

TOWARDS AN OPERATIONAL DEFINITION OF CREATIVITY: AN APPLICATION TO ITALY

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ABSTRACT

How is creativity distributed among Italian provinces? And how did Italian provinces change in terms of creativity? The first obstacle one gets into in working on creativity is the lack of a univocal definition. There are, indeed, many definitions, each emphasizing only a few of the many aspects related to the concept. Moreover, most “definitions” tend to *describe* (rather than define) creativity and in many cases inputs and outputs are mixed up. The fact is that creativity is a multifarious factor and, as such, difficult to confine. Thus, measuring creativity is particularly hard and the methods proposed until now present significant limits and drawbacks. Therefore, there is a need to overcome such limits through putting some order into definitions and measures in order to provide a clear theoretical framework.

This work moves in that direction through i. recognizing the existence of different types of creativity and ii. acknowledging the relevance of putting own talent into action. By considering artistic creativity, scientific creativity, and innovation as the main modes in which creativity can show itself, a new operational definition is put forward and some possible patterns of structural change are delineated.

The proposed operational definition is subsequently tested through an application to Italy: Italian provinces are classified according to the identified categories and potential patterns of structural change are explored.

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1. Introduction

Creativity has become a relevant research topic only relatively recently. The interest on such factor is due to its potential positive impact on economic development, through a mechanism that sees *creativity* and *knowledge*² as the *triggers* for *innovation*, which is known to positively and significantly affect economic development. As a consequence, after a fundamental strand of literature about the (positive) effect of *innovation* on economic development and after valuable research work on *knowledge*³ (and on its relationship with innovation), a relevant interest on the role played by *creativity* has emerged.

Thus, following the idea that creativity is a potentially important element in economic development, this work aims at analyzing its distribution across Italian provinces and the changes Italian provinces experienced in terms of creativity. However, defining a *level* of creativity is very difficult, essentially because the concept is multidimensional and because there are different types of creativity. Therefore, a step back is required in order to formulate a clear theoretical framework that allows to reason properly about the topic.

First of all, what is creativity? Creativity is definitely a multi-faceted concept. It has to do with skills, imagination, fantasy, inspiration, intuition, ideas, curiosity, and culture. However, it is also related to production processes, problem solving, R&D⁴, innovation, and knowledge creation⁵. Moreover, it is something deeply rooted into local systems (see Lazzeretti, 2007; and Lazzeretti et al., 2012). Creativity has been considered for a long time as connected just to arts and culture (see Howkins, 2007). As Landry (2008: xxix) puts it: “Today we can talk of creativity... but back in the late 1980’s... the key terms discussed were culture, the arts, cultural planning, cultural resources and the cultural industries. Scientific, technological and engineering creativity were not part of the original vocabulary... Creativity as a broad-based attribute... only came into common ... use during the mid-1990s”⁶.

All in all, the concept of creativity is many-sided and, as such, difficult to define. Despite this, there are many definitions available in literature. They are, however, characterized by limits and drawbacks, mainly related to the fact that different definitions just stress different aspects of creativity (they are, thus, somehow partial, see Csikszentmihalyi 1996) and that most definitions tend to describe (rather than define) creativity. In addition, in many cases inputs and outputs of creativity are not clearly identified and they are, in fact, mixed up.

Being difficult to define, creativity is also particularly hard to measure. There are two main approaches to the measurement of creativity: the *industry-based* approach and the *occupational* approach. Nevertheless, the existing methods are not fully satisfactory, mainly because of lack of clarity about what and who should be included into “creative categories” and because of the somehow misleading and volatile interpretations of the results. However, the main limit is probably related to the idea of measuring such a multidimensional factor as creativity through just a single measure. Therefore, the measurement of creativity needs to be improved in order to provide some clear and meaningful information about the topic.

In order to investigate creativity in Italian provinces, this work starts from the awareness of the limits sketched above and from the belief that there are different kinds of creativity, which can be identified first of all through recognizing the importance of the science-based creative driver in addition to the usual art-based one (see Ronan, 1983; Gardner, 1988; and Howkins, 2007). Another fundamental element of the reasoning is the acknowledgement of the importance of putting talent into practice. In line with this view, the paper tries to overcome the limits of definitions and measures by putting forward a new operational definition that takes

² On the relationship between creativity and knowledge see Csikszentmihalyi (1996), OECD (2002), Andari et al. (2007), Bakhshi et al. (2008, ch. 2), and Cappellin and Wink (2009).

³ See, for instance, Madanipour (2011).

⁴ According to the OECD (2002: 30) “Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including the knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications”.

⁵ See Torrance (1988) and Preiser (2006).

⁶ See also Madanipour (2011), ch.2.

into account the different modes in which creativity can show itself: artistic creativity, scientific creativity, and innovation.

On the basis of the devised operational definition, some possible *regional creative patterns* are identified. In addition, in order to try to investigate the possible changes and thus the potential evolution areas could experience in terms of creative endowment, some potential structural changes in creative patterns (moving from one pattern to another) are also delineated.

Exploiting data from the Italian Census of Population and Houses and from the Italian Patent and Trademark Office, the proposed operational definition is subsequently tested on Italian provinces (years 2001 and 2011). In line with the devised *regional creative patterns*, each province is assigned to the appropriate category and a very polarized picture of the situation in Italy is found out. Finally, possible structural changes in creative patterns are explored, in order to get some insights on the dynamics of creativity in Italy.

The paper is organized as follows: Section 2 presents a discussion on existing definitions and measures of creativity; Section 3 illustrates the limits of the definitions and measures presented in the previous section; Section 4 presents the conceptual framework, proposes a new operational definition for creativity, and suggests some possible structural changes in creative patterns; Section 5 reports the empirical (static and dynamic) application and its results; while Section 6 concludes and puts forward some possible further steps.

2. Creativity: definitions and measures

The available literature about creativity provides many possible definitions of the concept and two main measurement approaches (*industry-based* and *occupational*). In order to provide a clear picture of the existing definitions and measures, the state of the art is summarized and discussed in the following sections.

2.1 Creativity and its existing definitions

Creativity is a many-sided concept and, as such, difficult to confine. Nevertheless, quite a number of definitions are available in literature. They can be organized according to some peculiar features, depending on their focus.

First, there are definitions that are quite *generic* and refer to different aspects related to the concept. According to Santagata (2002 and 2009), for instance, creativity is: i. related to historical heritage (inextricably linked to a place and/or to a community and its history); ii. an input for production and communication (of cultural industries); iii. present in the «material culture», which is an expression of the territory and the community. Therefore, in this view, time and space seem to play an important role. In Florida's words (2002), instead, "Creativity is not intelligence. Creativity involves the ability to synthesize. It is a matter of sifting through data, perceptions and materials to come up with something new and useful". Creativity may also be looked at as ability in problem solving (Santagata, 2002) and as a competitive advantage (not only for firms but especially for local systems) associated to culture and territory (see Lazzeretti, 2007; and Lazzeretti et al., 2012). Moreover, variety and diversity can be seen as the engines of creativity (Lorenzen and Fredriksen, 2008).

