

n. 455 April 2012

Methodological approaches for measuring the creative employment: a critical appraisal with an application to Portugal

Sara Santos Cruz¹
Aurora A. C. Teixeira^{1,2}

¹ CEF.UP, FEP-UP, School of Economics and Management, University of Porto
² INESC TEC and OBEGEF

**Methodological approaches for measuring the creative employment: a critical appraisal
with an application to Portugal**

Sara Cruz

sarasantoscruz@yahoo.com

CEF.UP, Faculdade de Economia,
Universidade do Porto

Aurora A.C. Teixeira

ateixeira@fep.up.pt

CEF.UP, Faculdade de Economia, Universidade do
Porto; INESC Porto; OBEGEF

Abstract

Creative industries and creative occupations have increasingly been attracting attention in recent years, in both policy and academic fields. Not enough literature has yet been produced on the topic to overcome the fuzziness and all-embracing definitions of the creative class, the lack of objectivity in the criteria to select who is creative or not, the limitations of data used and problems of highly aggregated occupational categories which jeopardize an accurate analysis of these workers. This paper presents a survey and mapping of the main methods for measuring the creative class and industries and proposes a combined industry and occupation-based approach for estimating the scale of creative employment in Portugal. Using micro data from 2009 *Quadros de Pessoal* database, which encompasses over 3 million workers, we found that creative employment in Portugal amounts to 6.9% of total employment (i.e., 215525 workers), with the most important creative sectors being ‘advertising and marketing’ (1.7%), ‘software publishing/computer programming and consultancy’ (1.8%), and ‘research and development’ (0.9%). Additionally, we found that most creative employees (60%) work in non-core creative sectors, that is, Portuguese creative workers are highly dispersed across all the sectors of the economy, particularly those considered non-creative, such as the manufacturing and the services sectors.

Keywords: Creative class; Occupations; Industries; Measurement; Portugal

JEL-codes: L80; C81

1. Introduction

Creative industries and occupations have achieved increased attention in recent years, in both policy and academic fields. The role of creativity in economic growth has been recognized at various levels, gaining popularity after Florida's (2002a, 2004) studies on the *creative class*. According to this author, the different types of creativity (technological, economic, artistic) do have an impact on a region's ability to produce new types of knowledge and innovation and, ultimately, to induce regional growth.

Evidence has also proved that creative industries exhibit an irregular pattern of spatial distribution which is related to their location choices; they tend to concentrate in large metropolises to benefit from urban diversity externalities (Florida, 2002a). Due to their idiosyncrasies, they select location both because of local labour supply, and because they are attracted by factors such as technological facilities and innovation (Florida, 2002a, 2004), quality of place (Clifton and Cooke, 2009), cultural diversity (Florida and Mellander, 2007), or tolerance and openness (Florida *et al.*, 2008), compatible with their lifestyle and occupational status. For these reasons, the creative class constitutes a resource that attracts talent and innovation from one region to another (Florida, 2002a).

The literature on the creative class is relatively recent and consists of an array of publications which range from theoretical and policy-based articles (e.g., Pratt, 2009) to empirical studies on the estimation of creative employment in national and regional economies (e.g., Florida *et al.*, 2008; Higgs *et al.*, 2008; Asheim and Hansen, 2009; Boschma and Fritsch, 2009; Clifton and Cooke, 2009; Fritsch and Stuetzer, 2009; Hansen and Niedomysl, 2009; Mellander, 2009; Mellander *et al.*, 2010).

Since Florida's (2002a) seminal contribution, several studies and government reports have been published world-wide on the analysis of creative workers, their dimension (e.g., KEA European Affairs, 2006; Higgs and Cunningham, 2007; Higgs *et al.*, 2008; Cunningham and Higgs, 2009), spatial, sectorial and knowledge-based distribution (e.g., Gabe, 2006; Clifton, 2008; Asheim and Hansen, 2009; Clifton and Cooke, 2009; Mellander, 2009), the determinants of their location preferences (e.g., Hansen and Niedomysl, 2009), and their effect on economic growth (e.g., Florida *et al.*, 2008).

Despite the reasonable amount of literature produced on the topic, several challenges remain for anyone undertaking empirical and quantitative analyses of creative activities. Fuzzy and all-embracing definitions of which occupations should be included in the creative class (see

McGranahan and Wojan, 2007; Markusen *et al.*, 2008), lack of objectivity in the criteria to select who is creative or not (see Boschma and Fritsch, 2009; Clark, 2009), limitations of data used, and problems of highly aggregated occupational code categories (see Higgs *et al.*, 2008) seem to jeopardize an accurate analysis of these workers.

This paper reviews the literature related to the measurement of the creative class. It presents a thorough comparative mapping of the existing methodological approaches to measuring creative employment and estimates them, using data from the official employment datasets of Portugal, year 2009. Then it proposes a methodological approach suitable for empirical research on creative employment, using data from industries and occupations.

In the next section we revisit the seminal definitions of creative class and their most important critiques and drawbacks, and put forward the existing estimations and methodological approaches to delimiting and measuring the creative class. In Section 3 we map the most relevant measurement approaches and provide the basis for estimating the size of the Portuguese creative class in 2009. In Section 4 we propose an adapted measurement approach that combines industry and occupational data, to more rigorously estimate the importance of creative employment in Portugal. Finally, in Section 5, we present the most relevant conclusions of this study.

2. Definitions of and methods to measure the Creative Class. A review

2.1. Main definitions of the Creative Class

As creative activities have become the subject of rising interest as drivers of economic development, people involved in creative processes have been seen as playing a significant role in contemporary knowledge societies (e.g., Florida, 2002a; Markusen, 2006).

In the psychological field (e.g., Amabile, 1983, 1998; Csikszentmihalyi, 1997, 1999), we find *creative individuals* described as those who reveal original thinking and stimulate others through unusual perspectives, who express pioneering visions and a novel perception of the usual reality, who make significant discoveries in their field of expertise, or who develop knowledge that leads to structural changes in general understanding and ways of thinking.

Economic geography (e.g., Florida, 2002a; 2002b; 2005a; Scott, 2007) characterizes creative people not so much as a group of individuals but as a *class* that develops an activity or engages in occupations whose major purpose is to create or produce novelties which are

significant and valuable, or whose functions require some level of creativity in daily problem resolution.

Implicit in the notion of *class* is “some kind of self-identity and consistent value system within a socio-political hierarchy” (Clifton, 2008: 66). Indeed, creative individuals have aspects in common. As their ideas or solutions are economically valuable, they are paid according to their *creative potential* and, in general, they are individuals who enjoy a higher level of autonomy and mobility in the course of their professional lives. They often get involved in the social networks or communities that draw from their professional class or occupation, and they have common values, principles - “meritocracy”, “individuality”, ‘goal attainment’, “diversity”, “tolerance” and “openness” (Florida 2002a: 78-9) - consumption preferences and socio-cultural habits. They hold one type of capital that is intangible and totally incorporated in their intellect - the *creative capital* (Florida, 2002a,b, 2005a).

Several definitions and measurement approaches to studying the creative class have been developed in the last decade. The majority of them are refinements and variants of the most influential one developed by Florida (2002a). This author says that creative people can be encountered amongst a *core group*, whose main purpose is to produce original ideas or contents, novel technical solutions or new symbolic knowledge. It comprises the pure artistic fields, such as ‘performing arts’, ‘entertainment’ or ‘design’ activities, and scientific domains such as ‘engineering’, ‘architecture’, ‘science’ or ‘education’. These professions are entirely involved in the creative process (e.g., in product conception and development, in scientific discoveries, in the creation of original works, masterpieces, etc.) or often engaged in “problem finding” and resolution (Florida, 2002a: 69) (see Table 1).

In Florida’s notion of creative class there is also a broader group of *Creative Professionals* whose functions require a high degree of creativity to deal with daily problems or to create insightful judgements and new responses. Although they often use and contribute to the creative capital, the conception of novelties in its pure sense is not a basic component of their work, as it is in the case of the *creative core*. They are often asked to think independently in innovative ways in order to respond to a diversity of cases and may possibly be engaged in the experimentation or improvement of new processes and procedures (Florida, 2002a: 69). They are typically engaged in “knowledge-intensive and high-tech” sectors, “financial services”, “health and legal professions” or in “business administration or management” (Florida, 2002a: 69).

Table 1: Florida’s definition of Creative Class using occupational categories

Creative Class category groups	Occupational Categories Descriptions	Occupational ISCO-88 Codes ***
<i>Super Creative Core*</i>		. Computing professionals (213)
		. Mathematicians, statisticians and related professionals (212)
		. Architects, engineers and related professionals (214)
		. Life sciences professionals (221)
		. Physicists, chemists and related professionals (211)
		. Social science and related professionals (244)
		. College, university and higher education teaching professionals (231)
	. Computer and mathematics	. Secondary education teaching professionals (232)
	. Architecture and engineering	. Primary and pre-primary education teaching professionals (233)
	. Life, physical and social sciences	. Special education teaching professionals (234)
	. Education, training and library	. Other teaching professionals (235)
. Arts, design, entertainment, sports and media	. Archivists, Librarians and related information professionals (243)	
	+	
	Bohemians (see also below):	
	. Writers and creative or performing artists (245)	
	. Photographers and image and sound recording equipment operators (3131)	
	. Artistic, entertainment and sports associate professionals (347)	
<i>Creative Professionals*</i>		. Legislators, senior officials and managers (1)
		. Business professionals (241)
	. Management	. Business services agents and trade brokers (342)
	. Business and financial operations	. Legal professionals (242)
	. Legal	. Health professionals (except nursing) (222)
	. Healthcare practitioners and technical	. Nursing and midwifery professionals (223)
	. High-end sales and sales management	. Life science and health associate professionals (32)
		. Physical and engineering science associate professionals (31)
		. Finance and sales associate professionals (341).
	<i>Service Class*</i>	
. Health care support		. Building caretakers, window and related cleaners (914)
. Food preparation and food-service-related		. Personal care and related workers (513)
. Building and ground cleaning and maintenance		. Other personal services workers (514)
. Personal care and service		. Shop salespersons and demonstrators (522)
. Low-end sales and related		. Administrative associate professionals (343)
. Office and administrative support		. Clerks (4)
. Community and social services		. Police inspectors and detectives (345)
. Protective service		. Social work associate professionals (346)
		. Protective services workers (516).
<i>Bohemians**</i>	. Fine arts (literature, performing artists)	. Writers and creative or performing artists (245)
	. Photographic and Visual arts	. Photographers and image and sound recording equipment operators (3131)
	. Artistic, entertainment and sports related	. Artistic, entertainment and sports associate professionals (347)
	. Fashion related	. Fashion and other models (521).

Sources: Florida (2002a, 2004), Fritsch and Stuetzer (2009). The selection of codes in the last column of Table 1 is from the responsibility of this article’s authors as a result of their interpretation on Florida’s category groups and respective descriptions.

Notes: * Descriptions adapted from Florida (2002a: 328-9); ** Descriptions adapted from Fritsch and Stuetzer (2009: 10); *** Source: International Standard Classification of Occupations ISCO-88, available on the International Standard Classification of Occupations website, at: <http://www.ilo.org/public/english/bureau/stat/isco/isco88/major.htm> [accessed online April 2012].

Along with the Creative Class there is a socio-professional category that Florida (2002a) designates as *Service Class*, constituted by “low-end, typically low-wage and low-autonomy occupations” in the activity sector of Services. These workers represent a complementary

group whose activities respond to the creative class necessities. Since the workers in the *creative core* and the *creative professionals* “work long and unpredictable hours”, they demand a “pool of low-end service workers” to look after their household tasks and maintenance jobs (Florida, 2002a: 69). They include, for example, “cleaning and maintenance”, “food-service”, “personal care support”, “office and administrative support”, “computer and systems support” or “protective service” occupations (Florida, 2002a: 69, 329). Later on, the concept of *Bohemians* was also introduced into the analysis of the creative class. Departing from the revised version of Florida’s book (2004), the concept of *Bohemians* is used separately from the *Core Creative Group* and comprises those who are directly involved in purely cultural and artistic fields, such as “writers and performing artists”, “photographers and image/sound operators”, “artistic, entertainment, and sports associate professionals”, or “models/fashion” (see Boschma and Fritsch, 2009: 396, Fritsch and Stuetzer, 2009: 10) (cf. Table 1).

Florida’s (2002a, 2004) conception of *creative class* has been subject to intense debate (e.g., Glaeser, 2005; Markusen, 2006; McGranahan and Wojan, 2007; Clifton, 2008; Hansen and Niedomysl, 2009). The questions raised are mostly centred on *methodological underpinnings*, as stressed by Markusen (2006) and McGranahan and Wojan (2007) about the accurate measurement of the creative employment, and on *theoretical grounds* to be used in policy and academic fields, such as Glaeser’s (2005) critique on the differentiation between Florida’s (2002a) creative class and the notion of human capital; Markusen’s (2006) discussion on Florida’s (2002a) creative class and its causality with urban development; or Storper and Scott’s (2009: 147) arguments on revisiting the *creative class* concept in the contexts of the “economic geography of production”, “concentration of skills” and “urban growth” (see Table 2).

Within the methodological debate, the limitations of Florida’s seminal concept and of the empirical data used to assess the creative class make up the most important critiques developed so far. One example is that by McGranahan and Wojan (2007), who propose a refinement of Florida’s (2002a) measure to overcome the ambiguity of his definition, empirically described by fuzzy and broad occupational categories. To analyze creative employment in non-urban areas these authors propose a recasting of the summary categories wholly considered by Florida (2002a), such as *educational, health and legal services*,¹ with

¹ “Education, training and library occupations” is considered by Florida (2002a) to be part of the *Creative Core*, but it ranges from professors to classroom assistants, and comprises activities that seem to be grounded on low

the exclusion of *less creative* occupations. According to these authors, the consideration of whole summary categories includes several activities reliant on low creativity levels that may lead to an evaluation bias when quantifying the creative class. This is particularly true in rural regions, where educational and health occupations appear to be a relevant part of the local employment (McGranahan and Wojan, 2007: 202).

Markusen (2006) also raises questions on Florida's (2002a) methodology, on the grounds that it is reliant on vast categories that do not take into account functional details and the level of creativity embedded in the range of occupations. The statistical data (Census data) used in his study associates creative occupations with those involving high educational attainment, thereby intertwining *creative* with *human capital*. This is, according to Markusen (2006), a drawback of Florida's approach, given that the ability to create or innovate is not dictated by schooling degree.

