs employment is measured using Eurostat data on cultural employment (cult_emp_reg). Total R&D expenditure as % of GDP is measured using Eurostat data (rd_e_gerdreg). The share of PHD students in CCIs uses the European Commission ETER database. Regions with city(es) being CCIs hub(s) are identified following Montalto et al. 2019 using the Table A1 in the Appendix details data sources

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

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This influence holds also when estimation accounts for the share of PHD students in CCIs-fields as control variable (column 2 Table 5). Estimates do not change also when regressors include a dummy variable accounting for regions with urban CCIs hub (column 3 Table 5). This evidence suggests a strong and significant association between CCIs and R&D, corroborating existing literature on the importance of knowledge transfers between CCIs and the broad R&D activity carried on in a place (Faggian, Rajbhandari, et al., 2017; Innocenti & Lazzeretti, 2019; Rodríguez-Pose & Lee, 2020). Notably, this result does not change when the estimation includes a measure for CCIs-specific research, proxied by the share of PhD researchers in CCIs-departments in HEIs. Also, the significance and the size do the association do not depend either on the region having or not urban CCIs hubs.

Table 6 presents estimates of the association between the regional diversification of CCIs in different sectors and the R&D dimension. In this case, there is a significant association between the size of CCI-specific research and CCIs becoming less diversified. At the same time, the total R&D expenditure does not have any significant effect. The first result might appear surprising, since it could be reasonable to think that more research in CCIs-fields favor industry diversification through new ideas and innovation. However, it is also possible that research in CCIs-fields is driven by the needs of local CCIs firms. If this is the case, then CCIs research might be focusing on innovation in cultural and creative products that local CCIs firms are already engaged with. Hence, by favoring innovation on productions that already exist in the local context, CCIs-research would favor local specialization in those products.

Table 6 Regression estimates for the relation between research and the sectoral concentration of CCIs across European regions (NUTS2)

Dependent variable: CCIs sectoral concentration	(1)	(2)
Total R&D expenditure as % of GDP		31.63
		(18.04)
Share PhD students in CCIs	**405.9****	**645.7*****
	(185.9)	**(189.6)**
GVA		-33.11**
		(14.92)
Obs	157	120
R sq	0.06	0.13

Industry sectoral concentration is measured through entropy index applied to Eurostat data on Structural Business Statistics (SBS_R_NUTS06_R2). The lower that value of the entropy index, the more diversified is the regional sectoral composition of CCIs. The entropy index is the Hirschman-Herfindahl diversity index. See Tabner (2007) for more details. Eurostat data are also used to measure GVA. The share of PHD students in CCIs uses the European Commission ETER database. Table A1 in the Appendix details data sources

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

Total R&D expenditure does not have any significant effect on CCIs regional diversification, while it has a positive and significant effect on CCIs employment (Table 5). A possible explanation for this is that places doing more R&D benefits from higher spillovers and complementarities which open to economic growth in several sectors, including CCIs. At the same time, more R&D but with no strong focus on CCIs does not influence the evolution of CCIs product diversification. An interesting result is given by the negative and

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significant association between Gross Value Added (GVA) and CCIs sectoral concentration outlined in column 2, Table 6. The higher the regional GVA, the more diversified CCIs.

Estimates from tables 5-6 allows to formulate some insights on the nexus between CCIs, overall innovation and knowledge transfers (DISCE, 2019). CCIs are larger where there is more innovation, as summarized by estimates in Table 5. Also, places that are more innovative have CCIs that are more specialized.

A second set of regressions focus on the association between CCIs and measures for inclusiveness and sustainability at regional level. Table 7 presents estimates of the association between the regional size of CCIs, proxied by its employment as share of total employment, and openness towards immigrants.

Table 7 Regression estimates for the relation between the size CCIs and perception of immigrants across European regions (NUTS2).

Dependent variable: Perception of immigrants	(1)	(2)
CCIs employment	**0.230****	**0.294*****
	(0.0716)	**(0.0615)**
Adult Literacy		-0.009
		(0.006)
GVA		0.167**
		(0.0632)
Regional Competitiveness Index		-5.035***
		(0.653)
Obs	157	135
R sq	0.12	0.48

Perception of immigrants is measured using the European Social Survey Waves 6-8 answer to the question "Country's cultural life undermined/enriched by immigrants" (ESS code: imueclt). High values for imueclt refer to high openness. CCIs employment is measured using Eurostat data on cultural employment (cult_emp_reg). Adult literacy is the share of adult population with tertiary education measured with Eurostat figures. Eurostat data are also used to measure GVA. Regional Competitiveness Index figures are from the European Commions. Table A1 in the Appendix details data sources

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

Regions with larger CCIs sector are more open towards immigrants and their culture (Table 7, column 1). This significant and positive association remains when other elements which could have an influence on the local perception of migrants are considered, as summarized in Table 7, column 2.

Table 8 presents estimates of the association between the regional size of CCIs, proxied by its employment as share of total employment, and trust in the legal system. Results show that people living in regions with larger CCIs have more trust in their legal system, as outline by the positive and significant coefficient of CCIs employment in column 1. Also, this positive and significant association is not altered when other features which could play a role in explaining high trust in the legal system are considered (Table 8, column 2).

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Table 8 Regression estimates for the relation between the size CCIs and trust in the legal system across European regions (NUTS2).

