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Editors

Knowledge-creating Milieus in Europe

Firms, Cities, Territories

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Introduction

Augusto Cusinato and Andreas Philippopoulos-Mihalopoulos

The Introduction contextualises the book within the scientific debate on the socio-spatial conditions which are thought to be conducive to creativity and innovation. After briefly sketching the reasons behind the urge for continual innovation that characterises the contemporary market economy, the Introduction presents the twofold basic hypothesis of the anthology, according to which (a) an 'interpretative turn' concerning creativity and innovation is pragmatically taking place within enterprise and more generally industry, and (b) mainstream economics finds it hard to recognise that turn due to its firm adherence to the 'methodological individualism-behaviourism-cognitivism' triad. The book suggests that within the composite family of theoretical approaches which are part of the interpretative turn, a hermeneutic approach fits better on both analytical and normative levels because of its concern for socially- and spatially-situated processes and declared ethic stance. The Introduction therefore sketches the analytical, empirical and normative implications of a hermeneutic approach with regard to creativity and innovation. Not only do crucial familiar notions such as noise, ambiguity, learning and also 'the knowledge economy' change meaning, if not value, but the structural rather than functional, and the intangible rather than tangible features of places are seen to play an essential role in the collective shaping of creative attitudes and aptitudes. A critically updated version of the Durkheimian notion of generative milieu turns out to be central in this connection. Comments follow on how the various contributions to this anthology help to substantiate this interpretative framework and to generate suggestions for policies and further research work.

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Frame of Reference

It is perhaps a truism to maintain that the global economy and, in particular, the economies of mature industrialised countries are going through a period of profound change. A period which is characterised by two major and interrelated trends: a redrawing of economic geography on a global scale and a transition from the industrial age to what is increasingly referred to as the "age of the knowledge economy". In recent years, the change has accelerated dramatically, to an extent which suggests that it is 'precipitating' into a new division of labour at any conceivable scale (the global, the national and also the sectorial one), along with the rise of new mode(l)s of production and the stresses that ensue on the social, institutional and also geo-political realms. It is not entirely out of place to enquire if we are in the presence of an all-encompassing change of paradigm—a revolution—in the sense that not only economic geography, technology and maybe culture, but also social and political relationships will subsequently no longer be what they were before. While admitting that it would be presumptuous to imagine that we could answer such a question, this collective work aims to focus on a perhaps limited but (the authors assume) crucial aspect of that supposed all-encompassing change, which concerns the emergence of a new kind of cognitive praxis within enterprises and industry at large, with respect to the cognitivist praxis that has long informed their approach to knowledge, innovation and management, and has ultimately been the basis of their extraordinary success in the modern age.

A few empirical figures are enough to sketch the on-going change in the global economic geography. The industrial sector's contribution to global GDP dropped from 37.5 to 26.7 % between 1970 and 2011, while that of the service sector rose from 52.7 to 70.2 %.[1] In the OECD countries, the change has been even more marked, with industry contributing fourteen percentage points less to GDP over the same period, and services almost 19 % more. As regards the global distribution of economic activity, the centre of gravity is shifting from the Atlantic to the Pacific: while remaining largely dominant, the contribution of OEDC Atlantic members[2] to the world GDP has declined from 64.7 to 53.0 % in the same period, whereas that of the East Asian and Pacific countries has risen from about one seventh to about a quarter, due mainly to the growth of their industrial sectors, whose share has more than doubled.

On closer examination, however, the situation is more multifaceted. First of all, the world economy is not witnessing a process of deindustrialisation in any absolute sense. Globally again, the value of industrial production almost tripled in real terms (+174 %) between 1970 and 2011, sextupled in the East Asian and Pacific countries (+506 %) and almost doubled in the OECD countries (+72 %), though they were the most affected by industrial restructuring. The truly epoch-making phenomenon was the drop in industrial employment in the earliest industrialised countries

[1] Source: World Bank, *World databank* (Accessed: May 2014).

[2] Austria, Canada, Denmark, Finland, France, Germany, Hungary, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom, United States. Other states have been omitted because data are unavailable.

(−15.5 million units in the same period in the G7[3]), though it went hand in hand with an increase in production. To equate this admittedly dramatic change ('dramatic' because of the social effects it has generated) with material deindustrialisation is therefore misleading, and limiting in any case: what is occurring in those countries is the deindustrialisation of society and culture rather than merely the economy, in the face of the rapid industrialisation of other parts of the world.

Symmetrically, the global expansion of the service sector, which is generally seen as the other face of deindustrialisation, also needs to be interpreted with circumspection. Though no-one can deny that this sector has experienced even more intense growth than industry (+313 % of added value globally[4]), questions arise about how much of this growth is ascribable to the outsourcing of activities previously performed within (and registered as) industrial enterprises, how much to the globalisation of the economy and the connected need for specialised services and, *cæteris paribus*, how much to an increased demand for services by intermediate and end users. Although this is still subject to discussion (for example, Doloreux, Freel, & Shearmur, 2010; European Foundation for the Improvement of Living and Working Conditions, 2006), it is widely held that a major change is occurring within services themselves, with the rise of what is emerging as a structured sub-sector having a specific outcome (knowledge and innovation) and specific ways of 'producing' it, i.e., "Knowledge-intensive Services—KIS" (Windrum & Tomlinson, 1997, 1999).[5] According to Eurostat, "Knowledge-intensive activities" account for 33 % of total employment in the EU(27), with more than 40 % in the Northern European countries, and a peak of 48 % in Sweden.[6]

At the crossing of this twofold structural change is the advent of ICTs. On the one hand, ICTs have made it possible for the production cycle to be segmented into separate parts and phases, services to be outsourced by typical industrial enterprises, and routine phases to become footloose almost anywhere around the world, all of which have contributed to the slimming down of industry and to the corresponding growth of the service sector. On the other hand, the advent of ICTs has given rise, not only to a spectacular growth in both information processing and possibilities of remote-command-and-control within productive processes,[7] but also to a somehow paradoxical and in any case unexpected outcome, in that it has emphasised the knowledge-creating role of dialogical communication (which 'enjoys' significant margins of ambiguity), when the common expectation was that syntactical communication would have gained an absolutely dominant position (precisely thanks to its power of ruling out any margin of ambiguity).

[3] Source: OECD, "Civilian employment in industry" (Accessed: March 2014).

[4] Source: World Bank, *World databank* (Accessed: May 2014).

[5] Or other specifications, such as "Knowledge-intensive Business Services—KIBS" (Miles et al., 1995) or "Knowledge-creating Services—KCS" (as proposed in this book).

[6] Eurostat (Accessed: March 2014). Data refer to 2007.

[7] It is estimated that "global internet traffic" per month increased from 0.001 to 20,634 petabytes (1 petabyte = 10^{15} bytes) between 1990 and 2011 (Source: www.Cisco.com, "Visual networking Index").

As announced above, the present work grounds its *raison d'être* in this last connection, aiming to show how a new cognitive praxis is becoming established within firms and industry in general, to the point that the mainstream economic approach to knowledge and creativity becomes obsolete. The theoretical debate on this topic is well established within social sciences in general, itself drawing from the philosophical domain, but it does not yet seem capable of cutting into the very core of economics: a core which still features a stringent linkage between methodological individualism, logical positivism and cognitivism (Lavoie, 1990; Weber & Van Bouwel, 2005). Criticisms of this triad are not new but, inasmuch as they focus on one or the other term without considering the links which hold them together, outcomes remain inconclusive, irrespective of their epistemological soundness and rationality. An emblematic example of such a condition is represented by Gibbons et al. (1994), which can be considered a milestone along the path towards an alternative viewpoint on knowledge within economic reflection, with respect to cognitivism. Their essential message is that the time *was* right to move from "Mode 1" to "Mode 2" in addressing the issue of knowledge construction, where the two Modes synthetically stand for the individualist/cognitivist and the relational approaches. The fact that the two modalities are labelled in such an anodyne way attests to the extent to which the ultimate epistemological-and-pragmatic difference between them remains unachieved. It is not enough in fact, as the authors do, to take a phenomenological view, according to which there is both an individualistic and a relational mode for the construction of knowledge, because it does not allow them/us to recognise that in moving from the one to the other mode, the 'object' of knowledge changes radically: namely, it passes from information about something which (it is presumed) stays outside the subject's mind, to information about the subjects' minds.

To come to grips with that triad, a more radical criticism is needed, which points directly to its pre-analytical assumptions. This criticism is the outcome of a synthesis between post-modern and structuralist thought, and we understand it here as hermeneutics. While post-modern thought points to the link between logical positivism and cognitivism, but without distancing itself from individualism (and sometimes flirting with it), structuralism mainly calls into question individualism, without however rejecting any positivist and cognitivist stance and mainly the idea that an ultimate Truth is, and that Truth consists in the structure itself. The rise of *a* hermeneutic approach[8] within epistemological thought in the last century rightly raised questions about the above-mentioned triad as a whole, thus shedding light on the modern ideological remainders which lie within both the post-modern and the structuralist approaches. Here, we consider it to be the most suitable tool we have for understanding what is now happening in cognitive-and-creative praxes within firms, industry and, perhaps, society at large: that the cognitivist approach, from having been a factor of development of the creative forces in the industrial era, is turning into their fetters, and that it is in fact going to be *pragmatically* replaced by a hermeneutic approach.

[8] Referring to hermeneutics, we make use of the indefinite article "because it proposes *one way* of understanding things, not prescribing *the way* of understanding things" (Öberg, 2012, p. 40).

It follows that not only does the notion of the 'knowledge economy' become much denser than the depiction that conventional economic thought makes of it, but that the imperative for innovation which is inherent in it entails *a prior need to innovate within the representation of the link occurring between knowledge, creativeness and innovativeness*. A concise examination of the genesis of the present critical socio-economic condition and the main answers economic reflection has devised for coping with it will allow us to focus this work's subject and aims more effectively.

Epistemological Implications of the Present Crisis

The condition of crisis currently affecting the earliest industrialised economies is the late outcome of a combination of events that took root almost half a century ago, and now concludes with the demise of the industry-centred culture, especially the part of it that those economies inherited from the pairing of Fordism and Keynesianism. That the Fordist model was declining in its birthplace from the late 1960s is well known (for example, Sugrue, 1996), but at that time it had not yet deteriorated to the same extent elsewhere, though important diseconomies of scale were appearing, mainly in labour and social relations at large (Garofoli, 1992). For their part, Keynesian policies were giving their best in Western countries, in terms of the most spectacular age of growth *cum* social peace. A first crucial blow came to this exceptional condition from the repeated oil shocks of the 1970s, consequent on the loss of tight political and also military control over oil producing countries.[9] The shocks laid bare and tore down a pillar Keynesianism, which had until then remained implicit, concerning the absence of bottlenecks in the provision of productive factors, and especially energy. For its part, the ICT revolution of about a decade later, made it possible to overcome the main residual rigidities typical of Fordism, related to the technical indivisibilities of factory units: thanks to remote control devices, routine activities from then on became virtually footloose on the global scene, thus tearing down, as a secondary effect, another pillar of Keynesianism, relative to the fact that demand-side policies would yield their main effects within the national boundaries thanks to the relative immovability of industrial plants. Moreover, the entrance of new and, crucially, giant industrial competitors (BRICS) beside the traditional G7 has seriously compromised the capacities of Western economies to secure world market stability, with imaginable consequences for industrial investment propensities and effectiveness of demand-size policies.

