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Does Related variety matter for Creative Industries?

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Abstract

Creative industries have become a priority sector for economic development and to exit from the actual economic crisis. Nevertheless, creative industries includes heterogeneous industries and it is not enough investigated how variety and diversity work to favour knowledge spillovers and cross-fertilization processes.

The Related Variety approach aims to identify key factors of economic growth considering the need for a local system to have a certain degree of cognitive proximity, so as to promote innovation and development in the area.

This work contributes to both these strands of research and it attempts to investigate the role and importance of related and unrelated variety within creative industries for local economic growth. The study focuses on employment growth at provincial level during a long run period 1991-2011 in Italy.

Results suggests that the employment growth in creative industries depends on their variety and, even more, on their related variety, which make them able to promote interactions among industries and foster creativity.

Key words: Creative industries, creativity, related variety, growth.

Jel Code: R11, O10

1. Introduction

The socio-economic changes of the last decade have substantially altered the competitive environment of firms for basically all the economic sectors.

The globalization process made the planet smaller, so that low-cost resources are today more accessible to economic actors. In such a scenario, the competitiveness of countries and firms depends more and more on local advantages, on specialization and on the ability to transfer knowledge, all factors heavily relying on cognitive and geographical proximity.

This work intends to investigate the role and importance of variety, and especially of related and unrelated variety in terms of local economic growth in Italy, within creative industries (DCMS, 2013).

The related-variety approach (Frenken et al., 2007), which has received a growing attention in literature (Boschma and Iammarino 2009; Brachert et al. 2011; Boschma et al. 2012; van Oort et al., 2014), is applied to identify the key factors of economic development at both regional and national levels, by pointing up the need for a local system to have a certain degree of cognitive proximity so as to promote innovation and economic development in the area.

Also following Klepper findings (2007) we could say how important is the development in related industries, cause it improves the life chances of spin-off industries and new entrants if they already have some experiences in related sectors.

An important part of the literature, on local development that refers to the Evolutionary Economic Geography approach (Boschma and Frenken, 2006; Boschma and Martin, 2010), argues that economic growth can be favoured by Jacobian diversification externalities that, as underlined by Jacobs (1969), find in cities, regions and local systems their flywheel of development.

These economies can be studied through the so-called related variety approach developed mainly by a group of northern European scholars such Frenken, Boschma, Asheim, Cooke. This can be useful in this context as we know now, Europe is still gripped by the paradigm of rigor and austerity and struggling to emerge from the crisis that affects mainly the southern countries, such as Italy.

A possible way out supported by scholars of the creative approach, seems to be to invest in the so-called innovative cultural and creative industries (UNCTAD, 2010; Bakhshi et al. 2013). That based primarily on the development of new ICT technologies, can have an impact on the growth of the wider economy (Bakhshi et al., 2008), thanks to their ability to facilitate the transversal innovations fostered by processes of cross-fertilization.

Variety and diversity have a crucial value in the creative industries in creative cities and in creative local systems (Lorenzen and Frederiksen, 2008), recalling the concept of the the Jacobian diversification economies (Cooke, 2013). Creative cities are defined in the creative approach in terms of both creative class (Florida, 2002) and creative and cultural industries and clusters (Cooke and Lazzeretti, 2008), able to develop processes of development and innovation based on artistic, cultural, natural and human resources present in the territories.

The creative sector becomes strategic and it is seen as a priority for the development, growth and exit from the actual economic crisis. This is true also in countries like Italy, characterized by a high endowment of artistic and cultural resources (EC, 2010). And the related variety approach becomes a useful tool to study the variety of creative industries and the relationships among the local actors, cluster, network and industries, based not only on geographical proximity, but also on the cognitive proximity.

The motivations behind our choice of focussing on creative industries are, first of all, that they have raised a strong interest in literature, because they are increasingly seen as right sectors to promote for driving our economies out of the present crisis (UNCTAD, 2010). This is especially true for our country, which has a strong specialization in these sectors, an economic system strongly built on individual creativity, and an extensive artistic and cultural heritage; so that these fields can

very well constitute the future foundation on which to develop and maintain a competitive advantage at national level.

Another motivation that drove our attention precisely on these sectors is that many of concepts widely used in the creative approach, like the role of proximity, the Jacobian externalities and spillovers, or those drawn for the knowledge-based theories, that are also of fundamental importance for the related variety approach.

Several studies investigate the related variety and the impact on growth at the level of regions and nations (Frenken et al. 2007; Boschma and Iammarino, 2009; Boschma et al., 2012; van Oort et al., 2014) but few of them analyse the cultural and creative industries individually or together (Berg and Hassink, 2014; Lazzeretti et al., 2013). Many taxonomy of creative industries are proposed and this reflects the fuzzy nature of the creativity concept (Bakhshi et al., 2013; DCMS; 2013).

The aim of this work is to investigate the impact that may have related variety in the long term employment dynamics in the creative industries and the overall level in Italy, answering to this two main questions:

- What is the impact of Creative industries' related variety on the employment growth in Creative Industries in Italy?
- What is the impact of Creative industries' related variety on the employment growth in all sectors in Italy?

In other words, are high levels of related variety in creative industries associated to a stronger employment growth in creative industries? And subsequently, Do high levels of related variety in the creative industries entail a stronger economic growth involving all the economic sectors?

This analysis presents some novelties in terms of its two theoretical frameworks. In fact, compared to the studies falling under the Evolutionary Economic Geography (EEG), it has a farther-reaching scope in that it covers a long-term time frame (twenty years) and, by surveying data for 2011, it allows to make some evaluations in the context of a serious economic crisis (2001-2011). A second feature deserving attention is the application of the methodologies used in the related-variety approach, which seem also relevant in the literature on creative industries.

