

## THE KNOWLEDGE ECONOMY: A NEW SOURCE OF REGIONAL DIVERGENCE?

**Fabiano Compagnucci et Augusto Cusinato**

**Armand Colin** | *Revue d'Économie Régionale & Urbaine*

2014/2 - septembre  
pages 365 à 393

ISSN 0180-7307

Article disponible en ligne à l'adresse:

-----  
<http://www.cairn.info/revue-d-economie-regionale-et-urbaine-2014-2-page-365.htm>  
-----

Pour citer cet article :

-----  
Compagnucci Fabiano et Cusinato Augusto, « The knowledge economy: a new source of regional divergence? », *Revue d'Économie Régionale & Urbaine*, 2014/2 septembre, p. 365-393. DOI : 10.3917/reru.142.0365  
-----

Distribution électronique Cairn.info pour Armand Colin.

© Armand Colin. Tous droits réservés pour tous pays.

La reproduction ou représentation de cet article, notamment par photocopie, n'est autorisée que dans les limites des conditions générales d'utilisation du site ou, le cas échéant, des conditions générales de la licence souscrite par votre établissement. Toute autre reproduction ou représentation, en tout ou partie, sous quelque forme et de quelque manière que ce soit, est interdite sauf accord préalable et écrit de l'éditeur, en dehors des cas prévus par la législation en vigueur en France. Il est précisé que son stockage dans une base de données est également interdit.

# **L'économie de la connaissance: une nouvelle source de disparités régionales ?**

## **The knowledge economy: a new source of regional divergence?**

**Fabiano COMPAGNUCCI**

IUAV University, Venice – Department of Design and Planning in Complex Environments  
fabianoc@iuav.it  
Auteur correspondant

**Augusto CUSINATO**

IUAV University, Venice – Department of Design and Planning in Complex Environments  
augusto@iuav.it

**Mots-clés :** Créativité, Disparités Régionales, Économie de la Connaissance, Milieu Urbain

**Keywords :** Creativity, Knowledge Economy, Regional Disparities, Urban Milieu

**Classification JEL :** O3, O14, R11

## Résumé

*Il est généralement reconnu que la créativité et la capacité d'innovation sont les moteurs de la compétitivité, particulièrement là où les possibilités de diminution des coûts ont considérablement faibli. L'économie a fait importants efforts pour endogénéiser des facteurs capables de renforcer ces moteurs. L'article traite de deux problématiques reliées à cette question : tout d'abord de l'obsolescence de l'approche cognitiviste à laquelle l'économie mainstream se réfère pour expliquer les relations entre connaissance et créativité et, inversement, du pouvoir heuristique d'une approche herméneutique ; ensuite des implications spatiales de cette approche en raison de sa nature fortement localisée. L'article suggère que de grandes économies d'agglomération ainsi que des effets cumulatifs se mettent en place engendrant de fortes disparités régionales, voire des divergences. L'étude du cas italien corrobore cette hypothèse et suggère également que les activités de la connaissance donnent lieu à de nouvelles formes de disparités régionales.*

## Abstract

*It is widely recognised that creativity and the capacity to innovate are the drivers of competitiveness, especially where the possibilities for cost-cutting have drastically lessened. Economics have made important efforts to endogenise factors which boost such drivers. The paper deals with two connected issues. First, the obsolescence of the cognitivist approach to which mainstream economics mostly resorts to explain relationships between knowledge and creativity and, conversely, the heuristic power of a hermeneutic approach. Second, the spatial implications of this approach, because of its strongly place-based nature. The paper suggests that major economies of agglomeration and cumulative effects are at work, with important consequences on regional disparities if not divergences. Evidence from the Italian case corroborates this hypothesis, and also suggests that knowledge-based activities are giving rise to new forms of regional disparities.*

## - 1 -

**Introduction<sup>1</sup>**

There have always been geographical disparities in economic performance. Differences in natural endowment, technical and technological trajectories, institutional factors and, more generally, cultural characteristics and historical events have everywhere, and sometimes irreversibly, played a decisive role in shaping the material conditions, ways of life and opportunities of peoples in different parts of the world. So long as the regions concerned are not interrelated, the existence of disparities is not particularly noteworthy, nor indeed a problem. At most, it may be a source of curiosity for the external observer, as reflected in travellers' accounts since classical times. The phenomenon does however become important when regions enter into relationship. In these circumstances, disparities can be a source of opportunity, offering the possibility of mutually advantageous exchanges, or of threat, when one or more of the regions involved find that the disparities translate into divergence or a deterioration in the terms of exchange, on the economic and/or political level, in favour of the 'stronger' region.

It is therefore obvious that, in a historical situation characterised by the involvement, actual or potential, of all the world's regions in a single market, the subject of regional economic convergence/divergence assumes crucial importance. The demonstration of a natural<sup>2</sup> tendency to convergence in regional economic performance would be the privileged 'medium' (also because it would not involve any cost) to neutralise, or at least mitigate, the destabilizing prospect of divergence.

Having reviewed the principal contributions to the subject of convergence/divergence (Section 2), we shall outline an epistemological frame within which to interpret the knowledge economy and the related spatial implications (Section 3). Our findings suggest that it would be wise to adopt a more articulated view of knowledge than the cognitivist approach which more or less implicitly underlies mainstream economic treatments of the subject: and this more articulated approach is indicated in hermeneutics. As it is plausible to maintain that this practice best reveals its potentialities, in terms of creativity, in conditions of cultural and physical proximity to the subjects involved, we advance the dual hypothesis that (a) the geography of the activities undertaken in such conditions is extremely uneven, and (b) due to the path-dependent nature of learning, their spatial concentration tends to accentuate situations of regional disparities. Section 4 is devoted to testing out these hypotheses with reference to the Italian situation, characterised by a historical gap between North and South. Not only are both hypotheses corroborated by the empirical evidence, but evidence of a new gap between North-West and North-East also begins to emerge. Section 5 finally draws conclusions.

- 2 -

## Convergence or divergence?

The mainstream approach to the prospect of the convergence of regional growth trends is based on SOLOW's model (SOLOW, 1956), whereby the growth of productivity per worker within any given techno-economic paradigm is bound to be annulled over time, on account of the triple effect of demographic growth, the increasing cost of replacing the existing capital stock and the decreasing marginal productivity of investments. In such conditions, the economies of different regions are bound to converge towards stasis. Any deviations from this common trend is attributable to exogenous factors, above all innovation.

SOLOW's convergence model, however, is wide open to criticism, on the grounds that:

a) it is based on a COBB-DOUGLAS-type production function, which does not take into account economies of scale and agglomeration (which would eliminate the prospect of convergence if they were locally specific). Supporters of the standard approach might object that even these economies are subject to decreasing marginal productivity. The objection is plausible, unless one can prove the existence of some factor with non-decreasing marginal returns, and this factor has been indicated in knowledge. We shall return to this issue later, because it is the *raison d'être* of this article;

b) the regional convergence of growth rates in productivity per worker is conditioned<sup>3</sup> (MANKIW *et al.*, 1992; MANKIW *et al.*, 1995; MAGRINI, 2004). Final conditions of absolute disparity may therefore persist, together with possible conditions of dependency. In other words, convergence does not necessarily imply territorial cohesion. MANKIW *et al.* (1992) had themselves demonstrated that, if the role of human capital in the formation of the product<sup>4</sup> is explicitly accounted for, and assuming that a share of the same product is invested in human capital, an increase in per-capita income is achieved. Consequently, more disadvantaged regions can also improve their performance in terms of absolute per-capita income growth, provided they invest in human capital to a greater degree than advanced regions. The authors observe, however, that a major obstacle of a practical kind stands in the way, which consists in the difficulty of obtaining external finance to initiate and maintain a higher level of investment in human capital than in more wealthy regions, "because human capital does not serve well as collateral" (MANKIW *et al.*, 1995, p. 295);

c) the standard model envisages closed economic systems (TAYLOR, 1996). Introducing the hypothesis of opening up the factors of production to mobility does not, however, appear to solve the question of unconditioned convergence. BARRO *et al.* (1995) show that mobility of capital accelerates only the process of convergence of productivity rates, but without absolute convergence. According to RAZIN and CHI-WA (2002), this latter condition can only be realised in conditions of perfect mobility of labour. Here, too, the likelihood of realizing such conditions

seems remote, given the destabilizing effects that would result: efforts to achieve inter-regional cohesion might in fact endanger the internal cohesion of advanced regions, with disruptive effects on the whole system;

d) where the mobility of products is concerned, SLAUGHTER (1997) observes that there is no clear evidence to support the view that international trade favours convergence (contrary to the views of the authors he is criticizing), because the price variations generated can have significant redistributive effects;

e) technological progress, which in the standard model is the only factor slowing down or preventing the tendency towards stasis, is seen as an exogenous factor. The exogeneity of innovation is due not so much to its purely technical character as to the fact that its endogenisation would call into question the paradigm of equilibrium inherent in the neoclassical approach. If innovation is systematically pursued, through R&D for example, and also proves to have a cumulative effect, the convergence model would be invalidated at root.