Second, most definitions are based on the concept of *novelty*⁷. Howkins (2007) defines creativity as the ability to generate something new (either in the sense of "something from nothing" or in the sense of giving new character to something) and he refers to it in terms of talent and aptitude. Quite similarly, according to Cox (2005: 2), "...creativity is generation of new ideas – either new ways of looking at existing problems, or of seeing new opportunities, possibly by exploiting emerging technologies or changes in markets". In UNCTAD (2010: 4) "Creativity can ... be defined as the process by which ideas are generated, connected

⁷ Although they do not provide a definition as such, even Csikszentmihalyi (1996) states that "Creativity involves the production of novelty", while in KEA (2006: 41) it is reported that "Creativity refers to the ability to create something new". Even the Oxford Dictionary defines creativity as "the use of imagination or original ideas to create something".

and transformed into things that are valued. ... creativity is the use of ideas to produce new ideas". Somehow different, but still close to the concept of novelty, is Törnqvist's (1983) definition of creativity as the creation of something new out of information, knowledge, and competence; in this case, creativity could be regarded as a kind of synergy. Moreover, some authors define creativity as involving something new and useful. In Sternberg and Lubart (1999: 3) "Creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. useful concerning tasks constraints)"⁸, while Walberg (1988) defines it as "... the trial-and-error search for novel and useful solutions by combinations of stored and externally found elements".

Third, some definitions highlight the connection to *innovation*. Many authors stress how creativity is mainly an input for innovation. In this sense, creativity can be seen as "... a process of discovering and then enabling potential to unfold. It is applied imagination using qualities like intelligence, inventiveness and learning along the way ... Creativity is a journey not a destination, a *process* not a status ... Creativity is the precondition from which *innovations* develop" (Landry, 2008: 15). Some other works underline that "Creativity and innovation are overlapping concepts" (Andari et al., 2007: 16).

Finally, considering the link between creativity and *knowledge*, Cappellin (2009: 80) defines creativity as the capability to sustain the continuity of the process of knowledge creation. In this view, creativity would imply high interaction among many actors and original combinations of different and complementary pieces of knowledge. Although ideas are formed in the minds of individuals, indeed, *interaction* among individuals typically plays a critical role in developing these ideas (Nonaka, 1994).

2.2 Creativity and its existing measures

Being very difficult to define, creativity is also hard to measure. The breadth of the concept and the varied perceptions about how to define and delimit the creative economy make it difficult to identify or agree upon reliable and comparable economic indicators that capture its economic, cultural, social, and technological dimensions (UNCTAD, 2010, ch. 3). There are, however, two main approaches to try to do that: the *industry-based* approach and the *occupational* approach.

The *industry-based approach* focuses on the identification of *creative industries*⁹ which are subsequently considered as a proxy for creativity. Although the first appearance of the term *creative industries* was in 1994 in a report prepared by the Australian Government ("Creative Nation"), the most diffused definition is the one by the UK-DCMS (1998 and 2001). According to such definition, *creative industries* are those requiring creativity and talent, with potential for wealth and job creation through exploitation of their intellectual property.

On the basis of the *industry-based* approach to the measurement of creativity, employment and value added of the particular sectors devised as "creative" are analyzed. The main results are related to the facts that *creative industries* tend to cluster (Capone 2007, UNCTAD 2008 and 2010, Lazzeretti et al. 2009, Freeman 2010, Lazzeretti et al. 2012, Boix et al. 2014) and to concentrate in big cities (characterized by high population density, agglomeration economies, positive externalities, and easy face to face interaction). *Creative industries* may also be split into *traditional* and *technology-related* (see Capone, 2007 and Lazzeretti et al., 2012). Although depending on every single research work, *traditional cultural* industries are (roughly) film-making, publishing, music, architecture and engineering, and performing arts; while *technology related* creative industries are (roughly) R&D, ICT, and advertising. UNCTAD (2010) distinguishes between *upstream-activities* (traditional cultural activities such as performing arts or visual

⁸ Generally speaking, the *usefulness* component of creativity is very much taken into account within psychology literature (see, among others, Christensen, 2002).

⁹ See the pioneering work of Adorno and Horkheimer (1947) on *cultural* industries and, for practical examples and different classifications, UK-DCMS (1998 and 2001); WIPO (2003, Copyright Industries); Throsby (2001) and KEA (2006); Santagata (2009); UNCTAD (2008 and 2010) and UNESCO (2009). Each model has a particular rationale, depending on underlying assumptions about the purpose and mode of operation of the industries (UNCTAD, 2010).

arts) and *downstream-activities* (much closer to the market, such as advertising, publishing or media-related activities). Moreover, some authors only focus on *creative service industries* (thus neglecting *creative manufacturing*), following the view according to which the “real” (more intangible) creative value added is to be found in this category rather than in the (possibly low-skilled) production-related activities of manufacturing.

The second approach is the so-called *occupational approach*, which is essentially based on Richard Florida’s work (2002). On the base of the ideas that i. creativity is an individual characteristic, although deeply-rooted into a local system; and that ii. only the performing of really creative tasks should be included in the measure of creativity, the author looked at “creative occupations”, identifying a so-called “creative class” which includes a “creative core” (scientists and engineers, university professors, poets and novelists, artists, entertainers, actors, designers and architects, editors, researchers, analysts, and opinion-makers) and some “creative professionals” (who work in a wide range of knowledge-intensive industries such as high-tech sectors, financial services, the legal and health care professions, and business management). Florida also built a “creativity index” on the basis of four sub-indices: the “creative class” share of the workforce, innovation, high-tech industry, and diversity. The author found out a positive impact of *his* creative class and creativity index on economic development. Such effect was part of what Florida called “the 3 T’s of economic development”: Talent, Technology, and Tolerance. According to the author, each is necessary but by itself insufficient condition: to attract creative people, generate innovation and stimulate economic growth, a place must have all three.

3. Limits and drawbacks of definitions and measures

3.1 Limits of definitions

All in all, creativity is a multi-faceted factor. It is a complex system characterized by different aspects and none of its components alone can explain it (Csikszentmihalyi, 1996). Therefore, it is very difficult to define creativity since there cannot be a simple definition that encompasses all the various dimensions of this phenomenon (see UNCTAD, 2008 and 2010). In particular, different definitions just tend to emphasize different features of the concept (e.g. novelty or the relationship with innovation and knowledge) and are, thus, quite partial and not exhaustive.

In addition, most “definitions” tend to describe (rather than define) creativity, thus being in a sense too generic. They refer to the fact that creativity is related to ideas, skills, community, culture or that creativity has to do with innovation, R&D, production processes, and technology. They also sometimes list what creativity *is not*, but in fact usually do not clearly state what it actually *is*.

Finally, in many cases inputs and outputs of creativity are not clearly distinguishable, they are in fact mixed up (see Handke, 2004 and Power, 2011). Disentangling the two elements on the basis of the available definitions is not straightforward, and this leads to a difficulty in building a clear conceptual framework that allows to properly interpret the concept of creativity and its possible effects on economic development.

3.2 Limits of single measures for a multidimensional concept

Industry-based and *occupational* approaches to the measurement of creativity both have their limits and drawbacks.

As for the identification of *creative industries*, there is no “right” or “wrong” model, there are simply different ways of interpreting the structural characteristics of creative production. The attractiveness of the various models may therefore be different, depending on the analytical purpose. However, a standardized set of definitions and a common classification system are needed as a basis for designing a workable framework for dealing with *creative industries* (UNCTAD, 2008 and 2010 and EC Green Paper, 2010).

And yet, what should be included within “creative industries”? Even the most diffused definition, the one provided by the UK-DCMS (see Section 2.2), is not exhaustive. That definition, indeed, quotes creativity without properly defining it. In a sense, one could perhaps more clearly consider *creative industries* as those sectors that have a relevant value added (or employment) generated through products and/or processes originating from talent and/or new ideas.