The above remarks lead us to recognize the theoretical and empirical connections between the EEG and the studies of creative economy. Given that the two approaches have many common elements, attention is drawn on the need to find shared methodologies and to carry on studies combining EEG and creative economics.

With appropriate limits of the approach followed (first of all the definition of creative industries), the results lead us to resize the claim held by some that the creative industries (Cis) can actually have a strong impact on economic growth in the wider economy. This relevance does not seem to emerge in the Italian case sensitively.

Besides, results point out an important effect of related variety on the growth of the creative industries, characterized by a high internal connection among economic activities such as entertainment/media, or related by the use of new technologies, such as the recent interaction between fashion and museums or culture and food, that has operated the rejuvenation of many sectors of Made in Italy.

Results emphasize how different level of variety are key elements for innovation and local economic growth in Italy. In particular, they underline how the presence in a place of a variety of knowledge and resources is relevant to the innovation process, and especially for the creative industries. In conclusion the creative sector does not represent a panacea for ending the crisis, as has been argued by many critics, but creative industries can generate important trajectories of growth and development thanks to the high degree of related variety.

2. Related Variety, creative industries and growth

2.1. The Related variety approach

In the recent literature on economic development is growing the attention on the role of diversity (Boschma and Frenken 2009) rather than to the specialization as one of the performance and competitiveness determinants of clusters, districts and metropolitan areas.

After Marshall (1890), Krugman (1991, 1995) started to use the concept of spatial dimension in the economics models. In some studies, Glaeser et al., (1992) have distinguished three different types of dynamic externalities (Feser, 2002). The first, which originates from the contributions of Marshall, Arrow and Romer, is related to knowledge spillovers between firms belonging to the same sector. While the second theory, which is developed in the context of the debate on industrial districts (Becattini et al., 2009), places emphasis on how the dynamic externalities are maximized in the geographical areas that are characterized by a strong presence of small and medium-sized of specialized enterprises. Finally, the third theory belongs to the Jacobs writings (1969), following which, in addition to agglomeration economies, related to a specific sector or within a chain, it is evident that further positive externalities arise from the concentration in the territory of enterprises belonging to different sectors. These economies of scope, which are called *Jacobs externalities* (1969), are based on the idea that the diversity and variety of businesses close together in space can promote both the transfer of knowledge and the growth of productivity (Harrison, 1996).

This theory also highlights how local production systems (clusters and districts), more diversified from a technological point of view, will yield better results thanks to the transmission of innovations and knowledge between firms belonging to different sectors. What matters then is the process of cross-fertilization and cross-cutting processes that results from the interplay of ideas belonging to different technological trajectories (Lazzeretti, 2009).

To be capable to generate radical innovations and for a capacity of diversification within the local system is needed that the productive system is composed of companies sufficiently different from each other, as diversity makes possible the exchange of knowledge that come from different sectors (Broekel et al. 2012). Thanks to this variety the generation of new ideas is stimulated as claimed by Bishop and Gripaios (2010). These authors state that is precisely in terms of knowledge spillovers between different sectors that the growth and radical innovations are encouraged, while knowledge spillovers within the same sector foster incremental innovations.

According with this aspect it is interesting to refer the theories of Jacobs (1969) that explain how urban environments, rich in terms of variety, have a strong ability to generate innovation and growth; this is also confirmed in the writings of Glaeser et al. (1992).

It is in this context, it is not diversity itself that explains economic and innovative development of local systems, but the presence of related variety (Frenken et al., 2007), a concept that places a strong emphasis on contiguous and complementary knowledge that can be found in a given territory, district or cluster.

In this research, more importance is given to the idea that, in order to develop the learning capacity and the exchange between companies belonging to different sectors, it is necessary to have a level of variety such that companies are not too different from each other, since in this case would not have the opportunity to learn from each other, due to lack of a common language, and not even too similar because in that case they would not have almost anything to trade and learn from each other.

We are not yet in possession of such empirical evidence that we can use the concept of related variety to interpret clearly the performance of the industries or of clusters and districts. But we can, thanks to this concept, use new methods of analysis at regional or local systems level, to derive indications of policy and competitiveness.

These are precisely the methods used in the related variety approach that lead to focus attention on the search for similarities in the technological knowledge possessed by the various local units regardless of the sector they belong to. The related variety approach can also lead to overcome the policies for the district, cluster or sector by promoting interventions that can enhance the cross-relationships between the actors in the area.

In studies on the role of proximity, as we have previously mentioned, the conclusion is that, in the relationship between proximity, innovation and development, innovation and learning lock-in may happen, both in the case of excessive closeness and in a context of strong distance, and believes that this applies to all five dimensions of proximity (Boschma, 2005)[1].

The most interesting studies in this area analyse, on the basis of data disaggregated by type of product at the enterprise level, the presence of correlations close and distant to assess the impact on growth and competitiveness. So following Frenken (2007), variety in general has the function to protect the area from unemployment growth in presence of external shock, and this is even more valuable for the unrelated part of the variety, as higher will be the industrial diversification of the area within sectors not connected to each other, higher will be the capacity of this area to react in presence of sector specific crisis, while the other part of the variety, the related part, is considered as an important driver of economic development of the area, and particularly capable to foster employment growth.