The inconclusiveness of some of the theories intended to confer greater credibility on the standard model of convergence have led (and are still leading) scholars to investigate the plausibility of a hypothesis of divergence, albeit with reference to SOLOW's growth model. The fact that SOLOW (1957) himself reported that only one eighth of the growth in productivity per worker occurring in the United States between 1909 and 1949 could be attributed to increased capital endowment, whereas the remaining seven eighths derived from technological progress, is good reason to question the exogenous character of technical progress, because otherwise it would seem to be impossible to control the principal factor in economic growth. As we know, the answer was (and is) that knowledge is the factor crucial, which not only has non-diminishing marginal returns, but is also not completely appropriable.

Relying on these properties, ROMER (1986) reformulated the standard production function by introducing, alongside the traditional factors  $K$  and  $L$ , the information spill-overs variously conveyed by products, patents and, more generally, voluntary and involuntary exchanges of information. With reference to the enterprise-type  $i$  of the  $N$  operating in the market, the production function therefore becomes

$$Y_{it} = K_{it}^{\alpha} L_{it}^{1-\alpha} K_t^{\beta} \text{ with} \quad (1)$$

where  $K_t$  represents the information capital in the public domain and  $\beta$  the capacity of enterprise  $i$  to absorb it, i.e. to take hold of it and transform it into innovation. In this way, technical progress is internalised within a production function that presents increasing scale returns, even in the presence of a decreasing marginal return in public knowledge  $K_t$ .

The growth in the productivity of labour over time is therefore:

$$\dot{y}_{it} - \dot{l}_{it} = \alpha(\dot{k}_{it} - \dot{l}_{it}) + \beta\dot{k}_t \quad (2)$$

Even in the presence of a contribution of  $\alpha(\dot{k}_{it} - \dot{l}_{it})$  tending towards zero in time, (2) remains greater than zero until information spill-overs grow ( $\dot{k}_t > 0$ ), obviously with  $\beta > 0$ .

LUCAS (1988), for his part, expresses the product  $Y_t$  as a function of a technological constant  $A$ , physical capital  $K_t$ , human capital (where  $u$  is the fraction of time devoted to work,  $h_t$  the level of ability of the typical worker and  $L_t$ , as usual, the number of workers), and the cognitive externalities  $h_{at}^\beta$  produced on average by the degree learning of each worker, which gives:

$$Y_t = A K_t^\alpha (u h_t L_t)^{1-\alpha} h_{at}^\beta \quad (3)$$

Moving on, as usual, to logarithms and differentiating with respect to  $t$ , we obtain:

$$\dot{y}_t - \dot{l}_t = \alpha(\dot{k}_t - \dot{l}_t) + h_t(1 - \alpha + \beta) \quad (4)$$

Assuming finally that the learning is proportional to the acquired level of skills  $h_t$  and the effort devoted to learning itself  $(1-u)$ , i.e.

$$\dot{h}_t = h_t f(1-u), \text{ with} \quad (5)$$

we obtain:

$$\dot{y}_t - \dot{l}_t = \alpha(\dot{k}_t - \dot{l}_t) + h_t f(1-u)(1 - \alpha + \beta) \quad (6)$$

Equation (4) indicates that the growth in the productivity of labour is cumulative, while equation (6) makes clear that such growth is proportional to the acquired level of skills  $h_t$ , which strengthens the gap between the growth trajectories of systems already characterised by different endowment of capital, productivity and investment capacities. In LUCAS' model, too, growth is cumulatively unlimited: assuming, reasonably, that

$$\text{and } \dots, \text{ we get} \quad (7)$$

The crucial aspect is in fact the absence of limits to growth inherent in the models referred to. Technological progress is unlimited because spill-overs (ROMER) or learning (LUCAS) accumulate endlessly. Our initial critical observation is that beneath both these hypotheses lies a concept of knowledge that is very conventional (albeit having illustrious antecedents). Even if it is admitted that human capital is also subject to obsolescence, and therefore some investment in learning must be devoted<sup>5</sup>, the above models more or less explicitly assume<sup>6</sup> that (a) knowledge increases by a process of addition and (b) the absorptive capacity expressed by  $\beta$  maintains a value superior to zero. The point that we intend to challenge here is not that knowledge develops (through learning), but rather that it develops by a process of addition. Addition implies that each item can be reduced to a common *sub-stantia* which, in the case of knowledge, is information, understood ultimately in the physical terms of bits. The idea of *accumulating* knowledge that underlies these models in fact implies a concept of knowledge as an information capital, and of

learning as an increase in this capital. The point, however, is that knowledge has not only a physical dimension, consisting in a highly improbable combination of binary elements, but also a semantic dimension, without which it would revert to the condition of pure data.

The very fact that we distinguish between data and information presupposes a semantic difference between the two terms: an item of data is simply a factual emergence (*datum*), while information consists in the meaning attributed to data by an intelligent individual, with reference to a certain objective function and through a system of interpretation which he *constructs over time*, on the basis of education and lived experience (qualities that can be summed up in the concept of 'absorptive capacity' and expressed by the parameter  $\beta$ ). It follows that  $\beta$  may indeed increase over time, to the extent that the subject gradually continues to learn, but may also suddenly 'collapse' as a consequence of a gap developing between the trajectories of real facts and the cognitive competences developed to date<sup>7</sup>. How and why  $\beta$  may change over time – thus becoming  $\beta(t)$  – are matters outside the competence of the present paper, but two aspects can be cited:

a)  $\beta(t)$  may occasionally have negative values. The subject might find himself so incompetent in interpreting situations as to compromise action. However high  $\dot{k}_t$  may be in ROMER's model, if the contribution made by information externalities to the increase in labour productivity is negative. In LUCAS' model, the condition is less restrictive: the contribution made by learning becomes negative if  $\dot{\beta}$ , i.e. if inability to learn impairs the already acquired level of the contribution to productivity made by human capital, expressed by  $\beta$ . It is therefore vital that the individual be able to develop praxes to envisage the possible presence of such a lack of competence;

b) even more significant is the fact that absorptive capacities are path-dependent, in that possessed cognitive capital functions as a key to interpreting reality. LUCAS' model would therefore give  $\dot{\beta}$ , with obvious phenomena of circularity through the influence of  $\beta$  on  $h_{\alpha t}^{\beta}$ .

We can therefore advance the hypothesis that the more a region<sup>8</sup> is capable of managing the development of its own cognitive competencies, the greater its competitive advantage over time, and the more its growth trajectory is bound to diverge from those of more disadvantaged regions (SORIANO and MULATERO, 2010).

- 3 -

## The hermeneutic approach to creativity and knowledge

The first written notion of knowledge that has come down to us in Western culture is that it consists in "having experience of...". Not all experiences, however, constitute a source of knowledge, but only those that the individual is able to



realise mentally. 'Realizing something mentally' – for which 'something' we use the symbol  $a$  – means that the individual also manages to conceive of  $\neg a$ , which involves constructing the binary set  $\{a, \neg a\}$ . Only by acquiring this ability can he recognise  $a$  subsequently, through the double negation  $\neg(\neg a) = a$  (PIAGET, 1997[1953]). This ability corresponds to BATESON's (BATESON, 1972) *Learning 1*, which does not imply any form of creativity, because the individual remains to some extent a 'prisoner' of the binary opposition  $\{a, \neg a\}$ , in which  $\neg a$  is the pure reflection, in the negative, of  $a$ .

For creativity to come into play, he must learn to contextualise  $\neg a$  within a broad set of possible determinations, replacing  $\neg a$  with the complement of  $a$ , i.e.  $\bar{a}$ , and *constructing* the set, which corresponds to BATESON's *Learning 2*. Taking into consideration the complementary option, the individual acquires a potentially infinite number of alternatives for detaching himself mentally from  $a$ , by constructing countless possible combinations, depending on the determination assigned contingently to  $a$ . Assuming that the individual operates in conditions of limited rationality, he can in fact imagine only some of the possible complements of  $a$ , and therefore every specific he is able to imagine seems to him original and unexpected, in a word 'created'. It follows that:

a. *creativity implies a contextualization of the second order (Learning 2)*. Whereas in a first-order contextualization  $a$  is placed opposite its pure negation, in a second-order situation it is placed in front of  $\bar{a}$ , which in turn springs from an articulation of  $\neg a$  within a set  $\bar{a}$ , of countless possible contingencies;

b. *creativity has to do with ambiguity*. Once we admit that every possible pair the individual can conceive of is a contingency within a not completely knowable series of other possible determinations of, an aura of ambiguity is bound to take shape around the meaning – every possible meaning – contingently assigned to  $a$ , on the basis of the selected pairing;

c. *creativity implies further and probably infinite orders of contextualization*. The two previous points suggest that to become aware of one's creative capacity and, therefore, be open to the possibility of managing it, the individual must learn to relate not only to knowledge, but also to ambiguity. This kind of learning implies a third-order contextualization (*Learning 3*) concerning the ways (and, above all, the limitations) whereby he chooses a given combination within a broader combination. Third-order contextualization therefore requires a capacity to construct, which are concerned with the ways in which the keys for interpreting the 'world' and, ultimately, becoming creative, are constructed.