Boschma and Fritsch (2009: 395) link their critique of Florida to Markusen's (2006) arguments, referring to the difficulties of accurately measuring the creative class due to limitations of statistical information. The data used is catalogued in an educational logic and thus occupations considered as creative turn out to reveal a concentration bias around those with high educational content, overlooking low-skilled functions that can be creative as well. They also discuss the conceptual fuzziness of Florida's (2002a) definition, which leads to flaws in differentiating creative from non-creative occupations.

Glaeser (2005: 595-6), meanwhile, critically assesses Florida's (2002a) proposition by demonstrating that the model of city growth based on the concentration of creative employment merely recognizes the human capital perspective, where urban growth is determined by high educational level and people's skills.

When the variable *educational level* (schooling degree) is tested in regressions using Florida's datasets, there is a high correlation (of 75%) between this author's *super-creative core* and the human capital measured by the "percent of adults with a college education". The outputs of regression reveal a "positive, statistically significant impact of the schooling variable and a negative, statistically insignificant impact of the super creative core" (Glaeser, 2005: 595-6). This is true, too, for the other variables of Florida's model, i.e., the "patent citations per capita variable" and the "gay index" (Glaeser, 2005).

levels of creativity. Also, "Business and financial operations occupations" and "Legal occupations" have much lower creativity scores than other occupational classes (even some considered in the Service Class) and are categorized by Florida (2002a) in the *Creative Professionals* group (McGranahan and Wojan, 2007: 200-1).

Table 2: Major critiques of Florida’s definition of *creative class*

Critiques	Major drawbacks	Authors	New conceptual proposals/ refinements to Florida’s <i>Creative Class</i>
<i>Critiques on the Conceptualization and Definition</i>	- Florida’s <i>creative class</i> is an “eclectic list” of professions with fuzzy delimitations, overlooking the productive context.	Pratt (2008)	A theoretical conception of <i>creative class</i> as a <i>group</i> that is embedded in the productive environment and in all the stages of the value chain.
	- High difficulties in differentiating creative from non-creative employment; - Creative occupations tend to be biased around those with high educational content.	Boschma and Fritsch (2009)	These authors follow Florida’s (2002a) definition in their study, although recognizing its limitations.
<i>Methodological Critiques</i>	- Ambiguity of Florida’s definition of Creative Class, an all-inclusive concept; - Broad summary occupational categories, overlooking the detail of each category group; - The consideration of wide-ranging summary categories such as <i>Education, Legal and Health</i> activities may lead to the overestimation of creative employment in rural areas, where these services are often over-represented.	McGranahan and Wojan (2007)	- Refinement of Florida’s Creative Class, by looking into each category in detail; - The authors propose recasting wide-ranging categories such as <i>Education, training, and library occupations</i> and <i>Healthcare practitioners and technical occupations</i> , entirely considered by Florida. - Exclusion of <i>less creative</i> professions, mostly committed to basic provisions and that could overestimate the size of creative employment in rural areas.
	- Vast, all-inclusive occupational categories; - Data limitation (Census and Labour statistics) overlook the dimension of the artistic class; - Fuzziness of Florida’s definition; - Does not take into account the functional details and the level of creativity involved in each occupation; - Correlation between creative occupations and those involving high educational attainment (‘creativity’ and ‘human capital’ are conflated).	Markusen (2006)	- Study of the artistic class (<i>artists</i>) as a way to differentiate them from the other elements of the <i>creative class</i> , through the observation of their socio-economic and geographic distribution in urban areas.
	- <i>Creative Class and Human Capital</i> approaches are the same reality, but seen from different perspectives; - There is a high correlation (75%) between Florida’s <i>Super Creative Core</i> and <i>Human Capital</i> ; - When the educational level (schooling degree) is tested, the most relevant variables in Florida’s model become statistically insignificant.	Glaeser (2005)	The author does not propose alternatives to Florida’s approach.

In the theoretical field, Pratt (2008: 114) discusses the conceptual ambiguity of Florida’s (2002a) definition, considering his creative class as a mere “taxonomy”, an *eclectic list* of professions with fuzzy delimitations, that is unaware of the production environment where creativity might be being used or generated. Pratt suggests that the *creative class* concept needs to be related to a production context that should be interrelated with other organizations, institutional bodies and the community itself, in order to understand the linkages along the value chain and the locally enrooted practices that arise from these interconnections.

The above critiques appear to be sufficient to show the intense debate around conceptual and methodological issues of the seminal *creative class* definition and the eager attempts to overcome such limitations. In the search for an accurate delimitation and measurement of creative employment, refinements and new methodological approaches have recently been developed at several levels. In the next section, we present these approaches and show how they have evolved over time.

2.2. Approaches to measuring the size of the creative class

Studies on the empirical estimation of the creative economy are recent (e.g., Higgs and Cunningham, 2007; Clifton, 2008; Florida *et al.*, 2008; Higgs *et al.*, 2008; Asheim and Hansen, 2009; Boschma and Fritsch, 2009; Clifton and Cooke, 2009; Fritsch and Stuetzer, 2009; Hansen and Niedomysl, 2009; Mellander, 2009; Granger and Hamilton, 2010; Mellander *et al.*, 2010). One of the most important issues in the analysis of creative activities is the emergent need for a universal conception and a classification system that can accurately gather and map data on these industries and occupations.

Since the creative and cultural sectors are related more to the *service economy* than to manufacturing, and since they mainly result from the precedent “non-market economy of cultural public goods”, they cannot be easily quantified by means of the traditional frameworks of analysis (Potts *et al.*, 2008: 168).

Furthermore, new combinations of creative industries with the knowledge, high-tech, information and communication technology (ICT), or management sectors, go hand in hand with the development of the information society. These new hybrid and heterogeneous activities, whether within the creative sector or across different sectors, cannot be solely described by conventional industry classification systems, otherwise there may be a bias in the estimation of results (Higgs and Cunningham, 2007: 6).

Also, the increasing mobility between occupations in specialized creative industries (e.g., design, photography and visual arts) and creative functions in non-creative industries poses new challenges for the task of measuring the actual scale of creative employment using only occupational classification systems.

2.2.1. Conventional methodologies based on the *industry-based* approach

Conventional measures that have been employed in empirical studies of the creative economy are mostly related to the *industry approach*, which is based on the Standard Industrial

Classification (SIC) system. Here, creative employment is defined “by allocating all jobs in earmarked creative establishments - actual physical locations of production and service - into nested industries defined by major product” and estimated by summing all the workers in all the creative industries (Markusen *et al.*, 2008: 29).

This first generation of methods emerges with the *UK Creative Industries Mapping Document* (DCMS, 1998, 2001) which focused on capturing empirical information about the specialized industries in each sector of the creative economy. This study devoted a separate analysis to each of the thirteen selected creative sectors,² concerning their industry and market dimensions, their industrial structure, the employment in each sector, and estimations of the exports and gross value added. The creative employment, in this case, was simply measured by the existing employment in each creative sector, considering both *direct* and *indirect/support* activities in the process (DCMS, 1998, 2001).

Despite the relevance of this study, drawbacks in defining and delimiting the creative sectors (Higgs and Cunningham, 2007) and the reliance on scarce and low resolution data (UK Census), the lack of official statistics on some relevant industries (e.g., crafts and design), and the shortcomings of the SIC system used, too outmoded to be adapted to the new creative economy, led to difficulties in the accurate measurement of creative activities and limited the results obtained by the study (Higgs and Cunningham, 2007; Granger and Hamilton, 2010).

The industry approach has been criticised by several authors (e.g., Pratt, 1997, 2004; Markusen *et al.*, 2008; Potts *et al.*, 2008; Granger and Hamilton, 2010). It has been proved that the results provided by simple industry-based methods lead to inaccurate estimations of creative employment, since they consider the total number of employees working within what are regarded as creative industries when only a part of them may be actually involved in the production of creative contents (Markusen *et al.*, 2008: 36). Furthermore, the approach also overlooks the creative employment outside creative industries.

Even the latest SIC systems seem to be inadequate when it comes to capturing information on the creative industries (Markusen *et al.*, 2008; Potts *et al.*, 2008; Granger and Hamilton, 2010). This is particularly true for the Design and Digital Media sectors, which are often intertwined with other activity sectors, some of them outside the creative field, such as the categories of product development and conception, industrial design and fashion design, which mostly operate within the manufacturing sectors.

² Creative sectors selected by DCMS (1998, 2001): Advertising, Art and Antiques, Architecture, Crafts, Design, Fashion, Film, Leisure Software, Music, Performing Arts, Publishing, Software, TV and Radio.

The SIC classification mostly relies on narrow coding which does not provide detailed information on each sector, even when codes are disaggregated at their maximum levels. This limits a refined analysis of each activity sector. For instance, SIC codes on the activities of Design do not usually distinguish between the different fields of design; Crafts activities are only captured by means of industry codes for the manufacturing sector. Thus, conventional SIC codes have insufficient detail for an accurate treatment of creative activities, tending to mitigate or aggregate them into broad and comprehensive categories (Granger and Hamilton, 2010).

Creative processes are being developed across all the sectors of the economy, but the SIC codes are unable to capture those activities. This is true for Design, Architecture, Crafts, Visual and Performing arts, which often take place outside the creative field, and within the manufacturing and services sectors.

Limitations of industry-based approaches also appear related to the information on small and micro enterprises and free-lance activities, which is often scanty and scarcely available (Markusen *et al.*, 2008; Granger and Hamilton, 2010). This leads to a significant bias in the assessment of the creative field, since independent activities, small businesses or self-employed workers operating on a contract basis with several large companies seem to be responsible for a significant contribution to the creative economy (Higgs and Cunningham, 2007).

The shortcomings of industry-based approaches and the increasing need to define and quantify creative employment led to the development of alternative methodological approaches based on the study of *occupations*.

2.2.2. Occupational and combined industry/occupation-based approaches

Occupation-based approaches

The number of studies about creative employment using the *occupational approach* has been growing in the past few years. In this approach “employment is divided into nested occupational groups based on skill content and work process”, giving particular emphasis to what “workers do rather than what they make” (Markusen *et al.*, 2008: 29).

This line of research went beyond the industry-based approach, focusing on occupations instead of the aggregate employment existent on specialized sectors of the creative economy (Higgs and Cunningham, 2007). Unlike industry-based methodologies, mostly focused on a

restricted number of creative sectors (e.g., DCMS, 1998, 2001), occupational approaches have broadened the dimension of creative employment by accounting for all the occupations that may be considered as creative, in all activity sectors of the economy.

Florida's (2002a, 2004) study on the creative class represented an innovative effort on the use of occupational-based approaches to analyze these workers and their location choices. The author employed the Standard Occupational Classification codes (SOC) system for the empirical analysis of creative occupations.

Apart from the seminal contribution of Florida (2002a), the majority of the literature involving occupational approaches focuses on: how to define and measure the creative class (e.g., Gabe, 2006; Markusen, 2006; McGranahan and Wojan, 2007; Markusen *et al.*, 2008); the geographical distribution of creative employment by location, by knowledge-base, etc. (e.g., Clifton, 2008; Florida *et al.*, 2008; Asheim and Hansen, 2009; Boschma and Fritsch, 2009; Clifton and Cooke, 2009; Fritsch and Stuetzer, 2009; Hansen and Niedomysl, 2009; Lorenzen and Andersen, 2009); the importance of creative workers in regional growth (e.g., Florida and Mellander, 2007; Hansen, 2007; McGranahan and Wojan, 2007; Florida *et al.*, 2008), or their relation with urban development (e.g., Florida, 2002a, 2002b, 2005a, 2005b; Pratt, 2008; Storper and Scott, 2009). Except for the first group of articles produced, which attempt to propose refinements to the *creative class* seminal construct, all these studies are mostly based on Florida's (2002a) approach and share the same limitations, both conceptual and methodological.

When compared to most traditional methodologies, the use of occupational-based approaches permitted a more detailed analysis of the creative workforce and the occupational structure over time, across regions and countries (see Table 3). For instance, Gabe (2006) makes use of a shift-share model to study the evolution of creative workforce in urban areas of the United States (US), between 1990 and 2000. McGranahan and Wojan (2007) developed a detailed analysis of creative categories in order to assess the occupational structure of US non-metropolitan counties. Making use of Population Census data, Markusen *et al.* (2008: 34) present a detailed analysis of the occupational distribution within the American cultural sector.

One frequent shortcoming of occupation-based approaches is that activities considered as creative are often associated with those involving higher educational levels (Markusen *et al.*, 2008) to the detriment of others that might be creative too, but associated with less instruction

(Boschma and Fritsch, 2009). By employing Census occupational data and grouping creative workers into code categories associated with skills³ and high education, Florida's (2002a) criteria led to biases in the measurement of creative occupations, confusing *creativity* with *human capital* (Markusen, 2006). Since the author overlooks the detail of each activity listed in the broad categories that make up his definition of creative class, Florida's (2002a) estimations on the correlation between metropolitan growth and the concentration of creative workers merely describe the component of human capital determined by educational level (Markusen, 2006).

Another drawback is that each category code covers a diversity of detailed occupations and there is a high degree of arbitrariness in the categorization of activities as creative. The criteria used to classify occupations as creative or non-creative are rather subjective and somewhat questionable (see Markusen, 2006; Markusen *et al.*, 2008). On this issue, McGranahan and Wojan's (2007) study conferred greater objectivity on the scrutiny of creative occupations. These authors propose a refinement of Florida's (2002a) occupational groups, based on a ranking of the creativity required by each given activity.⁴ According to McGranahan and Wojan (2007: 213), this refinement produced more robust estimations of creative employment than Florida's (2002a).

Occupational approaches also overlook or neglect freelancers and self-employed workers, although their contribution to the creative economy appears to be significant. Since official source data and national statistics mostly contain information on firms employing creative workers, they do not account for the self-employed. This problem is particularly relevant in the case of *Bohemians*, for whom freelance and independent works represent a significant part of their activity (Fritsch and Stuetzer, 2009).

Finally, even though occupational codes allow the researcher to categorize activities in terms of knowledge bases (analytical, synthetic, and symbolic) which firms rely on, they fail to permit discrimination between the industries where creative workers operate (Asheim and Hansen, 2009).

³ The empirical measure used as proxy for skills is *occupations*. The proxy used for the estimation of human capital is *educational attainment* (see Florida *et al.*, 2008).

⁴ The *US O*NET database* presents the creativity requirements of each occupation, described by the item "Developing, designing or creating new applications, ideas, relationships, systems or products, including artistic contributions" of the O*Net Content Model (see McGranahan and Wojan, 2007: 201).