This perspective has been applied in recent years for several countries including initially Netherlands (Frenken et al. 2007) introducing the concept of related and unrelated variety. Italy (Boschma and Iammarino, 2009) using export and import data. Great Britain (Bishop and Gripaios, 2010) using spatial models and finding a higher impact of unrelated variety then of related variety on growth. Germany (Brachert et al. 2011) developing an industry-function approach dividing in three different categories white collar, R&D workers and blue collar. Spain (Boschma et al. 2012) using two different methods to measure revealed relatedness between sectors. Finland (Hartog et al 2013) also introducing a division between high-tech and low-medium tech sectors. A pan-European analysis have been conducted (van Oort et al. 2014) but at Nuts 2 level, this work is particularly interesting because use spatial-lag models and because the analysis is conducted taking into account many European country at the same time.

[1] Five dimensions of proximity: cognitive, organizational, social, institutional and geographical; the first four dimensions appear to be disconnected from the physical proximity, because they express a relational proximity that is linked to the interaction at a distance between actors (Amin and Cohendet 2003).

2.2. Creative industries

In the innovation process creativity has a key role, is now consolidated in the literature the tendency of qualified human capital and creative people to concentrate in certain places (Scott, 2005; Florida, 2002). Even in this case, (as previously said for the related variety) the cognitive proximity has to be such that the ideas should not be neither too close and nor too far from each other, so that they can develop interactions and ensure that new ideas rise and develop the innovation process.

These areas of high concentration of creative people and creative works have an equally high concentration of industries defined as creative industries that concentrate in medium and large cities, which consequently let to create local creative systems.

CIs play a pivotal role and have been acknowledged as a crucial element in culturally-led local development (Sacco and Segre, 2009), the growth of employment (Power, 2011), and the support of innovations and the creation of new firms (Bakhshi et al., 2008; Jeffcut and Pratt, 2009). Creative Industries (CIs) have become a very appealing sector at the global level because of their interconnections with the new technological trajectories and because they are considered an important source of innovation for emerging from the current crisis (UNCTAD, 2010) and contributing to national wealth (De-Miguel-Molina et al., 2012).

Several contributions suggest that there is a strong relationship between the presence of creative industries and regional prosperity. Power (2011) shows that those European regions with above-average concentrations of creative industries are generally characterized by an higher economic prosperity. Lazzeretti (2013) states that large urban areas and capital city regions dominate the creative and cultural industries, but some city regions do better than others depending on their specialisation in creative industries and on the presence of creative clusters. Bakhshi et al., (2008) analyse the contribution of creative industries to wider economy. De Molina et al., (2012) analyse the impact and importance of creative industries clusters in wealth of Europe. Barrowclough and Kozul-Wright (2008) investigates the potential of creative industries for economic growth in developing countries while Yusuf and Nabeshima (2005) focus on east Asia.

In this context, our interest is to contribute to this debate by analysing the contribution of creative industries to economic development in Italy through the Related Variety approach.

There are few studies that tried to connect the related variety approach to the creative industries approach. Lazzeretti et al. (2012) investigate the reasons why creative industries cluster and point out that the creative industries' Related Variety of an area is an important determinant.

The most recent one is the work of Berg and Hassink (2014) that analyse the creative industries from an evolutionary perspective and connecting them with the Evolutionary Economic Geography approach, but no one empirically tried to measure the impact of related variety of creative industries on growth while an interesting empirical study (Sedita et al. 2014) can be found using the concept of creativity as the symbolic knowledge base proposed by Asheim (2007).

3. Research design

3.1. Data sources

The main data consist in the number of employees subdivided by ATECO code, up to the 4-digit level of detail, figures gathered from the Statistical Atlas of Municipalities for the two first censuses (1991 and 2001) and from ISTAT for the 2011 Census of Industries and Services.

So, the period under study covers the whole twenty-years from 1991 to 2011, a rather long time span, characterized by many changes at all levels.

This study use as a territorial proxy of analysis the totality of the Italian provinces and avails itself of the ISTAT census data per province, corresponding to the NUTS-3 classification of the European Union. We decided to refer to the provinces existing before the 2001 revision, which were 103, for the sake of consistency in the investigation of the twenty-year time frame.

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3.2. The definition of creative industries

Creative industries were first catalogued by DCMS in 1998; however, in this study we take into account the more recent classification contained in the *Creative Industries Mapping Document* (DCMS, 2013), which is based on the creative intensity of economic activities

The creative industries have been analysed for the first time in the Creative Industries Mapping Document (DCMS 1998), these industries need individual creativity to grow and develop. DCMS's taxonomy has arguably stood the test of time well enough and has become a de facto world standard notwithstanding the received criticism (Bakhshi et al., 2013).

This new revision focuses on the idea of 'creative intensity' and uses the proportion of people doing creative jobs within each industry to indicate which industries should be included. The broad industry groups that are considered by DCMS (2013) as creative are the followings: Advertising, Architecture, Arts and entertainment activities, Computer programming activities, Design activities, Motion and video, Photographic activities, Programming and broadcasting activities, Publishing, Sound recording and music. This revision is an updated version of the original 2001 DCMS approach, which was one of the most applied approaches in international benchmarking (e.g. Boix et al., 2014, Power, 2011).

Table 1 summarizes the CIs selected for analysis and converted into NACE Rev. 2 economic activities at the three digit level, which is at present the deepest level of data availability (at the municipality level) for Italy.

Table 1 Creative Industries according to the DCMS, 2013.