In practice, each model has a particular rationale, depending on underlying assumptions about the purpose and mode of operation of the industries (UNCTAD, 2010, ch.1). Different operationalizations of similar conceptual terms, however, can generate very different figures. Moreover, are “creative” industries really “creative”? In most cases the whole production chain (Creative Industries Production System – CIPS) is taken into account (e.g. Howkins, 2007 and Santagata, 2009; see Boix et al., 2013, on creating vs making and UNCTAD, 2010, on value-chain analysis), but it is very hard to determine whether every segment of the craft industries participates in the production of design intensive and high fashion output or of low quality commodities with poor creative value. Considering the whole production chain (from conception/design to retail & consumption) seems too simplistic, since the creative component of low skilled production and/or of the distribution phase is clearly disputable. In addition, and perhaps most importantly, *creative industries* are at the same time an input and an output of creativity, which makes dealing with them somehow complicated from a conceptual perspective. Finally, a person can carry out creative tasks¹⁰ even if he/she does not work within a *creative industry* and, on the other hand, also *creative industries* employ people who do not perform creative tasks¹¹. Table 1 represents this issue through putting industries (creative vs non-creative) on the rows and occupations (creative vs non-creative) on the columns¹². As can be easily seen, there are four possible combinations of creativity (or non-creativity). The *industry-based* approach suffers from the fact that even people who do not perform creative tasks are eventually taken into account, while people performing creative tasks outside the *creative industries* are not.

Table 1 – Creativity: industries and occupations

		OCCUPATIONS (Talent-driven Creativity)	
		Creative	Non-creative
INDUSTRIES (Activity-driven Creativity)	Creative	e.g. publications manager working for the publishing industry	e.g. cleaner working for the publishing industry
	Non-creative	e.g. publications manager working for a bank	e.g. cleaner working for a bank

Following this logic, the *occupational* approach overcomes in a sense some of the problems of the *industry-based* approach, since it considers the specific tasks performed instead of the industrial sector as a whole. The main reference on this is Florida (2002). However, his work has been very much criticized since he defines creativity very broadly and ends up labelling as “creative class” about 30% of the U.S. workforce (see Markusen, 2006, Throsby, 2008, and UNCTAD, 2010, ch.1). Moreover, who should exactly be considered into the “creative class”? Florida’s definition seems very (too) wide, nevertheless including rather than excluding some specific categories is not completely straightforward and a clear and sound principle on the basis of which operating the choice would need to be established. In addition, Florida’s *creative class*

¹⁰ Creative tasks require “creative abilities” and may entail problem solving (possibly drawing on complex bodies of knowledge and finding original solutions), but also problem finding. Creative tasks are carried out by generating new ideas, creating new technologies, or combining existing knowledge in new and innovative ways (Marrocu and Paci, 2012).

¹¹ On this, see also UNCTAD (2008), Throsby (2008 and 2010), and Freeman (2010).

¹² See also Comunian et al. (2010).

comes out to be strongly correlated with the group of more educated people (see Glaeser, 2005; Marlet and van Woerkens, 2007; and Marrocu and Paci, 2012 and 2013) and thus apparently the effect caught by the author is more related to human capital per se than to genuine creativity.

In fact, the most relevant limit of the *occupational* approach *à la* Florida is probably that, in the end, the *creative class* is interpreted as the main driver of development, almost independently of the particular characteristics of the territory. This sounds quite naïve, since the importance of the endogenous determinants in the development of a local system is now well-known¹³.

Despite all the specific drawbacks of the two approaches presented above, the main problem is related to the general idea of trying to measure such a multi-faceted factor as creativity through a single measure. A multidimensional concept should be measured through a multidimensional scheme. This is the conceptual framework the present work tries to provide in the following sections.

4. Trying to overcome the limits: an operational definition of creative areas

From what said before, it comes out clearly how defining a *level* of creativity is very difficult. As explained above, such difficulty is essentially due to the confusion related to the existence of many different definitions of creativity and to the lack of a satisfactory method to measure such an intangible and multidimensional concept¹⁴. Moreover, a fundamental point to be taken into account is that there are different types of creativity. Given this complex situation, a step back is required in order to formulate a clear theoretical framework that allows to reason properly about the topic.

The idea on which this paper is based is that *creativity*, *knowledge*, and *innovation* are three distinct elements, in terms of creativity and knowledge being the triggers for innovation, that is widely recognized as one of the main determinants of long-run economic performance and prosperity¹⁵. Thus, the reason why studying creativity is relevant is that it has got a potential positive impact on (regional) economic development. Following such logic, the paper tries to overcome the limits of definitions and measures of creativity available in literature (see previous section) through recognizing the existence of different types of creativity and through acknowledging the importance of putting own talent into practice (Andari et al., 2007).

Consequently, considering the role played by knowledge (see next section), artistic creativity, scientific creativity, and innovation were identified as the modes in which creativity can be expressed and as the main elements of the reasoning. Building on this basis, this work proposes a new operational definition of creativity that is meant to provide a clearer framework for the research on this topic.

4.1 A possible operational definition

As stated before, creativity is a multi-faceted factor (see Csikszentmihalyi, 1996, on the complexity of creativity). Therefore, the main limit of the existing definitions is in their catching only a few aspects related to the concept and the main drawback of available measures is that they try to assess creativity through just a single measure. In addition, this work puts forward the idea that *creative performance* should also be considered, thus taking into account the capability of local areas to translate their creative potential into action.

There are, indeed, different types of creativity. They can be classified considering their peculiar characteristics, the role played by knowledge, and the importance of innovation as a practical expression of creativity. In particular, knowledge is more relevant for some kind of innovations rather than for others (see

¹³ Some endogenous elements that affect economic development are related to local entrepreneurship, local production factors (endowment of labor and capital), quality of the human capital, local knowledge and local learning, and networks of economic and social relations (see Capello, 2007, ch. 8).

¹⁴ In Preiser (2006) words “It seems impossible to find a definition that can be operationalized”.

¹⁵ Thus, in this work, creativity is not the same as innovation (see UNCTAD, 2010, ch.1).

below). Following this reasoning, the modes in which creativity can show itself were identified and devised as the main components of the different possible types of creativity. They are artistic creativity, scientific creativity, and innovation.

Artistic creativity. Art/culture-based creativity is the type of creative driver most commonly considered; it is absolutely and undeniably relevant and should be taken into account. This kind of creativity involves imagination and a capacity to generate original ideas and novel ways of interpreting the world, mainly expressed through text, sound, and image (UNCTAD, 2010, ch.1). In particular, this is the type of creativity related to artistic/cultural activities such as, for instance, cinema, museums, radio and TV, advertising, publishing, traditional arts (e.g. painting, carving, photography...), and performing arts (e.g. theatre, ballet, circus...). This kind of creativity can potentially generate innovation based on a high creative contribution mixed with a possibly low contribution in terms of (codified) knowledge¹⁶.

Scientific creativity. Science-based creativity was devised, within this work, as a fundamental type of creativity to be considered on the basis of the clear need of getting out of the general belief according to which art-based creativity is the only creative driver (see Madanipour, 2011, ch. 2 and ch. 4). Scientific creativity involves curiosity and willingness to experiment and make new connections in problem-solving (UNCTAD, 2010, ch.1). It is a more codified (scientific) type of creativity (for instance engineering, corporate R&D, or academic research in any field) and can potentially generate innovation based on a relatively limited purely creative contribution mixed with a relevant contribution in terms of (codified) knowledge¹⁷.

Innovation. The link between creativity and innovation has already been suggested from many authors. As far as this work is concerned, according to the idea that creative potential should be put into practice in order to actually trigger economic development, innovation is a very important element to be considered. Innovation is the way in which the transition from the abstract to the practical (Howkins, 2007) is taken into account.