[9] The beginning of that loss of control can be emblematically dated back to November 7, 1956, when the UN obliged the United Kingdom and France to withdraw their forces from the Sinai, which they had occupied after the Egyptian president Nasser nationalised the Anglo-French Suez Company.

The piling up of economic, social and also political stresses consequent on these events has probably reached breaking point over the last half decade. The dramatic rise of public debt incurred by many countries in order to prevent or alleviate social tensions consequent on deindustrialisation, an insufficient growth rate to compensate for technological unemployment, the spectacular move from industrial profit-seeking towards financial rent-seeking made possible by the advent of ICTs, the ephemeral attempts to sustain growth through speculative bubbles (mainly in the financial and real estate sectors), the continual and substantial transfer of resources to oil producers, with the suspicion that some of them wind up in the hands of international terrorism (ironically, for use against the oil buyers themselves), the rising awareness of the unsustainable effects of the capitalistic model of development on the ecological and, maybe, also social systems, and, what is more, the declining belief that an imminent and easy socio-economic recovery and/or a technological breakthrough will make it possible to sort out the mess—all these adverse circumstances raise serious concerns about the present real driving forces of both economic change and the new 'international division of labour'.

The early post-Fordist recommendation for flexibilisation (Piore & Sabel, 1984) along with its celebrated ideological antecedent *Small is Beautiful* (Schumacher, 1973) and the theorisation of the economic advantages and also higher ethical value of local SME systems (Becattini, 1978, 1989) do not seem to have provided an adequate answer to the need of firms and regions to stay competitive in an increasingly challenging market. Flexibility can indeed take the opposite forms of submissive or assertive adaptability to stresses, with crucially different implications. In the first case, which is typical of price-taking firms and systems, such as Industrial Districts (Belussi & Caldari, 2009; Marshall, 1919), the easiest though myopic answer consists of cost-cutting, carried out through wage-lowering or its macro-economic correspondent, currency devaluation, or through opportunistic externalisation of costs (such as depletion of common goods); in the second case firms and/or economic systems anticipate strains by innovating, deliberately stressing the market for their own advantage. But whilst in this latter case there is no upper limit (because any innovation opens the way to clusters of further ones), in the case of submissive adaptation there is a lower limit, which coincides with the resilience threshold of the system under consideration. The demand for flexibility thus remains convincing on condition that it refers to its assertive connotation, that is to attitudes and aptitudes to innovation.[10]

The demand for innovation can also turn out to be a misleading notion however, if one uncritically adheres to the Schumpeter (1934[1911]) distinction between the act of ideation and its implementation for profit. In fact, if the distinction is suitable for analytical purposes, in order to identify the entrepreneur's essential features,

[10] The establishment of a link between assertive behaviour and innovation makes it possible to leave aside the third hypothesis, of an aggressive reply to stress. Aggressiveness is indeed the opposite but substantially similar facet to submission in that both originate from the need to maintain one's own position unchanged, which is exactly the opposite of the attitude towards innovation.

which Schumpeter indicated as impetus towards innovation, it becomes unrealistic from a pragmatic viewpoint. The implementation of a new idea does not simply involve deciding to put it materially into operation, because there is plenty of room for things to go differently from how one might initially have forecast their course. In a condition of bounded rationality—inside which everyone lives, independently of his/her degree of awareness of the fact—nobody can predict all the contingencies that might follow a certain decision, especially when action is taken within a strategic context. In such a condition, the *act* of innovating actually turns into a *procedure* of innovating, maybe made of a very finespun sequence of ideational and applicative steps. It ensues that the *factual* entrepreneur can be an innovator insofar as he[11] is also an inventor, i.e., creative. At any step, he has to decide whether and how to carry on the ideation-implementation sequence and within this sequence, according to Schumpeter, his very distinctive role is to decide when and how to make the process to turn into action, thus opening up the prospect of new possible trajectories of ideation-and-innovation (Dosi, 1982): in a few words, no-one can be a successful entrepreneur, if not an entrepreneur *tout court*, without being creative, at least as long as he is living outside the Olympian world of absolute rationality.

This latter expression, however, gives us as little room as possible for a twofold interpretation, within which the rationale of this collective work becomes more precisely conveyed. There is no doubt, referring again to Schumpeter, about the belief that Humans, and also the Super-Man "entrepreneur", do not live in an Olympian condition, but it is one thing to maintain with him (positivist as he was) that they have at their disposal a reliable criterion (the logical-empirical method) for assessing the convergence of mental representations to reality, i.e., truth, and a completely different thing to question the soundness of such an assumption. In the first case, the intelligent individual—as the entrepreneur is, by definition, thanks to his marked aptitude for *inter-ligere* within things—may assume (and in fact assumes) that he has at his disposal the current best possible approximation to the right/true way of seeing things, thus arguing that he is legitimated to contend with the residual margin of under-determination which inevitably remains between any representation of reality and reality itself. And he copes with this issue by gambling on his ability to employ innovation to upset the current under-determined state of affairs to his own advantage, thus interposing a volitional act to bridge the gap between his limited knowledge and truth. Success or failure will eventually decide if innovation marks a real approach or an errancy with respect to truth, so that any innovation which turns out to be profitable represents an advancement towards it—the Truth—according to the finest interpretation of the "spirit of capitalism". From this point of view, successful innovation represents a pragmatic step in the process of progressive achievement of Knowledge/Truth, which is an entity that would pre-exist any possible realisation of it, and profit is the prize which is due to those who come first in accomplishing this essential human mission: "Ye were not made to live like unto brutes, But for pursuit of virtue and of

[11] The "Man of Action is always a 'he' for Schumpeter" (Swedberg, 2008, p. 26).

knowledge", Dante wrote in lines that can be considered as a proto-manifesto of Humanism.[12] In this vision, knowledge lies ontologically before innovation, and whilst the inventor—the "philosopher", according to Adam Smith—works behind the front line, conceiving devices and plans to attain it, the entrepreneur—the "adventurer", according to Jean-Baptiste Say—fights on the front line, at the risk of his own life. A fight that takes place between mind and ignorance, in the obscure space which separates imperfect human knowledge from Truth: a space that Man can however dependably explore, being endowed with the reliable Cartesian "light [or method] of reason".

According to the second interpretation, doubt arises that there is no reliable criterion actually to assess convergence to Truth, so that Truth itself loses all ontological status, and also relevance. Humans ineluctably live in the dark, and can only feel their way, possibly and preferably together, by looking at each other, sharing hopes, expectations, wishes, concerns, successes and failures, and in any case exchanging uncertain and provisional attainments: in a few words, by nurturing a common sense of being part of that same dramatic but also exciting condition. No Truth, no Knowledge has then to be discovered (Madison, 1990), but only knowledge has to be humbly and anyway provisionally constructed in a somehow rhizomatic way.[13] Within this portrayal, innovation appears as a bud, an emergence springing from experience and nurtured by the example, encouragement and possible recognition of fellow travellers. 'Recognition' is perhaps the key-word which gives sense to the entire process: to know and above all to be known-in-return by others is the most awaited reward—the true gamble—which induces people to run the risk of coping with innovation, and successful innovation substantially means having gained a further piece of *re*-cognition. On the other hand, i.e., facing the unknown, innovation opens new possible trajectories in this tentacular, tentative, open-ended learning and also social-building process: it is no longer bounded rationality which is at stake here, which anyway evokes the existence of an un-bounded, absolute knowledge, but procedural rationality[14] (or knowledge), which builds itself *en chemin faisant* (Le Moigne, 1990).

Moving from one to the other of the two above-mentioned perspectives entails a shift from the imagined steady relationship between mind and the external world under examination to the inherently smooth and changeable relationships between minds; from data and information 'coming from objects' to the multifaceted ways/attitudes through which data are perceived and information is constructed, and specifically to the search for peculiarities—and above all naiveties and fallacies—which inevitably permeate those ways/attitudes. In more appropriate language, that shift entails passing from the logical-positivist, cognitivist and essentially individualistic viewpoint to a hermeneutic perspective on knowledge and, by extension,

[12] The *Divine Comedy*, *Hell, Canto 26*, H.W. Longfellow's Translation. Available at: http://www.gutenberg.org/files/1001/1001-h/1001-h.htm

[13] See Philippopoulos-Mihalopoulos in this book.

[14] Terminology is clearly drawn from Simon (1976).

creativity and innovation. Whereas from the previous viewpoint, knowledge comes first with respect to creativity and innovation—creating essentially means discovering something which exists prior to it, and innovating means implementing discoveries—in the second perspective knowledge is co-essential to creativity—knowing is creating and vice versa—and innovation is the pragmatic way for opening new courses to knowledge development, where 'development' does not necessarily entail any 'advancement' (there is no ontological entity to be reached), but only enrichment of 'articulations'.

Main Hypotheses

On the premises outlined in the previous sections, the first hypothesis in this book is that *a complex set of events is, somehow surprisingly, leading enterprises to shift pragmatically from the modern-cognitivist approach to knowledge and innovation towards a hermeneutic approach*. 'Surprisingly', because though the philosophical criticism of the unfoundedness of the modern way to knowledge dates from about the end of the Nineteenth Century, no-one would have expected that it would enter the social domain through enterprise, the champion of modernity. Enterprise actually founded its rise and success on the then implausible[15] message that Men can "become masters and possessors of Nature" (Descartes[16]). How this astonishing shift towards hermeneutic practices might have occurred constitutes the first issue this book will have to deal with.

In this connection, though the terrain of the cognitivist approach to knowledge and innovation has been widely explored (as the 'institution' of technology as a specific branch of applied science shows), the terrain of a hermeneutic approach still lies quite uncharted, and anyway is not systematically tackled by economics.[17] With reference to this point, the book puts forward a second hypothesis, according to which, *while enterprises, independently of the degree of awareness of stakeholders, are pragmatically experiencing such a hermeneutic turn, mainstream*

[15] See Le Goff (1964), Lenoble (1969).