Dependent variable: Trust in legal system	(1)	(2)
CCIs employment	**0.385*** **	**0.452*** **
	(0.079)	**(0.106)**
Adult Literacy		-0.004
		(0.0109)
GVA		-0.169**
		(0.0668)
Regional Competitiveness Index		-2.529**
		(1.073)
Obs	157	135
R sq	0.18	0.25

Trust in legal system is measured using the European Social Survey Waves 6-8 answer to the question 'On a score of 0-10 how much you personally trust your legal system', where 0 means no trust at all, and 10 means complete trust' (ESS code: trstlgl). CCIs employment is measured using Eurostat data on cultural employment (cult_emp_reg). Adult literacy is the share of adult population with tertiary education measured with Eurostat figures. Eurostat data are also used to measure GVA. Regional Competitiveness Index figures are from the European Commission. Table A1 in the Appendix details data sources

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

Estimates from Table 9 corroborates the positive and significant association between the size of CCIs and positive attitudes towards institutions. More into details, Table 9 details the influence of CCIs in a region on the perception of corruption by citizens. Regions with larger CCIs, as proxied by the share of CCIs employment on total employment, have citizens thinking that their institutions are less corrupted. This is summarized by the significant and negative coefficient for CCIs employment in column 1 of Table 9. Also in this case, this result hold when the estimation is broadened to include features which could play a role in explaining patterns of perceived corruption.

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Table 9 Regression estimates for the relation between the size CCIs and the quality of institutions across European regions (NUTS2).

Dependent variable: Perception of corruption	(1)	(2)
CCIs employment	**-0.226*** **	**-0.266*** **
	(0.0398)	**(0.0464)**
Adult Literacy		-0.00215
		(0.0119)
GVA		0.138
		(0.0700)
Obs	193	154
R sq	0.11	0.15

Perception of corruption is measured using the PERCEIVE Survey answer to the question On a 0-10 scale, with '0' being that 'there is no corruption' and '10' being that corruption is widespread, how would you rate national governing institutions?' (Q16_2). CCIs employment is measured using Eurostat data on cultural employment (cult_emp_reg). Adult literacy is the share of adult population with tertiary education measured with Eurostat figures. Eurostat data are also used to measure GVA. Regional Competitiveness Index figures are from the European Commission. Table A1 in the Appendix details data sources

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

Notably, tables 8 and 9 use data from two different surveys to measure people's perception of institutions. Table 8 uses data from the European Social Survey and Table 9 draws on data from the PERCEIVE survey. These two surveys have different population samples. Hence, the positive relationship between CCIs and perception of institutions does not appear to be driven by either survey-design bias or sample selection bias.

The regression estimates from Tables 7-9 support the relevance of CCIs with respect to social cohesion, community well-being and social resilience. Regions with larger CCIs have higher level of trust, more respect for institutions and communities and are more capable of seeing opportunities out of the new social challenges posed by immigrants with diverse cultural background. As advanced by CCIs literature, the local exposure to new narratives produced by CCIs can represent a way through which communities manage to overcome perceived threats by overcoming stereotypes and lack of adequate information (Brown & Paterson, 2016; Vezzali, Hewstone, Capozza, Giovannini, & Wölfer, 2014). Fear of diverse groups and lack of trust in institutions are acknowledged as being the relevant drivers behind discontent, resentment and erosion of social fabric (Dijkstra et al., 2019; Hainmueller & Hopkins, 2014). Hence, CCIs appear to protect communities from these socioeconomic drawbacks.

In chapter 4, section 2, descriptive evidence suggested an association between cultural employment and some characteristics of the labour market. First, regions with higher share of cultural employment on total employment are regions with lower gender inequality in both employment rate and participation in the labour market. Second, regions with higher share of cultural employment are regions with higher share of part-time employment on total employment. These preliminary results suggest that cultural employment might influence these two elements which are relevant in terms of sustainable and inclusive growth of places. Through regression estimation, this influence is further investigated to check for its significance and whether it remains there once potential competing influencing features are considered. Due to data availability, cultural employment is considered as proxy for CCIs employment. As argued in Chapter 3 and in other DISCE

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reports (Dent et al., 2020), notwithstanding its limitations, cultural employment represents a comprehensive account for the share of workforce employed in CCIs.

Table 10 reports regression estimates for the association between CCIs employment and the incidence of part-time employment. Results show that CCIs employment is a significant and positive predictor of the intensity of part-time employment. This result remains also when the regression includes other potential predictors for the outlook of labour market: the degree of regional socioeconomic competitiveness and the gross value added generated in the region (Table 10, column 2). Hence, there is support for regions with larger share of population employed in CCIs having also larger share of population having part-time jobs. Clearly, this does not allow to conclude that CCIs in those are characterized by higher shares of part-time jobs. At the same time, it provides evidence that supports the need of adequate data to analyze more in depth the link between CCIs employment and working contracts.

Table 10 Regression estimates for the relation between CCIs employment and part-time employment across European regions (NUTS2).

Dependent variable: Part-time employment incidence	(1)	(2)
CCIs employment	**1.436*** **	**1.851*** **
	(0.284)	**(0.312)**
RCI		-12.23
		(8.068)
GVA		-1.757**
		(0.844)
Obs	273	204
R sq	0.06	0.18

Part-time employment incidence is measured using OECD Regional Labour Statistics. CCIs employment is measured using Eurostat data on cultural employment (cult_emp_reg). Eurostat data are also used to measure GVA. Regional Competitiveness Index figures are from the European Commission. Table A1 in the Appendix details data sources.

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

Table 11 reports regression estimates for the association between CCIs employment and the female-male gap in employment rate. Female-male gap in employment rate is measured as the difference between female employment rate and male employment rate, which has negative values in all European regions.

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Table 11 Regression estimates for the relation between CCIs employment and gender equality in employment across European regions (NUTS2).

Dependent variable: Employment Rate Gender difference	(1)	(2)
CCIs employment	**0.618*** **	**0.705 *** **
	(0.142)	**(0.124)**
RCI		-9.704**
		(3.742)
GVA		-0.184
		(0.171)
Obs	273	204
R sq	0.06	0.16

Employment Rate Gender difference is measured using OECD Regional Labour Statistics. CCIs employment is measured using Eurostat data on cultural employment (cult_emp_reg). Eurostat data are also used to measure GVA. Regional Competitiveness Index figures are from the European Commission. Table A1 in the Appendix details data sources.

