Doctoral dissertation

Determinants of the concentration of creative industries in Europe: a comparison between Spain, Italy, France, United Kingdom and Portugal

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2015

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Aknowledgements

This thesis has offered me intense years of study during which I have had the opportunity of undertaking academic research in the domain of regional and spatial economics. I have always been surrounded by scholars and colleagues who have supported me along the path.

I would like to express my deepest gratitude to my supervisor Rafael Boix, thanks to whom I became firstly interested in regional economics and later on in creative industries. He has supported me over the years, by providing me not only with guidance on the definition of the research topic, but also by reading carefully my work and always providing invaluable feedback.

My gratitude goes to my tutor Joan Trullén and my friend Vittorio Galletto, for their companionship in the journey of studying regional and spatial economics and for providing me with data about local labour systems.

I would also like to thank the members of the Department of Applied Economics of the Autonomous University of Barcelona (UAB) having provided feedback on earlier drafts of this thesis: Iván Muñiz, Francesc Trillas, José Luis Roig, Emilio Padilla and Rosella Nicolini.

I also thank Véronique Vervaeke for mentoring my research stay at the Centre Maurice Halbwachs in Paris. Alexandre Kych, from the ADISP-Centre Maurice Halbwachs in Paris, gave me access to statistical data about French creative industries.

Roberta Comunian and Andrés Rodríguez-Pose provided feedback on a paper stemming from my doctoral dissertation, thus contributing to my work.

My thanks go also to the administrative and IT support team of the Department of Applied Economics of the Autonomous University of Barcelona. Pilar Bernabé and Juan Carlos Migoya always assisted me in dealing with the administrative procedures of the PhD. Miquel Colobra provided IT assistance in the computer lab whenever it was needed.

I also acknowledge the *Regional Studies Association* and the *Institut Ignasi Vilallonga*. The former funded my attendance to the 2011 European Week of cities and regions, in which I presented my ongoing doctoral research and was awarded for it. The latter provided me with a small research grant for the initial stages of my doctoral research.

Last but not least, I am deeply grateful to my family, especially to my parents Mª Purificació and Aurelio, and also to my sister Cristina, to Francesc, Dolors and Meritxell. They have always encouraged me and believed in me unconditionally. My friend David and my friends at the OECD and UAB have also been a great source of support making this journey even more enjoyable.

Abstract

This thesis examines the determinants of localisation of creative industries by using plant-level microdata. The thesis proposes a model tailored to differentiate the effect of general-economic and specific-creative forces on the localisation of creative industries. The model is applied to the local labour systems of five European countries, namely, France, Italy, Portugal, Spain and the United Kingdom. On the one hand, the results show that traditional external economies (localisation and urbanisation externalities) affect the location of creative industries, complemented by the effect of specific creative forces. On the other hand, differences are observed at the national level and at the supra-national level with regard to the main drivers fostering the localisation of creative industries. The results offer a novel insight into the determinants of location of creative industries. The work provides thus some empirical basis for the design of policies that may boost the capacity of territories for creativity and innovation, in line with the objectives set out by the European Commission.

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1.1. Introduction

Creative industries can be defined as those industries that produce and commercialise creative goods and services. Over the last years, creative industries have become an object of interest for academics and policymakers. Indeed, creative industries have experienced an important economic growth accompanied by important levels of trade and employment. As a consequence, the EU considered these industries as a driving force to reach the goal established in the Lisbon agenda to make Europe "*the most competitive and dynamic knowledge-based economy*".

Creative industries are characterised by their tendency to concentrate in space (Scott 2006a; Cooke *et al.* 2007; Florida 2008; Florida *et al.* 2008; Cooke and Lazzeretti 2008; Lazzeretti *et al.* 2008; Boix *et al.* 2012) giving place to more creative intensive locations (Maskell and Lorenzen 2004; Cooke *et al.* 2007) such as local creative systems (Lazzeretti *et al.* 2008) and creative clusters (Cooke and Lazzeretti 2008; Boix *et al.* 2014). A creative cluster is defined in the literature as "a place that brings together *i*) a community of 'creative people' (Florida 2002) who share the same interest in novelty but not necessarily in the same subject; *ii*) a catalyzing place where people, relationships, ideas and talents can spark each other; *iii*) an environment that offers diversity, stimuli and freedom of expression; and *iv*) a thick, open and ever-changing network of interpersonal exchanges that nurture individuals' uniqueness and identity" (De Propris *et al.* 2009).

There is a growing interest in the study of the factors that explain the clustering pattern of creative industries in Europe. This thesis explores the main reasons observed in the literature for the clustering of creative industries. Traditional approaches such as external economies (localisation and urbanisation economies) have been seen as partial explanatory elements that might explain why creative industries tend to be geographically concentrated (Tschang and Vang 2008, p.3; Cooke *et al.* 2007; Wenting *et al.* 2011, pp.1335-1336). The main results of a theoretical analysis point to the existence of other determinants that could help to explain the tendency of the creative industries to concentrate in the space. In this line, related variety of activities and people, urban assets and creative class have been observed as factors of attraction of creative industries (Florida 2005; Sivitanidou 1999; van Oort *et al.* 2003; Lazzeretti *et al.* 2012; Lorenzen and Frederiksen 2008).

1.2. Hypothesis and research objective

Hoover and Giarratani (1984, p. 3) summed up regional and spatial economics in the question: "What is where, and why – and so what?". In the context of this thesis the first "what" refers to the creative industries. "Where" refers to the location of creative industries in Europe, involving questions of spatial location and concentration of these industries in the territory. "Why" refers to the identification of the factors that can contribute to the concentration of creative industries in Europe. Finally, "and so what" refers to the implications that this research has for economic policy based on creative industries.

In other words, the thesis aims to analyse **what are the determinants of the localisation of creative industries** by analysing their patterns of localisation and the determinants of these patterns in a wider selection of European countries for which homogeneous research can be performed at a detailed territorial level: Spain, Italy, France, United Kingdom and Portugal. The **hypothesis** of this thesis is that the localisation of firms in creative industries is determined by general forces (external economies) that affect the localisation of all the firms, and specific forces (creative factors) affecting the localisation of creative industries, although the effect of general forces is the most important determinant.

The **objective** of this thesis is twofold: *i.*) firstly, by using **micro-level data** on creative work and companies, to establish the geography of creative local labour systems in Spain, Italy, France, United Kingdom and Portugal; *ii.*) secondly, to identify the main **determinants of the localisation and concentration of creative industries** in a wide pool of European countries by means of an econometric model with the intention of making generalisations.

1.3. Contributions of the thesis

This study aims at **contributing** to the broad topic of spatial localisation and concentration of creative activities with some innovations regarding the use of micro-level data, the extension to five countries, and deep focus on the concrete determinants of clustering. The proposed methodology can be applied to other European and non-European countries, since the use of micro-data makes independent the identification of the clustering from the administrative units.

Furthermore, the econometric analysis performed in the thesis will be an important **input to European policies** on creative industries and a significant development with regard to the Green Paper on Cultural and Creative Industries (European Commission 2010a). Recent theories of regional growth and local development emphasize the role of regions, cities and clusters in national growth (bottom-up approach) to mobilize local assets in order to develop their own specific capabilities of growth. This thesis will provide an important input for implementing this new approach, by providing evidence for strategies and policy designs at different territorial levels: local, national and supranational. This multilevel approach will best contribute to the fulfilment of the objectives set out by the European Commission in terms of competitiveness, growth and welfare inhering in a creative and knowledge-based economy.

1.4. Structure of the thesis

This thesis is organised in 5 chapters. After the introduction, a second chapter presents an overview of the relation between creativity and space, the linkages of external economies with creative industries as well as a review of the literature that analyses the definition and concentration of creative industries mainly in European countries. The third chapter provides empirical evidence of the concentration of the creative industries in 5 European countries by using a homogeneous classification of creative industries. Additionally it discusses which is the best territorial level of analysis, emphasizing the need of defining functional spaces and proposing two procedures to map the clusters of creative industries in Europe (local creative systems and creative clusters). Finally, it presents the concentration of creative industries in Europe based on the ORBIS 2011 database (reference year 2009). The fourth chapter presents the empirical analysis by performing the econometric specification. The fifth chapter concludes by presenting the results which lead to the identification of factors that can be taken into account by policy-makers to promote the clustering of firms in creative industries firms in Europe.

Thesis structure:

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Chapter 3. Identifying clusters of creative industries in Europe: local creative systems and creative clusters

Chapter 4. Determinants of spatial location of firms in creative industries in Europe

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Chapter 2 . Theoretical framework: creativity and space

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2.1. Introduction

From early approaches (such as Adam Smith 1776/1996 or Alfred Marshall 1890/2009) up to now, there has been an interest in the study of knowledge and its impact on the economy. Knowledge economy stresses the importance of knowledge or localised knowledge as an immaterial factor in the new competitive world. Over the last decades, the economies of the developed countries, have evolved from being based on the intensive use of material goods to knowledge economies where "how" is produced is much more important than "what" is produced.

This chapter presents three different types of knowledge bases: analytical, synthetic and symbolic. It then focuses on the description on the creative economy which is an economy based on a symbolic knowledge base.

The chapter summarises the main definitions used in the literature to define creative industries. The term, coined in Australia in the 90's, has since then received different interpretations by several researchers and international and national institutions. Indeed, from a more restricted meaning covering exclusively cultural activities it has evolved to encompass also a wide array of more technological and service-oriented activities. The chapter discusses these different approaches and then moves on to present the different location theories and methods used to analyse the special concentration of creative industries.

2.2. Knowledge-based economy

2.2.1. Definition and characteristics

Modern economies have shifted from the intensive use of raw materials to an intensive use of knowledge (Knight 1995; Trullén *et al.* 2002). Knowledge is indeed seen as crucial for growth and development in modern economies by the OECD (1996, p. 11), which defines knowledge-based economy as directly based on the production, distribution and use of knowledge and information (OECD 1999). In this economic model, people, their ideas and their creations are more important than mechanisation to increase the competitiveness of the production activities. In other words, knowledge is seen as the driver of economic changes leading to processes of economic development (Boix and Galletto 2005, p. 66).

According to Boix (2006, pp. 20-21) knowledge economy presents the following characteristics:

- Knowledge and information are its main input and output.
- The speed of diffusion of knowledge and information has increased dramatically due to the globalisation of economies and to the spread of information and communication technologies.
- Given the increase of connectivity, knowledge economy can be considered a network economy. This way knowledge acquires a collective rather than an individual dimension.
- In knowledge economy innovation is highly rewarded.
- Knowledge economy changes very quickly and therefore success and failure occur also very quickly depending on the decisions taken in the light of market and technological changes.
- There is not a single path for an economy to become a knowledge economy.
- In knowledge economies it is more relevant *how* we produce than *what* we produce.

All these traits add up to an economic system with its own peculiarities if compared to industrial or agricultural economies, since in this case the economy is not so much based on the intensive used of material goods. However, one should not assume that the impact of knowledge on economy is an exclusive trait of modern economies. On the contrary, knowledge has contributed to economic progress since very early times. Examples abound in the history of human societies from skills for the construction of tools used in game hunting or agriculture, to knowledge allowing to distinguish plant species that could be grown to be later consumed or to be used as medical treatment (Montuschi 2001b, p.5). In the same vein, the relevance of knowledge is not an exclusive contribution of modern economic theory: several authors since the late XIXth century have been pointing to the need of including knowledge as an essential component of economic theory. Adam Smith (1776/1996, book 1, pp. 19-27) highlighted the relevance for economy of certain groups using specialised knowledge. Marshall (1890/2009, p. 124) noted that knowledge is the most powerful productive engine. He also noticed both the tendency of knowledge to be fragmented given the increasing division of work and the need to devise ways of integrating the otherwise disperse knowledge. As a result, he identified a series of organisation solutions that would foster the development and use of this knowledge. List

(1904) highlights the importance of infrastructures and institutions fostering the creation and the distribution of knowledge. Schumpeter (1943) points to the importance of innovation (and therefore of knowledge creation) in economic growth. Hayek (1945) sees knowledge as a tool to interpret and classify new stimuli and, if necessary, act on them. More recently knowledge has been also a central element of several theories and models aiming to describe the forces leading to economic growth in the long term (Solow 1957; Arrow 1962; Uzawa 1965; Griliches 1979; and authors from the new theory of growth such as Romer 1986, 1987, 1990, 1994; Arthur 1990, 1996; Lucas 1988; Grossman and Helpman 1991, 1994).

2.2.2. Knowledge and its types with regard to transferability

Knowledge includes the information and the practical and theoretical skills needed in order to understand and process data and information in problem resolution and decision making. This allows to produce adequate responses when a new situation arises (reactive knowledge) or to create a new situation (proactive knowledge) (Döring and Schnellenbach 2006, p. 377; Henric-Coll 2002, p. 1; Brusoni 2002, p. 9-10; European Commission 2000, p. 10). Unlike raw data and information, knowledge implies a cognitive activity and therefore relies on subjective qualities (Viginier 2002, p. 20). Access to data and information is therefore a necessary but not a sufficient condition for knowledge to arise. Indeed, the link between data or information and knowledge is only guaranteed if someone is able to interpret the information in order to produce a coherent meaning from it (Montuschi 2001a, pp. 27-28; Montuschi 2001b, pp. 2-4).

According to Polanyi (1958) the distinction between codifiable and non-codifiable knowledge is crucial. Codifiable knowledge (explicit or propositional) has the following characteristics (Trullén *et al.* 2002, p. 142):

- It is represented in some type of code (norms or standards) that enables its interpretation. It can be oral or written (*e.g.* words, sentences, books, manuals, scientific articles, formulae, patents) and it can also come in digital form (*e.g.* web pages). Montuschi (2001a, pp. 14-15) further notes that this code is independent from the context to which the knowledge refers.

- It can be stored and it is easily transferrable from different places and in different moments in time (Abramowitz and David 1996, p.86; European Commission 2000, p. 25).
- It can be transferred through formal training in a systematic way (Nonaka and Takeuchi 1995, p. 683; Matusik and Hill 1998, p. viii-ix).
- Usually it is available at a low price or almost for free.

However, not all the knowledge can be easily reduced to a propositional form in order to be codified (Polanyi 1958, p. 70). Indeed, some skills cannot be completely described verbally and when this is attempted many details can be left out[1]. In Polanyi's words, "we know more than we can say" (Polanyi 1966, p. 136). In this sense, non codifiable knowledge (also known as tacit or implicit) would consist in codes for the interpretation of information and skills allowing to find solutions for research problems that cannot be defined completely in a mathematical way (Trullén 2001, p. 18). Tacit knowledge has the following characteristics (Trullén *et al.* 2002, p. 142):

- Since this knowledge is tacit, it has not been possible to develop a system of standards to decode it. Only a certain group of individuals has access to this knowledge and therefore it is only them who can apply it.
- Since it cannot be recorded or codified, it resides completely in the individuals, the organisations and the societies possessing it (European Commission 2000, p. 2 and pp. 21-22; Viginier 2002, p. 20). Usually it is transmitted through personal exchanges and socialisation processes (Montuschi 2001a, pp. 14-15).
- It is built on the basis of past experiences and therefore the individual or the organisation possess it implicitly. It only emerges when the circumstances require it (Montuschi 2001a, pp. 14-15).
- It is difficult to code and transfer (Nonaka and Takeuchi 1995, pp. viii-ix). At the same time, it is available at a low price in the environment in which it can be easily decodified and interpreted.

[1] A very clear example is the ability to ride a bike: being able to ride a bike does not mean that one is able to describe this skill verbally (Polanyi 1958, p. 90).

2.2.3. Knowledge bases

The innovation process of any firm or industry is based on combinations of existent tacit and codified knowledge generated through learning-by-doing and interactions with other individuals, firms or institutions. In this sense, recent Regional Innovation System literature, stressed the crucial role played by face-to-face and buzz on the industrial knowledge creation process. On the one hand, face-to-face refers to one means of communication that requires physical contact between individuals and that aims at transmitting tacit knowledge through formal collaboration. On the other hand, buzz refers to the communication ecology (mutual shared cultural traditions, habits) created by the interaction of firms or individuals closely located which through informal collaboration will facilitate knowledge and information exchange (Asheim and Vang 2005, pp. 5-7). Thus, even if codified knowledge can be easily transmitted from one agent to another, its understanding relies on a degree of tacit knowledge by the receptor which is normally acquired through shared previous experiences or mutual communalities (Hansen 2009, pp. 27-28; Asheim and Vang 2005, p. 9).

Taking all these into account, Asheim and Vang (2005) and Asheim and Gertler (2005) identified three different knowledge bases in which innovation activities relay on: analytic, synthetic and symbolic. These authors group innovative industries according to several criteria (Asheim and Vang 2005, p. 20): firstly, the mixture of tacit and codified knowledge; secondly, the possibilities and limits of codification of knowledge used in the production process; and finally, the competences and skills required for the development of the activity in these industries.

2.2.3.1. Analytical knowledge base (science based)

The *analytical knowledge base* includes all industries (predominantly scientific) where the analytical codified knowledge plays a crucial role. These industries are mainly characterised by the following elements (Asheim and Vang 2005, pp. 21-22; Asheim *et al.* 2007a, p. 9): *i*) innovation in these industries takes place mainly through new knowledge; *ii*) the innovation process of these industries is usually guided by a deductive process and formal models; *iii*) products tend to be documented in reports, articles, electronic documents, patent descriptions; *iv*) the knowledge used in the innovation process is mainly scientific (codified) and there is a low proportion of tacit knowledge. The scientific

knowledge used in these industries might come from the collaboration research between firms (R&D departments) as well as research institutions outside industry, such as universities. However, since the activities of knowledge generation and processing are based on codified knowledge, its manipulation and interpretation requires specific qualifications and capabilities of the people involved in the production process. This training is normally acquired through research experience or university training; *v*) these industries rely on codified knowledge which is normally represented by patents, books or machinery (Wenting *et al.* 2011, p. 1341) which make easy its storage and transmission to any place at any time (Abramowitz and David 1996, p. 86; European Commission 2000, p. 35) at a low cost. These industries tend to be located in close proximity to public or private research centres or universities in order to facilitate access to researchers or specialists who can decode the information applied to the innovation production process. In this line, face-to-face interactions among researchers might give a competitive advantage to these firms since this allows to transfer knowledge before it is published.

2.2.3.2 Synthetic knowledge base (engineering based)

Another group of industries includes those with a *synthetic knowledge base*. They rely on a combination of codified and tacit knowledge since their main objective is to design and construct solutions to specific problems that appear from the interaction of the firm with the customers and suppliers. In this sense industries with a synthetic knowledge base tend to locate closely in space due to their need to have access to specialised tacit knowledge, normally exchangeable through face-to-face interactions.

These industries are characterised by five elements (Asheim and Vang 2005, pp. 25-26; Asheim *et al.* 2007a, p. 10): *i*) innovation in these industries takes place mainly through the combination of already existing knowledge; *ii*) the innovation process of these industries takes place mainly in response to the need of solving specific problems that appear from the interaction of the firm with the customers and suppliers; *iii*) knowledge is mostly created through an inductive process which includes testing, experimentation, computer based simulation and practical work. Knowledge is then embodied in technical solutions and engineering work which is at least partially codified; *iv*) the knowledge used is partially codified, but tacit knowledge is also important due to the fact that knowledge often results from experience gained at the workplace, and through learning by doing; *v*) since these industries rely both on codified and tacit knowledge, there is more concrete

know-how, craft and practical skills required in the knowledge production and circulation process which are provided by professional and polytechnic schools, or by on-the-job training.

2.2.3.3. Symbolic knowledge base (artistic based)

The *symbolic knowledge base* industries deal with the creation of cultural meaning and this includes creative industries such as media, advertising, design and fashion. These industries are characterised by the following elements (Asheim and Vang 2005, pp. 29-30; Asheim *et al.* 2007a, p. 11): *i*) innovation in these industries is mainly produced by a recombination of existing tacit knowledge. Creativity and innovation requires that the new knowledge is combined with the current knowledge generating new ideas (OECD 2008, p. 22); *ii*) these industries are mainly based on tacit knowledge and this knowledge is normally linked to the habits and norms learned in specific communities and which are exchanged mainly through informal interpersonal interaction in the professional community (face-to-face); *iii*) the innovation process of these industries is mainly market oriented since their main purpose is to release products that maximise the return on their investment; *iv*) products tend to be ephemeral since they attract the consumer's attention for a limited period of time; their product is meant mainly to entertain; *v*) the knowledge used in the innovation processes of these industries is mainly tacit knowledge, which is normally linked to the habits and norms learned in specific communities (buzz). This knowledge is usually incorporated and transmitted through aesthetic symbols, photos, videos, graphs, designs, artefacts, sounds and narratives. Abilities to cope with this strong semiotic content are therefore required.

2.3. Creative industries

2.3.1. Importance of creativity

In an economy where access to knowledge is becoming more and more pervasive, creativity has arisen as a new driver for growth. Creativity, which includes both innovation and invention, amounts to more than mere access to and use of knowledge: it implies the generation of new products, solutions or management procedures. There is no agreement in the literature on whether "creativity" is an attribute of individuals or a process by which original ideas and new creations are generated (UNCTAD 2008). However, it can be

understood as a human characteristic and effort that is manifest in a myriad of fields and situations, from artistic, scientific to economic areas (European Commission 2008; UNCTAD 2008). Its role for an effective response to the challenges and opportunities of modern economies has been highlighted by several scholars (for instance, Pratt 2009). This is probably related to the understanding of creativity as a process of creation and destruction (Schumpeter 1943 and Scott 2006b), the so-called "creative destruction", which represents a crucial element for the dynamism of the market. Its relevance has been highlighted in fields such as cultural geography, sociology and urban planning, and it has also lead to a new economic paradigm: creative economy (UNCTAD 2008). Whereas in the knowledge economy it is access to knowledge and the ability to interpret and use it in productive activities that is more valued, in the creative economy the main driver for growth is creativity.

According to the European Commission (2010a), much of the future prosperity of European countries will depend on the capacity to use the resources, knowledge and creativity that already exist in the territory. In this line, some studies have explored the spatial concentration of creativity (*e.g.* the creative city, Landry 2000; the creative class, Florida 2002). To date, however, only a limited number of studies have tried to explain the spatial and industrial conditions leading to the clustering of creative activities.

2.3.2. Creative industries

Creative industries can be defined as those industries that produce and commercialise creative goods and services. The term "creative industries" has its origins in Australia in the beginning of the 90's. More concretely, the term was originally coined in 1994, in a cultural and economic policy document entitled "Creative Nation" (KEA 2006, p. 46). The term gained more popularity among policy makers when the United Kingdom government (Department of Culture, Media and Sport) set up the Creative Industries Task Force in 1997. This Task Force helped to promote the role played by creative industries at the heart of the sub-national economic strategies (O'Connor 2007, p. 41) with the objective of turning the UK into the "world's creative hub".

Recently a number of different models have been put forward in the literature to define creative industries (Higgs *et al.* 2008, p. 3; UNCTAD 2008, p. 10). Galloway and Dunlop (2006, p. 35) identify five structural characteristics that contribute to a definition of

creative industries: creativity, intellectual property, symbolic meaning, use value, and methods of production.

i) *Creativity*: The Anglo-Saxon definitions of creative industries are based on the concept of innovation and creativity, ranging from the technological to the most artistic innovation (O'Connor and Xin 2006, p. 272; Brandellero *et al.* 2006, p. 3). Marshall (1980/2009, p. 88) emphasised that although men have no power of creating matter, they can produce value when they give useful forms to things. In other words, the knowledge generation that comes from the development of new ideas, new technologies or new business models, is an intrinsic capability of people (Florida 2005b, p. 32-34). In this line, the DCMS (2001, p. 5) defines the creative industries as those "which have their origin in individual creativity, skills and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property". However, the assumption that any activity that involves creativity will be part of a creative industry has some shortcomings, as highlighted by O'Connor (2000, p. 10). The author rightly argues that creativity can be applied to other industries which cannot be included under the umbrella of creative industries, such as a city cleaning service.

ii) *Intellectual property*: As highlighted by UNCTAD (2010, p. 6) this model focuses on industries that are involved in the production and distribution of copyright goods[2]. Similarly, Power and Nielsén (2010, p. 28) highlight that goods and services produced in creative industries are generally defined as intellectual property[3] subject to copyright[4]. In this line, Howkins (2001, p. xii-xiii) defines creative industries as those that produce or deal with copyright, patents, trademarks and designs. This argument was also included in the UK government's approach to define creative industries when saying that creative industries are those that "generate and exploit intellectual property" (DCMS 2001, p. 5). However, Galloway and Dunlop (2006, p. 36) underline that many industries which are not creative industries generate intellectual property (*e.g.* academia). Therefore, defining

[2] In this sense, inventors own the products of their creativity and are entitled, by intellectual property rights, to exercise both economic and moral rights over these products (Gowers 2006, p. 11-12).
[3] Intellectual property rights can be regarded as a collection of legal rights given to creators to protect their ideas or information having commercial value (Hansen and VanFleet 2003, p. 4).
[4] The rationale behind the existence of copyright protection is the following: knowledge and ideas can be easily consumed or copied given that they are partially public goods. However, since their development can be expensive, without a system of exclusive rights there would not be many incentives to pursue innovative activities (Pro inno 2007, p. 26).

creative industries exclusively on the basis of their capacity to generate intellectual property seems to be inappropriate as well.

iii) *Symbolic meaning*: Another approach to define creative industries is based on the idea that creative industries process[5] and transfer popular cultural value (UNCTAD 2010, p. 6). This is based on a shift of the concept of culture from describing individual intellectual and artistic cultivation, to defining a set of attitudes, beliefs, customs, values and practices shared by a group of individuals (EU 2006, p. 44; Galloway and Dunlop 2006, p. 38). Several authors have followed this approach to define creative industries. O'Connor (2000), for instance, defines creative industries as "those activities which deal primarily in symbolic goods - goods whose primary economic value is derived from their cultural value". Similarly, Garnham (1987, p. 55) defines creative industries as those which "produce and disseminate symbols in the form of cultural goods or services". In this line the UNESCO (2005, p. 6) defines creative industries as "those which use creativity, cultural knowledge and intellectual property to produce products and services with social and cultural meaning". However, one of the shortcoming of this model highlighted by Galloway and Dunlop (2006, p. 40) is that some goods that have symbolic meaning might not be always produced within creative industries (*e.g.* paintings).

iv) *Use value*: Another approach is based on the fact that industries that use the creative output of other creative industries in their production process are important actors for the spread of creativity in society (Galloway and Dunlop 2006, p. 39). Following this trend, Caves (2000, p. vii) defines creative industries as suppliers of a range of products that "we broadly associate with cultural, artistic, or simply entertainment value". In this line, Potts (2009, p. 9) highlights that creative industries help other sectors to organise, adapt and retain innovations. Additionally, UNCTAD (2010, p. 6) underlines that this model has been the basis for classifying creative industries in Europe. Nevertheless, Flew (2002, p. 13) has observed that an important shortcoming of this approach is that is has an extremely wide coverage and therefore includes almost any industrial activity.

v) *Methods of production*: Galloway and Dunlop (2006, p. 43) consider that creative industries are characterised by a combination of industrial-scale production and cultural content. In this line, Towse (2003, p. 170) defines creative industries as those which

[5] Products bear the symbols of the territories in which they are produced giving rise to the notion of "idiosyncratic" products (OECD 2005, p. 8).

"mass-produce goods and services with sufficient artistic content to be considered creatively and culturally significant". However, Galloway and Dunlop (2006, p. 43) add that the production method is not a sufficient foundation on which to base a definition of creative industries. Indeed, defining creative industries on the basis of how they produce can misrepresent what is being produced. In this sense Towse rightly observed that following this model, the creative arts sector would be excluded from the concept of creative industries since this sector does not typically use industrial-scale methods of production.

2.3.3. Old and new creative industries

According to Asheim *et al.* (2007) originally creative industries were restricted to artistic or cultural activities. These traditional creative industries have experienced a wide modernisation process (O'Connor and Xin 2006, p. 274) associated to technological changes which further enhance the creation and exchange of new knowledge. Besides that, knowledge creation is increasingly important in all segments of economic activity (Asheim *et al*. 2005, p. 11). Indeed, nowadays, the creative sector[6] includes a wide array of economic activities (Baumount and Boiteax-Orain 2005, p. 8), which range from traditional arts and cultural heritage to more technological and service-oriented activities (UNCTAD 2010, p. 7; 2008, p. 4). Moreover, creative industries such as media (film making, publishing, music, etc.), advertising, design and fashion are considered to be based on a symbolic knowledge base.

2.3.4. Defining the creative industries sectors

There has been an extensive debate in the literature regarding what activities should be included within the creative industries. Several scholars, national and international organisations have identified some creative sectors, but there is not yet a list of activities universally accepted as defining the creative sector. The constant technological evolution of the creative sector has been one of the main reasons of the difficulties for identifying them in a clear-cut way.

[6] Pratt (1997, p. 1959) observes that the term *sector* is used in this context by certain authors to refer to a group of activities that are linked in the chain of production, as the term *filière* traditionally used in France.

In this framework a great number of definitions have been proposed over the last 30 years by researchers, national institutions and international organisations. Some of them are briefly presented in what follows.

2.3.4.1. International organisations' classifications

Some international agencies and researchers have provided a number of different definitions of creative industries at the international level.

- An early precedent of the classification of creative industries was provided by the UNESCO in 1979. Following the recommendations set in 1972 during the UNESCO conference of European ministers of Culture held in Helsinki, the UNESCO Division of Statistics on Culture and Communication classified in 1986 the cultural/creative activities in 10 sectors: *a*) cultural heritage; *b*) printed materials and literature; *c*) music; *d*) performing arts; *e*) pictorial and plastic arts; *f*) cinema and photography; *g*) broadcasting; *h*) socio-cultural activities; *i*) sports and games; and *j*) nature and environment.
- The Leadership Group (LEG) on cultural statistics from the European Union in the year 2000 modified the UNESCO framework of cultural/creative activities. Its objective was to set up a new framework increasing the comparability and thus enhancing the analysis of the creative sector that helped to frame cultural policies by European policymakers. The LEG (2000, pp. 27-28) classified the new list of cultural/creative activities in 8 domains: *a*) cultural heritage; *b*) archives; *c*) libraries; *d*) books and press; *e*) visual arts; *f*) architecture; *g*) performing arts; and *h*) audio and audiovisual/multimedia.
- In 2003, the World Intellectual Property Organization (WIPO) provided one definition of cultural/creative industries based on the level of involvement of the industries in the creation, manufacture, production, broadcast and distribution of copyrighted work. In the WIPO (2003, p. 85) model, the creative industries also called "copyright-based industries" were defined as "those industries that include the cultural industries plus all cultural or artistic production, whether live or produced as an individual unit. The creative industries are those in which the product or service contains a substantial element of artistic or creative endeavor". According to this definition, WIPO (2003, p. 28) identified 9 creative sectors: *a*) press and literature; *b*) music, theatrical productions, operas; *c*) motion picture and

video; *d*) radio and television; *e*) photography; *f*) software and databases; *g*) visual and graphic arts; *h*) advertising services; and *i*) copyright collective management societies.

- Inspired by the UNESCO framework of cultural/creative industries set in 1979, the UNESCO Institute for Statistics (UIS) set a new classification of cultural/creative industries based on the analysis of cultural products (goods and services) entering international trade. Thus, the UIS (2005, p. 14) recognises 15 cultural/creative sectors: *a*) heritage; *b*) books; *c*) newspapers and periodicals; *d*) other printed matter; *e*) recorded media; *f*) visual arts; *g*) audiovisual media; *h*) audiovisual and related services; *i*) copyright royalties; *j*) equipment/support material; *k*) architecture; *l*) information services; *m*) news agency services; *n*) advertising; and *o*) other personal, cultural and recreational services.
- On the basis of the production or distribution of the arts, the Americans for the Arts (2005) classified creative industries into 6 sectors: *a*) museums and collections; *b*) performing arts (music, theatre, dance, opera and services or facilities related, performers); *c*) visual arts/photography (crafts, visual arts, photography, and services related); *d*) film, radio and television (motion pictures, television, radio), *e*) design and publishing (architecture, design, publishing, advertising); and *f*) schools and services (arts councils, art schools and institutions, agents).
- In 2006, the OECD suggested a new classification of cultural/creative activities inspired by the previous international classifications set by the UNESCO and the LEG. This new classification reconsidered the inclusion and exclusion of certain sectors for the international comparison of creative activities. As a result, Gordon and Beilby-Orrin (2006/2007) identified 13 cultural/creative sectors: *a*) advertising; *b*) architecture; *c*) video, film and photography; *d*) music and the visual and performing arts; *e*) publishing/written media ; *f*) radio and TV (broadcasting); *g*) art and antiques trade; *h*) design (including design fashion); *i*) crafts; *j*) libraries (including archives); *k*) museums; *l*) historic and heritage sites; and *m*) computer games, software and electronic publishing.
- Similarly, the research and advisory company KEA (2006, p. 3) classified the cultural/creative industries in 11 sectors: *a*) visual arts; *b*) performing arts; *c*) heritage; *d*) film and video; *e*) television and radio; *f*) video games; *g*) music; *h*) books and press; *i*) design; *j*) architecture; and *k*) advertising.

- The Inter-American Development Bank (IDB) described in 2007 the cultural/creative industries as those activities that produce goods with symbolic content. Based on this assumption, the IDB (2007, pp 11-27) classified the cultural/creative industries in 7 sectors: *a*) edition and literature; *b*) audiovisual (cinema, television); *c*) sound (discography, radio, opera, concerts); *d*) performing arts (concerts, theatre, orchestras, dance, opera, fine arts, design, fashion, architecture, museums and galleries); *e*) cultural tourism (architecture, museums and galleries, gastronomy); *f*) multimedia (publicity, software, video games, design); and *g*) sports.
- The UNCTAD approach extended the previous concept of creative activities mainly focused on activities having a strong artistic component in order to include "any economic activity producing symbolic products with a heavy reliance on intellectual property and for as wide a market as possible". UNCTAD (2008, p. 14; 2010, p. 8) classifies the creative industries in 9 sectors: *a*) cultural sites (archaeological sites, museums, libraries, exhibitions, etc.); *b*) traditional cultural expressions (art crafts, festivals and celebrations); *c*) visual arts (painting, sculptures, photography and antiques); *d*) performing arts (live musing, theatre, dance, opera, circus, puppetry, etc.); *e*) publishing and printed media (books, press and other publications); *f*) audiovisuals (film, television, radio, other broadcasting); *g*) design (interior, graphic, fashion, jewellery and toys); *h*) new media (software, video games, digitalised creative content); and *i*) creative services (architectural, advertising, creative R&D, cultural and recreational).
- In 2008, the ECLAC (Economic Commission for Latin America and the Caribbean) extended the concept of cultural industries to Latin America and introduced the idea of content industries. The ECLAC considered content industry all cultural, entertainment and digital industries that use Information and Communication Technologies (ICT) to produce their products and services. In this line ECLAC (2008, p. 106) classified 11 sectors as content industries: *a*) edition; *b*) cinema; *c*) television; *d*) radio; *e*) phonographic; *f*) mobile; *g*) music production; *h*) audio visual production; *i*) web content; *j*) video games; and *k*) media.
- In 2009, the UNESCO provided a new definition of cultural domains which differs significantly from the initial 1986 framework. Indeed UNESCO (2009, p. 23) classified cultural/creative industries based on a hierarchical model that was

composed of cultural domains (cultural activities, goods and services that are involved in all the different phases of the culture cycle model) and related domains (linked to the broader definition of culture, encompassing social and recreational activities). Based on this framework, UNESCO (2009, p. 24) grouped cultural/creative activities into 8 sectors: *a*) cultural and natural heritage (museums, archaeological and historical places, cultural landscapes, natural heritage); *b*) performance and celebration (performing arts, music, festivals, fairs and feasts); *c*) visual arts and crafts (fine arts, photography, crafts); *d*) books and press (books, newspaper and magazine, other printed matter, library, book fairs); *e*) audio-visual and interactive media (film and video, TV and radio, internet podcasting, video games); *f*) design and creative services (fashion design, graphic design, interior design, landscape design, architectural services, advertising services); *g*) tourism (charter travel and tourist services, hospitality and accommodation); and *h*) sports and recreation (sports, physical fitness and well-being, amusement and theme parks and gambling).

- Power and Nielsén (2010, pp. 27-28) and Power (2011, p. 31) with the objective of quantifying creative and cultural industries in Europe identified 12 sectors: *a*) advertising; *b*) architecture; *c*) broadcast media; *d*) design (fashion design, graphic design, interior design, production design); *e*) gaming software and new media; *f*) film; *g*) fine arts (literary, visual and performance arts); *h*) libraries, museums, heritage; *i*) music; *j*) photography; *k*) print media; and *l*) art objects (glass, ceramics, cutlery, crafts, jewellery).
- The European Statistical System Network on Culture (ESSnet-Culture) developed a new framework for cultural/creative statistics in 2012 based on the previous classifications set by the LEG-Culture (2000) and the UNESCO (2009). This new framework considered technological advances as well as improvements of statistical observation systems (NACE rev 2) to define the new cultural/creative industry domains. As a result, the ESSnet-Culture (2012, p. 44) proposed an updated European statistical framework of cultural/creative industries organised in 10 domains: *a*) heritage (museums, historical places, archaeological sites, intangible heritage); *b*) archives; *c*) libraries; *d*) books and press; *e*) visuals arts (plastic arts, photography, design); *f*) performing arts (music, dance, drama, combined arts and other live shows); *g*) audiovidual and multimedia (film, radio,

television, video, sound recordings, multimedia works, videogames); *h*) architecture; *i*) advertising; and *j*) art crafts.

2.3.4.2. National classifications

Some national organisations have also studied the creative industries. Indeed, countries such as the United Kingdon, France, Italy, Portugal and Spain have classified these industries as follows:

- The United Kingdom has played a key role with regard to the development of a model for the analysis of creative industries. The Department for Culture, Media & Sport (DCMS) published in 1998 and 2001 the first UK Creative Industries Mapping Documents which defined the creative industries as 'those industries which have their origin in individual creativity, skill and talent and which have the potential for wealth and job creation through the generation and exploitation of intellectual property'. The Creative Industries Mapping Document (DCMS, 1998 and 2001) identified 13 sectors: *a*) advertising; *b*) architecture; *c*) arts and antique markets; *d*) crafts; *e*) design; *f*) designer fashion; *g*) film and video; *h*) interactive leisure software; *i*) music; *j*) performing arts; *k*) publishing; *l*) software and computer services; and *m*) television and radio.
- In France, the *Département des études de la prospective et des statistiques* (DEPS) from the Ministry of Culture, has focused on cultural industries. These industries are defined as "all economic activities contributing to the production communication and marketing of a large number of cultural goods and services" (DEPS 2006, p. 9). The DEPS (2006, p. 10) further classifies the cultural activities in 4 sectors: *a*) edition (edition, trade of books, music and press); *b*) press agencies; *c*) audiovisual (cinema, radio, television, multimedia); and *d*) publicity. This definition has evolved over the years and Deroin (2011, p. 8) classifies the cultural industries in 8 sectors: *a*) books and press; *b*) audiovisual/multimedia; *c*) publicity; *d*) architecture; *e*) visual arts; *f*) cultural education; *g*) performing arts; and *h*) heritage.
- In Italy, the *Fondazione Simbola* and the *Camere di Comercio d'Italia* (Symbola – UNIONCAMERE 2011, pp. 65-196) have analysed the creative economy by classifying the cultural and creative industries in 14 sectors: *a*) design; *b*) architecture; *c*) publishing and communications; *d*) fine arts; *e*) audiovisual

(cinema); *f*) film and video; *g*) animation; *h*) radio and tv; *i*) video games; *j*) music; *k*) books and printing; *l*) visual arts; *m*) performing arts; and *n*) historic and artistic heritage.

- In Portugal, the Ministry of Culture presented in 2010 the first study evaluating the cultural and the creative sector in Portugal. This study (Mateus *et al.* 2010, p. 45) classifies the creative and cultural industries in 13 sectors: *a*) performing arts; *b*) visual arts and literary creation; *c*) historic and cultural heritage; *d*) cinema and video; *e*) edition; *f*) music; *g*) radio and television; *h*) educational software; *i*) architecture; *j*) design; *k*) publicity; *l*) software services; and *m*) creative components in other activities.
- The Ministry of Education, Culture and Sports of Spain analysed for the first time in 2009 the creative and cultural sector in Spain. Among all creative and cultural industries, the Ministry of Culture (2009, p. 6) identifies 6 sectors: *a*) heritage; *b*) archives and libraries; *c*) plastic arts; *d*) scenic arts; *e*) audio visual; and *f*) interdisciplinary (informatics and publicity).

2.3.4.3. Academic classifications

Creative industries have also been defined by academic studies.

- Howkins (2001) has classified creative industries into four broad sectors, namely copyright, patents, trademarks and design structure of the final product. Howkins (2001, pp. 88-117) identified 15 core industries which constituted the creative sector: *a*) advertising; *b*) architecture; *c*) art; *d*) crafts; *e*) design; *f*) fashion; *g*) film; *h*) music; *i*) performing arts (theatre/opera/dance/ballet); *j*) publishing; *k*) research and development; *l*) software; *m*) toys and games (excluding video games); *n*) tv and radio; and *o*) video games.
- Throsby (2001) defines the cultural/creative industries on the basis of the origin and diffusion of creative ideas in sound, text and image from core creative arts using a concentric circle model. Throsby (2008, p. 149) classifies cultural/creative industries in 16 sectors following the concentric circles model: *a*) literature; *b*) music; *c*) performing arts; *d*) visual arts; *e*) film; *f*) museums, galleries and libraries; *g*) photography; *h*) heritage services; *i*) publishing and print media; *j*) sound

recording; *k*) television and radio; *l*) video and computer games; *m*) advertising; *n*) architecture; *o*) design; and *p*) fashion.

- Hesmondhalgh (2002, pp. 17-19) provided an additional classification of cultural/creative industries based on their level of production and dissemination of texts, symbols or cultural artifacts. Hesmondhalgh's model, also known as symbolic texts model, classifies cultural/creative industries in 10 sectors: *a*) broadcasting (radio and television); *b*) film industries (dissemination of films on video, DVD and other formats and on television); *c*) music industries (recording, publishing and live performance); *d*) print and electronic publishing (books, online databases, information services, magazines and newspapers); *e*) video and computer games or digital games; *f*) advertising, marketing and public relations; *g*) web design; *h*) consumer electronics/cultural industries hardware; *i*) information technology (software industry); and *j*) internet industries (internet backbone industries; internet service providers, broadband service, navigation software, search engines and web directories, web portals, internet telephony applications, and media player software).
- The most recent classification of creative industries goes by the name of Orange Economy in Latin America and the Caribbean and has been proposed by Buitrago and Duque (2013, p. 40). According to them, the Orange Economy is composed of 12 sectors: *a*) visual arts (painting, sculpture, performance art, photography, fashion/haute couture); *b*) performing arts and public shows (theatre, dance and puppets, orchestras, opera and zarzuela, concerts, circuses, organized improvisations, fashion/catwalk); *c*) tourism and material and immaterial cultural heritage (crafts, antiques, lutherie and typical products, gastronomy, museums, galleries, archives and libraries, architecture and restoration, natural parks and eco-tourism, monuments, archeological sites, historic quarters, etc., traditional knowledge, festivals, carnivals, etc.); *d*) cultural and artistic education; *e*) publishing (books, newspapers and magazines, graphic industry/printing, edition, literature, bookstores; *f*) audiovisual (film, tv, video); *g*) phonographic (radio, recorded music); *h*) design (interior, graphic art and illustration, jewellery, toys, product); *i*) content software (videogames, other interactive audiovisual contents, digital content media support); *j*) news agencies and other information agencies; *k*) advertising; and *l*) fashion/prêt à porter.

2.4. The spatial concentration of creativity

2.4.1. Creative intensive locations

The spatial clustering of firms is one of the core research questions of urban and regional economic studies. Acs and Varga (2002, p. 134) underline that a central research issue in economics is to explain why economic activities tend to be concentrated in certain places while in other places they remain relatively underdeveloped. During the past two decades, firm clustering has also become relevant for sub-national policies (Malmberg and Maskell, 2001, p. 4). Indeed, governments (local and regional) from developed economies have introduced and implemented policies aimed at facilitating the emergence of clusters as well as at supporting existing clusters (Karlsson, 2008, p. 1).

The current interest in agglomeration has old roots. Several authors have analysed the different advantages generated by spatial proximity which motivate firms to locate close to other firms (Marshall 1890/2009; Weber 1909; Ohlin 1933; Hoover 1937/1971). Recently researchers have showed interest on the understanding of the factors that explain why creative industries, in particular, tend to be geographically concentrated (Hanson 2000; Tschang and Vang 2008; Vang 2005, 2007; Lazzeretti *et al.* 2008, 2012). Indeed, there is a need to understand if the multiple types of externalities that contribute to explaining the spatial concentration of the economic activity in general can also help to explain the spatial organisation of creative industries in particular (Vang 2007). Authors such as Tschang and Vang (2008, p. 3) suggest that traditional approaches provide only a partial explanation of the determinants that might affect creative industries.

Recent studies have analysed the spatial organisation of creative activities. They emphasise that creative activities are not distributed uniformly across space (Scott 2005; Cooke *et al.* 2007; Florida 2008; Florida *et al.* 2008; Cooke and Lazzeretti 2008; Lazzeretti *et al.* 2008; Boix *et al.* 2012). Several authors point out that activities with a high propensity to innovate tend to be more clustered than manufacturing industries (Feldman 2000, p. 378-379; Scott 1996, p. 327) due to their intrinsic characteristics. Similarly, companies in which tacit knowledge plays an important role tend to be clustered in space (OECD 2008) in order to benefit from the external economies (Pascal and McCall 1980; Cooke *et al.* 2007). Suarez-Villa and Walrod (1997) and Globerman (2001) underline that these

externalities derive from the concentration of companies, suppliers and workers with specialised abilities.

Boix *et al.* (2013, p. 10) point out that symbolic knowledge and knowledge spillovers tend to be locally sensitive. Industries such as media, advertising, design and fashion with a symbolic knowledge base, are mainly based on tacit knowledge. This knowledge is normally linked to the habits and norms learned in specific social groups and which are exchanged mainly through informal interpersonal interaction in the professional community (face-to-face).

And indeed spatial proximity matters in the innovative or creative process (Cooke *et al.* 2007, p. 30). Marshall (1980/2009, p. 226) points out that in a knowledge-dense context, tacit knowledge can benefit from spatial proximity. These kinds of knowledge spillovers occur mostly among geographically proximate individuals and organisations (OECD 2008, p. 10). Several scholars see this as a dynamic process called "knowledge spiral" (Nonaka and Takeuchi 1995; OECD 1996; Becattini 2005, pp. 52-53; Cooke *et al.* 2007, p. 29): the inventions as well as the organisational or process improvements achieved by a company located in a territory are made explicit, and then shared, analysed and adopted by the rest of the companies located in the same territory. Such knowledge is more effectively transmitted in a local context where there is proximity between individuals with a common social context (OECD 2008, p. 8). Thus, as Audretsch and Feldman (1996, p. 634, 637-639) note, industries which are more knowledge oriented will be expected to be more concentrated, given the need of transmitting tacit knowledge informally trough face-to-face interactions and repeated contact (Pratt 2004, p. 122; Audretsch 1998, p. 21; Von Hippel 1994; Audretsch 2003; OECD 2008, p. 28).

Suarez-Villa and Walrod (1997), Maskell and Lorenzen (2004) and Cooke *et al.* (2007) define cluster as a concentration of activities or workers in space, which are capable of generating, transferring and using knowledge. Bergman and Feser (1999) underline that the common element between clusters, industrial districts and *milieux innovateurs* is that the spatial proximity between agents provides competitive advantages.

Marshall (1890/2009) was the first to describe the existence of industries specialised in one production activity (generally small and medium size firms) concentrated in certain places of England, called industrial districts. Recent studies that have analysed the location of

creative activities (Cooke *et al.* 2007) affirm that spatial proximity matters in the process of information exchange. Then, as a result of the concentration of different agents and their face to face interaction, information, know-how and technology are easily exchanged by imitation or learning (Suarez-Villa and Walrod 1997; Globerman 2001; Cooke *et al.* 2007), and as a result new ideas emerge.

New ideas generated from the spatial concentration of creative activities, give place to more creativity intensive locations (Maskell and Lorenzen 2004; Cooke *et al.* 2007). Creativity will thus be concentrated in creative clusters (Le Blanc 2000; Lazzeretti *et al.* 2008), industrial districts and cities or metropolitan areas. Building on this observation, De Propris *et al.* (2009) define a creative cluster as "a place that brings together *i*) a community of 'creative people' (Florida 2002) who share the same interest in novelty but not necessarily in the same subject; *ii*) a catalyzing place where people, relationships, ideas and talents can spark each other; *iii*) an environment that offers diversity, stimuli and freedom of expression; and *iv*) a thick, open and ever-changing network of interpersonal exchanges that nurture individuals' uniqueness and identity".

2.4.2. Location theories and creative industries

As highlighted above, creative firms agglomerate in specific places in order to benefit from advantages generated from geographical and sectorial proximity. Several theories have been proposed over the last century in order to account for the industrial concentration that can be used to explain the concentration of creative industries. These are presented in what follows.

2.4.2.1. Global framework or Industrial Location Theory

The Industrial Location Theory is the oldest branch of regional economics having the objective of studying the static economic mechanisms that explain the organisation of the activity[7] in the territory (Capello, 2004, p. 23). According to this theory, the two main economic forces that determine the organisation of the economic activity over space are: the *reduction of transport costs* and the *increase of productivity*.

[7] Location theory explains the economic mechanism of the localisation of firms but also of the residential activities and the configuration of urban systems (Capello 2004, p. 42).

i) Reduction of transport costs: Alfred Weber in 1909, based on the seminal contribution of von Thünen (1826), identified the *reduction of transportation costs* as the main determinant of industrial location. Indeed, under several assumptions[8], Weber showed that the optimal location of the firm is based on the minimisation of the transportation costs between the source of raw materials and the final product market. This theory is considered as the foundation of modern location theories. Actually, Weber's theory shed some light on the spatial location of firms where the frequency of delivery of goods and services is high, and also on the location of industries where the transportation of the raw material is really costly (*e.g.* heavy industry), particularly in the first half of the twentieth century.

As noted above, creative industries are defined by Asheim and Vang (2005, pp. 29-30) and Asheim *et al.* (2007a, p. 11) as characterized by the fact that innovation is mainly produced by a recombination of existing tacit knowledge. Thus, even if the organisation and the transfer of tacit knowledge does not imply transportation costs, creative industries require spatial proximity to other agents holding tacit knowledge.

ii) Increase of productivity: Agglomeration economies explain the tendency to spatial concentration on the basis of the increase of efficiency and thus the reduction of production costs. Agglomeration economies can thus be defined as all the economic advantages that firms can benefit from in concentrated locations. This idea is the result of the combination of the conceptualisation developed by four authors: Marshall (1890/2009, pp. 222-225), who refers to natural resources and internal and external economies to explain the production, which can be interpreted as location factors; Weber (1909, pp. 124-173), who introduces the concept of "factors of agglomeration" understood as transportation cost advantages, to refer to the elements that cause a dense industrial localisation on the territory; and Hoover (1937/1971, pp. 90-91), who clarifies and extends the concept of "concentration economies" building on Ohlin (1933, p. 203). Concentration economies encompass both internal and external economies. These external economies are usually divided in two sub-categories (Hoover 1937/1971): *localisation* and *urbanisation economies*.

[8] Weber's theory was based on the following assumptions: (1) perfect competition exists in the market, (2) there are perfectly mobile factors of production, (3) firms' technology exhibits constant returns to scale, (4) raw material and output markets are fixed at certain specific points, (5) production factors are available in unlimited supply, (6) transportation costs are proportional to the weight of the goods and distance to the markets.

Localisation economies (Marshall 1890/2009, p. 222) are the advantages derived from the concentration in a particular location of specialised companies, suppliers and workers. In preliminary stages of the development of a technology or a new product or service, fast and direct contact with other concerned actors, such as specialised suppliers, workers and firms, is needed (Prager and Thisse 2009, p. 43). Creative industries are project-based industries where a group of agents work together with the aim of combining existing tacit knowledge and producing a new product. Thus, creative industries can benefit from the location of firms in the vicinity of specialised companies or suppliers, since this enhances professional association and knowledge exchange. Cooke *et al.* (2007, p. 31) and Audretsch (1998, p. 18) claim that since knowledge is created and shared more efficiently at local proximity, firms relying on a combination of existing knowledge will have a high propensity to cluster over space. In this line, Carlton (1983, p. 446) found that in industries where sophisticated technology is needed, the presence of concentrated technical expertise from the same industry or related industries is crucial. Creative industries are characterized by generating products that tend to be ephemeral since they attract the consumer's attention for a limited period of time. In this sense, creative industries need to adapt their production and thus their labour force to the market needs. Thus, spatial proximity of creative industries to the labour market might facilitate efficient matching between labour supply and demand.

Urbanisation economies are advantages derived from urban environment characteristics, which are directed in an indistinct way (without coming necessarily from the same productive sector) to all the economic activities that are located in it (Camagni 2005, pp. 24 and 34). In this line, Chinitz (1961, pp. 281-282) presented economic variety (or diversity) as determinant of economic concentration.

Turok (2003, p. 562) underlines that the city size as well as the density of the economic agents of a territory determine the importance of the benefits that creative industries could gain from their co-location. Indeed, the innovation process of the creative industries is mainly market oriented. Thus, creative industries will cluster in particular locations to take advantage of close proximity to concentrations of customers.

2.4.2.2. Clustering models

Since the early 1990's, industrial clusters received considerable attention both by policy makers and by researchers. Literature on industrial clusters has focused its attention on the causes of a non-random spatial concentration of economic activity in space. In the specialised literature several typologies of clusters have been identified.

Gordon and McCann (2000, pp. 516-521) provided a comprehensive assessment of various typological frameworks used in the literature for the analysis of industrial clusters. The authors adopted a transactions-costs perspective to address the relations between the firms within the cluster, such as transportation or communication costs. As a result they identified three distinct types of industrial clusters: *pure agglomeration*, the *industrial complex*, and the *social network*.

The classic model of *pure agglomeration*, refers to the external economies of scale or scope that benefit firms located in the same area. These externalities can arise from three different sources (Gordon and McCann 2000, p. 516). Firstly, firms benefit from access to a more extensive labour pool, making it easier to find skilled labour force and thus to maximize the job matching by adjusting labour needs according to the market conditions. Secondly, firms benefit from access to a large range of specialised industries and suppliers. Thirdly, firms benefit from the exchange of knowledge between specialised and concentrated firms, such as in the *filière*. Glaeser *et al.* (1992, p. 1127) also suggest that these knowledge externalities are often shared through the inter-firm movement of highly qualified people. Such external economies are essentially economic externalities that are derived from a geographical proximity between economic agents. Thus, co-location of creative industries might increase their opportunity to benefit from a skilled labour pool, to trade with specialised suppliers as well as to cooperate with other specialised firms to overcome market uncertainties.

The second model of clustering is the *industrial complex,* which is characterized mainly by stable trading relations between firms in the cluster (Gordon and McCann 2000, pp. 518-519). In this line, Rosenfeld (1992) has demonstrated the importance of fostering cooperation and collaboration in industrial environments where multiple small firms coexist. According to Boschma and Iammarino (2009), "related variety" is understood as industrial sectors that are characterized by complementary competences. The concentration

of these elements in the same place could facilitate the generation of a dense and varied network of agents that foster economic and social collaboration, enhancing knowledge transfer through cross-fertilisation mechanisms and thus promoting innovation (Lazzeretti *et al.* 2011; Lorenzen and Frederiksen 2008, p. 171). It is important to note that some authors have shown that the access to a diversified pool of firms will not have the same effect as a pool of diversified related firms and industries (Porter 2000, p. 259). According to Lazzeretti *et al.* (2012, p. 1246) related variety enhances creativity due to spillover processes of innovation in other sectors. In this line, Porter (1990, p. 52) notes that innovation will be fostered in geographically concentrated clusters of small firms due to: *i*) strong local rivalry, that requires firms to distinguish themselves through creativity, and *ii*) the changing final product demand which requires cooperation and collaboration among firms with complementary products (marketing, research, among others) to act rapidly and turn opportunities into real products and thus maintain the cluster reputation.

The third form of clustering is the *social network* that facilitates cooperation between firms (Gordon and McCann 2000, pp. 519-521). According to authors such as Malecki (1994), Camagni (2008) and Bergman *et al.* (1991), cooperation requires the presence in the territory of social networks and relationships of trust. In the creative domain, creative industries are characterized by the need of flexible production units in order to change their process and product configurations according to the unstable and changeable needs of the market. In order to operate in this way, Scott (2006b, p. 5-6) highlights that creative industries are generally connected to dense networks of specialised and complementary firms, which require high levels of trust to allow for the flow of information and ideas between them. Scott (2006b, p. 6) also notes that these networks of creative industries are frequently dominated by large firms.

Over the past decade, economic geography has been influenced by evolutionary thinking giving place to *Evolutionary Economic Geography* (EEG) models. EEG aims to explain the uneven distribution of economic activities underlying the industrial dynamics of firms (Boschma and Frenken 2009, p. 2). Boschma and Frenken (2010, p. 6) underline four elements that explain the spatial concentration of firms: first, self-reinforcing and irreversible dynamic processes; second, path dependency on early decisions in the formative stage; third, location choices, and fourth, market competition driven by scale economies at the firm level. Additionally, according to this theory, spatial clustering of

firms is the result of spatial historical conditions that contribute to the creation, maintenance and transmission of established organisational procedures, underlying the importance of related variety. In this line, Berg and Hassink (2013) contributed to explaining the spatial distribution of creative industries by using an evolutionary economic perspective. They remark that five essential elements explain this spatial trend: path dependence, lock-ins, path creation, related variety and co-evolution.

Cluster policy initiatives have been used in several European countries as a platform to increase innovation and thus to contribute to sustainable growth. In recent years, national and regional authorities have started to see creative industries as important elements for the economic performance of their territories, and thus have started supporting initiatives through industrial policies (Power and Jansson 2006, p. 8). For instance, programs such as the VinnVäxt in Sweden, have provided funding for knowledge-intense cluster initiatives since 2002, thus strengthening the linkages between local nodes of knowledge and innovation. This model is also known as "triple helix" and the main idea is to enable the effective cooperation between companies, institutions of research/high education and the public administration. One of the main aims of this program is to create environments which are attractive to national and international companies and researchers.

2.4.2.3. Specific creative models

Authors such as Tschang and Vang (2008, p. 3) suggest that traditional approaches only provide a partial explanation of the determinants that might affect the location of creative industries. New approaches have suggested taking into account residential or worker amenities, which are exogenous goods or services that could increase the attractiveness, value or comfort of a specific place. These amenities are important to attract and retain highly skilled workers, which tend to be extremely mobile (Turok 2003, p. 562). The academic debate on the determinants of localisation and clustering of creative industries is thus shifting from a business to a more people-oriented approach (Selada *et al.* 2010, p. 5).

According to Boix *et al*. (2014, p. 3), these alternative explanations can be summarized on the basis of the particular characteristics of the creative industries' clusters taken into account: the existence of *cultural infrastructure*, the presence of *'soft' factors*, the access to *gatekeepers*, the presence of *patronage*, the proximity to *political power*, the location of

'star' artists and *creative class*, the existence of a particular *identity* and a *place brand* and *image*:

i) The presence of *cultural infrastructure* and the proximity to *political power* have been highlighted by several authors such as Sivitanidou (1999, p. 9); Viladecans (2002, p. 9); van Oort *et al.* (2003, p. 516); Reardon (2009, pp. 13-16) and Selada *et al.* (2010, p. 7-10). According to them, it is possible to identify 3 categories of non-productive amenities that affect residents and workers utilities: *a*) *Governance*, understood as the leadership and management of places as well as the coordination of different actors and innovative and creative policies; *b*) *Natural and historical- cultural amenities*, understood as the natural, architectonic, archaeological heritage, the urban landscape and image, the climate and public spaces among others. Indeed, Kourtit *et al.* (2013, p. 4) highlight that the presence of historic authenticity in a place, such as cultural heritage, contributes to the emergence of an appropriate urban location favouring creative minds; *c*) Good access to e*conomic activities and cultural facilities*, understood as the structures essential for the health, social well-being and economic prosperity of local communities.

ii) Several authors highlight also the existence of a particular *identity*, place *brand* and *image* and the importance of '*soft' characteristics* to explain the spatial concentration of creative industries. Indeed, it is in these places, according to several authors, where creative people prefer to live (Sivitanidou 1999, p. 25; van Oort *et al.* 2003, p. 521). Pareja *et al.* (2009, pp. 28-33; 2010, pp. 9-10) point out that quality of life and diversity are two important elements that help to attract and retain creative industries and individuals. On the one hand, quality of life should be understood as a set of elements on which people rely for leisure or to increase their well-being (local gastronomy, quality of public services and cultural, leisure and sport entertainment; among others). On the other hand, diversity is understood as the level of tolerance (openness, social cohesion, equality) and ethnic and professional diversity of a territory which, according to these authors, will reinforce the informal professional networks between creative individuals. Similarly, Markusen *et al.* (1986) and De Vol (1999) highlight the impact of quality of life on the spatial distribution of innovative firms. According to them, places with accessible natural environments can increase the attractiveness of certain locations to creative industries and employees. Also in this line, Asheim *et al.* (2007b, p. 666) point to the relevance of quality of live, understood as the presence of bars, cafés, nightclubs, to attract creative workers. Additionally, the

level of openness, diversity and opportunity to work (tolerance), also highlighted by Jacobs (1961/1971 and 1969), Florida (2002), Saxenian (1994), Bounken (2009, p. 189) and EIS (2008, p. 11), is a characteristic that creative people evaluate positively. Furthermore, Bourdieu (1980) defines social capital as the set of actual or potential resources related to a long lasting network or relationships among a set of individuals. In this sense, the presence of public or semi-public spaces such as bars or restaurants can encourage people to meet (Murphy and Redmond 2009, p. 73) and thus facilitate social interactions.

iii) The externalities generated by the concentration of human capital or the creative class in a place can be seen as a reason for the clustering of economic activities (Glaeser 2000; Fritsch and Stützer 2008) as well as creative industries (Lazzeretti *et al.* 2012). The location of educated people and the necessary infrastructures for their education (such as universities and other educative institutions) plays a fundamental role in the location and performance of companies, especially for those where individuals with high levels of human capital constitute a primary input to the production process (Arora et al. 2000). The externalities generated by the concentration of human capital in a place can indeed be seen as a reason for the clustering of economic activities (Muñiz, 1998; Glaeser, 2000; Fritsch and Stützer, 2008) as well as for the generation of new ideas, and the attraction of new creative industries (Lazzeretti et al. 2012).

iv) Additionally, the presence of people working in creative occupations can attract other kinds of talent and creative industries (Clifton and Cooke 2007, p. 23). Assmo (2010, p. 314) shows that creative actors are crucial for the development of new creative and cultural firms and products. In this context, knowledge exchange takes place mainly on the basis of cognitive proximity, through informal interpersonal interaction in the professional community (face-to-face). Face-to-face interactions between different actors will facilitate spillovers of information, know-how and technology by imitation or learning (Suarez-Villa and Walrod 1997; Globerman 2001; Cooke *et al.* 2007), and as a result new ideas will emerge. As an example, Lucas (1988, p. 38) and Hanson (2000, p. 480) note that creative professionals such as musicians or actors may learn from other colleagues working in the same environment techniques that will improve their performance.

v) Finally, patronage and gatekeepers can contribute to the diffusion of knowledge inside the cluster. In this line, Scott (2006b, p. 6) stresses that in creative environments, free

exchange of information between members of a network is of critical importance for the development of new production processes. However, he also points out that low levels of trust can impede the flow of knowledge between the members of the network. Scott highlights that industrial associations or private-public partnerships can sometimes solve knowledge spillover failures in competitive environments.

2.5. Location of creative industries and identification of creative clusters in Europe

2.5.1. The creative sector in Europe

The creative sector in Europe has been analysed by several researchers, national and international institutions. Table 2.1 shows a list of the more exhaustive studies dealing with the measurement of creative industries[9] at the European and national level that where published in the last 10 years.

The creative sector ranges from 2.3% to 6.5% of the total workforce, depending on the definition of creative industries used in each study (Figure 2.1).