[16] *A Discourse of Method*. Available at: http://www.gutenberg.org/files/25830/25830-h/25830-h.htm

[17] In one of the few writings on the relationships between hermeneutics and economics, Don Lavoie notes that, whereas very little of the literature on the shift from the positivist towards a hermeneutic approach "has taken up economics explicitly [. . .,] contemporary economics has for the most part simply ignored the 'interpretative turn'. [. . .] economics and hermeneutics have by now grown so far apart" (Lavoie, 1990, pp. 3–4). The main exceptions are *Old Institutionalism* and the *Austrian School*, which the contributors to Lavoie's work often refer to. For a more recent review, see Priddat (2012). There is a crucial difference however in the ways this literature and our work understand relationships between hermeneutics and economics: whilst the former takes on a hermeneutic viewpoint *of* economics, our work is interested rather in examining how and with what consequences hermeneutic praxis is now entering the economy, despite the widespread indifference of mainstream economics. This latter recognition in any case represents the common starting point of the two approaches.

economics is hanging back within the positivist-cognitivistic-individualistic viewpoint,[18] with the consequence that its approach to knowledge, creativity and innovation has become obsolete, precisely because new praxes have spontaneously come about *within industry*.[19]

What then has happened at the level of praxis, and what blockage has occurred in economics, to bear out such an interpretation? In relation to the first question this book suggests that a conjunction of factors is leading enterprises pragmatically to adopt an approach to knowledge different to that whereby they had been able to become, in modern times, the key agent in socio-economic development. These factors, which, taken in isolation, would not have been able to bring about such significant turn in just a couple of decades, can be summed up as follows:

(a) an increasingly pervasive critique of modernity. Originating in the sphere of philosophical thought and experienced in different ways in the realm of arts, this critique has found expression in the currents of postmodernism and hermeneutics, which differ in their ethical emphasis, as we shall point out shortly. One might have expected these developments to remain confined to such ethereal but admittedly fertile domains, or to penetrate only very slowly into social practices at large, probably as the younger educated generations enter the world of work. It is doubtful however whether they would have been able to come to the fore by virtue of their persuasive power alone, in terms of a change in cognitive practices within the world of production. To achieve this, they would have had to prove not only the superiority of the exercise of the suspension of judgement (which constitutes the fundamental common element of these theoretical developments; Rovatti, 1992) over the decision-making attitude typical of modernity and entrepreneurship, but also that this exercise can be profitably integrated into the system of rules, routines, conventions and techniques which characterises and, in the final analysis, 'structures' the institutions of capitalism;
(b) the rise to prominence of a culture of consumerist opulence in the second half of the last century. Although initially it seemed destined to remain subordinate to the aggressiveness and all-pervasiveness of the producers' marketing strategies, this culture has proved itself capable of generating new room for manoeuvre in consumer behaviour, albeit within or in relation to those forms of conditioning (de Certeau, 1990). In fact, while

[18] For a review, see Noorderhaven (2004), who conclusively notes: "Judging by what is published in the major research journals, it seems fair to say that the majority of the international business researchers implicitly or explicitly adhere to a philosophy of science that is closer to logical empiricism than to hermeneutics" (p. 91).

[19] Whilst starting from a philosophical rather than pragmatic viewpoint, Mirowski (1990) foresees that "neoclassical economics [. . .] will find itself progressively isolated from [now emerging] cultural conceptions, defending an increasingly reactionary conception of 'natural order' as mechanically deterministic and static" (p. 105).

at the micro level these manoeuvres are tactical responses, incapable of affecting the on-going power struggle, taken together they present themselves objectively as strategies, which demand analogous strategic responses by producers. The admittedly conditioned creativity[20] of which consumers show themselves capable, led producers to become interactively and flexibly involved in the game of creativity, to relate to 'other' and evolutionary mental patterns and, finally, to changing situations where consumption is concerned. This has opened up a completely new field of opportunities for business to perform a shift of attention from consumer preferences, considered as given or, at most, to be actualised from their latent status, to the socio-cultural processes that mould them. Significantly, the focus of business strategies has changed dramatically from the study of individuals in their aggregate manifestations to that of the individuals in their socio-cultural milieu;

(c) the rise, where enterprises are more specifically concerned, of a culture of competition through innovation rather than scale economies and, more generally, cost. According to a (now already dated) post-Fordist approach, this change in orientation is due to the absence of an institutional apparatus which is able to achieve market stabilisation at a global level, a pre-requisite if the opportunities offered by economies of scale are to be effectively exploited (Piore & Sabel, 1984). In line with a post-modern approach (which is less encumbered by any reference to Fordism), the change is rather due to the above-mentioned endlessly evolving consumer preferences with respect to the predictability initially supposed. Anyway, a shift has occurred within the content and meaning of innovation itself: rather than concerning the functional properties of goods (in relation to supposed given or induced needs), innovation increasingly concerns the symbolic connection consumers establish with goods, whereby consumption is understood as process of emotional relationship with others, and goods as 'experiential' items (Holbrook & Hirschman, 1982). Last but not least, the changed epistemologies of collectives that, following such thinkers as Deleuze and Guattari (1986), Latour (1993), and more recently Bennett (2010), point to a proliferation of individual hybrids and trans-individual human/nonhuman assemblages. This has brought a realisation that enterprises are not isolated observers but parts of larger and indeed unpredictable assemblages of spatial and temporal considerations that must take into account the current doubting and redrawing of traditionally-thought lines of distinction between the human, the natural and the artificial, the organic and the inorganic, the topological and the ethical, and so on. Ecological considerations are now taking centre stage in rhetorical and

[20] In reality, could a form of non-conditioned creativity ever be conceivable? Is it not the will to gain further degrees of freedom from conditioning that stimulates it?

applied strategies, redefining responsibility in a much broader and inclusive manner than simply the enterprise-consumer nexus;

(d) the advent of the telematics revolution, which has served as the catalyst in precipitating all the above-mentioned circumstances into a new communicative-and-creative praxis within enterprises, but also in society at large. As Cusinato notes in this book, routine communication inside enterprise previously required recourse to the human factor, since the peripheral monitoring devices only worked in analogue mode, without any possibility of their being integrated into a complete monitoring system. It is therefore possible to realise how crucial the concern was to coping with ambiguity within those circuits in the mechanical-Fordist era (Sennet, 2006). With the advent of ICTs it became possible fully to integrate the peripheral monitoring devices into a single 'digital' network, thus making human intervention superfluous *in syntactic communication*, but freeing its generative potential in *dialogical communication*. At the same time, the mythology that precedes and reinforces the ICT revolution in all its phases (including its current manifestation), has enabled the fusion of a semantics of human superfluity with the material aspect of the shortcomings of the said revolution, to the point that most material gaps and inconsistencies are bridged by a semantic intervention of some telematic Hegelian *Aufhebung*. The main suggestion in this connection is that, given the philosophical and cultural premises mentioned above, the establishment of dialogical practices within firms, *which is connected to the ICT revolution*, opens the way to their entry as normal practices—i.e., praxis—into the social domain at large: in our approach, this would mark entrance into the 'knowledge age'.[21]

In relation to the blockage of economics within cognitivism while praxis would have set off along broadly 'post-modern' paths, this is due to the enduring link between methodological individualism and logical-empiricism within the neoclassical economics (or economics *tout court*). What allowed the latter to attain a status tantamount to natural science, was its adhesion to the Newtonian mechanistic paradigm, according to which the behaviour of any observable object can be traced back to the properties (which are given) of its elementary parts. So, on the one hand, a bi-univocal relationship between given or exogenously determined individual properties and aggregated behaviours is established within economics (methodological individualism); and on the other, only objectively observable properties and their logical derivatives are taken into consideration (logical-empiricism), and among these derivatives, the chief idea that *homo œconomicus* acts as a maximising computational machine (cognitivism) (Klamer, 1990). If this mechanist feature has endowed economics with a consistent analytical basis, this has occurred at the cost of (a) isolating the *homo œconomicus*' rationale from the complex system of

[21] This point is drawn from Compagnucci and Cusinato (2011).

inclinations, emotions, passions and, more comprehensively, apparently irrational elements which shape both individual and collective behaviours and (b) equating the socio-economic whole to the mechanical summation of its parts. As concerns the first aspect, the present work will show how the emotional component is co-essential to the cognitive process and hence creativity, as post-modern thought suggests; with respect to the second aspect, one could oppose that the insertion of agglomeration economies within the neoclassical economic theory exhaustively explains possible non-linear outcomes without invalidating the individualistic approach. However, it is one thing to assume that the working of those economies releases some properties that are inherent in the elementary parts; and a completely different thing to suggest that certain milieu conditions (rather than the more functionalist term 'agglomeration economies') modify those basic properties, as a structuralist approach does. As mentioned above, we think that a hermeneutic approach to knowledge and creativity fits with both the post-modern claim for a cautious perspective on the mind's ability to advance towards truth (however it may be conceived) and the structuralist claim for the *generative* capacities of certain milieu conditions that stay outside the individual handling capacities.

Main Issues

The point at issue is therefore to understand whether economic thought (rather than merely economics) is capable of bringing about such a shift in perspective, thus reconciling itself with the hermeneutic turn that is taking shape, maybe unconsciously, within enterprises and arguably society at large. All we can do in these introductory pages is to provide evidence of the upset which is occurring in some key notions related to knowledge and creativity by assuming a hermeneutic stance, and which a renewed economic thought cannot avoid facing:

(a) *Noise*. In information science and commonsense meaning, noise is a disturbance in the transmission of a signal, due to interference or entropy, which distorts it compared with an expected, though unlikely, form. This notion necessarily entails that of code: only by possessing a code can the receiver in fact distinguish between familiar and unfamiliar, correct and incorrect, meaningful and non-meaningful, expected and unexpected signals. From this viewpoint, noise is plainly a 'bad'. Its status becomes multifaceted, however, when communicators employ hermeneutic attitudes, which radically question the given categorisation between noise and order, as well as the moralistic understanding of order as good and noise as bad. Thus, 'order from noise' becomes married to 'noise is good'—the latter in its double moral and utilitarian sense. When considered from this perspective, noise becomes a potential source of original information, which could also be susceptible to being deliberately 'produced' within certain controlled conditions in order to enhance (or indeed stymie) creative attitudes (Atlan, 1979).

(b) *Ambiguity*. Ambiguity consists in the expected though vague 'amount' of information that could stem from noise once a suitable mental adaptation has been carried out (Piaget, 1967). In this case too, whilst ambiguity appears as a 'bad'—a sign of undecidability (rather than indeterminacy, as happens in the case of noise)—when it is seen from the syntactical/information-science viewpoint, it too becomes a basic and maybe irreplaceable 'good' in a hermeneutic perspective (Monod, 1970): a sort of intermediate material between noise and knowledge (Visser & Visser, 2004) that is firmly conditioned by contingency (Luhmann, 1995), in its turn conditioned by spatial and temporal parameters.

(c) *Learning*. From a hermeneutic viewpoint, learning appears as the capacity to reshape cognitive attitudes, rather than acquire information on the basis of a supposed given and reliable cognitive code. This is not a wholly new horizon in cognitive sciences, since Bateson (1942) distinguished between "simple-" or "proto-learning" and "deutero-learning", that is learning according to a certain "apperceptive habit" and learning about that and other possible mental habits. More recently, in dealing with creative firms, Nonaka and Takeuchi (1995) updated Bateson's insight by recalling the more anodyne labelling he had originally coined: "Learning I" and "Learning II". Echoing him, they define Learning I as "obtaining know-how in order to share specific problems *based upon existing premises*", and Learning II as "establishing *new premises* (i.e., paradigms, schemata, mental models, or perspectives) to override the existing ones" (p. 44; emphasis added). It is however worth noting that, while the two modalities of learning appear as alternatives in a postmodern approach (with the insistence it puts on the limits of modernism), they appear as intertwined and equally necessary components of the cognitive experience when approached from a hermeneutic viewpoint: the former modality focused on 'things' external to mind, the latter on the mental attitudes by which 'things' are perceived and finally categorised. This has important consequences for learning: cognitive excursions are now expected to go beyond repetition as identity (namely, dealing with like cases alike), and construct an understanding of repetition as difference, whereby cognitive repetition reapplies its premises every time *anew* and is consequently fundamentally exposed every time to the contextual, environmental noise. The immediate consequence of this is that every cognitive process becomes reflexive. Such a development runs the risk of self-annihilation for learning however, since the process may end up crashing against the wall of self-dissimulation of limits; but at the same time it makes learning truly radical, that is rhizomatic, and able to push the limits of cognitive immanence in seemingly innovative ways.