If, in turn, we contextualise the chain of learning levels just described, we can identify a thread running through and connecting them: this connecting thread is hermeneutics, the art of interpreting interpretations<sup>9</sup> by progressively decentralizing one's own point of view, as it was re-conceptualised in the 20<sup>th</sup> century (GADAMER, 2004[1960]; RICOEUR, 1981; HABERMAS, 1988). The fundamental lesson of hermeneutics is that the interpretative ground is beset with traps which

condition the process of contextualizing every possible notion, unbeknown to the individual. If, for example, in conceiving of a combination complementary to *a*, the individual takes into account the elements *x*, *y* and *w*, but systematically omits to consider the element *z*, which is crucial to finding an original, plausible and possibly more “satisficing”<sup>10</sup> interpretation than the current one(s), he remains prisoner of an inadequate – if not false – image of reality, in spite of all attempts to formulate hypotheses and test their reliability (VON GLASERSFELD, 1988).

It follows that knowledge cannot fully develop simply within a relationship between the mind and things (*Learning 1*), as positivism assumes. Once doubt has arisen as to the groundlessness of the idea that *res cogitans* possesses a higher ontological status than *res extensa* (STENGERS, 2000), it is no longer possible to trust in the capacity of the mind to get at the truth, because we cannot rule out the possibility that the two entities are in unity one with the other. In this new epistemological situation<sup>11</sup>, the path to discernment consists not in examining and re-examining the relations between mind and things – a procedure which allows us to discover errors, but not fallacies (COE and WILDEN, 1978) – but in investigating the differences between the ways in which individuals, groups and cultures look at things (GEERTZ, 1973), in accordance with the chain of learning levels described above.

At least three conclusions can be drawn from this contextualization of the subject of cognitive competencies:

a) *the hermeneutic approach is probably the most appropriate way of governing*<sup>12</sup> *creative competencies*, provided they do not stem from *Learning 1*, i.e. as an a-critical application of extant interpretative codes, but from the capacity to re-contextualise one’s own interpretative habit (FLEMING, 1991);

b) *hermeneutic practice can arise only in a relational context*. Whereas *Learning 1* can take place in the context of relations between mind and external world without any questioning of the cognitive aptitudes whereby these relations are (contingently) established, the higher levels of learning imply reflection on these aptitudes. To fulfil this condition, the subject must have a detached viewpoint from which he can observe his own mind, and this support can be provided only by the mind of another person, towards whom he will tend to shift his point of view. Since detachment of this kind cannot be achieved physically (and in any case would not be desirable), it can occur only on the mental level, where empathy plays a fundamental part (LIPPS, 1979 [1903]; MAKKREEL, 1996). This implies that, while the exchange of information that can be appropriated at *Learning 1* level can also occur through the market, exchange at higher levels of learning (where ambiguity comes into play) can take place only outside the market, essentially on the basis of reciprocal practices (REICH, 1992): and *positive reciprocity implies not only the cultural, but also the physical proximity of the parties involved* (SAHLINS, 1972; MORGAN, 2004; CHARNESS *et al.*, 2007);

c) finally, since hermeneutic competencies are intrinsically progressive (according to the chain of learning levels referred to above), the related creativity-generating

capacities are progressive, i.e. they depend on the levels of competence already acquired.

The combination of these factors means that the processes whereby hermeneutic competencies (and the corresponding creative aptitudes) are developed inclines us towards the hypothesis of a relatively concentrated geography, in terms of scale and/or agglomeration, of the individuals and organizations involved. Factor a) indicates that these individuals/organizations need to learn to learn (MORIN, 1986; FLEMING, 1991), by a process – in principle, endless – of gradual re-contextualization of their mental habits; factor b) indicates that this re-contextualization is also spatial in character; while factor c) indicates that higher and higher barriers present themselves to the entry of subjects suffering from a 'competence gap'. To sum up, on the basis of the model presented in the introduction, we obtain  $h_{at-1}^\beta$ , where is a function of the cognitive externalities  $h_{at-1}^\beta$  and the capacity to interpret them, which is again  $h_{at-1}^\beta$ , and this effectively completes the "hermeneutic circle" (GADAMER, 1975; BAUMAN, 2010).

Restricting our scope at this point to the regional economy, it should follow that (a) activities devoted to *Learning 2* and the higher levels of learning evince a geography characterised by phenomena of high concentration and (b) the same activities are correlated with (if not the origin of) regional disparities, as both cause and effect (on account of the hermeneutic circle just referred to). In the next section our principal intention is to indicate a method for identifying this type of activities empirically, and then to provide an application and, possibly, evidence validating this hypothesis.

## - 4 -

# Geography of knowledge and regional disparities: the case of Italy

## 4.1. The knowledge economy from a hermeneutic viewpoint

Hermeneutic practice is carried on more or less consciously, all the time, by all individuals endowed with the power of thought (i.e. the ability to contextualise), and therefore it is impossible to construct an exhaustive geography of the phenomenon. We can, however, construct a partial geography by resorting to certain indicators, on the basis that it will be sufficiently isomorphic to the full geography of hermeneutic practices. The idea underlying this hypothesis is that the shift to what is more and more commonly known as the 'knowledge-based economy' (referred to in this article simply as 'the knowledge economy') does not consist so much in the fact that economic activities now need to draw on more – indeed, very much more – knowledge than they did in the past (e.g. DRUCKER, 1968; OECD, 1996; FORAY, 2000), as that they are systematically and deliberately beginning to use it in a different way: and, precisely, a hermeneutic way. Already FLORIDA and KENNEY (1993), and GIBBONSET *et al.* (1994) had observed that, although the knowledge economy is characterised by a greater use of knowledge in creating added value than was the case

with industrial economy, the difference is not so much quantitative as qualitative. In other words, a way of generating knowledge is being introduced within enterprises, which is founded on the interaction between different components, in particular between R&D and production and commercial departments, whereas before the focus was on the mind-things relationship, by means of scientific thinking,<sup>13</sup> and was therefore 'localised' within more or less restricted circles of specialists.

Once this interactional interpretation on learning is regarded as plausible, and is also strengthened from a hermeneutic viewpoint, it is possible to construct a geography of economic activities connected with *Learning 2* (and higher levels) in two ways:

a) by reference to International Standard of Classification of Occupations (ISCO) data (ILO, 2007). This classification sub-divides occupations into ten major classes according to the level of intellectual competence required, eventually arriving at a 4-digit level of detail. The Italian National Institute of Statistic (ISTAT) has reclassified the employees recorded in the 2001 Census using ISCO criterion, but only at one digit level, a limitation that makes them almost unusable. In addition, the data refer to the place of residence of the workers concerned, whereas it would be more appropriate to classify them according to their place of work – the place where they use their creative capacities in a relational context within and outside their enterprise<sup>14</sup>;

b) by reference to the Census of Industry and Services. In this case, the data, which are to five digits for 1991 and 2001, and six digits for 2011, reflect the location of the economic activities concerned and therefore lend to interpretations based on their place specific character. On the other hand, as they refer to local units, they also include workers not directly involved in knowledge-generating activities, while excluding others who are involved in such activities but are employed by local units not classified as "knowledge-based". Despite these limitations, we opt for this second source of data, necessarily focusing our investigation on the 1991 and 2001 figures, since the results of the 2011 Census are not yet available<sup>15</sup>. Finally, we must point out that it has been possible to investigate only services, because the classification of industrial activities does not enable us to infer which activities systematically draw on Learning 2 practices (except for activities classified as 'high-tech').

## 4.2. Methodology

Analyses of economic activities and, in particular, 'knowledge-based' services are not a novelty. Two approaches are worth mentioning here: the Knowledge-Intensive Business Services (KIBS) approach and the Creative Industry (CI) approach. According to MILES *et al.* (1995), KIBS are "services that involve [...] economic activities which are intended to result in the creation, accumulation or dissemination of knowledge" (p. 18). At first sight, this approach might seem to take into account the specific characteristics of knowledge-based activities. Due to its ICT derivation, learning and knowledge are, however, interpreted in a conventional way, respectively as the acquisition and processing of information: knowledge is produced rather than generated, acquired rather than experienced, recombined

rather than hybridised, accumulated rather than articulated, disseminated rather than socially shared, and finally refined rather than re-contextualised. At the same time, the centrality assigned to the conversion of tacit knowledge into codified knowledge in encouraging innovation does not adequately take into account the fact that this kind of experience provides an extraordinary opportunity to consider the idiosyncrasies and ambiguities of the various cognitive 'codes' and so get at the hermeneutic dimension of knowledge.