Lazzeretti *et al.* (2008) and Boix *et al.* (2010/2012) are one of the first academic contributions that analysed and compared the geography of the creative industry in European countries. Understanding the creative sector as a combination of traditional cultural industries and technology-related creative industries, they observed that Italy, France, Spain and the United Kingdom concentrated over 4 million of jobs in creative industries (around 5% of the total jobs). In 2001, Italy accounted 879,000 jobs in creative industries, representing 5.6% of the total jobs in that country. The United Kingdom in 2007, accounted for 1,495,395 jobs in creative industries, which represented around 5.7% of the total jobs. France, in 2006, concentrated almost a million of jobs in creative industries, representing 4.5% of the national jobs. Spain, concentrated in 2001 673,363 jobs in creative industries (4.1% of the national jobs).

Some institutions also carried out studies about the creative sector in Europe using heterogeneous definitions of the creative industries. For instance, KEA (2006) and the BMWI (2009) analysed the creative sector by counting the number of cultural employees.

[9] In this study both creative and cultural industries have been considered as creative industries, according to the modern conception of the creative sector described in section 2.3.3.

According to these studies, the creative sector in the 5 European countries under study contained between 2% and 3.8% of the total employees. Other studies such as TERA (2010), Power and Nielsén (2010), WIFO (2011), ECCL (2013) and TERA (2014) observed that the creative sector accounted for a total share of the total employment that ranged between 2.1% and 9.2%.

2.5.1.1. Italy

National and international studies about the creative sector in Italy have been focused on both cultural and creative industries. Table 2.1 shows that studies which focus on cultural industries quantify this sector in Italy in a range between 1.7% and 5.8% of the total national employment. Employment in creative industries was quantified in Italy ranging from 2.2% and 6.1% of the total national employment. Finally, employment in cultural and creative industries together have been quantified ranging from 2.7% to 9% of the total Italian employment.

Santagata (2009) was the first study of the creative industrial sector in Italy commissioned by a public institution. This White Paper on creativity in Italy analyses the creative sector based on three main types of cultural and creative industries: material culture, production of content and ICT, and historic and artistic heritage. According to this study, the creative sector in 2004 accounts for 5.7% of the total jobs of the country (1,385,500 creative jobs). Bertacchini and Borrione (2013) is one of the most relevant academic papers focused on the creative industries in Italy. They observed that also in 2001 this sector represented 9% of the total national jobs (1,751,409 creative jobs).

2.5.1.2. United Kingdom

The creative sector has been mainly described in the United Kingdom trough the analysis of creative industries. Table 2.1 highlights that research of the creative industries in the UK quantifies the creative sector between 3.9% and 9.2% of the total creative jobs. These shares are a bit lower among the studies that focus on cultural industries, between 3.1% and 3.8%. The studies that take creative and cultural industries together quantify it between 3.1% and 4%.

The UK Department for Culture, Media and Sport highlighted that over 1.5 million people were employed in creative industries in 2010, representing 5.1% of the total employment

(DCMS 2011). The DCMS (2015) stressed that this sector grew until the year 2013, accounting for over 2.6 million people (8.5% of the total national jobs). Similarly, the NESTA quantified in 2001 the creative sector in the UK in 1,887,878 creative jobs, over 7% of the total jobs (Higgs *et al.* 2008). This research institution quantified the sector in the year 2010 with 2,495,700 creative jobs representing 8.5% of the total workforce. And in 2013 with 2,616,000 of creative jobs representing 8.3% of the total workforce.

2.5.1.3. Spain

The research on creative industries in Spain by national institutions has been mainly focused on cultural employment. In the year 2000 cultural activities gave employment to 397,600 people, which represented 3.6% of the total employment (Ministerio de Cultura 2005). This sector has increased over the years until 485,300 jobs in 2013, representing 2.8% of the total national employments (Ministerio de Cultura 2014). Among all the studies, cultural industries occupied between 2% and 2.8% of the national jobs.

The main study focusing exclusively on the creative industries in Spain is the one conducted by Boix and Lazzeretti (2011). According to this study, creative industries gave employment to 1,287,000 people in 2007, representing 6.5% of the total national employment. Over the last decade, several studies analysed this sector quantifying it between 3% and 6.5% of the total employment.

2.5.1.4. France

The main contribution to the study of creative industries by a national institution comes from the *Ministère de la Culture*. According to the reports conducted in 2005 and 2006 by the *Ministère de la Culture*, this sector accounted for 4 million of firms, which represented between 2.1% and 4% of the total active people in France.

In a more recent study based on 2006 data, Sánchez-Serra (2014) found that over 1 million workers were employed in creative industries, over 4.5% of the total employment. The EY (2013) also found that 1.2 million people were employed in cultural and creative industries in France in the year 2011, representing 5% of the total national jobs.

2.5.1.5. Portugal

The research on creative industries in Portugal has been mainly focused on cultural employment. These studies have quantified the creative sector between 1.4% and 2.3% of the cultural employment. Other studies analysed both creative and cultural employment and observed that this sector accounted between 1.8% and 2.6% of the total national employment. For example, according to Mateus *et al.* (2010), the creative and cultural sector in Portugal represented 127,079 employees in 2006, which accounted for 2.6% of the total national employment. Santos Cruz and Texeira (2012) quantified the creative sector in Portugal in the year 2009 in 215,525 creative workers, which represent 6.9% of the total employment.

Table 2.1. List of the more exhaustive studies dealing with the measurement of the creative industries in 5 European countries

Author (year)	Methodology	Year	France	Italy	Portugal	Spain	UK	EU (5 countries)
IAU (2010)	Employment in creative industries	2000	3.3%					
Ministerio de Cultura(2005)	Employment in cultural industries	2000				2.6%		
Boix *et al.* (2010/2012)	Employment in creative industries	2001	4.5%	5.6%		4.1%	5.7%	
Higgs *et al.* (2008)	Employment in creative industries	2001					7.1%	
Bertacchini and Borrione (2013)	Cultural and creative industries	2001		9.0%				
Ministère de la Culture (2005)	Employment in cultural industries	2002	2.1%	2.2%	1.4%	2.0%	3.2%	2.5%
KEA (2006)	Employment in cultural industries	2003	2.5%	2.8%	2.3%	3.1%	3.8%	3.1%
Ministère de la Culture (2006)	Cultural industries	2003	4%					
Santagata (2009)	Employment in cultural and creative industries	2004		5.7%				
Cléron and Patureau (2007)	Employment in cultural industries	2005	2%					
BMWI (2009)	Employment in cultural industries	2005	2.0%	2.1%	1.4%	2.1%	3.1%	2.4%
Power and Nielsén (2010)	Employment in cultural and creative industries	2006	2.5%	2.7%	2.1%	2.7%	3.1%	2.7%
Mateus *et al.* (2010)	Employment in cultural and creative industries	2006			2.6%			
Sánchez-Serra (2014)	Employment in creative industries	2006	4.5%					
IAU (2010)	Employment in creative industries	2007	3.2%					
Boix and Lazzeretti (2011)	Employment in creative industries	2007				6.5%		
TERA (2010)	Employment in creative industries	2008	6.2%	6.1%		5.9%	9.2%	6.5%
WIFO (2011)	Creative industries	2008	3.5%	2.2%	1.8%	3.0%	3.9%	3.0%
Boix *et al* .(2013)	Employment in creative industries	2008						6%

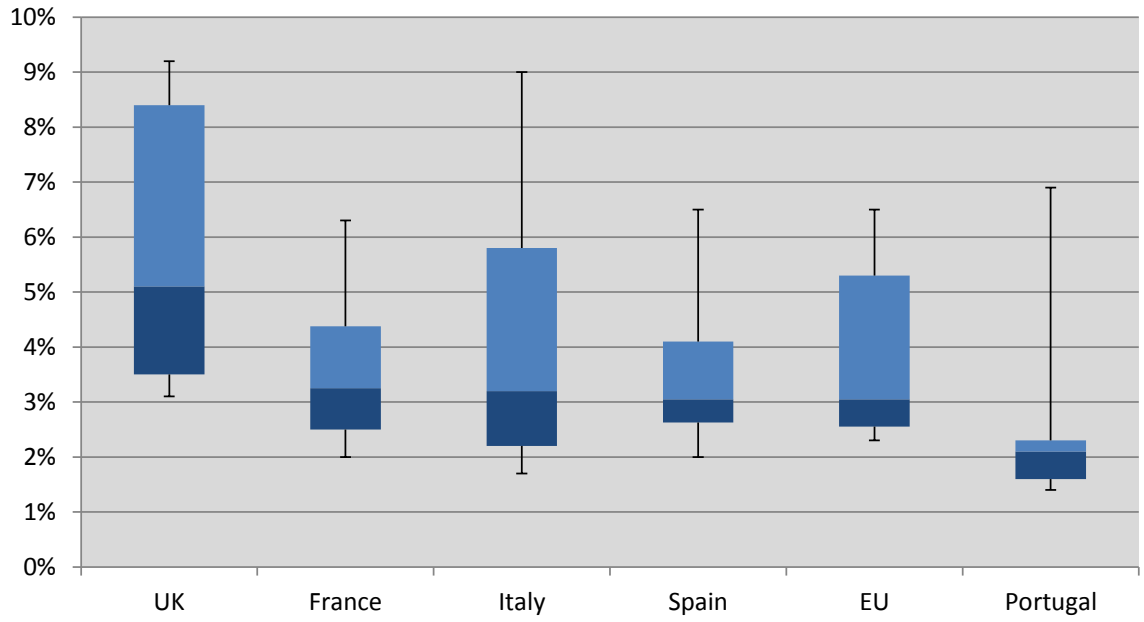
Source: Own elaboration.

Table 2.1. List of the more exhaustive studies dealing with the measurement of the creative industries in 5 European countries (continued)

Author (year)	Methodology	Year	France	Italy	Portugal	Spain	UK	EU (5 countries)
Santos Cruz and Texeira (2012)	Employment in creative industries	2009			6.9%			
Méndez *et al.* (2012)	Employment in creative industries	2009				4.1%		
Kancel *et al.* (2013)	Employment in cultural industries	2010	2.5%					
ECCL (2013)	Employment in cultural and creative industries	2010	3.3%	3.2%	2.2%	3.3%	4.0%	3.2%
Bakhshi *et al*. (2013)	Employment in creative industries	2010					8.7%	
DCMS (2011)	Employment in creative industries	2010					5.1%	
TERA (2014)	Employment in creative industries	2011	6.3%	6.2%		5.6%	9.0%	6.5%
Gouyon and Patureau (2014)	Employment in cultural industries	2011	2.6%					
Laurent (2014)	Employment in cultural industries	2011	2.6%	1.7%	1.6%		3.2%	2.3%
EY (2013)	Employment in cultural and creative industries	2011	5%					
Aguiar Losada (2014)	Employment in cultural industries	2012				2.6%		
Unioncamere (2014)	Employment in cultural industries	2013		5.8%				
DCMS (2015)	Employment in creative industries	2013					8.5%	
Ministerio de Cultura (2014)	Employment in cultural industries	2013				2.8%		
Bakhshi *et al.* (2015)	Employment in creative industries	2013					8.3%	

Source: Own elaboration.

Figure 2.1. Boxplot of the shares of employment in creative industries based on a review of the literature



Note: The boxplot is used here to show the distribution of the shares of employment in cultural and creative industries based on a revision of the literature. The data is split into quartiles (which contain 25% of the distribution) and the body of the boxplot consists here of two blue boxes which represents the second and third quartile (dark blue and light blue respectively). The lines dividing the two groups is the median of the distribution. Finally, the extremes of the figure display the extreme maximum and minimum value of the distribution.
Source: Own computations based on Table 2.1.

2.5.2. Empirical studies on the location of creative activities

The study of the industrial concentration started from the seminal work of Alfred Marshall "Principles of Economics" in which he devoted a chapter on the concentration of the Specialised Industries in Particular Locations. Almost a century later several academic disciplines revitalised the study of the concentration of specialised activities. As pointed out by Asheim *et al.* (2006), Doloreux and Parto (2004) or Trippl and Toedtling (2008), these concentrations of firms have been analysed in the literature as a part of different theories: *industrial districts* (Becattini, 1979, 1987, 1989, 1990; Bellandi,1982; Brusco, 1982, 1989, 1991; Triglia 1986, 1990; Dei Ottati 1986; Sforzi 1989, 1991; Piore and Sabel, 1984); *new industrial spaces* (Scott, 1988); *local production systems* (Crouch *et al.*, 2001; Courlet 2001); *local high-tech clusters* (Markusen, Hall and Glasmeier, 1986; Saxenian 1996; Keeble and Wilkinson, 1999, 2000); *innovation milieu* (Aydalot and Keeble 1988; Crevoisier 2001; Crevoisier and Camagni 2001; Maillat, 1998); *local and regional innovation systems* (Autio 1998; Asheim and Gertler 2005; Cooke 1998, 2001; OECD 2001; Tödtling and Trippl 2005); *learning regions* (Asheim 1996, 2001; Florida 1995;

Morgan 1997; Boekma *et al.* 2000) and *industrial or business clusters* (Porter 1998, 1990). All these theories emphasised two main elements that explain firm concentration: sectorial or functional concentration and agglomeration. The former refers to an a-spatial concept which underlines the relevance of having companies from the same sector linked by commonalities and complementarities. The latter, underlines the importance of geographical proximity to explain the localisation of industries.

However, measuring the location of firms is not an easy task. Indeed, the fact that an industry is present more in one place than in another is not itself an indicator that this industry is clustered in the territory. In order to cope with this challenge, the localisation of industries has been traditionally analysed with a range of quantitative techniques such as absolute and relative indexes (Combes and Overman 2003, pp. 15-18; Overman *et al.* 2003, pp. 20-21; Combes *et al.* 2008, pp. 255-275), also known as specialisation or concentration indexes as well as agglomeration indexes (Arbia 2001, pp. 272-275). In this line, Combes *et al.* (2008, pp. 256-259) suggest that the measures of concentration should satisfy 6 properties: *i*) to be comparable across industries; *ii*) to be comparable across spatial scales; *iii*) to be unbiased with respect to arbitrary changes to spatial classification; *iv*) to be unbiased with respect to arbitrary changes to industrial classification; *v*) to be taken with respect to a well-established benchmark; and *vi*) the measure should allow one to determine whether significant differences exist between an observed distribution and its benchmark, or between two situations (areas, periods, or industries).

These indexes can be measured in a different number of geographical scales (see Table 2.2) such as administrative territories (regions, provinces, municipalities, zip codes) or functional areas (local labour systems or metropolitan areas). Additionally, data on employment and establishments have been traditionally used in empirical studies to analyse the geographical pattern of the creative industries (see Table 2.2).

The empirical literature analysing the spatial distribution of creative activities is at an emergent stage (Boix *et al.* 2014; Santos Cruz and Teixeira 2015). Some of the main contributors to the empirical research of the location of creative industries are Lazzeretti *et al.* (2008, 2012), Power and Nielsén (2010), Hervas-Oliver *et al.* (2011), Power (2011), De Miguel *et al.* (2012) and Boix *et al.* (2014). This corpus of literature is currently growing

(see Table 2.2), and all the studies confirm the spatial concentration of creative industries over space.

Empirical studies can be classified according to four main measures used to analyse the distribution of creative industries over space: concentration, specialisation, agglomeration and co-location.

The first group of studies has analysed the industries' location behaviour by using **industry-specific measures (non-spatial indicators)**. According to these indicators, creative industry will be highly concentrated if a very large part of this industry is located in a small number of regions. The most well-known indicators are: Concentration ratio, Herfindhahl index, Gini and Theil coefficients:

The **Gini index** has been used to evaluate the spatial concentration of a given industrial sector in terms of a given magnitude such as employment or number of firms. Let x_r^s be the total number of firms in sector *s=1,...,S* and in region *r=1,...,R;* and $x^s = \sum_{r=1}^{R} x_r^s$ the total number of firms in sector *s*. To compute this index, regions are ordered in ascending order by their degree of specialisation (*n=1,...,R*), derived from a regional share of the number of firms in sector *s* and represented by $\delta_r^s = \frac{x_r^s}{x^s}$. Being $\delta_{r(n)}^s = \sum_{r=1}^{n} \delta_r^s$ the cumulative share of the number of regions in sector *s* of the *n* regions, the Gini index is formulated by:

$$G^s = 1 - \sum_{n=1}^{R} \frac{1}{R} \left[\delta_{r(n-1)}^s + \delta_{r(n)}^s\right] \qquad [1]$$

The Gini index ranges from 0 to 1. A value of 0 means that all regions share the same proportion of firms in sector *s*, while a value of 1 refers to extreme inequality, being the whole number of firms in sector *s* concentrated in a single region.

The **Herfindahl index**, also known as Hirshman-Herfindahl index (Herfindahl 1950, Hirschman 1945) is a commonly used absolute measure of sectoral concentration. This index measures the sum of the square of the regional share of the number of firms in a sector *s*.

$$HI^s = \sum_{r=1}^{R} (\delta_r^s)^2 = \sum_{r=1}^{R} \left(\frac{x_r^s}{x^s}\right)^2 \qquad [2]$$

The Herfindahl Index ranges from 1/R to one. The index increases with the degree of concentration reaching its upper limit of 1 when all firms belonging to sector *s* are located within the same region. On the contrary, the lower bound is reached when all regions concentrate the equal shares in creative industries.

Theil index has been also used to measure the concentration/dispersion of a particular industry. This index is interpretable as a weighted average of the log of the location quotients in each sector, weighed by the importance of each sector in the specific region analysed:

$$T^s = \sum_{r=1}^{R} \delta_r^s \ln \frac{\delta_r^s}{\delta_r} = \sum_{r=1}^{R} \frac{x_r^s}{x^s} \ln \frac{x_r^s/x^s}{x_r/x} \qquad [3]$$

This index ranges between 0 and ln(n), where 0 indicates perfect equality and the top extreme indicates maximum inequality.

The **Isard index**, also known as Krugman index (Krugman 1991) measures the concentration of a sector based on the absolute distance between the share of the number of firms in sector *s* in the region and the benchmark distribution of all firms. This index is formulated as follows:

$$I^s = \frac{1}{2} \sum_{r=1}^{R} |\delta_r^s - \delta_r| \qquad [4]$$

where $\delta_r^s = \frac{x_r^s}{x^s}$ refers to the regional share of firms of sector *s* in region *r* while $\delta_r = \frac{x_r}{x}$ refers to the total share of firms of the region.

This index ranges from 0 to 2. The lower value (0) refers to the case in which the territorial structures are identical, while the top value (2) refers to the situation in which the territorial structures are totally different.

Measures of creative industry concentration have been the most common in empirical literature (Table 2.2). Studies such as Power and Nielsén (2010), Power (2011), De Miguel *et al.* (2012) have used the concentration ratio to compare the patterns of concentration of employment in creative industries with respect to the total employment in Europe at NUTS2 level. As a result, they found that the patterns of concentration of creative jobs (employment in creative industries) in large urban areas and capital city regions are

significantly higher than the patterns of concentration of total employment. A more refined analysis using functional regions (Local Labour Systems) were conducted by Boix *et al.* (2013 and 2014b) in 4 European countries, namely, Spain, Italy, France and the United Kingdom. This study found a high concentration of creative jobs in large metropolitan areas in France and Spain. Additionally, they found that creative jobs are mainly concentrated around London and South East of England while in Italy they found a more diffused and polycentric pattern around the centre-north of the country. Finally, and by using Herfindhal, Gini and Theil index, Boix *et al.* (2013 and 2014b) show that a larger concentration was found in Spain, followed by Great Britain, Italy and France.

Other studies carried out at the national level and mainly using concentration ratios confirmed the trends observed in the studies previously described (Table 2.2). In this regard, Pratt (1997), Chapain *et al.* (2010) and Bakhshi *et al.* (2015) conducted their studies for the United Kingdom. García *et al.* (2003), Lazzeretti *et al.* (2012), Guerrero Panal and Navarro Yáñez (2012) and Méndez *et al.* (2012) analysed the concentration levels of the creative industries in Spain. Sánchez-Serra (2013, 2014) and Sánchez-Serra and Vervaeke (2013) described the concentration patterns of the employment in creative industries in France. Other studies have been conducted in other European and non-European countries such as the Netherlands (Stam *et al.* 2008), Czech Republic (Chovanec and Rehák 2012; Melichová and Fáziková 2014), and the United States (Markusen *et al.* 2008 and Campbell-Kelly *et al.* 2010).

Despite the extended use of these indicators to measure industry concentration, they do not satisfy some of the ideal index's properties: *i*) they cannot adequately compare industries having different market structures (Combes *et al.* 2008 property i); *ii*) they cannot compare different zones if they differ in their number of regions (Combes *et al.* 2008 property ii). In order to overcome these issues spatial and industry-specific concentration measures have been used in the empirical literature.

The second group of measures (specialisation) combine spatial and sectoral information. Using these measures, an industry region is considered to be highly concentrated in a particular location if its share of employment in the location exceeds the corresponding national share. The most common specialisation index used in the literature is the Location quotient (LQ).

The **Hoover Location Quotient** (LQ) is a measure that compares the percentage share of employment or firms of a particular industry in a specific geographic area by the national average. Indeed, Hoover (1936) used this quotient to examine the degree of dissimilarity between the geographical distribution of an industry and that of the population. One of the main advantages of using this index with respect to the industry-specific concentration indexes is that this one overcomes the second property mentioned by Combes *et al.* (2008). Indeed, one of the main characteristics of the Location Quotient is that it can be comparable across spatial scales (O'Donoghue and Gleave 2004, p. 422; Von Hofe and Chen 2006, p.10).

$$LQ_r^S = \frac{\delta_r^s}{\delta_r} = \frac{x_r^s/x^s}{x_r/x} \qquad [5]$$

This index will be 1 when the percentage of people employed by a number of firms within the creative industry, in a local area, is equal to the national average (percentage of people employed or firms in the creative industry). A LQ over 1 will indicate that the creative industry is over-represented within an area, and under-represented when the LQ is lower than 1. Indeed, it is important to note that areas with an over-representation of the creative industry are often held to constitute clusters (O'Donoghue and Gleave 2004, p. 421).

The empirical literature having analysed the concentration of creative industries has relied extensively on this specialisation indicator (see Table 2.2). Studies of the specialisation of creative industries at the European NUTS 2 level were conducted by Power and Nielsén (2010), Power (2011), Hervas-Oliver *et al.* (2011), De Miguel *et al.* (2012); Boix *et al.* (2014). They all show some metropolitan areas and capital regions with high levels of specialisation of creative industries. Similar results were also found in other studies using functional territories in European countries. Lazzeretti *et al.* (2008, 2012) focused their analysis in Italian and Spanish Local Labour Systems and found a larger concentration of creative jobs around large metropolitan areas (Barcelona and Madrid) in Spain while a more dispersed pattern in Italy. Boix *et al.* (2013, 2014b) included other European countries in the analysis (France and the United Kingdom), showing also a large concentration of the creative jobs in the large metropolitan areas in France and in London and the South East of England.

Studies conducted at the national level found similar results. For instance, Pratt (1997), De Propris *et al.* (2009), Chapain *et al.* (2010) and Bakshshi *et al.* (2015) also observed a large concentration of creative jobs specially in the capital city of London and in the South East of the United Kingdom. Capone (2008) and Bertacchini and Borrione (2013) observe a high concentration of creative jobs in big Italian cities. Similarly, Boix *et al.* (2014) and Méndez *et al.* (2012) analyse the regions and provinces in Spain and find a high concentration of employment in creative industries in Madrid and Barcelona followed by Valencia. Sánchez-Serra (2013, 2014) and Sánchez-Serra and Vervaeke (2013) found a high concentration of the creative jobs in Paris and in its surrounding area. Santos Cruz and Texeira (2014, 2015) and Santos Cruz (2014) conducted this analysis at municipal level in Portugal showing that some areas where more specialised than others depending on the specific creative sector taken into account.

The specialisation index was also used to analyse the creative industries in other territories, showing evidence of the high concentration of employment and firms in large cities: United States (Markusen *et al.* 2008 and Cambell-Kelly *et al.* 2010), China (Ye 2008), the Czech Republic (Chovanec and Rehák 2012; Melichová and Fáziková 2014), Austria (Trippl *et al.* 2013), Turkey (Lazzeretti *et al.* 2014), Indonesia (Zul Fahmi 2015) and the region of Catalonia (Coll-Martínez and Arauzo-Carod 2015).

The general use of the specialisation index to measure concentration patterns of the creative industry is mainly due to the fact that it does not require large amounts of data and it is easy to interpret (Von Hofe and Chen 2006, p.10). However, this indicator has also some drawbacks: *i*) there is no common agreement about the threshold value required for defining an area as a cluster of a specific industry (O'Donoghue y Gleave 2004, p. 421) even if some researchers consider 1.25 as a suitable threshold (Bergman and Feser 1999)[10]; *ii*) the indicator does not provide information about the size of the industry (Fingleton *et al.* 2004, p. 779; Lazzaretti *et al.* 2008, p. 9; O'Donoghue and Gleave 2004, p. 421). Thus, it is possible to obtain high values of the index even if the creative industry is small in absolute terms.

[10] O'Donogue and Gleave (2004) propose an improved LQ index which solves the cut-off problem by parametrizing the location quotient to a normal function. However, as explained in Lazzeretti *et al.* (2008), this modification introduces some drawbacks regarding the original indicator.

In order to overcome the second drawback mentioned about the Location Quotient, Fingleton *et al.* (2004, p. 780) suggest an alternative to this index called **Horizontal Clustering** (HC) which takes into account both the size of the creative industry in absolute terms and the relative local concentration of the creative industry within the area under study. This indicator is computed as follows:

$$HC_r^s = x_r^s - \hat{x}_r^s \qquad [6]$$

where $\hat{x}_r^s = \frac{x_r * x^s}{x}$ if $LQ_r^S = 1$. Indeed, this indicator measures the number of jobs in a given industry above the number of jobs expected for that industry (estimated through the number of jobs in the industry that would respond to the area having the national average share of that industry, and therefore produce an LQ value of 1).

Despite being an improvement to the LQ, this index also has some disadvantages (O'Donoghue and Gleave 2004, pp. 421-422): *i*) it is not able to capture clusters when the representation of the industry is slightly above the national average; *ii*) similarly to the LQ, there is no common agreement about the threshold value for defining an area as a cluster of a specific industry.

One of the main limitations of the previous measures is the fact that they consider the geographical units as isolated islands. However, empirical evidence has proved that values of a variable observed at nearby locations are more similar than those located at a higher distance. Concretely, it has been proven that the location of industries may not be independent across different locations. In this sense, positive spatial autocorrelation occurs when high or low values of a variable tend to cluster in the space. Negative spatial autocorrelation will occur when high/low values of a variable are surrounded by low/high values.

Local Indicators of Spatial Association (LISA) are the third set of spatial data techniques capable of measuring geographical clustering by identifying the number of geographical units and the precise location of each cluster. The most popular LISA technique is the "Moran's I"[11].

[11] The "G statistic" developed by Getis and Ord (1992) is another LISA measure.

The "**Moran's I**" measures the deviation of the values obtained from the expected values between proximate points regardless of the political boundaries. This indicator is calculated as follows:

$$I^S = \frac{R}{\sum_{i=1}^{R}\sum_{j=1}^{R} w_{ij}} \cdot \frac{\sum_{i=1}^{R}\sum_{j=1}^{R} w_{ij}(x_i-\bar{x})(x_j-\bar{x})}{\sum_{i=1}^{R}(x_i-\bar{x})^2} \qquad [7]$$

where R is the sum of observations, w_{ij} is the weight in the spatial weighted matrix corresponding to the observation pair i ,j (where $i \neq j$), x_i and x_j are the values of the observation in the geographical areas i and j respectively, being $\bar{x} = \frac{\sum_{i=1}^{R} x_i}{R}$ the mean of the variable across all observations.

Negative values indicate negative spatial autocorrelation and the inverse for positive values. Values range from −1 (indicating perfect dispersion) to +1 (perfect correlation). A zero value indicates a random spatial pattern.

This method has been used by Bertacchini and Borrione (2013) showing a spatial autocorrelation of the design activities in Italy. Melichová and Fáziková (2014) observed a more pronounced collocation in certain creative sectors in the Slovak Republic. While Currid and Williams (2010) analysed the location of creative industries at the zip-code level in two cities in the Unites States (Los Angeles and New York) showing that creative industries tend to cluster in central locations within these cities. Hervas-Oliver *et al.* (2011) conducted a similar analysis at the European level, Chovanec and Rehák (2012) for the Czech Republic and Santos Cruz and Texeira (2015) and Santos Cruz (2014) focused their analysis in Portugal showing that creative activities are concentrated in touristic places. Bertacchini and Borrione (2013) and Guerrero Panal and Navarro Yáñez (2012) used the **Ward method** (also called Ward's minimum variance method) for Italy and Spain respectively.

Despite the advantage of LISA techniques to identify agglomerations beyond administrative boundaries it also has some drawbacks. The most important is that it does not control spatial clustering for "first order" agglomerations (which occur due to population or employment densities).

Measures presented above have the limitation of being sensitive to the choice of geographical units (Fratesi 2008, p. 740). To overcome this problem a fourth group of techniques called **distance-based methods** (or measures of co-location), which use the point location of firms rather than a geographical area, were developed to identify the location and concentration of industries in a territory. Despite the advantages associated to these techniques, a limited number of studies on agglomeration and co-location of creative industries have used micro-geographic data and GIS tools to identify creative clusters.

Duranton and Overman (2005) developed an index based on the **kernel density** of the distances between pairs of plants which is then compared to the expected distribution of industries in a particular geographical area. Indeed, for an industry of *n* establishments, *n(n-1)* distances exist that can be plotted as *k-density* functions:

$$K(d) = \sum_{a=1}^{n-1} \sum_{b=a+1}^{n} \frac{\gamma(a,b,d)}{n(n-1)} \qquad [8]$$

where $\gamma(a, b, d) = 1$ if the distance from the establishment a to establishment b is equal to d, and $\gamma(a, b, d) = 0$ otherwise.

The **Nearest Neighbor Index** (NNI) is one of the oldest distance statistics to analyse point location of firms. Indeed, the NNI compares the distance between nearest points of firms and distances that would be expected by chance (Levine *et al.* 2004, p. 5.1). This indicator is computed as a quotient between the average minimum distances between all the establishments and the mean random nearest neighbour distance:

$$NNI^{S} = \frac{d(NN)}{d(ran)} = \frac{\sum_{a=1}^{n} \left(\frac{\min(\gamma_{ab})}{n} \right)}{0.5SQRT\left(\frac{A}{n}\right)} \qquad [9]$$

where $\min(\gamma_{ab})$ is the distance between each establishment and its nearest neighbour, n is the number of establishments in the distribution, and A is the area of the geographical area analysed.

If the observed average distance between establishments is about the same as the mean random distance, then the ratio will be around 1. However if the establishments are clustered, then, the observed average distance will be smaller than the mean random

distance, and then the NNI will be less than 1. Conversely, a NNI larger than 1 would indicate dispersion of the establishments.

The **Ripley's Statistics** is a super –order nearest neighbor statistic which provides a test of spatial concentration for the points contained in a circle. As it is mentioned by Chovanec and Rehák (2012, p. 19), the NNI is not well suited for a comparative analysis of the spatial concentration levels of the creative industries across creative sectors of different size. Indeed, it is demonstrated that an increment of the number of firms will lower the NNI. In order to overcome this limitation, the Ripley's K statistic will be used. The Ripley's K statistic is a distance based method that measures the concentration of a creative industry by counting the number of neighbours of each firm in a circle of a given radius (Levine *et al.* 2004). The Riplay's K has as a null hypothesis a complete spatial randomness of a point pattern (L(t_s)=0).

In order to compute this index, for each point a the distance to any other point b is measured and then compared to the distance of the radius of a circle with a fixed radius (t).

$$K(t_s) = \frac{A}{n^2} \sum_{a=1}^{n} \sum_{a \neq b}^{n-1} I(t_{ab}) \qquad [10]$$

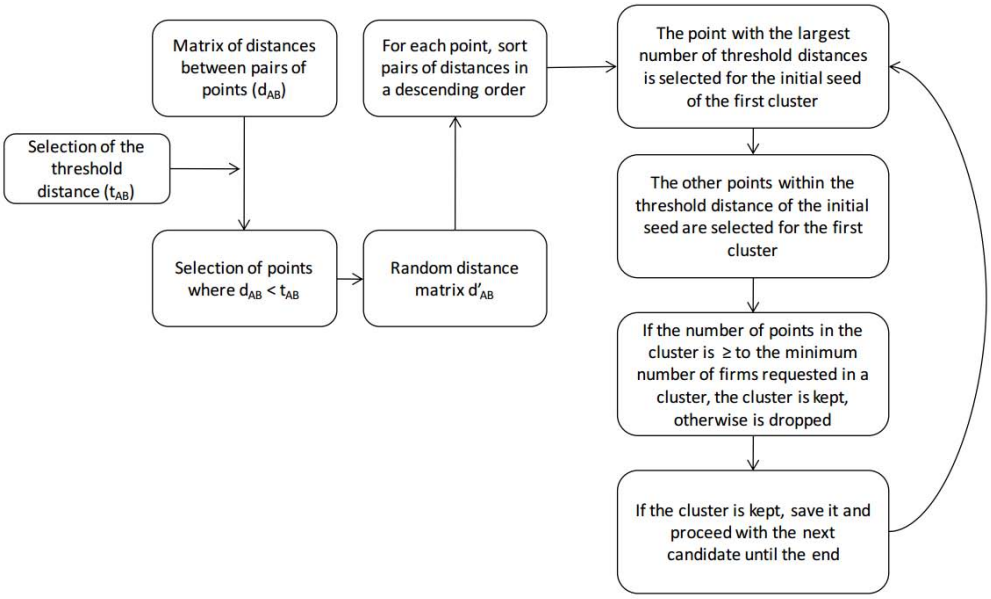
where A is the total study area, n is the sample size, $I(t_{ab})$ is the number of other points b found within distance, t_s, summed over all points a and then the total number of other points b inside the circle are counted. Consecutively, the circle is moved to the next point a and the whole process is repeated. After the double summation of points is done the radius of the circle is increased, and the entire process is repeated.

Given the fact that K(t_s) is an exponential function Kaluzny *et al.* (1998) suggested a transformation to make it more linear (L(t_s,)) according to the following formula:

$$L(t_s) = \sqrt{\frac{K(t_s)}{\pi}} - t_s \qquad [11]$$

The **Nearest Neighbor Spatial Clustering** (**NNSC**) technique builds on the nearest neighbour analysis method described above, since it compares the distance between pairs of points to the distance expected in a random distribution of points in the geographical area under analysis. However, this technique does not only inform about the existence of

clustering but also clusters establishments that are unusually close together in order to obtain the clusters. The algorithm is detailed in Boix *et al.* (2014, p. 9) as follows:



NNI and Ripley K techniques have been used by Chovanec and Rehák (2012) to analyse the spatial clustering of the creative industries in the Czech Republic. While K-order nearest neighbour was used in Boix *et al.* (2014) to study the clusters of creative industries in Europe, identifying 1,784 creative clusters in Europe, most of which are co-located. NNH and Ripley's can complement each other to produce a most robust approach, as showed in Capone and Boix (2015), this time for the identification of tourist clusters.

Finally, some additional contributions to the empirical research of the concentration of creative industries were done using the correlation analysis (using mainly Pearson correlation method). Some of the main studies having used this kind of analysis are Hervas-Oliver *et al*. (2011) and De Miguel *et al.* (2012) at the European level, De Propris *et al.* (2009) and Chapain *et al.* (2010) for the United Kingdom, Santos Cruz (2014) for Portugal, all showing high levels of correlation between most creative sectors.

Table 2.2. Overview of empirical studies on the location of creative activities 1997-2015

Authors	Countries analysed and territorial unit of analysis	Measure of concentration	Variable (employment/ industries)
Pratt (1997)	UK (NUTS2)	LQ Share of total employment	Employment in cultural industries
García *et al.* (2003)	Spain (NUTS2)	Total employment Share of total employment	Employment and firms in cultural industries
Brinkhoff (2006)	USA (zip in Los Angeles)	Number of firms	Creative firms
Capone (2008)	Italian LLS	LQ	Employment in creative industries
Lazzeretti *et al.* (2008)	Italy and Spain (LLS)	LQ Standardized LQ Share of total employment Total employment	Employment in creative industries
Markusen *et al.* (2008)	US (MSA or Boston, Massachusetts, New England)	LQ Share of total employment	Employment in cultural industries
Stam *et al.* (2008)	Netherlands (NUTS3)	Share of total employment	Employment in creative industries
Ye (2008)	China (provinces)	LQ	Employment in creative industries
De Propris *et al.* (2009)	UK (NUTS2, TTWA, SOAs)	LQ number of firms Pearson and Spearman coefficients (co-location/correlation analysis)	Firms in creative industries
Lazzeretti *et al.* (2009)	Spain and Italy (LLS)	LQ	Employment in creative industries
Campbell-Kelly *et al.* (2010)	USA (3-digit zip code, MSA)	LQ Share of total employment	Software industry employment

Source: Own elaboration.

Table 2.2. Overview of empirical studies on the location of creative activities 1997-2015 (continued)

Authors	Countries analysed and territorial unit of analysis	Measure of concentration	Variable (employment/ industries)
Chapain *et al.* (2010)	UK (NUTS2, TTWA and MSOAs)	LQ Share of firms Correlation analysis	Creative firms
Currid and Williams (2010)	USA (zip codes in Los Angeles and New York)	Cluster analysis: Global Moran's I Cluster analysis/ hotspot analysis: Getis-Ord (G-stat) Correlation analysis: Pearson correlation method	Firms in creative industries
Power and Nielsén (2010)	Europe (Countries and NUTS2)	LQ Share of total employment Total employment	Employment in creative industries
Rosted *et al.* (2010)	Europe (metropolitan regions) and US (MSA)	LQ Total employment	Employment in creative industries
Hervas-Oliver *et al.* (2011)	Europe (NUTS2)	LQ Correlation analysis Cluster analysis	Employment in creative industries
Power (2011)	Europe (countries and NUTS2)	LQ Share of total employment Total employment	Employment in creative industries
Chovanec and Rehák (2012)	Czech Republic (towns and villages, clusters)	LQ Cluster analysis (point pattern analysis)	Firms in creative industries
Guerrero Panal and Navarro Yáñez (2012)	Spanish municipalities (above 50,000 inhabitants)	Extension: Total firms Concentration: Total of firms over area Density: Total firms by 10000 inhabitants Relevance: Share of firms Diversity: Simpson Index Cluster analysis: Ward method	Firms in creative industries

Source: Own elaboration.

Table 2.2. Overview of empirical studies on the location of creative activities 1997-2015 (continued)

Authors	Countries analysed and territorial unit of analysis	Measure of concentration	Variable (employment/ industries)
Lazzeretti *et al.* (2012)	Italy and Spain (LLS)	LQ	Employment in creative industries
Méndez *et al.* (2012)	Spanish provinces and urban areas with more than 5000 inhabitants	LQ Share off total employment Total employment	Employment in creative industries
De Miguel *et al*. (2012)	NUTS 2 in EU 24 EU countries	LQ Share of total employment Correlation analysis	Firms in creative industries
Bertacchini and Borrione (2013)	Italian provinces (NUTS3)	Specialisation: LQ Agglomeration/Cluster analysis: Ward's minimum-variance method Spatial autocorrelation/cluster analysis: Global moran index Spatial autocorrelation/cluster analysis: LISA	Employment in creative industries Firms in creative industries
Boix *et al.* (2013)	France, UK, Italy, Spain (LLS)	LQ Share of employment Herfindhal index Gini index Theil index	Employment in creative industries
Sánchez-Serra (2013)	French LLS	LQ Share of total employment	Employment in artistic industries
Sánchez-Serra and Vervaeke (2013)	French LLS	LQ Share of total employment	Employment in design industries
Slach *et al.* (2013)	Czech Republic (regions and municipalities)	Total employment	Employment in creative industries
Trippl *et al.* (2013)	Austria (NUTS3)	Total employment LQ	Employment in creative industries

Source: Own elaboration.

Table 2.2. Overview of empirical studies on the location of creative activities 1997-2015 (continued)

Authors	Countries analysed and territorial unit of analysis	Measure of concentration	Variable (employment/ industries)
Boix, Hervás-Oliver, and De Miguel (2014)	European clusters	LQ Cluster analysis	Firms in creative industries
Boix *et al.* (2014b)	France, UK, Italy, Spain (LLS)	LQ Share of employment Herfindhal index Gini index Theil index	Employment in creative industries
Santos Cruz and Teixeira (2014)	Portuguese municipalities (LAU1)	Number of firms LQ	Firms in creative industries
Lazzeretti *et al*. (2014)	Turkey (provinces)	Total employment Share of total employment LQ	Employment in creativeindustries
Melichová and Fáziková (2014)	Slovak Republic (microregions –LLS and regions NUTS3)	Gini LQ Agglomeration: Moran I statistic and LISA	Firms in creative industries
Sánchez-Serra (2014)	French LLS	LQ Share of total employment Total creative jobs	Employment in creative industries
Yu *et al.* (2014)	China provinces	Creative density	Employment in creativeindustries
Santos Cruz (2014)	Portugal (municipalities LAU1)	LQ Cluster analysis Correlation analysis	Employment in creative industries
Bakhshi *et al.* (2015)	UK (NUTS2 and NUTS3)	LQ	Employment in creative industries
Santos Cruz and Texeira (2015)	Portugal (municipalities LAU1)	LQ Cluster analysis Correlation analysis	Employment in creative industries
Zul Fahmi (2015)	Indonesia (municipalities/districts)	LQ	Firms in creative industries
Coll-Martínez and Arauzo-Carod (2015)	Catalonia region (municipalities)	LQ	Employment in creative industries

Source: Own elaboration.

2.6. Conclusions

This chapter has presented a state of the art of the different approaches to the study of the location of creative industries. By reviewing the different location theories proposed in the literature the chapter sets the ground for the identification of the main drivers of the concentration of creative industries in the territory. Beyond traditional factors of agglomeration such as localisation and urbanisation externalities the chapter emphasises the relevance of specific creative forces accounting for the uneven location of creative industries in the territory.

The chapter highlights the quantification of the creative sector is a recent phenomenon. It also suggests that the differences in size of the creative sector in Europe are due to different definitions used to quantify this sector. According to this research, it has been observed that the creative sector is slightly higher in countries such as the United Kingdom or France than in southern European countries such as Portugal, Spain or Italy.

Different concentration measures are also presented and discussed: non-spatial indicators, spatial-industry specific concentration measures and agglomeration measures. A combination of these measures will be used in the following chapter.

Chapter 3 . Identifying clusters of creative industries in Europe: local creative systems and creative clusters

3.1. Introduction

The empirical research of clusters of creative industries has been determined by three main constraints. Firstly, the definition of creative industries was not homogeneous between studies, making it more difficult to quantify the size and the impact of clusters of creative industries. Secondly, the territorial unit of analysis most used in the literature has been administrative territories which have not been appropriate to provide a detailed geography of the clusters of creative industries. Thirdly, the traditional source of administrative data has been national statistical offices, which increased the difficulty of collecting appropriate and comparable data.

This chapter tries to overcome these difficulties by providing a homogeneous definition of creative industries, as well as a comparable territorial unit (more detailed than large administrative units) across 5 European countries. Additionally, this chapter highlights the advantages of using a micro-data database compared to administrative databases used in previous studies having attempted to identify and quantify creative industries across Europe.

Finally, this chapter studies the concentration of creative industries in 5 European countries applying a set of measures that goes from the most basic measures of concentration to more sophisticated co-location and spatial autocorrelation measures.

3.2. Methodology

3.2.1. Classification of the creative industries in this study

There is not yet a general consensus about what is the proper list of creative industries, a part of which it was advanced in chapter 2. One of the main critics is based on the fact that the existing industrial classification does not provide enough information to identify properly the creative industries (Tepper 2002, p. 163; Potts *et al.* 2008, p. 18). Based on this shortcoming, not all firms, workers or products that belong to an industry classified as creative would be creative (Mayerhofer and Mokre 2007, p. 143). Furthermore, a specific classification of creative industries might overlook some creativity in other activities not considered creative (Markusen *et al.* 2008, p. 8; Boix and Lazzeretti 2013). As a result, empirical studies using some of the existing classifications might provide misleading results (O'Connor 2002) or large differences regarding the size of the creative sector (Markusen *et al.* 2008, p. 26).

In order to overcome these limitations, several solutions have been suggested in the literature. DCMS (2015, p. 34) proposed a classification of creative industries based on ponderations by sector. Cunningham and Higgs (2008, p. 11) suggested the "creative trident" approach which defines the creative sector by taking into account all workers having either a cultural profession, or workers having a non-cultural profession but working in a firm within the cultural sector.

Another way to overcome this limitation is to take into account all the industries that have been recurrently considered in the literature as creative. Table 3.1 summarizes all the main creative and cultural sectors identified in the most representative studies (see chapter 2 for more detail). Among all classifications, 12 creative sub-sectors appear recurrently although some of them appeared more than others. Film, video and music appear in all the classifications analysed, while the R&D sector appears only in 10% of the creative industries classifications.

Table 3.1. Creative industries according to the national, international and academic classifications

	International													National					Academic			
	UNESCO (1979)	UNESCO (1979) LEG (2000)	WIPO (2003)	UIS (2005)	Americans for the Arts (2005)	Gordon and Beilby-Orrin (2006/2007)	KEA (2006)	IDB (2007)	UNCTAD (2008 – 2010)	ECLAC (2008)	UNESCO (2009)	Power and Nielsén (2010)	ESSnet-Culture (2012)	DCMS (1998, 2001)	DEPS (2006)	Symbola –Unioncamere (2011)	Mateus *et al.* (2010)	Ministry of Culture Spain (2009)	Howkins (2001)	Throsby (2001)	Hesmondhalgh (2002)	Buitrago and Duque (2013)
Term used	Cultural activities	Cultural activities	Copyright-based industries	Cultural sectors	Creative industries	Cultural and creative industries	Cultural industries	Cultural industries	Creative activities	Cultural industries	Cultural industries	Creative and cultural industries	Cultural industries	Creative industries	Cultural industries	Cultural industries	Cultural industries	Cultural industries	Creative industries	Cultural industries	Cultural industries	Creative industries
Fashion						✓		✓	✓		✓	✓		✓					✓	✓		✓
Publishing & printing	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
Film, video and music	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Crafts					✓	✓			✓		✓	✓	✓	✓					✓			✓
Software			✓			✓		✓	✓			✓		✓			✓	✓	✓		✓	✓
R&D									✓										✓			
Architecture		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓		
Photography	✓		✓		✓	✓			✓		✓		✓							✓		✓
Advertising			✓	✓	✓	✓	✓		✓			✓	✓	✓					✓	✓	✓	✓
Broadcasting	✓		✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Heritage	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓		✓		✓
Performing arts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Other	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

Note 1: The category "Other" refers to other sectors such as nature and environment (from UNESCO 1979), artistic education (Buitrago and Duque 2013), cultural education (DCMS 2001), cultural trade (DCMS 1998,2001; UNESCO 2009, …), sports (UNESCO 1979), design (UNCTAD 2008,2010;IDB 2007;…) or video games (Howkins 2001; Gordon and Beilby-Orrin;…) Throsby 2001,..), among others.
Note 2: Cultural trade and design are not included as part of the 12 main creative sub-sectors due to the difficulty of capturing these two sectors by using NACE rev 1.1.
Source: Section 2.3.4. Defining the creative industries sectors in Chapter 2.

This study uses the 12 creative sub-sectors most recurrent in the national, international and academic classifications of creative industries used in the literature (Table 3.1). Additionally, a list of NACE 4 digit sectors were identified inside each of the 12 creative sub-sectors (Table 3.2).

Table 3.2. Creative industries (NACE rev. 1.1)

Fashion	
1771	Manufacture of knitted and crocheted hosiery
1772	Manufacture of knitted and crocheted pullovers, cardigans and similar articles
1810	Manufacture of leather clothes
1821	Manufacture of workwear
1822	Manufacture of other outerwear
1823	Manufacture of underwear
1824	Manufacture of other wearing apparel and accessories n.e.c.
1830	Dressing and dyeing of fur; manufacture of articles of fur
1930	Manufacture of footwear

Publishing & printing	
2211	Publishing of books
2212	Publishing of newspapers
2213	Publishing of journals and periodicals
2214	Publishing of sound recordings
2215	Other publishing
2221	Printing of newspapers
2222	Printing n.e.c.
2223	Bookbinding
2224	Pre-press activities
2225	Ancillary activities related to printing

Film, video and music	
2232	Reproduction of video recording
2233	Reproduction of computer media
9211	Motion picture and video production
9212	Motion picture and video distribution
9213	Motion picture projection
2231	Reproduction of sound recording

Crafts	
3621	Striking of coins
3622	Manufacture of jewellery and related articles n.e.c.
3630	Manufacture of musical instruments
3650	Manufacture of games and toys

Software	
7221	Publishing of software
7222	Other software consultancy and supply
7260	Other computer related activities

R&D	
7310	Research and experimental development on natural sciences and engineering
7320	Research and experimental development on social sciences and humanities

Source: Based on UNCTAD (2008) and Lazzeretti et al. (2010).

Table 3.2. Creative industries (NACE rev. 1.1) (continued)

Architecture		Photography	
7420	Architectural and engineering activities and related technical consultancy	7481	Photographic activities
Advertising		Broadcasting	
7440	Advertising	9220	Radio and television activities
Heritage		Performing arts	
9251	Library and archives activities	9231	Artistic and literary creation and interpretation
9252	Museums activities and preservation of historical sites and buildings	9232	Operation of arts facilities
9253	Botanical and zoological gardens and nature reserves activities	9233	Fair and amusement park activities
		9234	Other entertainment activities n.e.c.

Source: Based on UNCTAD (2008) and Lazzeretti et al. (2010).

3.2.2. Geographical level of analysis (Local Labour Systems)

Industrial location studies have relied on a diversity of territorial units over time. Studies such as Bartik (1985); Coughlin *et al.* (1991); Hill and Munday (1992); Friedman *et al.* (1992); Fingleton (1994); and Head *et al.* (1995); Head *et al.* (1999); Feldman (2003); Basile (2004); Cieślik (2005) used large administrative territorial units (US states or European regions) to analyse the spatial distribution of firms over space. Improvements in data availability at lower levels and advances in the theoretical literature such as the New Economic Geography which emphasised the role of local areas in the generation of agglomeration economies contributed to the analysis of industrial location in small territorial units (Arauzo-Carod 2007, p. 195). In this line, researchers such as Rosenthal and Strange (2001); Couglin and Segev (2000); Feser *et al.* (2001); List (2001); Duranton and Overman (2005); Smith and Florida (1994); Woodward (1992); List and McHone (2000); Baudewyns (1999); Baudewyns *et al.* (2000); Monseny (2005); Arauzo-Carod (2005); Holl (2004 a,b,c); Guimarães *et al.* (2000); Arauzo-Carod and Manjón (2004); Arauzo-Carod and Viladecans (2006) focused their studies on countries and municipalities or zip codes. Over the same time period, similar industrial location studies were based on functional territorial units such as metropolitan areas or functional spaces such as Carlton

(1979, 1983); Rosenthal and Strange (2003); Gabe and Abel (2010) and Overman and Puga (2010).

Preliminary studies of creative industrial location used large administrative units as territorial units of analysis. NUTS 2 were used by Power and Niélsen (2010) to provide a first evidence of the clusters of creative industries in Europe. As pointed out by Boix *et al.* (2014, pp. 6 and 7) large administrative units are not satisfactory for the identification of clusters of creative industries for two major reasons. On the one hand, large administrative territories normally differ in their size (Hautdidier 2011) and their boundaries are usually the result of historical, political, economic and social events and they might no longer represent the current extension of clusters of creative industries. On the other hand, clusters normally happen in areas that are smaller than large administrative territories and are not constrained by administrative boundaries. It is thus possible to identify on the one hand, several clusters of the same creative industry that co-exist in the same large administrative region, while on the other hand it is also possible to detect cross-regional or cross-national clusters of creative industries (Crawley and Pickernell 2012).

Creative industrial location studies have moved from large administrative regions to more disaggregated territorial units. Similarly to the general industrial location studies, empirical contributions on clusters of creative industries use the local units to better illustrate agglomeration economies. Municipalities have been the territorial unit of analysis to study the national patterns of agglomeration and co-location of creative industries in Guerrero Panal and Navarro Yáñez (2012), Slach *et al.* (2013), Santos Cruz and Texeira (2014, 2015), Santos Cruz (2015), Zul Fahmi (2015) or Coll-Martínez and Arauzo-Carod (2015). However, as pointed out by Lazzeroni (2010) the municipal level does not capture all the spillovers that occur in a creative cluster since its spillovers usually extend to neighbouring municipalities. Additionally, the number and size of municipalities differ widely across countries (see Table 3.3) and the differences could have implications in terms of results. The number of municipalities across the 5 European countries analysed differ largely. Indeed, whereas the United Kingdom had more than 41,000 municipalities (which refers to "lower layer super output areas" (LSOA) in England and Wales, "data zones" (DZ) in Scotland and "super output areas" (SOA) in Northern Ireland) in 2001 featuring on average 1,400 inhabitants per municipality, on the other side, Portugal accounted for almost 4,300 municipalities (see Table 3.3).

Table 3.3. Municipalities in five European countries (2001)

	Number of municipalities	Total area size in sq. km (census data 2001)	Average number of people per municipality (census data 2001)
France	36,567	14.88	1600.37
Italy	8,101	37.07	7035.64
Portugal	4,243	21.7	2440.75
Spain	8,191	61.59	4986.86
United Kingdom	41,773	5.83	1407.4

Note: Municipalities refer to "communes "in France, "comuni" in Italy, "concelhos" in Portugal, "municipios" in Spain, "lower layer super output areas" (LSOA) in England and Wales, "data zones" (DZ) in Scotland, and "super output areas" (SOA) in Northern Ireland. Figures in France refer to the year 2006.
Source: Own calculations based on data from National Statistical Offices.

Clusters do not follow administrative boundaries and normally occur in areas smaller than provinces. Functional territories have been considered as the most appropriate territorial unit for economic analysis (Konjar *et al.* 2010, p. 1). One of the main characteristics of functional territories as opposed to administrative or normative regions is that their limits are not fixed according to historical or cultural reasons (European Commission 2007, p. 9). Additionally, labour policies may be more efficient if they are targeted to functional territories than to administrative areas (Coombes *et al.* 1986).

A functional territory is defined as a territorial division which captures a high social and economic interaction (OECD 2002, p. 11). For their delimitation, these territories have been traditionally identified using different methods and data. Commuting flow between municipalities has been the main variable used to delineate functional regions. However other methods, such as GIS are increasingly used to define functional areas not based on administrative boundaries.

Local functional units such as the local labour systems (LLS) have the advantage over administrative boundaries to better portray current social and economic conditions, because their boundaries are made according to commuting data (such as commuting flows from home to work). The LLS are built using an iterative procedure which identifies areas containing the higher possible amount of relations taking place between the places of residence and the places of work measured by journey-to-work trips. Thus the entire

country is divided in coherent self-containment functional zones within which most workers reside and work.

Since the 90s, several European countries have developed similar methods to delineate local labour systems. So far, the identification of LLS has been done based on three methods. Portuguese, Spanish and Italian LLS have been identified based on the Sforzi-ISTAT (1997) methodology. This methodology is very similar to the UK Travel-to-Work Areas defined by the ONS (Office of National Statistics) (Bond and Coombes 2007). In France, they are called "*zones d'emploi*" and have been defined by the INSEE and the Ministry of Labour, first in 1983 and then revised in 1994 and 2010 (MTESS 1997 INSEE and 2010). There are 304 LLS in France (year 2006), 243 in Great Britain (year 2001), 686 in Italy (year 2001), 806 in Spain (year 2001) and 83 in Portugal (year 2001). Table 3.4 shows some of the main characteristics of the different territorial methods used in this sample of 5 European countries under analysis. In general terms, LLS in France, Portugal and the United Kingdom seem to be larger than LLS in Italy and Spain, thus showing that commuting patterns must be larger in the former ones (Figure 3.1), although it could also be due to differences in the algorithms used to identify LLS.

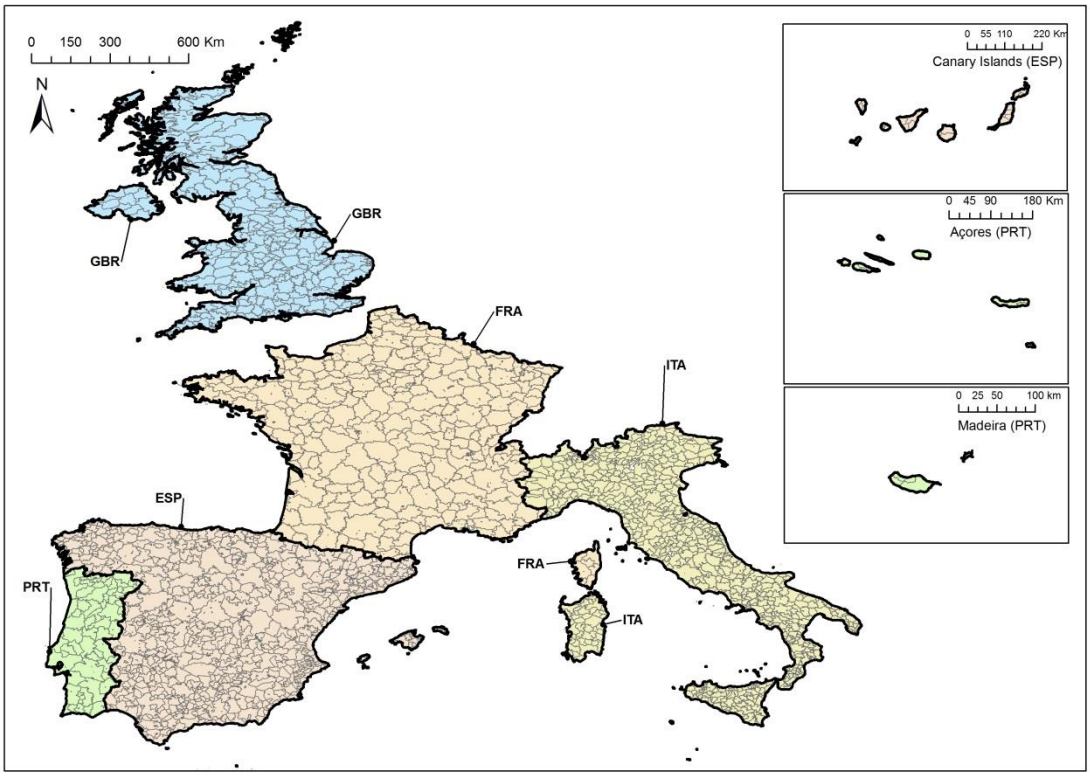
LLS are useful to the study of clusters (OECD 2002, p. 69). Several researchers such as Lazzeretti *et al.* (2008, 2012), and Boix *et al.* (2012, 2013, 2014b) use local labour markets (or systems) (LLS) as the territorial unit for the study of the processes of creative clustering in Europe. These geographical areas have also been used to analyse the spatial location of the creative industries in some European countries in the following studies: Capone (2008) in Italy; De Propris *et al.* (2009) and *Chapain et al.* (2010) in the United Kingdom; Sánchez-Serra (2013, 2014) and Sánchez-Serra and Vervaeke (2013) in France; Melichová and Fáziková (2014) in the Slovak Republic.

Table 3.4. Characteristics of the LLS methodologies used in a sample of European countries

Country	Number of LLS	Census year of reference	Territorial units aggregated	Average number of territorial units by LLS	Average population size of the LLS(census population 2001)	Average area size in sq. Km of the LLS (census population 2001)	Compatibility with higher territorial level (NUTS 2 and 3)
France	304	2006	Communes	120.29	192,502	1,788.67	No
Italy	686	2001	Comuni	11.81	83,084	439.25	No
Portugal	83	2001	Concelhos	51.12	124,772	1,110.79	No
Spain	806	2001	Municipios	10.16	50,679	625.9	No
United Kingdom	243	2001	Lower Layer Super Output Areas (LSOA) in England and Wales, Data Zones (DZ) in Scotland, and Super Output Areas (SOA) in Northern Ireland	171.91	242,147	1,001.28	No

Source: Own calculations based on data from National Statistical Offices.

Figure 3.1. LLS by country



Note: LLS in France refer to the census year 2006 while in the rest of the countries they refer to the year 2001.
Source: Istat (2006), Boix and Galletto (2006), INSEE (2010), ONS (2007, 2011); Galletto (forthcoming).

One of the main constraints of LLS is related to the timeliness of the daily commuting data which are required to their identification. Indeed, information concerning origin-destination matrix between municipalities of residence and work can be derived from census surveys which are normally conducted every ten years. Thus in a dynamic context boundaries identified using census data might not reflect the new reality. Additionally, the use of different methodologies for the identification of LLS and the heterogeneity of the municipalities across Europe might derive in problems regarding the comparability of these territories across countries.

3.2.3. Data

Employment data (*i.e.* persons employed) have been the most frequently used information to measure specialisation and concentration of industries in a particular region (Santos Cruz and Texeira 2013, p. 6), while spatial externalities are better captured from plant location distribution. Employment levels might be influenced by a mixture of two elements: the plant size and the plant location distribution, while only spatial externalities

arise from the plant location distribution (Lafourcade and Mion 2004, p. 6). Thus, plant data can be considered the most appropriate proxy to capture clusters of firms[12].

International access to micro-data has become a need for researchers and policymakers. The provision of accurate evidence-based research to develop and implement tailored policies has been increasing over the past years. At the same time, rapid advances in computational capabilities have allowed researchers to collect and manipulate large micro-data datasets.

Firm level micro-data have been recently used in the economic literature to explore firm growth dynamics, but its use for clustering analysis is still limited. In the case of official data (coming from public administration registers), some of the main reasons that lead to this situation have been both access restrictions to disaggregated administrative data and methodological differences in the way data is collected by country. Driffield *et al.* (2010, p. 4) confirm this by noting that data provided by official statistics normally present significant confidentiality and data quality constraints. Additionally, some data, for example the census, are not provided regularly, thus limiting the update of the results (normally provided every 10 years).

A recent alternative for researchers has been the use of commercial datasets (*e.g.* ORBIS-Amadeus, Kompass, etc.). Although the coverage and accuracy of commercial databases is still being probably slightly lower than official data, and they usually involve a higher monetary cost of access and higher costs of exploitation, there is no doubt that the availability and quality of the information is good and is improving by leaps and bounds. In particular, detailed information referring to the localisation of firms is one of the best outputs provided by those databases. Thus, commercial firm level datasets represent a valuable alternative source to official data to study the distribution of activities in a geographical area. The ORBIS-2011 database of Bureau van Dijk is a commercial dataset that provides information (structural and financial) for more than 60 million of companies worldwide. In relation to the use of firm level data as a proxy of local units (establishments) data, the magnitude of the bias between the real number of establishments and the establishments provided by the database is related to the presence of multi-plant firms and the geographical scale of the territorial unit of analysis. However, given that

[12] There are, however, arguments in favor of both sources of data, see for example Lazzeretti *et al.* (2008), De Propris *et al.* (2009) and Boix *et al.* (2014).