Combined industry- and occupation-based approaches

The limitations of occupation-based approaches called for the development of methodologies that combined industry with occupational data. The type of information taken here often leads to more accurate estimations of creative employment, since it provides data on industries in which the creative workers are operating. Moreover, it allows the identification of creative workers working in non-creative sectors of activity, and of non-creative/support labour existing in creative industries.

Examples of studies employing this approach (cf. Table 3) can be found in the report by Higgs *et al.* (2008: 4), which uses the *creative trident* approach - “total employment in creative occupations within the creative industries, the creative occupations within other industries and the support occupations in the creative industries” - to map the creative economy, employing both industry and occupational codes.

The approach is also used in articles published by Mellander (2009) on the occupational distribution within Swedish creative and knowledge industries, by Mellander *et al.* (2010) on the occupational and industrial structures of Denmark, the United States, Canada and Sweden, by Barbour and Markusen (2007) concerning the occupational structure in the high-tech and ICT sectors of California’s urban areas, by Currid and Stolarick (2010) on the regional analysis of Los Angeles IT sector, by combining industry with an occupational analysis, and by Koo (2005) on the study of Cleveland metropolitan area, using a model that integrates both industries and occupations.

More recently, studies drawing on the DCMS industry-based approach have improved their analysis of core creative sectors and their employment dimension on the basis of combining industry and occupational data. This is the case of the DCMS (2006, 2010a,b) recent statistical bulletins on the UK’s creative industries, which make use of SIC and SOC codes to capture the actual dimension of creative employment within and outside core creative industry sectors. Similarly, the article by Clark (2009) uses a SIC-SOC matrix to analyze creative employment in the UK (see Table 3).

It has been proved that the *combined industry- and occupation-based* approaches provide a more precise account of the real occupational distribution within industries and regions (see Barbour and Markusen, 2007). Since industries’ employment structures diverge significantly from region to region, this approach is able to provide better results for use in regional policy. Also, changes in regional labour structures and the economic dynamics of industries may gain

from an industry and occupational approach for a better interpretation of occupational mobility across sectors, over time (Barbour and Markusen, 2007; Currid and Stolarick, 2010).

Despite the advantages of using combined industry and occupational approaches in the measurement of creative employment, they are not free from limitations. In the study on the Swedish creative industries and occupations, Mellander (2009) recognizes that industry data based on a SIC system may restrict a complete analysis of “regional and intra-industry” disparities as “industry definitions in general tend to be based on the industry’s final product rather than internal processes” (Mellander, 2009: 299).

In addition, limitations of source information (e.g., population Census, national statistics), such as low resolution and highly aggregated data, particularly on industries, long time intervals between each data upgrading process, restricted knowledge on the self-employment figures, and lack of compatibility between datasets that may occur both in industry as in occupations, are some of most important difficulties reported by authors using combined industry and occupational-based approaches (Higgs and Cunningham, 2007; Higgs *et al.*, 2008).

Thus, even though it has been possible to apply more complete methods, such as the occupational (SOC) and the industry and occupational (SIC and SOC) approaches, which proved to be more appropriate measures of creative employment than the simplistic industry-based (SIC) approaches, we still face challenges.

First, the definition of *who is really the creative worker*: there are difficulties with the conceptualization of the creative class and fuzzy frontiers of this construct. Second, the quantification of people who are creative: there are several sources of limitations either with methods employed or with the data available (e.g., self-employment figures, which appear to be significant to the creative economy, what occupations can be considered as creative, and the criteria used in this scrutiny). Third, the SIC and SOC systems in general have weaknesses: all-inclusive and heterogeneous code categories which do not accurately take into account the details of industries or occupations; the lack of information on the creative activities and the creative processes in each industry, since the SIC system is focused on the final product; and the level of creativity involved in each occupation, which is not revealed by a SOC nomenclature.

A recurrent difficulty persists along with the increasing amount of empirical literature on the topic: given that creative workers are not only those employed in creative industries or

specialized sectors, how is it possible to quantify and estimate their whole size and contribution across sectors and regions?

Social Network Analysis approaches

One key argument about the creative class is that creative workers relate to each other through localised networks and face-to-face contacts that allow the accumulation of *know-who* and lend dynamics to the “process of socialization”, a distinguishing feature of the *symbolic knowledge-base* (Asheim and Hansen, 2009: 430). Thus, one primary need of the empirical analysis of creative employment is to understand the social structures behind creative processes.

Highlighting this human and sociological perspective, Granger and Hamilton (2010: 51) employed *social network analysis* to develop a spatial “relational mapping” of creative industries in order to investigate the dynamics of creative processes among organizations and networks of individuals from the arts and cultural fields in the West Midlands region of the United Kingdom (Granger and Hamilton, 2010).

Starting from a restricted “number of recognized ‘key contacts’”, the authors develop a relational map based on the feedback of people interviewed about who they were collaborating with, the networks and communities in which they were involved, and the “creative spaces”, such as festivals, exhibitions, public spaces, where they developed their social relationships (Granger and Hamilton, 2010: 52). This study led to valuable conclusions on the organizational dynamics of social and economic processes of cultural institutions and the creative workforce in the region. It allowed a fuller analysis of the density of the local network of contacts, the “institutional thickness” and the “organizational lock-in” of creative spaces in the region under study (Granger and Hamilton, 2010: 52).

Despite the wealth of results obtained, these approaches are based on sophisticated and rather complex techniques. Their application to an empirical context is often limited by the quality of source data, regularly obtained through surveys and questionnaires, and by the high degree of complexity inherent to the social processes behind the networks under study. This severely undermines the scope for international and regional comparisons.

Table 3: Creative employment - a synthesis of empirical results in literature

Methodological Approach	Characteristics	Author(s) Study	Methodology followed	Empirical results - Relative weight of creative employment in total workforce
Industry-based Approaches	Under these approaches, mostly drawn from the DCMS framework, estimates of creative employment are restricted to Core specialized creative sectors . This leads to more modest estimations of creative employment than found with other approaches, particularly those following Florida's (2002a, 2004) definition. [Use of SIC codes]	DCMS (1998, 2001), <i>UK Creative Industries Mapping Document</i>	Creative employment is measured by the total employment in each of the thirteen core creative sectors, considering both direct and indirect or supporting/non-creative activities in the process.	UK (1998): 5%
		DCMS (2001), <i>Creative Industries Mapping Document 2001</i>		UK (2001): 7%
		Boix et al. (2010), "The geography of creative industries in Europe: Comparing France, Great Britain, Italy and Spain"	Creative employment is measured using a method closely following the DCMS (2001) framework - industry-based approach	France: 4.5%; Great Britain: 5.7%; Italy: 5.6%; Spain: 4.1%
		Curran and Van Egeraet (2010), "Defining And Valuing Dublin's Creative Industries"		Ireland (2006): 6.8%
		White (2010), "Creative industries in a rural region: Creative West. The creative sector in the Western Region of Ireland"		Western Region of Ireland (2008): 3%
		Florida (2002a), <i>The rise of the Creative Class – and How it's Transforming Work, Leisure, Community and Everyday Life</i>		US (1999): 30.0%, of which: Super Creative Core: 11.7% Other Creative Class: 18.3%
			Creative Employment is determined on the basis of Florida's (2002a, 2004) definition of creative class: Super Creative Core; Creative Professionals; and Bohemians (see Section 2).	BROAD definition (including technicians) (2002): UK: 33.8%; Germany: 40.2%; Norway: 41.6%; Denmark: 41.8%; Finland: 41.0%; Sweden: 42.4%; Netherlands: 47.0%; United States: 27.3%; Canada: 38.1%
		Florida (2005a), <i>The Flight of the Creative Class: The New Global Competition for Talent</i>		NARROW definition (excluding technicians)(2002): UK: 20.1%; Germany: 20.1%; Norway: 18.8%; Denmark: 21.3%; Finland: 24.7%; Sweden: 22.9%; Netherlands: 29.5%
				United States: 23.6%; Canada: 25.0%
		Occupation-based approaches following Florida (2002a, 2004)	Under these approaches, estimates of creative employment cover all the creative occupations across all the industry sectors of the economy. This leads to a much broader perspective of the creative class , particularly because it includes all the creative professionals , a vast category that is present in almost all activity sectors. [Use of SOC codes]	Clifton (2008), "The 'creative class' in the UK: an initial analysis"
Clifton and Cooke (2009), "Creative knowledge workers and location in Europe and North America: a comparative review"	Estimation of Creative Employment in Europe, following Florida's (2004) creative class concept, although considering a "small number of occupations" in the "creative professionals" category (Clifton and Cooke, 2009: 79).			(2001): UK: 36.3%; Germany: 33.3%; Norway: 18.6%; Denmark: 27.6%; Finland: 33.4%; Sweden: 29.8%; The Netherlands: 52.4%
Boschma and Fritsch (2009), "Creative Class and Regional Growth: Empirical Evidence from Seven European Countries"	Estimation of Creative Employment in 7 European countries (Denmark, England and Wales, Finland, Germany, the Netherlands, Norway, and Sweden), following Florida's (2002a, 2004) definition of creative class.			7 developed European countries (2002): 37.7%, of which: Creative Core: 26% Creative Professionals: 70% Bohemians: 4%
Fritsch and Stuetzer (2009), "The geography of creative people in Germany"	Estimation of Creative Employment in West Germany, following Florida's (2002a) definition of creative class.			West Germany (2004): 36.8%

Methodological Approach	Characteristics	Author(s) Study	Methodology followed	Empirical results - Relative weight of creative employment in total workforce
Occupation-based approaches NOT following Florida (2002a, 2004) [Refinements of Florida's approach]	Here, refinements of Florida's (2002a) taxonomy are developed to restrict creative occupations to those that the authors believe are actually creative. [Use of SOC codes]	Gabe (2006) , "Growth of Creative Occupations in U.S. Metropolitan Areas: A Shift-Share Analysis"	Recasting of Florida's (2002a) concept, restricting the analysis of creative employment to <u>six categories</u> : "management; computer and mathematical; architecture and engineering; life, physical, and social science; education, training, and library; and arts, design, entertainment, sports, and media occupations".	USA urban (1999): 18.1%
		McGranahan and Wojan (2007) , "Recasting the Creative Class to Examine Growth Processes in Rural and Urban Counties"	Recasting of Florida's (2002a) measure, by the <u>exclusion of occupational categories</u> from the summary groups of 'Business', 'Educational' and 'Legal' occupations and by excluding the whole summary category of 'Healthcare' occupations.	Urban USA (2003): 30.9% Rural USA (2003): 19.4%
Combined industry- and occupation-based approaches following Florida (2002a, 2004)	Under these approaches, estimates of creative employment cover all the creative occupations across all the industry sectors + There is also a detailed analysis of the distribution of those creative workers across the industries or activity sectors [Use of SIC and SOC codes]	Mellander (2009) , "Creative and Knowledge Industries: An Occupational Distribution Approach"	Estimation of Creative employment, by studying the occupational structure within industries (private sector) in Sweden, and following Florida's (2002a) definition of creative class.	Sweden (2001): 36.8%
		Mellander et al. (2010) , "Occupational and Industrial Distribution in Denmark: A comparison study with the United States, Canada and Sweden"	Estimation of Creative employment, by studying the occupational structure within industries in Denmark, in comparison with the United States, Canada and Sweden, and closely following Florida's (2002a) definition of creative class.	Denmark(2007): 39.5%; USA (2005): 35.1%; Canada (2006): 30.9%; Sweden (2005): 43.0%
Combined industry- and occupation-based approaches NOT following Florida (2002a, 2004) [Mostly drawn upon the DCMS framework]	Under these approaches, estimates of creative employment are calculated by <u>all the occupations (creative occupations + non-creative/support occupations) in Core creative sectors</u> (specialist and support mode) + <u>All the creative occupations in non-creative sectors of activity</u> (embedded creative employment) [Use of SIC and SOC codes]	Higgs et al. (2008) , <i>Beyond creative industries: Mapping the creative economy in the UK</i> (coord. Higgs, P., Cunningham, S. and Bakshi, H.)	- The selection of 'core creative sectors' is mostly drawn from the <i>DCMS framework</i> ; - For creative employment, the authors develop the <i>Creative Trident</i> approach: CREATIVE employment = <u>specialist and support creative occupations in the 'specialized creative sectors'</u> - the <i>Core Creative industries</i> , or those dedicated to the 'pre-creation' and 'creation' stages of the process + All the <u>creative occupations in non-creative sectors of activity (embedded creative employment)</u> , namely, in sectors such as 'manufacturing', 'real estate', 'business activities', 'wholesale and retail trade', and 'financial intermediation'.	UK (2001): 7.1%
		Clark (2009) , "Crunching creativity: an attempt to measure creative employment"	Use of original DCMS framework with 2003 SIC codes (less specified industry categories). Use of a <i>SIC SOC matrix</i> with UK 2007 SIC codes formulation, which provide a more detailed specification of each industry's grouping category.	UK (2008): 5.5% UK (2008): 2.1%
		DCMS (2010a) , <i>Creative Industries Economic Estimates (Experimental Statistics) - December 2010</i>	DCMS framework combined with occupational data based on SOC system - Use of <i>combined industry and occupational approach</i> to measure the creative employment in the industry sectors of the UK. Creative employment is measured by: "Employment in the Creative Industries" + "Employment in creative occupations in businesses outside the Creative Industries" (DCMS, 2010a).	UK (2010): 7.8%

It is apparent from all the empirical literature reviewed (see Table 3) that the results obtained are highly dependent on how the creative class (i.e. the occupational groups included) is defined and/or the type of approach followed.

Industry-based approaches (DCMS, 1998, 2001; Boix *et al.*, 2010; Curran and van Egeraat, 2010; White, 2010) and combined industry- and occupation-based approaches, which do not follow Florida’s work (Higgs *et al.*, 2008; Clark, 2009; DCMS, 2010a), convey the smallest estimations for the size of creative class (\approx 5% of the total workforce). The figures for industry-based approaches range between 3% for the western region of Ireland in 2008 (White, 2010) and 7% for the UK in 2001 (DCMS, 2001), whereas in the case of combined industry- and occupation-based approaches the share of creative employment in total workforce reaches a minimum of 2.1% for the UK in 2008 (Clark, 2009) and a maximum of 7.8% for the same country in 2010 (DCMS, 2010a) (see Table 3).

The occupation-based approaches provide us with substantially higher figures. Accordingly, the creative class in the countries analyzed (mostly from Europe) encompasses about 30% of the total workforce (cf. Figure 1).