Consequently, KIBS include all general activities devoted to symbolic analysis (according to REICH's definition, 1992) or only synthetic and analytical knowledge (while neglecting the symbolic knowledge, according to the tripartition of ASHEIM *et al.*, 2007) in that they are connected to ICTs, whether or not these activities implement or generate interpretative 'codes', and when codes are considered, interest focuses on refining (rather than articulating) them. KIBS consequently include executive activities, such as "Agencies distributing books, newspapers and magazines", "Maintenance and repair of office machines and electronic processors", alongside activities which genuinely generate knowledge, such as "Research" and "Administration of companies and organizations, consultancy and business planning". Moreover, they do not include public organizations, such as universities, which are clearly devoted to dealing with cognitive aptitudes and frequently interact with industry and private services in the generation of knowledge.

The CI approach, on the other hand, focuses on "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property" (DCMS, 2001, p. 4). It is distinctive in taking into consideration the entire value chain, from the design of a potential innovation to its application in an industry, and on to the outlets selling the "creative goods" concerned. The central issue raised by this approach concerns the procedures for selecting creative value chains from among the whole mass of existing and potential chains, once it is admitted that creativity is potentially present in every chain leading to a product. The answer given by the CI approach is not convincing because the choice is based on a purely formal criterion: whether or not the creative act can be appropriated by being patented (HOWKINS, 2002). The result is that many other creative activities, which cannot be patented (e.g. the time-consuming work of research and consultancy) are overlooked, while others which are not intrinsically creative (to take a notable example, "Sale of second-hand goods") are included because they are reputed to belong to a value chain originated by a supposedly patentable activity.

To avoid these limitations and restore the specific features of *Learning 2 and 3* – based activities, we introduce the notion of 'Knowledge-creating Services' – KCS', i.e. services most likely devoted to interacting with aptitudes and interpretative codes, reformulating these codes, rather than mere processing information on the basis of a certain cognitive code. We further distinguish between private and public-sector KCS, depending on whether they are primarily market orientated or involved in other forms of 'product' circulation. The proposed classification is shown in Table 1.

**Table 1. Classification of Knowledge-creating Services (Kcs)**

Ateco cod.	Economic activity	Ateco cod.	Economic activity
<b>Private KCS</b>			
22110	Publishing of books	74145	Public relations
22120	Publishing of newspapers	74201	Architectural activities
22130	Publishing of journals and periodicals	74202	Engineering activities
22140	Publishing of sound recordings	74204	Aerial photogrammetry and cartography activities
72100	Hardware consultancy	74401	Advertising
72200	Hardware consultancy	74811	Photographic activities
72601	Telematic, robotics, eidomatic activities	74813	Aerial cinematography activities
72602	Other computer related activities	74845	Design activities
73100	Research and experimental development on natural sciences and engineering	91111	Activities of business and employers' organizations
73200	Research and experimental development on social sciences and humanities	91112	Economic organisations
74111	Legal activities	91120	Activities of professional organizations
74112	Notarial activities	91200	Activities of trade unions
74122	Auditing activities	91320	Activities of political organizations
74130	Market research and public opinion polling	92110	Motion picture and video production
74141	Financial consultancy	92200	Radio and television activities
74142	Labour consultancy	92310	Artistic and literary creation and interpretation
74143	Agrarian consultancy	92400	News agency activities
74144	Business and management consultancy activities		
<b>Public KCS</b>			
80301	Higher education	92510	Library and archives activities
80302	Higher education	92520	Museums activities and preservation of historical sites and buildings
80303	Higher education	99000	Extra-territorial organizations and bodies
85114	University Hospitals		

The final aspect of our method concerns the choice of an indicator to quantify the relative weight of KCS in the local economy. We shall use a localization quotient (LQ), calculated as follows:

$$LQ = \frac{E_{k,i}}{E_i} / \frac{E_K}{E} \quad (8)$$

in which  $E_{k,i}$  represents the number of workers in sector  $k$  of region  $i$ ;  $E_i$  the regional total of workers;  $E_K$  the total domestic number of workers in sector  $k$ ; and  $E$  the domestic total of workers.

### 4.3. A new regional issue for Italy?

The issue of the dualism between the North and South of Italy has been debated, in the academic field and in the field of public policy, since the time of Italian unification (1861) and variously interpreted from economic, social, cultural, anthropological and institutional perspectives (see, among many, DE MARTINO, 1959; BANFIELD, 1976; SARACENO, 1990; PUTNAM, 1993). In the 1970's, Italy's social geography became increasingly complex as a result of changes in the way the economic process was organised (both productively and spatially). The crisis that affected the Fordist system in the North-West and the almost contemporaneous emergence, in the North-East and Centre (NEC), of a fabric of Marshallian industrial district has demonstrated the existence of original and unexpected trajectories of industrial and, more generally, socio-economic development (GAROFOLI, 1992; BAGNASCO, 1977; FUÀ and ZACCHIA, 1983; BECATTINI, 1989). From a spatial point of view, and in its working rationale, this phenomenon ran counter to the dualistic Italian model based on the contrast between economic advanced circumstances in the North-West and the persistent backwardness of the South (the latter relieved only by a few poles of development, created mainly on public initiative and again exemplifying the Fordist industrial model).

Albeit having come to the fore as a successful production model (in common with the regions that hosted them), and having for a long time represented an ideal-type of local post-Fordist development in Italy and abroad, in the 1990s these industrial districts underwent (and are still undergoing) a series of internal and external shocks which have reduced their competitiveness in international markets. The greater stability of exchange rates resulting from the Lira's entry into the European Monetary System (1996) and the subsequent adoption of the Euro (2002) have stripped them of the benefit of accommodating currency policies. This period also saw the beginnings of strong pressure on the costs of the factors of production – first and foremost on the cost of labour – and growing competition from emerging manufacturing countries (ONIDA *et al.*, 1992). More generally, although until the 1990s district externalities were sufficient to ensure exceptional economic performance in many cases, tending above all to contain costs, with the advent of globalization this factor soon proved inadequate (CALAFATI, 2009; PORTER, 1990). Geographical arbitrage meant it was possible to relocate to wherever cost structures were more favourable (SHEARMUR, 2012), revealing the weakness of the district model, which had downgraded the

priority for innovation, especially basic and market-related innovation (QUINTIERI, 2006; RULLANI, 2003).

Under-investment in R&D was not only the result of deliberate company policy to remain competitive by cutting costs, but also the effect of inadequate structural conditions: as well as a specific mental attitude, innovation requires financial capacities and know-how not always in sufficient and ready supply in district-based enterprises. The urgent problem today is how to make up for the accumulated disadvantage in innovative capacity, because if innovation is not internalised within an enterprise (and the district), it must be sought externally, and this obviously leads to dependence. This need is also felt by more intensely technological enterprises, which are forced to rely on the market for some highly specialised services, such as marketing, design, R&D, and financial and legal consultancy. However, these markets are not evenly spread across a territory, but concentrated in urban areas, and in fact only in the most important urban centres (COMPAGNUCCI and CUSINATO, 2011).

The questions we need to answer in response to the above observations are as follows: "Is it possible to recover from the current crisis affecting the NEC district model? What are the geographical effects and consequences of regional disparities in Italy? Is it possible to posit a relationship between these consequences and the emergence of the knowledge economy? And, finally, are we witnessing a 'new regional issue'?"

#### 4.4. Emerging regional disparities

In this section, our aim is to test the plausibility of the above hypotheses by conducting an empirical analysis of the Italian situation. Adopting a macro-regional approach, we shall try to understand whether the respective development trajectories of the last twenty years should be interpreted in terms of convergence or divergence. Finally, we shall try to relate the results obtained to the geography of knowledge activities, looking for a possible correlation between the two phenomena, and so devise further working hypotheses. The fundamental idea is that the locally-based nature of activities specifically devoted to the generation of knowledge reinforces the spatial concentration of productive activities, especially activities geared to exporting, and so plays a part in accentuating regional disparities.

Our empirical analysis is based on the historical series (1995-2011) of Regional Financial Accounts (ISTAT, 2012). We take into consideration the four macro-regions<sup>16</sup> – North-West (NW), North-East (NE), Centre (CE) and Mezzogiorno (ME) – with reference to the value added (VA) per worker<sup>17</sup>, first in "Total", then separately for "Industry in the strict sense" (ISS), "Wholesale and retail trade, repair of motor vehicles and motorcycles; transport and storage; hospitality and catering services; information and communication services" (COTAI), "Financial activities and insurance; real-estate business; professional, scientific and technical activities; administration and support services" (FIPA) and "Public administration and defence, mandatory social insurance,



education, health care and social work; art, entertainment and leisure activities; repair of household goods and other services" (PA)<sup>18</sup>.