(d) *Creativity*. The commonly used notion of creativity is borrowed from Poincaré's (2011[1914]) concept of "discovery", according to which "[it] consists precisely in not constructing useless combinations, but in constructing those that are useful, which are an infinitely small minority"

(p. 51). In this situation, too, it is not the veracity of that notion that is being contested, but the fact that it just depicts the epiphenomenal aspect of the creative process—*combination*—without questioning how this process essentially happens: is it, for the sake of paradox, the outcome of a random re-arrangement within the individual's cognitive repertoire[22] or, once acknowledged that the notion of randomness only reflects our margin of ignorance about the factual chain of events, is it possible to investigate elements which ultimately come into play in the creative process and the way(s) it may re-combine them? To gain a preliminary insight into this subject, let us quote a definition proposed by a scholar of hermeneutical persuasion, according to which "creativity is the aptitude to enlarge the space of the mental possibilities with which we view the world: *it is therefore the art of shifting the points of view* from which an observation is made" (Bocchi, 2013; emphasis added). The emphasis here is moved from the content of the extant mental repertoire (from the re-combination from which creativity necessarily springs), to its complement, i.e., the context within which the individual concerned *might* replace his/her own repertoire, where the conditional suggests both the uncertainty about the fact that the individual triggers the process and the unknowable content of the complementary set with respect to which s/he will choose to *re*-contextualise things. So, if creativity is the outcome of an attitude/aptitude to re-contextualise rather than re-combine knowledge, the issue at stake becomes how to enhance propensities towards such an exercise. From this, we propose a conception of creativity that goes beyond the phenomenological and even the distinction between subject and object/environment, and, first, becomes immanently inscribed within the milieu conditions of its production; second, it finds itself in a position to affect the way needs for creativity and its modes of production are generated, though always contingently and never unilaterally; and third, it is itself subject to a continuous process of reflexive superimposition of limits and limitations, thus enabling itself to push the limits of immanence always further but always from the inside and always with respect to its limitations.

(e) *The meso-dimension*. Another main consequence is a reinterpretation of the meso-dimension within the economic discourse. Leaving aside the naive (though common) reading of this subject according to which the meso is something lying midway between the micro and the macro, it is here

[22] This is not the Poincaré case. According to him, useful combinations spring from the interaction between the conscious and the unconscious level. The researcher's deliberate effort provides the unconscious with raw unrelated materials, and this latter works as a "sieve", to select from the infinite possible combinations the "only few [which] are harmonious, and consequently at once useful and beautiful" (Poincaré, 2011[1914], p. 60). Though shedding important light on the emotional component of creativity, leaving the metaphor, the question remains unsolved as to how this process actually works, and how the two levels actually interact: are we sure that the unconscious does not subliminaly endow with usefulness the solutions it feels as beautiful?

considered as the domain wherein some essential untradeable goods (mainly, trust and knowledge) can be produced and circulate in "satisficing"[23] amounts and ways. Within this view, the anthology opts for the idea that the meso-dimension does not simply act as a facilitator for the diffusion of such goods, essentially following Schumpeter (for example, Dopfer, 2006, 2007), but as a generator, in that it induces people to re-contextualise knowledge, i.e., to become creative. This idea is grounded in the seminal notion of *generative* milieu put forward by Durkheim (1895, 1898), and the applications it has had (and is having) in the regional science (though, curiously, without making any mention of Durkheim himself[24]). Except for amongst the staunchest followers of Schumpeterian thought, the idea that certain milieu conditions can foster knowledge, creativity and innovativeness, has spread rapidly within the regional science, giving rise to a variety of approaches aiming at substantiating the notion of the meso, including Lundvall (1992), by the notion of "National Systems of Innovation", Morgan (1997), by "Learning Regions", Cooke, De Laurentis, MacNeill, and Collinge (2010), by "Platforms of Innovation", and especially the GREMI, through the notion of "*milieu innovateur*" (see Camagni & Maillat, 2006).[25] With respect to these approaches (and others of a similar kind[26]), this book puts forward the idea that they ultimately fail to explain analytically how milieu conditions work in enhancing creativity because they do not deal adequately with the role that the physical component of milieu—i.e., the spatial arrangement of all kinds of things within it—performs in fostering de/re-contextualisation practices, that is hermeneutic practices. This book points therefore to this last topic, by levering on Durkheim's seminal contribution about the milieu's *generative* role, which remained inconclusive precisely on this point. And conversely, it distances itself from the usual functional approaches and related notions (mainly 'cluster'), due to their inappropriateness to account for the *generation* of new elements rather than their functioning, within a certain socio-spatial context. The establishment in the following chapters of the notion of "Knowledge-creating Milieu—KCS" will precisely respond to this purpose.

(f) Finally, the *knowledge economy*. The different recourse to the cognitivist or the hermeneutical notion of knowledge gives rise to a very different image of the knowledge economy itself. According to mainstream economics, it is understood as the stage of capitalist development characterised by recourse

[23] Here too, the term is drawn from Simon (1956).

[24] On this point, see Cusinato (2015).

[25] It seems the time has come to question if regional science is actually becoming or is *tout court* the science of the meso-economy.

[26] For example, Scott (1999), Hemlin, Allwood, and Martin (2004), Meusburger, Funke, and Wunder (2009).

to knowledge on a previously unheard of and increasing scale—in particular the codified form of knowledge, specifically connected with the development of ICTs.[27] Our criticism of this kind of approach does not focus so much on its degree of realism—the definition it gives is so evident as to appear banal—as on its capacity to restore the intimate nature of the change that is occurring as compared with the preceding situation, the industrial economy, and mainly culture. This change is not, according to our and others' criticisms, purely quantitative (however major it may be), in that processes and products embody a far higher quantity of knowledge than in the past, but rather a qualitative one. For example, Florida and Kenney (1993) and Gibbons et al. (1994), to recall some crucial contributions, place this change in the shift from an individualistic towards a relational viewpoint (and connected practices) on learning inside firms, organisations and also local and regional systems.[28] These contributions have not however fully realised that the opening to the social dimension causes a shift towards a hermeneutic approach because the cognitivist idea intrinsically remains that comparison of different viewpoints helps one approach the right/true vision of things. The present book finally argues that the simple recognition of the role the hermeneutic approach is pragmatically assuming within industry will eventually induce economic thought to emerge from its increasing condition of obsolescence with respect to the evolution which is observable in the remaining human and social science as to knowledge and creativity, by levering on the not many and not always explicit and systematised cues which it is now possible to read in this direction within the economic literature (for example, Lavoie, 1990; Leydesdorff, 2006; Nguyên, 2010; Nonaka & Takeuchi, 1995).

Aims

Having depicted the book's epistemological and disciplinary background, we can now introduce its goals and contents in a detailed way. The crucial thing to realise is that, insofar as a hermeneutic approach proves to be more conducive to creativity than the conventional one, it becomes crucial to set out the conditions that improve attitudes and aptitudes towards re-contextualisation of cognitive schemata, which is the basic exercise of hermeneutics. Some of these conditions relate to the personal sphere and are concerned with intellectual factors (skills/competences/training), psychological factors (perceptive propensities), emotional factors (the pleasure of relaxing, maybe transgressing conventions, exposing oneself to new experiences and making new syntheses), material factors (corporeality and spatiality), and

[27] For example, OECD (1996), Foray (2000).

[28] This 'relational turn' on knowledge has also had consequences on spatial research, as Khan, Moulaert, and Schreurs (2013) show.

finally the more strictly rational dimension (deliberate purposes and the established relationship between means and ends). These topics have been explored over many years in the conventional approach[29] and, though deserving of further investigation, are not the subject of this work, except to point out that exposing them to a hermeneutical approach changes their system of reference on both theoretical and empirical realms.

Rather, this volume sets out to examine the milieu conditions which we believe influence the attitudes and abilities to practise the hermeneutic exercise. Or rather, since the hermeneutic practice is in any case performed, even when subjects believe they are operating exclusively in line with conventional learning procedures, it is possible to argue that *the anthology sets out to examine the milieu conditions that influence aptitudes consciously and at the same time affectively to adopt a hermeneutical approach to learning, on the assumption that this approach possesses a creative potential which is significantly superior to that of the cognitivist one*.

In this epistemological context, 'milieu' is not understood as one side of a dialectic concerning distinction/connection between the individual and the environment. Rather, developing Durkheim's seminal contribution, it is emphatically understood in the way Deleuze and Guattari (1986) portrayed it, namely as the space of the *middle*, where things pick up speed and into which one is thrown, battling with the competitive need for creativity from one's position as merely one part of an infinite assemblage that includes not just individual bodies and their environment, but significantly all the various strata of emergences that are generated when individual bodies and environments flow within and against each other. From this viewpoint the adopted notion of milieu is consistent with Camagni's notion of "local milieu", according to which it is "a set of territorial relationships encompassing in a coherent way a production system, different economic and social actors, a specific culture and a representation system, and generating a dynamic collective learning process" (Camagni, 1991, p. 130). What this work aims to achieve is to ascertain how those "territorial relationships" actually work in generating such "a dynamic collective learning process", by emphasizing that, whilst the term "territorial" encompasses both the social and the spatial dimension, analysis of the role of this latter dimension remains substantially unachieved. The fact that Durkheim himself, while repeatedly maintaining that the spatial configuration of objects within the milieu is of crucial importance in fostering generative power, did not explain how it actually works further induces us to examine this intriguing issue. If we succeed in providing a 'satisficing' explanation, it will open up a critical aspect on the normative dimension, in the sense that appropriate spatial policies might shape the milieu's generative effect.

Arguably, our overriding and indeed all-encompassing purpose is to contribute to the work various authors are pursuing with a view to (re)constructing a theory of spatial policies in the knowledge age, in the awareness that the approaches deployed in the industrial era, on which many urban planning and design practices

[29] For a review, Ochse (1990).

are still belatedly based, have not only become obsolete, but have also lost most of their social legitimacy (for example, Cusinato, 2012; Soja, 1989; Young, 2008; Zukin, 1982, 2010). By questioning such practices, we are interested in reinstating social legitimacy to them, but only once the various attempts at engineering, directing, politically and economically guiding and at the same time *dissimulating* such engineering, are discussed. We shall do this by matching the measurable aspects of milieu which Durkheim pointed as crucial, such as social volume, relational density and physical configuration, with the symbolic and also preconscious ones, variously seen as landscapes, lawscapes, nomotopes, nomospheres or indeed atmospheres (Philippopoulos-Mihalopoulos, 2013), and focussing on how atmospheric handling can turn out to be both benign and desired.