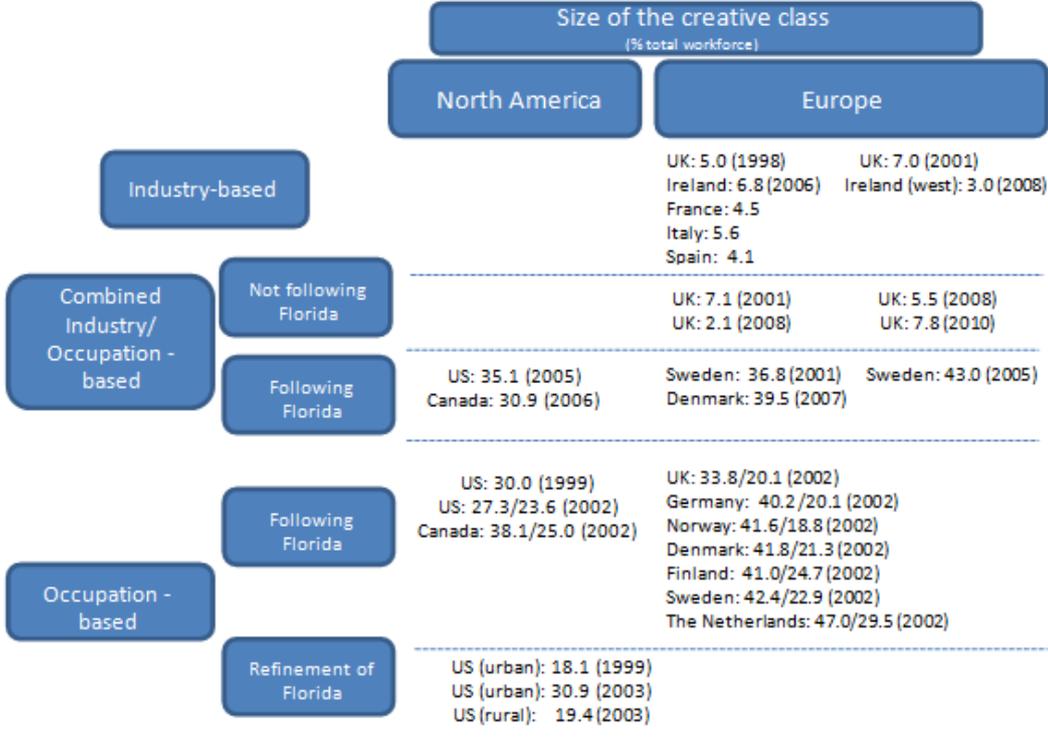


Figure 1: Size of the creative class

Source: Authors based on the papers summarized in Table 3.

In Europe, following the same conceptual methodology as Florida (2002a, 2004) with occupational data, the analysis by Boschma and Fritsch (2009: 397) of seven developed European countries for the year 2002, revealed a relative weight of creative occupations (including *Bohemians*) of “about 37.7 percent of the total workforce in the 7 European countries”. According to the authors, *creative professionals* represented the most important group, making up 70.0% of the entire creative workforce, the *creative core* made up about 26.0%, and the *Bohemians* were a smaller proportion of 4.0% (Boschma and Fritsch, 2009).

In a more recent publication on the occupation-based approach, Florida (2005a) compared the proportion of the creative class in national employment for 40 countries worldwide. The results obtained for 2002, using a broader definition of the creative class (which included technicians), were, for instance, 33.8% in the UK and 40.2% in Germany, and 20.1% for both countries using the narrow definition (excluding technicians).

Hence, by including vast categories such as creative professionals and technicians,⁵ Florida’s (2002a, 2004, 2005a) definition of creative class is actually a broadened concept and leads to high estimates of the creative workforce in the total employment of regions or countries. This is clearly corroborated by the empirical results of all the studies following the same conceptual methodology as Florida (2002a, 2004) (see Table 3 and Figure 1). On the other hand, industry-based approaches seem to lead to more modest figures for creative employment since they focus on specialized core sectors of the creative economy. All the empirical studies which draw on the DCMS framework (e.g., Higgs et al., 2008; Boix et al., 2010; Clark, 2009; DCMS, 2010a) report much more deflated figures for creative employment than do studies employing vast and broader definitions of the creative class, such as Florida (2002a, 2005a) and all those following his approach (e.g., Clifton, 2008; Boschma and Fritsch, 2009; Fritsch and Stuetzer, 2009; Mellander, 2009; Mellander *et al.*, 2010).

Florida (2002a: 68) identifies creative workers as those “whose function is to create meaningful new forms”. A vast, wide category of occupations thus easily fits this labelling. In truth, the main contribution of Florida (2002a) was the analysis of creative workers’ location choices rather than an accurate distinction of “who should or should not be included in the creative class” (Clark, 2009: 220). But studies using the DCMS framework combined with occupational data are not free from limitations either. Although the focus on the creative core is a serious attempt to establish what and who is really creative there is lack of objectivity on

⁵ Managers, high-end sales professionals, legal, healthcare practitioners, etc.

how proportions of each SIC and SOC code are determined to estimate the contribution of creative activities in terms of employment, gross value added or the number of businesses (Clark, 2009). The next section documents these aspects in more detail.

3. Methodological underpins: mapping the distinct methodologies in literature

We undertook an extensive mapping of the existing approaches in literature to measure and quantify the creative class based on the most recent occupational classifications (CPP2010⁶), with a maximum detail of 5-digit codes, and the International Standard Occupational Classification (ISCO-08),⁷ at 4 digits.⁸

3.1. The DCMS traditional industry-based/SIC approach

The methodology used to map creative industries for this particular exercise followed the information on creative industry sectors available in the technical note of the DCMS (2010b) report.⁹ Its methodological details, from the selection of the sectors to the industry codes that were included, corresponded to the taxonomy on creative sectors inspired by the original DCMS (1998, 2001) reports.

So that this mapping would be as accurate as possible we used detailed *5-digit* industry codes, the maximum resolution of the latest Portuguese classification on economic activities,¹⁰ *CAE - Rev. 3*. We also used the *International Standard Industrial Classification - Rev. 3.1* codes, compatible with the *UK SIC 2003* codes presented in the DCMS (2010b) technical note. To make a suitable correspondence between these codes and our nomenclature on industries, we converted all the *ISIC - Rev. 3.1* into the latest *ISIC - Rev. 4* codes, which have an appropriate compatibility with the structure of our *SIC* system, *CAE - Rev. 3* (see Table A1).¹¹

According to the DCMS (2010b) methodology, the industry sectors mapped were grouped into the following segments: ‘Advertising’; ‘Architecture’; ‘Arts and Antiques’, ‘Crafts’;

⁶ *CPP2010 - Classificação Portuguesa das Profissões de 2010*, the *Portuguese Classification of Occupations of 2010*, is compatible with *ISCO-08*, and is available online at: <http://metaweb.ine.pt/sine/> [accessed April 2012].

⁷ *ISCO - 08* codes are available online at: <http://www.ilo.org/public/english/bureau/stat/isco/> [accessed April 2012].

⁸ The detailed mapping of the approaches is presented in Appendix: http://fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.

⁹ Since the recent DCMS (2010b) report is in fact an updated version of the official industry-based framework, and to the best of our knowledge there are no publicly available methodological notes on the first DCMS (1998, 2001) industry-based reports, we used the technical note of the DCMS (2010b) report, mapping only the part corresponding to the core creative industries - where the DCMS used UK SIC 2003 codes - in order to analyse the traditional DCMS industry-based approach.

¹⁰ *Classificação das Actividades Económicas* or *CAE - Rev. 3*, the most recent revision is available online at: <http://metaweb.ine.pt/sine/> [accessed April 2012].

¹¹ Tables A1 is in Appendix, in http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

‘Design’; ‘Designer Fashion’; ‘Video, Film & Photography’; ‘Music and the Visual & Performing Arts’; ‘Publishing’; ‘Software, Computer Games & Electronic Publishing’; and ‘Radio & TV’. Following this approach, in the segments of ‘Architecture’, ‘Arts and Antiques’, ‘Designer Fashion’, ‘Video, Film & Photography’, ‘Music and the Visual & Performing Arts’, and ‘Publishing’, only a portion of the relevant industrial codes was taken, in order to capture the *creative* component of the activity sector. Given that these sectors also incorporate a large number of technical, administrative or functional activities, empirically, this portion corresponded to the number of workers operating in the creative activities of these industry sectors.

In the Crafts segment, no *SIC* codes were included by the authors of the DCMS report. In this case, “the majority of businesses was too small to be picked up in business surveys” DCMS (2010b: 2). Handicraft activities cannot be accurately described by using industry classification systems and business surveys, too, fail to extract information on these activities, since they are mainly developed in small and micro economic units. Despite that, and given the interest in capturing some traditional manufacturing activities, we have considered industrial codes that best represented craftwork and traditional trades in our context, such as ‘ceramics’, ‘glass products manufacture’, ‘production of wooden articles’ and ‘jewellery’, but in a small proportion of each code (5%).¹² This helped to some extent to assess some of the potential importance of those activities in this framework.

The mere use of industrial/*SIC codes*, the consideration of a restricted number of industry sectors in the creative core and the degree of arbitrariness in the portions attributed to each industrial code have been generally criticized in the literature (e.g., Markusen et al., 2008; Clark, 2009). Furthermore, the basic consideration of creative employment as the number of workers operating inside a core of creative sectors, overlooking the creative activities that are developed outside that established core, was found to be a major limitation of this approach and of simple industry-based approaches, in general.

When using this approach to map and estimate the real figures for creative activities in our context, even though we used codes with their maximum detail of 5 digits, not only limitations of the *SIC* system used, but also the application of portions to industry codes according to the DCMS approach, demonstrated to be quite restricting on the fair assessment of creative employment.

¹² The average portion of 5% was in line with figures already reported in the empirical literature, such as the *World Intellectual Property Organization* (WIPO) studies, available online at: http://www.wipo.int/ip-development/en/creative_industry/economic_contribution.html [accessed April 2012].

3.2. Florida's occupation-based/SOC approach

The second wave of methodologies to analyze creative employment has focused on occupations rather than on industrial sectors. The most influential occupation-based approach was developed by Florida (2002a, 2004). In it, all the creative occupations throughout the activity sectors of the economy were extensively scrutinized and categorized into two major groups: the Core Creative Group and the Creative Professionals.

In the Super Creative Core - which comprises all the occupations in artistic fields, such as performing arts, media, entertainment or design activities, and scientific domains such as science, engineering, architecture and education - we included all the professions considered to be directly engaged in the creative process, according to Florida (2002a). Hence, all the occupational categories relative to 'Computer and mathematical occupations'; 'Architecture and engineering occupations'; 'Life, physical and social science occupations'; 'Education, training and library occupations'; and 'Arts, design, entertainment, sports and media occupations' have been selected (see Table A2).¹³

Although Florida (2002a) uses broad summary occupational categories in his definition, we mapped his approach using *ISCO-08* codes with their maximum detail of 4 digits and our occupational nomenclature *CPP2010* at a 5-digit level to assure greater precision for and detailed information on this scrutiny. All the codes were estimated in their whole proportion (100%), corresponding to the total number of workers in each occupational category considered, in all the activity sectors of our economy.

The broader group of Creative Professionals, a class of technicians whose main purpose is to deal with daily problem resolution in a variety of knowledge-based segments such as "high-tech sectors, financial services, the legal and healthcare professions, and business management" (Florida, 2002a: 69), was also comprehensively mapped. During this exercise, it was noticeable that these professionals generally had a high academic background and they were highly skilled workers in their category. Here, a vast group of professions and their occupational codes were considered for a wide variety of fields: 'Management occupations'; 'Business and financial operations occupations'; 'Legal professionals'; 'Health professionals (except nursing)'; 'Nursing and midwifery professionals'; 'Life science and health associate professionals'; 'Physical, chemical, construction and engineering sciences associate professionals'; and 'Finance and sales associate professionals' (see Table A2).

¹³ Table A2 is in Appendix, in http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

Despite the practical simplicity of this approach and the interesting focus on studying occupations instead of industry sectors, certain shortcomings were detected. When mapping Florida's (2002a) occupational approach, we found three evidential findings that corroborated critiques already levelled at this author, as presented in Section 2: i) the use of vast, wide-ranging and summary category groups, which often overlooked the detail of each occupation present in the broad categories included; ii) the correlation between occupations considered as creative and highly skilled, educated professions; iii) the absence of handicraft workers, crafts occupations, and skilled labourers related to traditional, artisanal or hand-made activities, which Florida does not consider in his definition.

4.3. Occupation-based/SOC approaches following Florida's taxonomy

Closely following Florida's (2002a, 2004) approach, Boschma and Fritsch (2009) present a similar taxonomy for delimiting the creative class. Accordingly, when mapping their approach, we considered all the occupations in summary categories related to 'Computing', 'Science', 'Architecture and Engineering', 'Health (except nursing)' and 'Education', as being part of the *Creative Core*. *Creative Professionals* included all summary categories in the fields of 'Management and Legislation', 'Nursing', 'Business and Administration', 'Legal services', 'Administrative work', and 'Personal and Social services'. Finally, in *Bohemians*, all the occupational categories related to 'Arts, Design, Entertainment, Sports and Media' activities were considered (see Table A3).¹⁴ The mapping of this approach was quite similar in structure to that presented in the case of Florida (2002a), leading to a comprehensive categorization of the creative occupations. In addition to the categories that were presented by Florida, the Boschma and Fritsch (2009) categories also included the 'Administrative Associate professionals' in the segment of *Creative Professionals*. In Florida (2002a), these occupations appeared in the non-creative *Service Class*. This obviously led to more inflated results when compared to those obtained by using Florida's approach.¹⁵

All the approaches which closely follow Florida's taxonomy had the same characteristics and the same limitations mentioned above, especially those related to the use of broad summary category groups in their definition of the creative class.

¹⁴ Table A3 is in Appendix, in http://fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.

¹⁵ Another recent study closely following Florida's approach is that by Mellander *et al.* (2010), who used Florida's definition of the creative class to study the occupational structure by type of industry - the mapping procedure is rather similar to Florida's approach.

3.4. Occupational-based/SOC approaches - refinements of Florida's taxonomy

McGranahan and Wojan (2007) undertook a detailed analysis of all the summary occupational groups in Florida's taxonomy and proposed a refinement approach on the basis of the *creativity* required by each professional activity. The recasting was based on the information from a publicly available database - the U.S. *O*NET* database - which features the creativity level involved in each occupation, described by the proxy "Developing, designing or creating new applications, ideas, relationships, systems or products, including artistic contributions"¹⁶ (see McGranahan and Wojan, 2007: 201).