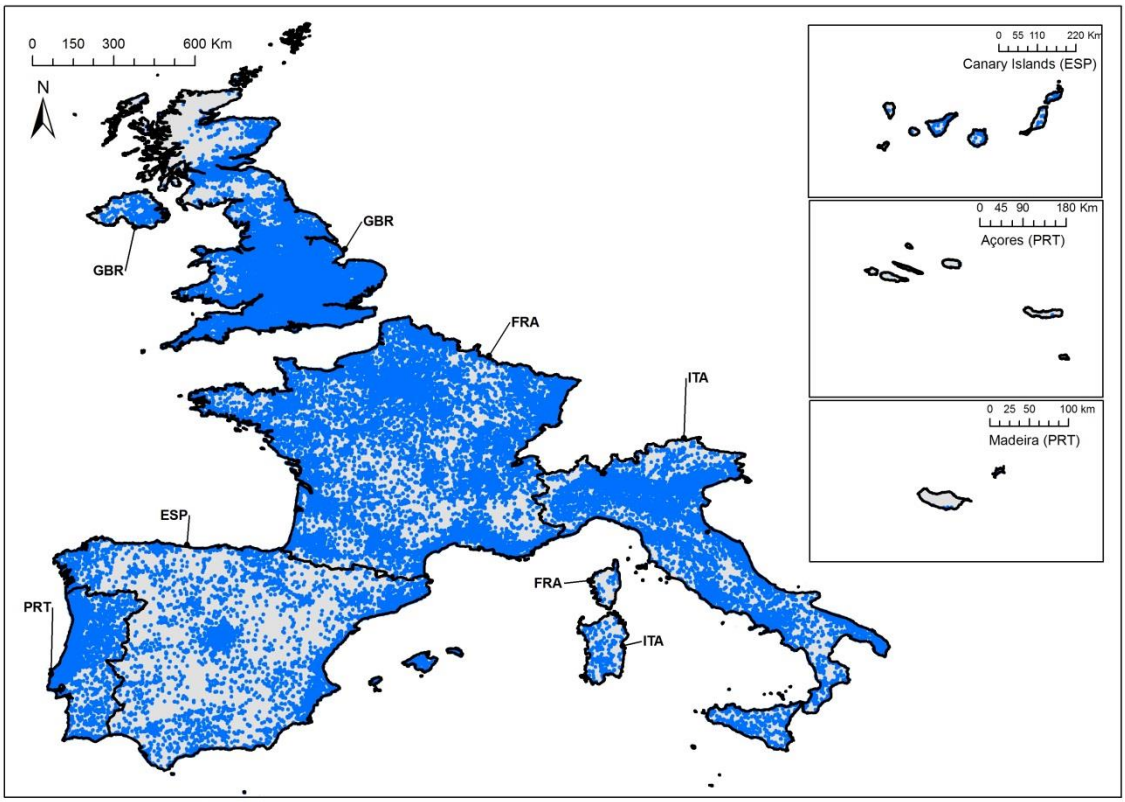
ORBIS relies on the most relevant firms database in each country and takes into account numerous quality checks[13], this bias is assumed to be limited (see *Boix et al.* 2014 for a quantification for the database, the European part of ORBIS). Thus, this database provides a potentially valuable resource for the development of cluster studies across countries since it provides some relevant information on the Statistical Classification of Economic Activities (NACE) each firm belongs to, the address and the size of the firm, among others.

The selection of the 5 European countries under study is motivated on the basis of two main reasons: *i*) the LLS had already been identified for those countries, *ii*) all 5 countries are adjacent and thus form a geographically continuous spatial area. The territorial distribution of creative economic activities in France, Italy, Portugal, Spain and the United Kingdom can be obtained from the distribution provided by the ORBIS-2011 database (reference year 2009)[14]. Based on the postal addresses provided by this database, it has been possible to geocode postal addresses of 4,807,879 firms of all productive sectors in the five European countries under analysis for the year 2009. Geo-localisation is one of the most difficult parts of the research with micro-data, being computationally difficult and time-expensive. This is due to the difficulty to match the imperfect postal addresses of the database with geo-coded administrative layers and subsequent depuration of unassigned registers[15]. Among these, 380,555 creative firms can be identified (based on NACE codes of Table 3.2).

Figure 3.2 presents the spatial distribution of all firms in creative industries in the 5 European countries under analysis (see Annex I the spatial distribution of firms by each of the 12 creative industries).

[13] Data providers are: Informa (Spain), Coface SCRL (France), Honyvem (Italy), Coface Mope (Portugal); Jordans (UK).
[14] 2009 data was the last year with information completely available for the 5 European countries under study at the beginning of the thesis.
[15] Among all economic activities available in ORBIS 2009, 76,679 firms have not been geolocalised due either to missing address information or to missing NACE code. The percentage of missing information varies across countries. In Italy 75,141 firms (97.99% of all the errors) have not been possible to identify, 1,407 (1.84%) in France, 111 (0.15%) in Spain, 17 (0.02%) in the United Kingdom and 3 (0%) in Portugal. The difficulties associated with geo-localisation Is probably one of the main reasons that discourages researchers to work with micro-data.

Figure 3.2. The location of firms in creative industries in 5 European countries, 2009

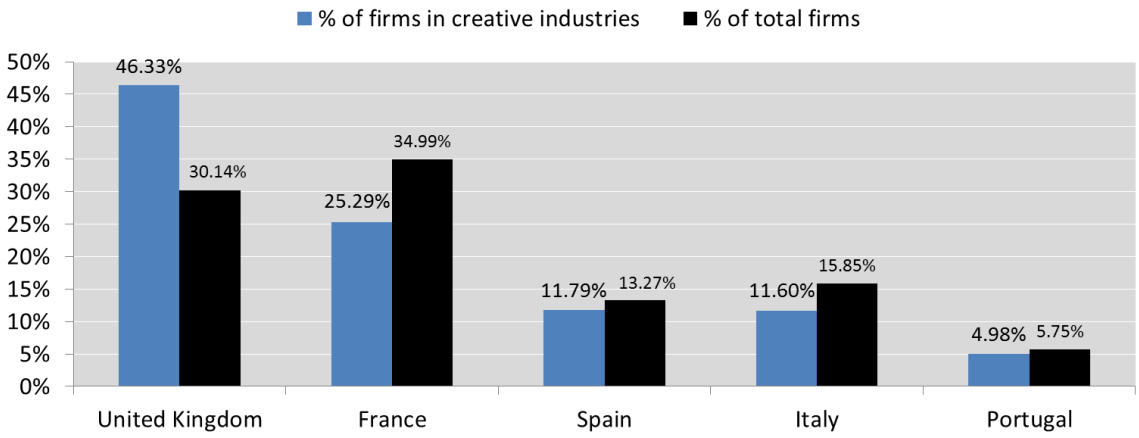


Note: Each point represents one of the 380,555 firms in creative industries.
Source: Own elaboration based on ORBIS-2011 data.

3.2.3.1. General features

Based on the ORBIS-2011 data, Figure 3.3 shows that France is the country that concentrated the largest share of firms across the 5 European countries under analysis, accounting for 35% of all firms in the sample. The United Kingdom accounts for the second largest share of European firms in Europe (30%), followed by Italy, Spain and Portugal (16%, 13%, and 6% respectively). Among the more than 380,000 firms in creative industries geolocalised, 72% were located in the United Kingdom and France. The remaining 28% was located in Spain, Italy and Portugal (11.8%, 11.6% and 5.05% respectively)[16].

Figure 3.3. Share of all firms and firms in creative industries by country based on ORBIS data, 2009



Source: Own calculations based on ORBIS-2011 database.

The relative importance of creative firms differs across European countries. Based on ORBIS-2011 data, around 8% of the economic firms in Europe belong to the creative industries sectors. This share varies largely across European countries (Table 3.5). The United Kingdom is the European country with the largest share of creative industries (12%), followed by Spain and Portugal (7%), and Italy and France (6%). It can be noted that these shares are slightly higher than the shares of creative industries on the employment (workers) detected in other research. This is explained because of the small firm size in creative industries, the list of sectors/activities we used, and the characteristics of the ORBIS database.

[16] These results might be due to the different sources used by ORBIS.

Table 3.5. Number of geolocalised firms by country and share of firms in creative industries over total firms, 2009

	Firms in creative industries	Total firms	Share of firms in creative industries over total firms
France	96,243	1,682,095	5.72%
Italy	44,137	762,247	5.79%
Portugal	18,970	276,425	6.86%
Spain	44,882	637,956	7.04%
United Kingdom	176,323	1,449,156	12.17%
Europe (5 countries)	380,555	4,807,879	7.92%

Source: Own calculations based on ORBIS-2011 database.

Creative firms are mainly concentrated in 4 creative sectors: software, architecture, publishing and printing and performing arts concentrate 70.1% of the creative industries across the 5 European countries under analysis. The software sector is the largest creative sector in Europe (mainly influenced by the United Kingdom effect), accounting for 24% of the total creative firms in the 5 European countries under analysis, followed by the architecture sector which accounts for 21% of the total creative firms, followed by the publishing and printing with 14% and the performing arts with 11%. The remaining 30% of the firms in creative industries are distributed across 8 creative sub-sectors being heritage, broadcasting and crafts the smallest creative sub-sectors in the 5 European countries under analysis accounting for less than 2% of the firms in creative industries.

The most representative clusters of creative industries differ slightly across countries (Table 3.6). In the United Kingdom, only the software creative sector account for almost half of the firms in creative industries in this country (46%). In France and Spain the architecture, publishing and printing and advertising sectors account for a large share of firms in creative industries (67% and 59% respectively). In Italy and Portugal the three largest creative sub-sectors are the architecture, fashion and publishing and printing (these three sub-sectors account for 54% and 68% of the total firms in creative industries in Italy and Portugal respectively).

Table 3.6. Shares of firms by creative industries in Europe, 2009

	France		Portugal		Italy		Spain		United Kingdom		Europe (5 countries)	
	Firms	**Share**	**Firms**	**Share**	**Firms**	**Share**	**Firms**	**Share**	**Firms**	**Share**	**Firms**	**Share**
Fashion	4,719	24.88%	6,574	14.89%	4,022	8.96%	2,327	1.32%	6,501	6.75%	24,143	6.34%
Publishing and printing	2,586	13.63%	6,934	15.71%	8,470	18.87%	15,161	8.60%	20,198	20.99%	53,349	14.02%
Film, video and music	765	4.03%	2,388	5.41%	1,965	4.38%	7,914	4.49%	6,930	7.20%	19,962	5.25%
Crafts	371	1.96%	1,703	3.86%	650	1.45%	1,236	0.70%	2,991	3.11%	6,951	1.83%
Software	850	4.48%	2,076	4.70%	3,829	8.53%	81,292	46.10%	4,294	4.46%	92,341	24.26%
R&D	171	0.90%	2,105	4.77%	861	1.92%	5,805	3.29%	2,028	2.11%	10,970	2.88%
Architecture	5,616	29.60%	10,201	23.11%	12,221	27.23%	21,169	12.01%	31,043	32.25%	80,250	21.09%
Advertising	1,845	9.73%	5,350	12.12%	5,871	13.08%	9,646	5.47%	13,037	13.55%	35,749	9.39%
Photography	503	2.65%	527	1.19%	1,258	2.80%	4,048	2.30%	1,868	1.94%	8,204	2.16%
Broadcasting	103	0.54%	101	0.23%	815	1.82%	3,794	2.15%	329	0.34%	5,142	1.35%
Performing arts	1,398	7.37%	5,786	13.11%	4,696	10.46%	22,426	12.72%	6,684	6.94%	40,990	10.77%
Heritage	43	0.23%	392	0.89%	224	0.50%	1,505	0.85%	340	0.35%	2,504	0.66%
Total creative industries	18,970	100%	44,137	100%	44,882	100%	176,323	100%	96,243	100%	380,555	100%
Total firms	276,425		762,247		637,956		1,449,156		1,682,095		4,807,879	
Share of CI over total firms	7%		6%		7%		12%		6%		8%	

Source: Own calculations based on ORBIS-2011 database

3.3. The location of creative industries in 5 European countries

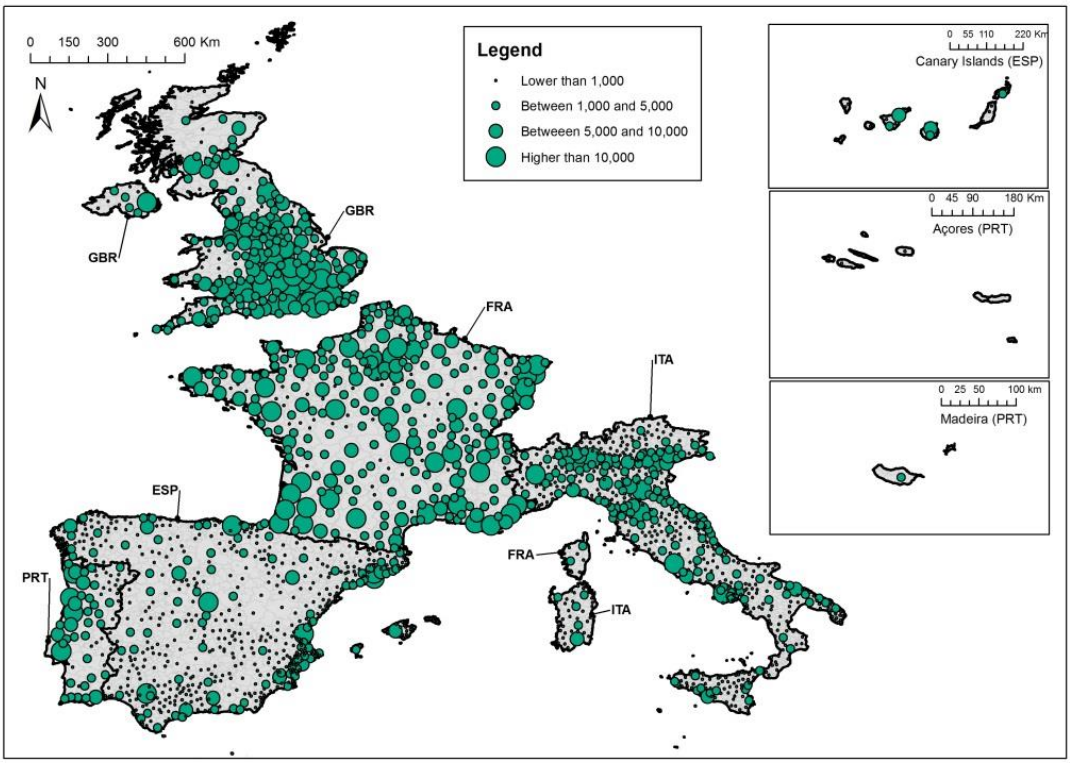
Creative industries are not distributed homogeneously across LLSs in Europe. All 380,555 creative firms geolocalised have been aggregated for each of the 2,122 LLSs in Europe. Figure 3.4 shows the geographic distribution of all firms and the firms in creative industries, highlighting a strong spatial concentration of creative firms in the space.

The rank-size relationship in 2009 is graphically illustrated in Figure 3.5, which depicts the log number of firms in LLSs on the horizontal axis and their log rank in the LLSs on the vertical axis. Figure 3.5 also provides the results of the estimation of the rank-size regression for the 5 European countries under study. The results of the rank-size model convey three main messages about the spatial distribution of creative firms. First, creative firms are disproportionally concentrated in capital cities in all the 5 European countries[17]. Second, the slopes of the double-logarithmic graph show that in general creative firms are more concentrated in few LLS compared to the concentration of all firms. And thirdly, Zipf's law distribution shows a larger number of LLSs with a small number of creative industries in Portugal, Spain and Italy than in the United Kingdom and France.

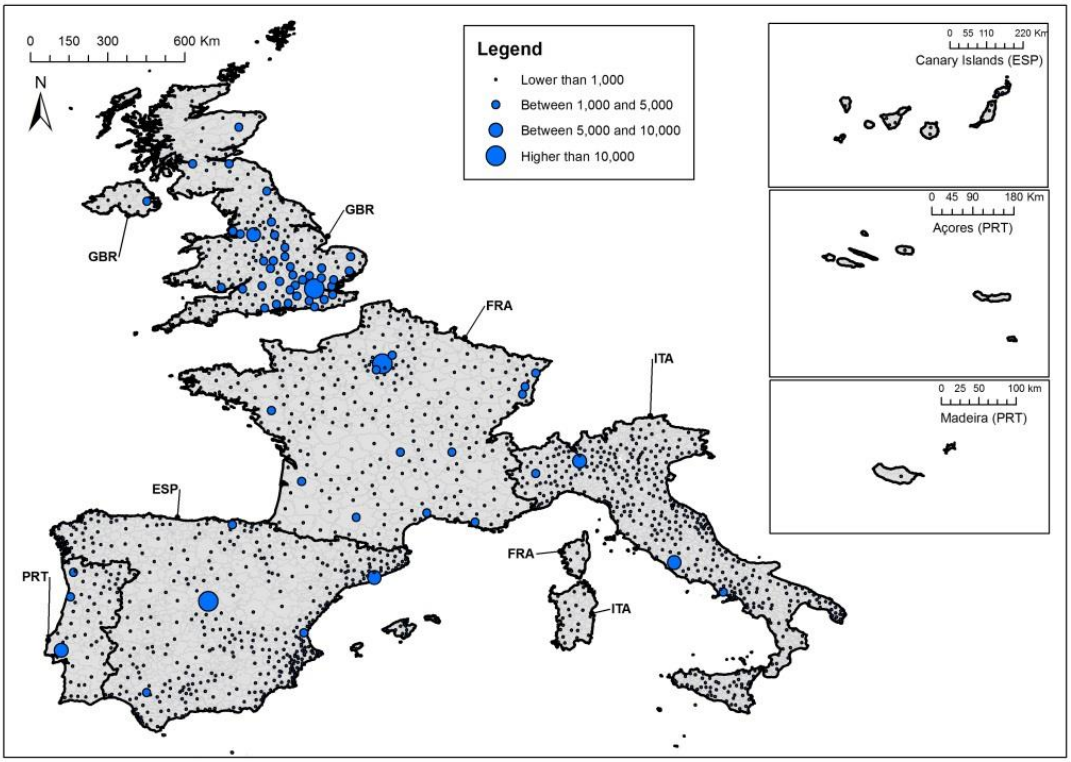
[17] This message was also confirmed by Lorenzen and Vaarst Andersen (2007) who run a similar analysis to explore the geography of the creative class in the 445 European cities

Figure 3.4. Number of all firms and firms in creative industries by LLS in 5 European countries, 2009

All firms



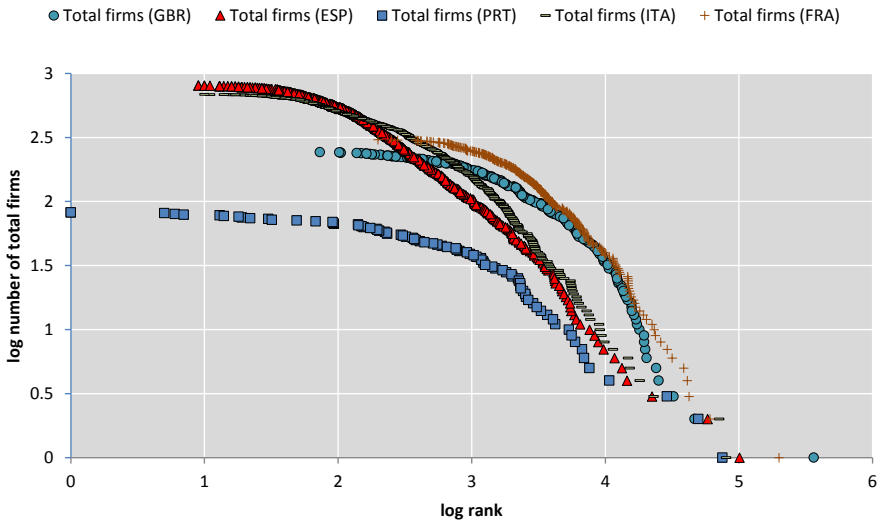
Firms in creative industries



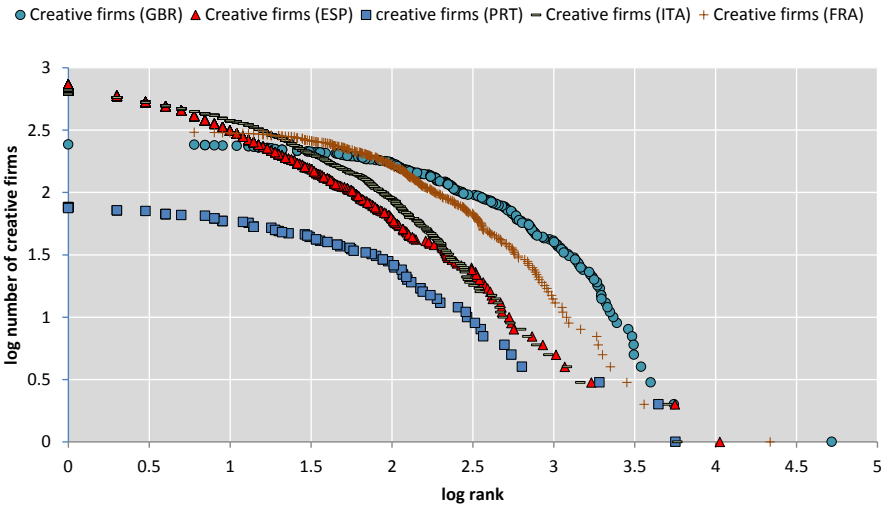
Source: Own calculations based on ORBIS-2011 database.

Figure 3.5. Total firms and firms in creative industries Zip's law distribution and results of OLS estimation of the rank-size parameters by country, 2009

Zip's law distribution (Total firms)



Zip's law distribution (firms in creative industries)



Results of OLSestimation of the rank-size parameters (Total firms)

	Intercept	Slope	R^2	Number of LLS
France	4.9848	-0.8518	0.8996	304
Italy	3.9672	-0.6257	0.8782	686
Portugal	2.4486	-0.3491	0.7242	83
Spain	4.0486	-0.684	0.924	806
United Kingdom	4.087	-0.6381	0.8111	243

Results of OLSestimation of the rank-size parameters (firms in creative industries)

	Intercept	Slope	R^2	Number of LLS
France	3.5973	-0.743	0.889	304
Italy	3.0238	-0.5498	0.8649	686
Portugal	2.1093	-0.4115	0.839	83
Spain	2.977	-0.5733	0.928	806
United Kingdom	3.2389	-0.5552	0.8025	243

Source: Own calculations based on ORBIS-2011 data.

3.3.1. The concentration of the creative industries

Some concentration indicators described in the theoretical section have been used in this section to quantify the degree of concentration of the creative industries across the 5 European countries under analysis.

The first indicator presented is the share of creative industries located in the first decile of the LLS with more firms in creative industries (see Boix *et al.* 2014). In general terms it is observed that this share is larger than the share of total firms concentrated in the same LLS, confirming a higher concentration of the creative industries in the geographical space (Table 3.7). As it is shown in Table 3.7, countries such as France or Spain display a higher concentration (in the first decile) of firms in the creative industries as compared to the total firms. This phenomenon is also observed when considering individual creative industries (*e.g.* fashion, publishing and printing,...). Italy and Portugal present a higher concentration of the creative industries in all sectors except for the Performing arts and Heritage creative sub-sectors. Finally, the United Kingdom presents a higher concentration in the first decile in all the creative industries except in the Architecture and the Heritage creative sectors.

Table 3.7. Share of firms in the first decile of LLS by country, 2009

	France	Italy	Portugal	Spain	United Kingdom
Fashion	60.13%	70.16%	82.28%	79.94%	71.55%
Publishing and printing	60.08%	75.30%	75.21%	83.23%	60.48%
Film, video and music	71.72%	85.13%	81.96%	88.35%	78.72%
Crafts	55.30%	84.50%	84.91%	93.69%	63.83%
Software	64.51%	78.66%	79.88%	88.87%	61.28%
R&D	61.93%	77.39%	77.78%	88.15%	58.14%
Architecture	56.48%	70.07%	76.21%	82.74%	54.68%
Advertising	61.98%	78.47%	79.78%	89.70%	65.98%
Photography	53.64%	79.13%	73.76%	80.68%	62.08%
Broadcasting	74.77%	100.00%	69.90%	82.33%	71.35%
Performing arts	55.33%	63.64%	67.81%	79.41%	68.07%
Heritage	54.12%	61.48%	65.12%	94.20%	47.11%
Total creative industries	59.18%	69.36%	76.05%	81.75%	61.58%
Total firms	49.53%	64.09%	69.45%	72.47%	54.85%

Source: Own calculations based on ORBIS-2011 data.

Secondly, Table 3.8 provides the top-5 LLS in terms of concentration of firms in creative industries in the 5 EU countries (Annex II provides several tables showing the top-5 LLS by creative industry). In general terms it can be observed how firms in creative industries are mainly concentrated in capital cities. Indeed, the top-5 LLS in Portugal concentrate almost 70% of the national creative industries while only Lisbon and Porto account for

more than half of the firms in creative industries of the country (30% and 23% respectively). Spain displays a similar pattern, with 45% of the firms in creative industries concentrated in the top-5 LLS, while Madrid and Barcelona account for 24% and 13% respectively. The top-5 LLS in the United Kingdom concentrate 39%, being London the LLS with the largest national share (30%). The top-5 LLS in France account for 34%, being Paris the LLS with the largest share in the country (23%). Finally, Italian top-5 LLS account for 33%, being Rome the LLS with the largest share in the country with 13% of the firms in creative industries, followed by Milano with 11%. These outcomes are in line with the results obtained by Lazzeretti *et al.* (2008) and Boix *et al.* (2012) using data on employment coming from Census data.

Despite the fact that big cities tend to concentrate the largest share of firms in creative industries, other cities concentrate a disproportional share of creative industries in specific creative sub-sectors (Annex II). For example in Italy, Naples concentrates the largest share of firms in the Fashion industry in Italy; Arezzo concentrates the largest share of firms in Craft, and Milano the largest share of firms in creative industries such as Publishing and Printing, Architecture, Advertising and Photography. Another significant example is the LLS of Porto which concentrates the largest share of firms in the Fashion and the Crafts industries.

Table 3.8. Top-5 LLS by share of firms in creative industries by country, 2009

France	**Share**
Paris	22.61%
Bordeaux	3.76%
Lyon	2.95%
Strasbourg	2.33%
Mulhouse	2.08%
Total top-5	33.73%

Italy	**Share**
Roma	13.13%
Milano	11.43%
Napoli	3.31%
Torino	2.73%
Bologna	2.10%
Total top-5	32.70%

Portugal	**Share**
Lisboa	29.83%
Porto	23.45%
Santa Maria da Feira	10.11%
Coimbra	3.35%
Paredes	2.89%
Total top-5	69.63%

Spain	**Share**
Madrid	23.73%
Barcelona	12.53%
Valencia	3.81%
Bilbao	2.61%
Sevilla	2.30%
Total top-5	44.99%

Source: Own calculations based on ORBIS-2011 data

Table 3.8. Top-5 LLS by share of firms in creative industries by country, 2009 (continued)

United Kingdom	**Share**
London	29.60%
Manchester	3.14%
Guildford & Aldershot	2.25%
Birmingham	1.96%
Bristol	1.77%
Total top-5	38.74%

Source: Own calculations based on ORBIS-2011 data

Thirdly, Table 3.9 to Table 3.12 present the main results of the most well-known concentration indicators as Gini, Herfindhal, Theil and Isard. All these indicators are weighted by the total number of firms in the economy comparing the spatial distribution of the creative industries with respect to the total firms. Results show that according to the Gini index, Crafts and Heritage are the two more concentrated creative industries in Spain. These results are also corroborated by the Theil and Isard indicators. Broadcasting and Film, video and music are the two more concentrated creative industries in France according to Gini and Herfindhal indexes. The other two indexes (Theil and Isard) also show that the Heritage is among the most concentrated creative industries in France. Italy presents a disproportional concentration of the Craft and Broadcasting according to the Theil and Isard indexes. Additionally, Software and Film, video and music are also presenting a high disproportionate concentration in Italy according to the Gini and Herfindhal indexes. Fashion and Crafts present high concentration levels in Portugal according to the Gini and Isard indexes. According to the Herfindhal and Theil indexes, Heritage and Film, video and music are also highly in Portugal. According to the Gini, Theil and Isard indicators, Fashion and Film, video and music are the most concentrated creative industries in the United Kingdom. The Herfindhal index also presents the Performing arts as one of the creative sectors with a higher concentration degree in the United Kingdom.

Table 3.9. Gini results on the concentration of firms in creative industries by country, 2009

GINI	France	Italy	Portugal	Spain	United Kingdom
Fashion	0.707	0.811	0.880	0.873	0.810
Publishing and printing	0.702	0.846	0.836	0.891	0.740
Film, video and music	0.800	0.915	0.875	0.934	0.853
Crafts	0.683	0.910	0.903	0.960	0.760
Software	0.753	0.876	0.872	0.929	0.747
R&D	0.750	0.866	0.862	0.931	0.719
Architecture	0.683	0.806	0.835	0.882	0.689
Advertising	0.731	0.864	0.864	0.932	0.788
Photography	0.680	0.891	0.839	0.891	0.752
Broadcasting	0.870	0.954	0.837	0.905	0.807
Performing arts	0.671	0.767	0.791	0.865	0.776
Heritage	0.758	0.808	0.836	0.943	0.608
Total creative industries	0.698	0.797	0.837	0.871	0.742

Source: Own calculations based on ORBIS-2011 data.

Table 3.10. Herfindhal results on the concentration of firms in creative industries by countries, 2009

HERFINDHAL	France	Italy	Portugal	Spain	United Kingdom
Fashion	0.083	0.014	0.195	0.033	0.124
Publishing and printing	0.069	0.053	0.172	0.094	0.093
Film, video and music	0.217	0.189	0.311	0.143	0.302
Crafts	0.036	0.057	0.242	0.092	0.101
Software	0.064	0.083	0.205	0.131	0.073
R&D	0.042	0.039	0.156	0.073	0.050
Architecture	0.033	0.029	0.185	0.060	0.055
Advertising	0.072	0.072	0.238	0.145	0.128
Photography	0.040	0.063	0.151	0.059	0.115
Broadcasting	0.114	0.061	0.130	0.070	0.166
Performing arts	0.044	0.026	0.146	0.059	0.174
Heritage	0.016	0.014	0.115	0.055	0.047
Total creative industries	0.058	0.036	0.159	0.078	0.094

Source: Own calculations based on ORBIS-2011 data.

Table 3.11. Theil results on the concentration of firms in creative industries by country, 2009

THEIL	France	Italy	Portugal	Spain	United Kingdom
Fashion	0.149	0.597	0.363	0.811	0.277
Publishing and printing	0.087	0.129	0.036	0.136	0.041
Film, video and music	0.418	0.499	0.211	0.352	0.261
Crafts	0.098	1.349	0.356	1.293	0.212
Software	0.149	0.310	0.105	0.254	0.041
R&D	0.155	0.283	0.214	0.392	0.118
Architecture	0.038	0.081	0.047	0.095	0.039
Advertising	0.110	0.175	0.100	0.256	0.078
Photography	0.104	0.465	0.092	0.264	0.064
Broadcasting	0.645	1.196	0.350	0.389	0.141
Performing arts	0.052	0.124	0.051	0.122	0.093
Heritage	0.562	1.009	0.595	0.849	0.218
Total creative industries	0.062	0.046	0.024	0.075	0.023

Source: Own calculations based on ORBIS-2011 data.

Table 3.12. Isard results on the concentration of firms in creative industries by country, 2009

ISARD	France	Italy	Portugal	Spain	United Kingdom
Fashion	0.209	0.397	0.386	0.409	0.270
Publishing and printing	0.154	0.185	0.100	0.199	0.110
Film, video and music	0.360	0.388	0.286	0.334	0.319
Crafts	0.172	0.520	0.355	0.498	0.216
Software	0.213	0.313	0.175	0.267	0.096
R&D	0.198	0.268	0.217	0.309	0.161
Architecture	0.109	0.143	0.129	0.152	0.095
Advertising	0.176	0.220	0.183	0.270	0.152
Photography	0.158	0.340	0.123	0.237	0.135
Broadcasting	0.445	0.559	0.279	0.297	0.220
Performing arts	0.119	0.181	0.121	0.157	0.185
Heritage	0.382	0.507	0.304	0.417	0.220
Total creative industries	0.135	0.110	0.088	0.153	0.087

Source: Own calculations based on ORBIS-2011 data.

The third set of indicators looks at the territorial creative specialisation of LLS. The location quotient shows that the spatial distribution of specialised LLS is different across countries. Indeed, Table 3.13 shows that 17% LLS (351 out of 2,122) are specialised in creative firms (LQ above 1). Figure 3.6 shows that specialised LLS in Europe are more dispersed in Spain and Italy, and they are more polarized around large agglomerations and

urban corridors in Portugal, France and the United Kingdom. This trend is also observed in all the other creative sub-sectors (see Annex III).

Specialisation results also show that a small share of specialised LLS concentrate a large share of creative firms in the 5 European countries under analysis (Table 3.14). Indeed, 55% of the total creative firms (209,494 creative firms) were concentrated in only 17% of the LLS (351 LLS). Based on these results, Spain displays even a larger concentration in almost all the creative sectors except in Performing arts and Broadcasting. This larger concentration is also observed in Portugal, where a larger share of firms in creative industries such as Fashion, Crafts, Architecture, Advertising and Heritage are concentrated in a smaller share of LLS than the average of the 5 European countries. This trend is also observed in Italy for the Craft, Photography and Broadcasting sectors, and in the United Kingdom for the Film, video and music and the Performing arts sector.

Table 3.13. Share of specialised LLSs by country, 2009

Share of LLS	France	Italy	Portugal	Spain	United Kingdom	EU (5 countries)
Fashion	25.00%	33.67%	16.87%	28.54%	25.10%	28.84%
Publishing and printing	16.78%	24.49%	22.89%	18.11%	29.22%	21.44%
Film, video and music	8.55%	13.12%	22.89%	14.89%	9.05%	13.05%
Crafts	37.50%	14.87%	10.84%	8.81%	37.45%	18.24%
Software	20.72%	23.32%	22.89%	14.14%	21.40%	19.23%
R&D	30.26%	24.78%	24.10%	15.88%	41.56%	24.08%
Architecture	18.75%	32.07%	19.28%	19.98%	43.62%	26.39%
Advertising	16.78%	18.37%	12.05%	10.67%	16.87%	14.80%
Photography	38.16%	19.83%	28.92%	23.20%	30.04%	25.26%
Broadcasting	22.04%	7.14%	28.92%	18.98%	20.99%	16.21%
Performing arts	31.58%	43.59%	39.76%	29.78%	19.34%	33.69%
Heritage	33.55%	26.24%	22.89%	9.80%	57.20%	24.46%
Total creative industries	11.18%	26.53%	15.66%	10.92%	13.99%	16.54%

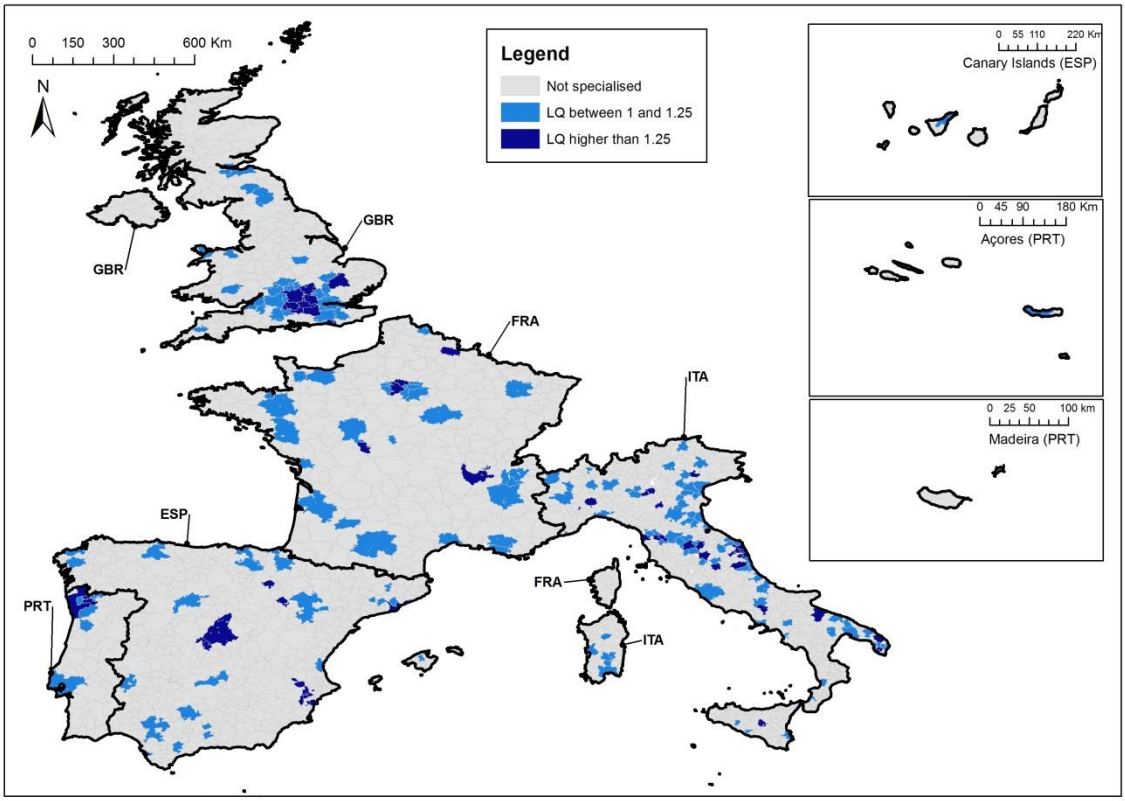
Source: Own calculations based on ORBIS-2011 data.

Table 3.14. Share and total number of firms in creative industries in specialised LLS by country, 2009

Share of firms	France	Italy	Portugal	Spain	United Kingdom	EU (5 countries)
Fashion	47.70%	61.52%	63.78%	64.07%	45.64%	57.13%
Publishing and printing	49.14%	61.94%	60.05%	64.96%	52.79%	54.88%
Film, video and music	64.79%	77.81%	70.33%	72.57%	72.37%	70.33%
Crafts	42.46%	73.75%	72.51%	73.54%	47.17%	55.47%
Software	52.75%	68.69%	64.12%	70.70%	53.78%	54.86%
R&D	47.68%	64.66%	52.05%	65.04%	50.18%	53.69%
Architecture	44.72%	57.23%	62.25%	60.40%	42.80%	49.42%
Advertising	51.56%	66.17%	66.50%	71.40%	55.61%	58.87%
Photography	41.33%	62.43%	59.24%	57.31%	54.37%	52.67%
Broadcasting	57.45%	63.37%	46.60%	56.44%	60.38%	59.35%
Performing arts	41.41%	54.63%	55.36%	55.11%	60.57%	55.81%
Heritage	24.41%	46.94%	51.16%	63.39%	39.40%	40.89%
Total creative industries	48.25%	61.98%	62.57%	64.02%	53.93%	55.05%

Source: Own calculations based on ORBIS-2011 data.

Figure 3.6. Specialised LLS in creative industries in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

3.3.2. Creative industries co-location

Annex III provides the spatial distribution of specialised LLS detailed for the 12 creative industries under analysis. The results suggest that some creative industries could be co-locating. In order to prove this, a correlation analysis has been conducted (Table 3.15), similarly to the one carried out by De Propris *et al.* (2009) for the UK[18].

Indeed by analyzing the patterns of co-location of creative sub-sectors at LLS level it is possible to identify the existence of simultaneous specialisation between creative industry. Thus, on the one hand, a positive and significant correlation coefficient between two creative sectors would indicate a high co-location of both sectors in the same LLSs. On the other hand, a negative and significant correlation coefficient between two creative sub-sectors would indicate a strong agglomeration of one of them and a week agglomeration of the other.

The correlation analysis run for the 5 European countries together shows strong levels of co-location between several creative sub-sectors. At this geographic level, sectors like Architecture, Film, video and music, Software and R&D tend to co-locate in the same geographical areas. Additionally, it is observed that firms from the Fashion creative sector tend to locate in LLS that are not specialised in Architecture. Patterns also differ across countries:

i) In the United Kingdom, similarly to the results obtained by De Propris *et al.* (2009, p. 41) strong levels of co-location have been found between Film, video and music, Software, R&D, Broadcasting and Performing arts. On the other hand, firms of the Heritage sector tend to locate in LLS that are not specialised in Software and Advertising.

ii) In Portugal, there is a strong co-location between Architecture, Software, Advertising and Broadcasting, also between Fashion and Crafts, and between Performing arts and Film, video and music.

iii) In Italy, there is a high correlation between LLS specialised in Architecture, Film, video and music and R&D and a negative co-location between Fashion and Architecture.

[18] De Propris *et al.* (2009) showed evidence of the co-location of creative industries by means of a correlation analysis. According to their results co-clustering was observed between advertising, design fashion and software, computer games and electronic publishing as well as between music and performing arts, publishing, video, film and photography and radio and television.

iv) In France two types of creative sub-sectors co-location are observed. On the one hand Advertising firms are highly co-located with other firms from Publishing and printing, Film, video and music, Software, R&D, Architecture, Broadcasting and Performing arts. On the other hand, Fashion is highly correlated with Publishing and printing and Film video and music.

v) Finally, in Spain a high correlation is found between Software, Fashion, Publishing and printing, Film, video and music, R&D, Architecture, Advertising and Performing arts. As well, it is observed that the Fashion sector is highly correlated with Software but negatively correlated with the Architecture sector.

Table 3.15. Partial correlation between LQ for creative sub-sectors by country, 2009

Europe (5 countries)	LQ Fashion	LQ Publishing and printing	LQ Film, video and music	LQ Crafts	LQ Software	LQ R&D	LQ Architecture	LQ Advertising	LQ Photography	LQ Broadcasting	LQ Performing arts	LQ Heritage
LQ Fashion	1											
LQ Publishing and printing	-0.0129	1										
LQ Film, video and music	-0.0097	**0.0450**	1									
LQ Crafts	0.003	-0.005	-0.0211	1								
LQ Software	0.0089	**0.0482**	**0.0981**	0.0281	1							
LQ R&D	-0.0086	**0.0434**	**0.0539**	-0.017	**0.0621**	1						
LQ Architecture	**-0.089**	**0.1108**	**0.1122**	-0.0091	**0.0778**	**0.1330**	1					
LQ Advertising	-0.0312	**0.0472**	**0.1397**	-0.0219	**0.0991**	0.0237	**0.1819**	1				
LQ Photography	-0.0214	**0.0486**	-0.008	0.009	0.0324	0.0012	0.0188	-0.0112	1			
LQ Broadcasting	-0.0261	-0.0042	-0.0095	**0.0474**	-0.0018	-0.0082	0.0248	-0.0076	0.033	1		
LQ Performing arts	-0.022	-0.0164	0.0349	0.0249	**0.0713**	-0.0101	0.0313	-0.0162	-0.0322	**0.0729**	1	
LQ Heritage	-0.0207	0.032	-0.0145	-0.0146	-0.0293	0.0044	0.0371	0.0272	-0.0148	-0.0057	-0.0237	1

Note: Cells contain Pairwise correlations. Text formatting indicates p-value: underlined p<0.1, **bold p<0.05**, **bold underlined p<0.01**. *The strength of these co-location patterns is indicated by the value of the correlation coefficient.*

Source: Own calculations based on ORBIS-2011 data.

Table 3.15. Partial correlation between LQ for creative sub-sectors by country, 2009 (continued)

FRANCE	LQ Fashion	LQ Publishing and printing	LQ Film, video and music	LQ Crafts	LQ Software	LQ R&D	LQ Architecture	LQ Advertising	LQ Photography	LQ Broadcasting	LQ Performing arts	LQ Heritage
LQ Fashion	1											
LQ Publishing and printing	**0.1918**	1										
LQ Film, video and music	**0.2140**	**0.5261**	1									
LQ Crafts	0.0859	**0.1353**	0.0735	1								
LQ Software	0.0437	**0.3141**	**0.2716**	0.0322	1							
LQ R&D	-0.0462	**0.1210**	0.0561	0.073	**0.2322**	1						
LQ Architecture	-0.0206	**0.3677**	**0.2973**	0.0682	**0.3992**	**0.2815**	1					
LQ Advertising	0.0461	**0.4969**	**0.4843**	-0.0151	**0.4561**	**0.2054**	**0.4693**	1				
LQ Photography	**0.1194**	**0.1549**	**0.1522**	**0.1972**	0.0869	-0.1092	0.0753	0.0289	1			
LQ Broadcasting	-0.0159	**0.3209**	**0.3058**	0.0166	0.032	-0.0202	**0.1364**	**0.2196**	-0.0015	1		
LQ Performing arts	-0.0314	**0.1278**	**0.1820**	-0.0351	**0.1299**	**0.1159**	**0.1170**	**0.1670**	0.0343	0.0478	1	
LQ Heritage	0.014	-0.0465	-0.0057	**0.1925**	-0.0178	0.0344	-0.043	-0.0762	**0.1435**	-0.0201	0.0424	1

Note: Cells contain Pairwise correlations. Text formatting indicates p-value: underlined p<0.1, **bold p<0.05**, **bold underlined p<0.01**. *The strength of these co-location patterns is indicated by the value of the correlation coefficient.*

Source: Own calculations based on ORBIS-2011 data.

Table 3.15. Partial correlation between LQ for creative sub-sectors by country, 2009 (continued)

ITALY	LQ Fashion	LQ Publishing and printing	LQ Film, video and music	LQ Crafts	LQ Software	LQ R&D	LQ Architecture	LQ Advertising	LQ Photography	LQ Broadcasting	LQ Performing arts	LQ Heritage
LQ Fashion	1											
LQ Publishing and printing	-0.0153	1										
LQ Film, video and music	-0.0104	0.0367	1									
LQ Crafts	0.0028	-0.0276	-0.0318	1								
LQ Software	-0.027	-0.0036	0.0748	-0.0096	1							
LQ R&D	-0.0569	**0.0883**	0.0026	-0.0265	0.0206	1						
LQ Architecture	**-0.0787**	0.0694	**0.1133**	-0.058	-0.016	**0.1254**	1					
LQ Advertising	-0.0133	-0.0391	0.036	-0.025	0.0195	0.0516	**0.0971**	1				
LQ Photography	-0.0067	0.0563	-0.0379	0.0124	0.0259	-0.0061	-0.035	-0.0378	1			
LQ Broadcasting	-0.0289	-0.0298	-0.0282	0.0535	-0.0035	-0.0212	0.0129	-0.0222	0.0223	1		
LQ Performing arts	-0.0584	-0.0329	0.0459	0.0427	0.0326	0.0124	0.0115	**-0.0833**	-0.057	**0.0949**	1	
LQ Heritage	-0.0477	-0.0209	-0.0472	-0.0294	-0.0433	-0.0341	0.0025	**0.0818**	-0.0216	-0.0059	-0.068	1

Note: Cells contain Pairwise correlations. Text formatting indicates p-value: underlined p<0.1, **bold p<0.05**, **bold underlined p<0.01**. *The strength of these co-location patterns is indicated by the value of the correlation coefficient.*

Source: Own calculations based on ORBIS-2011 data.

Table 3.15. Partial correlation between LQ for creative sub-sectors by country, 2009 (continued)

PORTUGAL	LQ Fashion	LQ Publishing and printing	LQ Film, video and music	LQ Crafts	LQ Software	LQ R&D	LQ Architecture	LQ Advertising	LQ Photography	LQ Broadcasting	LQ Performing arts	LQ Heritage
LQ Fashion	1											
LQ Publishing and printing	-0.0622	1										
LQ Film, video and music	-0.1372	-0.071	1									
LQ Crafts	**0.2277**	-0.0176	-0.0358	1								
LQ Software	-0.0953	-0.0867	-0.1753	0.1895	1							
LQ R&D	-0.0088	-0.0715	-0.0941	0.0301	0.1012	1						
LQ Architecture	-0.1174	0.099	0.0005	-0.0826	**0.2944**	0.0843	1					
LQ Advertising	-0.1056	-0.1056	0.066	0.1697	**0.5678**	0.202	**0.4142**	1				
LQ Photography	0.0424	-0.111	-0.0696	0.2156	0.2151	**0.2230**	0.0519	0.1822	1			
LQ Broadcasting	-0.07	-0.0485	-0.0548	-0.0552	**0.2413**	0.0295	**0.3204**	**0.3902**	-0.0174	1		
LQ Performing arts	-0.1875	-0.1206	**0.3459**	-0.0182	0.0569	-0.0409	0.0018	0.125	-0.0815	0.1501	1	
LQ Heritage	0.1285	0.1568	-0.0917	0.0006	-0.092	-0.0445	0.2062	-0.1321	-0.0779	-0.0462	-0.0933	1

Note: Cells contain Pairwise correlations. Text formatting indicates p-value: underlined p<0.1, **bold p<0.05**, **bold underlined p<0.01**. *The strength of these co-location patterns is indicated by the value of the correlation coefficient.*

Source: Own calculations based on ORBIS-2011 data.

Table 3.15. Partial correlation between LQ for creative sub-sectors by country, 2009 (continued)

SPAIN	LQ Fashion	LQ Publishing and printing	LQ Film, video and music	LQ Crafts	LQ Software	LQ R&D	LQ Architecture	LQ Advertising	LQ Photography	LQ Broadcasting	LQ Performing arts	LQ Heritage
LQ Fashion	1											
LQ Publishing and printing	0.0099	1										
LQ Film, video and music	-0.0092	0.0377	1									
LQ Crafts	-0.0029	0.0027	-0.0218	1								
LQ Software	**0.0925**	**0.1014**	**0.1656**	**0.0863**	1							
LQ R&D	0.0124	0.0171	**0.0701**	-0.0183	**0.0990**	1						
LQ Architecture	**-0.0909**	**0.1158**	**0.1240**	0.0159	**0.1168**	**0.1303**	1					
LQ Advertising	-0.0462	0.0644	**0.1790**	-0.0258	**0.1088**	-0.0107	**0.2061**	1				
LQ Photography	-0.0346	0.0568	0.0037	0.0027	0.0231	0.001	0.0782	-0.0125	1			
LQ Broadcasting	-0.0475	0.0678	-0.0147	**0.0782**	-0.0355	0.0009	0.0256	-0.0216	**0.0912**	1		
LQ Performing arts	0.0071	-0.0151	-0.0151	0.0145	**0.1269**	-0.0334	0.0286	-0.0033	-0.0103	0.0124	1	
LQ Heritage	-0.0098	-0.0044	0.0562	-0.0177	0.0044	0.0482	0.0392	-0.0217	-0.0019	-0.0331	0.0261	1

Note: Cells contain Pairwise correlations. Text formatting indicates p-value: underlined p<0.1, **bold p<0.05**, **bold underlined p<0.01**. *The strength of these co-location patterns is indicated by the value of the correlation coefficient.*

Source: Own calculations based on ORBIS-2011 data.

Table 3.15. Partial correlation between LQ for creative sub-sectors by country, 2009 (continued)

UNITED KINGDOM	LQ Fashion	LQ Publishing and printing	LQ Film, video and music	LQ Crafts	LQ Software	LQ R&D	LQ Architecture	LQ Advertising	LQ Photography	LQ Broadcasting	LQ Performing arts	LQ Heritage
LQ Fashion	1											
LQ Publishing and printing	-0.0167	1										
LQ Film, video and music	0.1071	0.1081	1									
LQ Crafts	**0.1633**	0.0981	0.113	1								
LQ Software	-0.0863	**0.3437**	**0.1702**	-0.069	1							
LQ R&D	0.0788	0.07	**0.2323**	-0.0003	**0.1436**	1						
LQ Architecture	-0.0769	**-0.1268**	0.0067	0.0193	**0.1570**	0.0739	1					
LQ Advertising	**0.1622**	**0.3103**	**0.1630**	-0.1004	**0.4747**	-0.0326	-0.0845	1				
LQ Photography	-0.0302	0.0516	0.0062	-0.0402	**0.2633**	0.1184	-0.0416	**0.2201**	1			
LQ Broadcasting	0.0474	0.0142	**0.1891**	-0.0166	0.0444	0.1207	0.0803	-0.0826	**0.1813**	1		
LQ Performing arts	0.0303	**0.2426**	**0.3919**	0.0521	0.0783	**0.1573**	**-0.1291**	0.0959	**0.1574**	**0.2445**	1	
LQ Heritage	-0.0088	-0.0592	0.0414	**0.187**	**-0.3184**	**0.2632**	**-0.1380**	**-0.2356**	0.0454	**0.1857**	**0.2976**	1

Note: Cells contain Pairwise correlations. Text formatting indicates p-value: underlined p<0.1, **bold p<0.05**, **bold underlined p<0.01**. *The strength of these co-location patterns is indicated by the value of the correlation coefficient.*

Source: Own calculations based on ORBIS-2011 data.

According to the Nearest Neighour Index (NNI) creative industries are highly clustered in the five European countries under study (Table 3.16). In aggregate terms, the NNI in these 5 European countries scored 0.252 when all firms in creative industries were taken into consideration. This level is below 1, indicating that the point pattern of all creative firms is more clustered than random distribution. This index also ranges from 0.610 in the Heritage creative sector to 0.227 in the Software sector in the 5 European countries under study.

When looking at this index by country, it can be observed that creative firms are highly concentrated in Spain (NNI=0.204), and that Spain has one of the lowest indexes across countries for all the creative sub-sectors (Table 3.16). Additionally it is observed that Portugal also displays a high level of concentration in the Fashion and Architecture creative sectors (NNI of 0.347 and 0.343 respectively) while the Heritage sector displays no concentration. Italy accounts for a high share of concentration in the Architecture and advertising (NNI of 0.87 and 0.369 respectively) creative sectors. The creative sectors of Architecture and Film, video and music are highly concentrated in France (both with a NNI below 0.35). And finally, the United Kingdom presents a higher concentration of the following creative sub-sectors: Publishing and printing, Software, Film, video and music, Performing arts, Publishing and printing, Advertising, and Broadcasting, (all with a NNI below 0.4).

Table 3.16. Nearest Neighbour Index of creative industries by creative sub-sector and country, 2009

Nearest Neighbour Index	France	Italy	Portugal	Spain	United Kingdom	EU (5 countries)
Fashion	0.421	0.409	0.347	0.325	0.449	0.375
Publishing and printing	0.351	0.393	0.472	0.285	0.341	0.338
Film, video and music	0.307	0.393	0.514	0.309	0.338	0.317
Crafts	0.475	0.419	0.454	0.372	0.567	0.442
Software	0.412	0.420	0.670	0.315	0.308	0.227
R&D	0.476	0.439	0.677	0.397	0.454	0.402
Architecture	0.349	0.387	0.343	0.260	0.395	0.335
Advertising	0.369	0.369	0.422	0.271	0.364	0.341
Photography	0.519	0.643	0.524	0.466	0.473	0.463
Broadcasting	0.487	0.860	0.647	0.451	0.383	0.342
Performing arts	0.470	0.471	0.486	0.370	0.338	0.366
Heritage	0.705	0.781	1.751	0.629	0.664	0.610
Total creative industries	0.298	0.308	0.264	0.204	0.290	0.252

Note: The NNI compares the mean distance between neighbor firms with the expected distance in a random nearest neighbor distribution. Single nearest neighbor was used in the analysis. NNI with a score of 1 indicates absolute random distribution of the firms, while a score lower than 1 indicate that firms are more clustered than expected in a random distribution.
Source: Own calculations based on ORBIS-2011 data.

As it is mentioned by Chovanec and Rehák (2012, p. 19), the NNI is not well suited for a comparative analysis of the spatial concentration levels of the creative industries across creative sectors of different size. In order to overcome this limitation, the Ripley's K statistic has been computed.

According to the Riplay's K statistic, the spatial distance at which the maximum concentration of creative industries is reached varies across countries and across creative sub-sectors (Table 3.17). Results show three different patterns when looking at all creative firms. The first one is that creative firms in the United Kingdom seem to be highly spread over a large area, which tends to concentrate in large clusters (60 km of radius). A second trend is found in Spain, France and Portugal, where creative firms also tend to be spread over large areas but smaller than in the United Kingdom (between 25 km and 31 km). Thirdly, Italian creative firms seem to be concentrated in small clusters (radius of 15 km). An analysis by creative sub-sector by country shows that, France presents a higher concentration index in the creative sectors of Craft and Film video and music (below 17 km), while it presents a lower concentration level in R&D and Heritage sectors (above 29 km). Italy presents instead a higher concentration in the sectors of Photography, Broadcasting and Heritage (below 13 km), while it presents a lower concentration level in the Fashion and Publishing and printing creative sectors (above 25 km). The Software and Broadcasting sectors are the most concentrated in Portugal according to this index (below 20 km), while the Fashion sector is the one that shows a lower concentration index in this country (above 52 km). Differently, Spain presents a higher concentration level in the creative sectors of Crafts and Heritage (below 22 km), while a lower concentration level in the Fashion, Publishing and printing and Software creative sectors (above 28 km). Finally, the United Kingdom presents a high concentration in the Fashion and Heritage sectors (below 25 km radius) while the R&D services and Software firms seem to be spread over a larger area, thus presenting the lowest concentration levels in this country (above 65 km).

Table 3.17. Ripley's K statistic across countries and creative sub-sectors, 2009

	France Maximum		Italy Maximum		Portugal Maximum		Spain Maximum		United Kingdom Maximum	
	Km	**L(ts)**	**Km**	**L(ts)**	**Km**	**L(ts)**	**Km**	**L(ts)**	**Km**	**L(ts)**
Fashion	19.807	108.009	32.937	31.780	52.570	51.929	33.151	80.786	24.678	74.056
Publishing and printing	22.283	97.169	25.617	49.467	24.263	38.131	28.415	97.764	60.873	63.085
Film, video and music	17.331	182.521	14.638	111.924	25.274	61.605	26.047	122.012	31.259	125.921
Crafts	17.331	62.518	23.788	61.028	24.263	56.180	14.208	102.560	46.066	63.210
Software	27.235	98.735	18.298	65.378	19.208	44.384	28.415	117.174	65.809	66.381
R&D	29.710	73.441	16.468	40.064	23.252	34.613	23.679	83.760	85.552	46.773
Architecture	27.235	64.412	14.638	33.302	24.263	39.741	23.679	74.088	55.938	43.987
Advertising	24.759	101.611	18.298	61.103	22.241	50.893	26.047	125.351	55.938	77.217
Photography	22.283	69.089	12.809	55.236	23.252	36.510	23.679	70.892	55.938	71.762
Broadcasting	19.807	127.684	12.809	51.367	17.186	29.270	23.679	80.106	31.259	98.399
Performing arts	22.283	74.096	14.638	26.706	25.274	30.920	26.047	68.969	31.259	90.204
Heritage	32.186	27.077	9.149	15.902	20.219	22.269	21.312	64.086	24.678	34.801
Total creative industries	24.759	88.904	14.638	38.093	26.285	34.452	30.783	85.984	59.228	65.711

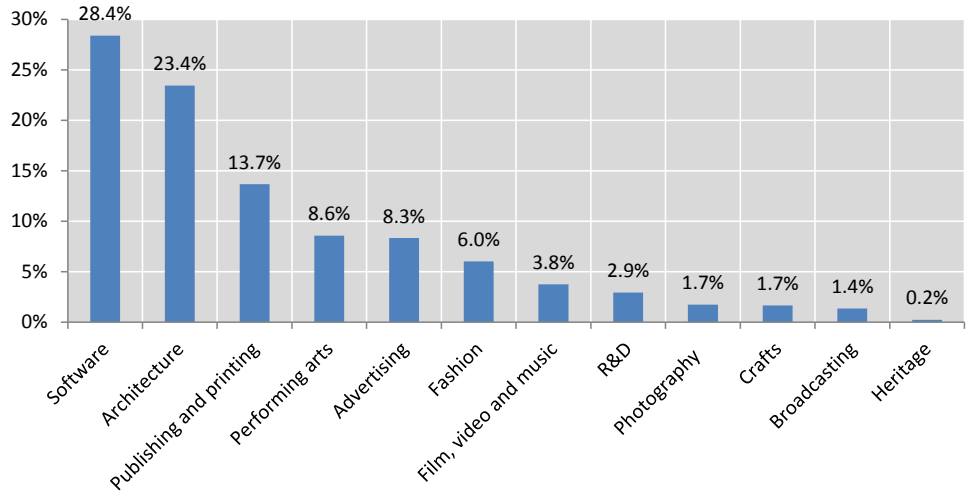
Note 1: The L(ts) is a measure of second-order clustering and shows the intensity of the concentration among the firms. An L(ts) of 0 indicates pure random distribution (also known as Complex Spatial Randomness (CSR)). L(ts) values displayed in the table show the maximum values of this statistic and the distance associated in km. The higher this statistic the more concentrated this sector will be with respect to a random distribution of firms.

Note 2: Riplay´s K results seem to be sensitive to the total dimension of the area. For a better comparison of the results, only national values (and not total EU 5 countries) are displayed in this table.

Source: Own calculations based on ORBIS-2011 data.

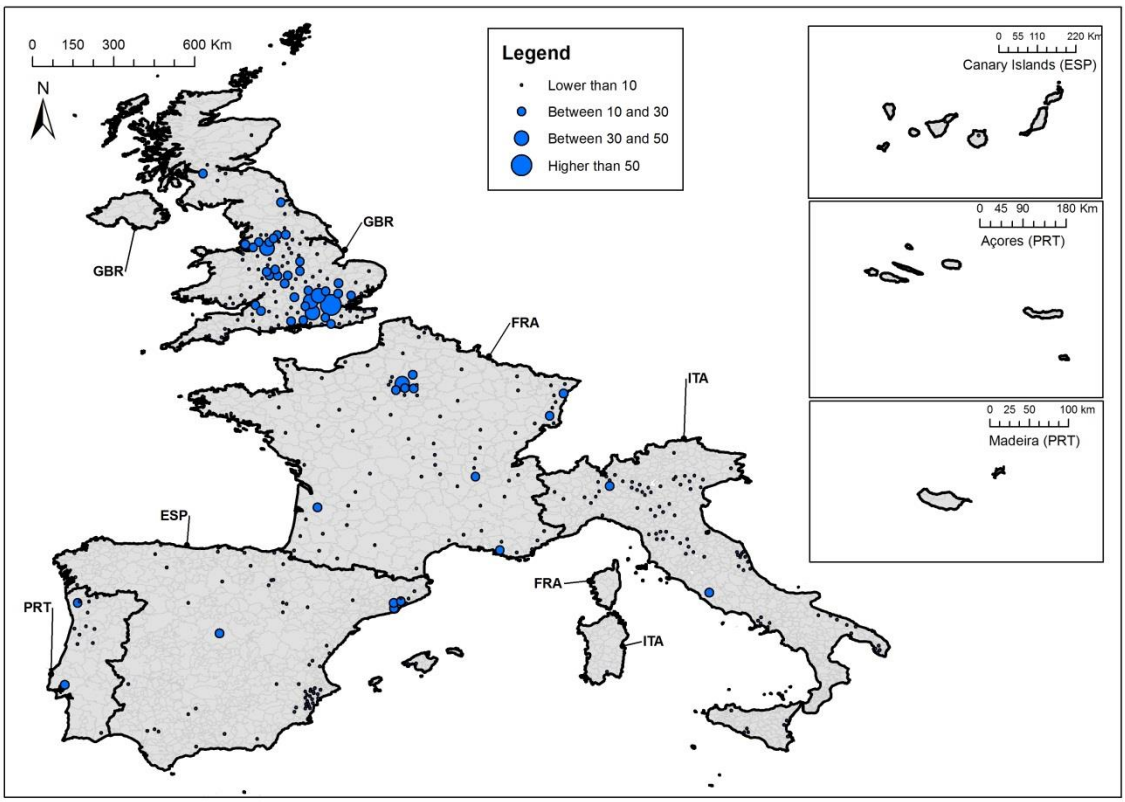
A more detailed picture of the concentration levels of creative firms is obtained by running the Nearest Neighbor Spatial Clustering technique. Based on this method and using the following criteria (likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50), in the year 2009, 1,332 clusters where identified in 5 European countries. However, the number of creative clusters varies across creative sub-sectors and across the space. Software is the sector that concentrates the largest share of creative clusters in the 5 European countries under analysis (28% of the total clusters), followed by Architecture (23%) and Publishing and printing (14%) (see Figure 3.7). At the other extreme of the figure, Photography, Crafts, Broadcasting and Heritage account for a lower share of creative clusters (below 2%). On the other side, creative clusters seem to be more concentrated in the space in Portugal, Spain and Italy (Figure 3.8; see also Annex IV), thus corroborating the results presented by Boix *et al.* (2014). Indeed, Portugal seems to present the majority of its clusters in the north-west side of the country near Coimbra and Porto, but also near Lisbon and in the south of the country near Faro. Madrid and its surrounding areas, in Spain, are the geographic areas where a larger share of creative clusters is found, but also the Mediterranean cost, near Barcelona, Valencia and Alicante present large concentrations of creative clusters. In Italy, creative clusters are mainly concentrated in and nearby Milan, Bologna, Florence, Rome and Naples. France and the United Kingdom present a larger concentration of creative clusters in large cities such as Paris, London, Liverpool and Birmingham. However, a significant number of clusters are also observed in other parts of the territory (Figure 3.8 and Annex IV).

Figure 3.7. Share of creative clusters in Europe (5 countries) by creative sub-sector, 2009



Source: Own calculations based on ORBIS-2011 data.