Lastly, a few words about the title chosen for this book. Tackling the subject of "knowledge-creating milieus" is an ambitious undertaking, for at least two reasons. Firstly, because the concept of milieu, however intuitive and widely it is now used in regional science, is still analytically elusive. More usual notions in mainstream economics, such as agglomeration, cluster, industrial district[30] and also region would sound more familiar than 'milieu', thanks to their better analytical foundations and empirical evidence, but they do not render (and rather refuse any contamination with) the generative role this notion is endowed with (cf. Buttimer, 1971). Although clear that it is employed to represent a system of local conditions which are generative of specific social effects, the process whereby it yields these effects is not so clear. Our work puts forward the hypothesis that the answer lies where Durkheim located it—in the relationship between 'volume', 'density' and 'space'—but especially where he left it inconclusive—that is, with reference to the role of spatiality and its symbolisation at the collective dimension. Secondly, our undertaking is ambitious in that it formulates the hypothesis that the milieu also possesses specific knowledge-generating capacities. Since cognitive experience is bound to pass through the minds of individuals (unless we believe, with Durkheim, in the existence of a collective consciousness), it follows either that certain conditions in the milieu foster individual learning—but in this case it would be inappropriate to speak of 'the creation of knowledge'—or that something happens at the collective level where learning is concerned. And it is in this precise direction that our work points, suggesting that such conditions contribute to the formation and spread of attitudes and aptitudes for learning in ways which are not only more effective in terms of creativity than the individualistically considered ones, but *new and different* from them. The analogy with the Saussurian pair *parole* and *langue* is evident: while the *parole* can only stem from individual acts, the *langue* forms and evolves at the collective level and imposes its rules on the speech of individuals: it is only in the play-margin between the steady rule of the *langue* and the erratic tendency of *paroles* that novelties arise in the *langue*, which in turn reflect on *paroles*. Here, we are interested in exploring that generative play-margin, also in its

[30] *À la* Porter (1998).

spatial dimension: what elements it is made of, and how these work in giving rise to knowledge-creating potential.

Contents

The book consists of two parts: one part theoretical, the other devoted to empirical research. In the first part, we examine and systematise the epistemological and disciplinary background (and also hinterland), the questions the book sets out to tackle, the conceptual apparatus and research methodologies. The second part is devoted to case studies, conducted at organisational, urban and territorial levels in a number of European situations. Their purpose is twofold: to test the soundness and the heuristic power of the adopted theoretical approach, as compared with other current approaches, and to outline a framework for policies to cope with spatial, social and institutional conditions to enhance the generative potential of milieu at various scales.

Theoretical contributions are ordered in such a way as to provide our view of knowledge and milieu with consistent epistemological and analytical bases. As regards the epistemological side, the option we suggest for a hermeneutical approach has (1) to relate consistently though critically to the extant theoretical debate and, specifically, the analytical and pre-analytical premises that more or less expressly underlie the mainstream economics approach to knowledge and, *à cascade*, to creativity and innovation, and (2) to demonstrate higher/wider heuristic power with respect to that same approach, in that it allows investigators to discern relevant new aspects and also naiveties which block further investigation, and policy makers to devise more successful strategies to cope with that triad. In order to be conversant with current theoretical debates, we do not disregard the criticisms that, for more than a century, have been made against positivism, logical-positivism and the typical expression of the latter in cognitive science, i.e., cognitivism[31]; however, instead of adopting a dismantling attitude, we find more expedient to show how certain developments to which the cognitivist approach has given rise on the material plane and precisely at the crossing between science and production, are paradoxically at the origins of propensities towards a hermeneutic approach to knowledge, and also radical criticism against cognitivism itself.

This option not only stops us from falling into the trap of purely destructive criticism, such as that certain post-modern approaches lead to, but allows us to look at the advent of ICTs as both the main achievement of the cognitivist paradigm, and the event that marks the *from within* commencement of its obsolescence. This is our take on hermeneutics. It will be future developments that have the last word on this topic: at the moment, as developments are just starting (or are perceived as such), it seems only possible (and necessary) to provide that approach with sound analytical

[31] Whereas behaviourism can be reputed as the corresponding typical expression within positivism.

bases and to show that it can serve as a foundation for new and fruitful opportunities in the cognitive-pragmatic domain. We now turn to a presentation of the content and design of contributions.

Paolo Garbolino's opening chapter of the theoretical part offers the basic traits of the twentieth century's epistemological debate in a critical frame. His focus is specifically on scientific thought, which is characterised by a concern for the truthfulness of mental representations. The intertwined issues of the ontological status of 'truth' and how the truthfulness of assertions can be assessed permeate and give substance to the entire body and history of the epistemological debate. Within it, Garbolino chooses a thread that refers to recent socio-historical and more widely ecological trains of epistemology. Assuming the neo-positivistic view as the necessary reference term (if for no other reason than to measure consistency and the possible higher explicative power of alternative approaches), he notes a crucial aspect concerning the clear-cut separation it established between the phases of discovering a hypothetical 'law' and validating it. Only the latter pertains to the scientific domain, whereas the former lies in psychological and sociological realms that are resistant to any possibility of decisive empirical testing. The above distinction is crucial with reference to the theory of innovation because it allowed (and allows) scholars and practitioners to depict innovation as an activity which is (epistemo)logically distinct and follows chronologically from ideation (as Schumpeter paradigmatically did): ideation works as the hypothesis that the idea it conveys is profitable, and innovation as the empirical test concerning its actual profitability. As Garbolino reminds us, this is the structure of the linear model of R&D, which, however, lacks a sound theoretical basis because it is not possible to exclude that the ways logical and/or empirical tests are conceived may themselves also be imbued with pre-analytical elements—"the glasses of a *paradigm*", in Garbolino's words—thus possibly hindering the conception of some crucial experiments. Criticism of neo-positivism therefore focuses on re-establishing connections between the scientific concern for attaining reliable assertions about reality, on the one hand, and the socio-historical context within which hypotheses and tests are inevitably conceived jointly, on the other. The consequence is that only a dialectical work between the two sides is epistemologically admissible from then on. This is the threshold for hermeneutics, at which Garbolino halts.

Daniele Goldoni takes over from where Garbolino leaves off. He introduces hermeneutics through a hermeneutic critique of the notion of creativity, which characterises the post-industrial, knowledge-based economy. The idea that creativity is a/the privilege that advanced societies freely enjoy, with the ultimate goal of achieving sustained economic growth along with social cohesion (a refrain which appears in almost every EU document[32]) lies in an ideological stance, where 'ideological' is intended in the Marxian meaning of removing some aspects of

[32] And which actually stresses the acuteness of the concern about the compatibility between the two goals.

the real world which would seriously challenge the dominant social structure (and superstructure). Albeit admitting that creativity fosters competition and economic growth, strong doubts arise, first, as to whether creativity allows all subjects to take part in and advantage from its presumed all-inclusive arena, thanks to its supposed innateness to individuals and free accessibility; and, second, whether it is essentially conducive to socially good outcomes. Universal accessibility to the creative arena is indeed highly questionable because of the elevated (and increasing) entry barriers in terms of increasingly high degrees of skill—"absorptive capacity", as economics significantly[33] labels it—that are required to interact effectively within creative circles: evidence of the present extent of social exclusion in advanced, knowledge-based economies does not leave much room for doubts about that contingency (Compagnucci & Cusinato, 2014). With reference to this aspect, it could in fact be countered that it is matter of erroneous forecasts rather than ideological blind spots. Yet no admission is observable in official documents about such a possible mistake, Goldoni remarks, and emphasis continues to be put on the inclusive power of a creativity-based economy. With respect to the second remark, he notes that the pervasive belief (from which this book does not wholly escape either) that creativity essentially yields good social outcomes[34] is a by-product of the need capitalism has to believe in (and promise) economic growth cum universal inclusion, as a condition for achieving a minimum social legitimacy. On this issue, the author recalls how much dictatorial systems in the 'short century' have made recourse to the ideology of creativity as a lever for involving people in their authoritarian if not evil designs. Anyway, his message is that an a-critical belief that creativity is conducive to socially good outcomes can induce people to fall into the trap which the alliance between capitalism and the media continuously renews to gain their minds (and maybe also bodies). A hermeneutic—or post-hermeneutic[35]—stance is thus called into play, to unveil the inescapable amount of unconscious, but also ideological content which is inherent in human expressions (and their interpretations). It is within such (post-)hermeneutic play that genuine creativity can arise, according to him, and it is no accident that his contribution opens and closes with a narration about how various kinds of creativity take form within various kinds of musical experience: Daniele Goldoni is in fact a musician besides being a professor of aesthetics!

Further developing the above pragmatic-and-interactional notion of knowledge, Giorgio De Michelis questions the role space plays in cognitive processes, especially after the advent of ICTs. Having concisely noted that space matters functionally for no other reason than information repositories (human minds included) are

[33] 'Significantly' because recourse to the term "absorptive" rather than "interpretative capacity" is symptomatic of the cognitivist approach which underlies the mainstream economics viewpoint on creativity, and more widely learning.

[34] Where 'good' here means 'enlarging opportunities to individuals and groups', especially the most deprived ones.

[35] In that it applies to messages stemming from every sort of media, economic relations included.

spatially distributed, he addresses the role space plays within this pragmatic notion of knowledge. From an individualistic viewpoint, knowing is possible insofar as individuals become able to detach themselves from something 'other' (which becomes 'other' precisely because of detachment), while mentally re-presenting it. Furthermore, individuals *learn to know* when they become able to realise detachments—to distinguish—on the mental rather than the purely factual plane, and in this occurrence physical space plays a metaphorical though essential role. The way by which they become able to know and learn however depends strictly on transmitted and acquired experience *within 'situated' socio-spatial conditions*, i.e., places. Possible pertinent and even effective systems of classification for an individual or a community are actually, if not potentially infinite, innumerable, and only locally established routines can turn a certain system into the 'normal' one, in the double sense of common and institutionalised. It follows that, once the idea of pragmatic-and-interactional knowledge has been embraced, space is not simply a functional condition for making it possible for knowledge to arise and also spread, but turns out to be an entity which takes shape simultaneously with the cognitive act, in that this latter gives space to a specific image and content: "Knowledge (for action)—De Michelis writes—is what links words and space coupling distinctions and sense-making", and since meaning systems are context specific, "language is the means through which we 'appropriate' space transforming it into place". Thus, if we look at 'milieu' as a knowledge-generative place, "space emergence, in its complexity and multiplicity, encompasses and justifies the creation of [the other two canonical components of milieu, i.e.,] social volume and relational density", rather than merely joining them (which is what De Michelis ascribes to the interpretation of milieu Cusinato here draws from Durkheim). The final suggestion is that changes—including deliberate changes—occurring *in* space have an effect on cognitive attitudes in that "any new space modifies the way people access, create and share knowledge", and this allows De Michelis to deal finally with the question of what happens to the couple knowledge and space with the advent of ICTs. Not only do space images and praxes multiply—"augment"—but attitudes towards knowledge creation increase for at least three reasons: first, because the design of ICT-based systems transforms the 'physical' space of possibilities for action; second, because it also changes the 'relational' space of possibilities and, third and most important, because it enhances possibilities for experiencing switches among different contexts. The lesson the author draws is that, if the notion of space is co-essential to knowledge, acting on the milieu's generative capacities entails intervening on its spatial component; though De Michelis argues that also the reverse holds, which is of the greatest relevance from the normative viewpoint, this remains an open question in his writing.