Robust standard errors are in parentheses; *** p<.01, ** p<.05, * p<.1

In this case, results show that regions having more people employed in CCIs have lower gender inequality in employment, as summarized by the positive and significant coefficient for CCIs employment in column 1. This result holds also when the regression includes other potential predictors for the outlook of labour market: the degree of regional socioeconomic competitiveness and the gross value added generated in the region (Table 11, column 2). This evidence suggests that regions with larger shares of people working in CCI have more gender-balanced employment. Similarly with Table 10, the current availability of data does not allow to investigate further. And again, this opens to the need of adequate data to analyze more the employment structure of CCIs.

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6. Policy recommendations

Throughout the report, the evidence presented suggests several policy recommendations. First, geography has a crucial role in shaping CCIs, therefore it should be accounted in an effective measurement. Employment, number of CCIs firms, CCIs sectoral growth have sizeable difference across European regions, also within the same country. These differences are not captured by country-level data. At the same time, they are relevant to understand how the different regions are performing regarding CCIs and whether there are regions that are "left behind" regarding cultural development. Currently, local statistics on CCIs which are harmonized at European level are scarce and they cover the regional (NUTS2) level. By showing that the adoption of a sub-country focus outlines relevant trends, our results support:

- **The production of more harmonized statistics at the regional level (NUTS2).** Data on CCIs firms at regional level should cover 3- and 4-digits classification, to allow for a more refined measurement of CCIs firms. Structural Business Statistics on CCIs should include harmonized data on NACE Rev.2 divisions 90 (Creative, arts and entertainment activities) and 91 (Libraries, archives, museums and other cultural activities). Also, the areas of culture statistics identified by Eurostat as deserving further development (tangible and intangible, cultural heritage, cultural tourism), should be operationalized at NUTS2 level. Similarly, data on CCIs-related research done by HEIs from ETER database should be operationalized by Eurostat, broadened to account also for faculty-staff in CCIs-related departments and complemented with figures on enterprises corresponding to NACE Rev.2 division 85.52 ("Cultural education"). Finally, figures on NUTS2-level public expenditure on culture should be collected, and this should be done according to a granularity of public expenditure classification which allows to detect public funds devoted to the different CCIs categories[29].
- **The production of harmonized statistics at the province level (NUTS3).** By doing so, it would be possible to have adequate evidence-base to investigate the existence and the significance of several topics that currently cannot be consistently analyzed across Europe, such as the urban/rural divide and the distance between CCIs clusters and HEIs. Having figures on CCIs at NUTS3 level would also allow for a more thorough analysis of the relationship between CCIs and European Structural and Investment Funds for regional and local development. These Funds have a strong local dimension, again with differences between urban and rural contexts. NUTS3-level data also also important since exiting CCIs figures at small geographic scale have important limitations. In fact, the current availability of city-level statistics on CCIs prevents inter-city comparison even with the same country30 (Eurostat, 2018), together with having a limited coverage of the European landscape (Eurostat, 2018; Montalto et al., 2019).
- **European Labour Force Survey (LFS) statistics should cover job precariousness in CCIs, information about roles performed by women and other minority groups at local level (NUTS2 and NUTS3).** Currently these data are not available, and this limitation does not allow to analyze occupational patterns in terms of inclusivity and gender-balance within CCIs. The evidence presented in the report shows significant associations between CCIs employment and incidence of part-time employment and between CCIs employment and gender-equality in labour markets. These preliminary findings further support the need for regional data on employment structure within CCIs.

[29] Currently data on public expenditure on CCIs are collected at national level. These country-level data have a limitation in being expenditure on culture not distinguishable from religious and recreational expenditures in some activities (Eurostat, 2018).
[30] Occasionally divergent definitions and the use of different data sources are two limitations of data collected at city-level in Eurostat City statistics relating to culture (Eurostat, 2018).

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- **Ongoing efforts by Eurostat in refining the measurement of cultural employment should be supported**, to overcome the existing limitations related, for instance, to the current absence of coverage for working activities that have partial cultural components.

Second, CCIs are complex and simply looking at administrative data does not provide an adequate account and more survey data could be beneficial. This report shows that regions with larger CCIs sectors have communities with higher trust in people and institutions. Also, citizens of these regions are more open towards minorities (ethnic minorities and LGBTQ+). Larger CCIs sectors are also associated with a higher perceived quality of institutions. All these findings rely on multi-wave survey data on people's attitudes collected by research institutions such as The Quality of Government and the European Social Survey network. To this regard, our results support:

- **The design of survey questions that explore more into details people's attitude and their approach to CCIs**. For instance, by complementing questions on cultural habits to questions on trust, openness and tolerance. This survey questions could be added to the European Social Survey core questions to be then administered across European countries at NUTS2-3 level. Otherwise, a European survey covering NUTS2-3 level could be designed and administered by Eurostat and national statistics offices. This point woud respond to the current lack of European surveys on culture (Eurostat, 2018).

Third, figures on foundations, charities, associations and other non-for-profit organizations working in CCIs should be collected, again at regional and province level. Currently, these figures are not available as harmonized data covering Europe (Eurostat, 2018). At the same time, these types of organizations produce culture and creative products, they employ people, pay wages, interact with HEIs. It might also be possible that specific fiscal regimes or local policy favor the creation of these types of organizations rather than private companies. Therefore, the unavailability of statistics on these organizations at regional and province level might be a source for measurement bias such that currently available data provide a lower bound for the actual measures related to CCIS.

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7. Conclusions

This report has detailed a quantitative mapping of cultural economy and CCIs across Europe according to the DISCE approach. By designing a database capable of merging data on CCIs with data on sustainable and inclusive growth, the report presents novel descriptive evidence supporting the conceptual approach developed within DISCE.

First, the evidence described in the report extensively corroborates the role of places in shaping existing patterns of CCIs and cultural employment. Comparison between country and regional level data show that there are strong sub-national variabilities that become invisible when the focus stops at the country level. This quantitative result confirms the crucial role that DISCE assigns to the socioeconomic context in understanding CCIs (Wilson et al., 2020). It also suggests that local data on CCIs are extremely relevant, hence they should cover more dimensions as well as being available at a smaller geographical scale.