We mapped this refinement approach of McGranahan and Wojan (2007) by excluding all those that were regarded by the authors as less creative occupations in the summary categories fully accounted by Florida (2002a). Hence, in 'Management occupations', we removed all the occupations related to 'farmers and farm managers'. From 'Healthcare practitioners and technical occupations', all the categories were excluded. In 'Education, training, and library occupations', only 'post-secondary teachers' and 'librarians, curators and archivists' were included. In 'Business and financial operations', only 'accountants and auditors' were considered. In 'Legal occupations', only 'lawyers' were included. From 'Life, physical and social science occupations', we excluded all the associated technicians. The summary category of 'Computer and mathematical occupations' was taken into account in full. The summary group of 'Architecture and engineering occupations' was also fully included in the recast measure. All the occupations related to 'Arts, design, entertainment, sports, and media' activities were wholly accounted. And finally, in 'High-end Sales', all the occupational codes related with 'sales representatives' and with the residual category of 'other sales and related occupations, including supervisors' were included (see Table A4).¹⁷

Since the code descriptions used by the authors on their recasting - *US SOC 2000* - and the occupational nomenclatures that we used - *ISCO-08* and *CPP2010* - did not match exactly, the codes to be considered in this mapping were selected according to our interpretation of McGranahan and Wojan (2007) and of their refinement criteria, based on the *O*NET database* of occupations.¹⁸ By the same token, the descriptions of major category groups considered in our Appendix may differ slightly from those presented in McGranahan and

¹⁶ Despite the use of more objective criteria on the selection of creative occupations, McGranahan and Wojan (2007: 200) state that the "creativity measure provides a quantitative, though arguably imperfect, reference for assessing the creativity requirements among summary occupations".

¹⁷ Table A4 is in Appendix, in http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

¹⁸ Available online at: <http://www.onetonline.org/find/> [accessed April 2012].

Wojan (2007), but all the codes included properly describe the refined measure developed by these authors.

Another refining approach of Florida's taxonomy of creative occupations was developed by Gabe (2006), who proposed to focus on Florida's *Super Creative Core*, to which he also added all the management occupations. Thus, on mapping this approach we included all the detailed 5-digit occupational codes which make up the summary categories of 'Computer and mathematical occupations', 'Architecture and engineering occupations', 'Life, physical and social science occupations', 'Education, training and library occupations', 'Arts, design, entertainment, sports and media occupations', 'Media and communication equipment workers', and all 'Management occupations' (see Table A5).¹⁹ These categories seemed pretty much the definition of Florida's (2002a) *Super Creative Core*.

Although relying upon more objective criteria in the selection of creative occupations, based on the *O*Net* occupational database, these approaches may be also conflating human capital with creativity. This is supported by the fact that they *only* suggest a recasting of the summary categories present in Florida's definition. These occupational groups had already been subject to criticism (see Glaeser, 2005) and the authors did not go beyond those categories in their refinement approaches. 'Jewellers', 'hand sewers and seamstresses', 'fabric and apparel patternmakers', 'precious metal workers', 'painting, coating, and decorating workers', 'potters', 'pre-press technicians', and other skilled workers in a vast array of manufacturing sectors (e.g., printing sector, wood, glass, ceramics, furniture, textiles), with professional activities that may also require creative thinking according to the *O*Net* database, seem to be absent from these refinement approaches.²⁰

3.5. Combined industry and occupation-based/SIC-SOC approaches

The Creative Trident approach

The *Creative Trident* method presented by Higgs *et al.* (2008) proposes to measure creative employment by taking into account three types of creative workers: i) *Specialist creative workers*, who all work in the defined creative occupations operating in the selected creative industrial sectors; ii) *Support workers*, who are employed in all the non-creative occupations, but are engaged in support activities - such as management, administrative, technical - in the

¹⁹ Table A5 is in Appendix, in http://fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.

²⁰ We undertook a detailed analysis on the categories that were recast by McGranahan and Wojan (2007: 201) and the structure of the US *SOC 2000* codes of the *U.S. Bureau of Labour Statistics*, using the information available online at: <http://www.bls.gov/soc/2000/socstruc.pdf> [accessed April 2012].

creative sectors; and iii) *Embedded creative workers*, who comprise all those in the defined creative occupations in non-creative sectors of the economy. The sum of these three modes or types, in the selected creative occupations and industry sectors, gives the *total creative employment* in the economy, according to this methodology.

The Creative Trident approach has been mapped using the methodological details described by the authors in the technical appendix of their report (see Higgs *et al.*, 2008: 59-61). To achieve the best possible accuracy in this mapping, we used our most recent industry codes - *CAE - Rev. 3* - at the maximum detail of 5-digit level, compatible with the latest international *ISIC - Rev. 4* codes of 4 digits, to describe all the industry sectors that best corresponded to the creative industries defined by Higgs *et al.* (2008). To define the core creative sectors, Higgs *et al.* (2008: 27) took as a departure point the Frontier Economics (2007) framework, and selected all those industries directly involved in “the pre-creation and creation stages of the value chain”, which they called the “creative core”.

Although the Creative Trident approach differs from the recent industry and occupational approach of DCMS, basically at the level of improvements included,²¹ the selected creative sectors were aligned “with the 13 sectors that make up the official DCMS measure of the creative industries” (Higgs *et al.*, 2008: 19), which permits direct comparisons between these approaches. The defined core creative sectors covered the following segments: ‘Advertising and Marketing’; ‘Architecture’, ‘Visual Arts and Design’; ‘Film, TV, Radio and Photography’; ‘Music and Performing Arts’; ‘Publishing’; and ‘Computer Software’ (see Table A6).²²

During the mapping exercise, even though a suitable correspondence was found between the different industrial nomenclatures used,²³ it was difficult to thoroughly describe the creative activities in some of the codes included by Higgs *et al.* (2008), particularly those related to all-inclusive or residual categories such as ‘Other entertainment activities’ or ‘Recreational, cultural and sporting activities not otherwise specified’. On the other hand, the set of creative occupations has been mapped according to those defined by Higgs *et al.* (2008) as corresponding to all workers whose primary purpose was engagement in *creative functions*

²¹ Higgs *et al.* (2008) excluded some industry sectors and some occupations considered by the DCMS industry and occupational approach as being creative. They also added other industries and professions to their definition of Creative Core that were not considered by the DCMS industry and occupational approach. For further details see Higgs *et al.* (2008: 27-30).

²² Table A6 is in Appendix, in http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

²³ Higgs *et al.* (2008) used *UK SIC 2003* codes to describe the selected core creative sectors. We used the recent *ISIC - Rev. 4* codes and our national nomenclature *CAE - Rev. 3* for economic activities.

and who were directly involved in the *production and creation stages*. In their definition, Higgs *et al.* (2008: 28) included: i) “those engaged in producing primary creative output - for example, writers, musicians, visual artists, film, television and video makers, sculptors and craftspeople”; ii) “those engaged in interpretive activity - for example, performers interpreting works of drama, dance, music, etc. in a wide variety of media from live performance to digital transmission via the Internet”; and iii) “those supplying creative services in support of artistic and cultural production - for example, book editors, lighting designers, music producers, etc.”.

We mapped all the occupational codes according to the nomenclature *UK SOC 2000* followed by Higgs *et al.* (2008: 60) in their technical appendix, and using the corresponding codes of the latest international *ISCO-08* system with a 4-digit detail, and of our most recent occupational nomenclature *CPP 2010* at the maximum detail of 5-digit level (see Table A6). The respective estimations of this SIC-SOC approach were carried out by considering the whole proportion (100%) of each industry and occupational code that was included in our mapping, according to Higgs *et al.* (2008). Likewise, the methodology for estimating creative employment applied the *Creative Trident* approach, by computing the total *Specialist* and *Support* workers in each defined creative sector plus the *Embedded creative* workers, i.e., those in the selected creative occupations, but operating in all the non-creative sectors of the economy.

The recent DCMS methodology

As with the Creative Trident approach, all the creative workers operating outside the defined core creative sectors are taken into account, besides the total employment in the selected creative industries.

We mapped this approach according to the technical note of the recent DCMS December 2010 report on the Creative Industries Economic Estimates (DCMS, 2010a). The selection of creative sectors followed the original *DCMS* framework, which distinguishes between the following segments: ‘Advertising and Marketing’; ‘Architecture’; ‘Arts and Antiques’; ‘Crafts’; ‘Design’; ‘Designer Fashion’; ‘Video, Film, and Photography’; ‘Radio and TV’; ‘Music and the Visual & Performing Arts’; ‘Publishing’; and ‘Software and Electronic Publishing’ (see Table A7).²⁴ In this mapping, we used the latest international *ISIC - Rev. 4* codes at 4 digits and the corresponding national industry codes - *CAE - Rev.3* - at the maximum detail of 5-digit level, to describe all the industry sectors that best matched the core creative industries defined by DCMS (2010a).

²⁴ Table A7 is in Appendix, in http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

According to DCMS (2010a), where industry sectors that were considered as creative also comprised non-creative activities only a portion of the code was accounted in the estimations. This was the case of ‘Photographic activities’, where only 25% of the code was considered, and the case of the vast number of manufacturing codes on ‘Textiles and apparel’, where a portion of only 0.5% was taken to describe Fashion Design activities. The proportion that was taken represented an attempt to extract only the creative employment in those economic sectors.

The industry code describing Design activities was, in accordance with DCMS (2010a), divided among three major segments: 4.5% of the code was included in the ‘Architecture’ segment, 89.7% was integrated in the ‘Design’ segment, and the remaining 5.8% was incorporated into ‘Designer Fashion’. This partition allowed for a better differentiation of the Design activities and did not affect the overall result since the code as a whole is considered in the total calculation of the creative employment in all the creative industries. Worthy of note is the ‘Crafts’ sector, where, according to DCMS (2010a), no industry codes were considered, given that the *SIC* system can hardly describe handicraft and craftwork activities. Here, only a set of creative occupations was defined by using the *SOC* nomenclature, in order to extract the number of handicraft workers across the sectors of the economy. Then the estimation for the total employment in creative industries was given by the sum of all the workers operating in the defined creative sectors.

In order to estimate the number of creative workers outside the core creative sectors, DCMS (2010a) presented a selection of creative occupations using the *UK SOC 2000* codes that best fitted those professional activities, in each creative sector. On mapping these occupations, we used the latest international *ISCO-08* codes, with 4 digits and the corresponding national occupational codes of the *CPP 2010* at the 5-digit level (see Table A7). Following DCMS (2010a) in the cases of skilled workers operating in the manufacturing sectors, such as ‘labourers in building and woodworking trades’, a portion of only 5% of the respective occupational codes was included in the estimations. This portion was intended to capture only the number of creative workers inside those vast occupational categories. In the case of ‘Product, Clothing and related designers’, a portion of 93.9% of the respective occupational codes was considered in the segment of ‘Design’ and the other 6.1% was included in ‘Designer Fashion’. In the overall estimate of total creative employment, product and garment designers were fully accounted.

The DCMS (2010a) approach has brought some necessary updates to its original framework for the analysis of creative industries. By making use of occupational codes, this approach provided a better suited and more complete analysis of creative employment since it now takes into account all the creative workers operating outside the Creative Core. It also attempted to extract only the creative component in the activities included in the Core, by using portions of codes. It considered Crafts occupations in the analysis and also presented a clearer differentiation between the creative sectors (e.g., Design vs. Designer Fashion) through the partition of industry and occupational codes. However, the use of established portions and partitions of *SIC* and *SOC* codes to determine the creative component in each industrial activity or each professional category may lead to biases in the estimates, since these proportions vary over time, depending on changes in the industrial and occupational structure. Furthermore, in practice this is a complex methodology to adapt. The estimation of this approach, considering its details on codes, partitions and portions taken, turned out to be anything but simple during the programming task on the extraction of data by each code.

Despite the challenges that the combination of data on industries and occupations brought to our mapping exercise and the relevant estimations, especially when compared with simple occupational-based approaches, these methodologies actually afforded a richer perspective on the creative economy by extending the analysis beyond the core creative sectors to include the creative employment existing across all the non-creative sectors of the economy.

However, given that these approaches use both industry and occupational codes, the limitations of *SIC* systems sometimes hindered the accurate correspondence between all the codes defined by the authors and those that we employed in our mapping, even using the latest international classification, *ISIC - Rev.4*, and the most recent national nomenclature, *CAE - Rev. 3*, with codes at their maximum level of detail. In addition, a better clarification is needed of the process of how the portions and partitions must be adapted to the respective *SIC* and *SOC* codes in each context of analysis.

4. Estimating the creative class using Portugal as the baseline case

4.1. The existing methodological approaches

The data on Portugal was extracted from the *Matched Employer-Employee Databases* of the DGEEP²⁵ of the Ministry of Labour and Social Solidarity of Portugal for 2009 (the latest

²⁵ Courtesy of the DGEEP - *Gabinete de Estratégia e Planeamento* of the Ministry of Labour and Social Solidarity (*Ministério do Trabalho e da Solidariedade Social - MTSS*) of Portugal, October - December 2011.

available). It covers all the employment in industries and establishments operating in the national territory - mainland Portugal and Autonomous regions - except for Public Administration and Domestic services. According to this dataset, the total employed population in 2009 was 3.128.126 workers.

One characteristic of this database is that it provides information that can be considered appropriate for our analysis on creative employment since a vast number of creative occupations operate outside the Public Administration. One limitation is that it does not provide information on freelance activities or self-employed workers, who contribute to a significant part of the creative economy.

All the estimated figures have been extracted code by code, through an intensive programming task using STATA 11® statistical analysis software.²⁶ The stage at which we proceed to the estimates was also a challenge to this research work, given the limitations of the *SOC* system that was used to extract the data available for the year 2009 from our employment datasets.²⁷ The conversion of all the *CPP2010* occupational codes into the previous version of *CNP94* was based on the instructions in the official report by Statistics Portugal (INE) (2010: 460-474) on the *Portuguese Classification of Occupations 2010*. The codes and descriptions using the previous nomenclature - *CNP94*, at 6-digit level, were extracted, code by code, from the Statistics Portugal (*INE*) official website.

Even using highly disaggregated codes it was not always easy to make a proper correspondence between the two *SOC* classification systems. This was particularly evident in the occupational categories of ‘Designers’, where the recent *CPP2010* provided a distinct set of codes to differentiate ‘Industrial/Equipment designers’; ‘Textile and Fashion designers’, ‘Interior, Spaces and Environment designers’, and ‘Graphic and Multimedia designers’. These occupations were mostly missing from the previous classification *CNP94*, resulting in a poor

The DGEEP is not responsible for the results and their interpretation contained in this study. These are the full responsibility of the authors.