ADVERTISING	**MOTION PICTURE, VIDEO AND TV**
73.11 Advertising agencies	***59.11 Motion picture and video production activities***
73.12 Media representation	***59.12 Motion picture, video and TV post production activities***
	59.13 Motion picture and video distribution activities
	59.14 Motion picture projection activities
ARCHITECTURE AND ENGINEERGIN	**PHOTOGRAPY**
71.11 Architectural activities	***74.20 Photographic activities***
ARTS AND ENTERTAINMENT	**PROGRAMMING AND BROADCASTING ACTIVITIES TV AND RADIO**
90.01 Performing arts	***60.10 Radio broadcasting***
90.02 Support activities to performing arts	***60.20 TV programming and broadcasting activities***
90.03 Artistic creation	

90.04 Operation of arts facilities	
COMPUTER PROGRAMMING	**PUBLISHING**
62.01 Software production	***58.11 Book publishing***
62.02 Computer consultancy activities	***58.13 Publishing of newspapers***
	58.14 Publishing of journals and periodicals
	58.19 Other publishing activities
DESIGN ACTIVITIES	**SOUND RECORDING AND MUSIC**
74.10 Specialised design activities	***59.20 Sound recording and music publishing activities***

Source: The authors' elaboration from DCMS, 2013.

3.3 Methodology and variables

Among the main methodologies applied to the relatedness studies we performed two exploratory studies.

The creation of an ad hoc *industrial space* to calculate the relatedness density of the area have been recently applied to many studies about the development and technological diversification, Hidalgo et al. (2007), Neffke et al. (2011), Rigby (2012), Boschma et al. (2013), Boschma et al. (2014).

The product space of Hidalgo (2007) represent in a network the exported products, where the nodes represent every different product and the lines the relatedness degree between them, based on the idea that two products are related if they are co-exported by many countries because is assumed that they require some common capabilities to be produced often together by the same countries.

The second is about the use of entropy indexes to calculate the variety that will be decomposed into *related* and *unrelated variety* (Frenken et al. 2007), (Boschma and Iammarino, 2009), (van Oort et al. 2014).

We chose to use this second method to calculate the industrial variety of the area, and then decomposing it in *related* and *unrelated variety*.

In the following lines, the chosen method will be explained and the measurement of the variable will be descripted.

We remind that the aim of the paper is to measure the relationships between the employment growth in creative industries in Italy and the related variety. Therefore the dependent variable of the model is the growth of employment in a long period run.

The dependent variable *Emp Grow* is calculated at provincial level, indicating the employment growth of the area during the period 1991-2001, 2001-2011 and 1991-2011 calculated as follow: $ln\ (emp\ t_1/emp\ t_0)$

Regarding variety we used the entropy measures following the rules adopted in Frenken et al. (2007), Hartog et al.(2012) and Boschma and Iammarino (2009).

Variety is measured as the sum of the entropy at the chosen digit level and designates the variety in the industrial composition of the area, the value of this variables will be higher in areas characterized by a high diversified industrial composition. (Hartog et al., 2012).

$$Variety = \sum_{g=1}^{G} Pi\ log_2 \left(\frac{1}{Pi}\right)$$

Then, starting from the *variety* we will break down this measure in two different indicators, the first one is the *unrelated variety* measured as the total amount of entropy at 2-digit level, being

assumed that the sectors that do not share the same 2-digits are unrelated to each other, so the higher this value is, the more the area will be composed of dissimilar industrial sectors, with high level of this variable are associated low knowledge spillovers (Frenken et al. 2007).

Unrel Var. is measured as follow:

$$Unrel.\ Var = \sum_{g=1}^{G} Pg\ log_2 \left(\frac{1}{Pg}\right)$$

Where *Pg* is the two digit shares, calculate summing the four digit shares *Pi* already used for the variety index

$$P_g = \sum_{i \in S_g} p_i$$

The second part of the variety is the Related Variety. It is the weighted sum of the entropy within each 2-digit sector and it is calculated as follow:

$$Rel.\ Var = \sum_{g=1}^{G} Pg\ Hg$$

and Hg measure the degree of variety within the 2-digit class of every Italian provinces:

$$H_g = \sum_{i \in S_g} \frac{p_i}{P_g} log_2 \left(\frac{1}{p_i/P_g}\right)$$

.

As already seen in literature, we assume that sectors that belongs to the same 2-digit class are technologically related each other (Frenken et al., 2007; Hartog et al., 2012) and they can learn through knowledge spillovers.

Indices will be calculated as, related and unrelated variety of creative industries, taking into account for the calculation only creative industries according to the DCMS (2013) classification.

Control variables are also included in the models. In order to control if the urbanization and industrialization level of an area are relevant in our study, we have calculated the population density of each province, measured as the population and area ratio of provinces.

We also calculated the percentage of residents with degree education level or higher for every province, this method of measuring the level of education of an area is in line with most of the literature on human capital and regional growth.

We also controlled for different industrialization level of Italian macro-regions using a dummy variables this is particularly useful for the Italian case, as is known the different industrialization between north and south of the country.

4. Related variety in creative industries and growth

4.1. Data, variables and descriptive statistics

In this study, we resort to the data collected by ISTAT in the ten-year censuses of 1991, 2001 and 2011, and employ the number of employees by ATECO classification at 4-digit level, calculating the indexes relative to the categories classified as creative according to the most up-to-date classification criteria set by DCMS (2013).