In terms of methodology, regional convergence analyses are normally conducted taking SOLOW's model (1956), described in section 2, as their point of reference, based on the hypothesis that growth rates of VA per worker tend towards stasis in the long term (MARTIN and SUNLRY, 1998; MONFORT, 2008). The algorithm generally used for estimating convergence is as follows, based on regression analysis:

$$(9)$$

where  $y_{it}$  is the ratio between VA per worker in region  $i$  at time  $t$  and the corresponding average reference VA,  $t$  is the basic time,  $T$  the time interval considered, and  $\varepsilon$  the standard error. If  $\beta$  is negative, we are seeing a process of regional convergence<sup>19</sup>. If convergence is also realised in the absolute values of VA per worker, we are witnessing "unconditioned convergence" and, if not, then "conditioned convergence". The model suffers, however, from the co-variance existing between the regional values and the average reference value. In reality, therefore, it estimates the spread of the former in relation to the latter and reduces the degree of significance of possible situations of convergence/divergence. To avoid this limitation, in the following analyses we shall take the NW as our benchmark in making comparisons, on the strength of its historical primacy and levels of development that even today are higher than elsewhere. To distinguish between possible situations of divergence and absolute or conditioned convergence, the analyses are conducted in the following stages:

- 1) examination of absolute regional disparities in VA per worker;
- 2) examination of the convergence of regional rates of variation in VA per worker.

Where absolute disparities in productivity per worker are concerned (cf. Figure 1 and Table 2),

a) comparison of NW with ME, as well as confirming the historical gap evident in all sectors (excluding PA), indicates an overall process of significant convergence overall ( $\beta$ -standardised = -0.511;  $F = 5.29$ ), resulting, however, from an aggregate of significant divergences in ISS and PA and of convergence in FIPA;

b) a comparison of NW and NE similarly points to an overall divergence in favour of the NW (albeit only around one third of the gap between NW and SO), but, unlike the results of the NW-ME comparison, no significant convergence in productivity per worker appears if all sectors are taken together ( $\beta$ -standardised = -0.172;  $F = 0.455$ ). Here again, the results are determined by the aggregation of divergences and convergences in the various individual sectors: there is a significant divergence, for instance, in ISS and COTAI to the detriment of the NE, i.e. in sectors typical of the district-based economy, such as manufacturing, transport and production support services. Even more striking, there is a gradual and almost continuous loss of competitiveness in the NE in the FIPA sector, which includes such advanced tertiary activities as research and the liberal professions (belonging to the KCS sector);

c) finally, comparing NW and CE, there would seem to be a significant process of divergence in Iss (in favour of the NW), whereas in the PA sector, we find a slight divergence in favour of the CE.

Where annual rates of variation in productivity per worker are concerned, and therefore the estimate of  $\beta$ -convergence, we cannot rule out the possibility of convergence for all the regional and sector-related comparisons made (cf. Table 3).

It is therefore possible to conclude that:

a) between NW and ME, a process of conditioned convergence is evident overall, but within this process there is divergence in the industrial sector and in PA (a sector which, it should be remembered, also includes activities other than public administration) and convergence in FIPA;

b) between NW and NE, it is not possible to rule out an overall process of conditioned convergence. We are, however, witnessing a gradual relative loss of competitiveness in the NE in all sectors, except PA, which raises significant questions as to the maintenance of the competitive capacity of the production model of this macro-region (and its capacity to work elsewhere). We may well wonder if we are seeing the advent of a new 'regional issue';

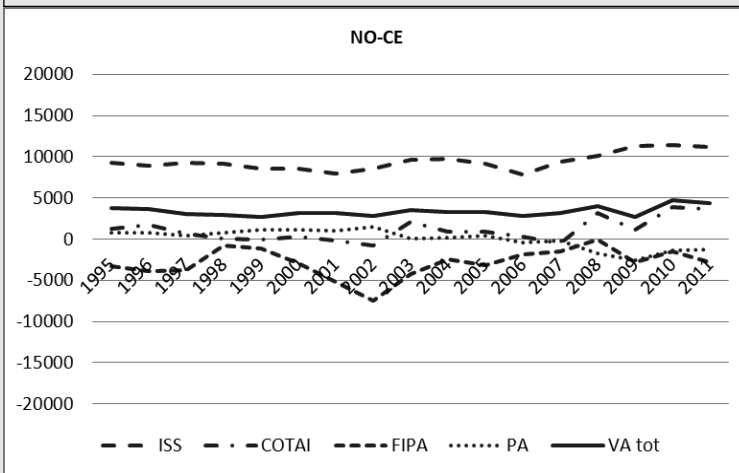
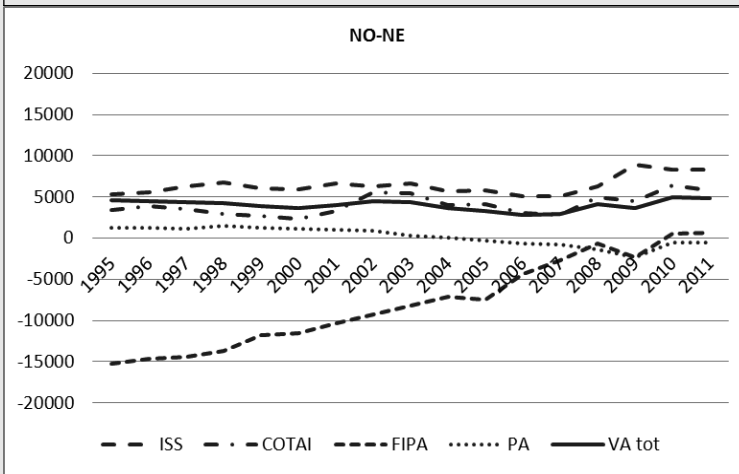
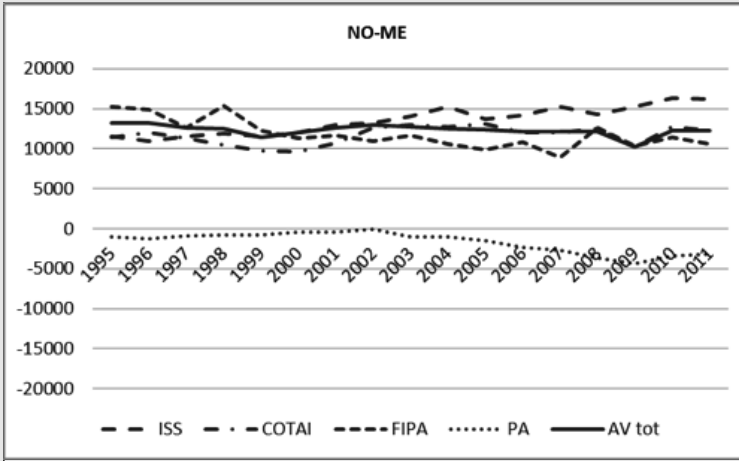
c) between NW and CE, the results as a whole do not provide evidence of significant (generally conditioned) convergences or divergences, except for a slight divergent tendency in Iss and PA.

#### 4.5. An intriguing correlation with the geography of knowledge

Where the emergence of an issue in the NE is concerned, there have been no lack of warnings (for a review, BANCA D'ITALIA, 2011), relating the declining competitiveness of the district system to the small size of the companies concerned, a consequent inability to "make prices" in global market, a persistent tendency to achieve competitiveness by cutting costs rather than promoting innovation, an imbalance in favour of low-technology sectors, a shortage of human capital, high levels of indebtedness, and the logistical difficulties inherent in a model whose components are spread over a wide area. In this paper, we advance the hypothesis that another cause (cultural, economic and spatial in character) needs to be added to the above list: the loss of ground in the NE in activities devoted to the generation of knowledge and, in particular, in what we have defined as KCS.

With this in mind, we have examined the relationship between the results obtained for the on-going divergence processes in productivity per worker in key sectors of the district economy and the dynamics of KCS, measured in terms of workers employed. The classification proposed earlier (Section 4.2) requires a very high level of detail (5 digits). The only databases currently available which fulfil this criterion in Italy are those of the 1991 and 2001 Censuses of Industry and Services.

Figure 1. Disparities in va per worker, by region and economic sector



**Table 2. Regression analysis of regional disparities in VA per worker**

	Sector	R2-adj	F	B	$\beta$ -stand	Sig.
NO-NE	ISS	0.220	5.525	5478.9	0.519	0.033*
	COTAI	0.268	6.859	2966.6	0.560	0.019*
	FIPA	0.974	597.870	-16381.1	0.988	0.000*
	P.A.	0.755	50.326	1741.4	-0.878	0.000*
	AV tot	-0.035	0.455	4186.8	-0.172	0.510
NO-CE	ISS	0.355	9.802	8336.1	0.629	0.007*
	COTAI	0.171	4.305	29.8	0.472	0.056
	FIPA	0.015	1.248	-3662.9	0.277	0.281
	P.A.	0.615	26.511	1486.1	-0.799	0.000*
	AV tot	0.075	2.292	3029.3	0.364	0.151
NO-ME	ISS	0.891	131.288	10919.0	0.947	0.000*
	COTAI	0.091	2.594	10991.6	0.384	0.128
	FIPA	0.478	15.657	13928.0	-0.715	0.001*
	P.A.	0.608	25.785	-36.8	-0.795	0.000*
	AV tot	0.211	5.290	12867.7	-0.511	0.036*