Figure 3.8. Number of creative clusters by LLS, 2009



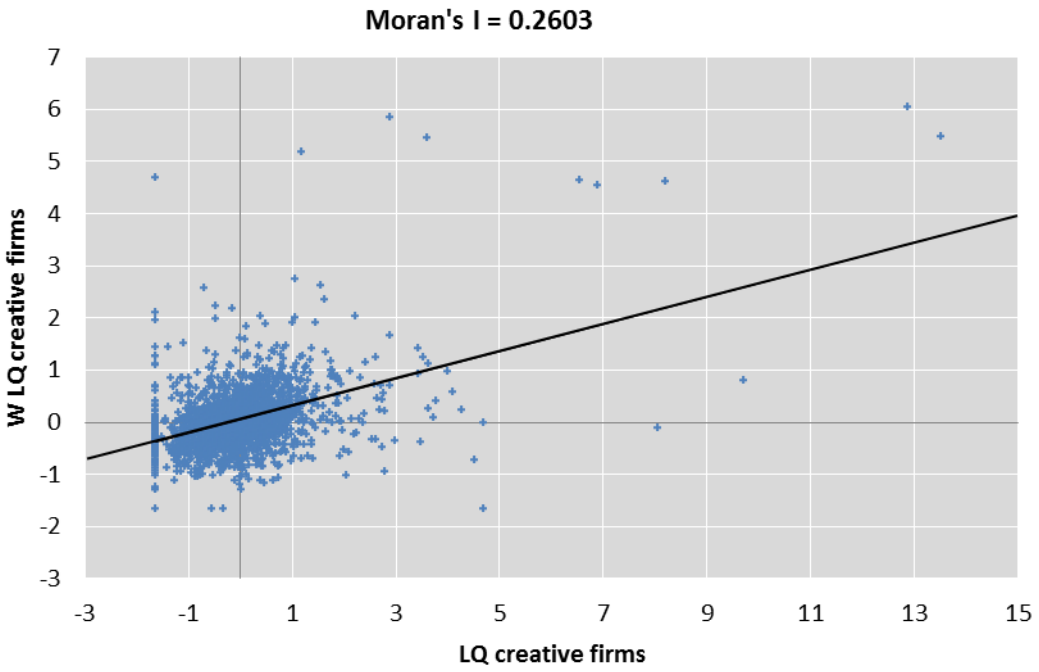
Note: This figure shows the total number of clusters falling into a LLS. Clusters falling into different LLS where considered as different clusters for this display. The following criteria were used to identify the creative clusters: Nearest Neighbor Spatial Clustering technique. Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

3.3.3. Spatial autocorrelation

A Moran's I index of spatial autocorrelation analysis (Moran 1950) has been calculated to explore to what extent high concentrations of creative industries in LLS are related to neighbour geographical areas.

The location quotient (LQ) of the creative industries for each LLS (presented in the previous section) has been used as input variable. Based on that, as Figure 3.9. demonstrates, the spatial autocorrelation analysis suggests that a positive but negligible[19] correlation exists between neighbourhood LLSs (Moran's I 0.2603[20]). These results confirm the fact that LLS do capture almost all the spillovers that occur in a creative cluster and which go beyond neighbouring municipalities.

Figure 3.9. Moran's I spatial autocorrelation level in Europe (5 countries), 2009



Note 1: LQ of the creative firms in the 2,122 LLS was used as input variable.
Note 2: Queen contiguity matrix (with first order of contiguity) was used in the analysis.
Source: Own calculations based on ORBIS-2011 data.

[19] According to Griffith (2009, p. 6) a Moran's I index between 0.25 to 0.50 denotes a weak autocorrelation, 0.50 to 0.70 denotes a moderate autocorrelation, 0.70 to 0.90 denotes a strong autocorrelation, and 0.90 to 1.00 denotes a marked degree of autocorrelation.
[20] Monte Carlo tests based on 999 simulations yield a *p-value* of 0.001 for the constant risk hypothesis, suggesting significant clustering of standardized deviations of the LLS counts observed from their values expected under constant risk.

3.4. Conclusions

This chapter has identified the clusters of creative industries in 5 European countries by overcoming some of the limitations existing in the literature. The methodology used to carry out this analysis has consisted in using a homogeneous definition of creative industries which includes 45 industries (NACE codes at 4 digits) grouped in 12 creative sub-sectors. 2,122 functional urban areas based on commuting data (Local Labour Systems) have been used as the territorial unit of analysis. Firm micro-data (from ORBIS-2011 of Bureau van Dijk) have been also used to identify the exact location of firms in the territory. Based on the postal address provided by this database, it was possible to geocode 4,807,879 firms and 380,555 creative firms in the 5 European countries under study.

The measures used allow to identify the spatial concentration of creative industries in the 5 European countries under analysis. Relative measures show that the share of firms in creative industries differs across countries being the United Kingdom the country with the largest share of creative industries, followed by Spain, Portugal, Italy and France. Additionally, it has been observed that creative industries are mainly concentrated in 4 creative sub-sectors namely, software, architecture, publishing and printing and performing arts, which concentrate over 70% of the creative industries across the 5 European countries under analysis.

The geographic distribution of creative firms over the territory shows a strong spatial concentration of these firms. Creative industries are disproportionally concentrated in capital cities. Top-5 Local Labour Systems (LLS) in Portugal concentrate almost 70% of the national creative industries. Spain displays a similar pattern concentrating for 45% of the creative firms in the top-5 LLS. The rest of the countries present a slightly smaller concentration but still considerable (the United Kingdom 39%, France 34% and 33% in Italy). Concentration indicators show that crafts and heritage are the two creative sectors more concentrated in Spain. In France, instead, the most concentrated sectors are of broadcasting and film, video and music. Craft, broadcasting, software and film, video and music are the creative sub-sectors more concentrated in Italy. Fashion, crafts, heritage and film, video and music are the ones more concentrated in Portugal. The United Kingdom shows a higher concentration in sectors such as fashion, film, video and music and performing arts.

Specialisation measures (location quotient) show that specialised creative LLS are more dispersed in Spain and Italy than in Portugal, France and the United Kingdom. Additionally, co-location measures show a relatively high degree of spatial overlapping of creative sub-sectors. In the United Kingdom high levels of co-location are found between film, video and music, software, R&D, broadcasting and performing arts. In Portugal, a strong co-location appears for example between architecture, software, advertising and broadcasting. Architecture, film, video and music and R&D are the sectors more co-located in Italy. France for instance displays a high co-location between publishing and printing, film, video and music, software, R&D, architecture, broadcasting and performing arts. Spain for example shows a high correlation between software, fashion, publishing and printing, film, video and music, R&D, architecture, advertising and performing arts.

Ripley's K results show disparities in terms of the size of the creative cluster across the 5 European countries under analysis. Indeed, creative firms tend to be highly spread over a large area in the United Kingdom (clusters of about 60 km of radius). Spain, France and Portugal show also large clusters but smaller than in the United Kingdom (between 25 km and 31 km), while Italy shows smaller creative clusters (radius of 15 km).

Using the Nearest Neighbor Spatial Clustering techniques 1,332 creative clusters have been identified over the 5 European countries under study. Portugal concentrates the majority of its clusters in the north-west side of the country near Coimbra and Porto, but also near Lisbon and the south of the country near Faro. The region of Madrid and the Mediterranean coast present large concentrations of creative clusters in Spain. France and the United Kingdom present a large concentration of creative clusters also in large cities such as Paris, London, Liverpool and Birmingham. In Italy, cities like Milan, Bologna, Florence, Rome and Naples are the ones that concentrate the larger part of creative industries.

Finally, the spatial autocorrelation analysis suggests that LLS capture almost all the spillovers that occur in a creative cluster. This result confirms the adequacy of these territories as units of analysis to study the concentration of creative firms.

Chapter 4. Determinants of spatial location of firms in creative industries in Europe

4.1. Introduction

This chapter is addressed to the econometric measurement of the determinants of localisation of creative industries in Spain, Italy, Portugal, France and the United Kingdom. As presented in Chapter 2, traditional agglomeration forces such as localisation and urbanisation economies provide and explanation of the determinatns that might affect the location of creative industries, which is completed with the effect of other forces specific of the creative industries. Some of these specific forces include the presence of 'soft' factors and patronage, the proximity to political power and the presence of talent, among others.

4.2. The analytical model

Ellison and Glaeser (1997, p. 892) suggest a location model based on the existence of natural advantages and externalities or inter-firm spillovers inside the same industry. This model assumes an industry divided in *N* business units, which choose in a consecutive way their location among the *M* areas in which the territory is divided. In this case, and to make the model tractable, the authors take only one company to illustrate the model. Thus, the *k*th business will maximize its profits through their decision to locate v_k inside the area *i*, by the following function:

$$\log \pi_{ki} = \log \overline{\pi}_i + g_i(v_1,...,v_{k-1}) + \varepsilon_{ki} \qquad [12]$$

where $\overline{\pi}_i$ is a random variable reflecting the probability of locating in area *i* (as influenced by observed and unobserved area characteristics), v_j is the location of the business *j*, while ε_{ki} is the random component.

Equation *[12]* shows that the profits derived from the location of a business are related with two elements. Firstly, they are related to an average measure of the territory profitability (*general-economic factors*), and secondly, to a random variable that collects idiosyncratic elements of the industry (*specific-creative forces*). The authors suggest a simple parametric specification of this model.

$$\log \pi_{ki} = \log(\pi_i) + \sum_{l \neq k} e_{kl}(1-u_{li})(-\infty) + \varepsilon_{ki} \qquad [13]$$

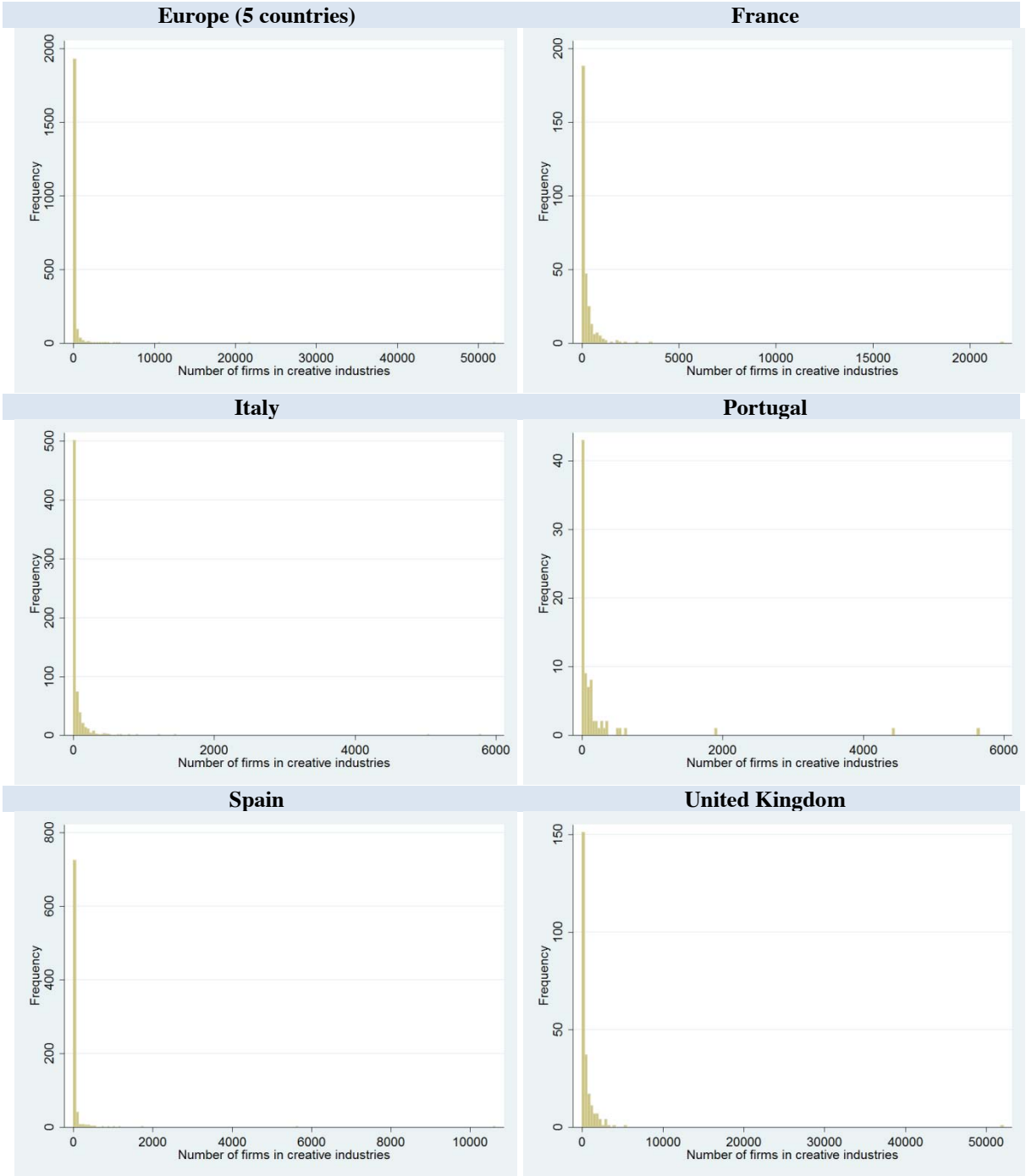
where e_{kl} is the Bernouilli random variable equal to one with probability γ_0 that indicates whether a potential valuable spillover exists between each pair of plants, and u_{li} is an indicator for whether plant l is located in area i (v_l=i), and ε_{ki}, again, is a random component independent from e_{kl}.

4.3. Econometric methodology

The number of firms in creative industries by Local Labour System is a nonnegative integer variable, also called event count. Given the characteristics of count data, the utilisation of ordinary least square (OLS)[21] method results in biased, inefficient, and inconsistent estimates (Long 1997). Indeed, count data can potentially result in skewed distributions cut off at zero, making unreasonable to assume that the response variables and resulting errors follow a normal distribution. As it is also observed in the industrial location literature (Aurauzo-Carod *et al.* 2010, pp. 692-696), the distribution of creative industries in the 5 European countries under study appears to be highly skewed (see the empirical analysis in Chapter 3). Indeed, there are many LLSs with a relatively low count of firms in creative industries and a small percentage withouth firms in creative industries (Figure 4.1). Thus, the problem of non-linearity should be handled through non-linear functions that transform the expected value of the count variable into a linear function of the explanatory variables. The most well known approaches are Discrete Choice Models (DCM) and Count Data Models (CDM).

[21] Several researchers have opted to transform the count variable with neperian logarithm.

Figure 4.1. Frequency of the number of firms in creative industries in 5 European countries, 2009: histogram



Source: Based on ORBIS-2011 data.

Discrete Choice Models are used to analyse the location from the perspective of the firm. Research studies done following these models are particularly focused on the individual elements of firms as determinants of the location of each firm, such as dimension of the firm or the sector to which the firm belongs (Manjón and Arauzo-Carod 2006). However, one of the main drawbacks of this empirical approximation is the difficulty to calculate the

likelihood function when there are so many location alternatives, which is so common at a local level (Arauzo-Carod 2007, pp.4-5).

According to Guimarães *et al.* (2003), a possible solution could be to apply Count Data Models which allow to use large data sets (the number of alternatives in a Conditional Logit Model equals the number of observations in a Count Data Model). Thus the increment of alternative locations when analysing the phenomenon at a local level is not a major problem using a Count Data Model. Moreover, null observations (territorial units that do not locate any industry over the analysed period) do not imply modelling problems in Count Data Models (unlike Conditional Logit Models).

The count models allow to analyse the localisation of creative industries from the geographical space chosen (municipality, region or non-administrative territory). The characteristics of the territory analysed (telling apart general-economic and specific creative forces, as described in chapter 2) will affect the probability to be chosen as the location of a company. Since this chapter aims at providing evidence of the determinants of location of firms in creative industries in the LLSs in 5 European countries from a territorial perspective a Count Data Model will be used.

The most popular specification of Count Data is the **Poisson Regression Model (PRM)**. This model assumes that the probability of observing a count location *Y* (*i.e.* the number of firms in creative industries in a specific LLS) can be written as a function of specific location characteristics of the territory that affect firms' spatial profit function. Mathematically, the Poisson density function of *Y* is described as follows (Greene 2005, p. 121).

$$Pr[Y = y|x] = \frac{e^{-\lambda}\lambda^{y}}{\Gamma(y+1)} = \frac{e^{-\lambda}\lambda^{y}}{y!} \qquad [14]$$

where the ratio of occurrence (mean or expected value) of the event of interest is denoted by $\lambda = e^{(x'\beta)}$, which is also the variance of a poisson distribution; y = *0, 1, 2,...* is the realisation of the aleatory variable; x denotes the vector of covariates (explanatory variables); β is the parameter vector to be estimated and $\Gamma(.)$ denotes the gamma integral that specialises to a factorial for an integer argument.

The Poisson density function has the feature that the mean and variance are identical, also known as "equidispersion".

$$E[y_i|x_i] = \lambda_i \qquad [15]$$

$$Var[y_i|x_i] = \lambda_i \qquad [16]$$

The PRM is the common starting point for count data analysis. However, count data may exhibit some characteristics that might violate some of the Poisson assumptions. The use of PRM in the presence of any of these features (overdispersion and excess of zeros) may lead to a poor fit, loss of efficiency and incorrect reported standard errors.

The first assumption is generally called "equidispersion", which implies that the mean and the variance should be equal. However, unobserved heterogeneity might lead to overdispersion (the variance exceeds the mean) due to the failure of the assumption of independence of events which is implicit in the PRM[22]. As a result, variables might appear to be a significant predictor when it is in fact not significant (Hilbe 2011, p. 141).

In this line, Arauzo-Carod (2007, p. 199) points out that industrial location generally violates this assumption, and indeed, this phenomenon is observed in the 5 European countries under analysis, revealing a large concentration of certain firms in few locations. As it is shown in Table 4.1 (see also Annex VI), the distribution of firms in creative industries in French, Italian, Portuguese, Spanish and British LLSs displays a variance larger than the mean. Indeed, the difference between the variance and the mean across the 5 European countries under analysis ranges from almost 16,000 times larger than the mean in the United Kingdom, where creative industries are mainly concentrated in London or its surrounding area, to around 1,500 times larger than the mean in Italy, where the distribution of the creative industries is more homogeneous.

The second assumption refers to the "excess of zeros" problem. PRM can deal with situations where the dependent variable is characterized by a large number of observations

[22] Such as when data are clustered and thus, violate the likelihood independence of observations assumption (Hilbe 2011, p. 141).

whose value is zero[23]. However, some adjustments need to be done in the model when this number is excessive. Among all the 2,122 LLS in the 5 European countries under analysis, only 103 do not concentrate any creative industry (72 in Spain, 23 in Italy, 8 in Portugal). The LLS with zero creative industries represent a small proportion in relative terms, only 4.8% of the total of LLS, ranging from 9.6% in Portugal to 3.4% in Italy. Of course, when taking into account the creative industries sector by sector, the share of zeros is much larger. For instance, in the 5 European countries under study (considering all the five countries together), the creative sector with the smallest share of zero is the Architecture sector, with only 19,51% of the LLS with zero count, while the largest one is the Broadcasting creative sector with 71,82% (Annex VI displays these figures by country and by creative sub-sectors).

Table 4.1. Features of the number of creative industries by LLS and by country (dependent variable), 2009

	France	**Italy**	**Portugal**	**Spain**	**United Kingdom**	**EU (5 countries)**
Mean	316.59	64.34	228.55	55.68	725.61	179.34
Standard deviation	1,297.73	312.25	804.38	437.11	3,402.12	1,318.06
Min	6	0	0	0	1	0
Max	21,756	5,797	5,658	10,651	52,200	52,200
% of Zeros	0.00%	3.35%	9.64%	8.93%	0.00%	4.85%
# LLS	304	686	83	806	243	2,122

Note: Mean and standard deviation refer to the mean and standard deviation of the number of firms in creative industries by LLS and by country. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" presents the share of LLS without firms in creative industries over the total number of LLS, expressed by "# LLS".
Source: Based on ORBIS 2011 data.

The presence of overdispersion in the dependent variable motivates the use of different distributions than the general PRM. Indeed, the **Negative Binomial Regression Model (NBRM)**, also called log-gamma model is a generalised extension of the PRM but does not impose equivalence between the mean and the variance[24]. The NBRM arises as the result of the introduction of log-gamma distributed unobserved heterogeneity into the log-linear Poisson mean (Greene 2005, p. 116). Thus, it includes a dispersion parameter to accommodate overdispersion problems resulting from unobserved heterogeneity distribution of the dependent variable.

[23] Given than count models show how many times a location (LLS) has been chosen by a creative firm, the LLSs with no firms in creative industries are relevant for the analysis. Indeed, independent variables in these locations will explain why these territories have not been chosen by any creative industry.
[24] Cameron and Trivedi (2009) also suggest the use of robust standard errors for the parameter estimates in a Poisson to control for mild violation of underlying assumptions.

Mathematically, the probability function of the NBRM is:

$$Pr[Y = y|x] = \frac{\Gamma(\alpha^{-1}+y)}{\Gamma(\alpha^{-1})\,\Gamma(y+1)}\left(\frac{\alpha^{-1}}{\alpha^{-1}+\lambda}\right)^{\alpha^{-1}}\left(\frac{\lambda}{\alpha^{-1}+\lambda}\right)^{y} \qquad [17]$$

where $\alpha = e^{\varepsilon}$ is the variance parameter of the gamma distribution and $\Gamma(.)$ denotes the gamma integral that specialises to a factorial for an integer argument. The NBRM is a more general model than the PRM since it accommodates overdispersion and it reduces to the PRM as $\alpha \to 0$.

The moments of the NBRM are:

$$E[y_i\,|x_i, \alpha_i\,] = \lambda_i \qquad [18]$$

$$Var[y_i\,|x_i, \alpha_i\,] = \lambda_i(1 + \alpha_i\lambda_i) \qquad [19]$$

where $\alpha_i = exp(\varepsilon_i)$ is the parameter gamma distribution.

Compared with the PRM, the conditional mean is identical while the probability distribution differs substantially since the parameter gamma enters the probability equation *[17]*. As Cameron and Trivedi (2009, p. 563) underline, if the data are overdispersed, then the NBRM is preferred with respect to the PRM.

4.4. Data and variables

4.4.1. Data

The data include one dataset accounting for the location of creative industries (dependent variable) and another dataset about the territorial characteristics of LLS in the 5 European countries under analysis. Additionally, dependent and independent variables have been computed for all the five European countries together, which will allow to provide also some evidence at supra-national level.

Econometric studies usually analyze the effect of the explanatory variables on the dependent variable. However there is the possibility that the dependent variable has simultaneously an effect on the explanatory variables (Kennedy 2003, p. 401). In order to avoid the simultaneous causation bias the dependent variable has been computed at time *t*, whilst explanatory variables in the model are defined at time *t-1*. The use of explicative

variables established in the initial year of the period might reduce the problem of simultaneity between dependent and independent variables.

According to the previous section, the dependent variable is the location of all firms in creative industries (without differentiating creative sub-sectors) in each of the 2,122 LLSs in the 5 European countries under study for the year 2009, which was drawn up using data from the ORBIS-2011 database (see Chapter 3).

The theoretical framework established in Chapter 2 provides an exhaustive pool of factors that are potentially involved in the localisation of firms in creative industries. The determinants of the concentration of firms in creative industries are grouped into two major groups: general-economic factors, which are subdivided in localisation and urbanisation externalities; and specific-creative forces. Below is presented the elaboration of various variables that have been considered as potential determinants of the geographic location of firms in creative industries.

4.4.2. General determinants of the localisation of firms in creative industries

This epigraph includes the effect of general agglomeration economies (in both static and dynamic approaches), divided in localisation external economies (internal economies have been included within this group as expressed as organisation of the local production) and urbanisation external economies. The formulas are presented in Table 4.2[25].

Localisation economies have been measured using several indicators. The first set of localisation economies have been captured by the industrial structure and organisation concepts underlined by Marshall (1980/2009). Indeed, following Combes (2000) and Paci and Usai (2005) these two concepts are captured by the degree of competition and scale effect. Firstly, the **economies of scale** have been approximated by the number of employees per firm. This indicator will capture the preference of creative industries to be organised in small or large firms. According to Lazzeretti et *al.* (2009, p. 19) large firm size tend to affect positively the concentration of creative firms. Secondly, the inverse of the Herfindhal index of the number of firms by their size is used to assess the **degree of**

[25] Since the number of indicators is large, an option could have been to sinthesize them in composite indexes. In this stage of the research, the methodological decisión I adopted is to use only individual indicators. Other than methodological preferences, this choice was motivated because by doing this, it is possible to control the effect of each indicator separately, providing more information for subsequent stages of the research.

local competition. According to Porter (1990, p. 52), local rivalry fosters the concentration of creative firms.

The second set of localisation economies have been based on the idea of the pure agglomeration cluster theory derived from Gordon and McCann (2000) and from the Evolutionary Economic Geography. Indeed, the concentration of creative firms in the same place could facilitate the generation of a dense and varied network of agents that foster economic and social collaboration, enhancing knowledge transfer through cross-fertilisation mechanisms and thus promoting innovation. The **filière effect (local value chain)**, which tries to capture the knowledge exchange between specialised and concentrated firms of the same sector, is computed by the inverse of the Herfindhal index of the number of employees occupied in the 45 creative industries NACE codes under analysis (see detailed codes at NACE 4 digits in Chapter 3). The concept of **related variety** derived from Boschma and Iammarino (2009) is approximated by the number of creative clusters by sector located in the LLS. It is worth mentioning that the number of overlaps of creative clusters by sector was also tested giving similar results to the variable number of creative clusters. According to the empirical literature, both elements are positively correlated with the concentration of creative industries (Lazzeretti *et al.* 2009, p. 19 and 22).

Finally, other effects of the Marshallian externalities have been measured using an index of the **specialised suppliers** in the LLSs. This index measures the availability of suitable supplies of labour force which may facilitate efficiency matching between labour supply and demand, and thus affecting positively the concentration of creative industries in the space.

Urbanisation economies are also measured using serveral indicators. Firstly, the social network concept of the clustering model and the potential size of the Ohlin-Hoover theory have been approximated by three elements: **employment density**[26] (working population in each LLS per Km^2), the **population size** of the LLS and the **disparity of the population** in the LLS (computed by an spatial population concentration index). Indeed, a large population and a denser territory imply a higher local demand and a larger supply of local public services (Paci and Usai 2005, p. 10) which may benefit the location of firms.

[26] This variable provides similar results as total firms' density (number of total firms from the ORBIS database by LLS per km^2).

However, this increment can also generate some diseconomies of scale if a certain threshold is reached since then congestion and pollution problems can emerge (Muñiz *et al.* 2002). Similarly, the economic density concept presented by Hoover and Vernon (1959) and Ciccone and Hall (1996, p. 54) has been approximated by a proxy of the economic capacity of the population (variable receiving the name of labour supply in the regressions). This indicator is the result of dividing the number of people with jobs over the total population of the LLS.

Moreover, the **economic diversity** concept presented by Chinitz (1961, pp. 281-282) and Jacobs (1961, 1969) is captured by the inverse of the Herfindhal index of the number of employees occupied in the 62 economic sectors in which the economy can be divided (NACE 2 digits). According to Lazzeretti *et al.* (2009, p.19) the diversity of a territory has a positive effect on creative clustering. Additionally, the **social capital** concept pointed out by Helliwell and Putnam (1995) has been incorporated in the model with a proxy of the trust in people at NUTS 2 level[27].The good **access to economic activities** has been approximated by the share of public services[28] present in the territory. While the concept of **transport costs** has been incorporated in the model by the share of the length of roads per capita in a LLS. Indeed, common resources such as roads might benefit firms located in cities regardless of their industry. Additionally, it helps all firms to have a better access to labor supply and demand.

4.4.3. Specific determinants of the localisation of firms in creative industries

Based on the theoretical framework of this work, the spatial location of firms in creative industries is also affected by a set of forces specifically linked to creativity.

The first set of proxies refers to the cultural infrastructure and proximity to the political power, concepts which try to capture non-productive amenities that may affect the residents' and workers' utilities in a LLS. Firstly, the **proximity to the political power** has been approximated by a dummy variable pointing out the location of the capital of the region (NUTS 2 region). And secondly, the **cultural amenities** concept (Kourtit *et al.*

[27] Similar results were obtained with other variables that tried to measure the degree of propensity of people to cooperate, such as the proportion of people belonging to sport associations.
[28] For the purpose of this study, the following elements have been considered as public services: Police offices, Postboxes, Postoffices, Hospitals, Pharmacies, Fire Stations, Kindergartens, Kiosks, Car Parks, Court Houses, Prisons, Telephone boxes, Stations, Airports, Universities and Schools.

2013) has been approximated by the share of artistic, architectonic and cultural elements located in the LLS.

The second set of specific creative forces refers to the identity, image and soft characteristics of a territory, which have been approximated by three elements. Firstly, the **quality of the environment** (Pareja *et al*. 2009, pp. 28-33; Markusen *et al.* 1986 and De Vol 1999) has been computed by the levels of CO^2 emissions per capita in the LLS[29]. Secondly, the level of **openness and social diversity** of a territory, as presented by Jacobs (1961, 1969) and Florida (2002), has been analysed by the level of tolerance to immigrant people at NUTS 2 level[30]. Thirdly, the **impact of tourism** over the local firms in creative industries has been computed using information on the number of touristic services in the territory. Indeed the increment of rents may lead to the expulsion of artists (Pratt 2009).

A third set of characteristics is related to the effect of **complementary knowledge bases** (analytic and synthetic), has been approximated with the level of specialisation of the territory to analytic (high tech) and synthetic (medium-high tech) activities. Additionally, the number of patents per capita in the LLS approximates the innovation capacity of the territory.

A fourth set of variables is related to the presence of **talent** (Florida 2002; Glaeser 2000) The role of the **human capital**, as presented by Carlton (1983, p. 446) but also one important element in the Cluster policy initiative (as presented in the "triple helix"model) has been approximated by the share of the population (over 24 years old) with a university degree. Finally, the **patronage** and **gatekeepers'** concept which can enhance the creation of new creative firms and the diffusion of knowledge (respectively) have been approximated by the number of financial institutions per capita in the area.

[29] Other variables such as the share of green spaces per person have been also tested in the model and removed due to the lack of significance. This variable has been computed for each LLS using MODIS (Moderate Resolution Imaging Spectroradiometer) Land Cover satellite information. The lack of significance can be derived from the fact that green areas can not be fully captured with the level of resolution provided by MODIS (500 m2).
[30] Other variables such as tolerance to homosexual have also been used in the model giving similar results.

Table 4.2. Location determinants and indicators selected

Location determinant	Proxy	Indicator	Source and year of reference	Expected sign
<u>*Localisation economies*</u>	Creative firm size	$Firm\ size_{ij} = \frac{L_{ij}}{F_j}$ where *L* refers to the employment (jobs) and *F* refers to the number of firms, *i* refers to the 12 creative industry sectors presented in chapter 3 and *j* refers to the LLS.	Employment and number of firms have been extracted from ORBIS database (reference year 2009) due to lack of business demography data from official sources for certain countries. 40% of the firms in creative industries provided by ORBIS contain information about the number of jobs.	+
	Creative competition – Scale effects	$Competition_{ij} = \frac{1}{\sum_{i,j}\left[\left(\frac{F_{s,i,j}}{F_{ij}}\right)^2\right]}$ where *s* refers to the size of the industry which can be micro (<10 employees), small (<50 employees), medium (< 250 employees), large (< 1,000 employees) and very large (>=1000 employees), *i* refers to the 12 creative industry sectors and *j* refers to the LLS.	The number of firms has been extracted from ORBIS database (reference year 2009) due to lack of business demography data from official sources for certain countries. 40% of firms in creative industries provided by ORBIS contain information about the number of jobs.	+
	Creative filière	$Filiere_{ij} = \frac{1}{\sum_{i,j}\left[\left(\frac{L_{i,j}}{L_{ij}}\right)^2\right]}$, where *L* refers to the employment, *i* refers to the creative industry sectors and *j* refers to the LLS.	Employment data have been extracted from ORBIS database (reference year 2009). 40% of the firms in creative industries provided by ORBIS contain information about the number of jobs.	+
	Creative specialisation externalities (or Creative knowledge spillovers)	$Creative\ externalities_{ij} = \frac{\left(F_{ij}/F_i\right)}{\left(F_j/F\right)}$, where *F* refers to the number of firms, *i* refers to the creative industry sectors and *j* refers to the LLS.	Firm data have been extracted from ORBIS database year (reference year 2009).	+
	Creative clusters	Number of creative clusters by LLS	Firm data have been extracted from ORBIS database year (reference year 2009). Creative clusters by creative industry have been identified running the Nearest Neighbor Hierarchical Spatial Clustering technique (see chapter 3 for more details on this technique).	+

Source: Own computations

Table 4.2. Location determinants and indicators selected (continued)

Location determinant	Proxy	Indicator	Source and year of reference	Expected sign
<u>*Urbanisation economiese*</u>	Population	$Population_j = \frac{P_j}{1{,}000}$, where *P* refers to the total population and *j* refers to the LLS.	Population size has been extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Employment density (potential size)	$Employment\ density_j = \frac{L_j}{A_j}$, where *A* refers to the total land, *L* refers to the total employment and *j* refers to the LLS.	Both values extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Spatial population concentration	$GINI_j = \frac{1}{2}\sum_{i=1}^{n}\left\lvert\frac{P_{mun}}{P_j} - \frac{A_{mun}}{A_j}\right\rvert$, where P_{mun} refers to the total population of one of the *n* municipality inside the LLS. P_j refers to the total population of the LLS. A_{mun} refers to the total surface in km^2 of one of the *n* municipalities inside the LLS. And A_j refers to the total size in km^2 of the LLS.	Both values extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Labour supply	$Labour\ supply_j = \frac{L_j}{P_j}$, where L refers to the total number of employees, *P* refers to total population and *j* refers to the LLS.	Both values extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Diversity externalities	$Diversity\ externalities_{ij} = \frac{1}{\sum_j\left[\left(\frac{L_{ij}}{L_j}\right)^2\right]}$, where L_i refers to the employment in 62 industrial sectors at NACE 2 digits and *j* refers to the LLS.	Employment data have been extracted from ORBIS database (reference year 2009). 50% of the firms provided by ORBIS contain information about the number of jobs.	+
	Infrastructures	$Infrastructures_j = \frac{length\ of\ roads_j}{Population_j}$, where *roads* refers to the length of motorways, primary, secondary and tertiary national roads and *j* refers to the LLS.	Roads data from Open Street Map database (year 2013) and population data extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+

Source: Own computations

Table 4.2. Location determinants and indicators selected (continued)

Location determinant	Proxy	Indicator	Source and year of reference	Expected sign
Urbanisation economies	Public services	$Public\ services\ _j = \frac{PS_j}{Population_j}$, where *PS* refers to the number of Police offices, Postboxes, Postoffices, Hospitals, Pharmacies, Fire Stations, Kindergartens, Kiosks, Car Parks, Court Houses, Prisons, Telephone boxes, Stations, Airports, Universities and Schools and *j* refers to the LLS.	All public service buildings have been obtained from the Open Street Map website (year 2013) except the number of airports which were obtained from the ESPON database. Population data were extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Social capital	$Social\ capital_j = \frac{T_j}{Population_j}$, where *T* refers to the people that say, generally speaking, "most people can be trusted" and *j* refers to the NUTS 2.	2008 data at NUTS 2 level from Atlas of European values (http://www.atlasofeuropeanvalues.eu/new/index.php, visited in June 2015).	+
Specific creative forces	Capital region (political power)	$1 = capital\ region$	Dummy variable that identifies the capitals of the regions (NUTS 2).	+
	Heritage (cultural infrastructure)	$Heritage_j = \frac{Art_j + Buildings_j + Cultural\ heritage_j}{Population_j}$x10,000 where *j* refers to the LLS.	Local street art, representative buildings and cultural heritage divided by the total population in each LLS. Local street art is provided by a worldwide graffiti website (www.fatcap.com, visited June 2015). Representative buildings are provided by a worldwide buildings database (www.skyscraperpage.com , visited June 2015). Protected cultural heritage goods (monuments, gardens, historic and arqueological places) are obtained from the UNESCO World heritage database.	+
	Quality of the environment (air quality)	$Pollution_j = \frac{CO2_j}{Population_j}$, where CO2 refer to the number of tonnes of CO2 emissions and *j* refers to the LLS.	CO2 emissions were estimated at LLS from the EDGAR global emissionDatabase version 4.1, developed by the Joint Research Centre of the European Commission. Population data were extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France)	-

Source: Own computations

Table 4.2. Location determinants and indicators selected (continued)

Location determinant	Proxy	Indicator	Source and year of reference	Expected sign
Specific creative forces	Touristic services	$Touristic\ services_{ij} = \frac{\left({S_j}/{S}\right)}{\left({P_j}/{P}\right)}$, where P refers to total population and S refers to the touristic services such as coffee shops, pubs, nightclubs, restaurants, fast food, attractions and bakeries and j refers to the LLS.	Touristic services have been obtained from the Open Street Map website (year 2013). Population data were extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	-
	Tolerance	Percentage of people that wouldn't like to have Muslims as neighbours.	2008 data at TL2 level from Atlas of European values (http://www.atlasofeuropeanvalues.eu/new/index.php, visited in June 2015).	-
	Human capital	$Human\ capital\ _j = \frac{H_j}{P24_j}$, where H refers to the total population with at least tertiary education attainment while P24 refers to total population above 24 years old and j refers to the LLS.	Both values extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Analytic specialisation externalities	$Analytic\ spillovers_{ij} = \frac{\left({L_{ij}}/{L_i}\right)}{\left({L_j}/{L}\right)}$, where L_i refers to the employment in high tech industries. NACE rev 1.1. (6411, 6412, 6420, 6511, 6512, 6521, 6522, 6523, 6601, 6602, 6603, 6711, 6712, 6713, 6720, 7110, 7121, 7122, 7123, 7131, 7132, 7133, 7134, 7140, 7210, 7230, 7240, 7250, 7411, 7412, 7413, 7414, 7415, 7430, 7450, 7460, 7470, 7482, 7485, 7486, 8010, 8021, 8022, 8030, 8041, 8042, 8511, 8512, 8513, 8514, 8520, 8531, 8532, 3530, 2441, 2442, 3001, 3002, 3210, 3220, 3230, 3310, 3320, 3330, 3340, 3350) and j refers to the LLS.	Employment data have been extracted from ORBIS database (reference year 2009).50% of the firms provided by ORBIS contain information about the number of jobs.	+

Source: Own computations

Table 4.2. Location determinants and indicators selected (continued)

Location determinant	Proxy	Indicator	Source and year of reference	Expected sign
Specific creative forces	Synthetic specialisation externalities	$Synthetic\ spillovers_{ij} = \frac{\left(L_{ij}/L_i\right)}{\left(L_j/L\right)}$, where L_i refers to the employment in high tech industries. NACE rev 1.1. (3110, 3120, 3130, 3140, 3150, 3161, 3162, 3410, 3420, 3430, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2420, 2430, 2451, 2452, 2461, 2462, 2463, 2464, 2465, 2466, 2470, 3520, 3541, 3542, 3543, 3550, 2911, 2912, 2913, 2914, 2921, 2922, 2923, 2924, 2931, 2932, 2941, 2942, 2943, 2951, 2952, 2953, 2954, 2955, 2956, 2960, 2971, 2972, 3511, 3512, 2511, 2512, 2513, 2521, 2522, 2523, 2524, 2310, 2320, 2330, 2611, 2612, 2613, 2614, 2615, 2621, 2622, 2623, 2624, 2625, 2626, 2630, 2640, 2651, 2652, 2653, 2661, 2662, 2663, 2664, 2665, 2666, 2670, 2681, 2682, 2710, 2721, 2722, 2731, 2732, 2733, 2734, 2741, 2742, 2743, 2744, 2745, 2751, 2752, 2753, 2754, 2811, 2812, 2821, 2822, 2830, 2840, 2851, 2852, 2861, 2862, 2863, 2871, 2872, 2873, 2874, 2875) and j refers to the LLS.	Employment data have been extracted from ORBIS database (reference year 2009). 50% of the firms provided by ORBIS contain information about the number of jobs.	+
	Innovation	$Innovation_j = \frac{PAT_j}{Population_j}$x1,000, where *PAT* stands for average total patents (2000-2010) and j refers to the LLS.	Patent data was obtained from the OECD Regpat database and geolocalised based on the information of the patent register. Population data were extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+
	Patronage	$Patronage_j = \frac{K_j}{Population_j} x10{,}000$, where *K* stands for the number of AMTs and Banks and j refers to the LLS.	Location of ATMs and banks has been obtained from the Open Street Map website (year 2013). Population data were extracted from the census (year 2001 for Portugal, Spain, Italy and the United Kingdom and 2006 for France).	+

Source: Own computations

4.5. Econometric analysis

4.5.1. Estimation issues

The results of the empirical model are presented in several tables (from Table 4.3 to Table 4.4) in order to facilitate the interpretation and comparability of the results. The analysis is conducted for each single country in order to identify similarities and differences with respect to the main determinants of the location of firms in creative industries across countries. Additionally, a general regression for all the 5 European countries together is also conducted to test whether different determinants of the concentration of firms in creative industries arise at the supra-national level. In order to avoid collinearity problems between explanatory variables (see correlation matrixes in Annex VII) variables with a strong correlation (Pearson's correlation above 0.6) were separated in different regressions. In general, a strong correlation is observed between the population, the employment density and the number of creative clusters, as well as between the number of public services, the number of touristic services and patronage. After that, Variance Inflation Factors (VIF) have been obtained for all the variables and all the regressions conducted in this study showing VIF values under 2.5[31].

Poisson regression (PRM) is often used to model count data. However, as observed in previous sections, the number of firms in creative industries in the LLS (dependent variable) tends to be largely concentrated in few locations, thus violating the equidispersion assumption of independence of events that is implicit in PRM. The presence of overdispersion (conditional variance exceeds the conditional mean) in the dependent variable motivates the use of alternative models such as the Negative Binomial Regression Model (NBRM). In order to confirm the better fit of the NBRM compared to the PRM, the Bayesian information criterion (BIC) and Akaike's information criterion (AIC) have been generated for each regression. Both methods show a smaller value, and thus a better fit, for the NBRM compared to the PRM. Moreover, the regression tables also provide two additional statistical tests, the Wald test (represented by Alpha) and the likelihood-ration chi square test indicating the good fit of the NBRM to the data *vs.* the PRM, all showing a

[31] According to Greene (2003) multicolinearity exists if VIF exceeds 10.

rejection of the null hypothesis that alpha equals zero, which is the case of Poisson regressions[32].

Generally, the estimated coefficients of the NBRM are interpreted as the expected increase in log count (dependent variable) for a one-unit increase in the independent variable, given the other predictor variables in the model are held constant. In order to facilitate the interpretation of the coefficients, they were transformed to incidence-rate ratio (IRR). According to Long and Freese (2006) an IRR is obtained by exponentiating the regression coefficient and provides an estimated rate ratio of the change in the dependent variable for a one unit increase in the independent variable. Thus, an IRR of less than one indicates a negative relationship between the predictor variable and the dependent variable, while an IRR greater than one shows a positive effect (Annex VIII presents the results of the regressions without the IRR transformation).

Additionally, the tables below also report several values wich are useful to interpret and compare their specifications:

a) For instance, these regressions do not have an equivalent to the R-squared measure found in OLS regressions but a Pseudo R-squared[33]. Due to that, it is recommended to interpret this statistic with caution. However, according to McFadden (1979), pseudo-R2 between 0.2 and 0.4 show a perfect feet.
b) The Log-Likelihood of the fitted model.
c) The Likelihood Ratio (LR) Chi-Square test (LR chi2) that at least one of the predictors' regression coefficient is not equal to zero.
d) The number of observations indicates the number of LLSs taken into account in each of the regressions.
e) Lnalpha represents the log-transformed over-dispersion parameter and is presented along with the untransformed value (alpha). If the alpha coefficient is zero then the model is better estimated using a poisson regression model.
f) A column showing the expected sign for each regression according to the theory.
g) A column showing the concordance of the expected sign of the regressor with the obtained result. Three signs are used: Firstly, ✓ indicates that the predictor variable

[32] Alpha determines the degree of dispersion of the dependent variable. When alpha=0, the Negative Binomial distribution is equivalent to a Poisson distribution and therefore overdispersion does not exist.
[33] For a discussion of various pseudo-R-squares see Long and Freese (2006).

is statistically singificant and corroborates the positive or negative expected sign. Secondly, ✖ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, ● indicates that the predictor variable is not statistically significant.

4.5.2. Results and interpretation

Regression results show a general good model fit, showing pseudo R-Square indexes around 0.2[34]. Considering all the 5 European countries under analysis together, they display an adjusted R-Squared index between 0.18 and 0.19, being close to the 0.2 threshold where a perfect fit is considered. The adjusted R-Squared index at the country level displays a larger variation ranging from 0.13 in France to 0.27 in Spain. Regressions in Italy, Portugal and Spain show an excellent model fit being the adjusted R-Squared index between the McFadden range of 0.2-0.4.

a) General determinants I: Localisation economies and competition

The analysis conducted from Table 4.3 and Table 4.4 supports the hypothesis that localisation economies predict positively and significantly the location of firms in creative industries at the national and supra-national level (5 European countries all together). Table 4.5 presents the summary of the results obtained in the regression analysis showing that all the localisation regressors, with the exception of creative competition in France, confirm the positive association with the concentration of creative industries in the space.

[34] According to McFadden (1979), pseudo-R2 between 0.2 and 0.4 show a perfect fit.

Table 4.3. Negative binomial regression results with reported incidence ratios: 5 European countries

		(1) Europe (5 countries)	(2) Europe (5 countries)	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	1.004*** (0.000)	1.003*** (0.000)	+	✓
	Creative competition	1.280*** (0.042)	1.199*** (0.038)	+	✓
	Creative filière	1.273*** (0.015)	1.224*** (0.014)	+	✓
	Creative specialisation externalities	3.451*** (0.238)	3.651*** (0.240)	+	✓
	Creative clusters	1.069*** (0.010)		+	✓
Urbanisation economies	Population		1.002*** (0.000)	+	✓
	Employment density	1.002*** (0.000)		+	✓
	Population concentration		12.57*** (1.513)	+	✓
	Labour supply	0.979*** (0.003)	1.002 (0.003)	+	✗
	Diversity externalities	1.090*** (0.006)	1.080*** (0.006)	+	✓
	Infrastructures	0.961*** (0.002)	0.962*** (0.002)	+	✗
	Public services	1.179*** (0.040)	1.429*** (0.045)	+	✓
	Social capital	1.002 (0.003)	0.994** (0.003)	+	✗
Specific creative forces	Capital region	1.319*** (0.125)		+	✓
	Heritage	1.003 (0.025)	1.048* (0.0262)	+	✓
	Air quality	0.999* (0.001)	0.998*** (0.001)	-	✓
	Touristic services		0.911*** (0.011)	-	✓
	Analytic specialisation externalities	1.224*** (0.044)	1.157*** (0.036)	+	✓
	Synthetic specialisation externalities	1.064*** (0.016)	1.041*** (0.012)	+	✓
	Human capital	1.119*** (0.005)		+	✓
	Tolerance	0.972*** (0.004)	0.962*** (0.003)	-	✓
	Innovation	1.063*** (0.023)	1.138*** (0.026)	+	✓
	Patronage	0.985 (0.013)		+	●
	Constant	2.259*** (0.473)	1.860*** (0.377)		

Pseudo R-squared	0.183	0.191
Observations	2122	2122
LR chi2	4207.37	4386.81
Log-likelihood	-9404.509	-9314.791
AIC	18853.0	18669.6
BIC	18977.5	18782.8
lnalpha	-0.377	-0.467
	(0.031)	(0.032)
alpha	0.685	0.627
	(0.022)	(0.020)
Likelihood-ratio test of alpha=0	200000***	180000***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: The Reported Incidence Ratios (IRR) represent the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, •indicates that the predictor variable is not statistically significant.

Table 4.4. Negative binomial regression results with reported incidence ratios

a) France

		(3) France	(4) France	(5) France	(6) France	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	1.005** (0.002)	1.007*** (0.002)	1.005** (0.002)	1.006** (0.002)	+	✓
	Creative competition	0.637*** (0.072)	0.755** (0.088)	0.626*** (0.071)	0.615*** (0.074)	+	✗
	Creative filière	1.165*** (0.025)	1.178*** (0.025)	1.172*** (0.024)	1.188*** (0.027)	+	✓
	Creative specialisation externalities			5.632*** (1.505)		+	✓
	Creative clusters	1.089*** (0.017)				+	✓
Urbanisation economies	Population		1.002*** (0.000)			+	✓
	Employment density			1.000 (0.000)	1.000 (0.000)	+	●
	Population concentration	4.273*** (1.853)	3.074*** (1.310)	3.067*** (1.311)	3.246** (1.530)	+	✓
	Labour supply	0.985 (0.011)	0.995 (0.011)	0.999 (0.012)		+	●
	Diversity externalities	1.043*** (0.010)	1.041*** (0.011)	1.045*** (0.010)	1.047*** (0.011)	+	✓
	Infrastructures	0.953*** (0.006)	0.957*** (0.006)	0.960*** (0.006)	0.956*** (0.006)	+	✗
	Public services	1.050 (0.080)	1.137 (0.091)	0.977 (0.084)	1.056 (0.071)	+	●
	Social capital	0.989 (0.010)		0.990 (0.010)		+	●
Specific creative forces	Capital region	1.712*** (0.252)		1.676*** (0.245)	1.791*** (0.276)	+	✓
	Heritage	1.042 (0.028)	1.043 (0.027)	1.061** (0.030)	1.052* (0.031)	+	✓
	Air quality	1.001 (0.002)	1.001 (0.002)	1.001 (0.002)	1.001 (0.002)	-	●
	Touristic services		0.948 (0.057)	1.020 (0.063)		-	●
	Analytic specialisation externalities	1.249*** (0.101)	1.230*** (0.098)	1.213** (0.096)	1.337*** (0.122)	+	✓
	Synthetic specialisation externalities	1.017 (0.013)	1.022 (0.014)	1.012 (0.013)	1.017 (0.014)	+	●
	Human capital				1.035*** (0.012)	+	✓

	Tolerance		1.037 (0.024)			-	•
	Innovation	1.136*** (0.042)	1.174*** (0.045)	1.195*** (0.046)	1.135*** (0.043)	+	✓
	Patronage	1.010 (0.040)				+	•
	Constant	120.822*** (73.963)	29.419*** (19.720)	18.167*** (11.457)	24.575*** (8.885)		
	Pseudo R-squared	0.133	0.134	0.136	0.126		
	Observations	304	304	304	304		
	LR chi2	539.05	544.17	552.22	512.44		
	Log-likelihood	-1759.724	-1757.163	-1753.138	-1773.027		
	AIC	3557.4	3550.3	3546.3	3580.1		
	BIC	3628.1	3617.2	3620.6	3643.2		
	lnalpha	-0.993	-1.005	-1.030	-0.911		
		(0.079)	(0.079)	(0.079)	(0.078)		
	alpha	0.370	0.366	0.357	0.402		
		(0.029)	(0.029)	(0.028)	(0.031)		
	Likelihood-ratio test of alpha=0	19000***	24000***	21000***	23000***		

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: The Reported Incidence Ratios (IRR) represent the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, •indicates that the predictor variable is not statistically significant.

b) Italy

		(7) Italy	(8) Italy	(9) Italy	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	1.008*** (0.001)	1.004*** (0.001)	1.007*** (0.0013)	+	✓
	Creative competition	1.225*** (0.068)	1.508*** (0.090)	1.204*** (0.066)	+	✓
	Creative filière	1.300*** (0.025)		1.301*** (0.025)	+	✓
	Creative specialisation externalities	2.422*** (0.191)	2.526*** (0.215)	2.613*** (0.207)	+	✓
	Creative clusters	1.225*** (0.040)			+	✓
Urbanisation economies	Population		1.004*** (0.000)		+	✓
	Employment density			1.003*** (0.000)	+	✓
	Population concentration	2.475*** (0.545)	2.126*** (0.508)	2.808*** (0.616)	+	✓
	Labour supply	1.036*** (0.008)		1.032*** (0.008)	+	✓
	Diversity externalities	1.086*** (0.009)	1.107*** (0.009)	1.087*** (0.009)	+	✓
	Infrastructures	0.923*** (0.006)	0.934*** (0.007)	0.940*** (0.007)	+	✗
	Public services	0.837** (0.065)			+	✗
	Social capital		1.014*** (0.005)		+	✓
Specific creative forces	Capital region	1.143 (0.199)	0.736* (0.134)	1.196 (0.209)	+	✗
	Heritage	0.920 (0.090)	0.896 (0.087)	0.930 (0.089)	+	●
	Air quality	1.001 (0.002)	0.999 (0.002)	1.001 (0.002)	-	●
	Touristic services		0.943*** (0.016)		-	✓
	Analytic specialisation externalities	1.104*** (0.039)	1.088** (0.037)	1.124*** (0.041)	+	✓
	Synthetic specialisation externalities	1.067*** (0.021)	1.087*** (0.025)	1.073*** (0.021)	+	✓
	Human capital		1.108*** (0.019)		+	✓
	Tolerance	0.978* (0.012)	0.938*** (0.012)	0.974** (0.012)	-	✓
	Innovation	0.997 (0.023)	1.001 (0.025)	0.999 (0.023)	+	●
	Patronage			0.952*** (0.017)	+	✗
	Constant	0.697 (0.334)	2.414** (0.914)	0.594 (0.281)		

Pseudo R-squared	0.206	0.197	0.209
Observations	686	686	686
LR chi2	1359.28	1296.88	1376.42
Log-likelihood	-2613.587	-2644.782	-2605.017
AIC	5265.2	5327.6	5248.0
BIC	5351.3	5413.7	5334.1
lnalpha	-0.822	-0.717	-0.835
	(0.061)	(0.059)	(0.061)
alpha	0.439	0.488	0.434
	(0.027)	(0.029)	(0.026)
Likelihood-ratio test of alpha=0	14000***	13000***	16000***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: The Reported Incidence Ratios (IRR) represent the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.

c) Portugal

		(10) Portugal	(11) Portugal	(12) Portugal	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	1.051*** (0.013)		1.063*** (0.015)	+	✓
	Creative competition	1.693*** (0.334)	1.995*** (0.472)	1.731** (0.386)	+	✓
	Creative filière	1.384*** (0.063)	1.283*** (0.0600)	1.408*** (0.068)	+	✓
	Creative specialisation externalities	1.687* (0.513)	2.385*** (0.745)	2.282*** (0.727)	+	✓
	Creative clusters	1.128*** (0.026)			+	✓
Urbanisation economies	Population		1.001*** (0.000)		+	✓
	Employment density			1.011*** (0.002)	+	✓
	Population concentration	11.49*** (8.657)			+	✓
	Labour supply		1.135*** (0.033)		+	✓
	Diversity externalities	1.171*** (0.026)	1.178*** (0.028)	1.163*** (0.028)	+	✓
	Infrastructures	0.967*** (0.012)	1.004 (0.018)	1.014 (0.019)	+	✗
	Public services	1.054 (0.174)			+	●
	Social capital	1.039** (0.018)	0.985 (0.021)	1.022 (0.018)	+	✓
Specific creative forces	Capital region	1.045 (0.307)	1.493 (0.477)	0.942 (0.314)	+	●
	Heritage	0.873 (0.234)	0.821 (0.227)	1.052 (0.285)	+	●
	Air quality	0.992 (0.008)	0.992 (0.008)	0.993 (0.008)	-	●
	Touristic services		0.884 (0.074)		-	●
	Analytic specialisation externalities	1.256* (0.171)	1.410*** (0.185)	1.225 (0.172)	+	✓
	Synthetic specialisation externalities		1.166*** (0.065)		+	✓
	Human capital			1.163*** (0.059)	+	✓
	Tolerance	0.967*** (0.009)	0.963*** (0.009)	0.969*** (0.009)	-	✓
	Innovation	15.48*** (15.130)	12.34** (12.560)	7.157* (7.436)	+	✓
	Patronage			1.013 (0.036)	+	●
	Constant	0.175***	0.005***	0.076***		

	(0.113)	(0.006)	(0.059)
Pseudo R-squared	0.236	0.230	0.232
Observations	83	83	83
LR chi2	222.88	217.63	218.72
Log-likelihood	-360.850	-363.473	-362.926
AIC	757.7	762.9	761.9
BIC	801.2	806.5	805.4
lnalpha	-1.236	-1.117	-1.120
	(0.186)	(0.180)	(0.060)
alpha	0.290	0.327	0.326
	(0.054)	(0.059)	(0.058)
Likelihood-ratio test of alpha=0	1135.25***	1701.19***	2214.54***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: The Reported Incidence Ratios (IRR) represent the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.

d) Spain

		(13) Spain	(14) Spain	(15) Spain	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	1.010*** (0.002)	1.006*** (0.001)	1.010*** (0.001)	+	✓
	Creative competition	1.132* (0.082)	1.532*** (0.127)	1.128* (0.081)	+	✓
	Creative filière	1.281*** (0.022)		1.281*** (0.022)	+	✓
	Creative specialisation externalities	4.223*** (0.374)	4.175*** (0.416)	4.198*** (0.372)	+	✓
	Creative clusters	1.127*** (0.034)		1.128*** (0.034)	+	✓
Urbanisation economies	Population		1.002*** (0.000)		+	✓
	Employment density	1.001*** (0.000)	1.001** (0.001)	1.001*** (0.000)	+	✓
	Population concentration	4.490*** (0.665)	3.555*** (0.623)	4.440*** (0.658)	+	✓
	Labour supply	1.027*** (0.005)	1.028*** (0.006)	1.027*** (0.005)	+	✓
	Diversity externalities	1.113*** (0.011)	1.126*** (0.012)	1.113*** (0.011)	+	✓
	Infrastructures	0.972*** (0.003)	0.969*** (0.003)	0.973*** (0.003)	+	✗
	Public services	1.139** (0.065)			+	✓
	Social capital	0.997 (0.005)	0.982*** (0.005)	0.996 (0.005)	+	●
Specific creative forces	Capital region	1.603*** (0.287)	0.929 (0.193)	1.606*** (0.289)	+	✓
	Heritage	1.080* (0.050)	1.046 (0.050)	1.082* (0.050)	+	✓
	Air quality	0.999 (0.001)	1.000 (0.001)	0.999 (0.001)	-	●
	Touristic services		1.000 (0.013)		-	●
	Analytic specialisation externalities	1.335*** (0.096)	1.263*** (0.094)	1.345*** (0.097)	+	✓
	Synthetic specialisation externalities	1.043** (0.022)	1.039* (0.023)	1.045** (0.022)	+	✓
	Human capital		1.086*** (0.013)		+	✓
	Tolerance	1.016*** (0.005)	1.022*** (0.005)	1.015*** (0.005)	-	✓
	Innovation	0.981 (0.016)	0.971* (0.017)	0.980 (0.016)	+	✗
	Patronage			1.013 (0.0115)	+	●
	Constant	0.108*** (0.041)	0.116*** (0.045)	0.116*** (0.043)		

Pseudo R-squared	0.265	0.246	0.265
Observations	806	806	806
LR chi2	1858.34	1721.54	1854.27
Log-likelihood	-2571.569	-2639.967	-2573.602
AIC	5185.1	5321.9	5189.2
BIC	5283.7	5420.5	5287.7
lnalpha	-0.930	-0.768	-0.926
	(0.061)	(0.061)	(0.061)
alpha	0.394	0.464	0.396
	(0.024)	(0.028)	(0.024)
Likelihood-ratio test of alpha=0	13000***	12000***	13000***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: The Reported Incidence Ratios (IRR) represent the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.

e) United Kingdom

		(16) United Kingdom	(17) United Kingdom	(18) United Kingdom	(19) United Kingdom	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	1.000** (0.000)	1.000* (0.000)	1.000* (0.000)	1.000* (0.000)	+	✓
	Creative competition	0.955 (0.039)	1.104** (0.046)	1.109** (0.045)	1.044 (0.042)	+	✓
	Creative filière	1.301*** (0.041)				+	✓
	Creative specialisation externalities	10.35*** (2.938)	12.03*** (3.795)	13.66*** (3.934)	13.35*** (3.950)	+	✓
	Creative clusters		1.051*** (0.009)			+	✓
Urbanisation economies	Population			1.002*** (0.000)		+	✓
	Employment density				1.004*** (0.000)	+	✓
	Population concentration	1.880 (0.800)	4.853*** (2.310)	3.577*** (1.577)	7.585*** (3.318)	+	✓
	Labour supply	1.020* (0.012)	1.035*** (0.013)	1.045*** (0.013)	1.050*** (0.013)	+	✓
	Diversity externalities	1.056*** (0.012)	1.048*** (0.012)	1.046*** (0.012)	1.055*** (0.012)	+	✓
	Infrastructures	0.958*** (0.005)				+	✗
	Public services		0.907*** (0.021)			+	✗
	Social capital	1.016*** (0.006)	1.009 (0.006)	1.001 (0.006)	1.006 (0.006)	+	✓
Specific creative forces	Capital region	1.340** (0.178)	1.803*** (0.249)	1.217 (0.176)	1.601*** (0.217)	+	✓
	Heritage	2.664*** (0.514)	1.588** (0.356)	1.166 (0.222)	1.323 (0.272)	+	✓
	Air quality	1.002 (0.002)	1.001 (0.002)	1.000 (0.002)	1.000 (0.002)	-	●
	Touristic services			0.844*** (0.0463)		-	✓
	Analytic specialisation externalities	1.103** (0.048)	1.134** (0.056)	1.126*** (0.051)	1.151*** (0.055)	+	✓
	Synthetic specialisation externalities	1.086* (0.052)	1.048 (0.054)	1.076 (0.053)	1.071 (0.052)	+	●
	Human capital	0.980** (0.010)	0.958*** (0.0101)	0.959*** (0.009)	0.973*** (0.010)	+	✓

	Tolerance	1.016 (0.022)	1.004 (0.024)	0.966 (0.022)	1.019 (0.024)	-	●
	Innovation	1.032 (0.049)	1.140** (0.062)	1.138** (0.060)	1.155*** (0.064)	+	✓
	Patronage				0.951 (0.038)	+	●
	Constant	2.208 (1.683)	1.638 (1.330)	2.115 (1.649)	0.306 (0.248)		
	Pseudo R-squared	0.149	0.139	0.144	0.145		
	Observations	243	243	243	243		
	LR chi2	532.41	499.78	515.55	520.50		
	Log-likelihood	-1525.394	-1541.706	-1533.821	-1531.345		
	AIC	3088.8	3121.4	3105.6	3100.7		
	BIC	3155.2	3187.8	3172.0	3167.1		
	lnalpha	-1.091	-0.954	-1.009	-1.032		
		(0.091)	(0.089)	(0.089)	(0.089)		
	alpha	0.336	0.385	0.364	0.356		
		(0.030)	(0.034)	(0.032)	(0.317)		
	Likelihood-ratio test of alpha=0	31000***	35000***	39000***	33000***		

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: The Reported Incidence Ratios (IRR) represent the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, •indicates that the predictor variable is not statistically significant.

Table 4.5. Concordance of the results obtained in the regression with the expected sign of the regressor: Localisation economies

	Expected sign	France	Italy	Portugal	Spain	United Kingdom	Europe (5 countries)
Creative firms size	+	✓	✓	✓	✓	✓	✓
Creative competition	+	×	✓	✓	✓	✓	✓
Creative filière	+	✓	✓	✓	✓	✓	✓
Craetive specialisation externalities	+	✓	✓	✓	✓	✓	✓
Creative clusters	+	✓	✓	✓	✓	✓	✓

Note 1: The three signs indicate the concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically singificant and corroborates the positive or negative expected sign. Secondly, × indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, •indicates that the predictor variable is not statistically significant.
Source: Own computations based on Table 4.3-Table 4.4.

According to the regression results, **not all localisation externalities regressors have the same effect on the localisation of firms in creative industries**.

As presented in Figure 4.2, **creative specialisation externalities seem to be the most significant localisation determinant** of the localisation of firms in creative industries in all the 5 European countries under analysis. For all the 5 European countries together, one unit increase in the specialisation externalities index increases the number of firms in creative industries located in the LLS by 3.6 times (maximum percentage change in the dependent variable, called max IRR from now on). Even if this can be considered the major localisation determinant across the 5 countries under analysis, its coefficient varies largely when observing the individual national results.