With specific reference to the firm, Carla Simone makes the above optimistic depiction of the 'augmenting' role of ICTs more multifaceted and intriguing. While agreeing that (a) knowledge and related innovative aptitudes stem from interaction, and more precisely, in her approach, from collaboration among the firm's stakeholders, and (b) ICTs augment opportunities for improving information processing, storage and exchange, she assesses the risks attendant on their arrival

with respect to the knowledge generative capacities of such a decisive but delicate system of collaboration. The main risk comes from the not so remote possibility that managers (and stakeholders, in general) look at that system through merely informational glasses, according to which relationships concerning knowledge creation appear as dealing with pure information 'production' and 'exchange', and with collaboration as the attained degree of effectiveness and efficiency of these processes. There is no doubt, in such a view, that a computerised and self-regulating informational device works better than any conceivable 'human system'—it could even expediently replace it—but serious doubts arise if a dialogical and, more precisely, hermeneutic perspective is taken, according to which meaning does not rise from pure information processing, but from de-contextualisation of informational repertoires, and above all interpretative habits: and de-contextualisation cannot occur anywhere—Simone remarks—but on pragmatic terrain, through opening local viewpoints to other/broader possible ones. The main questions hence become how organisations can foster aptitudes and capacities towards de-contextualising praxes within firms, and how ICTs, if anything, intervene in this occurrence. As regards the first question, she shows how the milieu approach, with the three canonical dimensions it puts forward—spatial arrangement of things and persons, social volume and relational density—fits well with the current debate on knowledge management/governance within firms. The key achievements in this connection echo the ones De Michelis underlines in his contribution, which consist of the crucial role the transformation of physical space into a socially living place and the connected role that de-contextualising practices play in fostering knowledge creation. With regard to the second question, Simone's answer is more problematic because, if the illusory view prevails that ICTs are able to reproduce and also augment real contexts, expectations that this fosters knowledge creation by itself are doomed to fail. What in fact a cyberspace does not seem to be able to do by itself is either to turn itself into a place, because this is an operation which entails the intervention of the affective dimension, as Andreas Philippopoulos-Mihalopoulos shows in his contribution, or to decontextualize itself, because this entails learning to deal/play with ambiguity. While ICTs can indeed work as an extraordinarily powerful means to drive, disseminate and amplify ambiguity, especially strategic ambiguity (Libicki, 2011), they cannot generate it and, even less, to extract novelties from it, at least insofar as they do not learn to recognise themselves as idiosyncratic cognitive systems and hence, to de-contextualise their irreducibly contingent way(s) of looking at things, as Carla Simone suggests: in a few words, insofar as ICTs do not learn to become ironic with respect to themselves, we could say, which is a very demanding challenge for syntactic systems. The opportunity ICTs really can offer, Simone conclusively notes, here too in agreement with De Michelis, is huge ease of albeit virtual access to a multiplicity of contexts (cyberspace included), which makes de-contextualisation easier to the agents/watchers/stakeholders, on condition that they are inclined actually to carry out such an exercise, which ultimately means bringing their mental habits into play in relation to the milieu's heterogeneous and ceaselessly evolving conditions.

Andreas Philippopoulos-Mihalopoulos' contribution is devoted to seeking the essential contents of the notion of 'milieu', with reference to knowledge creation. In accordance with the above comments and the general tone of the anthology, his opening point consists in adopting a pragmatic-experiential view of knowledge compared with the logical-positivist stance. There would actually be no room and no need for 'milieu' (if 'milieu' stands for something other than 'environment') if knowledge were seen from this latter viewpoint. According to it, validated knowledge indeed proceeds towards truth, which is endowed with an autonomous ontological status, and interaction of the knowing subject with the social-and-natural environment only serves to get occasions to test/achieve convergence towards it. From this viewpoint again, creativity consists essentially of 'discovering' solutions, or more effective and/or elegant solutions, to problems according to a linear approach to *the* true solution. There is consequently no room for emotions either, which are rather seen as detrimental to the researcher's strict observance of the logical-empiricist method.[36] And, if some emotions are cautiously admitted, they are confined before or beside or beyond the analytical process, as happens for curiosity, interest or enthusiasm in launching or carrying on a research project, or satisfaction or even joy in achieving something new: researchers are humans too, after all!—but this in no way authorises them to mix scientific work with emotions, and still less with passions. A wholly different vision opens when a pragmatic-experiential view of knowledge is taken. No truth awaits anybody at a certain mythical terminal of the cognitive process, because there is no reliable criterion against which to make a definitive assessment of the convergence of mind towards it: "... if there is any truth at all, it occurs not at the beginning or the end but in the process of interpretation", Joel C. Weinsheimer writes in commenting Gadamer's *Truth and Method* (quoted in Rector, 1990, p. 217).

Humans can only 'check out the lie of the land', being aware that there always is a risk of wandering and also getting lost, but nevertheless hoping to have new, pleasant and maybe fruitful (cognitive) experiences. If knowing means 'consciously experiencing something new', this however requires three conditions to be fulfilled for it not to turn into a casual/insignificant sequence of unrelated images: first, to be conscious that this entails endless leave-takings from what we were beforehand (this is the genuine content of 'e-motion'); second, to maintain a maybe weak and wistful tie (something like a sensation of '*morabeza*') with the image of what we were beforehand, thus avoiding getting lost and, third, to be inclined to draw encouragement in the above work from the recognition that no-one is alone in this adventure, because very many others are sharing similar it, with the expectations, concerns, enjoyments and, possibly, sense of failure it entails. This is the view of knowledge Andreas Philippopoulos-Mihalopoulos puts forward: an

[36] "... as personal factors did not intervene in [... the] process [of validation], there were no obvious reasons to doubt that whatever had been validated would remain valid for successive generations of scholars", Zygmunt Bauman (2010, p. 5) significantly writes in depicting the rationale of neo-empiricist science.

idea he wants to be free from any transcendentalism and teleologism, he (among others) labels as "post-human", which essentially means 'having taken leave from the humanistic/anthropocentric stance' (but that for this same reason appears as genuinely human).

If knowing is reflexively experiencing new and unknown terrains, and if it requires us to take maybe irrevocable leave from the Selves we were till then, and also to face the risk of getting lost—if, as Philippopoulos-Mihalopoulos draws from Guattari, knowing is ultimately "flirting with chaos"—the question arises of how to expose and somehow abandon ourselves to chaos (flirting anyway requires abandon!) without being swallowed up by it. According to them both, the mental device Humans have devised to carry out this very risky but essential exercise is the notion and experience of 'milieu'. Unlike the concreteness Durkheim conferred on it, in Philippopoulos-Mihalopoulos' opinion 'milieu' is that ideal, fugitive and evolving minimum reference system which makes it possible that the exposure of the mind to chaos may turn into the most exciting and potentially fecund source of knowledge. The 'substance', he follows, which provides milieu with that minimum necessary internal structure to be conceptualised, is rhythm: "Rhythm is the milieus' answer to chaos. [...] Rhythm organises milieu [...] to escape from the seduction of chaos" and, in turn, he observes, rhythm rests on emotions, and especially affects, which constitute their interpersonal dimension: we know inasmuch as we take intimate part in that rhythm because, in doing this, we succeed in realising the finest differences between rhythms. Creativity eventually springs from experiencing the specific and evolving features of different proximate and/or distant milieus, with their peculiar rhythms, emotions, networks of affects and related atmospheres: his ultimate message is that if any act of knowledge creation stems from the 'realisation' of new differences, the most fecund matrix of creativity lies in experiencing differences between milieus' rhythms and atmospheres.

Augusto Cusinato's contribution finally builds a bridge between the theoretical and the empirical parts of the book. Its main concerns are: (a) to show why and how a hermeneutic approach to knowledge has entered the enterprise, especially in relation to the issues of creativity; (b) to outline the peculiarities and mainly the higher potentiality of a hermeneutic approach to creativity in comparison with the conventional approach and related practices; (c) to explore conditions which are conducive to the enhancement of a hermeneutic approach to creativity, and (d) to provide empirical research on the size and geography of activities devoted to knowledge creation presumably through a hermeneutic approach, with suitable analytical notions and operational tools. As regards the first point, he puts forward the twofold idea that (a) a complex set of events in the philosophical, cultural, social and economic domains was long ago doing the groundwork for a hermeneutic turn[37] and (b) that those events were not able, by themselves, to ensure that the turn would actually take place, because they did not touch the core of social life, which lies within the sphere of production (along with the redistributive aspects that are

[37] Or the "interpretative turn", as Rabinow and Sullivan (1979) label it.

inherent to it). The decisive factor which caused those elements to trigger a radical change within the productive sphere, and from then on to enter society at large, is indicated in the advent of ICTs: their decisive contribution has been to make it profitable, within firms, to disentangle the dialogical from the monological circuits of communication, thus making the 'imperialism' of the cognitivist approach (on which ICTs are actually grounded) obsolescent. As regards the specificities of the hermeneutic approach in relation to its assumed higher creative potential, they relate to its focus on mental habits which drive, rather unconsciously, cognitive practices, and to the consequent social- and place-specific dimensions which are inherent in learning processes. The discourse thus naturally shifts to the socio-spatial aspects which are suited to enhancing attitudes and also aptitudes towards hermeneutic practices. Cusinato's discussion of this topic leads readers into the debate about the notion of milieu, which seems the most promising in establishing a link between the structural (and, among them, the unconscious) features of a localised community and its propensities and capacities towards knowledge creation. Discussion moves from Durkheim's seminal notion of generative milieu (and its limits and rigidity) to the more plastic interpretation stemming from the contributions commented on above. The main outcome is that the spatial arrangement of the milieu also matters as well as its internal heterogeneity and relational density, as Durkheim repeatedly maintained, without however providing this idea with a consistent explanation: whilst arguing that space matters insofar as it is vested with a symbolical content, he did not realise that the image-space which results from this 'vesture' is 'landscape', which finally becomes the operational notion—a sort of palimpsest (Corboz, 1983)—to deal with the entire chain which links the emotional to the spatial dimensions within milieus, passing through the intermediate links of affects and atmosphere, as mainly Goldoni and Philippopoulos-Mihalopoulos show in this volume. On these premises, two analytical tools are set up: (a) the category of "Knowledge-creating Milieu—KCM", which serves both to render the complex set of socio-spatial conditions which endow place with a knowledge-generative power, and to identify an 'algebra' of scaling milieus with respect to their specific dimension, structure, ways of working and outcomes, and (b) the notion of "Knowledge-creating Services—KCS", which refers to activities which are presumed to have pragmatic recourse to a hermeneutic approach to knowledge and creativity. Both categories allow researchers to place empirical stress on the heuristic power of such an approach in comparison with analogous works based on a conventional cognitivist-oriented approach, and to make available suitable levers for policies in the knowledge-creating domain.