²⁶ Official information about STATA 11 statistical software is available online at: <http://www.stata.com/stata11/> [accessed April 2012].

²⁷ At the time the estimations were undertaken - from October to December 2011 - the nomenclature in use to extract 2009 data was still the previous version of occupational codes corresponding to the *CNP94* (*Classificação Nacional de Profissões - 1994*). Besides facing the already known difficulties related to more obsolete classification systems - the lack of information/*SOC* codes on the different categories of *Designers*, or the unavailability of occupational codes which were non-existent or not relevant at the time of that previous revision (e.g., Graphic designer, Interior designer, Survey and market research interviewer) - this constraint also required the exhaustive and time-consuming task of converting all the *CPP2010* codes with 5 digits that were used in the mapping into the previous *CNP94* codes at the maximum detail level of 6 digits, in order to capture the most precise information possible. Indeed, given that to achieve the best correspondence possible between the latest occupational revision *CPP2010* and the previous nomenclature for occupations *CNP94*, it was necessary to look into the detail of 6-digit codes, in every single case.

conversion of the *CPP2010* 5-digit codes into the 6-digit codes of the *CNP94*. For instance, the *CPP2010* code describing ‘Graphic Designers’ was converted into the *CNP94* codes for ‘Animators (animation cinema)’, ‘Viewers – Advertising’, and ‘Illustrators’, according to the instructions followed in the guide from Statistics Portugal (2010).

The estimates of the *creative class* in Portugal, using each approach described in Section 3, are summarized in Figure 2.

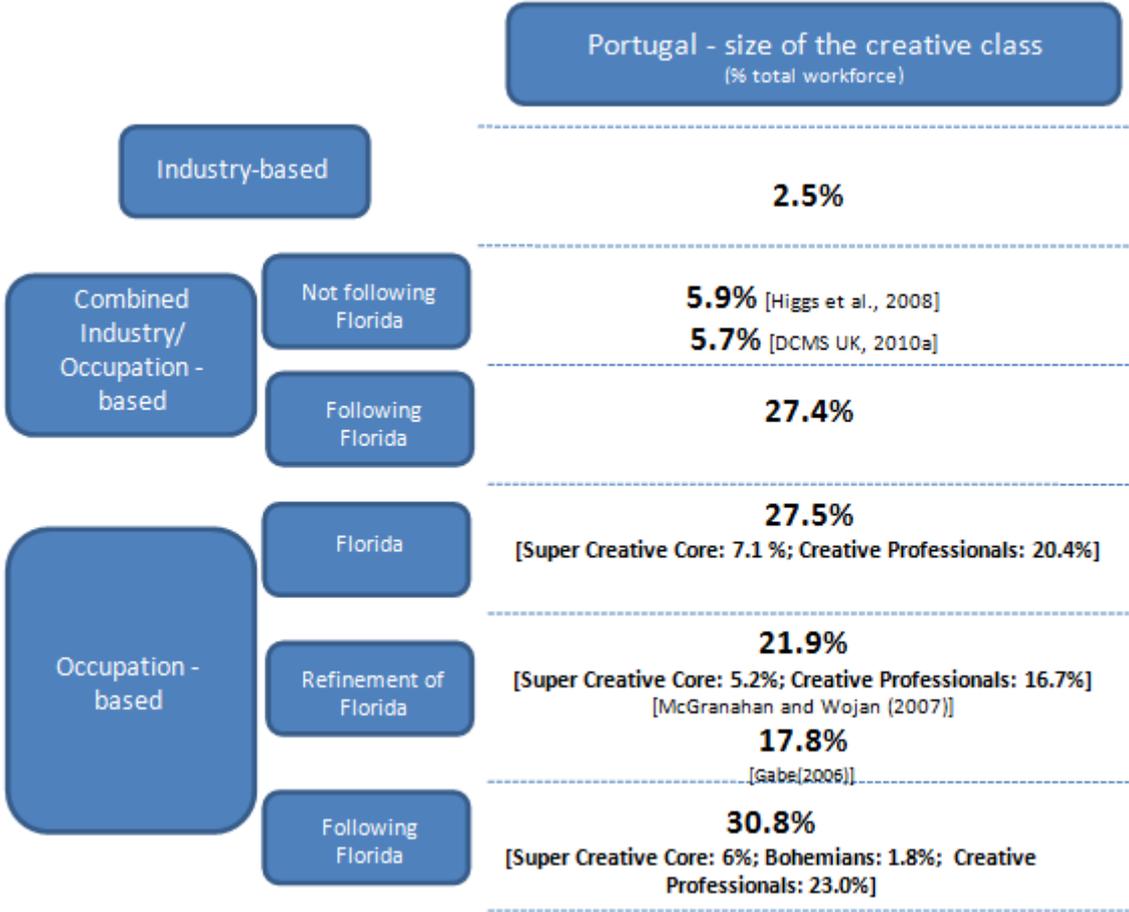


Figure 2: Size of the creative class in Portugal, 2009

Source: Computations by authors based on data from *Quadros de Pessoal* (total employment: 3.128.126 individuals)

Occupational approaches based purely on the analysis of occupational/SOC categories and following Florida’s (2002a) taxonomy led to more inflated results than those obtained by using simple industry-based/SIC or combined industry-occupational/SIC-SOC approaches. Accordingly, the Portuguese creative class ranges between 17.8% and 30.8% of the total employment in the first case, and between 2.5% and 5.9% in the second. Specifically, using the industry-based/SIC approach associated with the traditional DCMS model the estimates for the Portuguese creative class amount to a fairly negligible figure of 2.5% of the total employment (cf. Figure 2). Recall that this approach only takes into account the employment

within the selective core of creative sectors, and with the application of portions of codes to extract the creative labour in those sectors. At the other extreme, using Florida's taxonomy, the estimate for the Portuguese creative class reaches 27.5% of total employment (with the Super Creative Core accounting for 7.1% and the broad group of Creative professionals with a share of 20.4%). The approaches that closely follow Florida's definition, such as the one adapted by Boschma and Fritsch (2009) and Fritsch and Stuetzer (2009), also provide inflated estimates for the creative class, which accordingly represents 30.8% of total Portuguese employment in 2009. This figure exceeded that obtained using Florida's (2002a) methodology since the authors included the 'Administrative Associate professionals' in their broad category of Creative professionals, whereas for Florida (2002a) these occupations appear in the non-creative Service Class.

Considering the refinement approaches proposed by McGranahan and Wojan (2007) and by Gabe (2006) on Florida's taxonomy, estimates lead to lower relative weights of the creative class of, respectively 21.9% and 17.8%. In their refined measure McGranahan and Wojan (2007) excluded the vast categories of 'Health professions', 'Legal workers' and 'Teaching occupations' that were considered by Florida (2002a) and which they considered to be less creative.²⁸ The results obtained using Gabe's (2006) approach shows that if we exclude all the 'Management occupations' from the estimates this would lead to a share of 7.6%, not very far from the one obtained for the Super Creative Core (7.1%) using Florida's (2002a) approach.

Using the most recent approaches that combine industry and occupational data, we find that using a methodology closely following Florida's (2002a) definition, across all the industry sectors of the economy - the one used by Mellander *et al.* (2010) - the estimate of Portuguese creative class amounts to 27.4%, a very similar figure to that obtained with Florida's (2002a) approach.

The two of the most recent approaches that combine industry and occupational data in terms of a *SIC-SOC* matrix - Higgs *et al.* (2008) and DCMS (2010a) - consider the creative workers operating inside the creative industry sectors, the support workers in those creative industries, and the creative employment that can be detected across all the non-creative industry sectors of the economy. Using the Creative Trident approach (Higgs *et al.*, 2008), Portuguese creative employment amounts to 5.9%. The DCMS (2010a) approach gives a very similar figure

²⁸ In Portugal the discrepancy between the estimates using Florida's (2002a) approach and that obtained using McGranahan and Wojan's (2007) refinement method was not very substantial because our dataset excludes the workers in Public Administration, and a large majority of those *excluded* occupations, namely, *health*, *education* and *legal* professions, generally operate in the public sector in Portugal.

(5.7%). These estimates are higher than that of the purely industry-based/SIC approaches since this combined approach includes all the creative workers working outside the creative industries, in addition to those operating in these sectors.

4.2. An adapted approach for measuring the creative class in Portugal

Our methodological proposal is inspired in the most recent combined SIC-SOC approaches developed by Higgs *et al.* (2008) and DCMS (2010a). However, we adapted these methods so as to include an appropriate selection of industry sectors (SIC codes) and occupational activities (SOC codes), which takes into consideration the particularities of the Portuguese context.

The core creative industries and creative occupations were selected on the basis of sectors and activities whose primary purpose is to create, produce and directly support the creation of novel ideas, solutions, creative goods or services. For *core creative industries*, in line with Higgs *et al.* (2008) and the DCMS (2010a) report, we concentrated our analysis on the *pre-creation and creation stages* of the value chain, the inner layers considered in Frontier Economics (2007). This was envisaged as the Creative Core, in which the creative activity had the most significant expression. It also included all the activities related to preservation, archive and the collection of original works, sites and monuments.

The sectors selected were mapped using the latest *ISIC - Rev. 4*, 4-digit codes and *CAE - Rev. 3* codes with 5 digits, and grouped into the following segments: ‘Advertising and Marketing’; ‘Architecture’; ‘Design and Visual Arts’; ‘Crafts’; ‘Film, Video and Photography’; ‘TV and Radio’; ‘Music and the Performing Arts’; ‘Publishing’; ‘Software & Electronic publishing and Computer programming and consultancy’; and ‘Research and Development’ (see Table A8).²⁹

In line with the DCMS (2010a) SIC-SOC approach, *Crafts* were also included in our selection since they comprise the creation of handicraft works and hand-made productions, and also because we wanted to capture the creative workforce in traditional manufacturing activities in Portugal, i.e., ‘ceramics’, ‘glass’, ‘woodwork’, ‘textiles’, and ‘jewellery’. The activities in this sector were only mapped in terms of occupational/SOC codes, since the Portuguese industrial/SIC codes of *CAE - Rev. 3* refer to manufacturing industries that do not properly describe craftwork or handicraft activities. This is an advantage of using a SIC-SOC approach, combining data on industries and occupations: as no SIC codes matched craft

²⁹ Table A8 is in Appendix, in http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

activities, all the handicraft workers have been captured by using occupational/SOC codes, which overcame the limitations of the simple industrial classification.

In certain cases only a small portion, 5%, of the SOC code was taken in order to capture the creative workforce in vast occupational categories mostly consisting of skilled labourers in manufacturing activities. This was the case of ‘*Potters*’ in the ceramics industry, of ‘*Glass makers, cutters, grinders and finishers*’, in the glass industry, and of ‘*Cabinet-makers*’, in the woodworking trades. The percentages of 5% applied in these cases were in agreement with those presented by the DCMS (2010a) SIC-SOC approach. They were only intended to provide an idea of the creative potential in those manufacturing activities. Also in *Crafts*, we considered the all the categories under ‘Tailors, dressmakers, furriers and hatters’, since these workers are mainly dedicated to custom-made garment and traditional textile trades. In *Architecture*, only architectural activities were fully taken into account. All those related to *Engineering and technical services* were excluded since they are mainly related to functional and technical activities which do not occur at the creation or pre-creation stages. In *Publishing*, the ‘Printing’ sector was excluded from our core creative sectors, since it comprised many technical printing activities not considered as creative in our sense.

Since we assumed that the creative process involved not only artistic and cultural creativity but also scientific and analytical creative outputs, in the form of literary, academic, and scientific works, we also included the Research and Development (R&D) sector, dedicated to the production of scientific and technological creative contents, in addition to the traditional creative sectors. We excluded from the analysis all the Business, Legal, Health, High-tech, Distribution and commercialization (such as wholesale, retail sale or rental services) sectors, as well as Sports and related activities, since they are not primarily dedicated to creative activities occurring at the pre-creation or creation stages, and also because they led to distorted results in the overall analysis, due to their large size.

For the creative occupations, as with the selection process for industries, the focus was on all the workers directly operating in the pre-creation and creation stages of the creative process. We therefore selected all the professional activities: i) *directly involved in the production of creative contents* and original artworks, such as visual artists, crafts workers, motion picture, video and photography producers, musicians and composers, writers and editors, etc.; ii) *dedicated to creative interpretation*, such as performing artists, dancers, actors, etc.; iii) *engaged in the production of functional and creative outputs*, such as architects, designers, etc.; iv) *providing creative services* which help in the promotion, documentation, access and

dissemination of creative contents, such as advertisers and marketers, editors and publishers, librarians and archivists, computer and software professionals, media broadcasting technicians, etc; and those v) *directly involved in the scientific/analytic research*, such as scientists and other related intellectual activities.

We also took into consideration the arguments presented by McGranahan and Wojan (2007) on the selection of creative occupations. We considered their criteria as a significant effort to lend more objectivity to the process of selecting creative activities. Despite the differences between the US occupational classification, *US SOC 2010*, and the nomenclatures for occupations that we used, *ISCO-08* and *CPP2010*, it was possible to inspect our eligible occupations using the *O*Net* database.³⁰ This dataset is integrally related to the US SOC system, but given that it is mainly descriptive, the comments on the different occupational codes can be universally adapted to give a general idea of the creative potential of each given occupational activity.

The general descriptions of all the occupations and their individual requisites were publicly available on the *O*Net* database, which allowed us to ascertain that those we considered as creative occupations were the bulk of professional activities that required *creative thinking* as one of the most important conditions of their working activities. All the creative occupations were then selected in correspondence with the core creative sectors presented above, thus: i) ‘Advertising, media and marketing professionals’ in the sectors of *Advertising and Marketing*; ii) ‘Architects, draughtspersons, cartographers and related professionals’, in *Architecture*; iii) ‘Visual artists and Designers (product, garment, graphic and interior)’, in *Design and Visual Arts*; iv) ‘Handicraft workers’, in *Crafts*; v) ‘Film and stage directors and producers’, ‘Broadcasting and audiovisual technicians’, ‘Photographers and related professionals’, in *Film, Video and Photography*; vi) ‘Announcers/speakers, Television and radio producers and directors’, and the professionals involved in ‘Telecommunications, Broadcasting and Audiovisual communications’, in *TV and Radio*; vii) ‘Musicians, singers and composers’, ‘Dancers and choreographers’, ‘Actors, and other creative performing artists’, in *Music and Performing Arts*; viii) ‘Authors, journalists and linguists’, ‘Pre-press technicians’, ‘Archivists, Librarians and other museum, galleries and library technicians’, in *Publishing*; ix) ‘Computer

³⁰ As the US *O*NET* contains occupational codes *US SOC 2010* that can be converted into the codes used in the mapping of our approach, and because we have thoroughly analyzed the descriptions and contents of each of the occupations selected as *creative*, we could also use the details in the *O*Net* dataset, which, all in all, did not differ much from our descriptions. Thus, it was possible to do an overall inspection of the occupations regarded as creative and their requirements in terms of *Creative Thinking*. The *O*Net database* on occupations is available online at: <http://www.onetonline.org/> [accessed April 2012].

systems designers and analysts’, and ‘Information/communications technology operations and user support technicians (computer networks, web systems)’, in *Software publishing and Computer programming and consultancy*; and x) ‘Science, mathematics, life science, engineering and social scientists’, in the *Research and Development* sector (see Table A8).