The **creative competition appears as the second most important localisation predictor** when analyzing all the 5 European countries together showing that one unit increase in the level of local creative competition increases the number of firms in creative industries located in a LLS by 1.28 times. This regressor seems to be more important (max IRR>1.5) in southern countries (Portugal, Spain and Italy). The regressor also displays a positive sign in the United Kingdom although it presents a negative sign in France showing a positive effect of the presence of monopolistic creative structures to explain a larger location of firms in creative industries in the local area. Alternatively, the indicator used (inverse of the average firm size) can be interpreted in a more traditional way, indicating

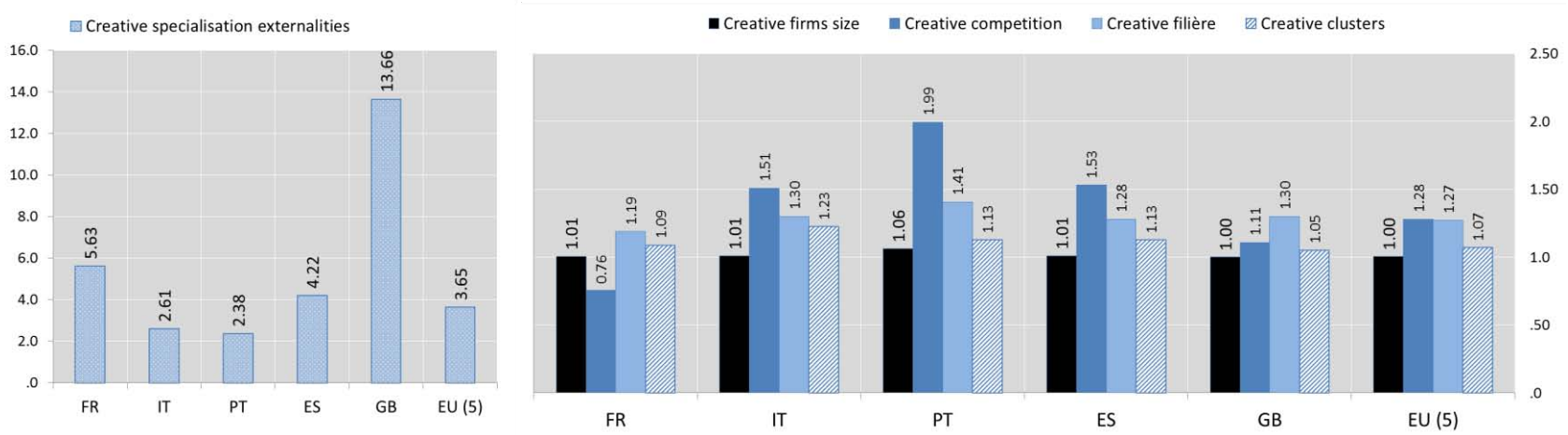
that scale economies are relevant to explain the concentration of creative industries in French LLS.

The **creative filière displays the third largest impact** among the localised independent variables in terms of a percentage change in the observed number of firms in creative industries count. For all the 5 European countries under study, firms in creative industries increase by approximately 1.27 with every one unit increase in the distribution of the creative industries (creative filiere index). This regressor seems to be most relevant in Portugal (max IRR=1.41), followed by France and the United Kingdom (1.30), Spain (1.28) and France (1.19).

The **creative cluster** variable also shows a positive and significant impact on the level of creative industries in the LLS. For the 5 European countries together, the presence of one additional creative cluster results in 1.07 times of firms in creative industries in the LLS. This variable is particularly important in Italy, Spain and Portugal, where it has the largest Incidence Rate Ratio across the 5 European countries under study (1.23, 1.13 and 1.13 times increase respectively).

Finally, small but positive IRR have been found for the **size of the firms in creative industries** showing a positive correlation between large firms in creative industries and creative clustering, although the effect is very small, increasing the rate in only 1.01 times increase.

Figure 4.2. Maximum reported Incidence Rate Ratios by country and by localisation economy.



Note 1: Creative specialisation externalities have been separated from the other localisation economies for a better display.
Note 2: This figure shows the maximum Incidence Rate Ratio that can be observed in the regressions presented from Table 4.3 to Table 4.4. The Reported Incidence Ratios (IRR) represents the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Source: Own calculations based on the results from Table 4.3 to Table 4.4.

b) General determinants II: Urbanisation economies

The econometric results corroborate also the **relevance of urbanisation economies as drivers of creative clustering** in the 5 European countries under study. Table 4.6 presents the summary of the results obtained in the regression analysis showing that urbanisation economies have a positive and significant impact on the location of firms in creative industries in the space. At the aggregate level, it has been observed that five out of eight urbanisation economies are considered to have a positive and significant effect on the concentration of creative industries (considering the 5 European countries together). The regressors of **city size and density of economic agents are positively associated with the creative clustering**. Additionally, higher **productive diversity** and better **public services** are also positively and significatively associated with a larger presence of firms in creative industries in the LLS.

Country regressions for the United Kingdom, Portugal and Italy show additional positive and significant correlations between the location of firms in creative industries and a larger presence of **labour force supply** or **social capital**. Contrary to what was initially expected, the **social capital variable**, which tries to measure the degree of trust of the LLS, displays a non significant effect in Spain and France and a **negative and significant coefficient** for all the 5 European countries together. **Public services** appear to be positively correlated with creative clustering in Spain, while this variable shows a non significance in France and Portugal and a negative correlation in Italy and the United Kingdom.

Among the 5 European countries under analysis, France appears to be the country with the smallest number of regressors positively affecting the localisation of firms in creative industries. Indeed, only variables such as population size, population concentration and the diversity of externalities appear to have a positive and significant effect on the concentration of creative industries. Variables such as employment density, labor supply, public services and social capital seem to be non significant in the regressions. Additionally, and contrary to the general opinion, a **large volume of roads per capita show a negative and significant relation** with the presence of firms in creative industries in the LLS. This result is also corroborated for all the other countries under analysis. This may be explained by the fact that firms in creative industries are not constrained to the volume of physical roads to operate since transfer of tacit knowledge is mainly generated at the local level by face to face contacts.

Table 4.6. Concordance of the results obtained in the regression with the expected sign of the regressor: Urbanisation economies.

	Expected sign	France	Italy	Portugal	Spain	United Kingdom	Europe (5 countries)
Population	+	✓	✓	✓	✓	✓	✓
Employment density	+	•	✓	✓	✓	✓	✓
Population concentration	+	✓	✓	✓	✓	✓	✓
Labour supply	+	•	✓	✓	✓	✓	×
Diversity externalities	+	✓	✓	✓	✓	✓	✓
Infrastructures	+	×	×	×	×	×	×
Public services	+	•	×	•	✓	×	✓
Social capital	+	•	✓	✓	•	✓	×

Note 1: The three signs indicate the concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically singificant and corroborates the positive or negative expected sign. Secondly, × indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.
Source: Own computations based on Table 4.3-Table 4.4.

For all the 5 European countries together, one unit increase in the **population** concentration Gini index increases the number of firms in creative industries located in the LLS by 12.5 times. When considering this variable at the country level its relevance is higher in Portugal and the United Kingdom.

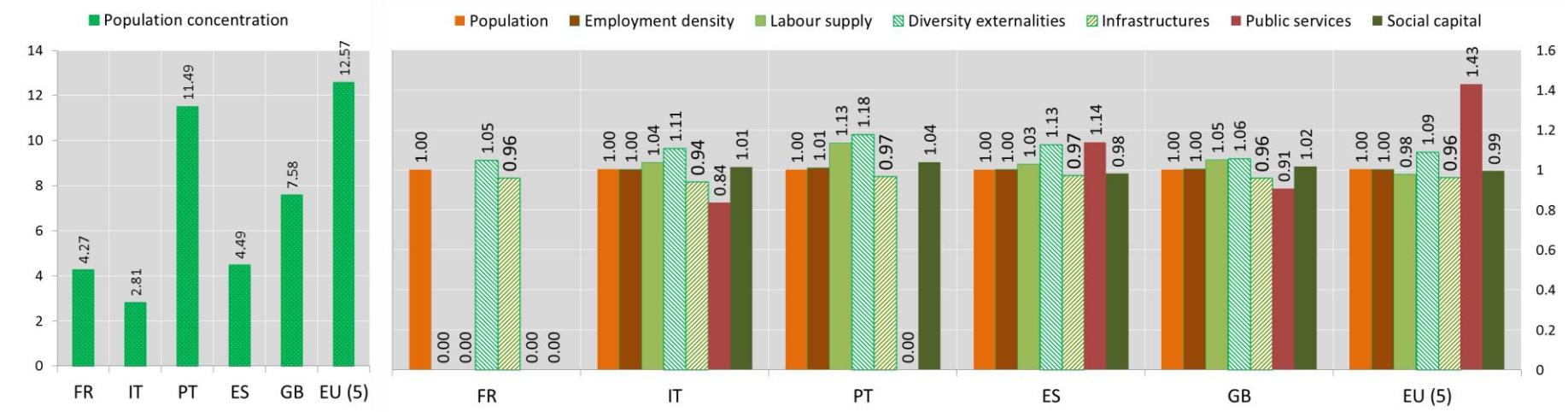
Public services appear as the second most important urbanisation determinant in the 5 European countries considered together (max IRR=1.43) and in Italy and Spain (max IRR = 0.84 and 1.14 respectively). This regressor appears to be negative and statistically correlated in the United Kingdom, where a one unit increase in the share of public services per capita reduces the number of firms in creative industries by a factor of 0.9, while holding all other variables in the model constant.

Productive diversity is the third most important urbanisation determinant in the 5 European countries under analysis. Based on the results obtained, one unit increase in the diversity of a LLS is associated with an increase of 1.09 times in the number of creative industries located in the LLS. As showed in Figure 4.3, this regressor seems to be particularly important in countries Portugal, Spain, and Italy.

The fourth most important urbanisation regessor is the **labour supply**, where the largest Incidence Rate Ratio is observed in Portugal (max IRR=1.13), and followed by the United Kingdom (max IRR=1.05), Italy (max IRR=1.04) and Spain (max IRR=1.03).

The rest of the urbanisation economies display a low but significant IRR (below 1.04) with the exception of public infrastructure that shows a negative relationship with the number of firms in creative industries for all the 5 European countries under study.

Figure 4.3. Maximum reported Incidence Rate Ratio by country and by urbanisation economy.



Note 1: Population concentration and public services have been separated from the other urbanisation economies for a better display.
Note 2: This figure shows the maximum Incidence Rate Ratio can be observed in the regressions presented from Table 4.3 to Table 4.4. The Reported Incidence Ratios (IRR) represents the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Source: Own calculations based on the results from Table 4.3 to Table 4.4.

c) Specific determinants

Based on the results obtained from Table 4.3 to Table 4.4 it can be observed that only two creative specific regressors display the expected significant sign in all the countries under analysis: **analytic knowledge base** and **human capital** (Table 4.7). Despite this fact, it is important to note that significant differences have been observed among the five countries analysed.

Air quality presents as expected a negative influence on the concentration of creative industries in the 5 European countries as a whole. However, this is not the case at the country level, being this index not statistically significant.

The presence of **patronage** (access to credit) does not seem to be relevant to explain the presence of creative industries in the 5 European countreis under study and it even has a negative impact on the location of firms in creative industries in Italy.

Touristic services seem to have a negative and significant impact on the concentration of creative industries in Italy, the United Kingdom and in the 5 European countries together, corroborating the general idea that tourism may make rents higher thus conditioning the location of creative individuals. The rest of the countries under analysis show a non significant effect of the tourism on the location of creative industries.

The presence of **innovation gatekeepers** seems to play also an important role to explain the location of firms in creative industries in the space, except in Spain (where the relationship between both variables is negative) and Italy (where the effect is not statistically significant).

The presence of **heritage** amenities is a positive and significant determinant of the location of firms in creative industries in the 5 European countries as a whole, in France, in Spain and in the United Kingdom. On the countrary, this index is not significant in Portugal and Italy.

Tolerance does not seem to be a relevant factor in northern countries such as the United Kingdom and France (non significant effect), while the expected sign has been observed in

Portugal, Spain and Italy. This result shows that the level of openness of a territory matters to explain the clustering of firms in creative industries in southern countries.

The **political power** represented by the capital of region is positive and statistically correlated with the presence of firms in creative industries in France, Spain, the United Kingdom and the 5 European countries as a whole, thus confirming the idea that firms in creative industries tend to be located close to centers of political power. However, this regressor seems to be negatively correlated with the location of firms in creative industries in Italy and it is not statistically significant in Portugal.

The relative specialisation of the LLS in **High tech sectors** (synthetic knowledge-based sectors) has a positive and significant impact on the location of firms in creative industries in Italy, Portugal and Spain. On the contrary, the presence of externalities derived from a larger specialisation of employment in synthetic knowledge-based sectors is not statistically significant in countries such as France and the United Kingdom.

All in all, creative specific externalities seem to be positive and statistically significant for the 5 European countries considered together (with the exception of patronage).

Table 4.7. Concordance of the results obtained in the regression with the expected sign of the regressor: Specific creative forces.

	Expected sign	France	Italy	Portugal	Spain	United Kingdom	Europe (5 countries)
Capital region	+	✓	✗	•	✓	✓	✓
Heritage	+	✓	•	•	✓	✓	✓
Air quality	-	•	•	•	•	•	✓
Touristic services	-	•	✓	•	•	✓	✓
Analytic specialisation externalities	+	✓	✓	✓	✓	✓	✓
Synthetic specialisation externalities	+	•	✓	✓	✓	•	✓
Human capital	+	✓	✓	✓	✓	✓	✓
Tolerance	-	•	✓	✓	✓	•	✓
Innovation	+	✓	•	✓	✗	✓	✓
Patronage	+	•	✗	•	•	•	•

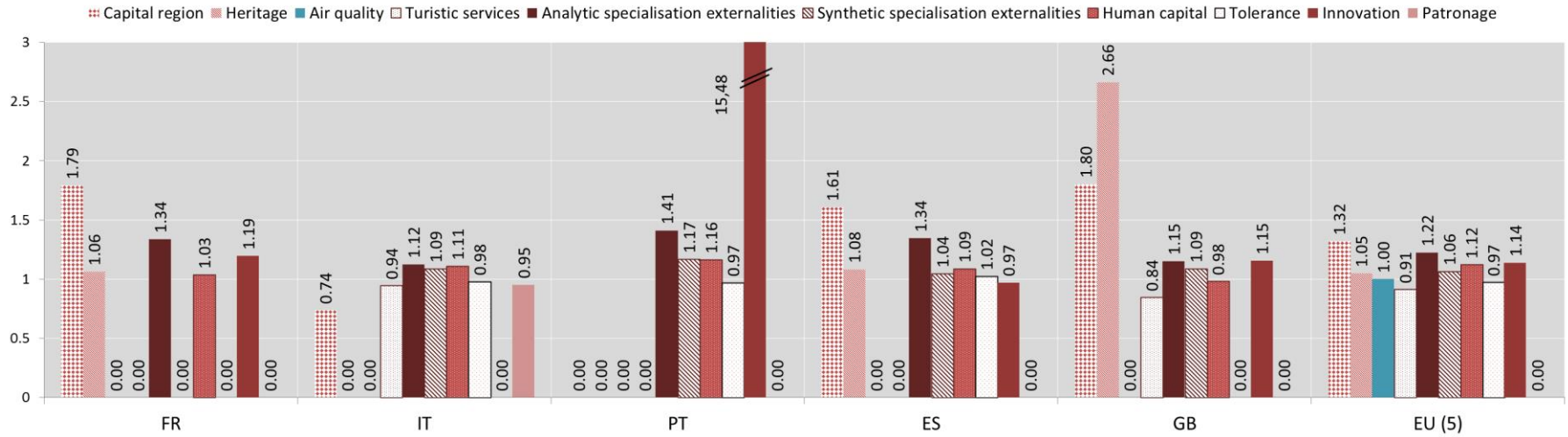
Note 1: The three signs indicate the concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically singificant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.
Source: Own computations based on Table 4.3-Table 4.4.

The Incidence Rate Ration observed from the specific creative forces varies country by country. For the 5 European countries together the largest IRR is observed in the **capital of the region**, showing that, given the other variables are held constant in the model, capital LLS compared to non-capital LLS are expected to have a rate 1.31 times greater for the number of firms in creative industries. The second most important specific creative force is derived from the technological levels observed in the territory. This is observed through two main elements. The first one is the level of **analytic specialisation** (max IRR=1.22), and the second one the **innovation intensity** generated in the LLS (max IRR=1.14). The presence of talented people is also positively associated to the concentration of firms. Indeed, one unit increase in the **share of population with a university degree** (human capital) would be expected to increase the number of firms in creative industries in the LLS by 1.12 (max IRR). Other elements shuch as **synthetic specialisation** and the

presence of **cultural heritage** also show a positive effect on the location of firms in creative industries in the LLS (max IRR= 1.06 and 1.05 respectively).

In **France**, the three specific creative forces with the largest IRR are the presence of a regional capital (max IRR= 1.79), followed by the analytic specialisation extenalities (max IRR= 1.34) and the innovation capacity of the territory (max IRR= 1.19). Similarly, the **United Kingdom** matches France in two of the most important determinants of the location of firms in creative industries, namely, regional capital (max IRR=1.80), innovation capacity and analytic specialisation externalities (both with a max IRR=1.15), adding as a third important element the presence of heritage (max IRR=2.66). In **Spain**, the presence of a regional capital and the specialisation externalities derived from a larger concentration of analytic firms are also important elements to explain the location of firms in creative industries (max IRR= 1.61 and 1.34 respectively) while the level of human capital appears to be the third most important predictor in Spain (max IRR=1.09). In **Italy**, the analytic specialisation externalities are the most important predictor of the concentration of creative industries in the LLS (max IRR=1.12), followed by the level of human capital in the LLS (max IRR=1.11) and synthetic specialisation externalities (max IRR=1.09). Finally, the innovation capacity (max IRR=15.48) appears to be the major determinant of the concentration of creative industries in **Portugal** followed by the presence of analytic and synthetic specialisation externalities (max IRR=1.41 and 1.17 respectively).

Figure 4.4. Maximum reported Incidence Rate Ratio by country and by specific creative forces.



Note 1: This figure shows the maximum Incidence Rate Ratio that can be observed in the regressions presented from Table 4.3 to Table 4.4. The Reported Incidence Ratios (IRR) represents the change in the dependent variable for a one unit increase in the independent variable, given the other variables are held constant in the model. The percentage increase or decrease is determined by the amount the IRR is either above or below 1. As a result, an IRR below 1 indicates a negative relationship between the dependent and the independent variable. On the contrary, an IRR above 1 specifies a positive relationship between them.
Source: Own calculations based on the results from Table 4.3 to Table 4.4.

4.6. Conclusions

This chapter has presented an empirical analysis of the main determinants of the concentration of creative industries in 5 European countries. This analysis relies on a Negative Binomial Regression Model which overcomes the overdispersion characterising the dependent variable (number of creative industries in the LLS).

Based on the theoretical framework of this thesis (Chapter 2) the determinants of the location of firms in creative industries are captured in 23 independent variables grouped into two major groups: a) general factors (which are subdivided in localisation and urbanisation externalities) and b) specific-creative forces.

The empirical results confirm the relevance of both general as well as of creative specific factors. More concretely, the analysis confirms the positive and significant impact of the localisation economies in the location of firms in creative industries in the 5 European countries under study. The only exception in this regard is France where a less competitive creative business environment affects positively the concentration of creative industries. The creative specialisation externalities appear as the main localisation force that explain the concentration of firms in all the countries analysed followed by creative competition and creative filière. To a lesser extent, the economies of scale and the presence of creative clusters also contributes to explain the location of firms in creative industries creative in the 5 European countries. However, the latter is significantly important in the context of Spain.

The results also corroborate the importance of urbanisation economies as drivers of the location of firms in creative industries. Indeed, at the supra-national level, five out of eight of the regressors analysed reveal a positive and significant effect on the location of creative industries, being the spatial population concentration and the access to public services the two main urbanisation forces. As for the volume of roads per capita (infrastructure) this variable shows a negative and significant relation with the presence of firms in creative industries in the LLS. Despite the overall consistency of the results across countries, some differences have been observed at country level.

Specific creative forces have also been confirmed as important determinants of the concentration of creative industries in the 5 European countries under analysis. As a

general trend, it is observed that analytic specialisation externalities and human capital seem to be positively and statistically significant in all the countries analysed. Similarly, low air quality, despite not being statistically significant in any of the studied countries, presents a negative statistical significance effect on the concentration when considering all the 5 European countries together. However, despite the consistency of these results across countries significant differences have been observed regarding the relevance of other specific creative forces. For instance, the presence of a regional capital shows the highest incidence rate ratio in France and Spain as well as when considering all 5 European countries together. However this variable seems to have a negative effect on the concentration of creative industries in Italy. Innovation capacity appears to be the major determinant of the concentration of creative industries in Portugal whereas it has a negative impact on the concentration of creative industries in Spain. The presence of heritage in the LLS is the main specific creative force in the United Kingdom while this variable is not significant in countries such as Italy or Portugal.

This result suggests the need to design and implement policies at the supra-national level taking into account all the creative specific externalities together in order to boost the concentration of creative industries in the EU as a whole. At the same time, specific policies should be envisaged at the national level, targeting particular sensitivities of national creative environments.

Chapter 5 . Conclusions and policy recommendations

5.1. Main conclusions of the thesis

5.2. Creative industries policy strategies: some reflections

5.3. Suggestions for further work

This thesis aimed to identify the determinants of the localisation of creative industries by analysing their patterns of localisation and the determinants of these patterns. Grounded on an exhaustive review of the literature, the research hypothesis is that the localisation of firms in creative industries is determined by general forces (external economies) that affect the localisation of all the firms, and specific forces (creative factors) affecting the localisation of creative industries, although the effect of general forces is the most important determinant.

The spatial patterns of localisation of creative industries were analysed in 5 European countries: France, Italy, Portugal, Spain and the United Kingdom. This is done by providing a homogeneous definition of creative industries (including 45 industries grouped in 12 creative sub-sectors), as well as comparable territorial units of analysis (2,122 Local Labour Systems). One of the main innovations of this thesis is the use of micro-level data (from ORBIS 2011 of Bureau van Dijk) to identify the exact location of creative firms in the 5 European countries under analysis. Based on the postal address provided by this database, it was possible to geocode almost 5 million firms among which more than 380,000 creative firms. LLS and geocoded data were the base for the empirical analysis of the localisation and concentration of firms in creative industries as well as for the econometric modelling of the determinants of their concentration.

5.1. Main conclusions of the thesis

The main conclusions of this thesis can be summarised in the following three points:

1. Creative industries tend to be highly concentrated in the space and creative sub-sectors tend to co-locate in the same places. Specialisation measures have shown the presence of more dispersed specialised creative LLS in Spain and Italy than in Portugal, France and the United Kingdom. Moreover, co-location measures have shown a relatively high degree of spatial overlapping of creative sectors.

2. The localisation of firms in creative industries, as well as their spatial concentration, is determined by general forces affecting all the activities, and by specific forces affecting creative industries. The empirical results confirm the relevance of traditional agglomeration economies. The analysis conducted confirms the positive and significant impact of almost all localisation and urbanisation variables on the location of firms in

creative industries in the 5 European countries under study. On the one hand, the creative specialisation externalities appear as the main localisation force explaining the concentration of firms in all the countries analysed, followed by creative competition and creative filière (local value chain). To a lesser extent the economies of scale and the presence of creative clusters also contribute to explain the location of creative firms in the 5 European countries. On the other hand, spatial population concentration and the access to public services are the two main urbanisation forces when considering all 5 European countries together.

Econometric results also confirm the significance of specific creative forces to explain the spatial location of creative industries when considering the 5 European countries under analysis. For instance, the presence of analytic specialisation externalities and human capital has been considered relevant for the localisation of creative firms in all the countries analysed. To a different extent, low air quality, despite not being statistically significant in any of the studied countries, presents a negative statistical significance effect on the concentration when considering all the 5 European countries together. This suggests the need to design and implement environmental policies at the supra-national level in order to attract and retain creative individuals.

3. Despite the general results observed when considering all 5 European countries together, the determinants of localisation of firms in creative industries show differences and, sometimes, opposed behaviours across countries. This is particularly notorious for specific creative forces. For instance, the fact that the local labour system hosts a regional capital has a positive influence for the localisation of creative industries in France and Spain, although its effect is negative in Italy. Other specific creative forces such as innovation or heritage have also a mixed effect across countries.

5.2. Creative industries policy strategies: some reflections

Policy implications of this research based on the findings are of significant importance for regional and local policy makers in the 5 countries under study. It is important to understand that the new EU initiative called Europe 2020 strategy (smart, green and inclusive growth) aims at boosting the growth of national economies and jobs by supporting a diversified, strong and competitive industrial base in Europe. At the same time, several studies have recently provided sound evidence on the contribution of creative

industries to local and regional development in the EU (De Miguel *et al.* (2012); Rausell *et al.* 2012; the European Commission 2010 b). ndeed, the European Commission (2010b) underlines that those creative industries can be considered important innovators as well as important drivers of innovation in other sectors of the economy. It is for this reason that regional policy makers need sound evidence on the factors that might attract creative industries. Indicators of such factors can indeed be integrated into concrete policy frameworks tailored to the characteristics of each country.

In terms of policy action, the main conclusion stemming from the results of this thesis is that, when it comes to designing policies aimed at boosting a creative industrial base in European territories, **one size does not fit all**. Indeed, the economic, environmental and social characteristics of a territory operating as drivers of the location of creative industries report heterogeneous behaviours across the analysed countries. This way, the same creative force may have a positive impact in some countries and a negative or non-significant one in others. The presence of touristic services is a clear example. Whereas in Portugal, Spain and France this variable is negligible to explain the location of creative industries, in the United Kingdom and in Italy a larger availability of touristic services deters these industries from locating in the territory. In order to avoid paying higher rental prices these industries tend to relocate in territories less saturated by touristic demand. **Territorial idiosyncrasies** thus have to be taken into account both in the national and the supra-national policy-making agendas.

The effect of territorial idiosyncrasies on the location of creative industries has been captured by general forces (external economies) but this thesis also provides evidence for the role played by specific forces (creative factors) affecting the location of creative industries. It is this comprehensive notion of **territorial capital** that has to be taken into account by policy-makers to foster the attractiveness of a territory for creative industries.

Since some of these drivers are better targeted at the national level whereas others are better targeted at the supra-national level**, non-fragmented** approaches should be envisaged. In this context, three implementation approaches can be devised. Firstly, a bottom-up approach with a main supra-national policy action, when the targeted forces are significant only at supra-national level; secondly, a bottom-up approach, when the targeted forces are significant only at national level; and, thirdly, a mixed approach when forces are

significant at both levels. For instance, air quality, has been confirmed by the results of this thesis as an attractor of creative industries best targeted at the supra-national level. EU restrictions on air pollution become in this sense strategic policy tools. In contrast, labour supply has been found to be significant at the national level, and thus should be tackled within national policy action, for instance through measures increasing working incentives. Lastly, the presence of human capital has been found to be a significant factor both at national and supra-national level. Educational and research infrastructures could for instance be fostered at the national level, whereas at the supra-national level student mobility could be further promoted.

This tiered intervention calls for a well- articulated **multi-level policy approach** whereby both vertical and horizontal coordination are assured. Vertical coordination ensures the management of a diversity of stakeholders participating in decision-making and policy implementation. In order to spot territorial opportunities and assets to be mobilized, the participation of both local and supra-national administrations becomes crucial: local administrations possess a fine-grained knowledge of the territorial assets and are thus better placed to identify potentially fruitful areas of action to successfully implement targeted policies. Horizontal coordination refers to the interaction between organisations operating at the same territorial level. This dimension is especially relevant for creative industries since they tend to be located in functional territories comprising several municipalities, going thus beyond the limits of administrative boundaries.

Besides that, the thesis provides evidence on the multidimensional nature of forces determining the location of creative industries: localisation, urbanisation and specific creative forces operate simultaneously. Therefore, **policy complementarity** becomes clearly a requirement. In this sense, for instance, integration policies (to increase citizen tolerance) and industrial policies (fostering the creation of clusters and diversifying the economy) may yield better results if implemented simultaneously.

Last but not least, emphasis should be put on the fact that specific forces driving creative industries concentration (*e.g.* the availability of high human capital) may be more easily impacted by public action than certain general forces (*e.g.* the fact that a LLS has a high population density). This observation sets the ground for the exploration of concrete feasible actions to be undertaken by different levels of government.

In this respect, this thesis aims to serve as a tool for national and supra-national policy-making aiming at boosting territorial development by attracting, retaining and generating creative industries. Based on the results, some general policy recommendations could be drawn: *i*) the need to create favourable eco-systems for creative entrepreneurs (support leading enterprises, strengthening of clusters and networks as well as creative competitiveness); *ii*) encourage open innovation approaches to facilitate cross-sectoral exchange, especially between analytic and symbolic industries ; *iii*) ensure the availability of skilled workers that better match the needs of creative industries; *iv*) promote labour mobility as well as social cohesion and tolerance; *v*) encourage economic diversification; and *vi*) encourage environmental sustainability. Additionally, some "place-based" policies need to be fostered in particular countries: *i*) to spread the uniqueness and diversity of cultural heritage in France, Spain and the United Kingdom; *ii*) encourage cross-sectoral exchange between synthetic and symbolic knowledge based activities in Italy, Portugal and Spain; *iii*) promotion of strategies for the maintenance of life satisfaction in Spain (better access to public services); *iv*) promote social capital (trust) in Italy, Portugal and the United Kingdom; *v*) enhance efficient public administration and proximity of creative industries to public institutions (which might provide support for funding, taxation, investment and financing) in France, Spain and the United Kingdom; and *vi*) promote faster simplified administrative procedures for intellectual property rights registration in France, Portugal and the United Kingdom.

All in all, it is worthy to mention that policy success depends on a careful analysis of the local needs and assets as well as on the creation of policies tailored to the specific situations. Besides that, good policy practices need to be shared in order to serve as an inspiration for new policy-making approaches in other locations.

5.3. Suggestions for further work

The aim of this section is to highlight a number of topics on which further research would be beneficial for a better understanding of the determinants of the location of creative industries.

Firstly, this thesis limits the analysis of the determinants of the location of creative industries to 5 European countries.The extension of this research to other countries would help to understand the territorial distribution of creative industries in Europe as well as the

local assets needed to help policy makers to better design policies at national and supra-national level aiming at attracting, retaining and creating creative industries. In order to conduct this research the territorial unit of analysis (LLS) would need to be identified by using commuting data from surveys or censuses. Additionally, the flexibility of the database (micro-data) would also allow to extend the analysis to non-European countries such as the United States.

Secondly, the cross-section analysis conducted in this thesis could be further extended incorporating temporal dynamics in the analysis. This exercise would provide a chronological analysis of the concentration and the specialisation of creative industries. Additionally, this extension could provide some evidence on whether the determinants of the localisation of creative industries in one territory differ over time. Temporal analysis would also be useful to monitor the effectiveness of policy actions implemented to attract, retain or create creative industries in specific locations.

Thirdly, data reduction techniques could be further used in the analysis to reduce the initial number of variables used in the analysis. Indeed, 23 indicators have been used as independent variables however, not all them were included at the same time due to correlation problems. Multivariate correlation analysis techniques could be thus used to analyse interdependence among variables belonging to the same theoretical framework with the primary purpose of reducing the large list of variables used in this analysis.

Fourthly, the econometric analysis in this thesis has been conducted for all the creative industries together. However, the location determinants firms in creative industries might also vary according to the creative sub-sector they belong to. Thus, the specific determinants of the concentration of each of the 12 creative sub-sectors presented in the thesis could also further analysed.

Fifthly, the Negative Binomial Regression Model (a two-parameter model since is a mixture of the Poisson distribution and the Gamma distribution) has been used in this research since it adjust better to the distribution characteristics of the dependent variable (number of creative industries by LLS). However, when the normality assumption cannot be applied to the categorical dependent variable, nonparametric (or distribution-free) econometric measures can also be used. Indeed, non-parametric models do not make assumptions about the baseline distribution and it has been shown to provide robust

conditional mean estimates. Thus, the cross-section econometric analysis could be extended by using nonparametric econometrics and space-time models when spatial and temporal data on the number of creative firms are used.

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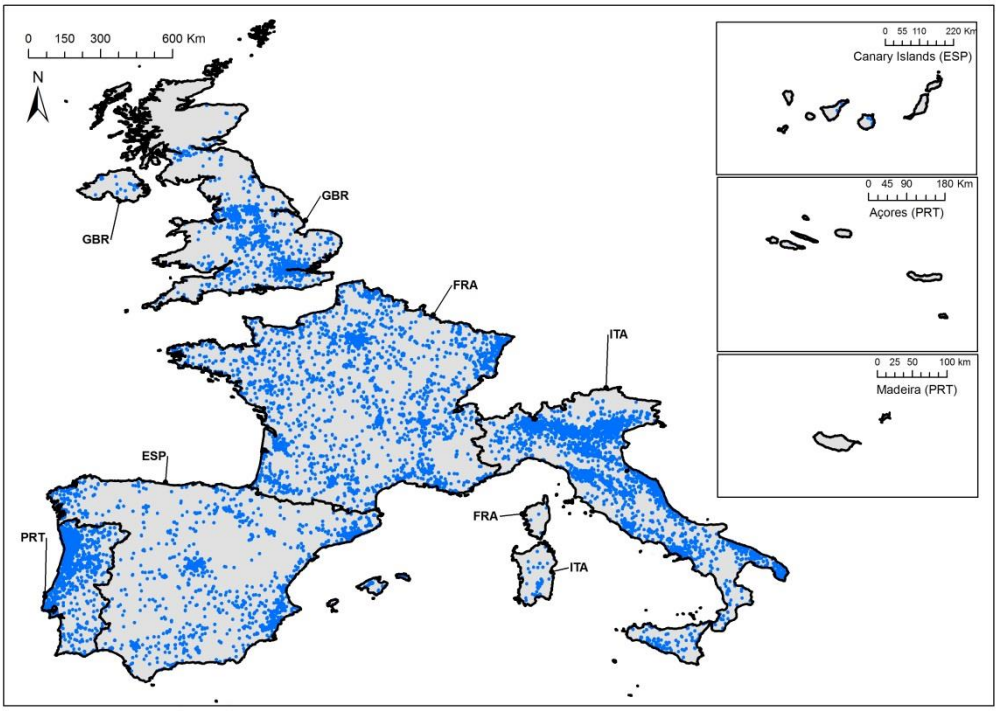
Annexes

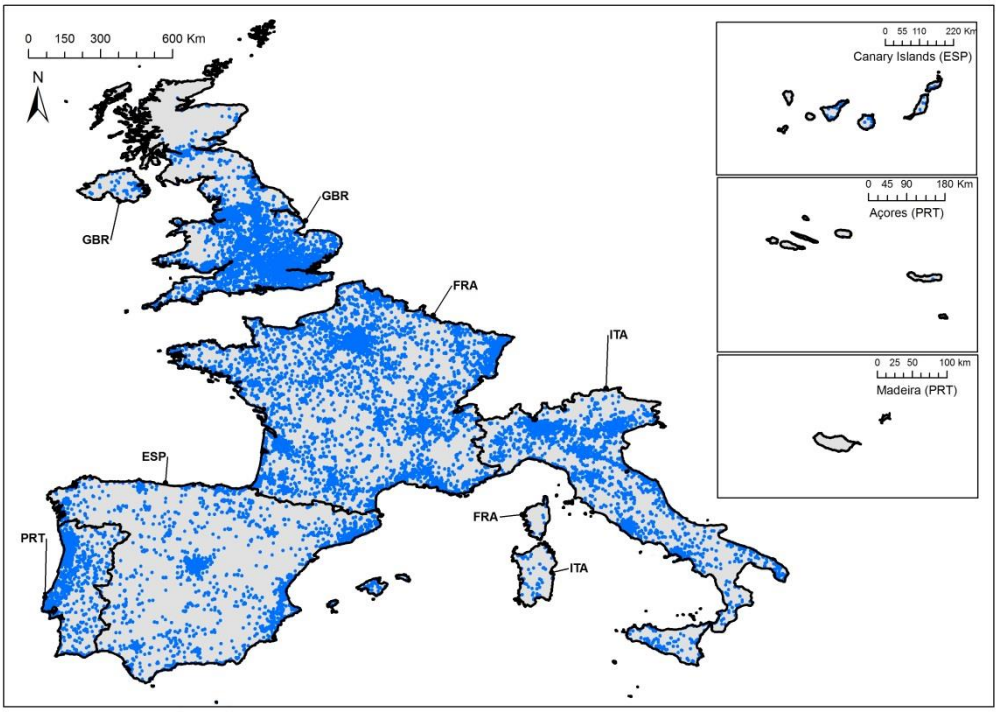
I. The location of creative firms by creative industry in 5 European countries, 2009

Figure I.1. The location of firms in the fashion sector in 5 European countries, 2009



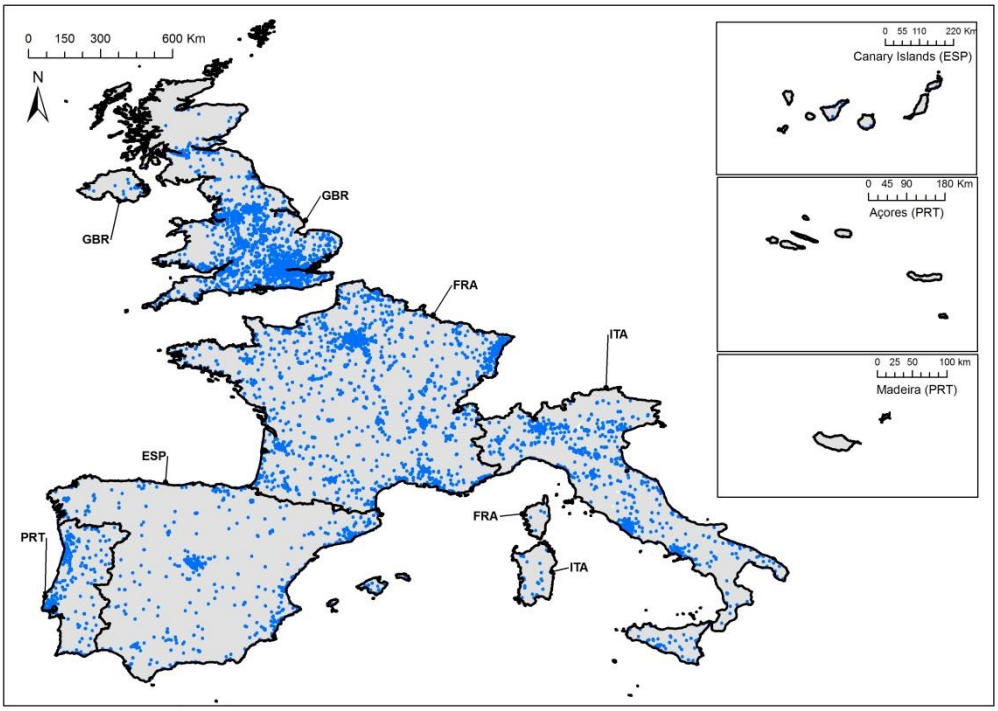
Note: Each point represents one of the 24,143 firms in the fashion sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.2. The location of firms in the publishing and printing sector in 5 European countries, 2009



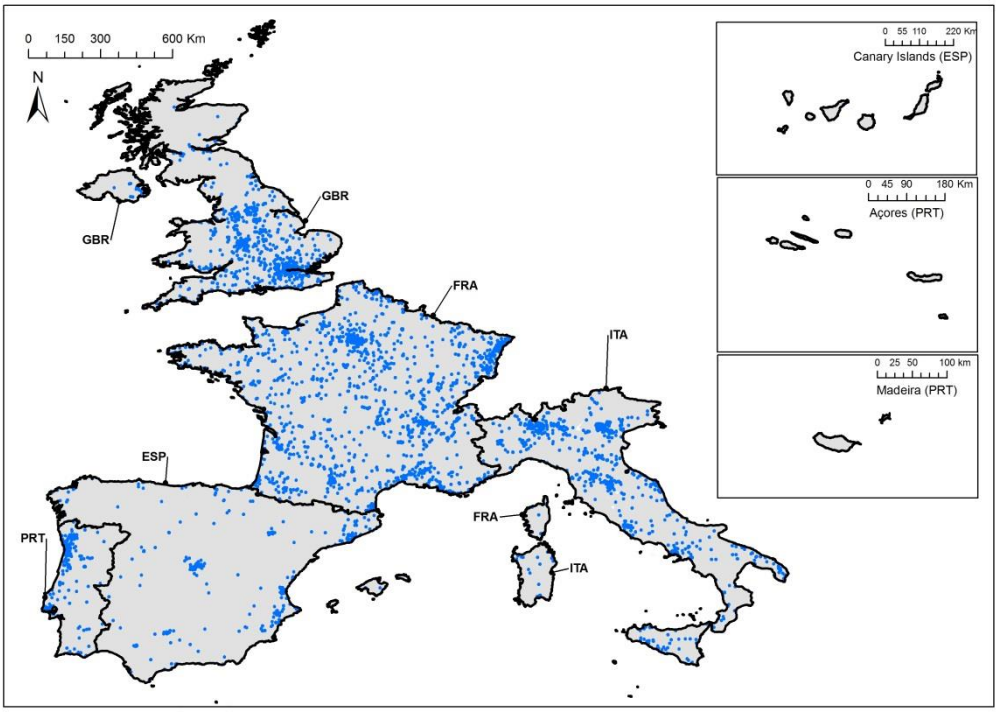
Note: Each point represents one of the 53,349 firms in the publishing and printing sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.3. The location of firms in the film, video and music sector in 5 European countries, 2009



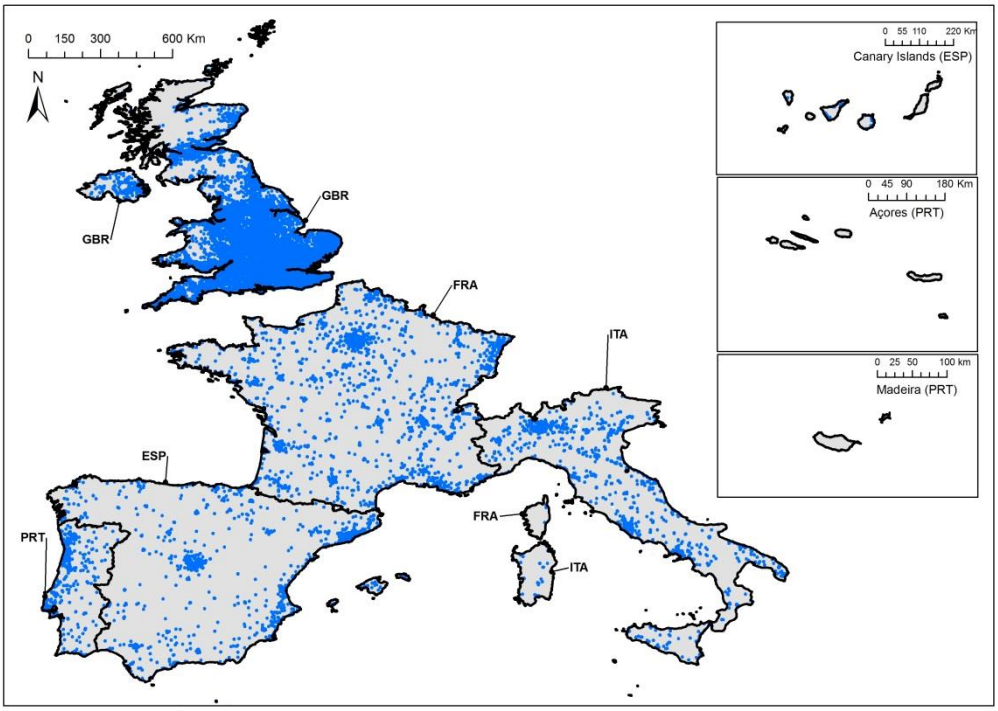
Note: Each point represents one of the 19,962 firms in the film, video and music sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.4. The location of firms in the craft sector in 5 European countries, 2009



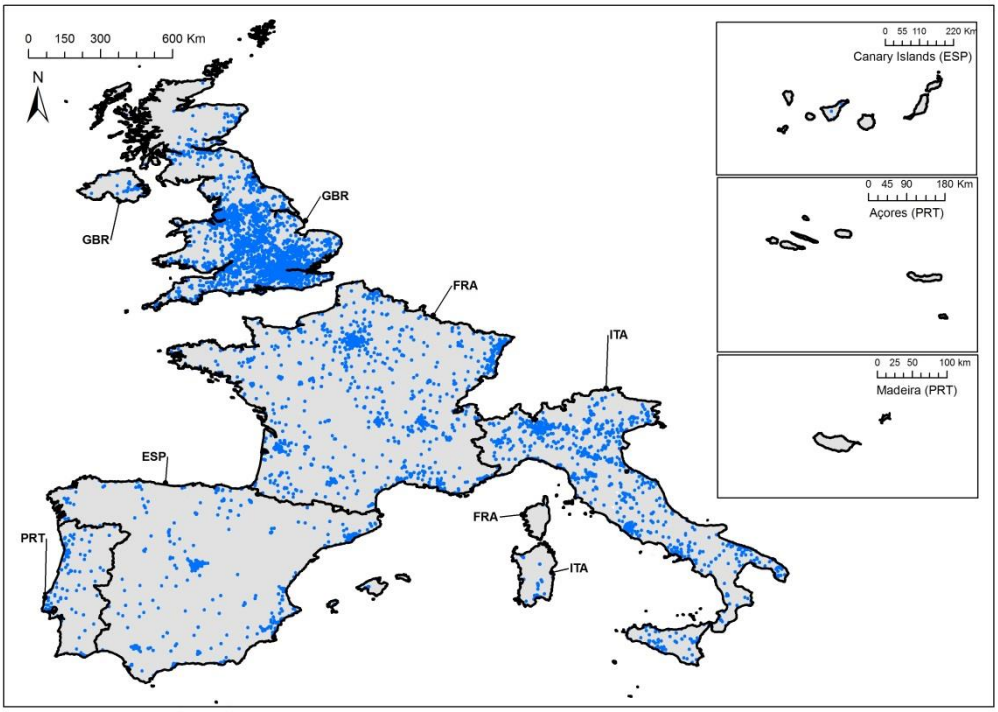
Note: Each point represents one of the 6,951 firms in the craft sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.5. The location of firms in the software sector in 5 European countries, 2009



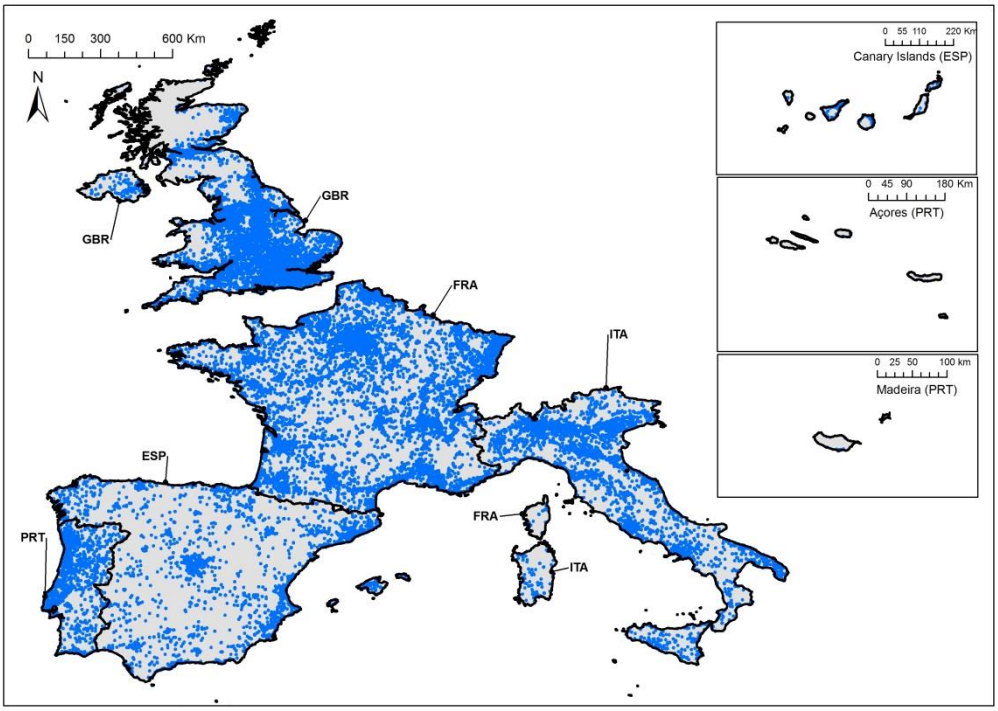
Note: Each point represents one of the 92,341 firms in the software sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.6. The location of firms in the R&D sector in 5 European countries, 2009



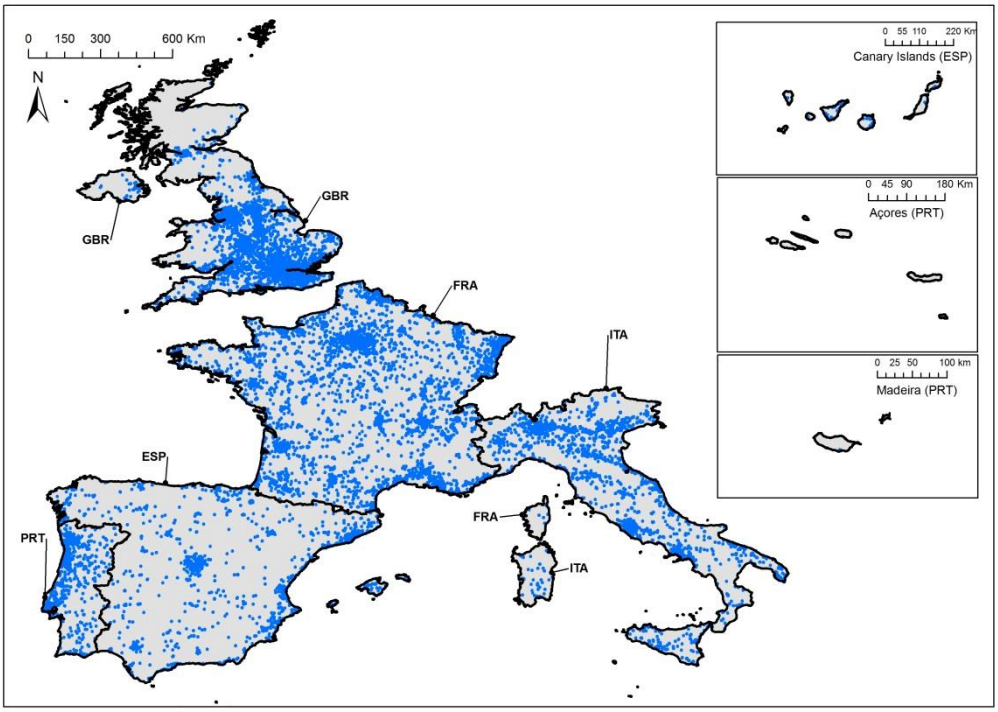
Note: Each point represents one of the 10,970 firms in the R&D sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.7. The location of firms in the architecture sector in 5 European countries, 2009



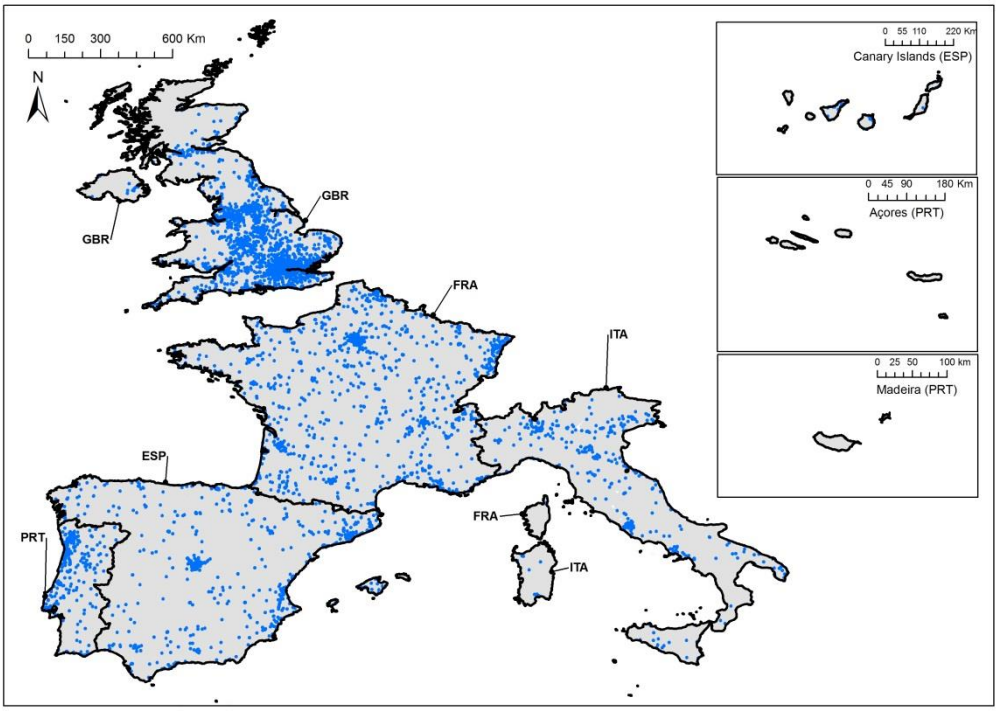
Note: Each point represents one of the 80,250 firms in the architecture sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.8. The location of firms in the advertising sector in 5 European countries, 2009



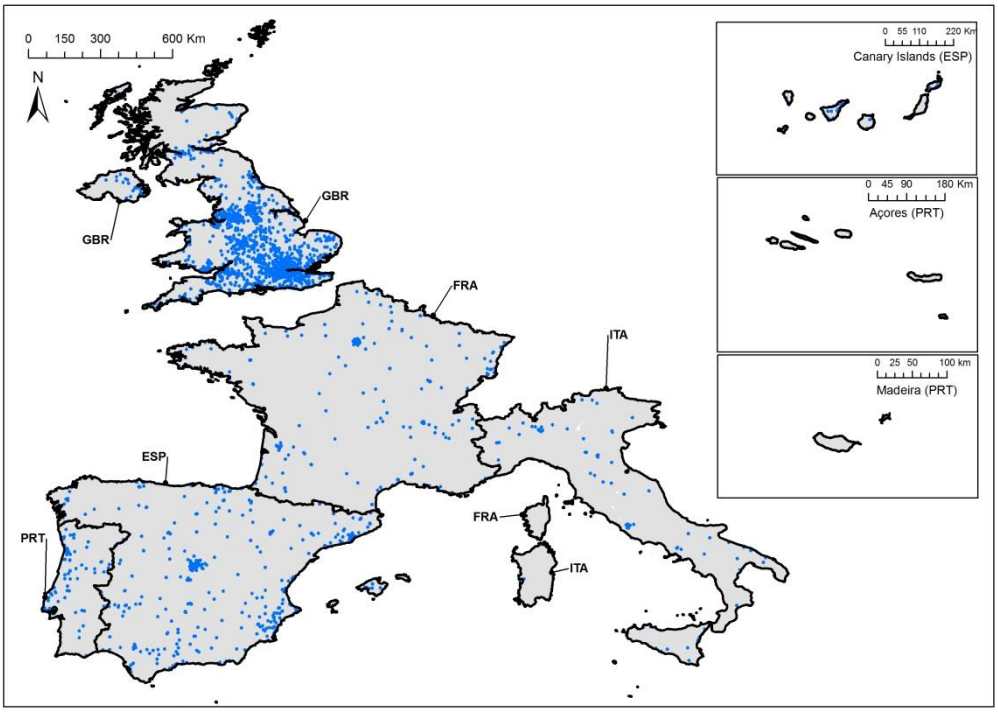
Note: Each point represents one of the 35,749 firms in the advertising sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.9. The location of firms in the photography sector in 5 European countries, 2009



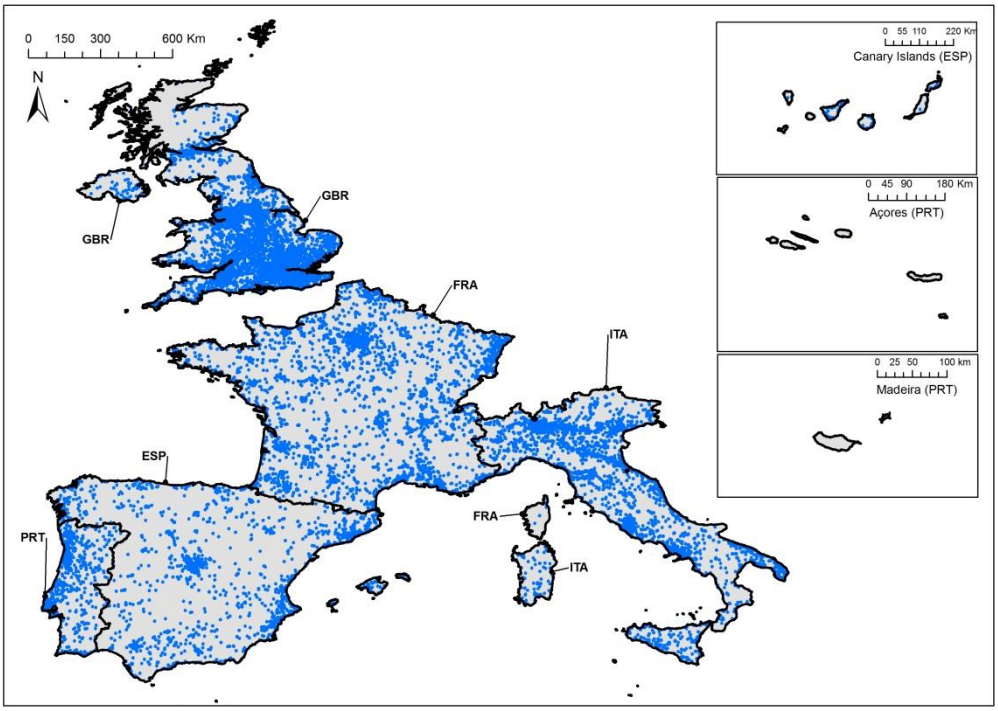
Note: Each point represents one of the 8,204 firms in the photography sector.
Source: Own elaboration based on ORBIS 2011-data.

Figure I.10. The location of firms in the broadcasting sector in 5 European countries, 2009



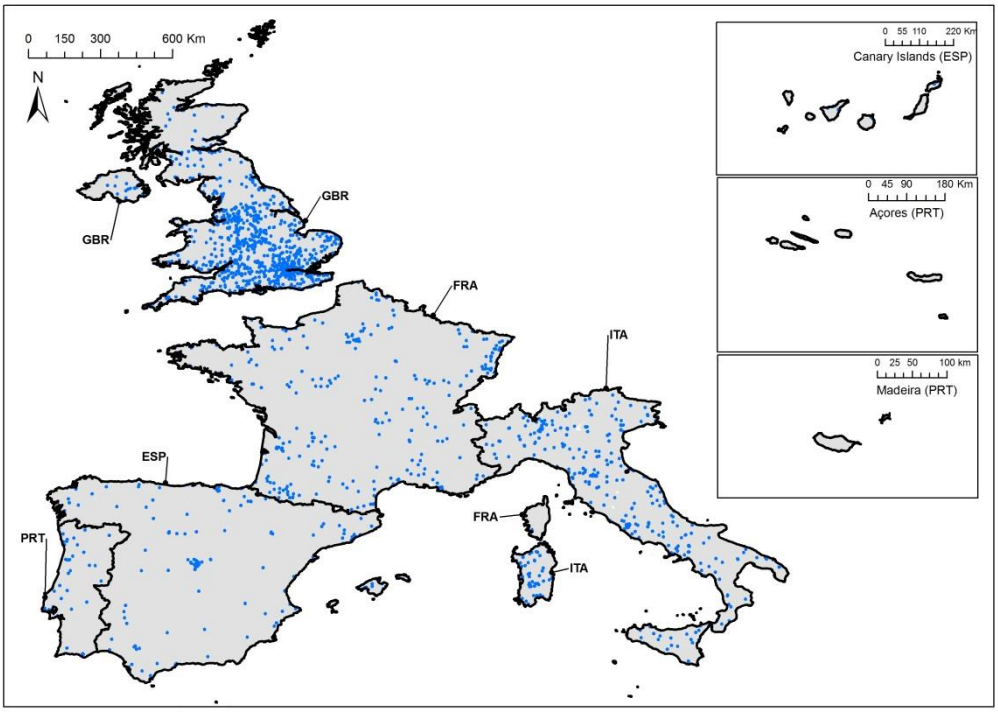
Note: Each point represents one of the 5,142 firms in the broadcasting sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.11. The location of firms in the performing arts sector in 5 European countries, 2009



Note: Each point represents one of the 40,990 firms in the performing arts sector.
Source: Own elaboration based on ORBIS-2011 data.

Figure I.12. The location of firms in the heritage sector in 5 European countries, 2009



Note: Each point represents one of the 2,504 firms in the heritage sector.
Source: Own elaboration based on ORBIS-2011 data.