The logic here is related to the fact that some creativity can be there although it is not put into action (Howkins, 2007). However, it is just putting potential creativity into practice that the process of economic development is triggered. In this sense, artistic creativity, scientific creativity, and innovation are identified as the main modes through which creativity can be expressed. A scheme of the operational definition of creativity proposed in this work on the basis of the above reasoning is reported in Figure 1. The three main components of creativity and all their possible combinations are investigated: there is no need for all the components to be there at the same time, since any possible combination shapes a particular type of creativity.

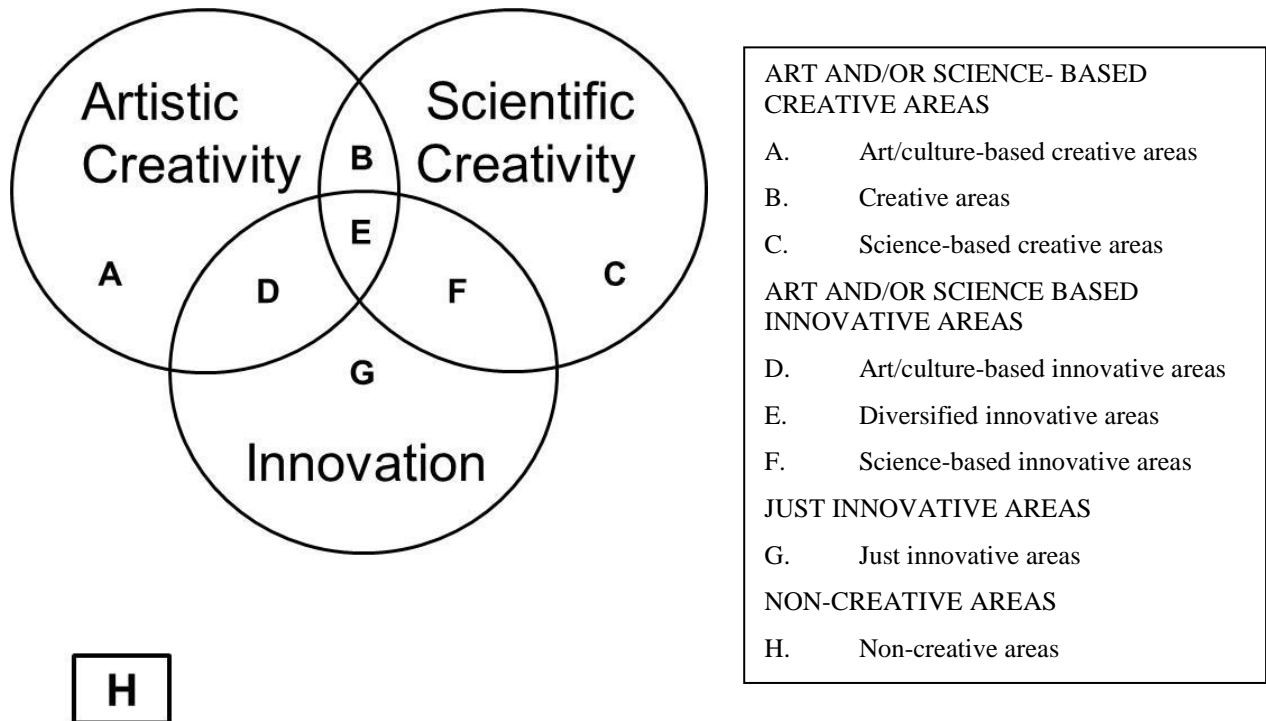
Following this logic and keeping in mind that the objective is to apply the proposed operational definition to geographical areas, different *regional creative patterns* (that can be grouped into four main patterns) are defined: i. *art and/or science based creative areas*, that can be either areas abundant in artistic creativity not accompanied by innovation (A), areas abundant in both artistic and scientific creativity not accompanied by innovation (B), or areas abundant in scientific creativity not accompanied by innovation (C); ii. *art and/or science based innovative areas*, that can be either areas characterized by innovation stemming from artistic creativity (D), areas characterized by innovation stemming from both artistic and scientific creativity (E), or areas characterized by innovation stemming from scientific creativity (F); iii. *just innovative areas* (G), that are innovative areas where the idea is that the innovation in question is incremental rather than radical, since it stems neither from artistic nor from scientific creativity. In this case, innovation takes place mainly through the application or novel combinations of existing knowledge (know-how) and does not come from a

¹⁶ Cultural production is not expected to go through a replicable and rational process; it is instead expected to engage in emotional articulation (expressive process) (Madanipour, 2011, ch. 4).

¹⁷ Scientific investigations are expected to produce reliable and replicable outcomes with objective value, expressed in the language of mathematics, which is the language of science (instrumental process) (Madanipour, 2011, ch. 4).

deductive process or through abstraction, but mainly through practical work (learning by doing)¹⁸; and iv. *non-creative areas*, that are areas poor in all the components (H). They are not creative (neither artistically nor scientifically) and they are not able to innovate.

Figure 1 – A possible operational definition of creativity: regional creative patterns



Apart from *non-creative areas* (category H, poor in all the creative components), which are clearly worse-off with respect to the others, no ranking (value) is implied by this classification, that is only meant to provide a clear scheme of possible different *regional creative patterns*.

This level of the proposed operational definition of creativity is obviously static: according to their peculiar characteristics, the different areas can be associated to one of the identified categories and this can provide a picture of the distribution of different types of creativity across local systems.

Some considerations on the dynamic level, and thus on possible (incremental) jumps from a category to another, are presented in the next section in terms of potential structural changes in *regional creative patterns*.

4.2 Possible structural changes in regional creative patterns

On the basis of the *regional creative patterns* defined above, some possible structural changes were identified. The idea is that local systems could “jump” from a category to another, thus changing their structure in terms of creativity. Of course, some “jumps” are considered to be more likely than others, based on the concept of incremental change (gradual changes are more likely than radical ones). The devised possible structural changes in creative patterns are reported in Table 2. As pointed out in the table, some possible combinations are thought to be very unlikely.

¹⁸ One could also think, to some extent, about innovation through imitation (see Müller et al., 2008), that however still requires some knowledge (Bakhshi et al., 2008).

Table 2 – Possible structural changes in creative patterns

		TO			
		ART AND/OR SCIENCE- BASED CREATIVE AREAS (A, B, C)	ART AND/OR SCIENCE- BASED INNOVATIVE AREAS (D, E, F)	JUST INNOVATIVE AREAS (G)	NON- CREATIVE AREAS (H)
FROM	ART AND/OR SCIENCE- BASED CREATIVE AREAS (A, B, C)	---	1.Areas learning to put their own creative potential into practice	Unrealistic	7.Areas losing all their creative potential and capabilities
	ART AND/OR SCIENCE- BASED INNOVATIVE AREAS (D, E, F)	2.Areas losing their capability of putting their own creative potential into practice	---	3. Areas losing their own creative potential, but keeping their (incremental) innovative capability	
	JUST INNOVATIVE AREAS (G)	Unrealistic	4. Areas developing some creative potential associated to an already existing (incremental) innovative capability	---	
	NON- CREATIVE AREAS (H)	5.Areas starting to develop some creative potential	Unrealistic	6.Areas starting to innovate (incremental innovation)	

In particular, 7 possible (realistic) path of change in creative patterns emerge (see Table 2):

1. areas learning to put their own creative potential into practice through starting to innovate (moving to a higher complexity in terms of creativity);
2. areas losing their capability of putting their own creative potential into practice through slowing their innovative performance (moving to a lower complexity in terms of creativity);
3. areas losing their own creative potential, but keeping their (incremental) innovative capability based on know-how. They move from radical to incremental innovation (moving to a lower complexity in terms of creativity);

4. areas developing some creative potential associated to an already existing (incremental) innovative capability. They move from incremental to radical innovation (moving to a higher complexity in terms of creativity);
5. areas starting to develop some creative potential, through acquiring some art and/or science-based creativity (moving to a higher complexity in terms of creativity);
6. areas starting to innovate through know-how and imitation (moving to a higher complexity in terms of creativity);
7. areas losing all their creative potential and capabilities, ending up in being *non-creative* (scarce in all the identified creative components) and thus definitely moving to lower complexity in terms of creativity.