Second, this report provides for evidence on several relationships between CCIs and economic features which delivers a variegated picture. On the one hand, data show that cultural employment has a positive association with the growth of CCIs as well as with the size of local endowment of cultural amenities. On the other hand, figures show that cultural employment has a negative association with Growth Value Added, maybe suggesting that other industries crowd out resources from CCIs. Similarly, cultural employment negatively relates to European Structural and Investment Funds targeting culture. This last result seems to suggest that the regions that invested the most in European funds dedicated to culture have not seen an increase in employment in the sector.

Third, the report supports the DISCE perspective in speculating a relationship between CCIs and sustainable and inclusive growth. Data show that larger cultural sectors are associated with more open and tolerant communities. Also, larger cultural sector relates to higher trust in institutions and other people.

Clearly, the evidence detailed in this report is both preliminary and descriptive. At the same time, it is the first attempt to analyze CCIs at sub-national level to understand its strengths and weaknesses for future inclusive and sustainable development. Further research would greatly benefit from more data availability on CCIs characteristics at regional level.

Also, the report does not provide any measure for causation, as it goes beyond the scope of the present investigation. Further work could explore the direction of association between the considered variables.

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8. Correlation evidence between CCIs and socioeconomic elements

This section details quantitative evidence on the relationship between cultural employment and socioeconomic characteristics that are relevant with respect to the DISCE approach. Correlation measures are assessed at regional level (NUTS2), given the extensive conceptual support to the role of geographical contexts detailed in several DISCE reports (Crociata, 2019; Gross et al., 2019) and the quantitative evidence proving the relevance of existing spatial variability detailed in section 3 above.

The investigation starts in sub-section 4.1, by addressing correlation between cultural employment and other economic features that refer to the economic dimension. Cultural employment has been chosen among the different dimensions of CCIs by drawing on CCIs literature which uses cultural employment as the established measure for the economic performance of CCIs (Innocenti & Lazzeretti, 2019). This approach aligns with literature on economic growth, which uses employment as proxy for growth (Duranton et al., 2009). Considered variables for measuring their correlation with cultural employment are:

- Growth of CCIs firms
- Trend in the structural composition of CCIs
- Gross Value Added (GVA)
- employment in knowledge-intensive sectors
- R&D and patents
- Higher Education Institutions (HEIs) and human capital
- Endowment of cultural amenities
- Tourism demand

European Structural and Investment Funds (ESIF) for regional and local development, which are a core pillar of EU Cohesion Policy aimed at fostering economic growth and employment and amounting to huge shares of total EU budget (Crescenzi & Giua, 2020).

Notably, the majority of these features can be proxied referring to related indicators developed in Deliverable D2.2. More into details, the growth of CCIs firms can be proxied considering the evolution along time of the indicator "size of CCIs". Similarly, the trend in the structural composition of CCIs is conveyed by the dynamic evolution of the indicator "CCIs diversification". Employment in knowledge-intensive sectors can be measured referring to two indicators developed in Deliverable D2.2: "workforce employed in S&T" and "knowledge workers". R&D and patents are proxied using two indicators developed in Deliverable D2.2: "R&D expenditure" and "Scientific Publications". HEIs are accounted for the relevant dimensions of: supply of skilled labor, research in CCIs related fields and preservation of cultural products through three indicators designed in Deliverable D2.2: "Local Supply of CCIs skills", "Local Research in CCIs fields" and "Local Availability of CCIs-related knowledge infrastructure". Finally, endowment of cultural amenities is proxied using the indicator "territorial stock of cultural heritage". Regional GVA, tourism demand and ESIF do not pertain the CCIs operationalization that is addressed in Deliverable D2.2, while representing relevant dimensions in the measurement of the socioeconomic outlook of CCIs (DISCE, 2019). They are measured referring to extant literature that is detailed in sub-section 4.1.

Subsection 4.2 introduces correlation between cultural employment and geographical features pertaining sustainable and inclusive growth (DISCE, 2019). By doing so, the report provides quantitative evidence corroborating the conceptual framework developed within DISCE linking CCIs to human development and

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care (Wilson et al., 2020). The considered measures for sustainable and inclusive growth target marginalization of vulnerable groups, several dimensions of trust, local community livelihood and quality of institutions. More into details, considered measures are:

- youth marginalization
- trust in people
- trust in institutions
- tolerance towards different minority groups
- territorial capital
- quality of institutions and corruption
- inclusiveness in the labour market.

Also the quantitative assessment of the association between CCIs and sustainable and inclusive growth refers to the indicators developed in Deliverable D2.2. More into details, youth marginalization is proxied by the indicator "Share of young cohorts affected by socioeconomic vulnerability". Trust in people and trust in institutions respectively by the indicators "Trust: people" and "Trust in institutions". Tolerance towards minority groups is measured through the indicators "Openness & Tolerance towards migrants" and "Openness & Tolerance towards LGBTQ+". Territorial capital is proxied by the indicator proposed in Deliverable D2.2 "Regional Competitiveness Index (RCI)". RCI has been developed by the European Commission as composite indicator designed by the European Commission to provide a synthetic picture of territorial competitiveness for each of the NUTS 2 regions of the 27 EU Member States. Territorial competitiveness envisioned by RCI can be defined as the ability to offer an attractive and sustainable environment for firms and residents to live and work (Dijkstra, Annoni, & Kozovska, 2011). Hence, it represents an encompassing measure for territorial capital, a key acknowledged factor for assessing socioeconomic performance of places (Camagni & Capello, 2013). Quality of institutions and corruption are proxied using indicators "Quality of Institutions" and "Corruption". Measuring the relationship between CCIs and regional labour market disparities was among the aims of DISCE (DISCE, 2019). This point is addressed using metrics detailed in sub-section 4.2.