II. Top-5 LLS by share of creative firms, by creative industry and by country, 2009

Table II.1. Top-5 LLS by share of firms in the fashion sector by country, 2009

France	Share
Paris	27.76%
Bordeaux	3.21%
Lyon	2.12%
Mulhouse	1.94%
Roissy - Sud Picardie	1.86%
Total top-5	**36.90%**

Italy	Share
Napoli	5.26%
Civitanova Marche	3.79%
Milano	3.65%
Roma	3.33%
Santa Croce Sull'arno	2.30%
Total top-5	**18.33%**

Portugal	Share
Porto	38.55%
Santa Maria da Feira	17.80%
Lisboa	6.59%
Paredes	6.44%
Montalegre	4.03%
Total top-5	**73.41%**

Spain	Share
Madrid	9.55%
Elche/Elx	9.35%
Barcelona	8.63%
Elda	5.05%
Mataró	3.03%
Total top-5	**35.60%**

United Kingdom	Share
London	33.18%
Leicester	8.17%
Manchester	5.97%
Birmingham	2.84%
Nottingham	2.02%
Total top-5	**52.17%**

Source: Own calculations based on ORBIS-2011 data

Table II.2. Top-5 LLS by share of firms in the publishing and printing sector by country, 2009

France	Share
Paris	24.94%
Bordeaux	3.83%
Lyon	2.46%
Mulhouse	2.41%
Strasbourg	2.25%
Total top-5	**35.89%**

Italy	Share
Milano	16.46%
Roma	14.22%
Torino	2.91%
Napoli	2.81%
Bologna	2.70%
Total top-5	**39.10%**

Portugal	Share
Lisboa	35.77%
Porto	17.25%
Santa Maria da Feira	9.20%
Coimbra	4.06%
Leiria	2.86%
Total top-5	**69.14%**

Spain	Share
Madrid	25.99%
Barcelona	14.64%
Valencia	4.20%
Sabadell	2.46%
Bilbao	2.15%
Total top-5	**49.43%**

United Kingdom	Share
London	29.54%
Manchester	2.72%
Guildford & Aldershot	1.85%
Leicester	1.81%
Birmingham	1.80%
Total top-5	**37.72%**

Source: Own calculations based on ORBIS-2011 data

Table II.3. Top-5 LLS by share of firms in the film, video and music sector by country, 2009

France	Share
Paris	46.16%
Bordeaux	2.87%
Lyon	2.03%
Strasbourg	1.39%
Mulhouse	1.31%
Total top-5	**53.77%**

Italy	Share
Roma	40.79%
Milano	13.74%
Napoli	3.27%
Torino	2.72%
Bologna	2.39%
Total top-5	**62.90%**

Portugal	Share
Lisboa	53.59%
Porto	12.55%
Santa Maria da Feira	7.19%
Faro	2.48%
Coimbra	1.70%
Total top-5	**77.52%**

Spain	Share
Madrid	32.16%
Barcelona	18.63%
Sevilla	3.56%
Valencia	3.36%
Bilbao	2.65%
Total top-5	**60.36%**

United Kingdom	Share
London	54.69%
Manchester	2.07%
Bristol	1.88%
Wycombe & Slough	1.63%
Brighton	1.53%
Total top-5	**61.80%**

Source: Own calculations based on ORBIS-2011 data

Table II.4. Top-5 LLS by share of firms in the craft sector by country, 2009

France	Share
Paris	16.22%
Lyon	4.35%
Bordeaux	3.84%
Marseille - Aubagne	2.98%
Strasbourg	2.57%
Total top-5	**29.96%**

Italy	Share
Arezzo	16.56%
Vicenza	11.39%
Alessandria	8.57%
Milano	5.93%
Roma	3.82%
Total top-5	**46.27%**

Portugal	Share
Porto	45.82%
Lisboa	13.48%
Santa Maria da Feira	7.55%
Braga	5.66%
Coimbra	3.77%
Total top-5	**76.28%**

Spain	Share
Córdoba	21.54%
Barcelona	12.46%
Valencia	11.23%
Madrid	10.77%
Onil	4.46%
Total top-5	**60.46%**

United Kingdom	Share
London	29.61%
Birmingham	9.39%
Manchester	1.70%
Nottingham	1.70%
Guildford & Aldershot	1.62%
Total top-5	**44.01%**

Source: Own calculations based on ORBIS-2011 data

Table II.5. Top-5 LLS by share of firms in the software sector by country, 2009

France	Share
Paris	23.54%
Bordeaux	4.01%
Lyon	3.26%
Saclay	3.00%
Toulouse	2.54%
Total top-5	**36.35%**

Italy	Share
Roma	23.51%
Milano	14.64%
Napoli	5.11%
Torino	3.61%
Bologna	1.88%
Total top-5	**48.75%**

Portugal	Share
Lisboa	40.00%
Porto	18.24%
Santa Maria da Feira	7.41%
Coimbra	5.06%
Braga	2.71%
Total top-5	**73.41%**

Spain	Share
Madrid	32.10%
Barcelona	15.10%
Valencia	3.55%
Bilbao	2.90%
Sabadell	2.69%
Total top-5	**56.33%**

United Kingdom	Share
London	25.49%
Manchester	3.11%
Guildford & Aldershot	2.89%
Reading & Bracknell	2.52%
Wycombe & Slough	2.17%
Total top-5	**36.18%**

Source: Own calculations based on ORBIS-2011 data

Table II.6. Top-5 LLS by share of firms in the R&D sector by country, 2009

France	Share
Paris	17.70%
Lyon	5.03%
Bordeaux	3.85%
Strasbourg	2.96%
Marseille - Aubagne	2.66%
Total top-5	**32.20%**

Italy	Share
Roma	13.40%
Milano	11.45%
Napoli	3.66%
Torino	3.37%
Bologna	2.85%
Total top-5	**34.73%**

Portugal	Share
Lisboa	33.33%
Porto	14.04%
Santa Maria da Feira	10.53%
Coimbra	9.36%
Alcobaça	4.09%
Total top-5	**71.35%**

Spain	Share
Madrid	21.02%
Barcelona	14.17%
Valencia	4.76%
Bilbao	4.41%
Sevilla	2.56%
Total top-5	**46.92%**

United Kingdom	Share
London	20.05%
Cambridge	4.34%
Oxford	3.29%
Manchester	2.74%
Guildford & Aldershot	2.29%
Total top-5	**32.71%**

Source: Own calculations based on ORBIS-2011 data

Table II.7. Top-5 LLS by share of firms in the architecture sector by country, 2009

France	Share
Paris	15.40%
Bordeaux	4.08%
Lyon	3.46%
Strasbourg	2.67%
Mulhouse	2.22%
Total top-5	**27.83%**

Italy	Share
Milano	10.88%
Roma	10.19%
Torino	3.95%
Bergamo	2.42%
Napoli	2.41%
Total top-5	**29.85%**

Portugal	Share
Lisboa	36.77%
Porto	19.87%
Santa Maria da Feira	6.78%
Coimbra	3.81%
Faro	2.97%
Total top-5	**70.21%**

Spain	Share
Madrid	20.54%
Barcelona	10.04%
Valencia	4.28%
Bilbao	3.28%
Sevilla	2.90%
Total top-5	**41.04%**

United Kingdom	Share
London	21.81%
Manchester	3.91%
Aberdeen	2.32%
Glasgow	1.93%
Bristol	1.90%
Total top-5	**31.88%**

Source: Own calculations based on ORBIS-2011 data

Table II.8. Top-5 LLS by share of firms in the advertising sector by country, 2009

France	Share
Paris	25.50%
Bordeaux	3.74%
Lyon	3.23%
Strasbourg	2.49%
Mulhouse	2.04%
Total top-5	**36.99%**

Italy	Share
Milano	20.52%
Roma	15.79%
Torino	4.04%
Napoli	2.67%
Bologna	2.15%
Total top-5	**45.18%**

Portugal	Share
Lisboa	44.93%
Porto	16.31%
Santa Maria da Feira	7.05%
Coimbra	2.93%
Leiria	2.60%
Total top-5	**73.82%**

Spain	Share
Madrid	33.88%
Barcelona	15.99%
Valencia	3.25%
Bilbao	2.78%
Sevilla	2.06%
Total top-5	**57.96%**

United Kingdom	Share
London	34.90%
Manchester	4.17%
Birmingham	1.99%
Wycombe & Slough	1.78%
Guildford & Aldershot	1.69%
Total top-5	**44.53%**

Source: Own calculations based on ORBIS-2011 data

Table II.9. Top-5 LLS by share of firms in the photography sector by country, 2009

France	Share
Paris	18.20%
Bordeaux	3.53%
Lyon	2.46%
Mulhouse	2.41%
Strasbourg	2.25%
Total top-5	**28.85%**

Italy	Share
Milano	17.84%
Roma	16.13%
Napoli	3.04%
Torino	2.47%
Bologna	1.90%
Total top-5	**41.37%**

Portugal	Share
Lisboa	31.61%
Porto	19.09%
Santa Maria da Feira	8.95%
Braga	3.38%
Paredes	3.38%
Total top-5	**66.40%**

Spain	Share
Madrid	20.27%
Barcelona	10.65%
Valencia	4.93%
Bilbao	2.70%
Zaragoza	1.99%
Total top-5	**40.54%**

United Kingdom	Share
London	33.05%
Manchester	2.77%
Guildford & Aldershot	2.00%
Bristol	1.66%
Wycombe & Slough	1.48%
Total top-5	**40.96%**

Source: Own calculations based on ORBIS-2011 data

Table II.10. Top-5 LLS by share of firms in the broadcasting sector by country, 2009

France	Share
Paris	31.91%
Bordeaux	6.08%
Lyon	5.17%
Pau	2.74%
Vitry-le-Franèois - Saint-Dizier	2.43%
Total top-5	**48.33%**

Italy	Share
Roma	18.81%
Milano	10.89%
Bologna	5.94%
Torino	3.96%
Napoli	2.97%
Total top-5	**42.57%**

Portugal	Share
Lisboa	32.04%
Porto	8.74%
Santa Maria da Feira	7.77%
Coimbra	4.85%
Alcobaça	4.85%
Total top-5	**58.25%**

Spain	Share
Madrid	23.44%
Barcelona	10.06%
Bilbao	2.45%
Valencia	2.33%
Santa Cruz de Tenerife	2.21%
Total top-5	**40.49%**

United Kingdom	Share
London	39.93%
Manchester	3.98%
Glasgow	2.21%
Bristol	2.13%
Guildford & Aldershot	2.08%
Total top-5	**50.34%**

Source: Own calculations based on ORBIS-2011 data

Table II.11. Top-5 LLS by share of firms in the performing arts sector by country, 2009

France	Share
Paris	19.28%
Bordeaux	3.35%
Strasbourg	2.03%
Lyon	1.99%
Mulhouse	1.96%
Total top-5	**28.62%**

Italy	Share
Roma	13.20%
Milano	6.22%
Napoli	3.46%
Bologna	2.06%
Torino	1.66%
Total top-5	**26.60%**

Portugal	Share
Lisboa	33.40%
Porto	15.02%
Santa Maria da Feira	7.87%
Coimbra	3.00%
Braga	2.50%
Total top-5	**61.80%**

Spain	Share
Madrid	20.57%
Barcelona	10.39%
Valencia	3.28%
Sevilla	3.00%
Bilbao	2.30%
Total top-5	**39.54%**

United Kingdom	Share
London	41.13%
Manchester	2.57%
Brighton	1.95%
Birmingham	1.64%
Guildford & Aldershot	1.50%
Total top-5	**48.78%**

Source: Own calculations based on ORBIS-2011 data

Table II.12. Top-5 LLS by share of firms in the heritage sector by country, 2009

France	Share
Paris	6.18%
Bordeaux	3.53%
Pau	3.24%
Mulhouse	2.65%
Bourges	2.35%
Total top-5	**17.94%**

Italy	Share
Roma	7.91%
Milano	4.34%
Firenze	2.55%
Cagliari	1.79%
Genova	1.53%
Total top-5	**18.11%**

Portugal	Share
Lisboa	27.91%
Porto	13.95%
Santa Maria da Feira	4.65%
Coimbra	4.65%
Faro	4.65%
Total top-5	**55.81%**

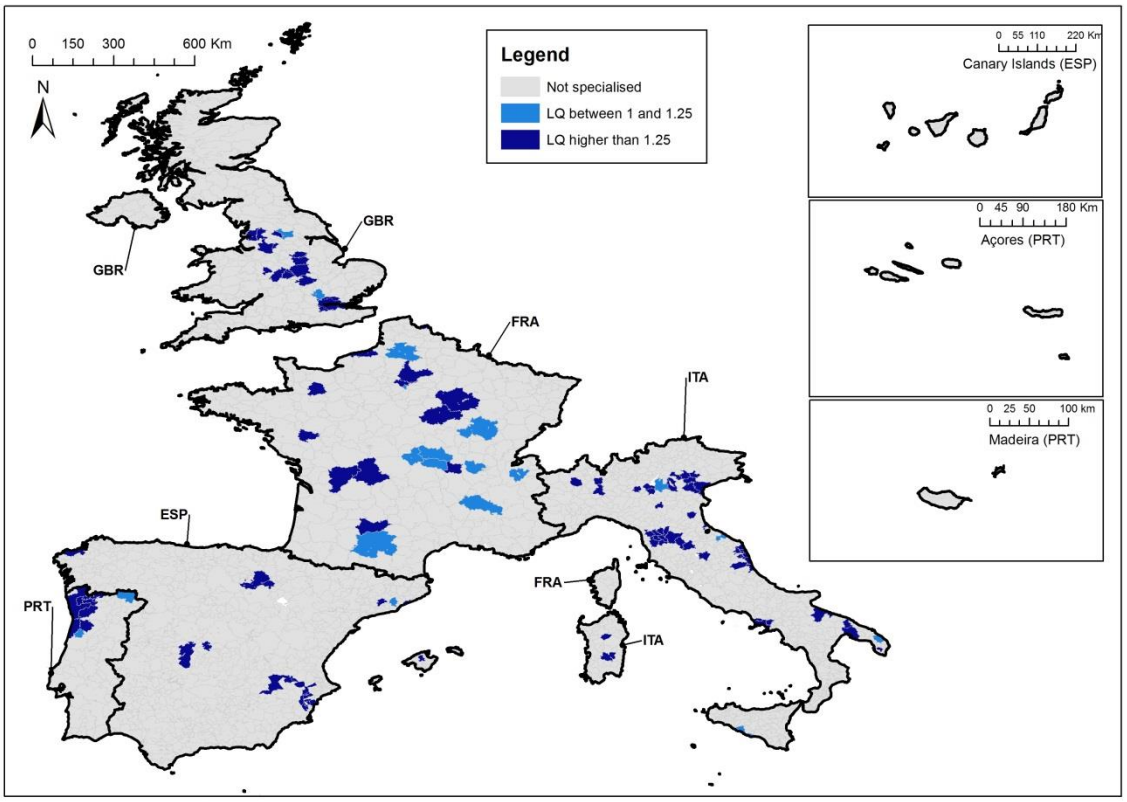
Spain	Share
Madrid	19.20%
Barcelona	8.48%
Bilbao	4.46%
Valencia	4.02%
Pamplona/Iruña	3.13%
Total top-5	**39.29%**

United Kingdom	Share
London	20.40%
Manchester	2.86%
Edinburgh	1.73%
Bristol	1.53%
Swindon	1.46%
Total top-5	**27.97%**

Source: Own calculations based on ORBIS-2011 data

III. Creative firms specialisation across creative sectors in 5 European countries, 2009

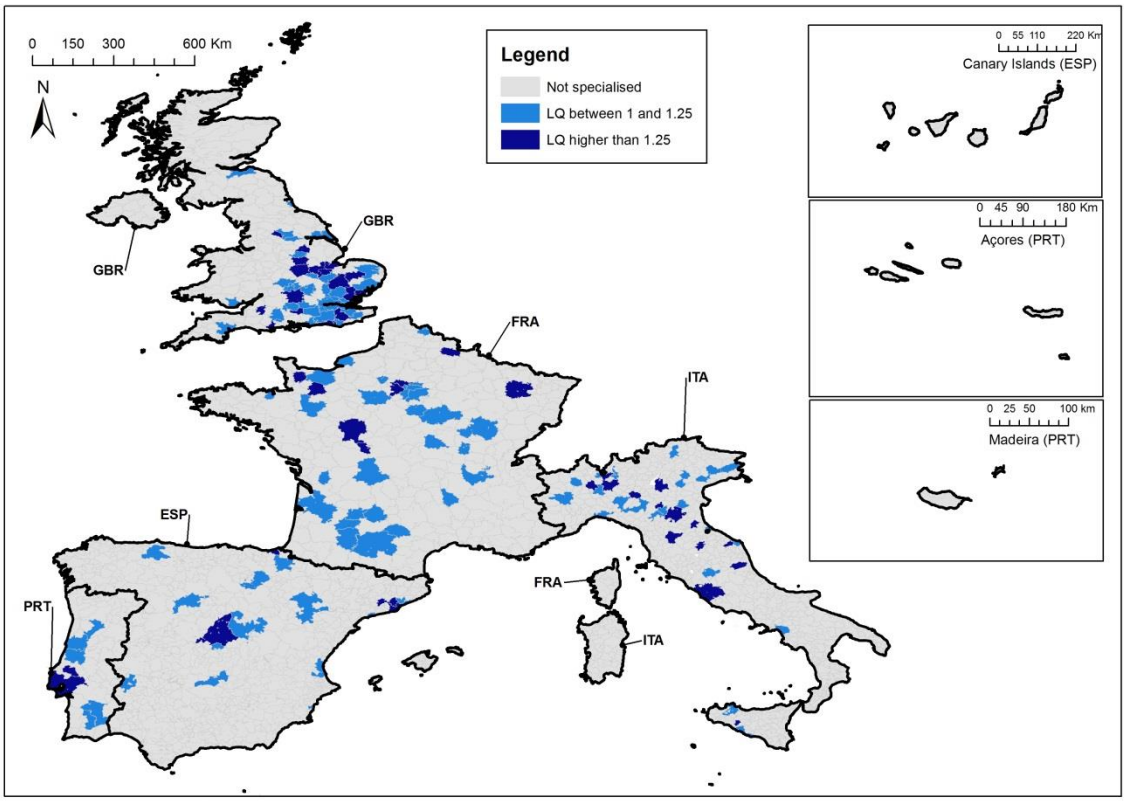
Figure III.1. Specialised LLS in the fashion sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

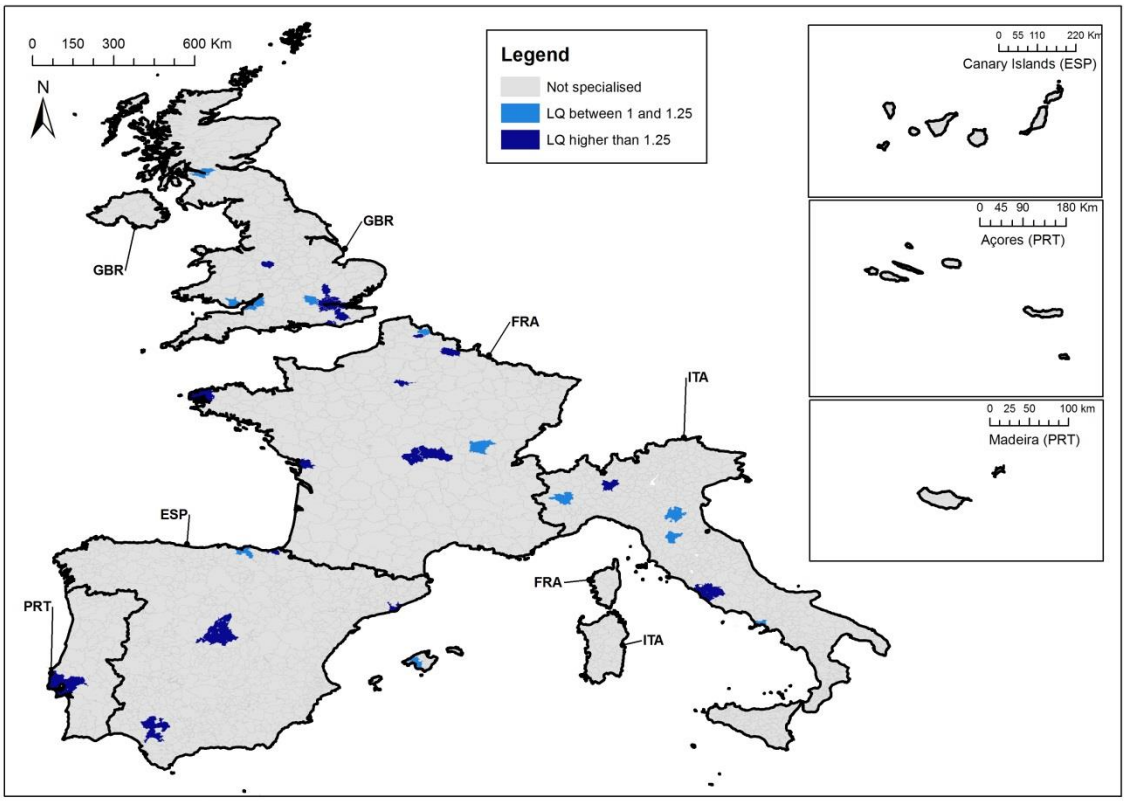
Figure III.2. Specialised LLS in the publishing and printing sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

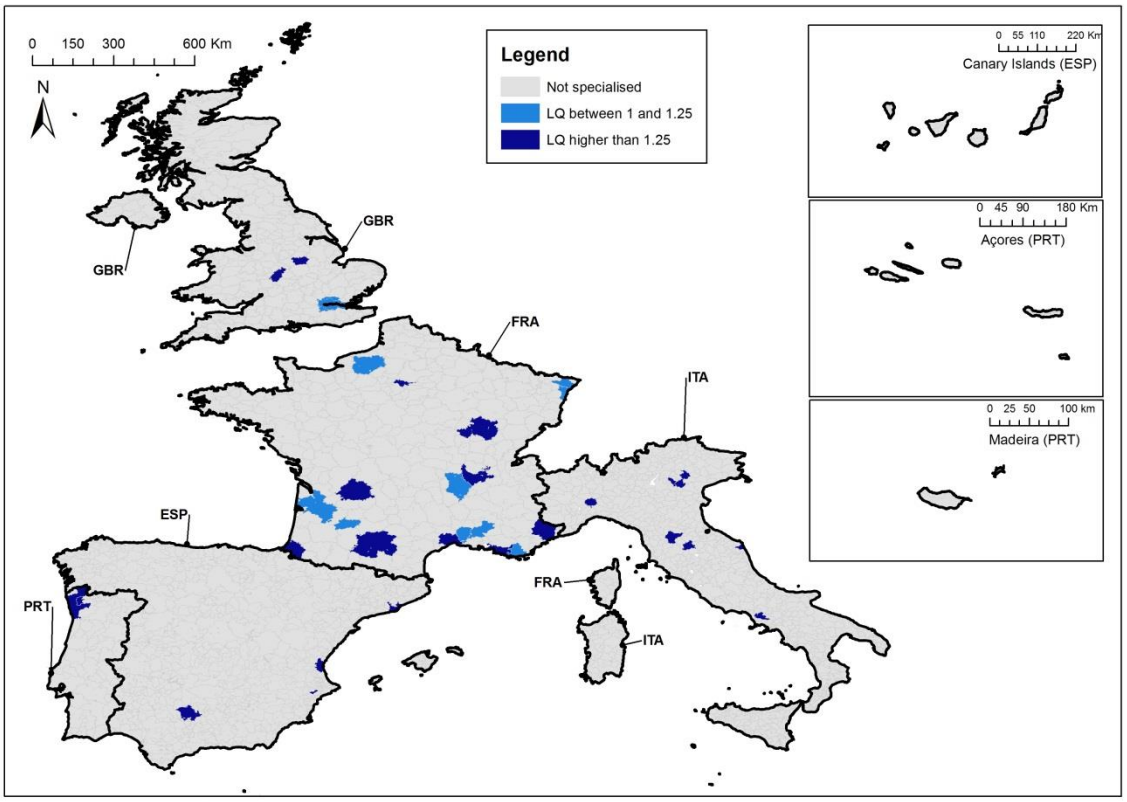
Figure III.3. Specialised LLS in the film, video and music sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

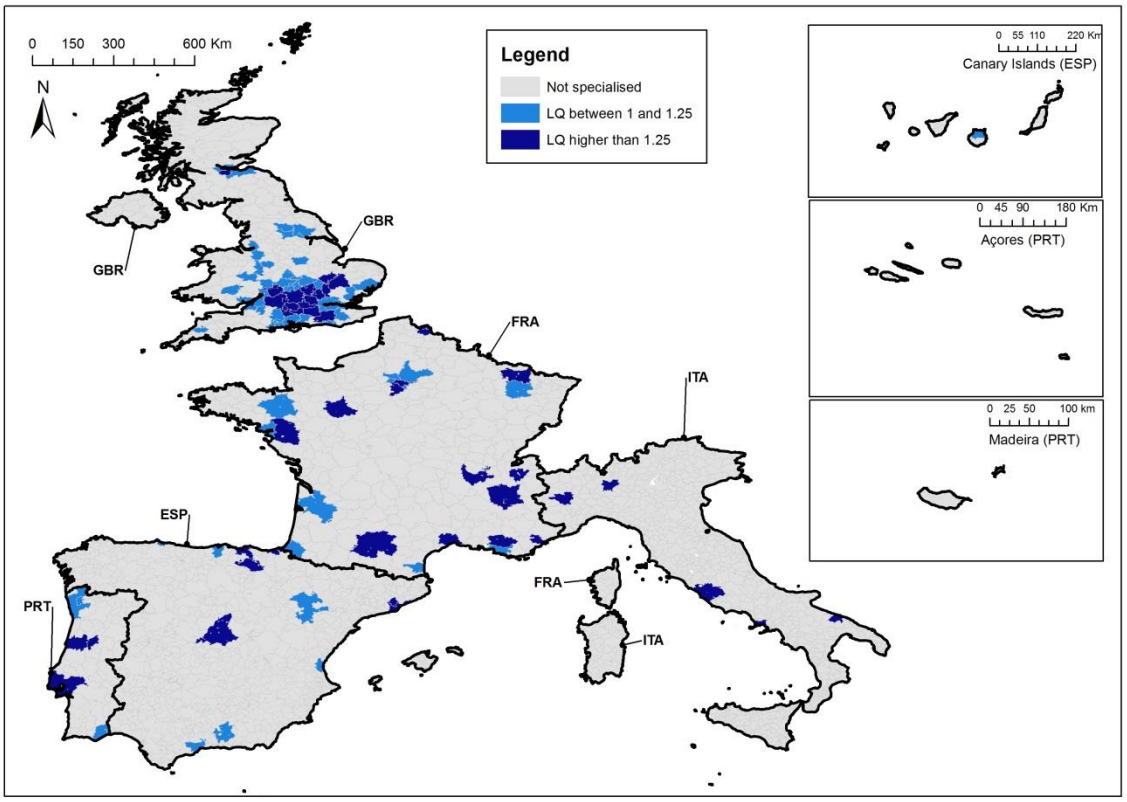
Figure III.4. Specialised LLS in the craft sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

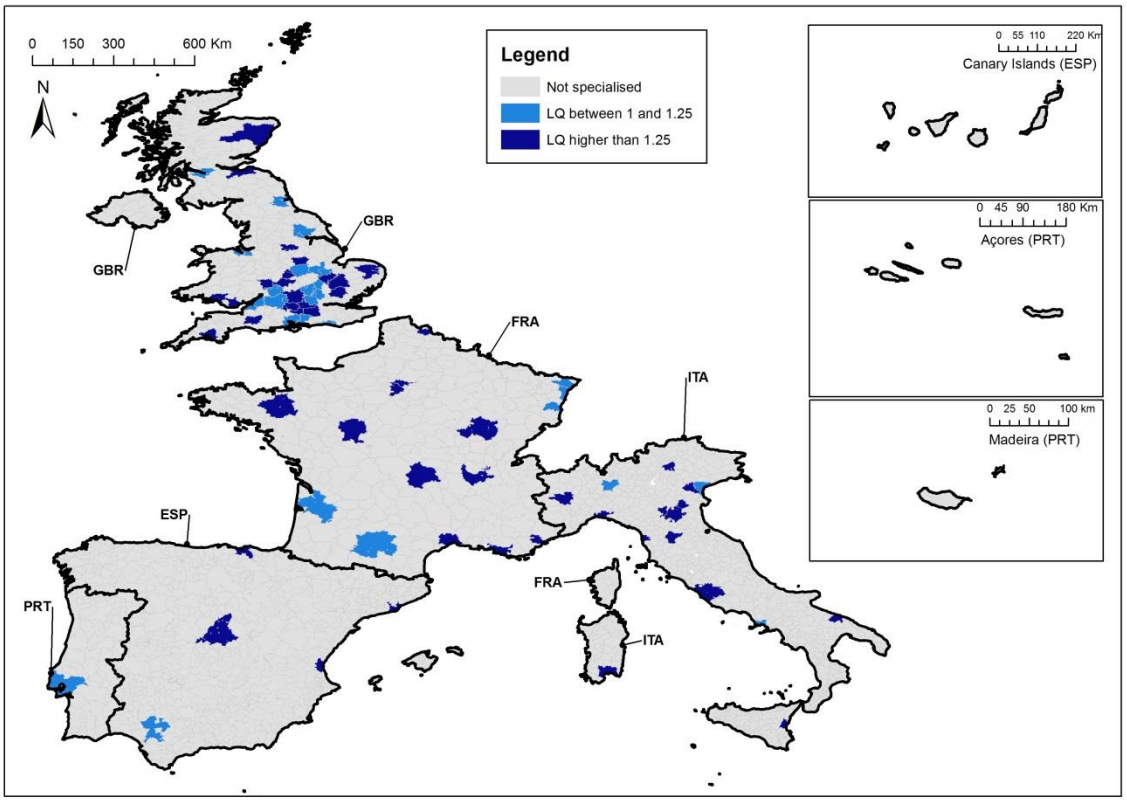
Figure III.5. Specialised LLS in the software sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

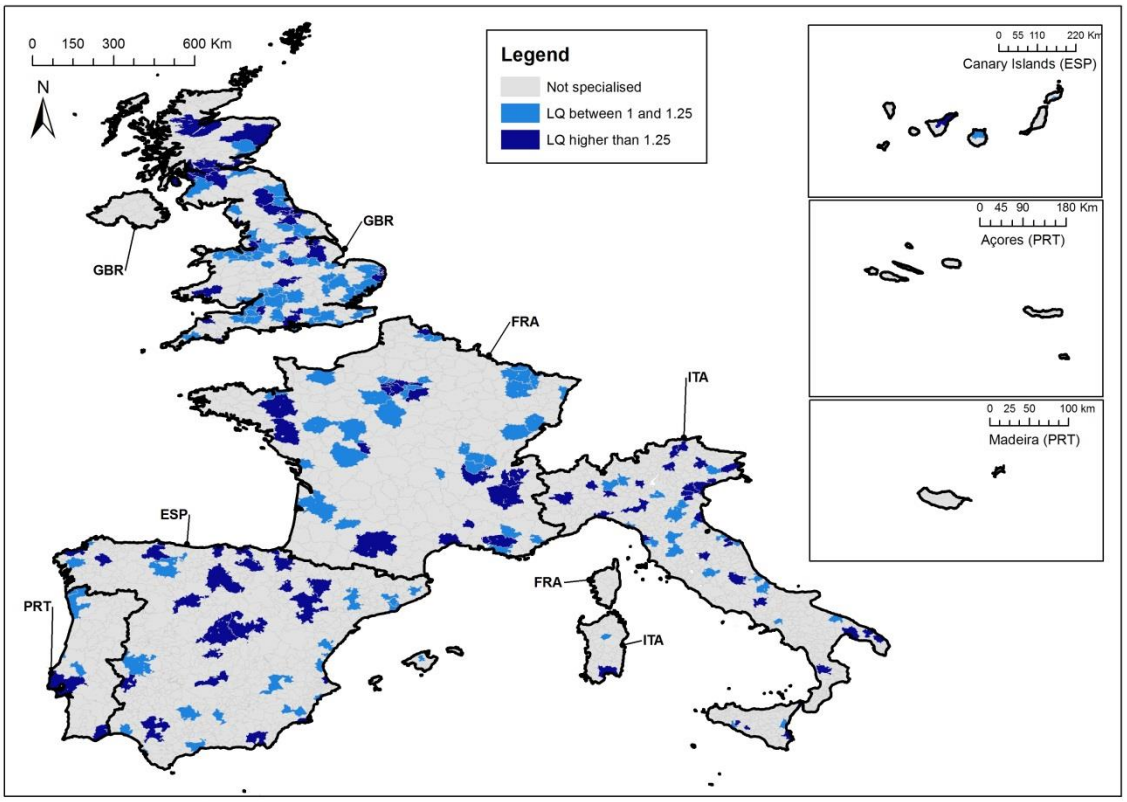
Figure III.6. Specialised LLS in the R&D sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

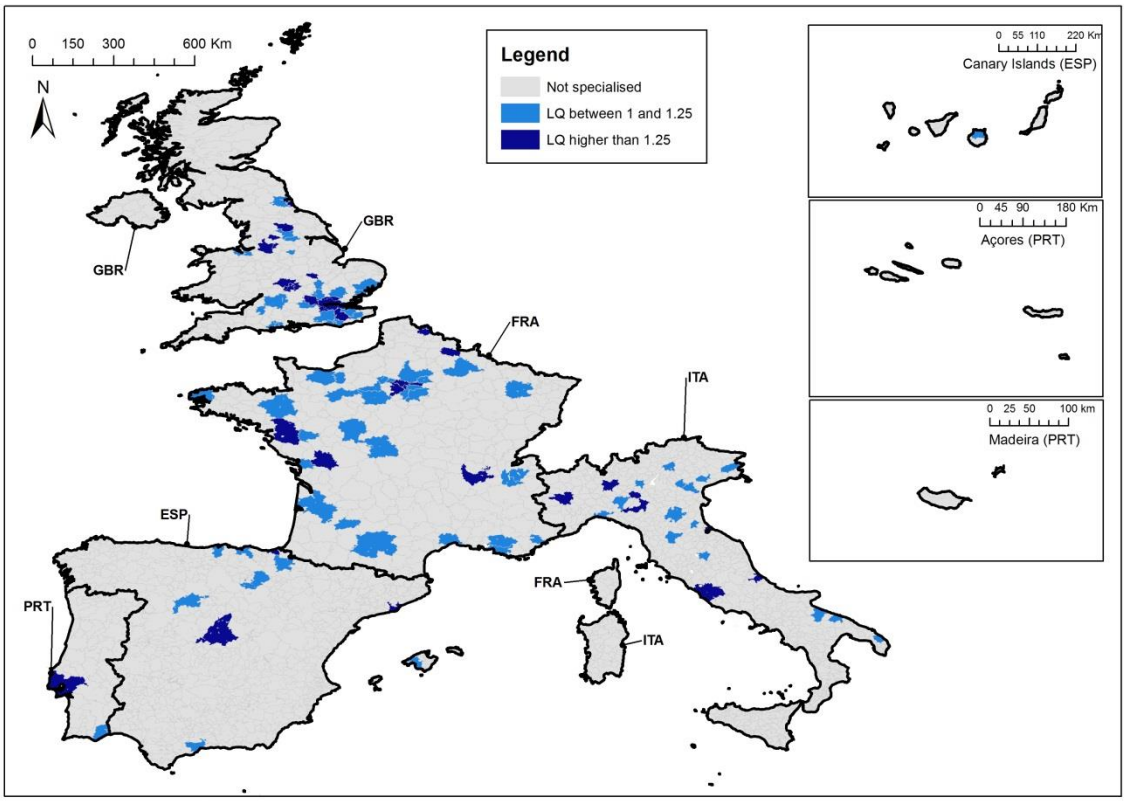
Figure III.7. Specialised LLS in the architecture sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

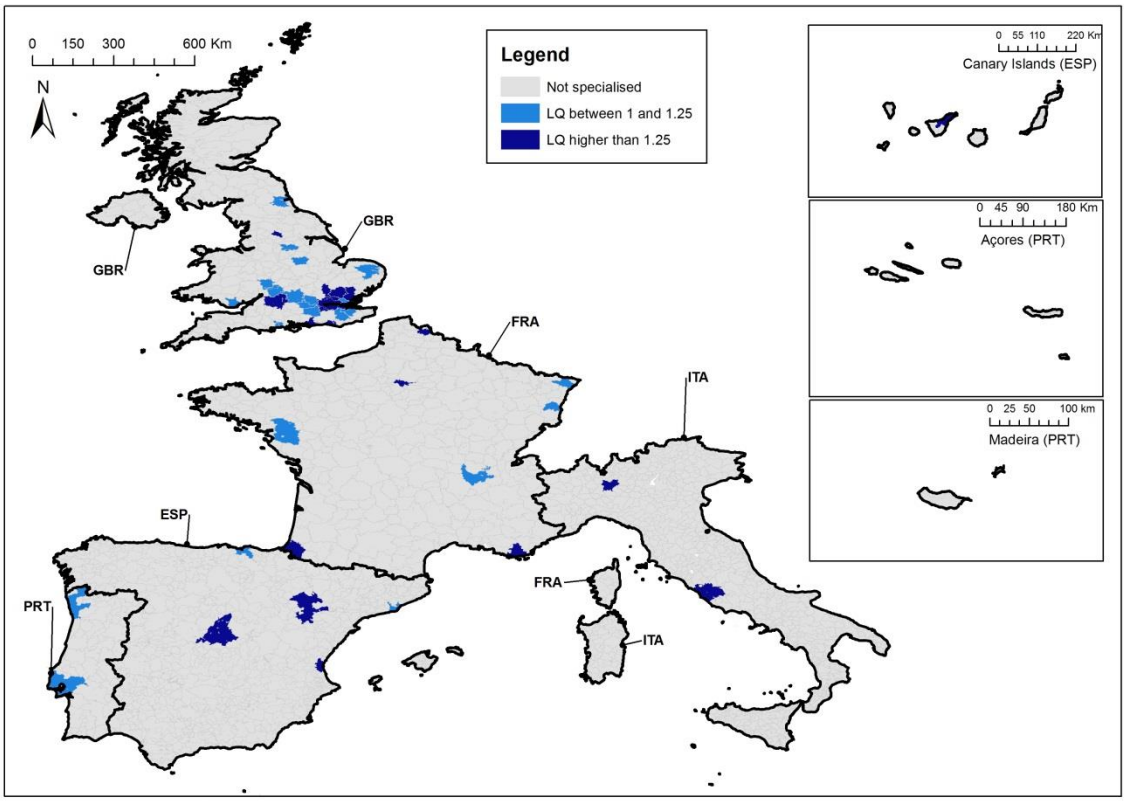
Figure III.8. Specialised LLS in the advertising sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

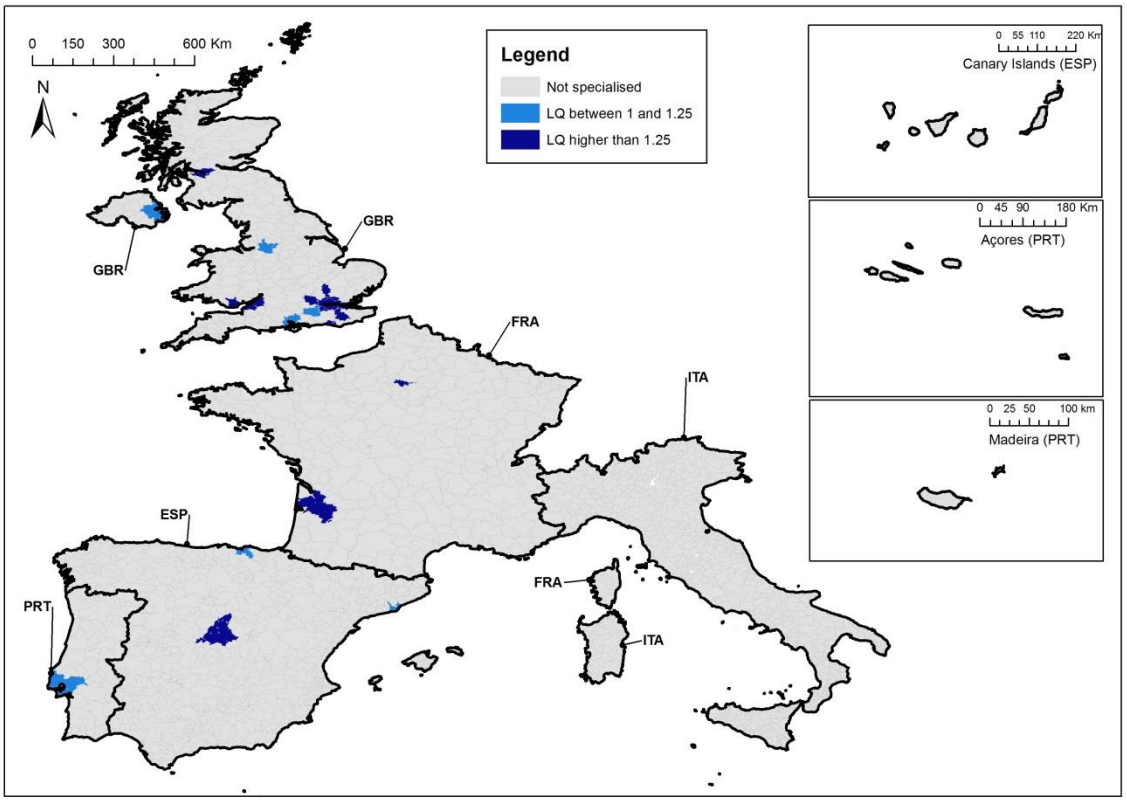
Figure III.9. Specialised LLS in the photography sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

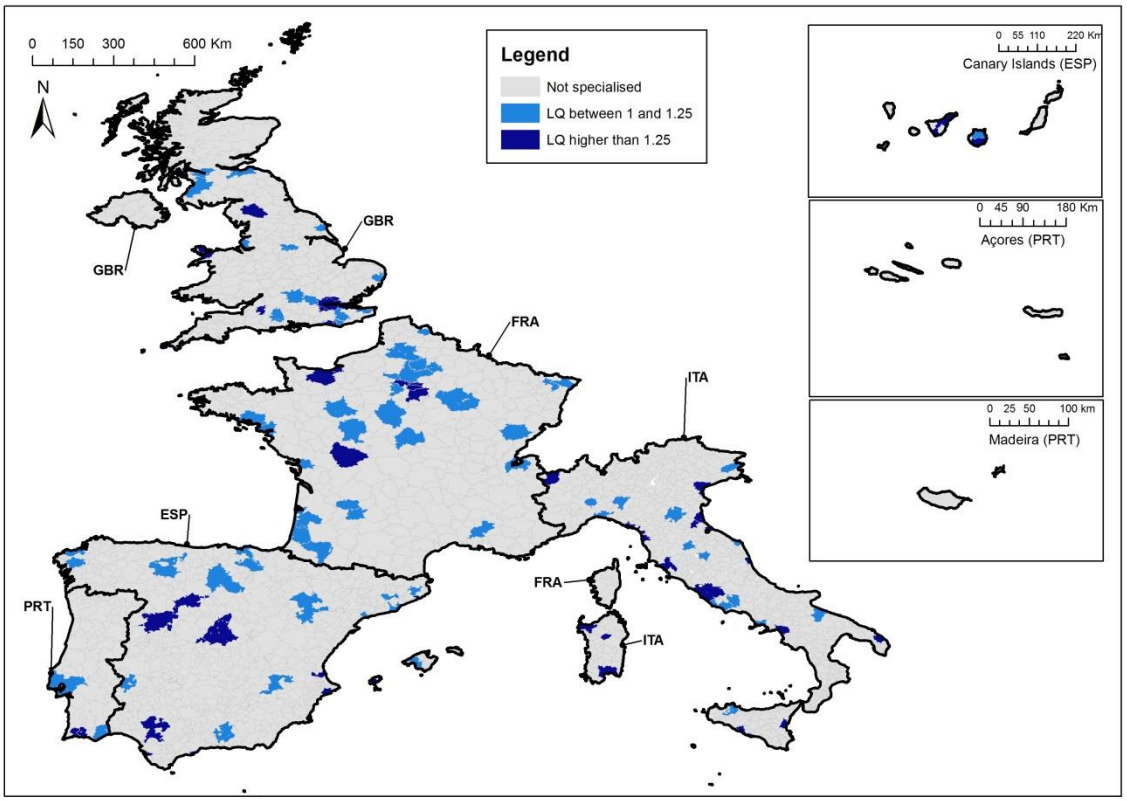
Figure III.10. Specialised LLS in the broadcasting sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

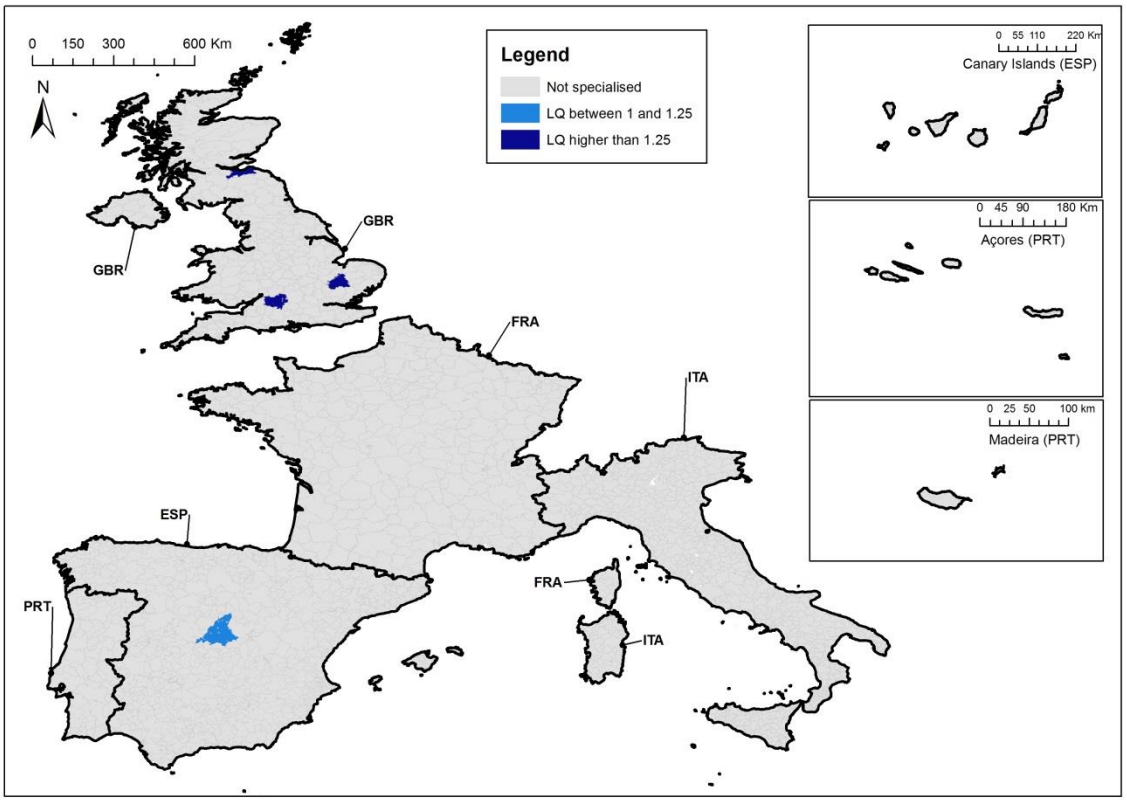
Figure III.11. Specialised LLS in the performing arts sector in 5 European countries, 2009



Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

Figure III.12. Specialised LLS in the heritage sector in 5 European countries, 2009

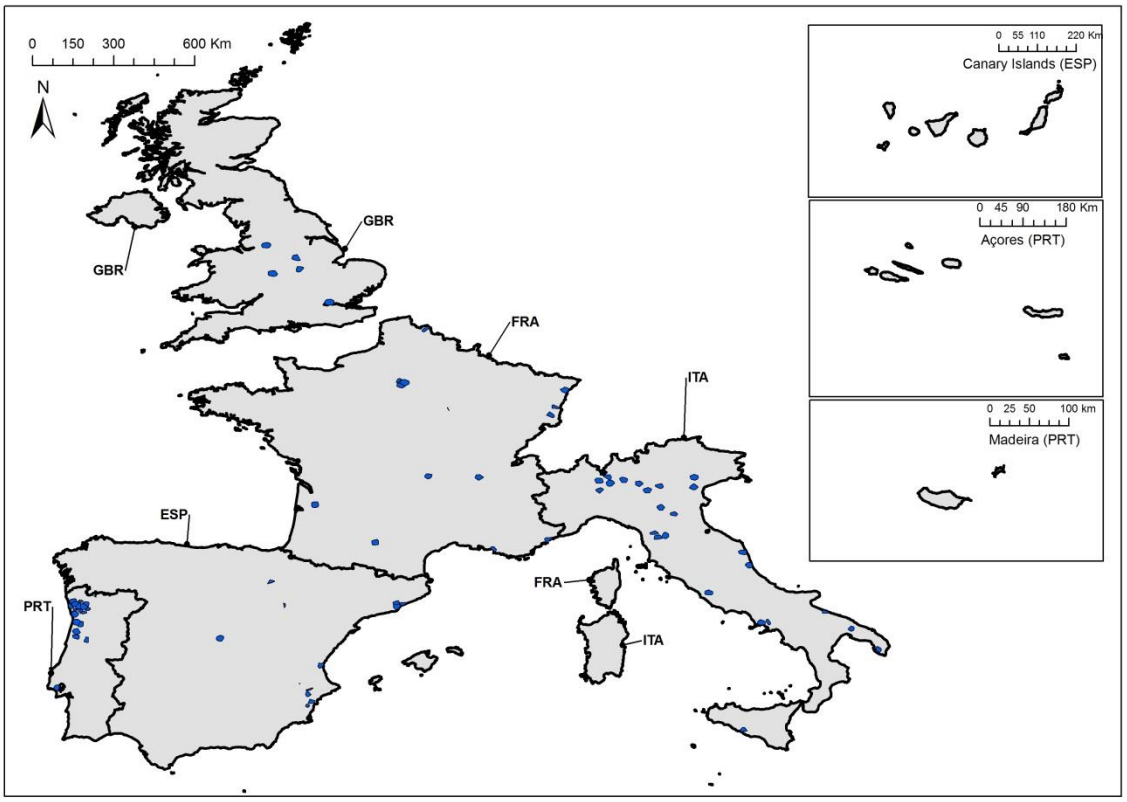


Note: 20 is the minimum number of firms that has been required to be displayed in the map (threshold taken from Perry (2005, pp. 90-91).

Source: Own calculations based on ORBIS-2011 data.

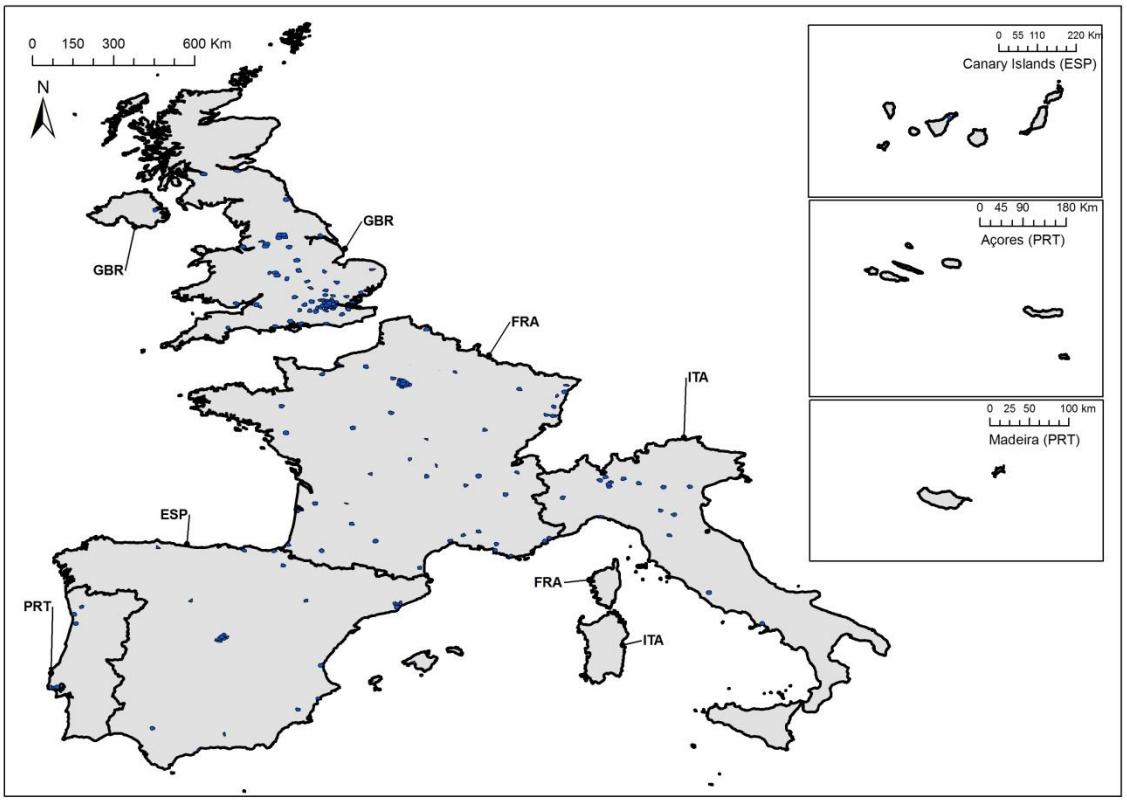
IV. Clusters of firms in creative industries by creative sector in 5 European countries, 2009

Figure IV.1. Fashion clusters, 2009



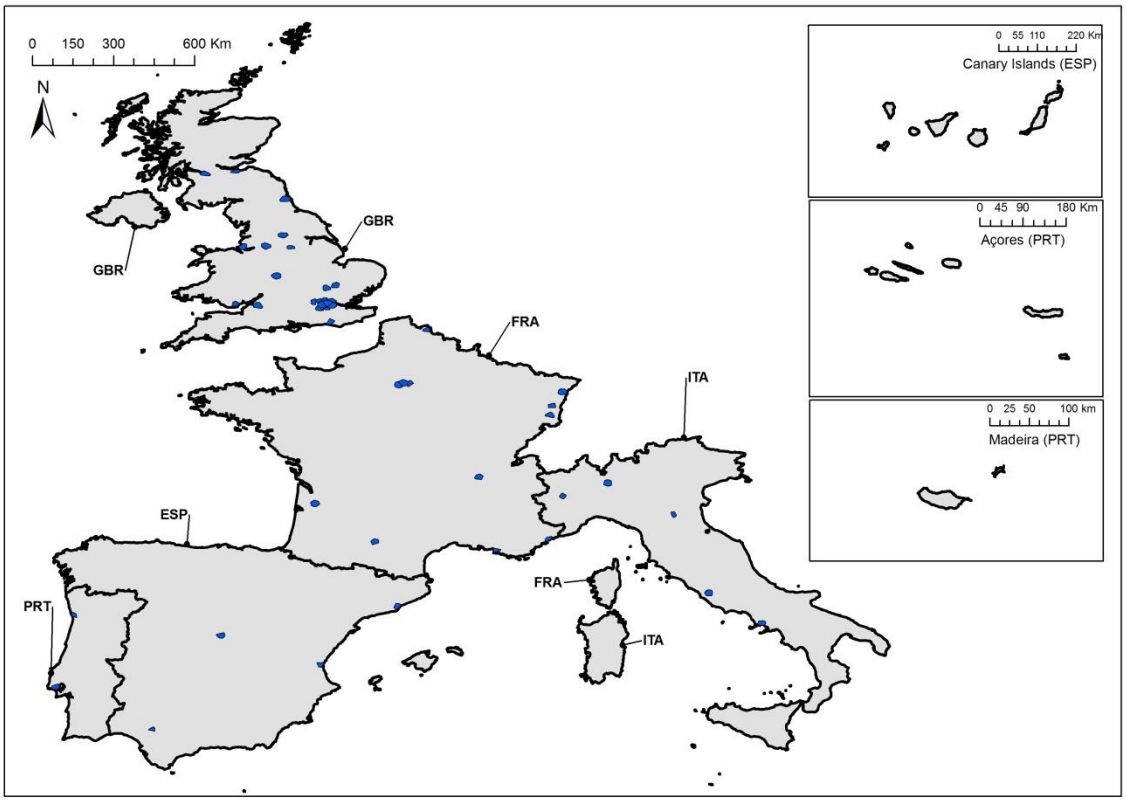
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.2. Publishing and printing clusters, 2009



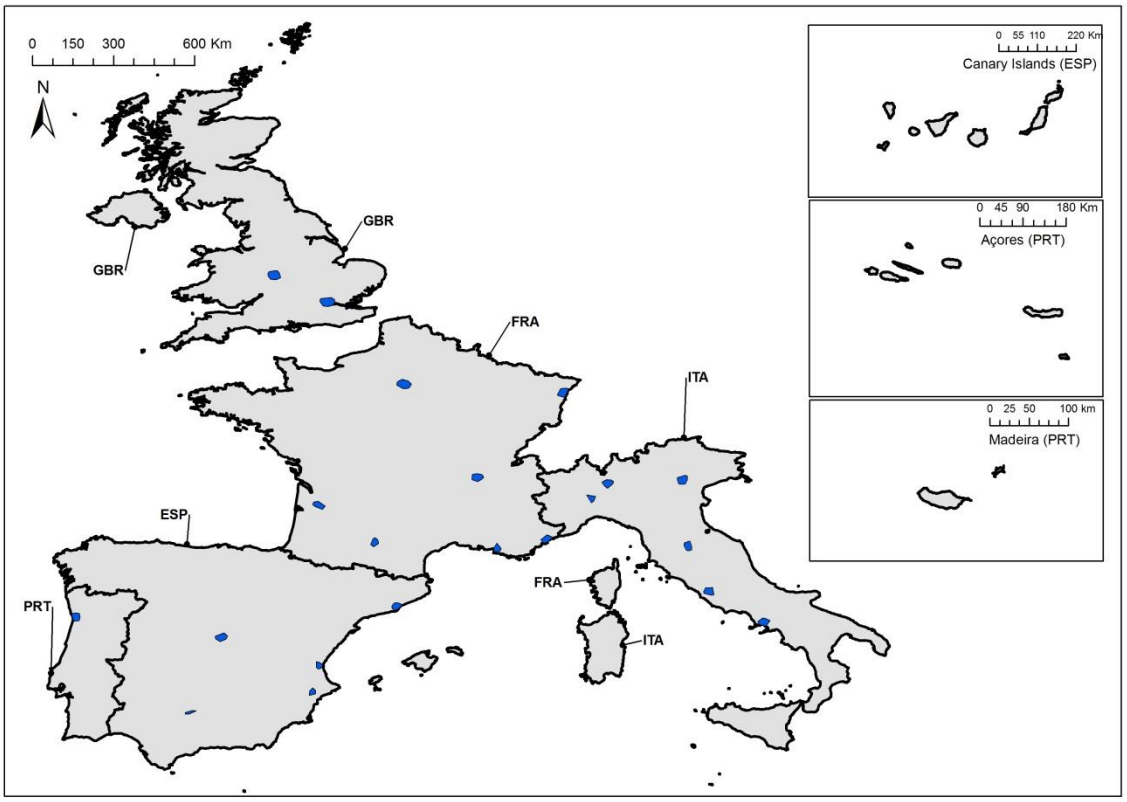
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.3. Film, video and music clusters, 2009



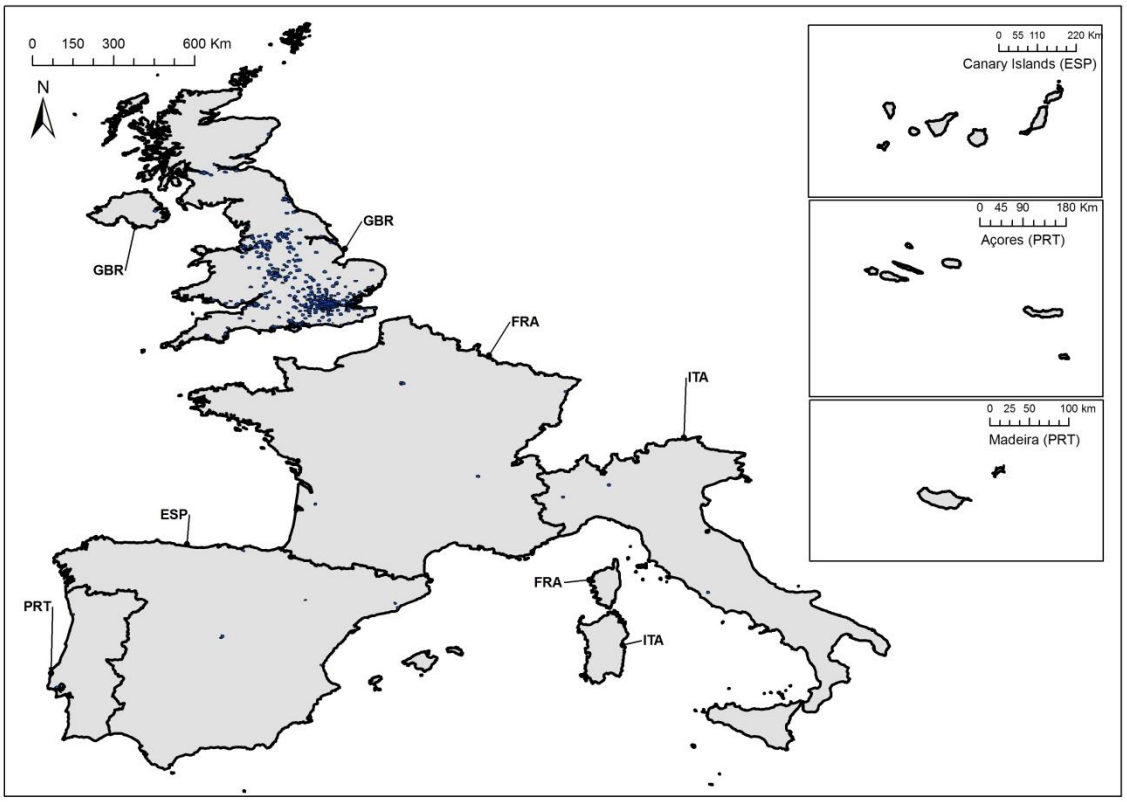
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.4. Crafts clusters, 2009



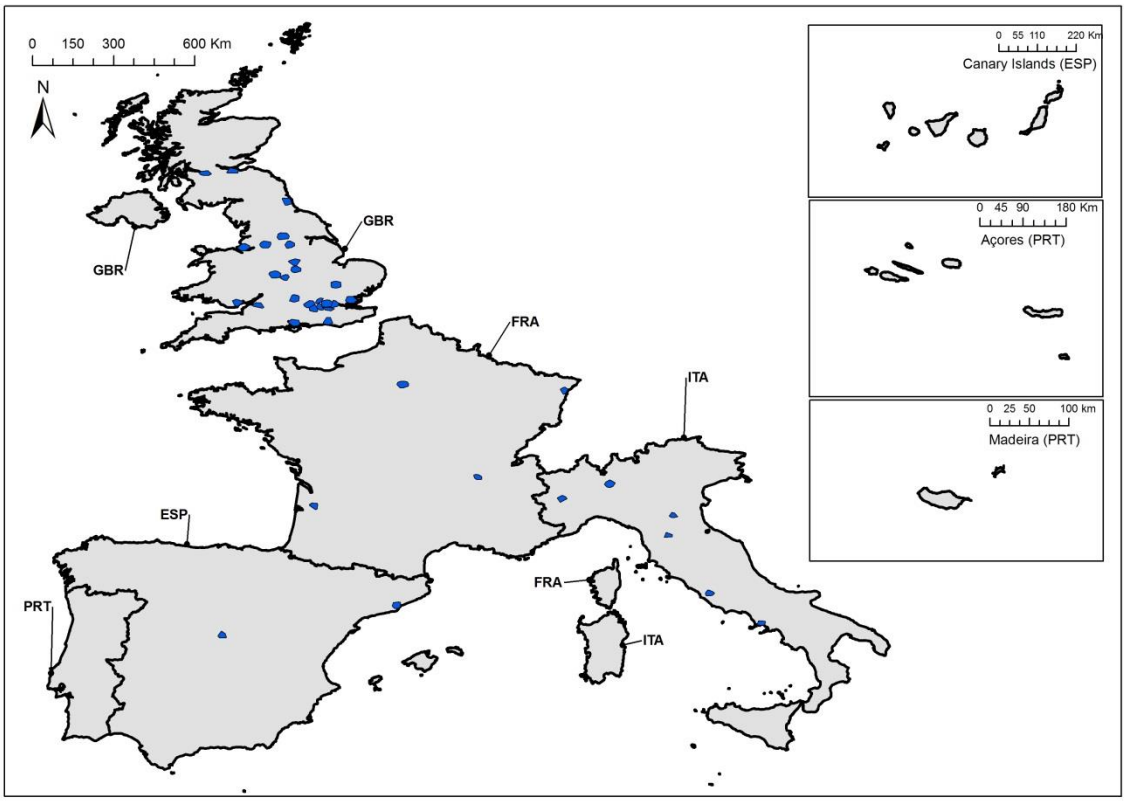
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.5. Software clusters, 2009



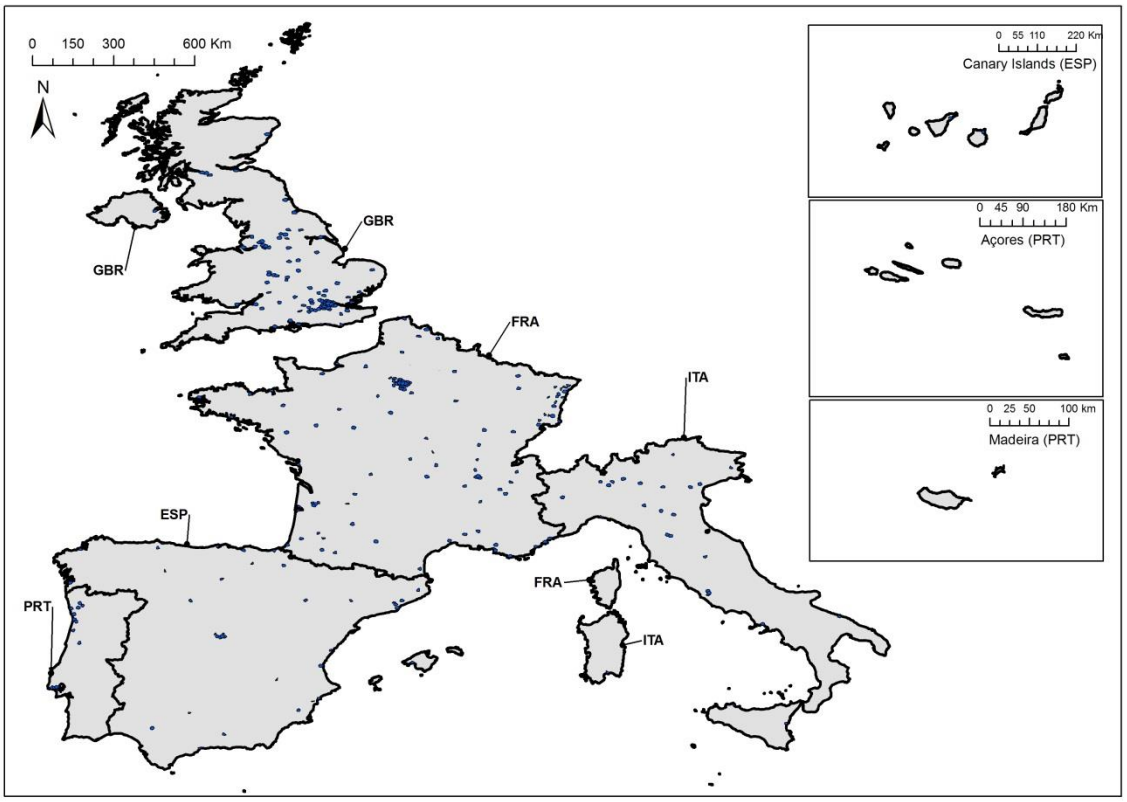
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.6. R&D clusters, 2009