5. Empirical application

After providing an operational definition for creativity and after identifying different *regional creative patterns*, it is now possible to apply the conceptual framework discussed so far to a practical case. Italian provinces (NUTS3 level) are the unit of analysis and each province is assigned to a specific *regional creative pattern* on the basis of its peculiar characteristics, according to the data and the method explained in the next sections.

As for the data (measures) to be used, both *industry-based* and *occupational* approaches are interesting and relevant. Thus, they should both be taken into account. However, although their relevance is acknowledged, creative industries will not be directly considered within this work. Creative industries are, indeed, at the same time inputs and outputs of creativity and this characteristic could potentially bias the analysis. Therefore, the investigation of the role played by creative industries is left to future research (see Section 6) and the measurement of artistic and scientific creativity is carried out trying to follow as much as possible the *occupational* approach.

5.1 Data

In order to test the operational definition of creativity proposed in the previous section, data on the 103¹⁹ Italian provinces (NUTS3 level) for years 2001 and 2011 were exploited. All the indicators were expressed in terms of share over working age (15-64 years) population, thus allowing to escape from the logic of the mere employment and to consider the overall *creative environment* of provinces²⁰.

As for artistic and scientific creativity, trying to follow the logic of the *occupational* measurement approach, the Italian Census of Population and Houses was chosen as the data source. Every 10 years a census is carried out by ISTAT (Italian National Institute of Statistics) to provide an accurate population count and survey of structural features, update and review anagraphical data, calculate the legal population, and gather information on the number and structural characteristics of housing and buildings. In particular, within the Census questionnaire, there are two questions (pieces of information) that are potentially relevant to this work²¹.

¹⁹ In 2011 Italian provinces were, in fact, 110. For comparability, data for 2011 were aggregated in order to obtain the same 103 provinces as in 2001.

²⁰ See Csikszentmihalyi (1988 and 1996) on the contribution of the social context to creativity and on “creative surroundings”; Preiser (2006), Smith and Carlsson (2006), and Sternberg (2006) about the importance of the environment in creativity; Santagata (2007 and 2009) on the importance of the environment and on the link between creativity and community. See also Scott (1999 and 2006) on the concept of “creative field”, Hennessey and Amabile (1988) and Gardner (2012). On the importance of interaction, among others, Nonaka (1994) states that “communities of interaction” contribute to the amplification and development of new knowledge (social interaction between individuals that share and develop knowledge).

²¹ Being a census, it is important to keep in mind that the information is self-reported.

The first is about occupation in terms of performed task. This would be very useful, but unfortunately the information is organized in ten categories, of which the only one interesting for this paper purpose is “High specialization, technical, administrative, intellectual, scientific, or artistic activity”. Such category includes, among others, doctors, university professors and scholars, actors, musicians, teachers, engineers, chemists, agronomists, lawyers, and pharmacists. Thus, the category is very wide and does not allow to disentangle artistic and scientific creativity.

The second piece of information which is potentially exploitable within this work is the one related to occupation in terms of wide economic activity. Here the information is organized according to twenty-one categories, two of which are relevant for the purposes of this work: “Employment in artistic, sport, and entertainment activities” (also including libraries, archives, and museums) and “Employment in professional, scientific, and technical activities” (also including R&D and advertisement).

Of course the best possible measure could be got through putting together the two pieces of information, thus looking at how many people belonging to the “High specialization, technical, administrative, intellectual, scientific, or artistic activity” are included into “Employment in artistic, sport, and entertainment activities” or “Employment in professional, scientific, and technical activities”. Unfortunately, such elaboration is not available. For this reason, the share of working age population employed in “artistic, sport, and entertainment activities” was chosen as a measure of artistic creativity and the share of working age population employed in “professional, scientific, and technical activities” was chosen as a measure of scientific creativity. Thus, in the end, these measures represent the share of working age population employed in two (wide) economic activity classes that can be useful in order to disentangle artistic and scientific creativity.

Artistic Creativity

As explained above, the measure chosen as a proxy of artistic creativity is the share of working age (15-64 years) population employed in “artistic, sport, and entertainment activities”. From the descriptive statistics presented in Tables 3.a and 3.b, it can be clearly observed that the value of the indicator grew significantly on average between 2001 and 2011. In particular, all the provinces increased their shares.

Table 3 – Employment in artistic, sport, and entertainment activities (share over working age population)

3.a 2001

MIN	.0017	DISTRIBUTION				
MAX	.0179	10%	25%	50%	75%	90%
MEAN	.0047					
STD. DEV.	.0023	.0023	.0029	.0044	.0057	.0069

3.b 2011

MIN	.0026	DISTRIBUTION				
MAX	.0226	10%	25%	50%	75%	90%
MEAN	.0078					
STD. DEV.	.0032	.0039	.0054	.0073	.0094	.0115

Scientific Creativity

As explained above, and similarly to what was done for artistic creativity, the measure chosen as a proxy of scientific creativity is the share of working age (15-64 years) population employed in “professional, scientific, and technical activities”. As reported in the descriptive statistics (Tables 4.a and 4.b), the share of

working age population employed in such category increased dramatically on average during the ten years period under investigation (2001-2011). In particular, all the provinces increased their shares.

Table 4 - Employment in professional, scientific, and technical activities (share over working age population)

4.a 2001

MIN	.0108	DISTRIBUTION				
MAX	.0379	10%	25%	50%	75%	90%
MEAN	.0212					
STD. DEV.	.0058	.0135	.0161	.0224	.0244	.0281

4.b 2011

MIN	.0225	DISTRIBUTION				
MAX	.0797	10%	25%	50%	75%	90%
MEAN	.0427					
STD.DEV.	.0107	.0277	.0343	.0444	.0485	.0559

Innovation

Patents and trademarks are different forms of intellectual property rights and can be used as measures of creativity put into practice in terms of innovation (see Howkins, 2007).

Patents are a set of exclusive rights granted by a sovereign state to an inventor or assignee for a limited period of time in exchange for detailed public disclosure of an invention. An invention is a solution to a specific technological problem and can be either a *product* or a *process*. Trademarks, instead, are recognizable signs, designs or expressions which identify *products* or services of a particular source from those of others.

In this paper, the number of trademarks applied for in each Italian province in 2001 and 2011 was collected and used - in its share over working age population - as a measure of *innovation*. Thus *product innovation* is what is considered here. For the present empirical application, trademarks were preferred to patents since they are better representative of sectors typically related to creativity (e.g. jewelry, musical instruments, furniture, clothing, food & wine), while “scientific” innovation is still accounted for. The source is the Italian Patent and Trademark Office, which provides an online database of patents and trademarks, organized on the basis of province and year. As shown in the descriptive statistics presented in Tables 5.a and 5.b, the average number of trademarks for thousand working age residents increased during the 10 years period (2001 to 2011) under analysis. Out of 103 provinces, the only ones in which the value of the indicator decreased were: Rovigo, Reggio Emilia, Bologna, Napoli, Catanzaro, and Reggio Calabria.