Table 2 Variables included in the regression

	Model 1	***Model 2***	***Model 3***	***Model 4***	***Model 5***
Emp. Growth	$emp\ C_{11}/emp\ C_{91}$	$emp\ C_{11}/emp\ C_{91}$	$emp\ C_{01}/emp\ C_{91}$	$emp\ C_{11}/emp\ C_{01}$	emp_{11}/emp_{91}
Variety CIs	$\sum_{g=1}^{G} Pi \log_2 \frac{1}{(Pi)}$				
Rel. Var CIs		$\sum_{g=1}^{G} Pg\ Hg$	$\sum_{g=1}^{G} Pg\ Hg$	$\sum_{g=1}^{G} Pg\ Hg$	$\sum_{g=1}^{G} Pg\ Hg$
Unrel. Var CIs		$\sum_{g=1}^{G} Pg \log_2 \frac{1}{(Pg)}$	$\sum_{g=1}^{G} Pg \log_2 \frac{1}{(Pg)}$	$\sum_{g=1}^{G} Pg \log_2 \frac{1}{(Pg)}$	$\sum_{g=1}^{G} Pg \log_2 \frac{1}{(Pg)}$
Pop. Density	$ln(pop_{91}/sup.)$	$ln(pop_{91}/sup.)$	$ln(pop_{91}/sup.)$	$ln(pop_{01}/sup.)$	$ln(pop_{91}/sup.)$
Human Cap.	$graduated_{91}/pop_{91}$	$graduated_{91}/pop_{91}$	$graduated_{91}/pop_{91}$	$graduated_{01}/pop_{01}$	$graduated_{91}/pop_{91}$
Macro regions	*Dummy*	*Dummy*	*Dummy*	*Dummy*	*Dummy*

Table 2 illustrates the variables that are included in the regression analysis. The variable *employment growth C* is calculated as the difference between the initial and the final values for the period under study, and it corresponds to Δ (1991-2011) in Models 1 and 2, to Δ (1991-2001) in Model 3, and to Δ (2001-2011) in Model 4. While in model 5 the variable *employment growth* is not estimated for the creative industries alone, but for all industrial sectors.

The other variables will be determined on the basis of the 1991 census data, except from Model 4 that will refer to the data of 2001 census.

Now we can depict the evolution of the Related variety indexes from 1991-2011, where we can see that there is a strong variation between the minimum and the maximum values of *Variety*, *Rel Var* and *Unrel var.*

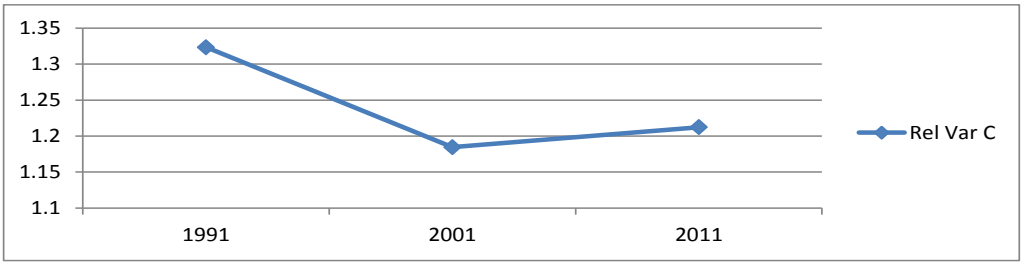
Table 3 Descriptive statistics. Evolution from 1991-2011.

Variables	*Mean*	*Min.*	*Max.*	*Std. Dev*
Emp. Grow. CIs	0.282	0.062	0.682	0.13
Emp. Grow.	0.124	-0.304	0.457	0.12
Variety CIs	3.190	2.057	3.797	0.33
Rel Var. CIs	1.323	0.720	1.951	0.21
Unrel Var. CIs	1.867	1.279	2.347	0.19
Pop Density	240.9	35.5	2575.6	328.6
Hum Cap.	0.033	0.015	0.069	0.0086

Source: our elaboration on ISTAT data

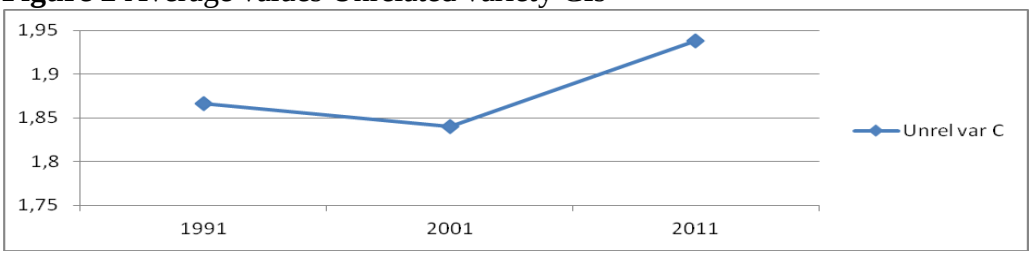
If we analyse the evolution over time of the average degrees of related and unrelated varieties in the creative industries of the Italian provinces (Fig. 1-2), we can notice that the evolution of both variables is very slow, but while the value of *Unrel var CIs* shows a slight drop in the period 1991-2001 and a more marked increase in the period 2001-2011, the similar trend of *Rel var CIs* presents a noticeable decrease in the first period and a slight recovery in the second, notwithstanding the concomitant beginning of the economic crisis.