The second part of the volume presents a series of case studies on those socio-spatial 'devices' that, at different scales, can be thought of as Knowledge-creating Milieus, thanks to their capacity or mission to foster creativity and innovativeness within/through a relational context. As Cusinato maintains in his contribution, scale matters because, moving from the 'elementary form' of KCM—the dialogical context—towards the most complex one—the city—the weight of both deliberately constructed socio-spatial conditions and shared behaviour lessens, progressively making room for the intervention of social facts (in the way Durkheim understands

them). Also the 'mechanism' through which the milieu works in engendering its specific outcomes changes with scale, ranging from fair reciprocation in the dialogical context, to competition and free collection of spillovers in urban contexts, and passing through a variable mix of both mechanisms at intermediates scales, such as enterprises, institutions, and the like.

The case studies will not examine KCMs at the dialogical scale, however, but only on upper scales, where 'upper' stands for 'more articulated' in terms of the elements concerned, the number and variety of relationships occurring among them, the kinds of generative devices and outcomes. This choice does not entail under-evaluation of the role dialogical KCMs play in generating knowledge and fostering creativity, but relates to the extensive attention which hermeneutic literature already gives to them, starting from Gadamer (1975[1960]). What this book will try to add in this connection is a spatial topology of the dialogical context (and the hermeneutic experience, in general) which will serve to introduce the debated issue of relationships between space, knowledge and creativity (see chapter "A Hermeneutic Approach to the Knowledge Economy" by Cusinato).

The first case study is on the organisational scale, and specifically a scientific park, which can be viewed as a KCM made of smaller KCMs (the tenant enterprises, research centres and institutions). This kind of milieu lies in an intermediate position between the two aforementioned extremes—the elementary/'artificial' kind and the complex/'social' one—since it shares features with both of them. As the term conveys, an organisation is the outcome of a deliberate action aiming at establishing a certain kind of relationships within a certain set of human and material resources in order to pursue a certain goal: from this viewpoint, the 'organisation' belongs to the family of artefacts. Because of a generalised condition of informational asymmetry and the contractual foundation of relations within it, margins rise however for idiosyncratic viewpoints and for heterodox and also opportunistic behaviours to take form, as typically happens in social milieus.

The fact that these tendencies are treated as disturbances (noise) or dissonances (ambiguity) and are then given negative or potentially positive value, depends more on the technological and organisational interface—the 'infrastructure', as Michela Cozza calls it in her contribution—rather than the individual attitudes of principals and agents. Rigid as these interfaces are (as occurs within a Fordist plant or a bureaucratic situation, inside which routine largely prevails), the majority of these idiosyncrasies are destined to be perceived as disturbances, to be 'reduced' by recourse to a mix of carrot and stick to induce agents to align themselves to the norm. A quite different situation appears when mental rather than behavioural attitudes and capabilities become central, as occurs when knowledge creation and innovation are at stake. An articulated and continuously evolving mix of margins of free-playing and structured situations rather than carrot and stick, turns out to be a suitable device for making exploration and ideation possible and fruitful. In other words, governance rather than government (or command) is preferred when generative rather than applicative issues are at play. We thus expect that a knowledge-creating organisation works according to an alternate register: as a milieu inside

which margins of freedom can originate (or are deliberately built) within the unavoidable bureaucratic tangles to facilitate the emergence of divergences/novelties, and as an ordered device aiming at realising and somehow extracting convergences from the previous ones: thus turning disorder into *new* order, namely innovation. In such a situation, the very managerial art is producing that mix of relaxing and demanding conditions in connection with a suitable technological and relational interface, along with being able to learn and teach how to draw *new* order from apparent disorder: this is what, drawing from the current literature, Cozza labels respectively as "infrastructure" and "balance between standardization and flexibility", and employs as analytical tools in examining her case-study, the VEGA Park in Venice.

According to a generative perspective, a scientific park appears as an organisational device having the mission of augmenting the innovative attitudes tenants individually profess, thanks to a suitable infrastructure.[38] Her examination of the internal structure and ways of working of this boosting device develops by matching her disciplinary background (Information Systems & Organisations) with the milieu approach: the milieu's material and organisational substratum is rendered by the notion of *infrastructure*; the relational device by which novelties emerge is the dialectical/dialogical interplay between *disalignment and convergence* that takes (or would take) place among tenants, and atmosphere which necessarily imbues a milieu condition, is rendered in the terms of the shared vision among tenants and Park management. A vision, she continues, which is evoked and institutionalised by a suitable *spatial and symbolic arrangement*, and which is nurtured through exchange, however tentative it might be, of disaligned and maybe apparently incommensurable viewpoints. This triad of elements endows a technological park with a context-specific generative power, by which it becomes a milieu rather than being a low-cost hostel for poor or idle self-professed start-ups (as someone critically labels VEGA); and the procurement and nurturing of this triad is the park management's specific mission.

With these premises, Cozza examines the VEGA Park experience. The results are not very encouraging because it does not seem to meet the above requirements. It is in fact characterised by (a) inadequacy of the spatial-symbolic arrangement, which emblematically recalls the "positivist architecture", to which Galison (1997) refers to as an example of obsolete arrangement with respect to the post-modern condition of knowledge 'production'; (b) lack of interaction between tenants, although the recent rise of a start-up incubator could reverse this condition; (c) a widening discrepancy between the Park's original designers and management vision and that of the present main stakeholders, who are inclined to consider the Park management as a real-estate operation, an 'object' rather than a 'subject'; and (d) lack of interactions between the Park, as a unitary agent, and the external world, and specifically the *Triple Helix* components, that is regional industry, university and institutions.

[38] See "Why Knowledge is Linked to Space" by De Michelis, in this book.

The examination of case studies continues with a number of European examples at the national, regional and urban scales. Fabien Paulus and Céline Vacchiani-Marcuzzo examine the French geography of KCS. The first hypothesis is that KCS are essentially urban-oriented activities, to such an extent that cities can be viewed as KCMs at the largest scale. The hypothesis is not new because relationships between urban dimension and concentration of knowledge-based activities is a central issue in regional science,[39] on the assumption that they take advantage of a vivid and heterogeneous ambience. When learning and creativity come specifically into play, more and more people dealing with them are attracted, so that a cumulative process triggers with respect to the generative power of the milieu, which can be hindered only by the rise of urban rent. Florida's (2003) claim that it is the 'creative class' which drives industry to locate within/around major cities rather than the opposite rests indeed on the supposed working of such a self-reinforcing process: cities endowed with high levels of Talent, Tolerance and Technology draw creative people, who attract advanced industry, which contributes in turn to strengthening at least two of the above '3 Ts,' and so on, in a virtuous circle.

Urban economies are not the only kind of agglomeration economies that knowledge-based activities take advantage of, however. Externalities rising from the relationships among them—'within industry'—also matter, such as informational spillovers, the rise of a pool of skilled workers and generalised entrepreneurial spirit, reduction in communication and transaction costs, as economic thought usually holds with reference to the Marshall intuitions. The question thus arises as to what kind of knowledge-intensive activities are more susceptible to urban rather than industrial agglomeration economies. Starting from the differentiation between analytical and synthetic knowledge bases (Høgni Kalsø, Vang, & Asheim, 2005), Vang (2005) suggests that activities based on analytical knowledge prefer to locate near research centres and universities, whether these are placed in urban or extra-urban contexts, while those based on synthetic knowledge tend to locate near/within manufacturing clusters. After Asheim, Boschma, and Cookes (2011), it is also possible to argue that activities based on symbolic knowledge are particularly susceptible to urban economies (mainly 'buzz'). Agreeing with Torre (2008) that permanent physical proximity matters mainly for tacit knowledge-based activities (a category which embraces symbolic and partially synthetic-based activities), it is possible to suggest that (a) knowledge-based activities which rely on symbolic knowledge are the most urban-centripetal; (b) activities based on analytical knowledge tend to be sited near research centres and high-tech industry, while (c) synthetic knowledge-based activities develop mainly near/within manufacturing clusters.

[39] For a review, Vang (2005).

Table 1 Population in urban case-studies (thousand inhabitants)

City	Core city (2011)	Metropolitan region (2012)
Paris	2,244[a]	11,915
Munich	1,353	2,727
Milan	1,242	4,275
Poznań	554	1,156
Pécs	158[a]	389

[a]*2010*

Source: Eurostat. According to Eurostat, the "Core city" is the administrative unit and "Metropolitan regions" are NUTS3 regions or a combination of NUTS3 regions which represent all agglomerations of at least 250,000 inhabitants

The empirical investigation on the French national scale focuses on urban agglomeration economies, showing that:

(a) the relationship between urban size and KCS density is concave, especially when the most sophisticated kinds of KCS are at stake. This means that important cumulative urban agglomeration economies are at work in this sector;
(b) the relationship between city size and KCS density proves to be stronger in the case of private, business-oriented KCS rather than the case of public KCS, the location of which mainly obeys non-market criteria.

Passing to case studies at the urban or regional level, they concern cities or metropolitan areas which have already been the subject of literature and/or policies in the field of knowledge-intensive services: Milan, Munich, Paris, Pécs and Poznań. The set of cities examined not only covers commonsense city ranking however, but also responds to a more sophisticated classification grid. Paris lies at the core of the largest metropolitan region in Western continental Europe, with almost 12 million inhabitants (Table 1). Munich and Milan are second rank metropolitan regions with about 3–5 million inhabitants, whereas Poznań and Pécs are medium-small sized cities.

City size, with its maybe exponential buzz effect, must however be combined with other factors to be conducive to knowledge creation in sophisticated knowledge-based systems. This suggests that information quality also matters, such as originality, uniqueness, accessibility to and relevance for global players. A good proxy of the information quality potential of cities is provided by their rank in the global scene. According to the "Global Command and Control Centres" ranking,[40] Paris is placed fourth in the world and first among the cities examined as regards the number of headquarters of the world's largest 2,000 public corporations,

[40] Source: Globalization and World Cities (GaWC) Research Network, Loughborough University (UK). http://www.lboro.ac.uk/gawc/group.html

Table 2 Main global command and control centres, 2012

City	No HQs	Rank HQs	Rank employees	Rank profit	Rank revenue
Tokyo	154	1	1	4	1
New York	82	2	5	1	3
London	68	3	4	3	4
Paris	60	4	2	5	2
Milan	11	21	49	64	48
Munich	9	23	20	26	16

Source: GaWC: http://www.lboro.ac.uk/gawc/datasets/da26.html

after Tokyo, New York and London (Table 2) and comes second when their revenue and employees are considered. Milan follows at some distance, ranking 21st as to the number of headquarters, and only 48th and 49th in relation to their revenue and employees. Though it has a lower number of head offices, Munich performs much better than Milan as regards all the other indicators considered, which means that, though fewer in number, Munich's headquarters are bigger in terms of employees, business and profits.