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Appendix

Table A1. Data sources and details

Data	Source	Geography	Data Code
Economic			
Cultural employment	Eurostat 2014-2019	NUTS0-NUTS2	cult_emp_reg
Gross Value Added (GVA)	Eurostat 2014-2019	NUTS0-NUTS2	nama_10r_2gvagr
Employment growth rate CCIs NACE Rev 2	Structural business statistics 2008-2017	NUTS2	SBS_R_NUTS06_R2
Employment in technology and knowledge-intensive sectors NACE Rev. 2	Eurostat 2014-2019	NUTS2	HTEC_EMP_REG2
Local units CCIs NACE Rev 2	Structural business statistics 2008-2017	NUTS2	SBS_R_NUTS06_R2
Wages and salaries CCIs NACE Rev 2	Structural business statistics 2008-2017	NUTS1-NUTS2	SBS_R_NUTS06_R2
	Labour Cost survey 2008 and 2012	NUTS1	reg_lcs_r2
Wages and salaries	Labour Cost survey 2008-2016	NUTS1	LC_RCOST_R2
Part-time employment incidence	OECD Regional Labour statistics	TL2-TL3	Part-time employment incidence
Employment Rate Gender difference	OECD Regional Labour statistics	TL2-TL3	Employment Rate Gender diff
Participation Rate Gender difference	OECD Regional Labour statistics	TL2-TL3	Participation Rate Gender diff
	OECD Regional Business Demography	TL2-TL3	
	OECD Regional Business Demography	TL2-TL3	
	OECD Regional Business Demography	TL2-TL3	
Knowledge workers	Labour Force Survey	NUTS2	
Total R&D expenditure as % of GDP	Regional S&T Statistics	NUTS2	rd_e_gerdreg
Scientific publications	ScienceMetrix Scopus data	NUTS2	
Employed in S&T as of % labor force	Eurostat Regional S&T Statistics	NUTS2	hrst_st_rcat
EU structural funds. Ex post evaluation 2007-2013	European Commission (EC)	NUTS2	wp13_db_nuts2_cs_v1
HEI students enrolled in Arts and Humanities	EC ETER 2011-2016	NUTS2	STUD.ISCED5_7FOE02
HEI students enrolled in Social Sciences	EC ETER 2011-2016	NUTS2	STUD.ISCED5_7FOE03
HEI students enrolled in ICT	EC ETER 2011-2016	NUTS2	STUD.ISCED5_7FOE06
HEI students	EC ETER 2011-2016	NUTS2	STUD.TOTALISCED5-7
HEI research in Arts and Humanities	EC ETER 2011-2016	NUTS2	RES TUDISCED8FOE02
HEI research in Social Sciences	EC ETER 2011-2016	NUTS2	RES TUDISCED8FOE03
HEI research enrolled in ICT	EC ETER 2011-2016	NUTS2	RES TUDISCED8FOE06
HEI research	EC ETER 2011-2016	NUTS2	RES TUDISCED8TOTAL
HEI types (generic, CCIs-specific, other types)	EC ETER 2011-2016	NUTS	BAS.INSTCATENGL
Nights at tourist accommodation establishments	Eurostat	NUTS2	TOUR_OCC_NIN2
Material Cultural heritage and pre 1919 dwellings	ESPON	NUTS2	ALLMCHN2
Regions (NUTS2) with Cultural and Creative Cities	Cultural and Creative Cities Monitor 2017-2019	NUTS2	Selected cities
sustainable and inclusive growth			
Female cultural employment	Eurostat 2008-2017	NUTS0	cult_emp
Male cultural employment	Eurostat 2008-2017	NUTS0	cult_emp
Young people aged 15-24 that are neither in employment nor in education or training (NEET)	Eurostat 2014-2019	NUTS0-NUTS2	EDAT_LFSE_04
Population aged 25-64 with tertiary education (level 5-8)	Eurostat 2014-2019	NUTS0-NUTS2	EDAT_LFSE_0
Most people can be trusted, or you can't be too careful	European Social Survey Waves 6-8	NUTS2	ppltrst
Gays and lesbians free to live life as they wish	European Social Survey Waves 6-8	NUTS2	freehms
Country's cultural life undermined/enriched by immigrants	European Social Survey Waves 6-8	NUTS2	imueclt
Trust in legal system	European Social Survey Waves 6-8	NUTS2	trstlgl
Trust in country's parliament	European Social Survey Waves 6-8	NUTS2	trstprlt
Regional Competitiveness Index	REGIO-B1-PAPERS /Yves Durinck	NUTS2	
Population on 1 January by NUTS 2	Eurostat 2014-2019	NUTS2	region[demo_r_d2jan]
Corruption in National Institutions	QoG PERCEIVE survey 2017	NUTS2	Q16_2
Quality of Institutions	QoG EQI survey 2019-2010	NUTS2	EQI

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Table A2. Coherence between data used in the report and data proposed in DISCE Description of Action