Figure 1 Average values Related variety CIs



Source: our elaboration

Figure 2 Average values Unrelated variety CIs

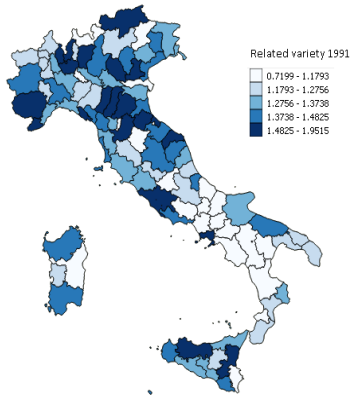
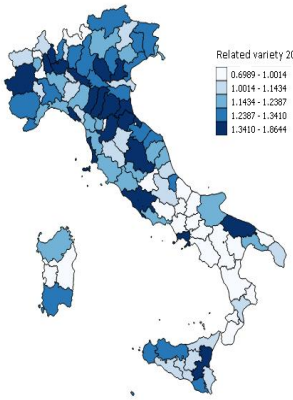
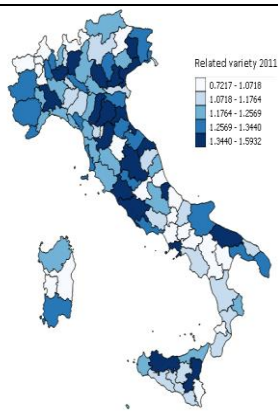


Source: our elaboration

In Figures 3, 4 and 5, we can see the distribution of the related variety per provinces and compare its evolution over time as well from 1991 till 2011.

The levels of related variety in creative industries are rather homogeneously distributed in the Northern and Central Italy, and are even present in some provinces of the South. In sum, there seems to be a strong evenly distribution and a less marked differentiation between the country's south and north, so much that Central Italy even appears to present a greater degree of connection among creative industries than Northern Italy. As to the time evolution of the index at issue, we can notice that its level rises in the Southern-Centre, especially in between 2001 and 2011, and slowly but gradually falls in the northern provinces. So, in this case, the time evolution is progressive and long.

Figure 3, 4, 5 Related variety CIs 1991, 2001, 2011

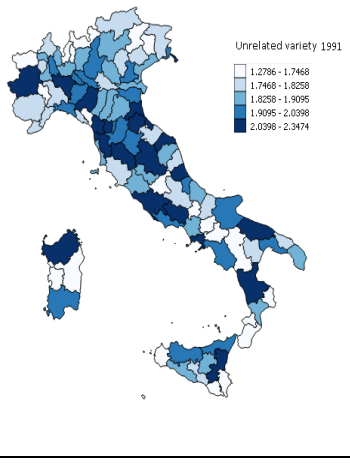
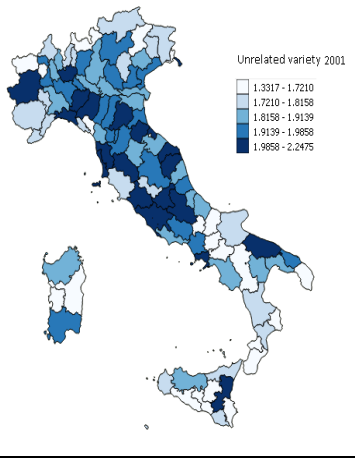
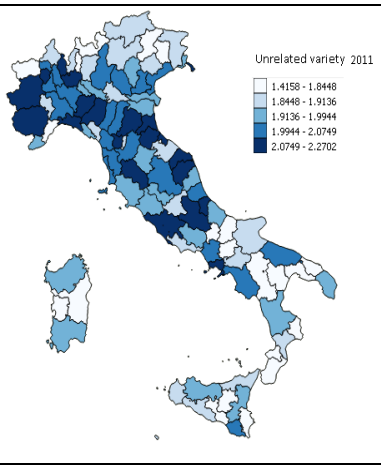
1991	2001	2011
		

Source: our elaboration

Regarding the values for the Unrelated variety index, its distribution is differentiated and the higher values can mainly be found in the provinces localized in the central part of the country, but they present a much more uniform distribution as compared to the values of *Rel var CIs*. However, it is worth underling that the evolution trend is just opposite to the one of the variables examined so far, since in the 2001-2011 period these values increased in the country's north. In fact, while in the first time interval (1991-2001) the number of provinces with high levels increases in the Centre-South, in the second interval (2001-2011) this same rise takes place in the north, and especially in the north-west of Italy.

As to *Variety*, the distribution of the provinces with higher levels of this indicator is quite homogeneous, but it also presents a stronger concentration in the provinces of Central Italy.

Figure 6, 7, 8 Unrelated variety CIs 1991, 2001, 2011

1991	2001	2011
		

Source: our elaboration

Appear to be interesting to present the employment growth for each province both for creative industries and for all sectors. We can notice how employment growth higher levels are not concentrated in a single area but distributed along the whole Italian peninsula, with a thicker distribution in the southern areas, at least compared to the other variables described so far.

This underline the importance to investigate more this aspect, since the growth distribution is not is not at least graphically guessed from the analysis of the related variety maps. However is

possible to find some trends. The levels of *Related variety* are strikingly more elevated in Central Italy. Comparing this result with Figure 9, which shows the map of employment growth, it is possible to observe a partial coincidence of the provinces reporting high levels of Related variety and those registering a high rate of growth for creative industries, a fact which signifies the existence of a relationship between the two indexes.

In addition, by comparing the above-said rate of growth with the evolution of the levels of Related variety for the years 2001 and 2011, we find that the provinces with the higher related variety levels are gradually turning to be among those also reporting higher levels of growth.