**Table 3. Regression analysis of regional disparities in VA growth rates per worker**

	Sector	R2-adj	F	B	$\beta$ -stand	Sig.
NO-NE	ISS	-0.067	0.052	0.000	0.061	0.823
	COTAI	-0.049	0.297	-0.003	0.144	0.594
	FIPA	-0.230	0.669	0.003	0.214	0.427
	P.A.	-0.066	0.065	-0.005	0.068	0.802
	AV tot	0.280	1.432	-0.005	0.305	0.251
NO-CE	ISS	-0.039	0.435	-0.005	0.174	0.520
	COTAI	-0.023	0.662	-0.009	0.212	0.430
	FIPA	-0.071	0.002	0.000	-0.011	0.967
	P.A.	-0.065	0.085	-0.001	-0.078	0.775
	AV tot	-0.005	0.928	-0.005	0.249	0.352
NO-ME	ISS	-0.071	0.001	0.003	0.010	0.971
	COTAI	-0.067	0.052	-0.003	0.061	0.823
	FIPA	-0.061	0.137	-0.005	0.098	0.717
	P.A.	-0.049	0.296	0.001	-0.144	0.595
	AV tot	-0.038	0.446	-0.007	0.176	0.515

Although time-wise our sources are out of phase (the data for VA cover the period 1995-2011, while the information on KCS is for the period 1991-2001), it is not unreasonable to study the relationship between them while waiting for the results of the 2011 Census. Between 1991 and 2001, the number of workers in private-sector KCS<sup>20</sup> increased by 41.8% nationwide (from around 676,000 to around 958,000) (cf. Table 4). The increase was not, however, uniform in regional terms. For instance, the NW experienced an increase of 45.4%, as compared with 48.4% for the CE, 38.6% for the ME and only 30.6% for the NE. These differing regional dynamics have brought about changes in both the relative weight of the KCS sector regionally and in localization indices, both of which evidence a negative dynamic only in the NE: where territorial distribution is concerned, the NE has lost 1.6 percentage points to the NW (+0.9) and the CE (+1.1), while the ME has lost half a percentage point. Where LQ is concerned, the NE is the only region to show a regression (-0.1), as compared with increases of 0.04 in the NW and CE, and no change in the ME.

Although the existence of a correlation between the dynamics of KCS and the regional divergences that emerge from the analyses does not necessarily indicate a cause-and-effect relationship, the connection cannot be totally ignored. The hypothesis that knowledge activities, or rather their presence/absence in given regions, plays a decisive role in generating or heightening regional imbalances is reinforced by an analysis of the dynamics of manufacturing, taking into account the level of technology involved. Table 5 shows that, between 1991 and 2001, the NE was the only macro-region to record an increase, albeit only slight, in employment in manufacturing generally, and in related LQ. At infra-sectorial level, however, it is clear that the type of specialization practised in the NE is increasingly geared to activities of low technological intensity, unlike the NW, where greater high and high-medium technology potential is concentrated.

To sum up, comparison of NW and NE reveals a situation in which, as well as an already worrying process of divergence in VA per worker in ISS and COTAI to the detriment of the NE, and the beginnings of a divergence in FIPA, we are seeing a decline in the NE in specialization in KCS and a persistent situation of under-specialization in high-tech activities compared with the national average and, more specifically, compared with the NW (although there was some improvement during the decade under consideration).

Finally, given the distinctly urban character of KCS, let us focus attention on the urban geography of these activities. Comparing the geography of LLS (Local Labour Systems) specializing in private KCS in 1991 and 2001 (cf. Figure 2), first of all we observe a growing concentration of such activities in the larger urban centres: compared with the 56 LLS specializing in KCS in 1991, there were only 37 in 2001. In particular, whereas the LLS in Milan and Turin accounted respectively (in 2001) for 46.8% and 16.5% of workers in private-sector KCS in the NW, Bologna and Padua accounted for 'only' 13.1% and 9% in the NE.

The situation is even clearer if we study the localization indices for LLS with more than 500,000 inhabitants (cf. Table 6): while Rome maintained its national

Table 4. Kcsworkers – Absolute values, regional distribution and LQ

Employment	1991			2001		
	KCS_91	KCS_priv_91	KCS_pubb_91	KCS_01	KCS_priv_01	KCS_pubb_01
NO	262,886	238,733	24,153	380,470	347,174	33,296
NE	158,197	136,050	22,147	206,915	177,643	29,272
CE	207,199	163,542	43,657	295,853	242,636	53,217
ME	182,005	137,835	44,170	256,636	191,042	65,594
ITA	810,287	676,160	134,127	1,139,874	958,495	181,379
Employment (%)	KCS_91	KCS_priv_91	KCS_pubb_91	KCS_01	KCS_priv_01	KCS_pubb_01
NO	32.4	35.3	18.0	33.4	36.2	18.4
NE	19.5	20.1	16.5	18.2	18.5	16.1
CE	25.6	24.2	32.5	26.0	25.3	29.3
ME	22.5	20.4	32.9	22.5	19.9	36.2
ITA	100.0	100.0	100.0	100.0	100.0	100.0
Growth rates 2001-1991 (%)	KCS	KCS_priv	KCS_pubb			
NO	44.7	45.4	37.9			
NE	30.8	30.6	32.2			
CE	42.8	48.4	21.9			
ME	41.0	38.6	48.5			
ITA	40.7	41.8	35.2			
LQ	KCS_91	KCS_priv_91	KCS_pubb_91	KCS_01	KCS_priv_01	KCS_pubb_01
NO	1.01	1.10	0.56	1.05	1.14	0.58
NE	0.86	0.89	0.73	0.77	0.79	0.69
CE	1.26	1.19	1.60	1.26	1.23	1.43
ME	0.90	0.82	1.32	0.92	0.82	1.48

**Table 5. Workers in manufacturing as a whole and in sub-divisions of the manufacturing sector – Absolute values, regional distribution and LQ<sup>a</sup>**

Employment	1991					2001				
	Man_91	Hi_91	HiMe_91	MeLo_91	Low_91	Man_01	Hi_01	HiMe_01	MeLo_01	Low_01
NO	2,085,738	194,311	588,493	549,349	753,585	1,817,426	150,155	515,774	549,398	602,099
NE	1,375,482	65,935	301,978	347,466	660,103	1,405,942	76,990	347,618	398,101	583,233
CE	913,247	78,341	127,212	189,158	518,536	853,661	68,761	135,659	195,905	453,336
ME	831,877	63,288	143,905	228,827	395,857	807,331	55,410	143,438	226,995	381,488
ITA	5,206,344	401,875	1,161,588	1,314,800	2,328,081	4,884,360	351,316	1,142,489	1,370,399	2,020,156
Employment (%)	Man_91	Hi_91	HiMe_91	MeLo_91	Low_91	Man_01	Hi_01	HiMe_01	MeLo_01	Low_01
NO	40.1	48.4	50.7	41.8	32.4	37.2	42.7	45.1	40.1	29.8
NE	26.4	16.4	26.0	26.4	28.4	28.8	21.9	30.4	29.1	28.9
CE	17.5	19.5	11.0	14.4	22.3	17.5	19.6	11.9	14.3	22.4
ME	16.0	15.7	12.4	17.4	17.0	16.5	15.8	12.6	16.6	18.9
ITA	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LQ	Man_91	Hi_91	HiMe_91	MeLo_91	Low_91	Man_01	Hi_01	HiMe_01	MeLo_01	Low_01
NO	1.25	1.51	1.58	1.30	1.01	1.17	1.33	1.41	1.25	0.93
NE	1.16	0.72	1.15	1.16	1.25	1.23	0.97	1.34	1.28	1.27
CE	0.86	0.96	0.54	0.71	1.10	0.85	0.96	0.58	0.7	1.11
ME	0.64	0.63	0.50	0.70	0.68	0.68	0.63	0.5	0.66	0.76

a. Hi=High-technology, HiMe = High/Medium technology, MeLo = Medium/Low technology, Low = Low technology, in accordance with Eurostat definitions for manufacturing industry (Eurostat, 2009).

primacy, with an LQ of 2.16 at the beginning and 2.26 at the end of the decade under consideration, Milan and Turin displayed the greatest dynamism, while in the NE Padua barely increased its already relatively low level of specialization, Bologna lost ground, and Verona disappeared from the ranks of major cities specializing in private-sector KCS. In the CE, the positions of Rome and Florence were confirmed, albeit with a slight decline on the part of Florence, while in the ME Naples made an appearance (LQ = 1.08), Bari (with slight growth) and Palermo (slight decline) confirmed their status, and Catania dropped off the list of major LLS specializing in KCS.