All the professional categories were mapped using the latest *ISCO-08* nomenclatures at 4-digit level and the Portuguese *CPP2010* at 5 digits.³¹ On the whole, the creative occupations considered in our taxonomy were all listed in Florida’s (2002a) *Super Creative Core*. Since the SIC-SOC approach requires that each creative occupation is suitable for its relevant creative sector, those that were included as creative occupations also proved to be empirically related to the creative industry sectors selected, during the research work on the estimations. This was not a simple task given the difficulties deriving from the simultaneous matching of *SIC* and *SOC* systems and the fact that a large range of creative occupations was dispersed throughout the economy, as explained below. The correspondence was performed by examining the relation of creative occupations that were specialized in each creative sector and that same relation in other creative sectors or in non-creative sectors. This led us conclude that in a number of cases there was a relatively higher concentration of creative workers who were specialized in the respective creative sector, compared with each of the other sectors, whether they or not they are creative sectors. This was the case of Announcers/speakers and broadcasting technicians in *TV and Radio*, Writers, editors and journalists in *Publishing*, Choreographers and dancers in *Music and Performing arts*, and of Actors, directors and filmmakers, or Photographers in *Film, Video and Photography*. However, there were cases in which those selected as creative occupations were found more generally dispersed throughout the economy. These were particularly the cases of professionals operating in creative functional/supporting activities, which are usually found in a large number of other activity sectors and have a transversal importance across all the sectors of the economy. This was the case of Computer and software professionals; Scientists, in general; Draughtspersons; Architects; Designers and Decorators; and Advertising/Marketing professionals. In keeping with the empirical literature already developed (e.g., DCMS, 2010a), we endeavoured to relate each of these occupational categories to the core creative sector with which they had greatest affinity.

³¹ Each of the occupational activities considered as creative and mapped using *ISCO-08* at and *CPP2010* codes at 5 digits, were matched with the respective creative industry sector, which was mapped using *ISIC - Rev. 4* and *CAE - Rev. 3* 5-digit codes (see Table A8, in Appendix: http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf).

The need to group all the selected occupational categories in straight correlation with their relevant creative sector was also the reason to disaggregate at their 5-digit code level the occupational categories of ‘Film, stage and related directors and producers (code 2654)’ and of ‘Broadcasting and audiovisual technicians (code 3521)’, and divide them between the segments of *Film, Video and Photography* and of *TV and Radio*. In *Publishing*, we excluded all the occupational categories related to ‘Printers’, ‘Print Screeners’ and ‘Print finishers’, since the primary requirements for these professional activities did not involve creative abilities, according to the *O*Net* database. Furthermore, these professional activities - such as ‘Serigraphers’, ‘Engravers and Photoengravers’, ‘Print machine operators’ and ‘Bookbinders’ - proved to have a low correlation with the *Publishing creative* sectors, where a small number of specialist workers in these categories were operating in the selected creative sectors. Here, only the ‘Pre-press technicians’, such as ‘graphic assemblers’ and ‘graphic composers’, were included, for the creative requirements³² of their functional activities and because they had a higher correlation with Publishing creative sectors.

Compared with the use of a purely industry-based approach, the SIC-SOC methodology enabled us to capture only the component of creative activities that is present in the vast sector of Printing. It was possible to discriminate between creative and non-creative occupations within each industry sector, avoiding the use of portions of industry codes or the consideration of vast industry sectors to account for the creative component. In our proposed approach, the massive Printing sector was fully excluded from core creative industries, because instead we included only the occupational activities regarded as being creative in that sector. This procedure indirectly gave us the creative component of that sector.

To capture only the occupational categories related to scientific production in the R&D sector, we excluded all the workers in the vast categories of ‘Teachers’ and ‘Engineers’ operating in all the non-creative sectors of the economy, so that only the specialist workers from those categories within the research sector would be accounted. All the other scientific occupations considered in this sector – i.e., life, natural and social science professionals - were entirely accounted, either in the creative *R&D* sector, or in all the other activity sectors of our economy.³³

³² According to the *O*Net* database, the occupational activities of ‘pre-press’ and ‘printing preparing technicians’ involve creative skills in their working context.

³³ In all the creative sectors not mentioned in the previous explanations, those selected as creative occupations were fully taken into account, in strict accordance with our proposed taxonomy, as presented in Table A8, in Appendix - http://www.fep.up.pt/docentes/ateixeira/Appendix_Creative_Employment.pdf

Using the data extracted with the STATA 11® software from the 2009 *Matched Employer-Employee Databases* of the DGEEP (Ministry of Labour and Social Solidarity of Portugal), we estimated the figures for creative employment in Portugal according to our proposed methodology. The resulting estimates are summarized in Table 4.

Table 4: Creative Employment in Portugal (2009) using an adapted SIC-SOC approach

Creative industry Sector/segment	% specialists in each sector	% of each sector in total employment
ADVERTISING and MARKETING	5.0	1.7
ARCHITECTURE	12.0	0.6
DESIGN and VISUAL ARTS	3.0	0.1
CRAFTS	-	0.4
FILM, VIDEO and PHOTOGRAPHY	12.0	0.3
TV and RADIO	16.0	0.2
MUSIC and the PERFORMING ARTS	5.0	0.4
PUBLISHING	21.0	0.5
SOFTWARE publishing/Computer programming and consultancy	34.0	1.8
Research & Development (R&D)	3.0	0.9
Creative employment	215.525 workers	6.9
% Creative workers		14.0
% Non-creative/support workers	working in core creative sectors	26.0
% Creative workers	operating outside the established core creative sectors	60.0

In 2009 the creative class in Portugal accounted for 6.9% of the total employment, corresponding to 215.525 workers. This estimate is not far from the figures obtained using the combined SIC-SOC approaches of Higgs *et al.* (2008) (5.9%) or of the DCMS (2010a) report (5.7%). Our estimate is about one percentage point higher, mostly explained by the inclusion of the R&D sector in addition to the traditional core creative sectors. The R&D sector and its associated occupational activities in science contributed to about 1% of our total employment in 2009.

Although it is not possible to compare between pure occupation-based approaches and SIC-SOC methodologies,³⁴ we observed a fact that is worthy of note. Since we focused on core creative activities, the creative occupations selected in our combined SIC-SOC approach corresponded to a certain extent to those presented in the super creative core of Florida's (2002a, 2004) approach, with exception for 'Engineers', 'Teachers' and 'Sports' occupations, which represent vast occupational categories that were excluded from our analysis. Instead, we did include all the occupations in handicraft and crafts activities, which Florida (2002a)

³⁴ The procedures behind the determination of creative employment using a SIC-SOC methodology and a pure occupation-based approach are substantially different.

excluded from his definition. Coincidentally, our estimated share of 6.9% led to a similar result to that obtained for Florida's Super Creative Core, 7.1%.

Although comparisons cannot be made, since our SIC-SOC approach also takes into account the support workers in each core creative sector, who are excluded from Florida's super creative core, the percentage of 7% can be seen as an indicative value for the relative weight of the core creative class in Portugal. This is effectively corroborated by our SIC-SOC approach, which focuses on a core of creative industries and creative occupations.

The most important creative sectors in Portugal (in 2009) are 'Advertising and Marketing' (1.7%), 'Software publishing/Computer programming and consultancy' (1.8%), and 'Research and Development' (0.9%). On the other hand, the figures for 'Design and Visual Arts' (0.1%), 'TV and Radio' (0.2%), and 'Film, Video and Photography' (0.3%) are low.

These estimates allow to infer that in Portugal, creative employment emerges more from workers operating in sales, consultancy or in the promotion of creative goods or contents (e.g., cultural promoters, commercial and marketing occupations, software and computer consultants, or the support professionals working in core creative sectors) than from *creative people* in a strict sense, i.e., those directly involved in the conception or production of creative output. Only 14% of creative workers are employed in core creative sectors.

The creative sectors with the greatest *specialization* of their creative workforce (with a percentage of creative workers working in the sector above the average of 14%) are those of 'Software publishing/Computer programming and consultancy', where 34% of the workers were specialists in creative occupations, 'Publishing' (21%), and 'TV and Radio' (16%). The sectors with a relatively low specialized creative workforce are 'Design and Visual Arts', with 3% of their creative workers operating in the respective creative sectors, 'Music and Performing Arts' (5%); and 'Research and Development' (3%) (cf. Table 4).

These figures also illustrate the limitations that the process of corresponding occupational/SOC with industry/SIC codes was found to have and that can be regarded as a drawback of the SIC-SOC approach in general. The low levels of specialization were particularly found in sectors where matching SOC with SIC codes was harder - the sectors of 'Design and Visual Arts', 'Music and Performing Arts' and 'Research and Development' - and where the creative occupations considered to be specialist in those sectors were highly dispersed throughout the activity sectors of the economy. Indeed, 'designers, modellers and decorators' were found in a variety of *manufacturing sectors*, particularly those in the

professional categories of ‘garment, industrial, product and equipment designer’. The creative occupations of ‘Music and Performing arts’ were dispersed throughout the *Services sectors*. Scientists, in particular ‘social scientists’, were generally distributed all across the *services and knowledge-based sectors*.

The percentage of *creative workers working outside the core creative sectors* in the total of creative employment in Portugal in 2009 was about 60%. This finding testifies to the fact that creative workers are widely dispersed across all the sectors of the economy, particularly in those considered as non-creative, such as the Manufacturing and Services sectors. A large array of creative occupations related to transversal and supporting services, such as the professionals in ‘Software and Computing’, ‘Advertising’, ‘Design’, ‘Architecture’, and ‘Research and development’, was distributed all through the economy, contributing to that high percentage of creative workers operating within non-creative sectors.

Once again, this demonstrated the limits of using a SIC-SOC method, particularly given the limitations of SIC codes in capturing the creative economy and the difficulties in matching industry and occupational codes by means of the SIC and the SOC nomenclatures in use. These difficulties were greater in the Research and Development sector, where a large number of creative occupations - i.e., social science specialists, such as ‘psychologists’, ‘economists’, ‘sociologists’, and ‘political scientists’ - were operating in a variety of non-creative sectors of the economy. They were mostly found in the vast *services and knowledge-based sectors*, which were not considered as core creative, such as education, financial services, business and management, legal and accounting, or the health and social work services.

If the R&D sector was excluded from our analysis and everything else kept constant, the percentage of creative workers operating in all the non-creative sectors of the economy would drop to about 56% of the total creative employment. We opted to retain this sector in our analysis due to its creative potential and its importance in the scientific production of the country. For the R&D sector to be more accurately analyzed using a SIC-SOC approach, the occupational classification should discriminate between the science workers directly related to scientific and creative production and all the others in technical, consultant, and associate positions. This refinement of the occupational codes would make it possible to determine the actual creative employment in the R&D sector. However, even the latest occupational nomenclatures do not provide that information.

Regardless of the limitations of the existing SIC and SOC nomenclatures when it comes to accurately describing the creative economy, and some drawbacks of the SIC-SOC approach, particularly related to the difficulties of matching the selected creative occupations in straight correlation with the respective core creative industries, the use of a combined occupation and industry-based approach to analyze creative employment in Portugal led us to useful and enlightening findings on the estimates, compared with the other methodologies studied.

5. Concluding remarks

The research developed so far on the topic of creative industries and creative occupations demonstrates the increasing importance of creativity in the economic context of regions and countries. This has been recognized in both the policy and academic fields, particularly after Florida's (2002a) seminal study on the creative class. Yet the amount of literature so far produced has not been sufficient to overcome the drawbacks that present a challenge to those who undertake empirical studies on creative activities. Fuzzy and all-embracing definitions of the creative class, lack of objectivity in the criteria for selecting who is or is not creative, the limitations of the data used, and weaknesses of industry and occupational codes seem to constrain an accurate analysis of the creative economy. Empirically, approaches simply based on the study of creative industries or on the analysis of creative occupations are not adequate for a complete quantification of the creative economy and a full understanding of the creative process. Furthermore, estimations and comparisons between estimates of creative employment are often undertaken using disparate databases, information on distinct countries or regions, and covering different periods of reference.

This present article presents an extensive review of the empirical literature that we undertook in order to systematize all the methodological approaches developed to measure and quantify the creative employment. For an accurate assessment of the disparities between the existing methodologies studied we carried out an extensive mapping, using a comparable scheme of occupational classifications. All the approaches have been thoroughly mapped using the recent International Standard Occupational Classification - *ISCO-08* 4-digit codes and the latest version of the Portuguese nomenclature on occupations - *CPP2010* codes at 5-digit level, compatible with *ISCO-08*.

We carried out estimations of creative employment in Portugal according to each methodological approach - industry-based, occupation-based, and combined industry and occupational approach - starting from the same employment dataset, the official *Matched*

Employer-Employee database (data for 2009). This empirical exercise allowed us to distinguish the main features of each approach and to make direct comparisons between them.

We further proposed an adapted approach - *combined industry- and occupation-based (SIC-SOC) approach* - in order to estimate creative employment in the context of Portugal, using data on industries and on occupations. According to this method, creative employment in Portugal represents 6.9% of total employment corresponding to 215.525 workers.

The most important creative sectors in national employment were those in Advertising and Marketing (1.7%), Software publishing/Computer programming and consultancy (1.8%), and Research and Development (0.9%).

In Portugal specialist creative workers constituted about 14% of the total creative employment whereas the percentage of creative workers working in non-core creative sectors is about 60%. This result suggested that creative workers were widely dispersed across all the sectors of the economy, particularly in those considered as non-creative, such as the Manufacturing and the Services sectors. This also demonstrated the shortcomings of using a SIC-SOC methodology to describe the creative economy, since industry (SIC) and occupational (SOC) nomenclatures failed to fully capture all the creative activities, and it was hard to match the SOC with SIC codes in some of the cases analyzed.