Figure 9 Employment growth in Creative Industries 1991-2011

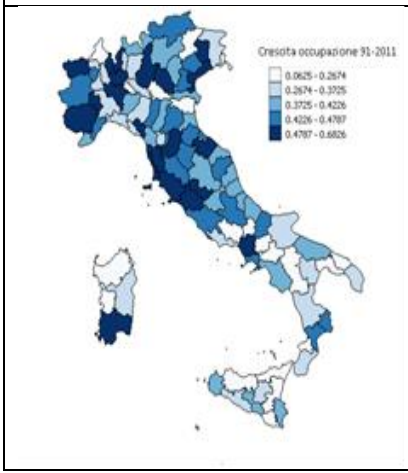
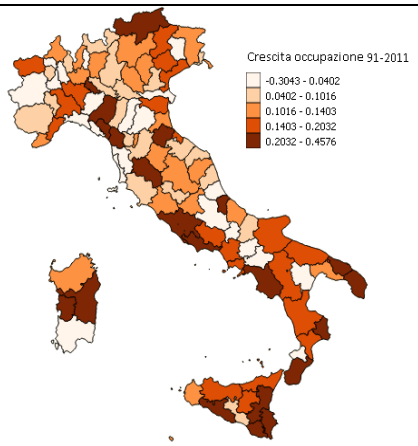


Figure 10 Employment Growth 1991-2011



Source: our elaboration.

Finally Table 4 denote the correlation among variables. It does not recognize any high correlation levels, safe for the variable *Variety C*, which is strongly correlated with *Rel var C* and *Unrel var C*. Therefore, *Variety C* will be subject to a specific regression analysis, instead of being included together with the other two variables of interest.

Table 4 Correlation matrix

	Emp. Growth CIs	*Variety CIs*	*Rel. Var CIs*	*Unrel. Var CIs*	*Pop. Density*	*Human Cap.*
Emp. Growth CIs	1					
Variety CIs	0.2804	1				
Rel. Var CIs	0.3554	0.8793	1			
Unrel. Var CIs	0.1045	0.8288	0.4622	1		
Pop. Density	0.1742	0.5216	0.464	0.426	1	
Human Cap.	0.2384	-0.0046	-0.0536	0.0544	0.1284	1

Source: our elaboration.

4.2. Estimation results and discussion

According to other studies on Related variety and employment growth (Freken et al., 2007; Boschma and Iammarino, 2009), we used an Ordinary least squares baseline models (OLS) to compute our multiple linear regressions, and using as dependent variables for models 1 to 4 the employment growth in creative industries, while for model 5 the employment growth in all sectors.

Table 5 presents the estimation results. We first note that the results concerning Model 1, where *Variety C* is significant and positive. It signifies a favourable association between a general diversification of creative industries and employment growth in the same industries. We can also observe that the dummy for the provinces in Central Italy register a positive effect on growth.

Table 5 Estimation results

	Model 1		***Model 2***		***Model 3***		***Model 4***		***Model 5***	
	1991-2011		***1991-2011***		***1991-2001***		***2001-2011***		***1991-2011***	
Dependent variable	Employment growth in CIs		Employment growth in CIs		Employment growth in CIs		Employment growth in CIs		Employment growth in Italy	
	β	*Std-Err*	*β*	*Std-Err*	*β*	*Std-Err*	*β*	*Std-Err*	*β*	*Std-Err*
Constant	0.0436	0.1166	0.1933	0.1218	0.2208**	0.0752	-0.1355*	0.0637	0.3614**	0.1308
	(0.37)		(1.59)		(2.93)		(-2.13)		(2.76)	
Rel Var CIs			**0.2913*** **	0.0645	**0.1133** **	0.0414	**0.3051*** **	0.0519	0.0696	0.0639
			(4.51)		(2.74)		(5.87)		(1.09)	
Unrel Var CIs			-0.0755	0.0612	**-0.0946***	0.0388	-0.0194	0.0500	-0.1168	0.0613
			(-1.23)		(-2.44)		(-0.39)		(-1.91)	
Variety CIs	**0.1172** **	0.0408								
	(2.87)									
Control Variables										
Pop density (Ln)	-0.0123	0.0202	-0.0136	0.0161	-0.0090	0.0117	0.0022	0.0092	-0.0164	0.0190
	(-0.61)		(-0.85)		(-0.77)		(0.24)		(-0.86)	
Human cap.	-0.3436	2.0114	-0.5678	1.9451	-0.2447	0.9558	-0.1564	0.5541	0.5690	1.5542
	(-0.17)		(-0.29)		(-0.26)		(-0.28)		(0.37)	
NorthW	0.0607	0.0320	0.0425	0.0310	0.0239	0.0219	-0.0190	0.0183	-0.1071***	0.0293
	(1.89)		(1.37)		(1.09)		(-1.04)		(-3.65)	
NorthE	0.0371	0.0347	0.0232	0.0344	-0.0135	0.0206	0.0329	0.0201	-0.0509	0.0274
	(1.07)		(0.67)		(-0.66)		(-1.64)		(-1.86)	
Center	0.0878**	0.0319	0.0942**	0.0295	0.0201*	0.0232	-0.0210	0.0203	-0.0500	0.0325
	(2.75)		(3.19)		(0.86)		(-1.04)		(-1.54)	
Obs.	103		103		103		103		103	
R2	0.1865		0.2878		0.1285		0.5608		0.1609	

Source: our elaboration on ISTAT data. *Note*: *t-values* in parentheses. Variable *South* excluded. Significant at: * p<0.05, ** p<0.01, *** p<0.001

As to Model 2, where *Variety* has been replaced with *Rel var CIs* and *Unrel var CIs*, we find a highly positive significance for Related variety, but no significance at all for Unrelated variety, which means that a high amount of creative firms operating in interconnected sectors and sharing a good degree of related variety has a positive relation with the area's employment growth. This result is confirmed in Models 3 and 4, and acquires even more consequence for the period 2001-2011, affected as it is by an ongoing economic crisis.