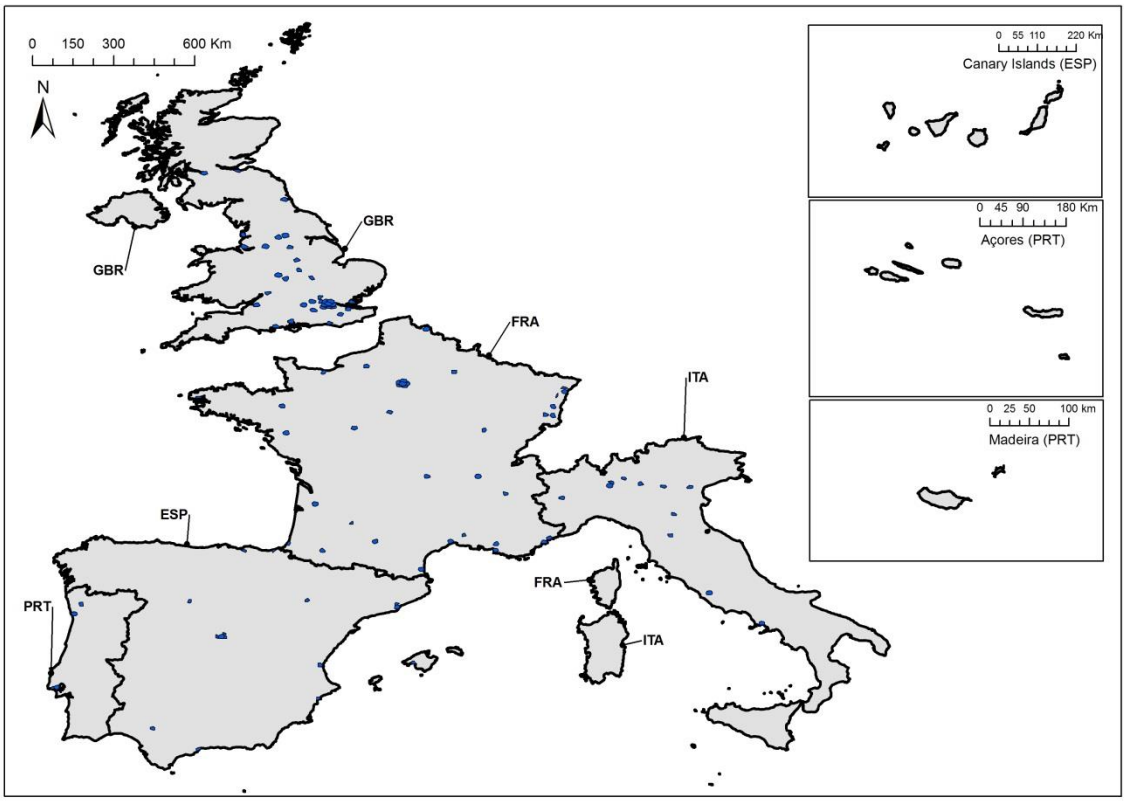
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.7. Architecture clusters, 2009



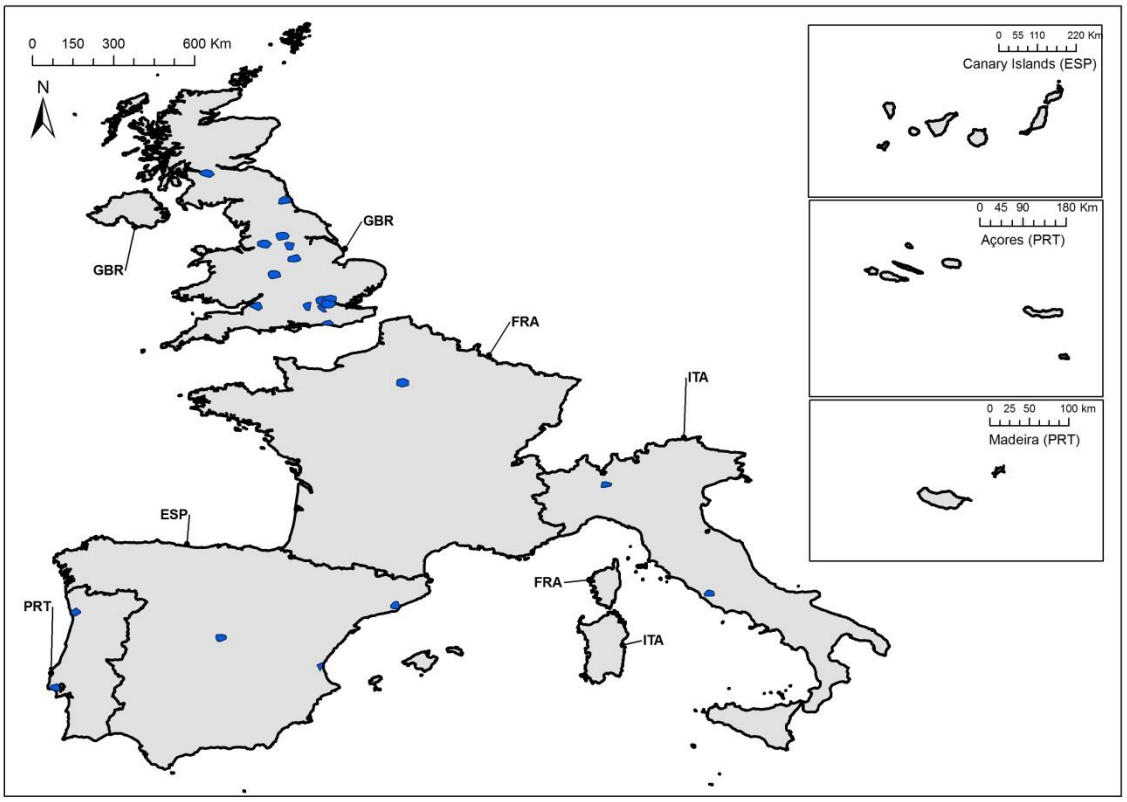
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.8. Advertising clusters, 2009



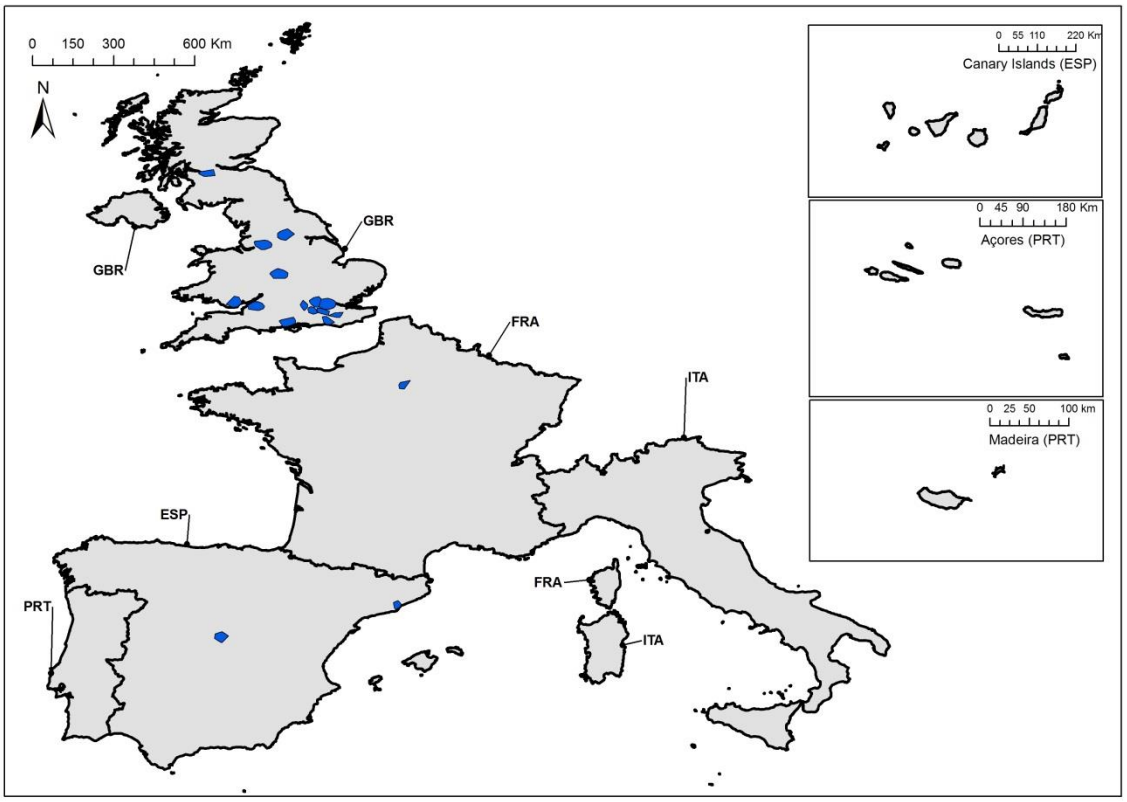
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.9. Photography clusters, 2009



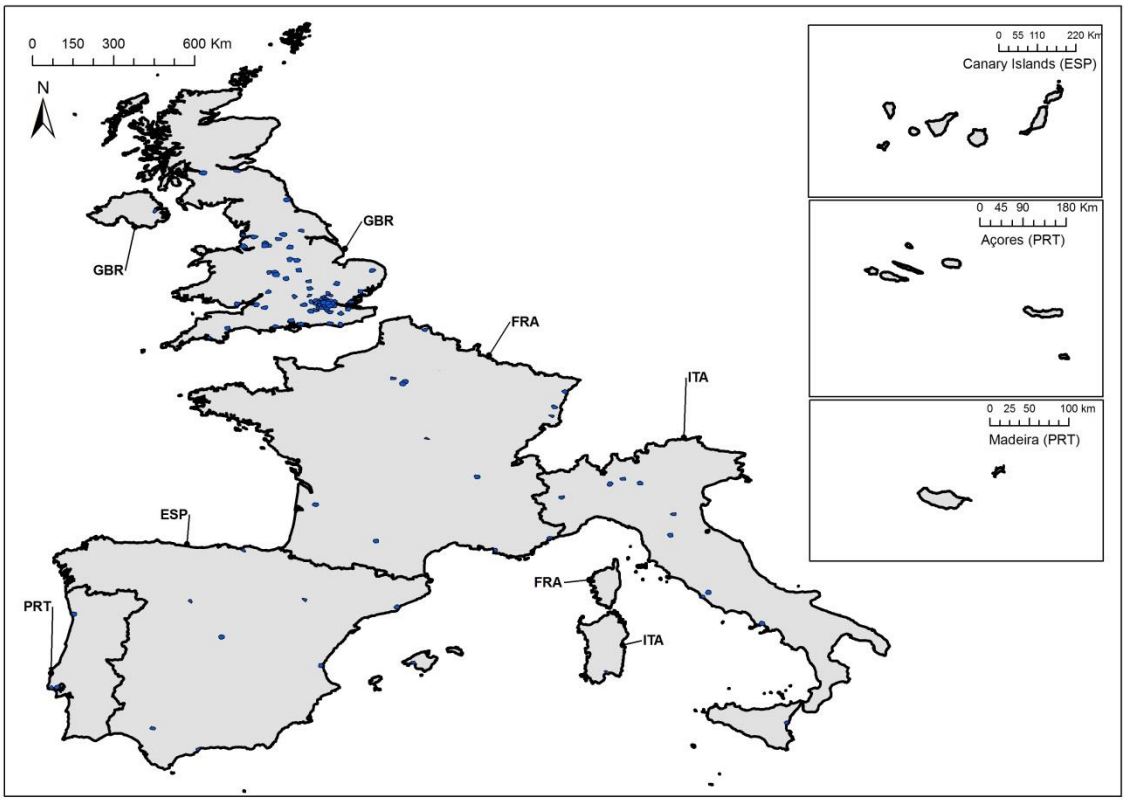
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.10. Broadcasting clusters, 2009



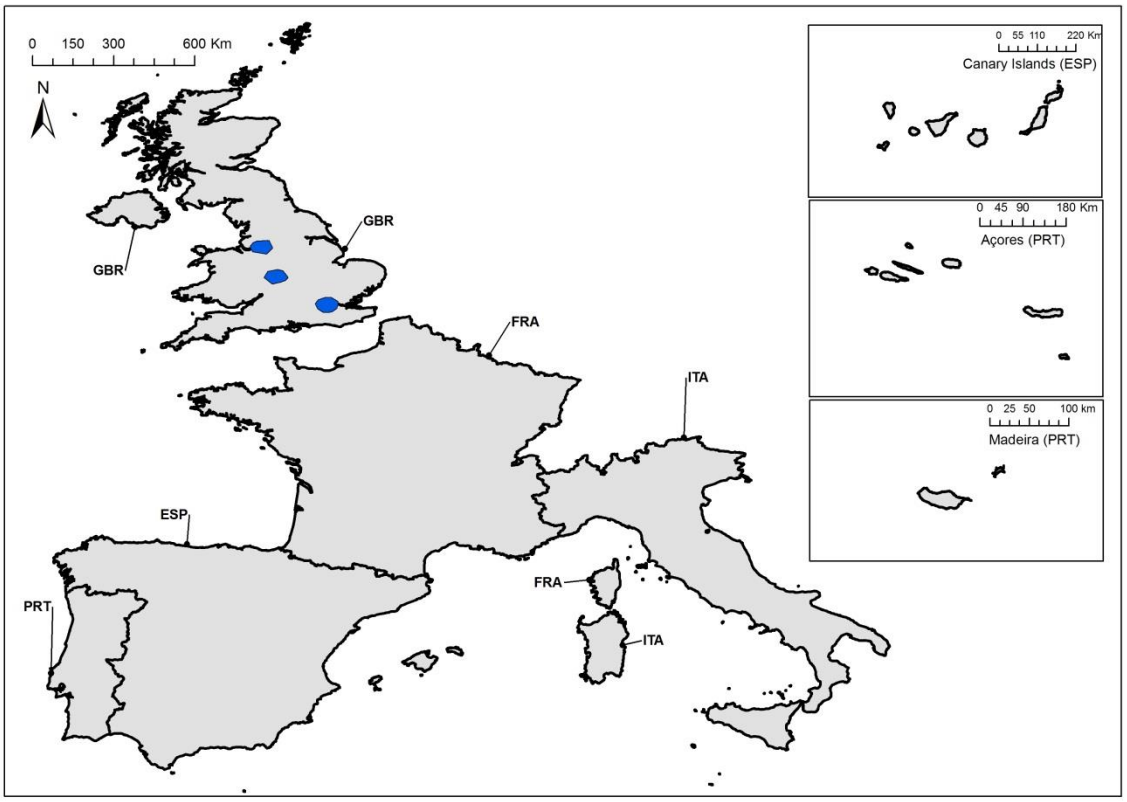
Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

Figure IV.11. Performing arts clusters, 2009



Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

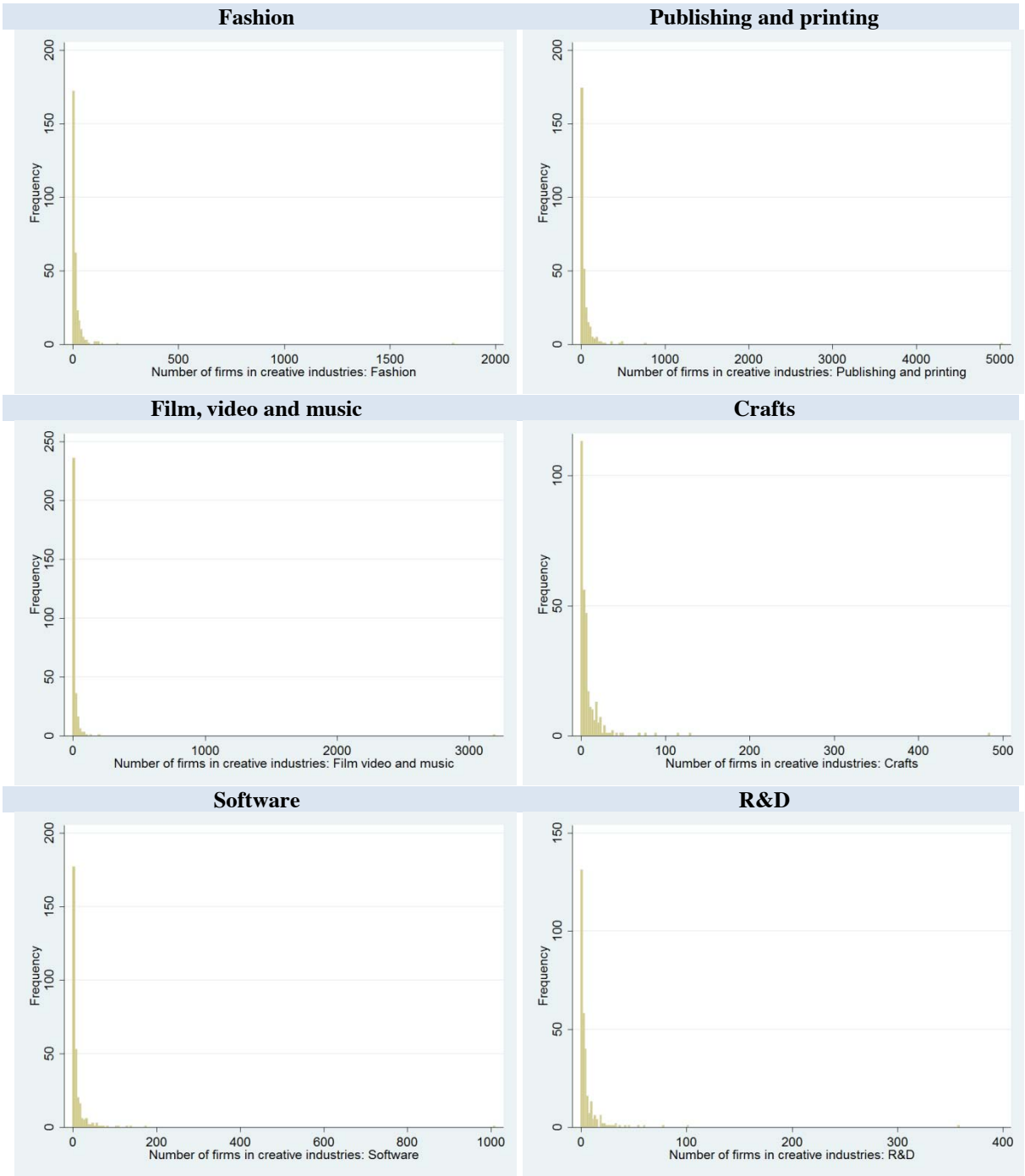
Figure IV.12. Heritage clusters, 2009



Note: The following criteria were used to identify the creative clusters: Nearest Neighbor Hierarchical Spatial Clustering technique (first order clusters). Likelihood of grouping pair of points by chance: 0.10000; Standard Deviations: 1.5; minimum number of points required to be defined as a cluster: 50 (based on INNO Germany 2010, p. 30 and Boix et al. 2014, p. 16); visualisation of the cluster output: Convex hull output.
Source: Own calculations based on ORBIS-2011 data.

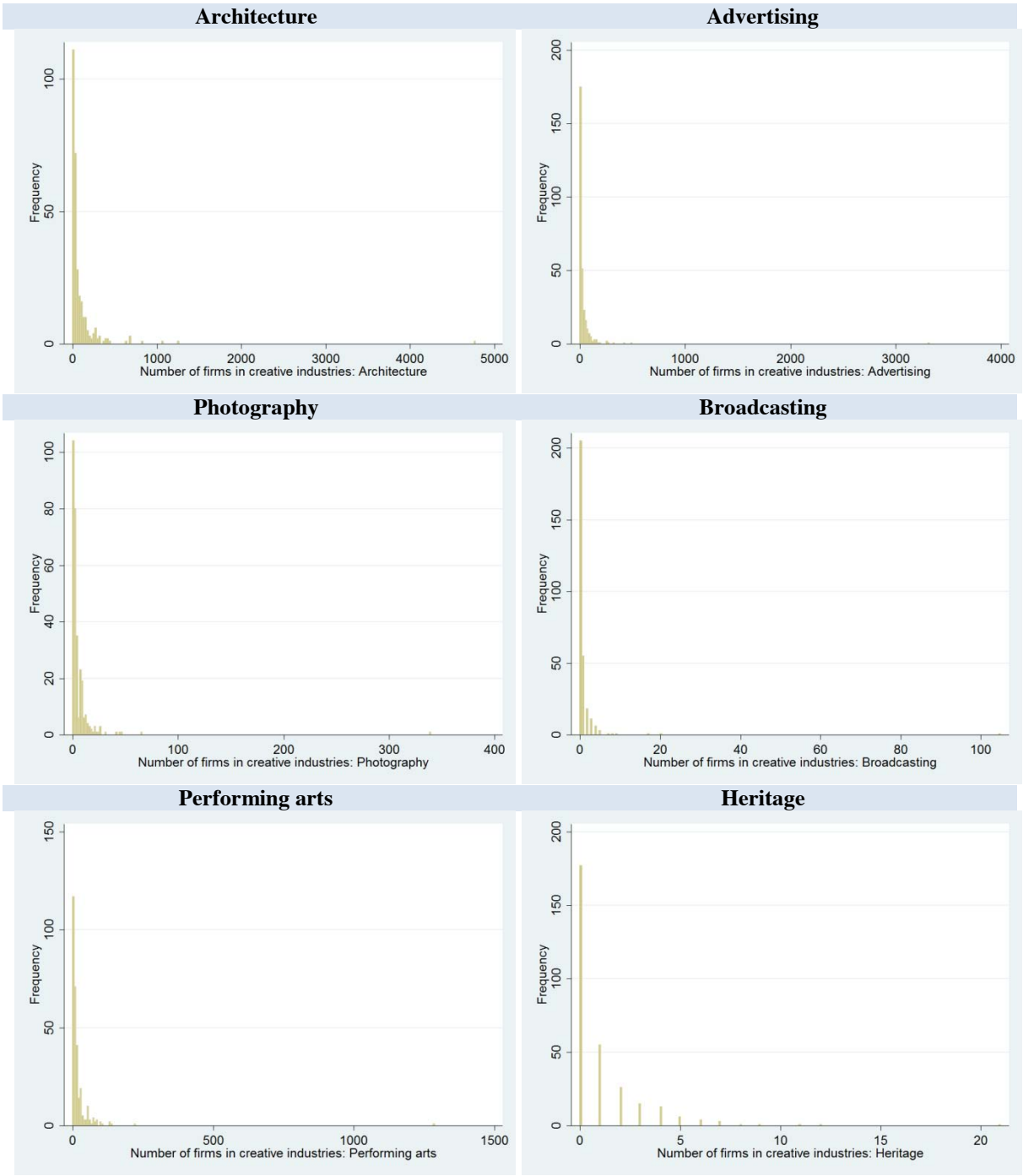
V. Frequency of the number firms by creative industry of creative industries in 5 European countries, 2009: histogram

Figure V.1. Frequency of the number of firms by creative industry in France, 2009: histogram



Source: Based on ORBIS-2011 data.

Figure V.1. Frequency of the number of creative industries in France, 2009: histogram (continued)

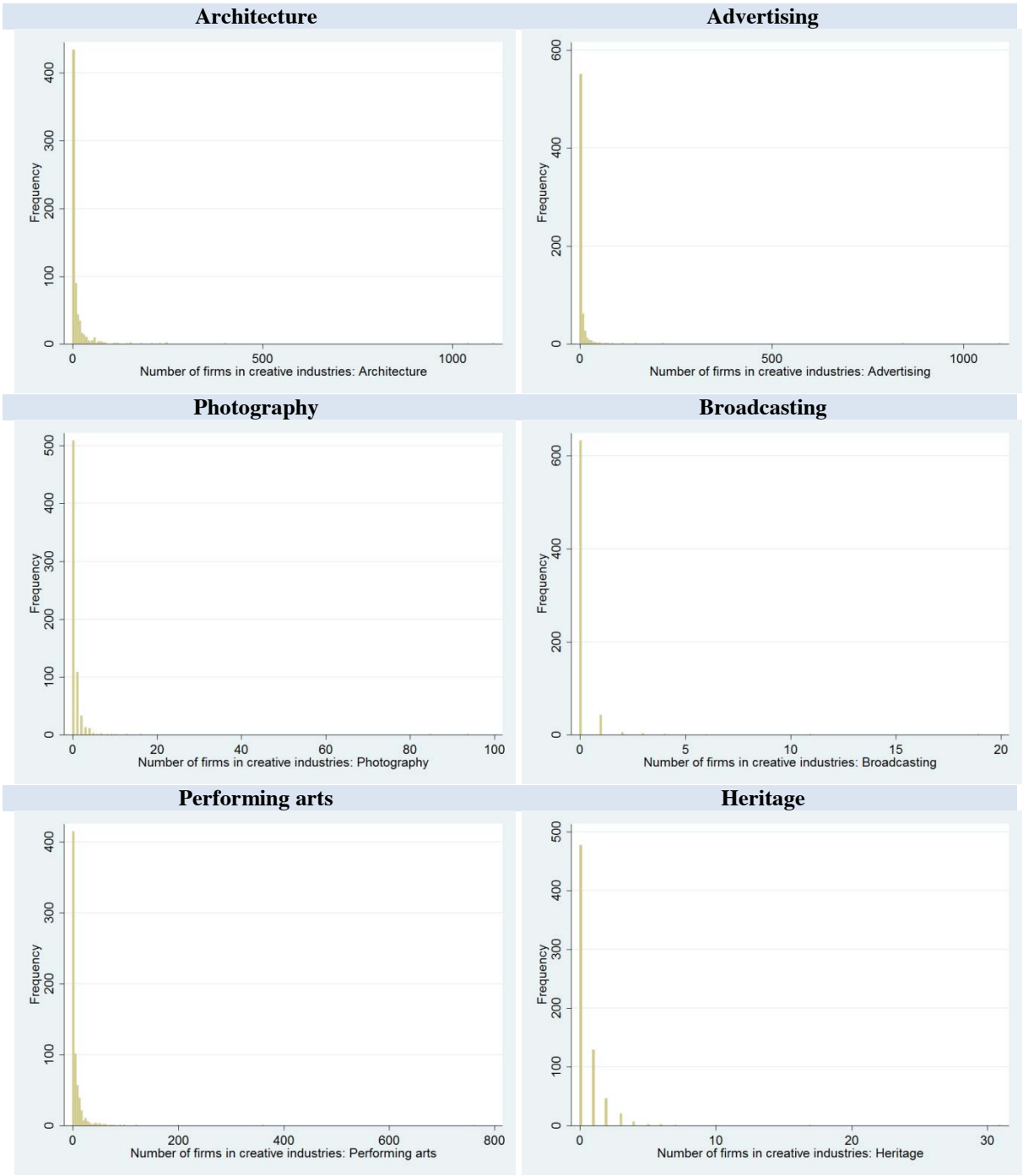


Source: Based on ORBIS-2011 data.

Figure V.2. Frequency of the number of firms by creative industry in Italy, 2009: histogram

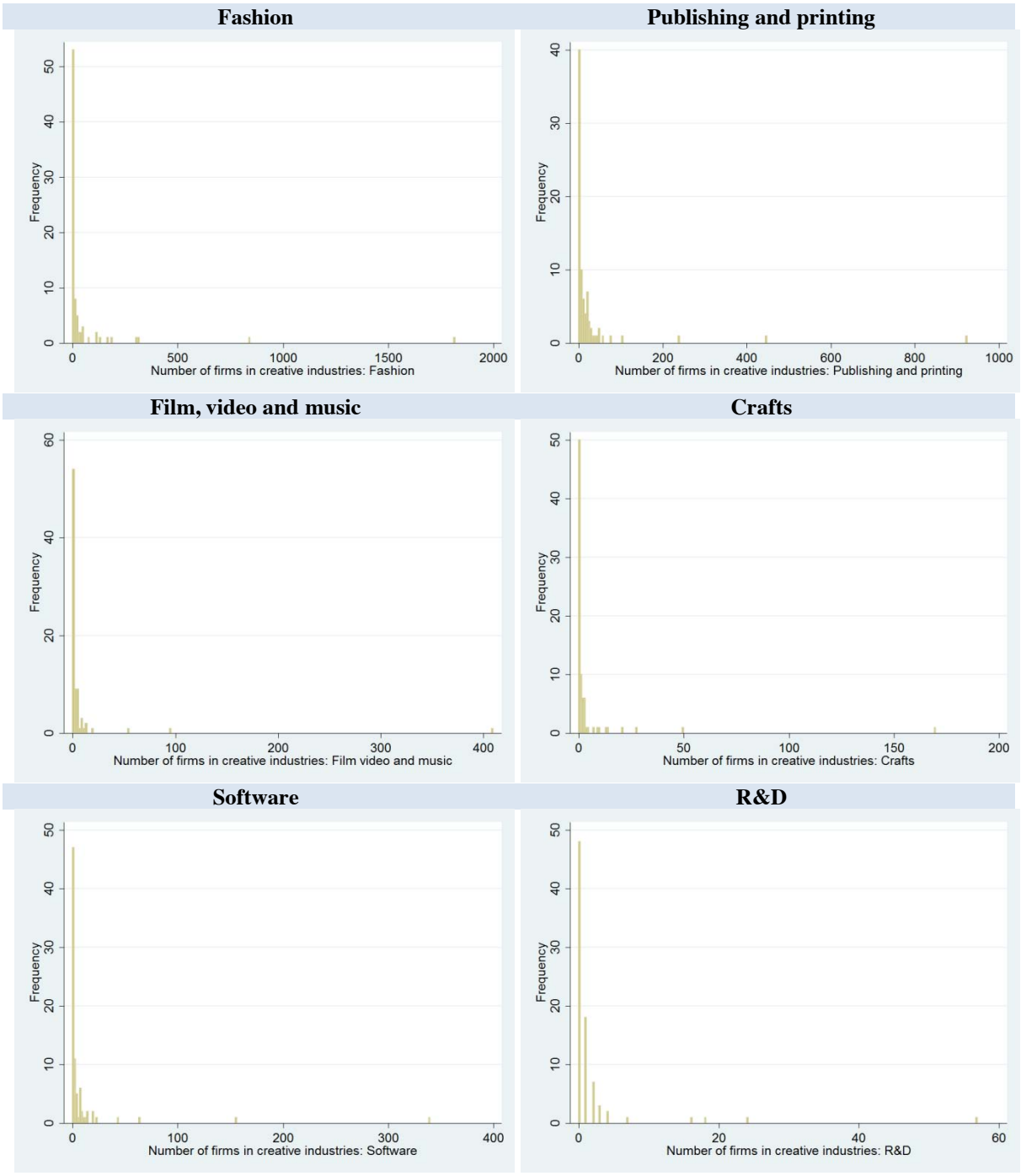
Source: Based on ORBIS-2011 data.

Figure V.2. Frequency of the number of creative industries in Italy, 2009: histogram (continued)



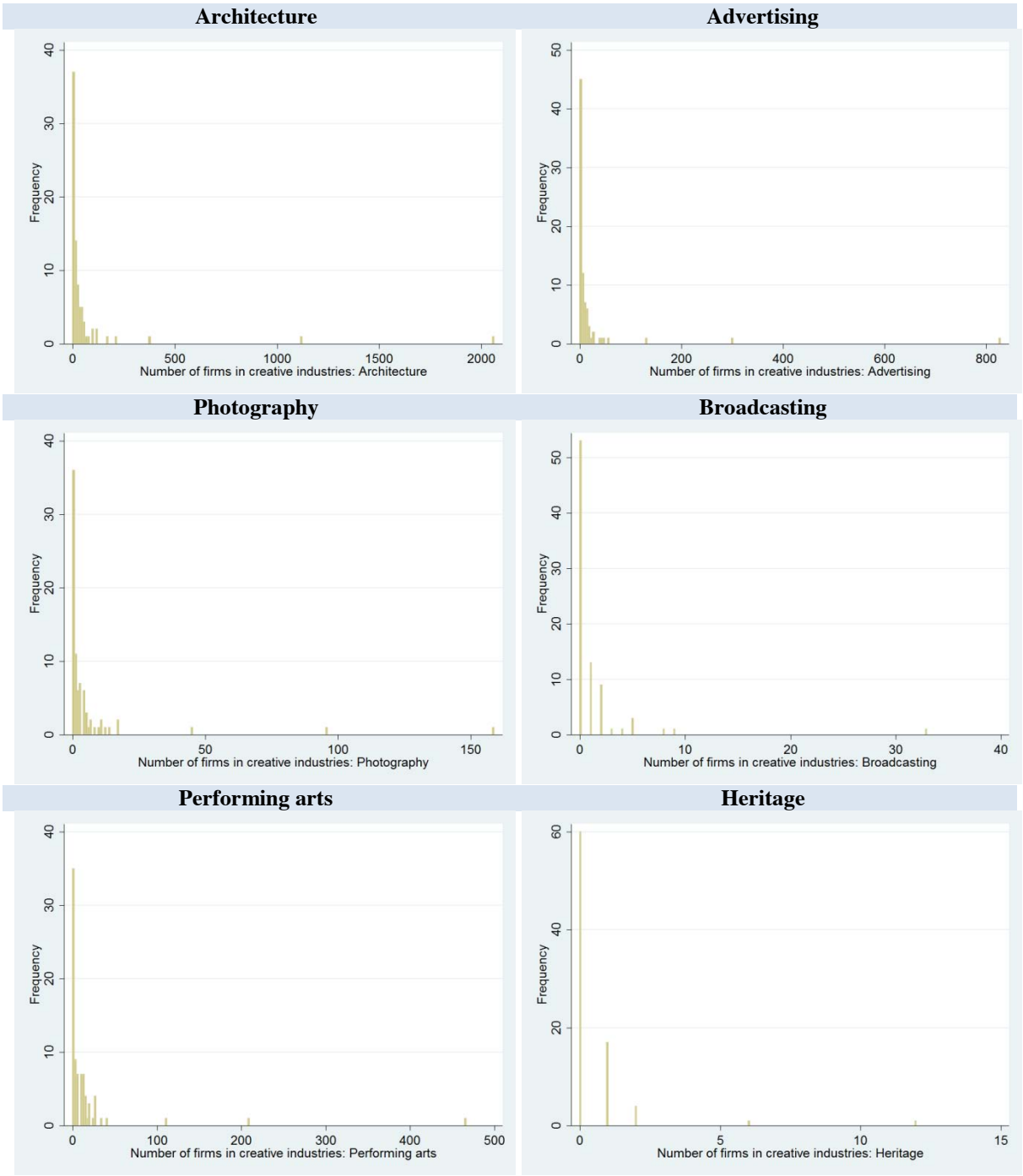
Source: Based on ORBIS-2011 data.

Figure V.3. Frequency of the number of firms by creative industry in Portugal, 2009: histogram



Source: Based on ORBIS-2011 data.

Figure V.3. Frequency of the number of creative industries in Portugal, 2009: histogram (continued)

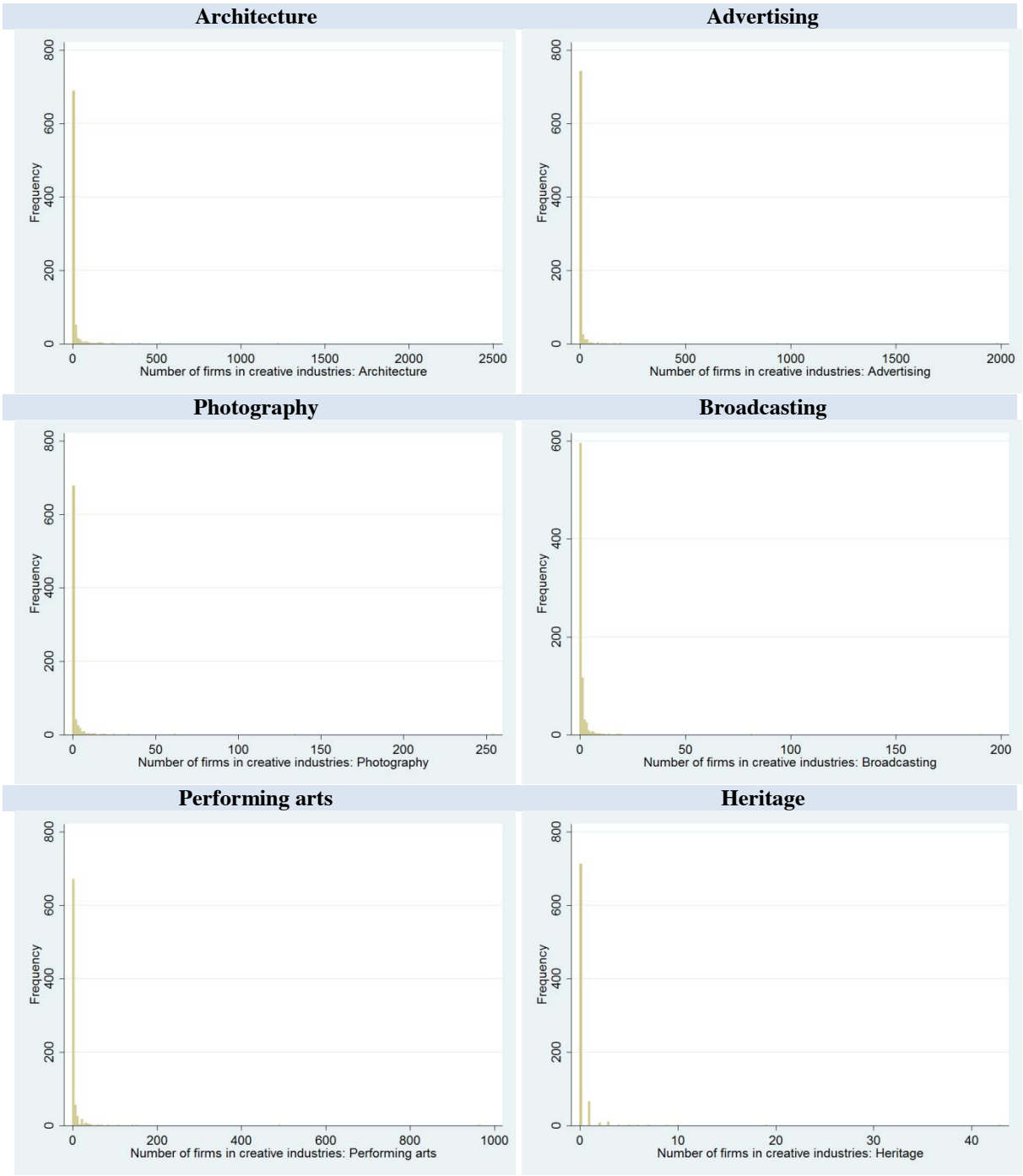


Source: Based on ORBIS-2011 data.

Figure V.4. Frequency of the number of firms by creative industry in Spain, 2009: histogram

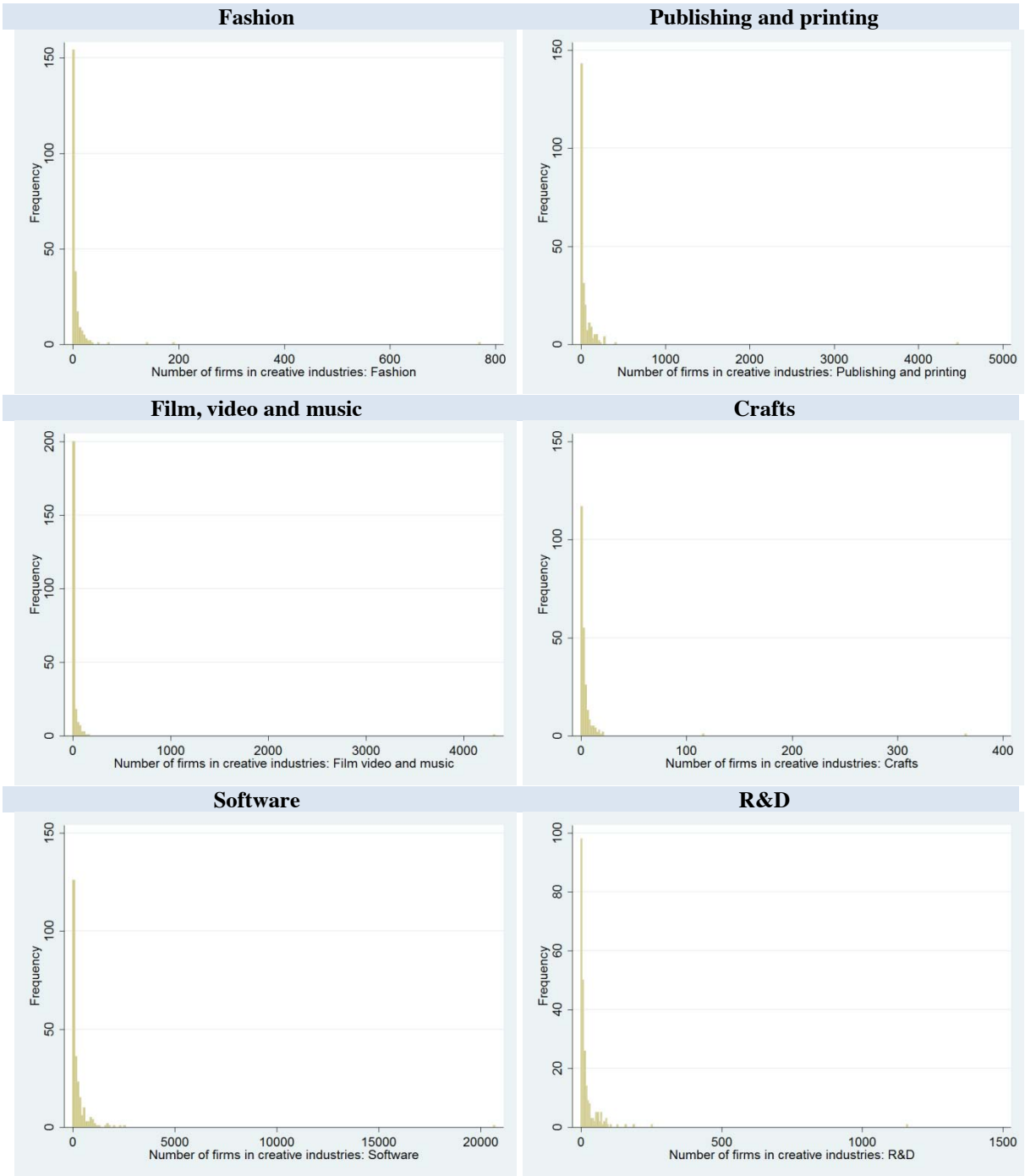
Source: Based on ORBIS-2011 data.

Figure V.4. Frequency of the number of creative industries in Spain, 2009: histogram (continued)



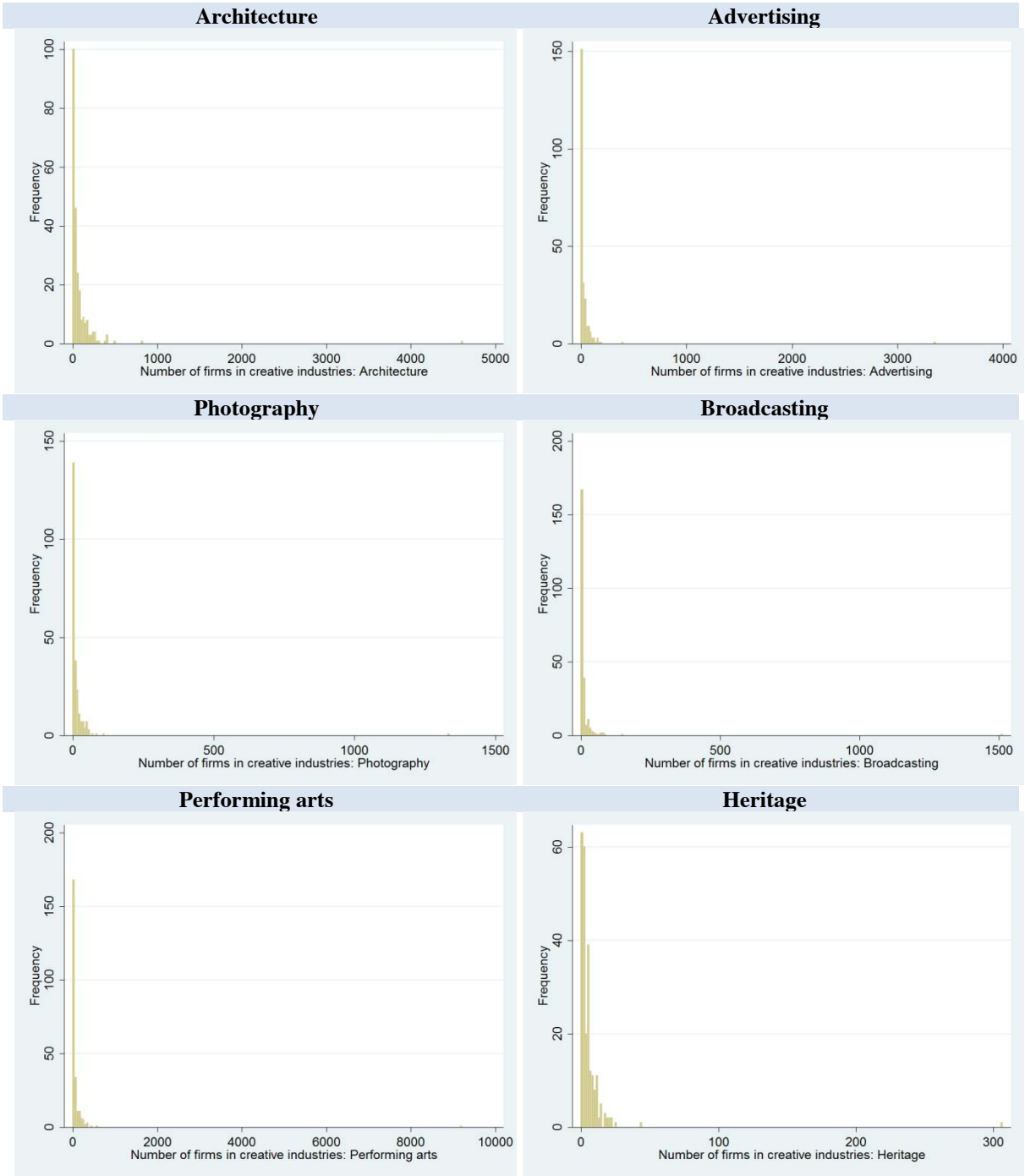
Source: Based on ORBIS-2011 data.

Figure V.5. Frequency of the number of firms by creative industry in the United Kingdom, 2009: histogram



Source: Based on ORBIS-2011 data.

Figure V.5. Frequency of the number of creative industries in the United Kingdom, 2009: histogram (continued)



Source: Based on ORBIS-2011 data.

VI. Features of the number of creative industries by sector, LLS and by country

Table VI.1. Features of the number of creative industries in France by creative industry, 2009

	Mean	Standard deviation	Min	Max	% of Zeros	# LLS
Fashion	21.38	105.33	0	1805	3%	304
Publishing and printing	66.44	297.50	1	5037	0%	304
Film, video and music	22.80	183.91	0	3199	8%	304
Crafts	9.84	30.87	0	485	9%	304
Software	14.13	60.92	0	1011	12%	304
R&D	6.67	22.96	0	359	24%	304
Architecture	102.12	306.55	1	4781	0%	304
Advertising	42.88	196.85	0	3324	3%	304
Photography	6.14	20.63	0	340	17%	304
Broadcasting	1.08	6.28	0	105	67%	304
Performing arts	21.99	77.34	0	1289	4%	304
Heritage	1.12	2.16	0	21	58%	304
Creative industries	316.59	1297.73	6	21756	0%	304

Note: Mean and standard deviation refer to the mean and standard deviation of the number of creative firms by LLS. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" present the share of the number of LLS without creative firms over the total number of LLS, expressed by "# LLS".

Source: Based on ORBIS-2011 data.

Table VI.2. Features of the number of creative industries in Italy by creative industry, 2009

	Mean	Standard deviation	Min	Max	% of Zeros	# LLS
Fashion	9.58	27.75	0	346	33%	686
Publishing and printing	10.11	60.15	0	1141	32%	686
Film, video and music	3.48	39.50	0	974	59%	686
Crafts	2.48	15.37	0	282	65%	686
Software	3.03	22.64	0	488	55%	686
R&D	3.07	15.54	0	282	55%	686
Architecture	14.87	64.70	0	1110	21%	686
Advertising	7.80	54.48	0	1098	39%	686
Photography	0.77	4.99	0	94	74%	686
Broadcasting	0.15	0.94	0	19	92%	686
Performing arts	8.43	34.94	0	764	24%	686
Heritage	0.57	1.66	0	31	70%	686
Creative industries	64.34	312.25	0	5797	3%	686

Note: Mean and standard deviation refer to the mean and standard deviation of the number of creative firms by LLS. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" present the share of the number of LLS without creative firms over the total number of LLS, expressed by "# LLS".

Source: Based on ORBIS-2011 data.

Table VI.3. Features of the number of creative industries in Portugal by creative industry, 2009

	Mean	Standard deviation	Min	Max	% of Zeros	# LLS
Fashion	56.86	222.72	0	1819	20%	83
Publishing and printing	31.16	114.19	0	925	18%	83
Film, video and music	9.22	46.17	0	410	33%	83
Crafts	4.47	19.66	0	170	60%	83
Software	10.24	41.24	0	340	40%	83
R&D	2.06	7.16	0	57	58%	83
Architecture	67.66	257.62	0	2065	17%	83
Advertising	22.23	96.77	0	829	29%	83
Photography	6.06	20.72	0	159	43%	83
Broadcasting	1.24	3.91	0	33	64%	83
Performing arts	16.84	56.55	0	467	22%	83
Heritage	0.52	1.53	0	12	72%	83
Creative industries	228.55	804.38	0	5658	10%	83

Note: Mean and standard deviation refer to the mean and standard deviation of the number of creative firms by LLS. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" present the share of the number of LLS without creative firms over the total number of LLS, expressed by "# LLS".

Source: Based on ORBIS-2011 data.

Table VI.4. Features of the number of creative industries in Spain by creative industry, 2009

	Mean	Standard deviation	Min	Max	% of Zeros	# LLS
Fashion	4.99	25.33	0	384	48%	806
Publishing and printing	10.51	91.05	0	2201	37%	806
Film, video and music	2.44	26.07	0	632	69%	806
Crafts	0.81	6.89	0	140	85%	806
Software	4.75	48.62	0	1229	59%	806
R&D	1.07	8.12	0	181	77%	806
Architecture	15.16	104.23	0	2510	31%	806
Advertising	7.28	78.43	0	1989	54%	806
Photography	1.56	10.67	0	255	66%	806
Broadcasting	1.01	7.54	0	191	74%	806
Performing arts	5.83	39.68	0	966	41%	806
Heritage	0.28	1.83	0	43	88%	806
Creative industries	55.68	437.11	0	10651	9%	806

Note: Mean and standard deviation refer to the mean and standard deviation of the number of creative firms by LLS. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" present the share of the number of LLS without creative firms over the total number of LLS, expressed by "# LLS".

Source: Based on ORBIS-2011 data.

Table VI.5. Features of the number of creative industries in the United Kingdom by creative industry, 2009

	Mean	Standard deviation	Min	Max	% of Zeros	# LLS
Fashion	9.58	51.89	0	772	23%	243
Publishing and printing	62.39	291.30	0	4478	6%	243
Film, video and music	32.57	277.87	0	4328	10%	243
Crafts	5.09	24.70	0	366	26%	243
Software	334.53	1372.17	0	20725	1%	243
R&D	23.89	79.77	0	1164	6%	243
Architecture	87.12	307.49	0	4618	2%	243
Advertising	39.70	218.59	0	3366	12%	243
Photography	16.66	86.57	0	1338	15%	243
Broadcasting	15.61	98.10	0	1515	16%	243
Performing arts	92.29	593.66	0	9223	1%	243
Heritage	6.19	20.10	0	307	12%	243
Creative industries	725.61	3402.12	1	52200	0%	243

Note: Mean and standard deviation refer to the mean and standard deviation of the number of creative firms by LLS. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" present the share of the number of LLS without creative firms over the total number of LLS, expressed by "# LLS".

Source: Based on ORBIS-2011 data.

Table VI.6. Features of the number of creative industries in the 5 European countries under analysis by creative industry, 2009

	Mean	Standard deviation	Min	Max	% of Zeros	# LLS
Fashion	11.38	66.44	0	1819	33%	2122
Publishing and printing	25.14	166.45	0	5037	26%	2122
Film, video and music	9.41	120.84	0	4328	49%	2122
Crafts	3.28	18.00	0	485	60%	2122
Software	43.52	476.93	0	20725	43%	2122
R&D	5.17	30.90	0	1164	54%	2122
Architecture	37.82	183.10	0	4781	20%	2122
Advertising	16.85	121.91	0	3366	36%	2122
Photography	3.87	31.76	0	1338	55%	2122
Broadcasting	2.42	33.89	0	1515	72%	2122
Performing arts	19.32	207.12	0	9223	25%	2122
Heritage	1.18	7.23	0	307	69%	2122
Creative industries	179.34	1318.06	0	52200	5%	2122

Note: Mean and standard deviation refer to the mean and standard deviation of the number of creative firms by LLS. The minimum and maximum number of firms within a LLS is presented in the categories Min and Max respectively. The "% of Zeros" present the share of the number of LLS without creative firms over the total number of LLS, expressed by "# LLS".

Source: Based on ORBIS-2011 data.

VII. Correlation tables between the independent variables by country

Table VII.1. Correlation matrix: 5 European countries

	Creative firms size	Creative competition	Creative filière	Creative specialisation externalities	Creative clusters	Population	Employment density
Creative firms size	1.0000						
Creative competition	-0.0881 (0.0000)	1.0000					
Creative filière	-0.0569 (0.0088)	0.1028 (0.0000)	1.0000				
Creative spec. externalities	0.0633 (0.0035)	0.2017 (0.0000)	0.1851 (0.0000)	1.0000			
Creative clusters	0.1518 (0.0000)	-0.1112 (0.0000)	0.2224 (0.0000)	0.1418 (0.0000)	1.0000		
Population	0.0954 (0.0000)	-0.1380 (0.0000)	0.3399 (0.0000)	0.1615 (0.0000)	0.8001 (0.0000)	1.0000	
Employment density	0.0763 (0.0004)	-0.0022 (0.9182)	0.2601 (0.0000)	0.1624 (0.0000)	0.5314 (0.0000)	0.6279 (0.0000)	1.0000
Population concentration	0.1692 (0.0000)	0.0704 (0.0012)	0.3024 (0.0000)	0.1130 (0.0000)	0.1986 (0.0000)	0.2528 (0.0000)	0.1165 (0.0000)
Labour supply	0.0155 (0.4756)	-0.0675 (0.0019)	0.1888 (0.0000)	-0.0540 (0.0128)	0.0911 (0.0000)	0.0799 (0.0002)	0.0920 (0.0000)
Diversity externalities	-0.0630 (0.0037)	0.1478 (0.0000)	0.4885 (0.0000)	0.1345 (0.0000)	0.0925 (0.0000)	0.1999 (0.0000)	0.1687 (0.0000)
Infrastructures	-0.0942 (0.0000)	-0.1501 (0.0000)	-0.2074 (0.0000)	-0.1793 (0.0000)	-0.1541 (0.0000)	-0.1916 (0.0000)	-0.2842 (0.0000)
Public services	0.1125 (0.0000)	-0.0154 (0.4781)	-0.0442 (0.0418)	0.0059 (0.7855)	0.0697 (0.0013)	0.0338 (0.1198)	-0.0072 (0.7399)
Social capital	0.1083 (0.0000)	0.0618 (0.0044)	-0.0954 (0.0000)	-0.0722 (0.0009)	0.1503 (0.0000)	0.0659 (0.0024)	0.0874 (0.0001)
Capital region	0.0792 (0.0003)	-0.0431 (0.0469)	0.2768 (0.0000)	0.1365 (0.0000)	0.3901 (0.0000)	0.5256 (0.0000)	0.3560 (0.0000)
Heritage	-0.0083 (0.7017)	-0.1226 (0.0000)	0.1828 (0.0000)	0.0635 (0.0034)	0.1638 (0.0000)	0.2482 (0.0000)	0.2256 (0.0000)
Air quality	-0.0076 (0.7249)	0.0022 (0.9204)	-0.0432 (0.0464)	-0.0184 (0.3970)	-0.0072 (0.7387)	-0.0153 (0.4808)	-0.0284 (0.1904)
Touristic services	-0.0068 (0.7529)	-0.0469 (0.0307)	-0.0561 (0.0098)	-0.0598 (0.0059)	-0.0227 (0.2966)	-0.0392 (0.0708)	-0.0460 (0.0339)
Analytic spec. externalities	0.0295 (0.1750)	-0.0386 (0.0753)	0.1384 (0.0000)	0.0962 (0.0000)	0.1539 (0.0000)	0.2083 (0.0000)	0.1431 (0.0000)
Synthetic spec. externalities	0.0139 (0.5234)	0.0358 (0.0989)	0.0376 (0.0837)	0.0031 (0.8862)	0.0371 (0.0871)	0.0341 (0.1164)	0.0445 (0.0403)
Human capital	0.1395 (0.0000)	-0.1032 (0.0000)	0.3117 (0.0000)	0.1364 (0.0000)	0.3202 (0.0000)	0.3550 (0.0000)	0.2649 (0.0000)
Tolerance	-0.0490 (0.0241)	0.0961 (0.0000)	-0.2110 (0.0000)	-0.0039 (0.8561)	-0.1293 (0.0000)	-0.1287 (0.0000)	-0.0921 (0.0000)
Innovation	0.0569 (0.0088)	-0.0175 (0.4193)	0.0519 (0.0169)	0.0441 (0.0424)	0.1234 (0.0000)	0.0912 (0.0000)	0.0767 (0.0004)
Patronage	-0.0007 (0.9726)	-0.0370 (0.0881)	0.0382 (0.0782)	-0.0199 (0.3605)	0.0138 (0.5245)	0.0125 (0.5640)	-0.0150 (0.4909)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.1. Correlation matrix: 5 European countries (continued)

	Population concentration	Labour supply	Diversity externalities	Infrastructures	Public services	Social capital	Capital region	Heritage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration	1.0000							
Labour supply	0.0531 (0.0143)	1.0000						
Diversity externalities	0.2003 (0.0000)	0.0657 (0.0025)	1.0000					
Infrastructures	-0.0889 (0.0000)	-0.0862 (0.0001)	-0.1387 (0.0000)	1.0000				
Public services	0.2585 (0.0000)	0.0455 (0.0361)	-0.0827 (0.0001)	0.1846 (0.0000)	1.0000			
Social capital	0.0775 (0.0004)	0.3533 (0.0000)	-0.0827 (0.0001)	-0.0021 (0.9234)	0.1504 (0.0000)	1.0000		
Capital region	0.2784 (0.0000)	0.0717 (0.0010)	0.1886 (0.0000)	-0.1469 (0.0000)	0.0474 (0.0289)	0.0506 (0.0198)	1.0000	
Heritage	0.1858 (0.0000)	0.1014 (0.0000)	0.1317 (0.0000)	-0.0359 (0.0984)	0.0358 (0.0989)	-0.1022 (0.0000)	0.2208 (0.0000)	1.0000
Air quality	-0.0058 (0.7893)	-0.0222 (0.3066)	-0.0184 (0.3979)	0.0860 (0.0001)	0.0412 (0.0579)	0.0424 (0.0511)	-0.0087 (0.6897)	-0.0130 (0.5487)
Touristic services	0.0047 (0.8270)	0.0974 (0.0000)	-0.0471 (0.0299)	0.1718 (0.0000)	0.3749 (0.0000)	0.0595 (0.0061)	-0.0138 (0.5265)	0.0707 (0.0011)
Analytic spec. externalities	0.1224 (0.0000)	0.0016 (0.9418)	-0.0639 (0.0032)	-0.0932 (0.0000)	0.0174 (0.4237)	-0.0131 (0.5463)	0.1401 (0.0000)	0.0891 (0.0000)
Synthetic spec. externalities	0.0620 (0.0042)	0.0615 (0.0046)	-0.0656 (0.0025)	-0.0439 (0.0433)	-0.0196 (0.3680)	0.0329 (0.1302)	0.0254 (0.2422)	-0.0280 (0.1975)
Human capital	0.6190 (0.0000)	0.2830 (0.0000)	0.1756 (0.0000)	-0.1108 (0.0000)	0.4093 (0.0000)	0.0868 (0.0001)	0.3144 (0.0000)	0.3347 (0.0000)
Tolerance	-0.3057 (0.0000)	-0.5028 (0.0000)	-0.1121 (0.0000)	0.0138 (0.5240)	-0.1904 (0.0000)	-0.0496 (0.0223)	-0.0850 (0.0001)	-0.2250 (0.0000)
Innovation	0.1353 (0.0000)	0.0607 (0.0051)	0.0596 (0.0060)	-0.0729 (0.0008)	0.0944 (0.0000)	0.0869 (0.0001)	0.0662 (0.0023)	0.0564 (0.0093)
Patronage	0.0824 (0.0001)	0.1033 (0.0000)	0.0312 (0.1502)	0.1316 (0.0000)	0.4371 (0.0000)	0.0523 (0.0159)	0.0367 (0.0907)	0.0876 (0.0001)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.1. Correlation matrix: 5 European countries (continued)

	Air quality	Touristic services	Analytic specialisation externalities	Synthetic specialisation externalities	Human capital	Tolerance	Innovation	Patronage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration								
Labour supply								
Diversity externalities								
Infrastructures								
Public services								
Social capital								
Capital region								
Heritage								
Air quality	1.0000							
Touristic services	-0.0142 (0.5130)	1.0000						
Analytic spec. externalities	-0.0197 (0.3632)	0.0225 (0.3002)	1.0000					
Synthetic spec. externalities	0.0149 (0.4923)	-0.0102 (0.6391)	0.0148 (0.4966)	1.0000				
Human capital	-0.0265 (0.2221)	0.0114 (0.5988)	0.1323 (0.0000)	0.0383 (0.0778)	1.0000			
Tolerance	-0.0113 (0.6025)	-0.0470 (0.0305)	-0.0339 (0.1181)	-0.0653 (0.0026)	-0.5305 (0.0000)	1.0000		
Innovation	0.1018 (0.0000)	0.0091 (0.6750)	0.0631 (0.0036)	0.0622 (0.0042)	0.1974 (0.0000)	-0.1159 (0.0000)	1.0000	
Patronage	-0.0093 (0.6674)	0.6981 (0.0000)	0.0136 (0.5312)	0.0101 (0.6417)	0.1266 (0.0000)	-0.0926 (0.0000)	0.0182 (0.4016)	1.0000

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.2. Correlation matrix: France