Table 5 – Number of trademarks for thousand working age residents

5.a 2001

MIN	0	DISTRIBUTION				
MAX	5.02	10%	25%	50%	75%	90%
MEAN	.69					
STD. DEV.	.73	.14	.23	.45	.93	1.49

5.b 2011

		DISTRIBUTION				
		10%	25%	50%	75%	90%
MIN	.11					
MAX	5.05					
MEAN	.99					
STD.DEV.	.78	.33	.44	.8	1.27	1.93

5.2 Method

The usual statistical technique for this type of work is cluster analysis, through which a set of objects can be grouped in such a way that objects in the same group (called a cluster) are more similar (in some sense or another) to each other than to those in other groups (clusters)²². However, a classical clustering procedure was not feasible in this particular case, due to two main issues. First, and most important, the distribution of the observations (Italian provinces) across the identified *regional creative patterns* is very polarized. As showed in next paragraph, indeed, most provinces fall in the two “extreme” categories: E (*diversified innovative areas*, rich in all the creative components) and H (*non-creative areas*, poor in all the creative components). Second, retaining the operational scheme presented above was thought to be useful so as to have a clear conceptual framework to work in; thus there was the intention to assign every Italian province to one of the *regional creative patterns* identified through the proposed operational definition explained above.

Therefore, in order to empirically test the operational definition, another method had to be designed. For each variable in the analysis the median value was chosen as a threshold²³. Following such logic, a province was considered as abundant in a specific factor if characterized by a value of that particular variable higher than the median one and as poor in that element otherwise. Once again, no ranking or value judgement is implied by the proposed classification²⁴, which is only meant to organize a clear scheme of possible *regional creative patterns*.

5.3 Results

5.3.1 Spatial distribution of creative patterns

On the basis of the *regional creative patterns* and of the threshold defined above, the situation represented in Figures 2.a and 2.b emerged. As appears quite clearly from the maps, there is a very strong polarization, with southern Italy generally weak in all the elements under consideration and thus falling almost homogeneously in creative pattern “H” (*non-creative areas*, poor in all the creative components) and central and northern Italy more heterogeneous, but substantially polarized towards creative pattern “E” (*diversified innovative areas*, rich in all the creative components).

²² Clustering can be performed by various algorithms that differ significantly in their notion of what constitutes a cluster and how to efficiently find them.

²³ The median was selected as a threshold following the idea that it was more meaningful than the mean.

²⁴ The only category on which a value judgement can be made is H since, being poor in all the creative components, it is clearly worse-off with respect to the others in terms of creativity.

Figure 2 - Regional creative patterns: geographical distribution

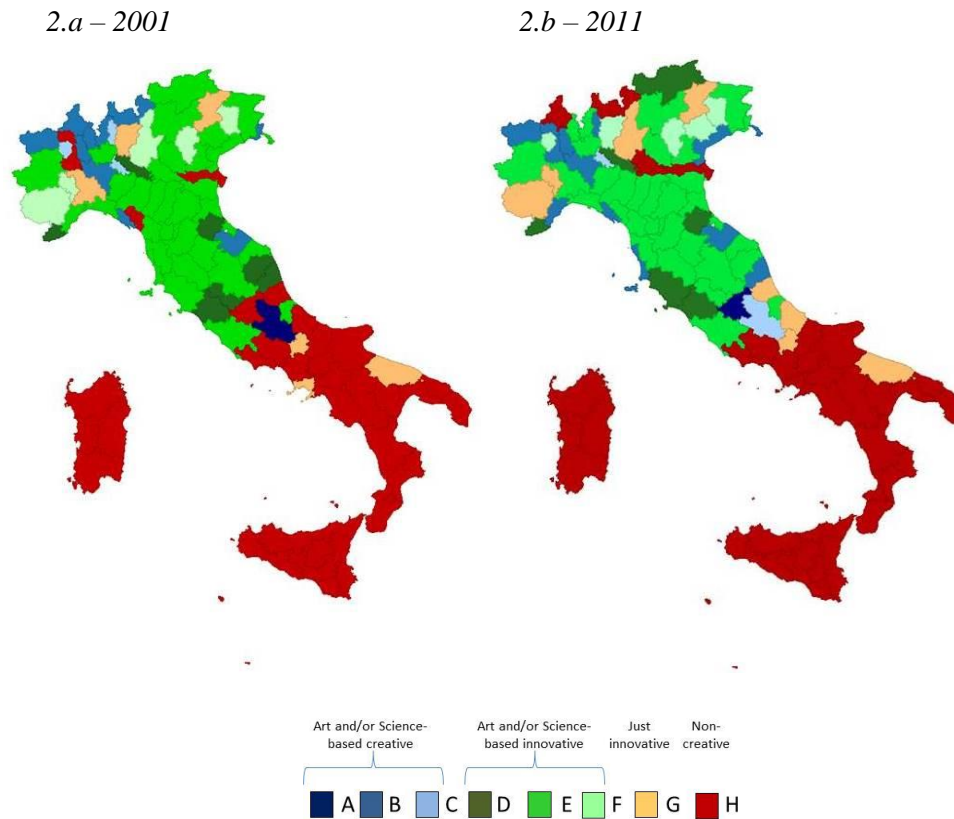


Table 6 shows, in absolute and percentage terms, the distribution of Italian provinces across the identified *regional creative patterns*. As can be observed, the most common category is H (*non-creative areas*, poor in all the creative components): provinces falling in that situation are simply not creative at all. The other very common situation is, however, E (*diversified innovative areas*, rich in all the creative components), which makes up more than 30% of cases in both years under analysis (slightly decreasing over time). Thus, summarizing, *art and/or science-based creative areas* make up about 14% of the observations (slightly increasing from 2001 to 2011), *art and/or science-based innovative areas* represent more than 40% of the total (decreasing over the time period), *just innovative areas* moved from making up about 6% to about 8% of the observations, while *non-creative areas* were almost constant around 35% of the total.

Table 6 – Regional creative patterns: percentage distribution

		2001		2011	
		OBS.	%	OBS.	%
Art and/or science-based creative areas	A – Art/culture-based creative areas	1	0.97%	1	0.97%
	B – Creative areas	10	9.71%	12	11.65%
	C – Science-based creative areas	3	2.91%	2	1.94%
Art and/or science-based innovative areas	D – Art/culture-based innovative areas	7	6.80%	6	5.83%
	E – Diversified innovative areas	34	33.01%	33	32.04%
	F – Science-based innovative areas	5	4.85%	5	4.85%
Just innovative areas	G – Just innovative areas	6	5.83%	8	7.77%
Non-creative areas	H – Non-creative areas	37	35.92%	36	34.95%

5.3.2 Structural changes in creative patterns

After classifying Italian provinces according to the proposed operational definition for years 2001 and 2011, looking at possible structural changes in creative patterns (provinces moving from a category to another), seemed an interesting exercise. Out of the 103 Italian provinces in the analysis, 30 moved to a different creative pattern during the 10 years period. Therefore, in general, the situation was relatively stable (see Table 7 for details about occurring structural changes in creative patterns), and even more so considering that, out of the 30 provinces changing their creative pattern, 7 can be conceptually considered as “stable”²⁵ (shaded in Table 7), while 22 fell in one of the patterns of structural change theoretically identified in Section 4.2. Massa Carrara, instead, presented a peculiar (and unexpected) behavior, jumping from being a *non-creative area* to be an *art and/or science-based innovative area*.