Data used in D2.4	Source	Metrics posited in DISCE Description of Action
Economic		
Cultural employment	Labor Force Survey	Labor Force Survey
Gross Value Added (GVA)	GVA Eurostat	GVA
Employment growth rate CCIs NACE Rev 2	Structural business statistics	Structural Business Statistics
Employment in technology and knowledge-intensive sectors NACE Rev. 2	Labor Force Survey	Labor Force Survey
Local units CCIs NACE Rev 2	Structural business statistics	Structural Business Statistics
Wages and salaries CCIs NACE Rev 2	Structural business statistics	Earnings data by industry Labor costs by industry
Wages and salaries	Labour Cost survey	Earnings data by industry Labor costs by industry
Part-time employment incidence	OECD Regional Labour statistics	Regional labour market disparities
Employment Rate Gender difference	OECD Regional Labour statistics	Regional labour market disparities
Participation Rate Gender difference	OECD Regional Labour statistics	Regional labour market disparities
Knowledge workers	Eurostar Regional S&T Statistics	OECD R&D and innovation
Total R&D expenditure as % of GDP	Eurostat Regional S&T Statistics	OECD R&D and innovation
Scientific publications	ScienceMetrix Scopus data	R&D and innovation
Employed in S&T as of % labor force	Eurostat Regional S&T Statistics	OECD R&D and innovation
HEIs density	European Commission EDER	HEIs statistics
HEIs students by relevant fields	European Commission EDER	HEIs education statistics
HEIs research by relevant fields	European Commission EDER	HEIs research statistics
HEIs activities by relevant fields	European Commission EDER	HEIs structural statistics
Nights at tourist accommodation establishments	Eurostat Regional Statistics	Tourism statistics
EU structural funds. Ex post evaluation 2007-2013	European Commission	Socioeconomic resilience
Regions (NUTS2) with Cultural and Creative Cities	Cultural and Creative Cities Monitor	Cultural amenities
Cultural heritage and pre 1919 dwellings	ESPON	Cultural amenities
sustainable and inclusive growth		
Female cultural employment	Eurostat	social cohesion and wellbeing
Male cultural employment	Eurostat	
Young people aged 15-24 that are neither in employment nor in education or training (NEET)	Eurostat	socioeconomic resilience
Population aged 25-64 with tertiary education (level 5-8)	Eurostat	graduates' census
Most people can be trusted, or you can't be too careful	European Social Survey Waves 6-8	social cohesion and wellbeing
Gays and lesbians free to live life as they wish	European Social Survey Waves 6-8	social cohesion and wellbeing
Country's cultural life undermined/enriched by immigrants	European Social Survey Waves 6-8	
Trust in legal system	European Social Survey Waves 6-8	social cohesion and wellbeing
Trust in country's parliament	European Social Survey Waves 6-8	
Regional Competitiveness Index	REGIO-B1-PAPERS /Yves Durinck	Socioeconomic resilience
Population	European Population Census Eurostat	European Population Census
Corruption in National Institutions	QoG PERCEIVE survey 2017	QoG
Quality of Institutions	QoG EQI survey	QoG

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Table A3. Mapping of data used in the report and indicators proposed in Deliverable D2.2

Data used in D2.4	Source	Indicators proposed in Deliverable D2.2
Cultural employment	Labor Force Survey	Contribution of CCIs to the overall economy
Employment growth rate CCIs NACE Rev 2	Structural business statistics	
Wages and salaries CCIs NACE Rev 2	Structural business statistics	Income generated by CCIs sectors
Wages and salaries	Labour Cost survey	
Local units CCIs NACE Rev 2	Structural business statistics	Size of each CCIs sectors
Entropy index made using Local units CCIs NACE Rev 2	Structural business statistics	CCIs diversification
Knowledge workers	Eurostar Regional S&T Statistics	Knowledge workers
Total R&D expenditure as % of GDP	Eurostat Regional S&T Statistics	R&D expenditure
Scientific publications	ScienceMetrix Scopus data	Scientific publications
Employed in S&T as of % labor force	Eurostat Regional S&T Statistics	Employed in S&T
Entropy index made using Local units CCIs NACE Rev 2	Structural business statistics	CCIs diversification
HEIs students by relevant fields	European Commission EDER	Local supply of CCIs skills
HEIs research by relevant fields	European Commission EDER	Local research in CCIs-related fields
HEIs density	European Commission EDER	Local availability of CCIs- related knowledge infrastructures
HEIs activities by relevant fields	European Commission EDER	Local availability of CCIs- related knowledge infrastructures
		Indicator for the territorial stock of cultural heritage
Cultural heritage and pre 1919 dwellings	ESPON	
Cultural employment	Labor Force Survey	CCIs as enabler for people's income
Young people aged 15-24 that are neither in employment nor in education or training (NEET)	Eurostat	Share of young cohorts affected by socioeconomic vulnerability
Population aged 25-64 with tertiary education (level 5-8)	Eurostat	Share of people accessing Higher Education
Country's cultural life undermined/enriched by immigrants	European Social Survey Waves 6-8	Openness & Tolerance towards migrants
Gays and lesbians free to live life as they wish	European Social Survey Waves 6-8	Openness & Tolerance Towards LGBTQ+
Trust in legal system	European Social Survey Waves 6-8	Trust: institutions
Trust in country's parliament	European Social Survey Waves 6-8	
Most people can be trusted, or you can't be too careful	European Social Survey Waves 6-8	Trust: people
Corruption in National Institutions	QoG PERCEIVE survey 2017	Corruption
Quality of Institutions	QoG EQI survey	Quality of Institutions
Regional Competitiveness Index	REGIO-B1-PAPERS /Yves Durinck	Regional territorial capital enabling sustainable growth and well-being

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Table A4. Correlation coefficients and p-values between cultural employment and the socioeconomic variables considered in the report

Variable	Correlation coefficient between considered variable and cultural employment
Growth rate of CCIs local units	0.2232 (0.0002)
Growth rate of CCIs industry concentration	0.2137 (0.0062)
Real growth rate of regional GVA (% change)	-0.1228 (0.0400)
Share of knowledge workers	0.4216 (0.000)
Share of Human resources in Science and Technology	0.3510 (0.000)
Total R&D expenditure as %of GDP	0.3690 (0.000)
Scientific publications per million inhabitants	0.3731 (0.000)
Share of students in CCIs related fields (ISCED 5-7)	0.1287 (0.0397)
Share of students in CCIs related fields and ICT (ISCED 5-7)	0.1581 (0.0113)
Share of PhD students in CCIs related fields (ISCED 8)	0.0863 (0.1862)
Share of PhD students in CCIs related fields and ICT (ISCED 8)	0.1024 (0.1166)
Share of CCIs-specific HEIs on total HEIs	0.1610 (0.0071)
Cultural Heritage per capita	0.2226 (0.0550)
Night spent in touristic accommodation (% of country total)	-0.1037 (0.0860)
Share of people aged 15-24 neither in employment nor in education or training	0.3206 (0.000)
Share of population aged 25-64 with tertiary education	-0.0659 (0.2695)
Trust in people	0.3723 (0.000)
Disagree with “Gays and lesbians free to live life as they wish”	-0.2100 (0.0075)
Agree that country’s cultural life is enriched by people coming to live here from other countries	0.3151 (0.000)
Trust in legal system	0.4129 (0.0000)
Trust in country’s parliament	0.4754 (0.000)
Perceived corruption in national institutions	-0.2693 (0.0001)
European Quality of Government Index	0.2700 (0.0011)
Labour market participation rate Gender difference (female-male)	0.2715 (0.000)
Employment rate Gender difference (female-male)	0.2529 (0.000)
Part-time Employment incidence	0.2522 (0.000)