This is a reason to assume that the existence of a diversification among creative firms belonging to the same industrial category is a strong incentive to production and innovation processes, and allows job creation in these sectors even under difficult circumstances.

It is worth noting that in Model 3 even *Unrel Var* has some significance, but with a negative sign, thus implying a negative relation between growth and diversification among unconnected sectors.

Coming to examine the results for the other variables, we find that localization, as already pointed out, is positively significant for Central Italy in Model 1, an outcome validated by Models 2 and 3, while no significance is found in Model 4. Conversely, the variables denoting educational level and population density are not significant in none of the tested models. As to the second variable, this result suggests that the urbanization level has no effect on job creation in the creative industries, while the level of Related variety, which is often higher in large-sized cities, does. Moreover, it can be said that the level of education is not a determining factor in the growth of these sectors.

Model 5, was aimed at identifying possible relations between related variety of creative industries and employment growth in all the Italian industrial sectors.

As can be seen from the models' outcomes, almost none of the variables under study presents any significance, and the relationship among the control variables still denotes the localization of provinces in the Italian macro-regions, suggesting that in the period under study to be placed in the southern part of the country has constituted a driving factor to employment growth.

The non-significance of the variables of interest does not allow to assess the relations between our variables of interest and employment growth.

We also tested the model only for metropolitan areas, taking into account only the provinces of the main Italian cities as creative industries are localised in large urban centres, expecting positive results. Confirming this issue wide documented in the literature, a positive and significant relation was found in respect of employment growth in creative industries while no relationship was found concerning the growth of all sectors.

The results of the first four models allow for more substantial and worthy conclusions in terms of our research goals. In fact, they are robust and significant, and evidence a strong relationship between the diversification of firms with a high degree of cognitive proximity, and employment growth.

This outcome suggests that a high level of *Related variety* positively affects job creation through the support of innovation processes, the spread of creativity in the area, and the promotion of communication among subjects, firms and workers operating in sectors that share a fair degree of variety, which allows them to learn from one another and participate in innovation and development projects that would not be feasible for the single firm.

Consequently, in this case *Variety* has a positive impact on the growth of creative industries, and *Related Variety* even a much stronger one.

The aim of last model was to correlate growth in all industrial sectors with the indicators of the different kinds of variety for the creative industries alone; in other words, we wanted to understand whether a specific typology of diversification in creative industries, considered at the level of a geographically bounded area like the province, might have positive effects on the rate of employment growth.

The results have demonstrated that there is no relation between these two dimensions, an outcome probably due to the fact that the number of employees in the industries classified as creative according to the DCMS classification (2013) is too low to have an effect on employment growth for all industrial sectors.

5. Concluding remarks and future research

This work is intended to contribute to the present debate on the role and importance of variety, and especially of related variety in terms of local economic growth and to contribute also to the debate on the competitiveness of creative industries. It aimed to investigate the role and importance of related and unrelated variety within creative industries for local economic growth.

The results achieved in this work reveal that the ability to grow of creative industries depends upon the area's industrial variety, and particularly its related variety.

Related variety seems in fact to foster employment growth through the promotion of interaction processes among firms, and virtuous paths of creativity and innovation. This shows that such advantages are more stable and replicable over time than those associated to the co-existence of firms whose knowledge is unrelated. Then, it should be advisable to identify the prevailing, specific features of local industry, and sustain both these features and all the other sectors further down the line, rather than diversify the sectors that are not denoted by dominant characteristics.

Besides, a fact that should be taken into account in the present competitive setting is that there are few cases of firms that can afford to support internally the whole process of innovation. On the contrary, most firms need collaboration to advance innovation processes, and this is particularly true for the Italian context, where the majority of firms are small, and so industry is fragmented. It is obvious in fact that collaboration is easier when people share a common, or at least a contiguous knowledge, even though only a certain amount of dissimilarity can allow each participant to effectively contribute to the innovation process.

In what concerns the specific results obtained in the course of this work, we have already suggested that they make clear the role of industrial variety, and still more of related variety, in sustaining growth for the creative industries – all this for a twenty-year span of time, whose final period has seen a serious economic crisis.

In discussing variety-related growth in creative industries, we must consider that the conflicting results found by comparing this variable first with the growth of all the industrial sectors, and then with that of the creative industries alone, can be ascribed to two main reasons.

The first reason has to do with the unit of analysis, that is the province, which turns to be an area too wide to show the impacts and side effects on the creative industries, as they tend to concentrate in specific and circumscribed areas, like the creative cities. A second reason is connected with the number of units in the industries classified as creative by the *Creative Industries Mapping Document* (2013), which is too small to have a noticeable effect on employment growth at all industries level.

To sum up, this work provides a robust quantitative basis from which to start further studies, that might go deeper into the role of cognitive proximity for the economic growth of our country, particularly by means of its creative industries. It also offers several cues about their competitive power and their driving force in the present economic context, and the reasons behind the growth of a particular place and the development of creative industries are today at the centre of a heated debate.

For the future, our aim is to go on with the examination of this research issue, by applying the same methodologies at level of local labour systems, and thus try and compare the results obtained with different units of analysis. This should allow us to fully understand the role of related variety, and most of all to keep up with the issue of creative industries. These, more than all other sectors, have built ties with the territory and, if examined at a more circumscribed level, in view of their strong concentration in creative cities or local systems described as such, might lead us to more substantial conclusions.

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