Despite the limitations, the use of a combined occupation- and industry-based approach to analyze creative employment in Portugal led us to useful and enlightening findings on the estimates undertaken compared with the other methodologies studied. Thus far, most of studies on this subject have focused on more developed countries. Our research adds to the empirical literature on the area by analyzing and estimating the importance of creative employment in a country of intermediate development level.

References

Amabile, T. (1983), *The social psychology of creativity*. New York: Springer – Verlag New York Incorporated.

Amabile, T. (1998), “How to kill creativity”, *Harvard Business Review*, 76(5): 76-87.

Asheim, B., Hansen, H. (2009), “Knowledge bases, talents, and contexts: on the usefulness of the creative class approach in Sweden”, *Economic Geography*, 85(4): 425-442.

Barbour, E., Markusen, A. (2007), “Regional occupational and industrial structure: Does one imply the other?”, *International Regional Science Review*, 30(1): 72-90.

- Boix, R., Lazzeretti, L., Capone F., de Propriis, L., Sánchez, D. (2010), “The geography of creative industries in Europe: comparing France, Great Britain, Italy and Spain”, *Paper presented at the 50th Anniversary, European Congress of the Regional Science Association International (ERSA)*, on the “Sustainable Regional Growth and Development in the Creative Knowledge Economy”, Jönköping, Sweden, 19 - 23 August 2010.
- Boschma, R., Fritsch, M. (2009), “Creative Class and Regional Growth: Empirical Evidence from Seven European Countries”, *Economic Geography*, 85(4): 391-423.
- Clark, D. (2009), “Crunching creativity: an attempt to measure creative employment”, *Creative Industries Journal*, 2(3): 217-230.
- Clifton, N. (2008), “The “creative class” in the UK: an initial analysis”, *Geografiska Annaler Series B*, 90 (1): 63-82.
- Clifton, N., Cooke, P. (2009), “Creative knowledge workers and location in Europe and North America: a comparative review”, *Creative Industries Journal*, 2(1): 73-89.
- Csikszentmihalyi, M. (1997), *Creativity: Flow and the Psychology of Discovery and Invention*. New York: Harper Collins Publishers.
- Csikszentmihalyi, M. (1999), “Implications of a systems perspective for the study of creativity”, in R. Sternberg (ed.), *Handbook of Creativity*. Cambridge: Cambridge University Press: 313-335.
- Cunningham, S., Higgs, P. (2009), “Measuring creative employment: implications for innovation policy”, *Innovation: Management, Policy & Practice*, 11: 190-200.
- Curran, D., Van Egeraat, C. (2010), “Defining and valuing Dublin’s Creative Industries (NIRSA)”, *Working Paper Series. No. 57*. Ireland: NIRSA - National Institute for Regional and Spatial Analysis.
- Currid, E., Stolarick, K. (2010), “The Occupation-Industry mismatch: New trajectories for regional cluster analysis and economic development”, *Urban Studies*, 47(2): 337-362.
- Department for Culture, Media and Sport (DCMS) (1998), *Creative Industries Mapping Document 1998*. London: UK DCMS.
- Department for Culture, Media and Sport (DCMS) (2001), *Creative Industries Mapping Document 2001*. London: UK DCMS.
- Department for Culture, Media and Sport (DCMS) (2006), *Creative Industries Economic Estimates Statistical Bulletin – September 2006*. London, UK DCMS. Available online

- at: http://tblp.localknowledge.co.uk/Assets/1681/creative_industrieseconomicestimates2006.pdf
[accessed April 2012].
- Department for Culture, Media and Sport (DCMS) (2010a), “*Creative Industries Economic Estimates – December 2010 (Experimental statistics) - Full Statistical Release*”. London: UK DCMS. Available online at: <http://www.culture.gov.uk/publications/7634.aspx> and at: http://www.culture.gov.uk/images/research/CIEE_Full_Release_Dec2010.pdf [accessed April 2012].
- Department for Culture, Media and Sport (DCMS) (2010b), “*Creative Industries Economic Estimates – 10 April 2010*”. London: UK DCMS. Available online at: http://www.culture.gov.uk/what_we_do/research_and_statistics/4848.aspx [accessed April 2012].
- Florida, R. (2002a), *The rise of the Creative Class – and How it’s Transforming Work, Leisure, Community and Everyday Life*. New York: Basic Books.
- Florida, R. (2002b), “The Economic Geography of Talent”, *Annals of the Association of American Geographers*, 92 (4): 743-755.
- Florida, R. (2004), *The rise of the Creative Class – and How it’s Transforming Work, Leisure, Community and Everyday Life* (Revised paperback ed.). New York: Basic Books.
- Florida, R. (2005a), *The Flight of the Creative Class: The New Global Competition for Talent*. New York: Harper Collins Publishers.
- Florida, R. (2005b), *Cities and the Creative Class*. New York: Routledge.
- Florida, R., Mellander, C. (2007), “The creative class or human capital? Explaining regional development in Sweden”, *CESIS Electronic Working Paper Series*.
- Florida, R., Mellander, C., Stolarick, K. (2008), “Inside the black box of regional development - human capital, the creative class and tolerance”, *Journal of Economic Geography*, 8: 615-649.
- Fritsch, M., Stuetzer, M. (2009), “The geography of creative people in Germany”, *Int. J. Foresight and Innovation Policy*, 5 (1/2/3): 7-23.
- Frontier Economics (2007), *A framework for evaluating cultural policy investment. A Report prepared for DCMS*. London: Frontier Economics Ltd., 2007. In http://webarchive.nationalarchives.gov.uk/+http://www.culture.gov.uk/NR/rdonlyres/D187FA99-2930-4100-B6DB-5B0606D84112/0/Aframe_workforevaluatingculturalpolicyinvestmentmainreport.pdf
[accessed April 2012].

- Gabe, T. (2006), "Growth of Creative Occupations in U.S. Metropolitan Areas: A Shift-Share Analysis", *Growth and Change*, 37(3): 396-415.
- Glaeser, E. (2005), "Review of Richard Florida's the rise of the creative class", *Regional Science and Urban Economics*, In <http://www.creativeclass.com/rfcgdb/articles/GlaeserReview.pdf> [accessed April 2012].
- Granger, R., Hamilton, C. (2010), "Re-spatializing the creative industries: a relational examination of underground scenes, and professional and organizational lock-in", *Creative Industries Journal*, 3(1): 47-60.
- Hansen, H. (2007), "Technology, Talent and Tolerance – the Geography of the Creative Class in Sweden", Rapport och Notiser 169, Department of Social and Economic Geography, Lund University, Sweden.
- Hansen, H., Niedomysl, T. (2009), "Migration of the creative class: evidence from Sweden", *Journal of Economic Geography*, 9: 191-206.
- Higgs, P., Cunningham, S. (2007), "Australia's Creative Economy: Mapping Methodologies". Brisbane: ARC Centre of Excellence for Creative Industries & Innovation (CCI) 2007. Available online at: <http://eprints.qut.edu.au/6228/> [accessed April 2012].
- Higgs, P., Cunningham, S. (2008), "Creative Industries Mapping: Where have we come from and where are we going?", *Creative Industries Journal*, 1(1): 7-30.
- Higgs, P., Cunningham, S., Bakhshi, H. (2008), *Beyond creative industries: Mapping the creative economy in the UK*. London: NESTA.
- KEA European Affairs (2006), *The Economy of Culture in Europe, study prepared for the European Commission* (Directorate-General for Education and Culture). Brussels.
- Koo, J. (2005), "How to analyze the regional economy with occupation data", *Economic Development Quarterly*, 19(4): 356-372.
- Lorenzen, M., Andersen, K. (2009), "Centrality and Creativity: Does Richard Florida's Creative Class Offer New Insights into Urban Hierarchy?", *Economic Geography*, 85(4): 363-390.
- Markusen, A. (2004), "Targeting occupations in regional and community economic development", *Journal of the American Planning Association*, 70(3): 253-268.
- Markusen, A. (2006), "Urban Development and the Politics of a Creative Class: Evidence from the Study of Artists", *Environment and Planning A*, 38 (10): 1921-1940.

- Markusen, A., King, D. (2003), *The artistic dividend: the hidden contributions of the arts to the regional economy*. Minneapolis: University of Minnesota, Project on Regional and Industrial Economics.
- Markusen, A., Schrock, G. (2006), "The artistic dividend: Urban artistic specialization and economic development implications", *Urban Studies*, 43(9): 1661-1686.
- Markusen, A., Wassall, G., DeNatale, D., Cohen, R. (2008), "Defining the Creative Economy: industry and occupational approaches", *Economic Development Quarterly*, 22(1), 24-45.
- McGranahan, D., Wojan, T. (2007), "Recasting the creative class to examine growth processes in rural and urban countries", *Regional Studies*, 41(2): 197-216.
- Mellander, C. (2009), "Creative and knowledge industries: an occupational distribution approach", *Economic Development Quarterly*, 23(4): 294-305.
- Mellander, C., Stolarick, K., King, K. (2010), "Occupational and Industrial Distribution in Denmark: A comparison with the United States, Canada and Sweden", *Martin Prosperity Research Working Paper Series* September 2010, available online at: <http://research.martinprosperity.org/2010/10/occupational-and-industrial-distribution-in-denmark-a-comparison-with-the-united-states-canada-and-sweden/> [accessed April 2012].
- Peck, J. (2005), "Struggling with the Creative Class", *International Journal of Urban and Regional Research*, 29(4): 740-770.
- Potts, J., Cunningham, S. (2008), "Four models of the creative industries", *International Journal of Cultural Policy*, 14(3): 233-247.
- Potts, J., Cunningham, S., Hartley, J., Ormerod, P. (2008), "Social network markets: a new definition of the creative industries", *Journal of Cultural Economics*, 32: 167-185.
- Pratt, A. (1997), "The cultural industries production system: a case study of employment change in Britain, 1984-91", *Environment and Planning A*, 29 (11):1953-74.
- Pratt, A. (2004), "Mapping the cultural industries: Regionalization; the example of South East England", in Power, D. and Scott, A. (eds), *Cultural industries and the production of culture*, New York: Routledge: 16-36.
- Pratt, A. (2008), "Creative cities: the cultural industries and the creative class". *Geografiska Annaler: Series B - Human geography*, 90 (2). pp. 107-117.
- Pratt, A., Pratt, Norris, D., Marler, L. (2009), "Research frontiers for the creative class", *Louisiana Tech University*. In <http://nciia.org/conf08/assets/pub/pratt.pdf> [accessed April 2012].

- Scott, A. (1997), "The cultural economy of cities", *International Journal of Urban and Regional Research*, 2: 323-339.
- Scott, A. (2000), *The Cultural Economy of Cities: Essays on the Geography of Image producing Industries*. London: Sage.
- Scott, A. (2002), "The distribution and production of American motion pictures", *Regional Studies*, 36 (9): 957-975.
- Scott, A. (2003), *The cultural economy of cities*. CA, Thousand Oaks: Sage.
- Scott, A. (2004), "Cultural-products industries and urban economic development: prospects for growth and market contestation in global context", *Urban Affairs Review*, 39 (4): 461-490.
- Scott, A. (2005), "Creative Cities: conceptual issues and policy questions", Paper presented at the OECD International Conference on City Competitiveness, Spain, 3-4 March, 2005.
- Scott, A. (2007), "Capitalism and urbanization in a new key? The cognitive-cultural dimension", *Social Forces*, 85(4): 1465-1483.
- Statistics Portugal, Instituto Nacional de Estatística (INE) (2010), *Classificação Portuguesa das Profissões 2010 (Portuguese Classification of Occupations 2010)*. Lisbon: INE. In http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOESpub_boui=107961853&PUBLICACOESmodo=2 [accessed April 2012].
- Sternberg, R. (1999), *Handbook of Creativity*. Cambridge: Cambridge University Press.
- Storper, M., Scott, A. (2009), "Rethinking human capital, creativity and urban growth", *Journal of Economic Geography*, 9: 147-167.
- White, P. (2010), "Creative industries in a rural region. Creative West: the creative sector in the Western Region of Ireland", *Creative Industries Journal*, 3(1): 79-88.

Recent FEP Working Papers

454	Raquel Meneses and Carlos Brito, <i>A Dynamic Approach to the Development of International New Ventures</i> , April 2012
453	Sara Santos Cruz and Aurora A. C. Teixeira, <i>Industry-based methodological approaches to the measurement of Creative Industries: a theoretical and empirical account</i> , April 2012
452	Liliana Fernandes, Américo Mendes and Aurora A. C. Teixeira, <i>Assessing child well-being through a new multidimensional child-based weighting scheme index: an empirical estimation for Portugal</i> , March 2012
451	Jurrien J. Bakker, Oscar Afonso and Sandra T. Silva, <i>The effects of autocatalytic trade cycles on economic growth</i> , March 2012
450	Luís Rola and Rui Henrique Alves, <i>Competitiveness of Nations in the Globalization Era: Is the (In)Existence of a Collective Strategy Relevant</i> , March 2012
449	Luís Guimarães, <i>A Comment on the 'Effect of a Common Currency on the Volatility of the Extensive Margin of Trade'</i> , March 2012
448	Helena Martins and Teresa Proença, <i>Minnesota Satisfaction Questionnaire - Psychometric properties and validation in a population of Portuguese Hospital Workers</i> , February 2012
447	Carlos F. Alves and Ernesto Fernando R. Vicente, <i>Does the Latin Corporate Governance model perform worse than others in preventing earnings management?</i> , February 2012
446	Márcia Oliveira and João Gama, <i>Visualization of Evolving Social Networks using Actor-Level and Community-Level Trajectories</i> , February 2012
445	Ricardo Biscaia and Paula Sarmento, <i>Spatial Competition and Firms' Location Decisions under Cost Uncertainty</i> , January 2012
444	Rosa Forte and Paula Sarmento, <i>Foreign Presence and Market Concentration: The Case of Portuguese Manufacturing Industries</i> , January 2012

Editorial Board (wps@fep.up.pt)

Download available at: <http://wps.fep.up.pt/wplist.php>
also in <http://ideas.repec.org/PaperSeries.html>

www.fep.up.pt

UNDERGRADUATE, MASTER AND PHD PROGRAMMES



FACULDADE DE ECONOMIA
UNIVERSIDADE DO PORTO



School of Economics and Management, University of Porto
Rua Dr. Roberto Frias | 4200-464 Porto | Portugal
Telephone: +351 225 571 100