**Table 6. Percentage distribution of Kcs workers in urban LLS with more than 500,000 inhabitants and related QL**

Employment (%)*	KCS_91	Priv_KCS_91	Pubb_KCS_91	KCS_01	Priv_KCS_01	Pubb_KCS_01
Roma	54,6	56,0	49,4	59,1	59,8	55,8
Milano	43,9	44,4	39,9	45,9	46,8	36,1
Torino	16,2	15,9	19,0	17,0	16,5	22,1
Bologna	14,8	13,2	24,6	14,3	13,1	21,3
Firenze	9,4	9,0	11,1	8,8	8,1	11,9
Bari	6,4	6,0	7,8	6,5	6,2	7,1
Genova	6,0	4,9	16,5	5,2	4,6	11,6
Padova	8,2	7,4	13,6	9,9	9,0	15,2
Palermo	6,6	6,0	8,3	7,2	5,5	12,1
Napoli	17,1	12,9	30,2	18,5	14,9	28,8
QL	KCS_91	Priv_KCS_91	Pubb_KCS_91	KCS_01	Priv_KCS_01	Pubb_KCS_01
Roma	2,23	2,16	2,57	2,29	2,26	2,44
Milano	1,80	1,97	0,91	1,93	2,14	0,83
Torino	1,32	1,41	0,86	1,52	1,60	1,09
Bologna	1,45	1,33	2,04	1,34	1,26	1,78
Firenze	1,27	1,17	1,76	1,34	1,24	1,82
Bari	1,44	1,22	2,56	1,45	1,24	2,54
Genova	1,39	1,26	2,10	1,37	1,23	2,10
Padova	1,31	1,17	2,00	1,26	1,21	1,54
Palermo	1,35	1,13	2,49	1,60	1,08	4,34
Napoli	1,35	0,92	3,50	1,51	1,08	3,77

\*employment share of macro-region totals.

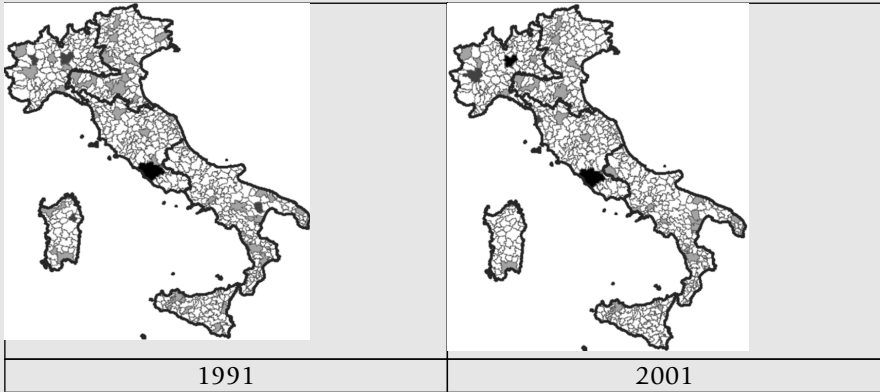
## - 5 -

### Conclusion

Despite the time lag in the historical series used, the results of our analyses are clear:

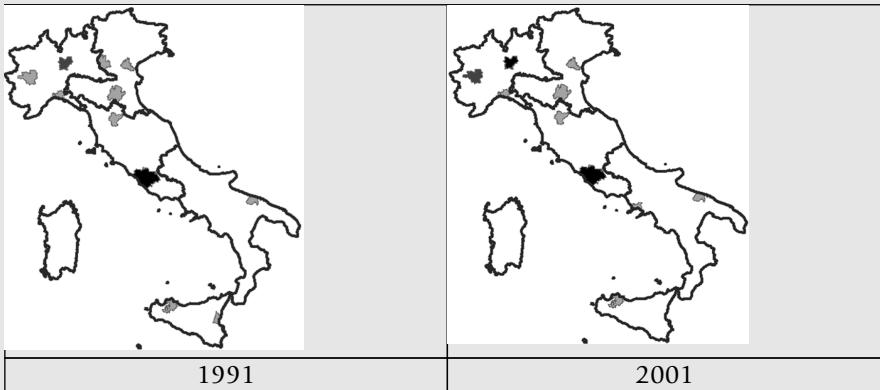


**Figure 2. LLSpecializing in private-sector Kcs<sup>a</sup>**



a. In light grey, LLS with LQ of between 1 and 1.5; in dark grey, those with LQ of between 1.5 and 2; and, in black, those with LQ of more than 2.

**Figure 3. LLS with more than 500,000 inhabitants, specializing in private-sector Kcs**



a) the historical gap between North and Mezzogiorno is still wide in absolute terms, despite a process of conditioned convergence, indicating that the 'southern question' is still a serious problem;

b) it is plausible that a new regional dualism between NW and NE is now emerging. Since these two regions are the principal engines of the Italian economy, this could have a significant impact on the country as a whole;

c) the causes of the divarication in the developmental trajectories of NW and NE lie in the structural changes that have affected the economies of the two regions. In the NW, it would seem that we are witnessing an intensification of the processes

of concentration and an increase in the productivity of knowledge-based activities, accompanied by higher localization indices in high-tech industry. Meanwhile, in the NE, there has been a weakening of knowledge-based activities (in terms of both localization indices and competitiveness), and this has been accompanied by growing specialization in manufacturing activities of low technological intensity. If these findings will be confirmed by the results of the 2011 Census, it would add weight to the hypothesis we outline here regarding the effects of cumulative retroactive mechanisms in the NW and of a lock-in in the NE, resulting ultimately in a new 'regional issue';

d) the divergence between NW and NE has been accompanied by phenomena of polarisation of driving urban services, such as KCS, in the two regions: whereas in the NW we are seeing an increasing concentration of knowledge-based activities in the major urban centres, in the NE the opposite is occurring.

These findings raise issues of two kinds, issues which also have implications for public policy:

a) the recent changes in the competitiveness of local economic systems point to a need for closer integration (including spatial integration) between industrial and knowledge-based activities. From a functional point of view, the sources of creativity and innovation are increasingly located within interactive networks of entities characterised by both functional diversity and similarity of cognitive competence. Leaving aside the vast literature on the subject of local innovation systems, learning regions and *milieux innovateurs*, one might well speculate about the possible existence of a fourth helix, in addition to the three indicated in the model of biological derivation developed by ETZKOWITZ and LEYDESDORFF (2000), identifiable in private KCS<sup>21</sup>. The question is whether the manufacturing enterprises in industrial districts and knowledge-based urban services have sufficiently compatible cognitive maps to be able to generate networking synergies in terms of *Learning 2* and *3* as a matrix for creativity;

b) from a spatial point of view, there is the problem of the physical proximity between manufacturing and KCS (and, consequently, urban centres). In spite of the ICT revolution, which should make it possible to operate anywhere in the world, the interactional ways in which competencies are constructed at the higher levels of learning mean that the players involved need to be in close physical and cultural proximity. Where the new 'regional issue' of the NE we have aired is concerned, we foresee a need to examine in greater depth the question of relations between the "industrialised countryside" (BECATTINI, 1975) and the city, to try to understand whether the ancient dualism (partly cultural) between the two environments is still a relevant factor, and whether this inhibits the developmental capacities of the local system as a whole.

## Références bibliographiques

- ASHEIM B, COENEN L, MOODYSSON J, VANG J (2007) Constructing knowledge-based regional advantage: implications for regional innovation policy. *International Journal of Entrepreneurship and Innovation Management* 7(2):140-155.
- BAGNASCO A (1977) *Tre Italie: La problematica territoriale dello sviluppo economico italiano*. Il Mulino, Bologna.
- BANCA D'ITALIA (2011) *L'economia del Nord-Est*. Banca d'Italia, Roma.
- BANFIELD E-C (1976) *Le basi morali di una società arretrata*. Il Mulino, Bologna.
- BARRO R-J, MANKIW N-G, SALA-I-MARTIN X (1995) Capital mobility in neoclassical models of growth. *American Economic Review* 85(1): 103-115.
- BATESON G (1972) *Steps to an ecology of mind: collected essays in anthropology, psychology, evolution, and epistemology*. University of Chicago Press, Chicago.
- BAUMAN Z (2010) *Hermeneutics and social science: approaches to understanding*. Taylor & Francis, London.
- BECCATTINI G (1989) Riflessioni sul distretto industriale marshalliano come concetto socio-economico. *Stato e mercato* 25: 111-128.
- BECCATTINI G (1975) *Lo sviluppo economico della Toscana*. IRPET, Guaraldi, Firenze.
- CALAFATI A-G (2009) *Economie in cerca di città: la questione urbana in Italia*. Donzelli, Roma.
- CHARNESS G, HARUVY H, SONSINO D (2007) Social distance and reciprocity: an internet experiment. *Journal of Economic Behavior & Organization* 63(1): 88-103.
- COE M-R, WILDEN A (1978) *Errore*. In: R. Romano (ed) *Enciclopedia Einaudi* 5: 682-711, Einaudi, Torino.
- COMPAGNUCCI F, CUSINATO A (2011) Industrial districts and the city: relationships in the knowledge age. Evidence from the Italian case. *Working Paper* 365, UNIVPM.
- DCMS (2001) *Creative industries mapping document 2001*. Department of Culture, Media and Sport, London.
- DE MARTINO E (1959) *Sud e magia*. Feltrinelli, Milano.
- DRUCKER P-F (1968) *The age of discontinuity*. Heinemann, London.
- ETZKOWITZ H, LEYDESDORFF L (2000) The dynamics of innovation: from national systems and "mode 2" to a triple helix of University-Industry-Government relations. *Research Policy* 29(2): 109-123.
- EUROSTAT (2009) 'High-technology' and 'Knowledge Based Services' aggregations based on NACE Rev. 2. Available at: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/Annexes/htec\\_esms\\_an3.pdf](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an3.pdf).
- FLEMING D (1991) The concept of meta-competence. *Competence and Assessment* 16: 9-12.
- FLORIDA R, KENNEY M (1993) The new age of capitalism: innovation-mediated production. *Futures* 25(6): 637-651.
- FORAY D (2000) *L'économie de la connaissance*. La Découverte, Paris.
- FUÀ G, ZACCHIA C (1983) *Industrializzazione senza fratture*. Il Mulino, Bologna.
- GADAMER H-G (1975) Hermeneutics and social science. *Philosophy & Social Criticism* 2(4): 307-316.
- GADAMER H-G (2004 [1960]) *Truth and method*. Continuum International Publishing Group, London.
- GAROFOLI G (1992) *Economia del territorio. Trasformazioni economiche e sviluppo regionale*. Etas Libri, Milano.
- GEERTZ C (1973) *The interpretation of cultures*. Basic Books, New York.
- GIBBONS M, LIMOGES C, NOWOTNY H, SCHWARTZMAN S, SCOTT P, TROW M (1994) *The new production of knowledge: the dynamics of science and research in contemporary societies*. Sage, London.
- GLASERSFELD (VON) E (1984) An Introduction to Radical Constructivism. In: Watzlawick P (ed) *The invented reality: how do we know what we believe we know? contributions to constructivism*. Norton, New York.
- HABERMAS J (1988) *On the logic of the social sciences*. Polity Press, Cambridge.
- HOWKINS J (2002) *The creative economy: how people make money from ideas*. Allen Lane, London.