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Table A5. European region (NUTS2) code and name

NUTS2 code	NUTS2 name	NUTS2 code	NUTS2 name	NUTS2 code	NUTS2 name	NUTS2 code	NUTS2 name	NUTS2 code	NUTS2 name
AT11	Burgenland	DK01	Hovedstaden	IS00	Ísland	RS11	Београдски регион	UKM6	Highlands and Islands
AT12	Niederösterreich	DK02	Sjælland	ITC1	Piemonte	RS12	Регион Војводине	UKM7	Eastern Scotland
AT13	Wien	DK03	Syddanmark	ITC2	Valle d'Aosta/Vallée d'Aoste	RS21	Регион Шумадије и Западне Србије	UKM8	West Central Scotland
AT21	Kärnten	DK04	Midtjylland	ITC3	Liguria	RS22	Регион Јужне и Источне Србије	UKM9	Southern Scotland
AT22	Steiermark	DK05	Nordjylland	ITC4	Lombardia	SE11	Stockholm	UKN0	Northern Ireland
AT31	Oberösterreich	EE00	Eesti	ITF1	Abruzzo	SE12	Östra Mellansverige		
AT32	Salzburg	EL30	Αττική	ITF2	Molise	SE21	Småland med öarna		
AT33	Tirol	EL41	Βόρειο Αιγαίο	ITF3	Campania	SE22	Sydsverige		
AT34	Vorarlberg	EL42	Νότιο Αιγαίο	ITF4	Puglia	SE23	Västsverige		
BE10	Région de Bruxelles-Capitale	EL43	Κρήτη	ITF5	Basilicata	SE31	Norra Mellansverige		
BE21	Prov. Antwerpen	EL51	Ανατολική Μακεδονία, Θράκη	ITF6	Calabria	SE32	Mellersta Norrland		
BE22	Prov. Limburg (BE)	EL52	Κεντρική Μακεδονία	ITG1	Sicilia	SE33	Övre Norrland		
BE23	Prov. Oost-Vlaanderen	EL53	Δυτική Μακεδονία	ITG2	Sardegna	SI03	Vzhodna Slovenija		
BE24	Prov. Vlaams-Brabant	EL54	Ήπειρος	ITH1	Bolzano/Bozen	SI04	Zahodna Slovenija		
BE25	Prov. West-Vlaanderen	EL61	Θεσσαλία	ITH2	Trento	SK01	Bratislavský kraj		
BE31	Prov. Brabant Wallon	EL62	Ιόνια Νησιά	ITH3	Veneto	SK02	Západné Slovensko		
BE32	Prov. Hainaut	EL63	Δυτική Ελλάδα	ITH4	Friuli-Venezia Giulia	SK03	Stredné Slovensko		
BE33	Prov. Liège	EL64	Στερεά Ελλάδα	ITH5	Emilia-Romagna	SK04	Východné Slovensko		
BE34	Prov. Luxembourg (BE)	EL65	Πελοπόννησος	ITI1	Toscana	TR10	İstanbul		
BE35	Prov. Namur	ES11	Galicia	ITI2	Umbria	TR21	Tekirdağ, Edirne, Kırklareli		
BG31	Северозападен	ES12	Asturias	ITI3	Marche	TR22	Balıkesir, Çanakkale		
BG32	Северен централен	ES13	Cantabria	ITI4	Lazio	TR31	İzmir		
BG33	Североизточен	ES21	País Vasco	LT01	Sostinės regionas	TR32	Aydın, Denizli, Muğla		
BG34	Югоизточен	ES22	Foral de Navarra	LT02	Vidurio ir vakarų Lietuvos regionas	TR33	Manisa, Afyonkarahisar, Kütahya, Uşak		
BG41	Югозападен	ES23	La Rioja	LU00	Luxembourg	TR41	Bursa, Eskişehir, Bilecik		