Table 7 – Structural changes in creative patterns: detailed empirical results

PROVINCE	PATTERN 2001-2011	TYPE OF SWITCH
BIELLA	C to F	from art and/or science-based creative areas to art and/or science-based innovative areas (1)
VARESE	B to E	from art and/or science-based creative areas to art and/or science-based innovative areas (1)
COMO	B to E	from art and/or science-based creative areas to art and/or science-based innovative areas (1)
GORIZIA	B to E	from art and/or science-based creative areas to art and/or science-based innovative areas (1)
VENEZIA	E to B	from art and/or science-based innovative areas to art and/or science-based creative areas (2)
TRIESTE	E to B	from art and/or science-based innovative areas to art and/or science-based creative areas (2)
SAVONA	E to B	from art and/or science-based innovative areas to art and/or science-based creative areas (2)
LIVORNO	E to B	from art and/or science-based innovative areas to art and/or science-based creative areas (2)
ASCOLI PICENO	D to B	from art and/or science-based innovative areas to art and/or science-based creative areas (2)
CUNEO	F to G	from art and/or science-based innovative areas to just innovative areas (3)
ASTI	F to G	from art and/or science-based innovative areas to just innovative areas (3)
BRESCIA	F to G	from art and/or science-based innovative areas to just innovative areas (3)
BERGAMO	G to F	from just innovative areas to art and/or science-based innovative areas (4)
ALESSANDRIA	G to E	from just innovative areas to art and/or science-based innovative areas (4)
VERCELLI	H to B	from non-creative areas to art and/or science-based creative areas (5)
RIETI	H to A	from non-creative areas to art and/or science-based creative areas (5)
TERAMO	H to G	from non-creative areas to just innovative areas (6)
CHIETI	H to G	from non-creative areas to just innovative areas (6)
VERBANO-CUSIO-OSSOLA	B to H	from any creative areas to non-creative areas (7)
SONDRIO	B to H	from any creative areas to non-creative areas (7)
MANTOVA	E to H	from any creative areas to non-creative areas (7)
NAPOLI	G to H	from any creative areas to non-creative areas (7)
MASSA CARRARA	H to E	from non-creative areas to art and/or science-based innovative areas
LECCO	C to B	stable
BOLZANO	E to D	stable
TREVISIO	E to F	stable
TERNI	D to E	stable
MACERATA	D to E	stable
GROSSETO	E to D	stable
L'AQUILA	A to C	stable

In order to have a clearer idea of the meaning of structural changes in creative patterns and of the likelihood of the occurrence of every possible shift, Table 8 shows how many provinces - in percentage terms over the number of provinces initially included in the same category (“FROM”) - fall in each possible combination. Although representing only 6 provinces in 2001, *just innovative areas* (G) seems to be the more unstable pattern, with half of the provinces switching from that category to another one during the period in analysis. Another pattern that came out to be prone to change is *art and/or science based creative areas*: more than 40% of the provinces associated to this category changed their pattern, either making their creativity more structured through starting to innovate more significantly (28.57% of cases) or impoverishing their creativity because of the loss of their creative potential (14.29% of cases). On the other hand, a “jump” that was considered as “unrealistic” occurred in one case (Massa Carrara) through the change from *non-creative* to *art and/or science-based innovative area*.

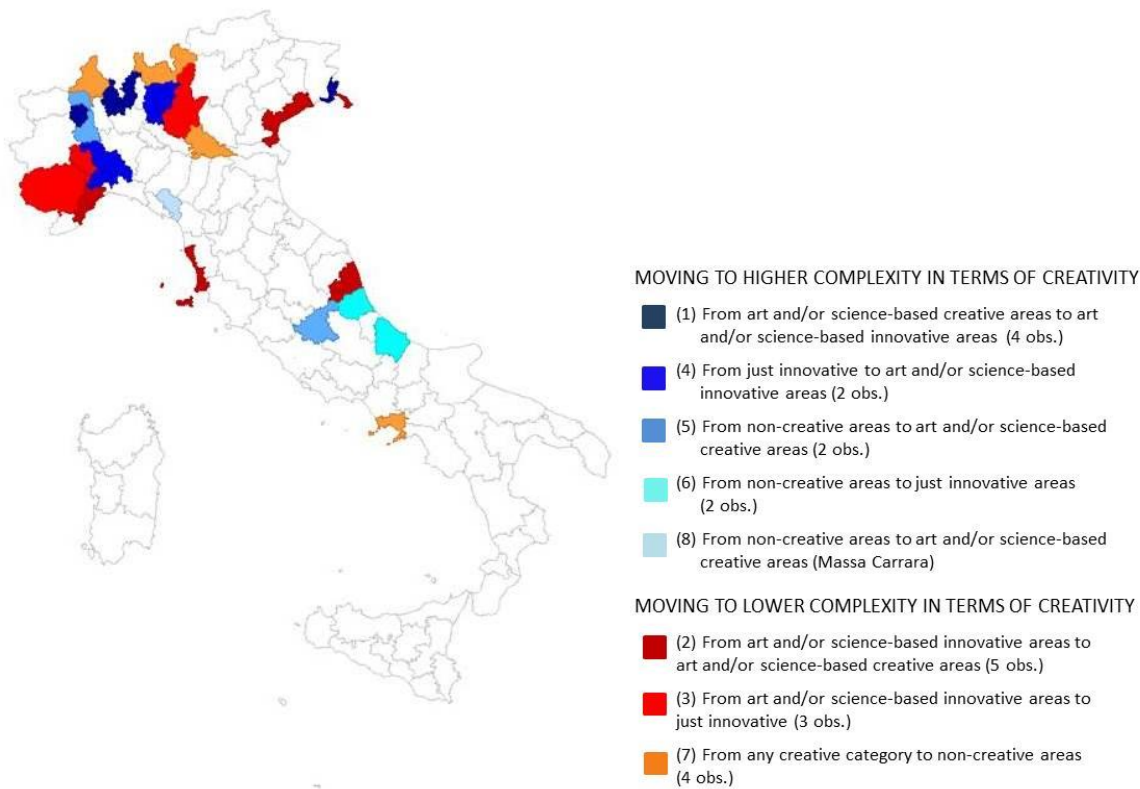
²⁵ In fact, seven provinces (Lecco, Bolzano, Treviso, Terni, Macerata, Grosseto, and L’Aquila) moved between categories that, conceptually, are quite similar. Thus those seven provinces can be considered as “stable”.

Table 8 - Structural changes in creative patterns (% over the no. of obs, associated to the initial pattern)

		TO			
		ART AND/OR SCIENCE- BASED CREATIVE AREAS (A, B, C)	ART AND/OR SCIENCE- BASED INNOVATIVE AREAS (D, E, F)	JUST INNOVATIVE AREAS (G)	NON- CREATIVE AREAS (H)
FROM	ART AND/OR SCIENCE- BASED CREATIVE AREAS (A, B, C)	---	28.57% (4 obs.)	Unrealistic	14.29% (2 obs.)
	ART AND/OR SCIENCE- BASED INNOVATIVE AREAS (D, E, F)	10.87% (5 obs.)	---	6.52% (3 obs.)	2.17% (1 obs.)
	JUST INNOVATIVE AREAS (G)	Unrealistic	33.33% (2 obs.)	---	16.67% (1 obs.)
	NON- CREATIVE AREAS (H)	5.4% (2 obs.)	2.7% (1 obs.)	5.4% (2 obs.)	---

So as to gain a better idea of the geographical distribution (and heterogeneity) of structural changes in creative patterns, a graphical representation is provided in Figure 3. Two elements that emerge quite distinctly are geographical polarization and stability. Most provinces are stable in their (polarized) categories, thus showing that creative patterns are a strong, structural characteristic of local systems. Central and northern provinces present some signs of dynamism, while southern provinces do not change and remain stuck in their (poor) condition. Basically, the whole south of Italy does not move from a situation of scarcity in all the creative components, continuing to be labelled as *non-creative area* (category H). As for the changes in structural creative patterns, Figure 3 represents in bluish shades those “jumps” that led to a higher complexity in terms of creativity (provinces that made their creativity somehow more structured, improving their relative endowment of some components) and in reddish shades the “jumps” that led to a lower complexity in terms of creativity (provinces that impoverished their creativity through decreasing their relative endowment of some components).