- ILO (2007) *Resolution concerning updating the international standard classification of occupations*. Geneva. Available at: <http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm>.
- ISTAT (2012) Conti economici regionali. Available at: <http://www.istat.it/it/archivio/75111>.
- KUHN T-S (1962) *The structure of scientific revolutions*. University of Chicago Press, Chicago.
- LIPPS T (1979[1903]) Empathy, inner imitation and sense-feelings. In: Rader M-M (ed) *A Modern book of esthetics: an anthology*. Holt, Rinehart and Winston, New York.
- LUCAS R-E (1988) On the mechanism of economic development, *Journal of Monetary Economics* 22(1): 3-42.
- MAGRINI S (2004) Regional (di)convergence. In: HENDERSON J-V, THISSE J-F (eds) *Handbook of regional and urban economics*. Elsevier, Amsterdam.
- MAKKREEL R-A (1996) How is empathy related to understanding? *Contributions to Phenomenology* 24: 199-212.
- MANKIW N-G, PHELPS E-S, ROMER P-M (1995) The growth of nations. *Brookings Papers on Economic Activity* 1: 275-326.
- MANKIW N-G, ROMER D, WEIL D-N (1992) A contribution to the empirics of economic growth, *The Quarterly Journal of Economics* 107(2): 407-437.
- MARTIN R, SUNLEY P (1998) Slow convergence? The new growth theory and regional development. *Economic Geography* 74(3): 201-227.
- MILES I, KASTRINOS N, BILDERBEEK R, DEN HERTOEG P, WITH FLANAGAN K, HUNTINK W (1995) Knowledge-intensive Business Services: their role as sers, carriers and sources of innovation, *Report to the EC DG XIII Sprint EIMS Programme*. Luxembourg.
- MONFORT P (2008) Convergence of EU Regions. Measures and Evolution, *Directorate-General for Regional Policy Working Papers* 1.
- MORGAN K (2004) The exaggerated death of geography: learning, proximity and territorial innovation systems, *Journal of Economic Geography* 4(1): 3-21.
- MORIN E (1986) *La méthode 3: La connaissance de la connaissance*. Éditions du Seuil, Paris.
- OECD (1996) *The Knowledge-based economy*. Available at: <http://www.oecd.org/dataoecd/51/8/1913021>.
- ONIDA F, VIESTI G, FALZONI A-M (1992) *I distretti industriali: crisi o evoluzione?* Egea, Milano.
- PIAGET J (1997[1953]) *The origin of intelligence in the child*. Routledge, London.
- PORTER M-E (1990) *The competitive advantage of nations*. Macmillan, London.
- PUTNAM R (1993) *Making democracy work: civic tradition in modern Italy*. Princeton University Press, Princeton.
- QUINTIERI B (2006) *I distretti industriali dal locale al globale*. Soveria Mannelli, Rubettino.
- RAZIN A, CHI-WA Y (2002) Factor mobility and income growth: two convergence hypotheses, *Review of Development Economics* 1(2): 171-190.
- REICH R-B (1992) *The work of nations: preparing ourselves for 21st century capitalism*. Vintage, New York.
- RICOEUR P (1981) *Hermeneutics and the human sciences: essays on language, action and interpretation*. Cambridge University Press, Cambridge.
- ROMER P-M (1986) Increasing returns and long run growth, *Journal of Political Economy* 94(5): 1002-1037.
- RULLANI E (2003) I distretti industriali al tempo dell'economia globale, *Impresa & Stato* 63. Franco Angeli, Milano.
- SAHLINS M-D (1972) *Stone age economics*. Transaction Publishers, Piscataway, NJ.
- SARACENO P (1990) *Sottosviluppo industriale e questione meridionale. Studi degli anni 1952-1963*. Il Mulino-Svimez, Bologna.
- SCHON D (1983) *The reflexive practitioner: how professionals think in practice*. Basic Books, New York.
- SHEARMUR R (2012) Are cities the font of innovation? A critical review of the literature on cities and innovation, *Cities* 29(2): 9-18.

## L'économie de la connaissance: une nouvelle source de disparités régionales ?

- SIMON H-A (1956) Rational choice and the structure of the environment, *Psychological Review* 63(2): 129-138.
- SLAUGHTER M-J (1997) Per capita income convergence and the role of international trade, *The American Economic Review* 87(2): 194-199.
- SOLOW R-M (1956) A contribution to the theory of economic growth, *Quarterly Journal of Economics* 70(1): 65-94.
- SOLOW R-M (1957) Technical change and the aggregate production function, *Review of Economics and Statistics* 39(3): 312-320.
- SORIANO F-H, MULATERO F (2010) Knowledge policy in the EU: from Lisbon strategy to Europe 2020, *Journal of Knowledge Economy* 1(4): 289-302.
- STENGERS I (2000) *The invention of modern science*. University of Minnesota Press, Minneapolis.
- TAYLOR A-M (1996) Convergence and international factor flows in theory and history, *NBER Working Paper Series* 5135.

## Notes

- 1 - Sections 2 and 3 are by Augusto Cusinato, section 4 is by Fabiano Compagnucci, section 1 and 5 are common.
- 2 - In the sense that it is inherent in market mechanism.
- 3 - In the case of unconditioned convergence, a state of stasis with parity of absolute levels of productivity per worker between regions is finally reached; in the case of conditioned convergence, the different regions tend towards stasis but absolute levels of productivity differ (i.e. they are 'conditioned' by the regions' different initial circumstances). For a review, see MARTIN and SUNLEY (1998).
- 4 - Instead of the COBB-DOUGLAS formula used by SOLOW ( $Y_t = A_t K_t^\alpha L_t^{1-\alpha}$ , with  $0 < \alpha < 1$ ), the authors propose  $Y_t = A_t K_t^\alpha H_t^\beta L_t^{1-\alpha-\beta}$ , where  $H$  is human capital and  $\alpha + \beta < 1$ . The formal properties of the standard function are therefore respected (decreasing marginal returns for the individual factors and constant yields of scale). This new formula shows, however, that the accumulation of human capital increases the productivity of physical capital, leaving out of consideration economies of scale or agglomeration.
- 5 - This is made clear in MANKIW *et al.* (1992).
- 6 - In ROMER, the assumption is explicit, when he speaks of "accumulation of knowledge".
- 7 - As with the "scientific revolutions" described by KUHN (1962).
- 8 - On a smaller scale, this might also apply to an enterprise.
- 9 - We say 'interpretations', rather than 'texts', because every text is in fact an interpretation.
- 10 - The term is clearly drawn from SIMON (1956).
- 11 - 'New' because it arises from a critique of modernity.
- 12 - In the sense of 'governance'.
- 13 - SCHON (1983) is an authoritative exponent of this approach.
- 14 - We intend to devote ourselves to this aspect in the near future.
- 15 - At the date we submitted this paper.
- 16 - Hereinafter referred to as "regions".
- 17 - VA per worker is expressed in thousands of euros in real prices ("valori concatenati"). Year of reference 2005.
- 18 - "Agriculture" and "Construction" are therefore excluded.
- 19 - The move to logarithms is justified by the fact that, calculated in this way, the convergence value is zero, rather than 1.

- 20 - Our analysis focused on private-sector KCS, because they constitute the part of the knowledge economy which does not depend – at least directly – on public investment.
- 21 - Moreover, in the biological field, too, from which the two authors have borrowed the image of the triple helix, the hypothesis of the existence of a fourth helix in DNA is now being advanced.