	Creative firms size	Creative competition	Creative filière	Creative specialisation externalities	Creative clusters	Population	Employment density
Creative firms size	1.0000						
Creative competition	-0.3042 (0.0000)	1.0000					
Creative filière	-0.2545 (0.0000)	0.0738 (0.1996)	1.0000				
Creative spec. externalities	0.0375 (0.5150)	-0.2809 (0.0000)	0.1477 (0.0099)	1.0000			
Creative clusters	0.0994 (0.0835)	-0.3590 (0.0000)	0.1471 (0.0102)	0.5038 (0.0000)	1.0000		
Population	0.0752 (0.1912)	-0.4014 (0.0000)	0.1263 (0.0277)	0.5269 (0.0000)	0.8450 (0.0000)	1.0000	
Employment density	0.0577 (0.3160)	-0.2241 (0.0001)	0.0654 (0.2560)	0.4279 (0.0000)	0.8221 (0.0000)	0.8239 (0.0000)	1.0000
Population concentration	0.0096 (0.8675)	-0.2053 (0.0003)	0.2411 (0.0000)	0.2673 (0.0000)	0.1364 (0.0173)	0.1754 (0.0021)	-0.0645 (0.2619)
Labour supply	0.0952 (0.0974)	-0.1814 (0.0015)	0.0294 (0.6102)	0.2150 (0.0002)	0.3095 (0.0000)	0.2504 (0.0000)	0.2112 (0.0002)
Diversity externalities	-0.1674 (0.0034)	-0.0695 (0.2268)	0.1120 (0.0512)	0.0983 (0.0869)	0.1105 (0.0544)	0.1593 (0.0054)	0.0415 (0.4708)
Infrastructures	-0.0874 (0.1284)	0.2102 (0.0002)	-0.0704 (0.2212)	-0.3847 (0.0000)	-0.3353 (0.0000)	-0.3279 (0.0000)	-0.2617 (0.0000)
Public services	-0.0261 (0.6501)	-0.0534 (0.3536)	-0.0345 (0.5490)	-0.0066 (0.9082)	-0.0160 (0.7813)	-0.0398 (0.4890)	-0.0527 (0.3596)
Social capital	-0.0020 (0.9717)	0.0044 (0.9396)	-0.0660 (0.2512)	0.2557 (0.0000)	0.2627 (0.0000)	0.1888 (0.0009)	0.2496 (0.0000)
Capital region	0.0336 (0.5593)	-0.2252 (0.0001)	0.1288 (0.0247)	0.3625 (0.0000)	0.4336 (0.0000)	0.5917 (0.0000)	0.3784 (0.0000)
Heritage	-0.0018 (0.9755)	-0.2272 (0.0001)	0.1308 (0.0225)	0.2833 (0.0000)	0.3749 (0.0000)	0.4055 (0.0000)	0.3081 (0.0000)
Air quality	-0.0013 (0.9827)	0.0040 (0.9440)	-0.0012 (0.9832)	0.0066 (0.9091)	0.0059 (0.9187)	-0.0065 (0.9101)	-0.0023 (0.9688)
Touristic services	-0.0619 (0.2820)	-0.0197 (0.7319)	-0.0118 (0.8376)	-0.0929 (0.1061)	0.0285 (0.6210)	0.0184 (0.7497)	0.0187 (0.7457)
Analytic spec. externalities	0.1251 (0.0292)	-0.2064 (0.0003)	0.0583 (0.3107)	0.3171 (0.0000)	0.3610 (0.0000)	0.3913 (0.0000)	0.3352 (0.0000)
Synthetic spec. externalities	0.0208 (0.7176)	0.0443 (0.4411)	-0.0083 (0.8860)	0.1069 (0.0626)	0.0453 (0.4315)	0.0305 (0.5968)	0.0586 (0.3088)
Human capital	0.0690 (0.2303)	-0.3940 (0.0000)	0.0943 (0.1009)	0.5557 (0.0000)	0.5558 (0.0000)	0.5445 (0.0000)	0.3995 (0.0000)
Tolerance	0.0078 (0.8924)	0.0043 (0.9399)	0.0850 (0.1394)	-0.2144 (0.0002)	-0.2460 (0.0000)	-0.1820 (0.0014)	-0.2354 (0.0000)
Innovation	0.0824 (0.1518)	-0.2014 (0.0004)	0.0533 (0.3546)	0.1730 (0.0025)	0.2565 (0.0000)	0.1847 (0.0012)	0.1569 (0.0061)
Patronage	0.0277 (0.6309)	-0.1384 (0.0158)	-0.0385 (0.5036)	0.0033 (0.9540)	0.0973 (0.0903)	0.0754 (0.1898)	0.0300 (0.6020)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.2. Correlation matrix: France (continued)

	Population concentration	Labour supply	Diversity externalities	Infrastructures	Public services	Social capital	Capital region	Heritage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration	1.0000							
Labour supply	0.0933 (0.1045)	1.0000						
Diversity externalities	0.1737 (0.0024)	-0.0036 (0.9501)	1.0000					
Infrastructures	-0.2076 (0.0003)	-0.4406 (0.0000)	-0.1089 (0.0579)	1.0000				
Public services	0.0067 (0.9071)	-0.0267 (0.6423)	-0.0185 (0.7481)	0.3742 (0.0000)	1.0000			
Social capital	-0.0235 (0.6827)	0.2782 (0.0000)	0.0155 (0.7879)	-0.1353 (0.0183)	-0.1043 (0.0694)	1.0000		
Capital region	0.2454 (0.0000)	0.1943 (0.0007)	0.1112 (0.0528)	-0.1572 (0.0060)	0.0298 (0.6046)	-0.0100 (0.8627)	1.0000	
Heritage	0.2100 (0.0002)	0.1624 (0.0045)	0.1525 (0.0077)	-0.2630 (0.0000)	-0.0352 (0.5412)	0.0086 (0.8819)	0.3678 (0.0000)	1.0000
Air quality	0.0497 (0.3881)	-0.0466 (0.4184)	-0.0464 (0.4207)	0.1039 (0.0705)	-0.0078 (0.8918)	0.0592 (0.3038)	-0.0016 (0.9781)	-0.0479 (0.4056)
Touristic services	0.0046 (0.9360)	0.0931 (0.1053)	0.0036 (0.9498)	0.1082 (0.0596)	0.5876 (0.0000)	-0.1947 (0.0006)	0.0500 (0.3849)	0.0286 (0.6198)
Analytic spec. externalities	0.0229 (0.6908)	0.1868 (0.0011)	-0.1556 (0.0065)	-0.2115 (0.0002)	-0.0462 (0.4222)	-0.0111 (0.8466)	0.2562 (0.0000)	0.2367 (0.0000)
Synthetic spec. externalities	-0.0430 (0.4550)	0.0887 (0.1226)	-0.2206 (0.0001)	-0.0905 (0.1152)	-0.0311 (0.5892)	-0.0194 (0.7365)	0.0099 (0.8639)	-0.0423 (0.4624)
Human capital	0.3648 (0.0000)	0.6146 (0.0000)	0.0936 (0.1035)	-0.4854 (0.0000)	0.0323 (0.5744)	0.2578 (0.0000)	0.4072 (0.0000)	0.3643 (0.0000)
Tolerance	0.0338 (0.5577)	-0.3294 (0.0000)	-0.0064 (0.9113)	0.2159 (0.0001)	0.0808 (0.1599)	-0.9093 (0.0000)	0.0247 (0.6674)	0.0035 (0.9516)
Innovation	-0.0076 (0.8953)	0.3589 (0.0000)	0.0929 (0.1060)	-0.2524 (0.0000)	0.1090 (0.0575)	0.0898 (0.1181)	0.0947 (0.0993)	0.0744 (0.1961)
Patronage	-0.0550 (0.3394)	0.1394 (0.0150)	-0.0134 (0.8153)	0.0488 (0.3967)	0.5535 (0.0000)	-0.1031 (0.0725)	0.1143 (0.0465)	0.0588 (0.3071)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.2. Correlation matrix: France (continued)

	Air quality	Touristic services	Analytic specialisation externalities	Synthetic specialisation externalities	Human capital	Tolerance	Innovation	Patronage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration								
Labour supply								
Diversity externalities								
Infrastructures								
Public services								
Social capital								
Capital region								
Heritage								
Air quality	1.0000							
Touristic services	-0.0740 (0.1985)	1.0000						
Analytic spec. externalities	0.0016 (0.9780)	-0.0551 (0.3384)	1.0000					
Synthetic spec. externalities	0.0114 (0.8432)	-0.0628 (0.2749)	0.0375 (0.5153)	1.0000				
Human capital	-0.0447 (0.4371)	0.1682 (0.0033)	0.2232 (0.0001)	0.0776 (0.1770)	1.0000			
Tolerance	-0.1034 (0.0718)	0.1311 (0.0222)	-0.0175 (0.7610)	0.0235 (0.6828)	-0.2939 (0.0000)	1.0000		
Innovation	-0.0214 (0.7098)	0.0917 (0.1104)	0.1473 (0.0101)	0.0021 (0.9714)	0.3425 (0.0000)	-0.1296 (0.0239)	1.0000	
Patronage	-0.0780 (0.1750)	0.7285 (0.0000)	0.0900 (0.1175)	-0.0652 (0.2570)	0.2233 (0.0001)	0.0403 (0.4835)	0.1652 (0.0039)	1.0000

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.3. Correlation matrix: Italy

	Creative firms size	Creative competition	Creative filière	Creative specialisation externalities	Creative clusters	Population	Employment density
Creative firms size	1.0000						
Creative competition	0.1899 (0.0000)	1.0000					
Creative filière	-0.0502 (0.1892)	0.2639 (0.0000)	1.0000				
Creative spec. externalities	0.1321 (0.0005)	0.2701 (0.0000)	0.1164 (0.0023)	1.0000			
Creative clusters	0.0632 (0.0983)	-0.0518 (0.1751)	0.4297 (0.0000)	0.1256 (0.0010)	1.0000		
Population	0.0566 (0.1387)	-0.0647 (0.0905)	0.5043 (0.0000)	0.0735 (0.0545)	0.8662 (0.0000)	1.0000	
Employment density	0.0723 (0.0585)	0.0748 (0.0502)	0.4729 (0.0000)	0.1075 (0.0048)	0.6936 (0.0000)	0.6687 (0.0000)	1.0000
Population concentration	0.0716 (0.0610)	0.1048 (0.0060)	0.2944 (0.0000)	-0.0625 (0.1019)	0.1482 (0.0001)	0.2201 (0.0000)	0.1258 (0.0010)
Labour supply	0.1205 (0.0016)	0.2421 (0.0000)	0.2481 (0.0000)	0.0908 (0.0174)	0.1845 (0.0000)	0.1474 (0.0001)	0.1953 (0.0000)
Diversity externalities	0.0057 (0.8822)	0.2833 (0.0000)	0.5891 (0.0000)	0.0758 (0.0472)	0.3044 (0.0000)	0.3246 (0.0000)	0.3880 (0.0000)
Infrastructures	-0.0440 (0.2493)	-0.2253 (0.0000)	-0.4309 (0.0000)	-0.0918 (0.0162)	-0.2205 (0.0000)	-0.2682 (0.0000)	-0.4594 (0.0000)
Public services	-0.0179 (0.6396)	-0.0296 (0.4381)	-0.0186 (0.6265)	-0.0814 (0.0331)	-0.0274 (0.4736)	-0.0297 (0.4368)	-0.0625 (0.1019)
Social capital	0.0823 (0.0312)	0.1833 (0.0000)	0.1426 (0.0002)	0.0326 (0.3933)	0.1317 (0.0005)	0.1020 (0.0075)	0.1300 (0.0006)
Capital region	0.0303 (0.4282)	-0.0464 (0.2250)	0.3804 (0.0000)	0.0700 (0.0669)	0.4587 (0.0000)	0.5711 (0.0000)	0.3492 (0.0000)
Heritage	-0.0026 (0.9448)	0.0309 (0.4195)	0.0995 (0.0091)	-0.0096 (0.8013)	0.1467 (0.0001)	0.1737 (0.0000)	0.1327 (0.0005)
Air quality	-0.0100 (0.7936)	-0.0128 (0.7386)	-0.0220 (0.5647)	-0.0182 (0.6341)	0.0186 (0.6266)	0.0075 (0.8444)	-0.0168 (0.6602)
Touristic services	0.0272 (0.4766)	-0.0883 (0.0207)	-0.0922 (0.0157)	-0.0794 (0.0376)	-0.0519 (0.1743)	-0.0641 (0.0932)	-0.1023 (0.0073)
Analytic spec. externalities	-0.0025 (0.9480)	0.0449 (0.2405)	0.1327 (0.0005)	0.0186 (0.6259)	0.1117 (0.0034)	0.1469 (0.0001)	0.0615 (0.1077)
Synthetic spec. externalities	0.0275 (0.4720)	0.0826 (0.0305)	0.0368 (0.3363)	-0.0316 (0.4090)	0.0421 (0.2711)	0.0452 (0.2369)	0.0225 (0.5569)
Human capital	0.0191 (0.6172)	0.1075 (0.0048)	0.5016 (0.0000)	0.1002 (0.0086)	0.2844 (0.0000)	0.4031 (0.0000)	0.3907 (0.0000)
Tolerance	-0.0561 (0.1419)	-0.0694 (0.0693)	-0.0875 (0.0220)	0.0713 (0.0618)	-0.0362 (0.3437)	-0.0301 (0.4307)	0.0094 (0.8068)
Innovation	0.0103 (0.7870)	0.0278 (0.4667)	0.0024 (0.9506)	-0.0661 (0.0836)	0.0336 (0.3799)	0.0285 (0.4557)	0.0107 (0.7792)
Patronage	-0.0087 (0.8210)	0.0024 (0.9504)	0.0154 (0.6866)	-0.0355 (0.3532)	0.0040 (0.9174)	-0.0033 (0.9318)	-0.0135 (0.7241)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.3. Correlation matrix: Italy (continued)

	Population concentration	Labour supply	Diversity externalities	Infrastructures	Public services	Social capital	Capital region	Heritage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration	1.0000							
Labour supply	0.1760 (0.0000)	1.0000						
Diversity externalities	0.1857 (0.0000)	0.2515 (0.0000)	1.0000					
Infrastructures	-0.2081 (0.0000)	-0.1110 (0.0036)	-0.4157 (0.0000)	1.0000				
Public services	0.0839 (0.0280)	0.3029 (0.0000)	0.0376 (0.3254)	0.0974 (0.0107)	1.0000			
Social capital	0.2175 (0.0000)	0.7096 (0.0000)	0.1534 (0.0001)	-0.0181 (0.6369)	0.2653 (0.0000)	1.0000		
Capital region	0.2462 (0.0000)	0.0858 (0.0246)	0.2277 (0.0000)	-0.1362 (0.0003)	0.0467 (0.2216)	0.0255 (0.5052)	1.0000	
Heritage	0.0846 (0.0268)	0.0331 (0.3873)	0.0948 (0.0130)	-0.0602 (0.1151)	-0.0054 (0.8872)	-0.0024 (0.9509)	0.1421 (0.0002)	1.0000
Air quality	-0.0315 (0.4097)	0.0601 (0.1156)	0.0034 (0.9289)	0.0129 (0.7351)	0.0423 (0.2689)	0.1237 (0.0012)	-0.0068 (0.8582)	-0.0095 (0.8045)
Touristic services	0.0609 (0.1113)	0.3719 (0.0000)	-0.0346 (0.3659)	0.1945 (0.0000)	0.7175 (0.0000)	0.2636 (0.0000)	0.0047 (0.9016)	0.0010 (0.9782)
Analytic spec. externalities	0.0880 (0.0211)	0.0578 (0.1304)	-0.0656 (0.0861)	-0.0582 (0.1277)	0.0369 (0.3346)	0.0236 (0.5372)	0.1025 (0.0072)	0.0096 (0.8015)
Synthetic spec. externalities	0.0756 (0.0479)	0.1702 (0.0000)	-0.1019 (0.0076)	0.0096 (0.8021)	0.0065 (0.8642)	0.1634 (0.0000)	0.0185 (0.6287)	-0.0118 (0.7571)
Human capital	0.3089 (0.0000)	0.0138 (0.7183)	0.3976 (0.0000)	-0.3859 (0.0000)	-0.0345 (0.3668)	-0.0748 (0.0503)	0.3760 (0.0000)	0.0692 (0.0699)
Tolerance	-0.1219 (0.0014)	-0.4872 (0.0000)	-0.0936 (0.0142)	-0.0195 (0.6107)	-0.3336 (0.0000)	-0.4366 (0.0000)	0.0046 (0.9036)	-0.0450 (0.2393)
Innovation	0.0495 (0.1955)	0.1754 (0.0000)	0.0084 (0.8253)	0.0183 (0.6328)	0.1022 (0.0074)	0.2400 (0.0000)	0.0057 (0.8806)	0.0177 (0.6436)
Patronage	0.0816 (0.0326)	0.3722 (0.0000)	0.0795 (0.0373)	0.0380 (0.3209)	0.7319 (0.0000)	0.2684 (0.0000)	0.0371 (0.3325)	0.0149 (0.6962)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.3. Correlation matrix: Italy (continued)

	Air quality	Touristic services	Analytic specialisation externalities	Synthetic specialisation externalities	Human capital	Tolerance	Innovation	Patronage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration								
Labour supply								
Diversity externalities								
Infrastructures								
Public services								
Social capital								
Capital region								
Heritage								
Air quality	1.0000							
Touristic services	0.0169 (0.6581)	1.0000						
Analytic spec. externalities	-0.0241 (0.5286)	-0.0081 (0.8330)	1.0000					
Synthetic spec. externalities	-0.0136 (0.7230)	0.0025 (0.9473)	0.0089 (0.8163)	1.0000				
Human capital	-0.0841 (0.0276)	-0.1035 (0.0067)	0.0971 (0.0110)	-0.0092 (0.8094)	1.0000			
Tolerance	-0.0199 (0.6036)	-0.3011 (0.0000)	-0.0589 (0.1235)	-0.1077 (0.0048)	0.2008 (0.0000)	1.0000		
Innovation	0.0752 (0.0491)	0.0509 (0.1828)	0.0101 (0.7911)	0.1226 (0.0013)	-0.0609 (0.1113)	-0.1102 (0.0038)	1.0000	
Patronage	-0.0050 (0.8957)	0.7033 (0.0000)	0.0340 (0.3738)	0.0270 (0.4809)	-0.0250 (0.5126)	-0.2995 (0.0000)	0.0327 (0.3918)	1.0000

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.4. Correlation matrix: Portugal

	Creative firms size	Creative competition	Creative filière	Creative specialisation externalities	Creative clusters	Population	Employment density
Creative firms size	1.0000						
Creative competition	0.1662 (0.1333)	1.0000					
Creative filière	0.0197 (0.8595)	-0.0422 (0.7049)	1.0000				
Creative spec. externalities	0.3108 (0.0042)	0.1551 (0.1616)	0.1276 (0.2503)	1.0000			
Creative clusters	0.1714 (0.1214)	-0.2635 (0.0161)	0.2045 (0.0637)	0.2627 (0.0164)	1.0000		
Population	0.1056 (0.3418)	-0.3823 (0.0004)	0.3334 (0.0021)	0.2107 (0.0559)	0.8883 (0.0000)	1.0000	
Employment density	0.0788 (0.4790)	-0.1577 (0.1546)	0.2385 (0.0299)	0.1912 (0.0834)	0.8035 (0.0000)	0.7441 (0.0000)	1.0000
Population concentration	0.1145 (0.3029)	-0.0887 (0.4253)	0.5190 (0.0000)	0.1495 (0.1773)	0.3528 (0.0011)	0.4308 (0.0000)	0.3738 (0.0005)
Labour supply	-0.0864 (0.4374)	-0.0493 (0.6579)	0.4127 (0.0001)	0.0455 (0.6831)	0.3861 (0.0003)	0.3977 (0.0002)	0.5874 (0.0000)
Diversity externalities	0.4074 (0.0001)	0.0103 (0.9261)	0.4797 (0.0000)	0.1971 (0.0741)	0.1883 (0.0882)	0.1663 (0.1331)	0.1374 (0.2153)
Infrastructures	0.0850 (0.4449)	0.0509 (0.6477)	0.0901 (0.4181)	-0.1113 (0.3166)	-0.2830 (0.0095)	-0.2716 (0.0130)	-0.5030 (0.0000)
Public services	-0.1638 (0.1389)	-0.1061 (0.3395)	-0.0071 (0.9491)	-0.2689 (0.0140)	-0.0107 (0.9232)	-0.0200 (0.8575)	0.0572 (0.6073)
Social capital	-0.3715 (0.0005)	-0.1992 (0.0710)	0.0596 (0.5923)	-0.1671 (0.1312)	-0.1811 (0.1013)	-0.0429 (0.7004)	-0.0408 (0.7141)
Capital region	0.0104 (0.9257)	-0.3513 (0.0011)	0.2385 (0.0299)	0.1548 (0.1622)	0.4762 (0.0000)	0.5703 (0.0000)	0.5359 (0.0000)
Heritage	-0.1607 (0.1467)	-0.1799 (0.1037)	-0.1058 (0.3412)	0.0727 (0.5138)	0.1188 (0.2849)	0.1510 (0.1731)	0.1559 (0.1592)
Air quality	0.0003 (0.9982)	0.0275 (0.8049)	0.3905 (0.0003)	-0.0490 (0.6601)	-0.0069 (0.9505)	0.0186 (0.8672)	-0.0046 (0.9668)
Touristic services	-0.1618 (0.1439)	-0.1179 (0.2886)	-0.0686 (0.5380)	-0.2635 (0.0161)	0.0063 (0.9552)	-0.0188 (0.8661)	0.0765 (0.4919)
Analytic spec. externalities	0.2836 (0.0094)	-0.0310 (0.7811)	0.1972 (0.0740)	0.1088 (0.3277)	0.1839 (0.0961)	0.2776 (0.0111)	0.2250 (0.0408)
Synthetic spec. externalities	0.6312 (0.0000)	-0.2268 (0.0392)	0.0708 (0.5250)	0.0804 (0.4701)	0.0395 (0.7231)	-0.0022 (0.9845)	-0.0148 (0.8943)
Human capital	-0.0352 (0.7519)	-0.2604 (0.0174)	0.4203 (0.0001)	0.1843 (0.0953)	0.4434 (0.0000)	0.5422 (0.0000)	0.5948 (0.0000)
Tolerance	-0.2560 (0.0195)	-0.1100 (0.3223)	-0.2989 (0.0061)	-0.2332 (0.0339)	-0.2144 (0.0517)	-0.2103 (0.0564)	-0.1532 (0.1667)
Innovation	0.0730 (0.5117)	0.0481 (0.6662)	0.4178 (0.0001)	0.0770 (0.4892)	0.2757 (0.0117)	0.2041 (0.0642)	0.3262 (0.0026)
Patronage	-0.1245 (0.2620)	-0.0605 (0.5866)	0.0527 (0.6363)	-0.1952 (0.0770)	0.0184 (0.8691)	-0.0042 (0.9697)	0.0620 (0.5779)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.4. Correlation matrix: Portugal (continued)

	Population concentration	Labour supply	Diversity externalities	Infrastructures	Public services	Social capital	Capital region	Heritage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration	1.0000							
Labour supply	0.4228 (0.0001)	1.0000						
Diversity externalities	0.3012 (0.0057)	0.1469 (0.1852)	1.0000					
Infrastructures	-0.0694 (0.5331)	-0.4624 (0.0000)	0.2616 (0.0169)	1.0000				
Public services	0.0581 (0.6021)	0.2063 (0.0614)	-0.0530 (0.6341)	0.2143 (0.0518)	1.0000			
Social capital	-0.0180 (0.8719)	0.4223 (0.0001)	-0.2607 (0.0173)	-0.2209 (0.0448)	0.1057 (0.3417)	1.0000		
Capital region	0.4172 (0.0001)	0.3221 (0.0030)	0.1753 (0.1130)	-0.2602 (0.0175)	-0.0222 (0.8422)	0.1144 (0.3030)	1.0000	
Heritage	0.0923 (0.4066)	0.2304 (0.0361)	-0.2492 (0.0231)	-0.2732 (0.0125)	-0.0094 (0.9331)	0.2269 (0.0391)	0.1185 (0.2859)	1.0000
Air quality	0.1282 (0.2479)	0.2076 (0.0597)	0.1190 (0.2840)	0.0355 (0.7499)	0.0916 (0.4101)	0.1308 (0.2385)	-0.0306 (0.7837)	0.0042 (0.9701)
Touristic services	0.0380 (0.7329)	0.1634 (0.1400)	-0.1232 (0.2671)	0.1402 (0.2062)	0.9238 (0.0000)	0.1431 (0.1967)	-0.0051 (0.9636)	0.0596 (0.5926)
Analytic spec. externalities	0.3783 (0.0004)	0.1924 (0.0814)	-0.0115 (0.9176)	-0.0716 (0.5203)	-0.0982 (0.3773)	0.0058 (0.9584)	0.2045 (0.0637)	0.0390 (0.7264)
Synthetic spec. externalities	-0.0304 (0.7851)	-0.1237 (0.2653)	0.3594 (0.0008)	0.1151 (0.3003)	-0.0389 (0.7268)	-0.2426 (0.0271)	-0.0550 (0.6214)	-0.1150 (0.3005)
Human capital	0.6652 (0.0000)	0.6381 (0.0000)	0.1956 (0.0764)	-0.4398 (0.0000)	-0.0337 (0.7622)	0.1397 (0.2078)	0.5484 (0.0000)	0.2114 (0.0550)
Tolerance	-0.3459 (0.0014)	0.0171 (0.8781)	-0.3349 (0.0020)	-0.1879 (0.0889)	0.0240 (0.8294)	0.5553 (0.0000)	-0.0355 (0.7503)	0.0642 (0.5641)
Innovation	0.2326 (0.0344)	0.2976 (0.0063)	0.2311 (0.0356)	-0.0052 (0.9631)	0.0583 (0.6005)	-0.0874 (0.4319)	0.0831 (0.4550)	-0.0912 (0.4122)
Patronage	0.1234 (0.2664)	0.1870 (0.0904)	0.0130 (0.9075)	0.2060 (0.0617)	0.8913 (0.0000)	0.0503 (0.6515)	0.0037 (0.9736)	-0.0708 (0.5250)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.4. Correlation matrix: Portugal (continued)

	Air quality	Touristic services	Analytic specialisation externalities	Synthetic specialisation externalities	Human capital	Tolerance	Innovation	Patronage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration								
Labour supply								
Diversity externalities								
Infrastructures								
Public services								
Social capital								
Capital region								
Heritage								
Air quality	1.0000							
Touristic services	0.0372 (0.7387)	1.0000						
Analytic spec. externalities	0.0395 (0.7232)	-0.0849 (0.4454)	1.0000					
Synthetic spec. externalities	0.0315 (0.7772)	-0.0514 (0.6446)	0.1029 (0.3547)	1.0000				
Human capital	0.0524 (0.6379)	-0.0852 (0.4440)	0.3378 (0.0018)	-0.0710 (0.5233)	1.0000			
Tolerance	0.0736 (0.5082)	0.0657 (0.5548)	-0.1000 (0.3684)	-0.1245 (0.2623)	-0.1824 (0.0989)	1.0000		
Innovation	0.1294 (0.2436)	0.0051 (0.9634)	0.2071 (0.0602)	0.0139 (0.9008)	0.3351 (0.0020)	-0.2566 (0.0192)	1.0000	
Patronage	0.0679 (0.5420)	0.8926 (0.0000)	-0.1072 (0.3347)	-0.0396 (0.7224)	-0.0743 (0.5045)	-0.0064 (0.9539)	0.0446 (0.6886)	1.0000

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.5. Correlation matrix: Spain

	Creative firms size	Creative competition	Creative filière	Creative specialisation externalities	Creative clusters	Population	Employment density
Creative firms size	1.0000						
Creative competition	-0.0211 (0.5495)	1.0000					
Creative filière	-0.0305 (0.3878)	0.1987 (0.0000)	1.0000				
Creative spec. externalities	0.1225 (0.0005)	0.3179 (0.0000)	0.2758 (0.0000)	1.0000			
Creative clusters	0.0506 (0.1509)	-0.1670 (0.0000)	0.2666 (0.0000)	0.1994 (0.0000)	1.0000		
Population	0.0771 (0.0287)	-0.1768 (0.0000)	0.2970 (0.0000)	0.1636 (0.0000)	0.8716 (0.0000)	1.0000	
Employment density	0.0307 (0.3848)	-0.0439 (0.2131)	0.3181 (0.0000)	0.1437 (0.0000)	0.4897 (0.0000)	0.4563 (0.0000)	1.0000
Population concentration	0.0605 (0.0860)	0.0984 (0.0052)	0.4078 (0.0000)	0.1833 (0.0000)	0.1856 (0.0000)	0.2416 (0.0000)	0.0549 (0.1196)
Labour supply	0.0234 (0.5072)	0.0730 (0.0382)	0.2800 (0.0000)	0.1283 (0.0003)	0.1532 (0.0000)	0.1327 (0.0002)	0.2461 (0.0000)
Diversity externalities	-0.0364 (0.3020)	0.2830 (0.0000)	0.5045 (0.0000)	0.2177 (0.0000)	0.1661 (0.0000)	0.1761 (0.0000)	0.2035 (0.0000)
Infrastructures	-0.0019 (0.9565)	-0.0844 (0.0165)	-0.3058 (0.0000)	-0.1354 (0.0001)	-0.1356 (0.0001)	-0.1442 (0.0000)	-0.2754 (0.0000)
Public services	-0.0096 (0.7846)	-0.0407 (0.2484)	0.0133 (0.7070)	-0.0266 (0.4500)	0.0064 (0.8566)	0.0156 (0.6585)	-0.0390 (0.2686)
Social capital	-0.0073 (0.8350)	-0.1309 (0.0002)	-0.1926 (0.0000)	-0.1534 (0.0000)	-0.0617 (0.0801)	-0.0057 (0.8721)	-0.0690 (0.0504)
Capital region	0.0351 (0.3197)	-0.0614 (0.0814)	0.2774 (0.0000)	0.1433 (0.0000)	0.4531 (0.0000)	0.5245 (0.0000)	0.2473 (0.0000)
Heritage	0.0448 (0.2042)	-0.0196 (0.5790)	0.0992 (0.0048)	0.0528 (0.1346)	0.0857 (0.0150)	0.1078 (0.0022)	0.1023 (0.0036)
Air quality	-0.0153 (0.6638)	0.0025 (0.9441)	-0.0593 (0.0926)	-0.0030 (0.9333)	-0.0104 (0.7687)	-0.0163 (0.6438)	-0.0395 (0.2630)
Touristic services	-0.0281 (0.4251)	-0.0437 (0.2154)	-0.0052 (0.8818)	-0.0338 (0.3380)	-0.0210 (0.5522)	-0.0240 (0.4963)	-0.0372 (0.2916)
Analytic spec. externalities	0.1179 (0.0008)	-0.0157 (0.6572)	0.1547 (0.0000)	0.1148 (0.0011)	0.3134 (0.0000)	0.3482 (0.0000)	0.1599 (0.0000)
Synthetic spec. externalities	0.0544 (0.1231)	0.0504 (0.1529)	0.0738 (0.0362)	0.0022 (0.9505)	0.0302 (0.3914)	0.0294 (0.4046)	0.0110 (0.7556)
Human capital	0.0633 (0.0725)	0.0598 (0.0897)	0.5568 (0.0000)	0.2199 (0.0000)	0.3183 (0.0000)	0.3882 (0.0000)	0.3312 (0.0000)
Tolerance	-0.0376 (0.2870)	-0.0867 (0.0138)	-0.1540 (0.0000)	-0.1361 (0.0001)	-0.1024 (0.0036)	-0.0768 (0.0293)	-0.1558 (0.0000)
Innovation	0.0138 (0.6965)	0.0497 (0.1587)	0.0185 (0.5995)	0.0254 (0.4721)	0.0425 (0.2276)	0.0166 (0.6370)	0.0082 (0.8151)
Patronage	-0.0342 (0.3326)	0.0008 (0.9823)	0.0570 (0.1057)	0.0102 (0.7716)	-0.0015 (0.9659)	0.0037 (0.9162)	-0.0212 (0.5481)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.5. Correlation matrix: Spain (continued)

	Population concentration	Labour supply	Diversity externalities	Infrastructures	Public services	Social capital	Capital region	Heritage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration	1.0000							
Labour supply	-0.0161 (0.6490)	1.0000						
Diversity externalities	0.3806 (0.0000)	0.0774 (0.0280)	1.0000					
Infrastructures	0.0474 (0.1790)	-0.5020 (0.0000)	-0.1347 (0.0001)	1.0000				
Public services	0.0570 (0.1061)	-0.0216 (0.5398)	-0.0069 (0.8450)	0.1728 (0.0000)	1.0000			
Social capital	-0.1630 (0.0000)	-0.1888 (0.0000)	-0.1021 (0.0037)	0.0148 (0.6754)	-0.1064 (0.0025)	1.0000		
Capital region	0.2489 (0.0000)	0.1158 (0.0010)	0.1977 (0.0000)	-0.1169 (0.0009)	0.0172 (0.6266)	-0.0164 (0.6411)	1.0000	
Heritage	0.1328 (0.0002)	0.0834 (0.0179)	0.0350 (0.3208)	-0.0147 (0.6777)	0.1282 (0.0003)	-0.0819 (0.0200)	0.1038 (0.0032)	1.0000
Air quality	0.0065 (0.8543)	-0.1315 (0.0002)	-0.0156 (0.6574)	0.0792 (0.0245)	0.0388 (0.2714)	0.0065 (0.8530)	-0.0115 (0.7438)	0.0042 (0.9042)
Touristic services	0.0475 (0.1783)	0.0495 (0.1604)	-0.0274 (0.4380)	0.1890 (0.0000)	0.6562 (0.0000)	-0.0797 (0.0236)	-0.0045 (0.8981)	0.2296 (0.0000)
Analytic spec. externalities	0.1571 (0.0000)	0.1134 (0.0013)	-0.0139 (0.6944)	-0.0634 (0.0720)	0.0614 (0.0813)	0.0059 (0.8671)	0.1935 (0.0000)	0.0829 (0.0186)
Synthetic spec. externalities	0.1749 (0.0000)	0.0461 (0.1914)	0.0016 (0.9646)	-0.0611 (0.0832)	0.0332 (0.3464)	-0.0090 (0.7979)	0.0265 (0.4524)	-0.0217 (0.5390)
Human capital	0.5277 (0.0000)	0.3078 (0.0000)	0.4444 (0.0000)	-0.2317 (0.0000)	0.1361 (0.0001)	-0.1458 (0.0000)	0.3958 (0.0000)	0.2023 (0.0000)
Tolerance	-0.0658 (0.0617)	-0.3653 (0.0000)	-0.0894 (0.0111)	0.2900 (0.0000)	-0.0798 (0.0236)	0.3404 (0.0000)	-0.0690 (0.0502)	-0.0770 (0.0288)
Innovation	0.0467 (0.1854)	0.0163 (0.6447)	0.0638 (0.0702)	-0.0187 (0.5956)	-0.0171 (0.6276)	-0.0650 (0.0651)	0.0169 (0.6316)	-0.0053 (0.8801)
Patronage	0.0799 (0.0233)	-0.0036 (0.9187)	0.0310 (0.3799)	0.1214 (0.0006)	0.6657 (0.0000)	-0.0651 (0.0647)	0.0271 (0.4416)	0.1655 (0.0000)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.5. Correlation matrix: Spain (continued)

	Air quality	Touristic services	Analytic specialisation externalities	Synthetic specialisation externalities	Human capital	Tolerance	Innovation	Patronage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration								
Labour supply								
Diversity externalities								
Infrastructures								
Public services								
Social capital								
Capital region								
Heritage								
Air quality	1.0000							
Touristic services	-0.0291 (0.4101)	1.0000						
Analytic spec. externalities	-0.0180 (0.6101)	0.1480 (0.0000)	1.0000					
Synthetic spec. externalities	0.0374 (0.2884)	0.0043 (0.9038)	0.0308 (0.3821)	1.0000				
Human capital	-0.0793 (0.0244)	0.1501 (0.0000)	0.2490 (0.0000)	0.1569 (0.0000)	1.0000			
Tolerance	0.0014 (0.9675)	-0.1158 (0.0010)	-0.0928 (0.0084)	-0.1771 (0.0000)	-0.2360 (0.0000)	1.0000		
Innovation	0.1514 (0.0000)	-0.0158 (0.6540)	0.0038 (0.9132)	0.0706 (0.0451)	0.0462 (0.1897)	-0.0679 (0.0539)	1.0000	
Patronage	-0.0169 (0.6313)	0.6865 (0.0000)	-0.0013 (0.9706)	0.0489 (0.1655)	0.1647 (0.0000)	-0.0339 (0.3362)	-0.0218 (0.5372)	1.0000

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.6. Correlation matrix: the United Kingdom

	Creative firms size	Creative competition	Creative filière	Creative specialisation externalities	Creative clusters	Population	Employment density
Creative firms size	1.0000						
Creative competition	-0.2672 (0.0000)	1.0000					
Creative filière	-0.0419 (0.5154)	0.1641 (0.0104)	1.0000				
Creative spec. externalities	0.1166 (0.0695)	-0.0663 (0.3031)	0.4296 (0.0000)	1.0000			
Creative clusters	0.0793 (0.2180)	-0.1808 (0.0047)	0.5900 (0.0000)	0.3627 (0.0000)	1.0000		
Population	0.0677 (0.2932)	-0.1233 (0.0549)	0.5590 (0.0000)	0.2500 (0.0001)	0.9255 (0.0000)	1.0000	
Employment density	0.0654 (0.3102)	0.0294 (0.6487)	0.5809 (0.0000)	0.2779 (0.0000)	0.7162 (0.0000)	0.6758 (0.0000)	1.0000
Population concentration	0.0790 (0.2198)	0.0808 (0.2093)	0.1215 (0.0587)	0.0847 (0.1882)	-0.0238 (0.7126)	0.0127 (0.8444)	0.0196 (0.7611)
Labour supply	0.0902 (0.1612)	-0.0955 (0.1377)	0.2875 (0.0000)	0.3501 (0.0000)	0.2031 (0.0015)	0.0999 (0.1203)	0.0447 (0.4877)
Diversity externalities	-0.0480 (0.4563)	0.1983 (0.0019)	0.2669 (0.0000)	0.1747 (0.0063)	0.1747 (0.0063)	0.2002 (0.0017)	0.2250 (0.0004)
Infrastructures	-0.1175 (0.0675)	-0.1346 (0.0360)	-0.2792 (0.0000)	-0.2414 (0.0001)	-0.1727 (0.0070)	-0.1708 (0.0076)	-0.3423 (0.0000)
Public services	-0.0441 (0.4940)	-0.1275 (0.0471)	-0.1737 (0.0066)	-0.0227 (0.7252)	-0.1071 (0.0957)	-0.1224 (0.0568)	-0.2498 (0.0001)
Social capital	0.0175 (0.7856)	-0.0538 (0.4039)	0.2196 (0.0006)	0.2639 (0.0000)	0.2140 (0.0008)	0.1445 (0.0243)	0.1773 (0.0056)
Capital region	0.0348 (0.5893)	-0.0066 (0.9179)	0.4978 (0.0000)	0.2862 (0.0000)	0.3773 (0.0000)	0.4084 (0.0000)	0.4413 (0.0000)
Heritage	0.0527 (0.4135)	-0.0652 (0.3112)	0.4114 (0.0000)	0.2298 (0.0003)	0.4899 (0.0000)	0.5248 (0.0000)	0.5310 (0.0000)
Air quality	-0.0482 (0.4546)	0.0537 (0.4047)	-0.0468 (0.4674)	-0.0207 (0.7479)	-0.0433 (0.5014)	-0.0370 (0.5659)	-0.1112 (0.0836)
Touristic services	-0.0228 (0.7240)	-0.1257 (0.0504)	-0.1171 (0.0684)	0.0589 (0.3610)	-0.0835 (0.1945)	-0.0975 (0.1298)	-0.2358 (0.0002)
Analytic spec. externalities	0.0212 (0.7420)	-0.1650 (0.0100)	0.1781 (0.0054)	0.2340 (0.0002)	0.1697 (0.0080)	0.1215 (0.0586)	0.1060 (0.0992)
Synthetic spec. externalities	0.0287 (0.6561)	0.0024 (0.9704)	0.1355 (0.0347)	0.0258 (0.6890)	0.1315 (0.0405)	0.0911 (0.1569)	0.1659 (0.0096)
Human capital	-0.0295 (0.6472)	-0.2626 (0.0000)	0.1342 (0.0366)	0.3604 (0.0000)	0.2319 (0.0003)	0.1706 (0.0077)	-0.0577 (0.3702)
Tolerance	-0.0500 (0.4374)	0.0450 (0.4850)	-0.2629 (0.0000)	-0.3634 (0.0000)	-0.2166 (0.0007)	-0.1121 (0.0812)	-0.1612 (0.0119)
Innovation	0.0548 (0.3953)	-0.2001 (0.0017)	0.2883 (0.0000)	0.5521 (0.0000)	0.2040 (0.0014)	0.1097 (0.0878)	0.0846 (0.1888)
Patronage	-0.0335 (0.6032)	-0.1641 (0.0104)	-0.0869 (0.1767)	0.0330 (0.6084)	-0.0448 (0.4870)	-0.0515 (0.4238)	-0.1983 (0.0019)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.6. Correlation matrix: the United Kingdom (continued)

	Population concentration	Labour supply	Diversity externalities	Infrastructures	Public services	Social capital	Capital region	Heritage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration	1.0000							
Labour supply	0.0882 (0.1707)	1.0000						
Diversity externalities	0.1641 (0.0104)	0.0745 (0.2474)	1.0000					
Infrastructures	-0.2720 (0.0000)	-0.0617 (0.3385)	-0.2593 (0.0000)	1.0000				
Public services	-0.2933 (0.0000)	0.0642 (0.3189)	-0.1940 (0.0024)	0.8008 (0.0000)	1.0000			
Social capital	0.2383 (0.0002)	0.3298 (0.0000)	0.0557 (0.3871)	-0.0155 (0.8095)	0.0660 (0.3057)	1.0000		
Capital region	0.1802 (0.0048)	0.0963 (0.1344)	0.3354 (0.0000)	-0.1959 (0.0022)	-0.1463 (0.0226)	0.0927 (0.1496)	1.0000	
Heritage	0.1070 (0.0962)	0.0717 (0.2656)	0.2055 (0.0013)	-0.1447 (0.0241)	-0.1209 (0.0599)	0.1015 (0.1144)	0.4921 (0.0000)	1.0000
Air quality	-0.0832 (0.1964)	0.0149 (0.8177)	-0.0074 (0.9087)	0.2060 (0.0012)	0.2439 (0.0001)	-0.1759 (0.0060)	-0.0072 (0.9112)	-0.0689 (0.2845)
Touristic services	-0.3258 (0.0000)	0.1600 (0.0125)	-0.1711 (0.0075)	0.5438 (0.0000)	0.7890 (0.0000)	-0.0057 (0.9296)	-0.1212 (0.0592)	-0.0638 (0.3223)
Analytic spec. externalities	0.1515 (0.0181)	0.1724 (0.0071)	-0.1787 (0.0052)	-0.1268 (0.0483)	-0.0470 (0.4662)	0.1337 (0.0372)	0.0881 (0.1712)	0.0580 (0.3681)
Synthetic spec. externalities	0.0108 (0.8674)	0.0999 (0.1206)	0.1857 (0.0037)	-0.1755 (0.0061)	-0.1777 (0.0055)	-0.1238 (0.0539)	0.1476 (0.0213)	0.0462 (0.4736)
Human capital	0.1609 (0.0120)	0.2904 (0.0000)	-0.0177 (0.7836)	0.3574 (0.0000)	0.3620 (0.0000)	0.1863 (0.0036)	0.1254 (0.0509)	0.1985 (0.0019)
Tolerance	-0.1443 (0.0245)	-0.3720 (0.0000)	-0.0243 (0.7062)	0.0406 (0.5289)	-0.0974 (0.1300)	-0.6475 (0.0000)	-0.0380 (0.5558)	-0.1306 (0.0419)
Innovation	0.0999 (0.1203)	0.4076 (0.0000)	0.2042 (0.0014)	-0.1672 (0.0090)	0.0017 (0.9788)	0.2882 (0.0000)	0.0916 (0.1547)	0.0707 (0.2726)
Patronage	-0.2318 (0.0003)	0.0452 (0.4827)	-0.1436 (0.0252)	0.5548 (0.0000)	0.7024 (0.0000)	0.0817 (0.2042)	-0.0310 (0.6307)	-0.0091 (0.8884)

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

Table VII.6. Correlation matrix: the United Kingdom (continued)

	Air quality	Touristic services	Analytic specialisation externalities	Synthetic specialisation externalities	Human capital	Tolerance	Innovation	Patronage
Creative firms size								
Creative competition								
Creative filière								
Creative spec. externalities								
Creative clusters								
Population								
Employment density								
Population concentration								
Labour supply								
Diversity externalities								
Infrastructures								
Public services								
Social capital								
Capital region								
Heritage								
Air quality	1.0000							
Touristic services	0.1996 (0.0018)	1.0000						
Analytic spec. externalities	-0.0294 (0.6485)	-0.0471 (0.4650)	1.0000					
Synthetic spec. externalities	-0.0413 (0.5215)	-0.1544 (0.0160)	-0.0361 (0.5755)	1.0000				
Human capital	0.1693 (0.0082)	0.3377 (0.0000)	0.1907 (0.0028)	-0.1075 (0.0947)	1.0000			
Tolerance	0.1410 (0.0280)	-0.1176 (0.0672)	-0.0844 (0.1898)	0.0915 (0.1550)	-0.2175 (0.0006)	1.0000		
Innovation	-0.0073 (0.9103)	0.0779 (0.2262)	0.2211 (0.0005)	0.0663 (0.3034)	0.3775 (0.0000)	-0.2793 (0.0000)	1.0000	
Patronage	0.1481 (0.0209)	0.7674 (0.0000)	-0.0191 (0.7675)	-0.0706 (0.2730)	0.4169 (0.0000)	-0.1251 (0.0514)	0.0656 (0.3088)	1.0000

Note: Numbers in parentheses represent the significance of each correlation. Generally, p<0.10 (*), p<0.05 (**), p<0.01 (***).

VIII. Regression results without reported incidence ratios

Table VIII.1. Negative binomial regression results: 5 European countries

		(1) Europe (5 countries)	(2) Europe (5 countries)	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	0.004*** (0.000)	0.003*** (0.000)	+	✓
	Creative competition	0.247*** (0.033)	0.182*** (0.032)	+	✓
	Creative filière	0.241*** (0.012)	0.202*** (0.011)	+	✓
	Creative specialisation externalities	1.239*** (0.069)	1.295*** (0.066)	+	✓
	Creative clusters	0.067*** (0.009)		+	✓
Urbanisation economies	Population		0.002*** (0.000)	+	✓
	Employment density	0.002*** (0.000)		+	✓
	Population concentration		2.531*** (0.120)	+	✓
	Labour supply	-0.021*** (0.003)	0.002 (0.003)	+	✗
	Diversity externalities	0.086*** (0.005)	0.077*** (0.005)	+	✓
	Infrastructures	-0.039*** (0.003)	-0.039*** (0.002)	+	✗
	Public services	0.165*** (0.034)	0.357*** (0.032)	+	✓
	Social capital	0.002 (0.003)	-0.006** (0.003)	+	✗
Specific creative forces	Capital region	0.277*** (0.095)		+	✓
	Heritage	0.003 (0.025)	0.047* (0.025)	+	✓
	Air quality	-0.001* (0.001)	-0.002*** (0.001)	-	✓
	Touristic services		-0.093*** (0.012)	-	✓
	Analytic specialisation externalities	0.202*** (0.036)	0.146*** (0.031)	+	✓
	Synthetic specialisation externalities	0.062*** (0.015)	0.040*** (0.012)	+	✓
	Human capital	0.113*** (0.004)		+	✓
	Tolerance	-0.029*** (0.004)	-0.039*** (0.003)	-	✓
	Innovation	0.061*** (0.021)	0.129*** (0.023)	+	✓
	Patronage	-0.015 (0.013)		+	●
	Constant	0.815*** (0.209)	0.621*** (0.202)		

Pseudo R-squared	0.183	0.191
Observations	2122	2122
LR chi2	4207.37	4386.81
Log-likelihood	-9404.509	-9314.791
AIC	18853.0	18669.6
BIC	18977.5	18782.8
lnalpha	-0.377	-0.467
	(0.031)	(0.032)
alpha	0.685	0.627
	(0.022)	(0.020)
Likelihood-ratio test of alpha=0	200000***	180000***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: Negative binomial regression coefficient can be interpreted as follows: for a one unit change in the predictor variable, the difference in the lags of expected counts of the response variable is expected to change by the respective regression coefficient, given the other predictor variables in the model are held constant.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, •indicates that the predictor variable is not statistically significant.

Table VIII.2. Negative binomial regression results

a) France

		(3)	(4)	(5)	(6)	Expected sign based on the theory	Concordance with theory
		France	France	France	France		
Localisation economies	Creative firms size	0.005** (0.002)	0.007*** (0.002)	0.005** (0.002)	0.006** (0.003)	+	✓
	Creative competition	-0.451*** (0.113)	-0.281** (0.117)	-0.468*** (0.113)	-0.487*** (0.120)	+	✗
	Creative filière	0.152*** (0.022)	0.164*** (0.021)	0.158*** (0.021)	0.172*** (0.022)	+	✓
	Creative specialisation externalities			1.729*** (0.267)		+	✓
	Creative clusters	0.085*** (0.016)				+	✓
Urbanisation economies	Population		0.002*** (0.000)			+	✓
	Employment density			0.000 (0.000)	0.000 (0.000)	+	●
	Population concentration	1.452*** (0.434)	1.123*** (0.426)	1.121*** (0.427)	1.177** (0.471)	+	✓
	Labour supply	-0.015 (0.011)	-0.005 (0.011)	-0.001 (0.012)		+	●
	Diversity externalities	0.042*** (0.010)	0.040*** (0.010)	0.044*** (0.010)	0.046*** (0.010)	+	✓
	Infrastructures	-0.048*** (0.006)	-0.044*** (0.006)	-0.041*** (0.006)	-0.045*** (0.006)	+	✗
	Public services	0.049 (0.076)	0.129 (0.080)	-0.023 (0.086)	0.055 (0.067)	+	●
	Social capital	-0.011 (0.010)		-0.010 (0.010)		+	●
Specific creative forces	Capital region	0.538*** (0.147)		0.516*** (0.146)	0.583*** (0.154)	+	✓
	Heritage	0.042 (0.027)	0.043 (0.026)	0.059** (0.028)	0.050* (0.029)	+	✓
	Air quality	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	-	●
	Touristic services		-0.054 (0.060)	0.020 (0.062)		-	●
	Analytic specialisation externalities	0.222*** (0.081)	0.207*** (0.080)	0.193** (0.079)	0.290*** (0.091)	+	✓
	Synthetic specialisation externalities	0.017 (0.013)	0.022 (0.014)	0.012 (0.013)	0.017 (0.014)	+	●
	Human capital				0.034***	+	✓

				(0.012)		
	Tolerance		0.036 (0.023)		-	●
	Innovation	0.127*** (0.037)	0.160*** (0.039)	0.178*** (0.039)	0.127*** (0.038)	+	✓
	Patronage	0.010 (0.040)				+	●
	Constant	4.794*** (0.612)	3.382*** (0.670)	2.900*** (0.631)	3.202*** (0.362)		
	Pseudo R-squared	0.133	0.134	0.136	0.126		
	Observations	304	304	304	304		
	LR chi2	539.05	544.17	552.22	512.44		
	Log-likelihood	-1759.724	-1757.163	-1753.138	-1773.027		
	AIC	3557.4	3550.3	3546.3	3580.1		
	BIC	3628.1	3617.2	3620.6	3643.2		
	lnalpha	-0.993	-1.005	-1.030	-0.911		
		(0.079)	(0.079)	(0.079)	(0.078)		
	alpha	0.370	0.366	0.357	0.402		
		(0.029)	(0.029)	(0.028)	(0.031)		
	Likelihood-ratio test of alpha=0	19000***	24000***	21000***	23000***		

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: Negative binomial regression coefficient can be interpreted as follows: for a one unit change in the predictor variable, the difference in the lags of expected counts of the response variable is expected to change by the respective regression coefficient, given the other predictor variables in the model are held constant.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, •indicates that the predictor variable is not statistically significant.

b) Italy

		(7) Italy	(8) Italy	(9) Italy	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	0.008*** (0.001)	0.004*** (0.001)	0.007*** (0.001)	+	✓
	Creative competition	0.203*** (0.056)	0.411*** (0.060)	0.186*** (0.055)	+	✓
	Creative filière	0.263*** (0.019)		0.263*** (0.019)	+	✓
	Creative specialisation externalities	0.885*** (0.079)	0.927*** (0.085)	0.960*** (0.079)	+	✓
	Creative clusters	0.203*** (0.033)			+	✓
Urbanisation economies	Population		0.004*** (0.000)		+	✓
	Employment density			0.003*** (0.000)	+	✓
	Population concentration	0.906*** (0.220)	0.754*** (0.239)	1.033*** (0.219)	+	✓
	Labour supply	0.036*** (0.007)		0.032*** (0.008)	+	✓
	Diversity externalities	0.083*** (0.008)	0.102*** (0.008)	0.083*** (0.008)	+	✓
	Infrastructures	-0.080*** (0.007)	-0.068*** (0.007)	-0.062*** (0.008)	+	✗
	Public services	-0.178** (0.078)			+	✗
	Social capital		0.014*** (0.005)		+	✓
Specific creative forces	Capital region	0.133 (0.174)	-0.306* (0.182)	0.179 (0.175)	+	✗
	Heritage	-0.083 (0.098)	-0.110 (0.097)	-0.072 (0.095)	+	●
	Air quality	0.001 (0.002)	-0.001 (0.002)	0.001 (0.002)	-	●
	Touristic services		-0.059*** (0.017)		-	✓
	Analytic specialisation externalities	0.099*** (0.036)	0.085** (0.034)	0.117*** (0.036)	+	✓
	Synthetic specialisation externalities	0.065*** (0.020)	0.084*** (0.023)	0.070*** (0.020)	+	✓
	Human capital		0.102*** (0.017)		+	✓
	Tolerance	-0.022* (0.012)	-0.064*** (0.013)	-0.026** (0.012)	-	✓
	Innovation	-0.003 (0.023)	0.001 (0.025)	-0.001 (0.023)	+	●
	Patronage			-0.050*** (0.018)	+	✗

Constant	-0.361	0.881**	-0.520
	(0.479)	(0.378)	(0.473)
Pseudo R-squared	0.206	0.197	0.209
Observations	686	686	686
LR chi2	1359.28	1296.88	1376.42
Log-likelihood	-2613.587	-2644.782	-2605.017
AIC	5265.2	5327.6	5248.0
BIC	5351.3	5413.7	5334.1
lnalpha	-0.822	-0.717	-0.835
	(0.061)	(0.059)	(0.061)
alpha	0.439	0.488	0.434
	(0.027)	(0.029)	(0.026)
Likelihood-ratio test of alpha=0	14000***	13000***	16000***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: Negative binomial regression coefficient can be interpreted as follows: for a one unit change in the predictor variable, the difference in the lags of expected counts of the response variable is expected to change by the respective regression coefficient, given the other predictor variables in the model are held constant.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.

c) Portugal

		(10) Portugal	(11) Portugal	(12) Portugal	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	0.049*** (0.013)		0.061*** (0.014)	+	✓
	Creative competition	0.527*** (0.197)	0.690*** (0.236)	0.549** (0.223)	+	✓
	Creative filière	0.325*** (0.046)	0.249*** (0.047)	0.342*** (0.048)	+	✓
	Creative specialisation externalities	0.523* (0.304)	0.869*** (0.312)	0.825*** (0.318)	+	✓
	Creative clusters	0.120*** (0.023)			+	✓
Urbanisation economies	Population		0.001*** (0.000)		+	✓
	Employment density			0.011*** (0.002)	+	✓
	Population concentration	2.442*** (0.753)			+	✓
	Labour supply		0.126*** (0.029)		+	✓
	Diversity externalities	0.158*** (0.022)	0.164*** (0.024)	0.151*** (0.024)	+	✓
	Infrastructures	-0.034*** (0.013)	0.004 (0.018)	0.014 (0.018)	+	✗
	Public services	0.053 (0.165)			+	●
	Social capital	0.038** (0.017)	-0.015 (0.021)	0.022 (0.018)	+	✓
Specific creative forces	Capital region	0.044 (0.293)	0.401 (0.319)	-0.060 (0.333)	+	●
	Heritage	-0.136 (0.269)	-0.197 (0.276)	0.050 (0.271)	+	●
	Air quality	-0.008 (0.008)	-0.008 (0.008)	-0.007 (0.008)	-	●
	Touristic services		-0.123 (0.084)		-	●
	Analytic specialisation externalities	0.228* (0.136)	0.344*** (0.131)	0.203 (0.141)	+	✓
	Synthetic specialisation externalities		0.154*** (0.056)		+	✓
	Human capital			0.151*** (0.051)	+	✓
	Tolerance	-0.034*** (0.009)	-0.037*** (0.009)	-0.032*** (0.009)	-	✓
	Innovation	2.740*** (0.977)	2.513** (1.018)	1.968* (1.039)	+	✓
	Patronage			0.013 (0.036)	+	●

Constant	-1.742***	-5.270***	-2.577***
	(0.646)	(1.130)	(0.779)
Pseudo R-squared	0.236	0.230	0.232
Observations	83	83	83
LR chi2	222.88	217.63	218.72
Log-likelihood	-360.850	-363.473	-362.926
AIC	757.7	762.9	761.9
BIC	801.2	806.5	805.4
lnalpha	-1.236	-1.117	-1.120
	(0.186)	(0.180)	(0.060)
alpha	0.290	0.327	0.326
	(0.054)	(0.059)	(0.058)
Likelihood-ratio test of alpha=0	1135.25***	1701.19***	2214.54***

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: Negative binomial regression coefficient can be interpreted as follows: for a one unit change in the predictor variable, the difference in the lags of expected counts of the response variable is expected to change by the respective regression coefficient, given the other predictor variables in the model are held constant.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.

d) Spain

		(13) Spain	(14) Spain	(15) Spain	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	0.010*** (0.001)	0.006*** (0.001)	0.010*** (0.001)	+	✓
	Creative competition	0.124* (0.072)	0.427*** (0.083)	0.121* (0.072)	+	✓
	Creative filière	0.247*** (0.017)		0.248*** (0.017)	+	✓
	Creative specialisation externalities	1.441*** (0.089)	1.429*** (0.100)	1.435*** (0.089)	+	✓
	Creative clusters	0.120*** (0.031)		0.120*** (0.031)	+	✓
Urbanisation economies	Population		0.002*** (0.000)		+	✓
	Employment density	0.002*** (0.000)	0.001** (0.001)	0.001*** (0.000)	+	✓
	Population concentration	1.502*** (0.148)	1.268*** (0.175)	1.491*** (0.148)	+	✓
	Labour supply	0.027*** (0.005)	0.028*** (0.005)	0.027*** (0.005)	+	✓
	Diversity externalities	0.107*** (0.010)	0.119*** (0.010)	0.107*** (0.010)	+	✓
	Infrastructures	-0.029*** (0.003)	-0.032*** (0.003)	-0.028*** (0.003)	+	✗
	Public services	0.130** (0.056)			+	✓
	Social capital	-0.003 (0.005)	-0.019*** (0.005	-0.004 (0.005)	+	●
Specific creative forces	Capital region	0.472*** (0.179)	-0.074 (0.208)	0.474*** (0.180)	+	✓
	Heritage	0.077* (0.046)	0.045 (0.047)	0.079* (0.046)	+	✓
	Air quality	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-	●
	Touristic services		-0.000 (0.013)		-	●
	Analytic specialisation externalities	0.289*** (0.072)	0.234*** (0.0742	0.296*** (0.072)	+	✓
	Synthetic specialisation externalities	0.042** (0.021)	0.039 (0.022)	0.044** (0.021)	+	✓
	Human capital		0.083*** (0.012)		+	✓
	Tolerance	0.016*** (0.005)	0.022*** (0.005)	0.015*** (0.005)	-	✓
	Innovation	-0.020 (0.017)	-0.030* (0.018)	-0.020 (0.017)	+	✗

Patronage			0.013 (0.011)	+	•
Constant	-2.224*** (0.376)	-2.155*** (0.388)	-2.158*** (0.374)		
Pseudo R-squared	0.265	0.246	0.265		
Observations	806	806	806		
LR chi2	1858.34	1721.54	1854.27		
Log-likelihood	-2571.569	-2639.967	-2573.602		
AIC	5185.1	5321.9	5189.2		
BIC	5283.7	5420.5	5287.7		
lnalpha	-0.930	-0.768	-0.926		
	(0.061)	(0.061)	(0.061)		
alpha	0.394	0.464	0.396		
	(0.024)	(0.028)	(0.024)		
Likelihood-ratio test of alpha=0	13000***	12000***	13000***		

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: Negative binomial regression coefficient can be interpreted as follows: for a one unit change in the predictor variable, the difference in the lags of expected counts of the response variable is expected to change by the respective regression coefficient, given the other predictor variables in the model are held constant.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.

e) United Kingdom

		(16) United Kingdom	(17) United Kingdom	(18) United Kingdom	(19) United Kingdom	Expected sign based on the theory	Concordance with theory
Localisation economies	Creative firms size	0.000**	0.000*	0.000*	0.000*	+	✓
		(0.000)	(0.000)	(0.000)	(0.000)		
	Creative competition	-0.046	0.099**	0.103**	0.043	+	✓
		(0.040)	(0.041)	(0.041)	(0.040)		
	Creative filière	0.264***				+	✓
		(0.032)					
	Creative specialisation externalities	2.337***	2.487***	2.614***	2.592***	+	✓
		(0.284)	(0.316)	(0.288)	(0.296)		
	Creative clusters		0.049***			+	✓
			(0.009)				
Urbanisation economies	Population			0.002***		+	✓
				(0.000)			
	Employment density				0.004***	+	✓
					(0.000)		
	Population concentration	0.631	1.580***	1.275***	2.026***	+	✓
		(0.425)	(0.476)	(0.441)	(0.437)		
	Labour supply	0.020*	0.034***	0.044***	0.049***	+	✓
		(0.012)	(0.013)	(0.013)	(0.012)		
	Diversity externalities	0.055***	0.047***	0.045***	0.054***	+	✓
		(0.011)	(0.012)	(0.012)	(0.012)		
	Infrastructures	-0.043***				+	✗
		(0.006)					
	Public services		-0.097***			+	✗
			(0.023)				
	Social capital	0.016***	0.009	0.001	0.006	+	✓
		(0.006)	(0.006)	(0.006)	(0.006)		
Specific creative forces	Capital region	0.293**	0.590***	0.196	0.471***	+	✓
		(0.133)	(0.138)	(0.145)	(0.135)		
	Heritage	0.980***	0.463**	0.154	0.280	+	✓
		(0.193)	(0.224)	(0.190)	(0.206)		
	Air quality	0.002	0.001	-0.000	-0.000	-	●
		(0.002)	(0.002)	(0.002)	(0.002)		
	Touristic services			-0.169***		-	✓
				(0.055)			
	Analytic specialisation externalities	0.098**	0.125**	0.119***	0.141***	+	✓
		(0.044)	(0.049)	(0.045)	(0.048)		
	Synthetic specialisation externalities	0.083*	0.047	0.073	0.069	+	●
		(0.048)	(0.052)	(0.050)	(0.049)		
	Human capital	-0.020**	-0.043***	-0.042***	-0.028***	+	✓
		(0.010)	(0.011)	(0.010)	(0.011)		

	Tolerance	0.016 (0.022)	0.004 (0.024)	-0.035 (0.023)	0.019 (0.023)	-	•
	Innovation	0.031 (0.048)	0.131** (0.055)	0.129** (0.053)	0.144*** (0.055)	+	✓
	Patronage				-0.050 (0.040)	+	•
	Constant	0.792 (0.762)	0.493 (0.812)	0.749 (0.779)	-1.185 (0.811)		
	Pseudo R-squared	0.149	0.139	0.144	0.145		
	Observations	243	243	243	243		
	LR chi2	532.41	499.78	515.55	520.50		
	Log-likelihood	-1525.394	-1541.706	-1533.821	-1531.345		
	AIC	3088.8	3121.4	3105.6	3100.7		
	BIC	3155.2	3187.8	3172.0	3167.1		
	lnalpha	-1.091	-0.954	-1.009	-1.032		
		(0.091)	(0.089)	(0.089)	(0.089)		
	alpha	0.336	0.385	0.364	0.356		
		(0.030)	(0.034)	(0.032)	(0.317)		
	Likelihood-ratio test of alpha=0	31000***	35000***	39000***	33000***		

Note 1: Standard errors in parentheses
Note 2: Asterisks represent p-values: p<0.10 (*), p<0.05 (**), p<0.01 (***)
Note 3: The dependent variable is the absolute number of creative industries by LLS (source ORBIS - 2011).
Note 4: Negative binomial regression coefficient can be interpreted as follows: for a one unit change in the predictor variable, the difference in the lags of expected counts of the response variable is expected to change by the respective regression coefficient, given the other predictor variables in the model are held constant.
Note 5: Three signs are used in the last column of the table indicating a concordance between the obtained results and the expected sign according to academic theory. Firstly, ✓ indicates that the predictor variable is statistically significant and corroborates the positive or negative expected sign. Secondly, ✗ indicates that the predictor is statistically significant but has a different sign than expected. Thirdly, • indicates that the predictor variable is not statistically significant.