BG42	Южен централен	ES24	Aragón	LV00	Latvija	TR42	Kocaeli, Sakarya, Düzce, Bolu, Yalova
CH01	Région lémanique	ES30	Comunidad de Madrid	ME00	Црна Гора	TR51	Ankara
CH02	Espace Mittelland	ES41	Castilla y León	MK00	Северна Македонија	TR52	Konya, Karaman
CH03	Nordwestschweiz	ES42	Castilla-La Mancha	MT00	Malta	TR61	Antalya, Isparta, Burdur
CH04	Zürich	ES43	Extremadura	NL11	Groningen	TR62	Adana, Mersin
CH05	Ostschweiz	ES51	Cataluña	NL12	Friesland (NL)	TR63	Hatay, Kahramanmaraş, Osmaniye
CH06	Zentralschweiz	ES52	Comunitat Valenciana	NL13	Drenthe	TR71	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir
CH07	Ticino	ES53	Illes Balears	NL21	Overijssel	TR72	Kayseri, Sivas, Yozgat
CY00	Κύπρος	ES61	Andalucía	NL22	Gelderland	TR81	Zonguldak, Karabük, Bartın
CZ01	Praha	ES62	Región de Murcia	NL23	Flevoland	TR82	Kastamonu, Çankırı, Sinop
CZ02	Střední Čechy	ES63	Ciudad de Ceuta	NL31	Utrecht	TR83	Samsun, Tokat, Çorum, Amasya
CZ03	Jihozápad	ES64	Ciudad de Melilla	NL32	Noord-Holland	TR90	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
CZ04	Severozápad	ES70	Canarias	NL33	Zuid-Holland	TRA1	Erzurum, Erzincan, Bayburt
CZ05	Severovýchod	FI19	Länsi-Suomi	NL34	Zeeland	TRA2	Ağrı, Kars, Iğdır, Ardahan
CZ06	Jihovýchod	FI1B	Helsinki-Uusimaa	NL41	Noord-Brabant	TRB1	Malatya, Elazığ, Bingöl, Tunceli
CZ07	Střední Morava	FI1C	Etelä-Suomi	NL42	Limburg (NL)	TRB2	Van, Muş, Bitlis, Hakkari
CZ08	Moravskoslezsko	FI1D	Pohjois- ja Itä-Suomi	NO02	Innlandet	TRC1	Gaziantep, Adıyaman, Kilis
DE11	Stuttgart	FI20	Åland	NO06	Trøndelag	TRC2	Şanlıurfa, Diyarbakır
DE12	Karlsruhe	FR10	Ile-de-France	NO07	Nord-Norge	TRC3	Mardin, Batman, Şırnak, Siirt
DE13	Freiburg	FRB0	Centre — Val de Loire	NO08	Oslo og Viken	UKC1	Tees Valley and Durham
DE14	Tübingen	FRC1	Bourgogne	NO09	Agder og Sør-Østlandet	UKC2	Northumberland and Tyne and Wear
DE21	Oberbayern	FRC2	Franche-Comté	NO0A	Vestlandet	UKD1	Cumbria
DE22	Niederbayern	FRD1	Basse-Normandie	NO0B	Svalbard og Jan Mayen	UKD3	Greater Manchester
DE23	Oberpfalz	FRD2	Haute-Normandie	PL21	Małopolskie	UKD4	Lancashire
DE24	Oberfranken	FRE1	Nord-Pas de Calais	PL22	Śląskie	UKD6	Cheshire
DE25	Mittelfranken	FRE2	Picardie	PL41	Wielkopolskie	UKD7	Merseyside
DE26	Unterfranken	FRF1	Alsace	PL42	Zachodniopomorskie	UKE1	East Yorkshire and Northern Lincolnshire
DE27	Schwaben	FRF2	Champagne-Ardenne	PL43	Lubuskie	UKE2	North Yorkshire

DE30	Berlin	FRF3	Lorraine	PL51	Dolnośląskie	UKE3	South Yorkshire
DE40	Brandenburg	FRG0	Pays de la Loire	PL52	Opolskie	UKE4	West Yorkshire
DE50	Bremen	FRH0	Bretagne	PL61	Kujawsko-pomorskie	UKF1	Derbyshire and Nottinghamshire
DE60	Hamburg	FRI1	Aquitaine	PL62	Warmińsko-mazurskie	UKF2	Leicestershire, Rutland and Northamptonshire
DE71	Darmstadt	FRI2	Limousin	PL63	Pomorskie	UKF3	Lincolnshire
DE72	Gießen	FRI3	Poitou-Charentes	PL71	Łódzkie	UKG1	Herefordshire, Worcestershire and Warwickshire
DE73	Kassel	FRJ1	Languedoc-Roussillon	PL72	Świętokrzyskie	UKG2	Shropshire and Staffordshire
DE80	Mecklenburg-Vorpommern	FRJ2	Midi-Pyrénées	PL81	Lubelskie	UKG3	West Midlands
DE91	Braunschweig	FRK1	Auvergne	PL82	Podkarpackie	UKH1	East Anglia
DE92	Hannover	FRK2	Rhône-Alpes	PL84	Podlaskie	UKH2	Bedfordshire and Hertfordshire
DE93	Lüneburg	FRL0	Provence-Alpes-Côte d'Azur	PL91	Warszawski stołeczny	UKH3	Essex
DE94	Weser-Ems	FRM0	Corse	PL92	Mazowiecki regionalny	UKI3	Inner London — West
DEA1	Düsseldorf	HR02	Panonska Hrvatska	PT11	Norte	UKI4	Inner London — East
DEA2	Köln	HR03	Jadranska Hrvatska	PT15	Algarve	UKI5	Outer London — East and North East
DEA3	Münster	HR05	Grad Zagreb	PT16	Centro (PT)	UKI6	Outer London — South
DEA4	Detmold	HR06	Sjeverna Hrvatska	PT17	Área Metropolitana de Lisboa	UKI7	Outer London — West and North West
DEA5	Arnsberg	HU11	Budapest	PT18	Alentejo	UKJ1	Berkshire, Buckinghamshire and Oxfordshire
DEB1	Koblenz	HU12	Pest	PT20	Região Autónoma dos Açores	UKJ2	Surrey, East and West Sussex
DEB2	Trier	HU21	Közép-Dunántúl	PT30	Região Autónoma da Madeira	UKJ3	Hampshire and Isle of Wight
DEB3	Rheinhessen-Pfalz	HU22	Nyugat-Dunántúl	RO11	Nord-Vest	UKJ4	Kent
DEC0	Saarland	HU23	Dél-Dunántúl	RO12	Centru	UKK1	Gloucestershire, Wiltshire and Bristol/Bath area
DED2	Dresden	HU31	Észak-Magyarország	RO21	Nord-Est	UKK2	Dorset and Somerset
DED4	Chemnitz	HU32	Észak-Alföld	RO22	Sud-Est	UKK3	Cornwall and Isles of Scilly
DED5	Leipzig	HU33	Dél-Alföld	RO31	Sud-Muntenia	UKK4	Devon
DEE0	Sachsen-Anhalt	IE04	Northern and Western	RO32	Bucureşti-Ilfov	UKL1	West Wales and The Valleys
DEF0	Schleswig-Holstein	IE05	Southern	RO41	Sud-Vest Oltenia	UKL2	East Wales
DEG0	Thüringen	IE06	Eastern and Midland	RO42	Vest	UKM5	North Eastern Scotland