Figure 3 – Structural changes in creative patterns: stability and geographical polarization



6. Conclusions and further steps

6.1 Conclusions

This work aimed at analyzing the distribution of creativity among Italian provinces and the changes Italian provinces experienced in terms of creativity. However, defining a *level* of creativity is very difficult, essentially because of the confusion related to the existence of many different definitions and because of the lack of a satisfactory method to measure such an intangible and multidimensional concept. Thus, a step back was required in order to formulate a clear theoretical framework that allowed to reason properly about the topic.

In order to do that, the paper started from the recognition of the fact that creativity is a multi-faceted factor and, as such, difficult to define. There are, indeed, many definitions of creativity available in literature, but different definitions just emphasize different aspects of the concept (e.g. novelty or the relationship with innovation and knowledge). In addition, most “definitions” tend to generically *describe* (rather than define) creativity and in many cases inputs and outputs are mixed up.

Nonetheless, defining creativity is not the only challenge. Measuring creativity is another complicated task. The breadth of the concept and the varied perceptions about how to define and delimit the creative economy make it difficult to identify or agree upon reliable and comparable economic indicators that capture its economic, cultural, social, and technological dimensions (UNCTAD, 2010, ch. 3). In literature there are two main approaches to the measurement of creativity: the *industry-based* approach and the *occupational* approach. They are, however, characterized by limits and drawbacks.

In this sense, the first clear message this work means to deliver is that creativity is a very complex factor, such complexity being certainly related to its intangibility but, more importantly, to its multidimensionality. Creativity is, indeed, a multi-faceted concept that conveys many elements related for instance to talent, ideas, and curiosity but also to problem solving, production processes and innovation. These features make defining and measuring creativity a challenging task.

Therefore, based on the idea that *creativity*, *knowledge* and *innovation* are three distinct elements (in terms of *creativity* and *knowledge* being the *triggers* for *innovation*), the paper tried to overcome the limits of definitions and measures through i. recognizing the existence of different types of creativity and ii. acknowledging the importance of putting own creative talent into action (*innovation*).

By identifying, through the role played by knowledge, *scientific creativity*, *artistic creativity*, and *innovation* (as practical expression of creativity) as the modes in which creativity shows itself and the main elements of the reasoning, this work proposed a new operational definition of creativity and identified different *regional creative patterns*. In addition, in order to try to investigate the possible changes and thus the potential evolution areas could experience in terms of creative endowment, some potential structural changes in creative patterns (moving from one pattern to another) are also delineated.

In this framework, a second important message put forward by the paper is that creativity can be there even without innovation, but it is by putting creativity into action through innovation that the process of economic development is triggered.

The proposed operational definition was subsequently tested on Italian provinces. Using employment data from the Italian Census of Population and Houses (ISTAT, 2001-2011) and information on trademarks from the Italian Office of Patent and Trademark, Italian provinces were assigned to the appropriate *regional creative pattern* and structural changes were also explored.

What appeared quite clearly from the empirical exercise is that there is a very strong polarization, with southern Italy generally weak in all the elements under consideration and thus falling almost homogeneously in category H (*non-creative areas*, poor in all the creative components) and central and northern Italy more heterogeneous, but substantially polarized towards category E (*diversified innovative areas*, rich in all the creative components).

Moreover, out of the 103 Italian provinces in the analysis, only 30 moved to a different creative pattern during the 10 years period between 2001 and 2011. Therefore, in general, the situation was relatively stable and even more so considering that 7 cases can be conceptually considered as “stable”. Of the remaining 23 provinces that experienced structural changes in creativity, 22 fell in one of the patterns of structural change theoretically identified in Section 4.2, while Massa Carrara presented a peculiar (and unexpected) behavior, jumping from being a *non-creative area* to be an *art and/or science-based innovative area*.

Most provinces are stable in their (polarized) categories, thus showing that creative patterns are a strong, structural characteristic of local systems. Nevertheless, central and northern provinces present some signs of dynamism, while southern provinces do not switch and remain stuck in their (poor) condition.

Thus, a third clear message conveyed by this work is related to *stability*. Creativity, in its different expressions, is a structural characteristic of local systems. In this sense, generally speaking, it does not change neither easily nor rapidly. In addition, changes tend to be slow and gradual (incremental) rather than sudden and radical.

Overall, however, the potential role played by creativity in economic development is still to be proved and, if finally found out, clearly measured.

6.2 Further steps

In order to improve our level of understanding of creativity through exploiting the operational definition proposed in this work, some further steps could be considered. First of all, after working on a clear identification of *creative industries*, relating the operational definition proposed in this paper to the presence of such sectors would be an interesting step in order to understand if there is in fact a relationship between creativity as operationalized in this work and the presence/activity (in terms of employment and/or value added) of *creative industries*. Second, further analyzing provinces that experienced structural changes in creative patterns, would allow to better identify and understand possible regional paths in terms of creativity. Third, investigating the role played by creativity in regional development (possibly reasoning on a potential

direct contribution of creativity, without necessarily passing through innovation) would definitely contribute to the current research on the topic. Moreover, an interesting empirical exercise would be to isolate southern Italy in order to further analyze the heterogeneity within such area.

Finally, depending on data availability, interesting hints could be i. working on more meaningful spatial disaggregations (e.g. Local Labor Systems) that refer more to the actual organization of local areas (Menghinello, 2002); ii. using better measures for artistic and scientific creativity (e.g. through putting together the information on performed tasks and wide economic activity of employment); and iii. looking at the specific types of product innovation through possibly exploiting the classification of trademarks²⁶.

²⁶ For the purpose of registering trademarks, goods and services are usually classified according to the Nice Classification, established by the Nice Agreement (1957). The author is currently working on the construction of a database that allows to take into account additional information about trademarks.

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SOMMARIO

Come si distribuisce la creatività tra le province italiane? E come cambiano le province italiane in termini di creatività? Il primo ostacolo in cui ci si imbatte lavorando sulla creatività è la mancanza di una definizione univoca. Esistono, infatti, molteplici definizioni, ognuna delle quali si sofferma solo su alcuni aspetti che caratterizzano il concetto. Inoltre, la maggior parte delle “definizioni” tende a *descrivere* (piuttosto che a definire) la creatività e in molti casi *input* e *output* non vengono distinti. La questione è che la creatività è un fattore multidimensionale e, in quanto tale, difficile da delineare. Per questa ragione misurare la creatività è particolarmente complesso e i metodi proposti fino ad oggi presentano limiti sostanziali. Emerge, quindi, la necessità di superare tali limiti mettendo ordine tra le definizioni e le possibili misure al fine di ottenere una cornice teorica chiara.

Questo lavoro si muove in tale direzione riconoscendo: i. l’esistenza di diversi tipi di creatività e ii. l’importanza di concretizzare il proprio potenziale creativo. In particolare, a partire da *creatività artistica*, *creatività scientifica* e *innovazione*, viene proposta una nuova definizione operativa di creatività e si delineano possibili modelli di cambiamento strutturale.

La definizione operativa proposta viene poi testata attraverso un’applicazione empirica relativa all’Italia: le province italiane sono classificate sulla base delle categorie identificate e vengono esplorati i possibili modelli di cambiamento strutturale delineati.