Due to their medium-small size and local role, Poznań and Pécs do not appear in the above ranking. This raises the issue of the role small and medium-sized cities (SMCs) play or can play within a knowledge-based economy. This is a topic which has not so far received the attention it deserves, both in the academic and public policy debate. The recent draft opinion of the Commission for Territorial Cohesion "Towards an Integrated Urban Agenda for the EU" (European Union, 2014) may represent a turning point in this view. While focusing on the crucial role cities play in modern knowledge-based economies and on the need/opportunity to foster their involvement in policy-making processes, the document further stresses the importance of SMCs within the European urban and economic fabric. Hosting nearly 40 % of the EU total population, it is supposed that SMCs contribute to a more balanced territorial distribution of economic activities as well as improving regional innovation potential. Focusing on their potentialities means making reference to the interplay between economies and diseconomies of agglomeration and, more specifically, of urbanisation, which vary across space (with regard to different models of cities and regional development) and time (by moving, for example, from industrial to knowledge-based economies, and societies as well), and which is subject to cumulative processes (Phelps & Ozawa, 2003). Ascertaining what specific agglomeration economies and diseconomies and what specific cumulative processes are at work in a knowledge-based economy is a main issue to be dealt with if we are to know the role urban realities can play at various scales and, mainly, under what circumstances SMCs may benefit or suffer from its advent. Maintaining that creativity rises within a relational context, endowed with certain learning capabilities, pressures and infrastructure, and that cumulative forces are at work, it might be expected that SMCs play an active role in knowledge creation on two connected conditions: to be closely related to major cities, which remain the main drivers and also hubs in this sector, and to belong, with them, to a dynamic regional system on the global scene (Alonso, 1973; Meijers, 2008).

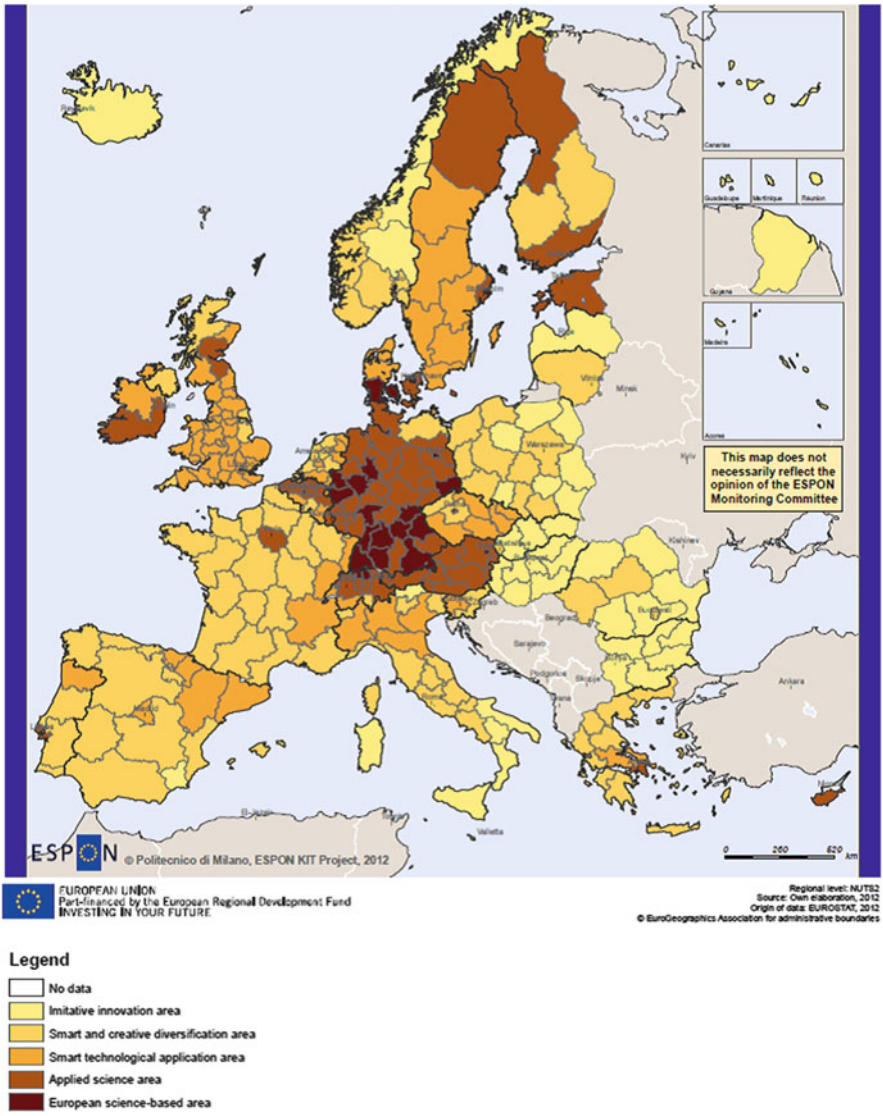
A more detailed measure of their potentialities can thus be inferred by making reference to their respective regional pattern of production and innovation: if it is based on analytical knowledge and, especially, technology, proximity to research centres and high-tech industry is actually of prime importance (Asheim et al., 2011). In this case, as the Greater Munich and Paris Metropolitan Area case studies show (see, respectively, chapter "Geographies of Knowledge-Creating Services and Urban Policies in the Greater Munich" by Mazzoleni and Pechmann; chapter "Localisation Patterns of Knowledge-Creating Services in Paris Metropolitan Region" by Compagnucci), SMCs endowed with clusters of high-tech industry also play an important role in KCS location. In other situations, such as Milan and its metropolitan region (chapter "Knowledge-Creating Activities in Contemporary Metropolitan Areas, Spatial Rationales and Urban Policies: Evidence from the Case Study of Milan" by Mazzoleni), where more traditional manufacturing activities are scattered around the city, a more centripetal pattern for KCS is observable, with the main central place specialised in symbolic knowledge-based services and the surrounding SMCs working as places for synthetic knowledge-based services or else as relaxing residential places for the 'creative class'. A third occurrence is also possible, when a minor city is the seat of public research centres, though being peripheral and/or lacking of dynamic manufacturing sector, as Vacchiani-Marcuzzo and Paulus notice in this book with reference to the French case, and Lovra, Szabó and Tóth with reference to Pécs.

An interesting grid for discriminating between different regional patterns of innovation and the related different role major and minor cities play within them is provided by ESPON (2012).[41] Having defined a territorial pattern of innovations as "made of a combination of *territorial specificities (context conditions)* that are behind *different modes of performing the different phases of the innovation process*" (ibid., vol. 1, p. 24; original emphasis), ESPON identifies three main territorial innovation patterns and five related empirical classes, with reference to the European case:

(a) *Endogenous innovation pattern*, which rests on a scientific network, and inside which "the local conditions are all present to support the creation of knowledge, its local diffusion and transformation into innovation and its widespread local adoption" (ibid.). In relation to this innovation pattern, two kinds of regions at NUTS 2 level are empirically identified within the EU 27 (Map 1)[42]:
   (a1) *Science-based areas*, which show the highest quality innovation performances. This kind of region is characterised by high levels of accessibility, scientific and human capital endowment and the presence of a metropolitan urban tissue. It is no coincidence that these areas are mostly located in the central part of Western

[41] See also Capello and Lenzi (2013).

[42] For detailed classifications of urban regions see http://database.espon.eu/db2



Map 1 Territorial patterns of innovation in Europe

Europe and mainly Germany, the historical birthplace of the alliance between scientific research and industry;

(a2) *Applied science areas*, which share the science-based feature of the innovation process with the previous class, though at a lower level, especially in terms of "General Purpose Technology" patenting. This kind of region lies substantially around the core science-based-areas, albeit with some noticeable exceptions such as Sweden and Finland;

(b) *Creative application pattern*, which is "characterized by the presence of creative actors interested and curious enough to look in the external world for knowledge which is lacking inside the region, and creative enough to apply external knowledge to local innovation needs" (ibid.). This pattern too finds expression in two regional classes on the empirical level:
  (b1) *Smart technological application areas*, which are similar to the (a2) class above as regards capacity to turn research work into innovative abilities, but show more pronounced inclination towards application in product rather than process innovation. This kind of area "can easily represent our conceptual [...] creative application pattern, where *co-invention of application* is the result of internal creativity and external basic knowledge" (ibid., p. 40; emphasis added). It generally lies concentric to the previous one, with the exceptions of North-eastern Spain, Madrid, Lisbon, Attica, which prove that it can be highly urban oriented;
  (b2) *Smart and creative diversification areas*. Despite having innovation capabilities which are higher than EU average, this kind of region relies mainly upon tacit rather than scientific codified knowledge;
(c) *Imitative innovation pattern*, "where the actors base their innovation capacity on imitative processes, that can take place with different degrees of creativity in the adaptation of an already existing innovation. This pattern is based on the literature dealing with innovation diffusion" (ibid.).

Table 3 provides a synoptic representation of our case studies according to the above and other ESPON criteria. In general, case studies cover the entire

Table 3 Case studies according to some KIT classification criteria

Case-study city	Territorial pattern of innovation	Knowledge base	Knowledge networking	Industrial regions in transition
Munich	Science-based area	Scientific region	Networking region	(Not covered)
Paris	Applied science area	Scientific region	Globalizing region	(Not covered)
Milan	Smart technological application area	Research intensive region	Networking region	Region with industrial branches losing importance
Poznań	Smart and creative diversification area	Regions with no specialization in knowledge activities	Non-interactive region	Region with industrial branches losing importance
Pécs	Creative imitation area	Regions with no specialization in knowledge activities	Non-interactive region	Regions with internal industrial structural change

Source: http://database.espon.eu/db2

classification of Territorial patterns of innovation: Munich belongs to Science-based Areas, Paris to an Applied Science Area, Milan to Smart Technological Application Areas, Poznań to Smart and Creative Diversification Areas, and Pécs to a Creative Imitation Area. With regard to the knowledge base, Munich and Paris make recourse mainly to scientific knowledge, while Milan relies on research but at a lower level of integration with industry. Finally, while Poznań and Pécs seem to have no knowledge specialisation, though Stachowiak; Lovra, Szabó and Tóth respectively prove that this last assertion is partially misleading because both cities play a significant role in KCS. These different outcomes probably arise from ESPON's neglect of symbolic knowledge-based activities and the leading influence it exerts on private innovative aptitudes.

The outcomes from the empirical investigation into the size and structure of KCS are consistent with the above classification, although with some margins of approximation due to the specificity of the approach assumed. The Paris and Munich metropolitan regions share not only a similar primacy as regards volume and quality of KCS, but also an analogous KCS geography, which is characterised by a networked rather than centripetal location pattern. A system of specialised KCS clusters, research centres and high-tech or cultural industry is observable in both regions, which highlights their science-based character. Unlike them, the Milan metropolitan area features a monocentric and less differentiated KCS geography. Though important research centres and high-tech industry are present, clearly identifiable clusters do not stand out in the local geography, with the consequence that KCS follow a common pattern of decreasing diffusion from the core city towards the surrounding 'manufacturing countryside'. This seems consistent with the more pronounced application-oriented character of the Milan region with respect to those of Paris and Munich.

Coming now to the smaller and peripheral case studies of Poznań and Pécs, they can be clearly differentiated. As Stachowiak maintains with reference to Poznań, knowledge-based activities follow a twofold pattern of development, based respectively on an imitative and an endogenous drive. This matches the ESPON classification, according to which the Poznań innovation pattern is characterised by a high creative potential, while being mostly application-oriented. Some divergence arises in relation to the kind of knowledge networking: while ESPON ranks Poznań as a "non-interactive region", Stachowiak repeatedly notes its growing role as a *relais* in the Berlin-Poznań-Warsaw trajectory, if not as an albeit minor hub within the wider European macro-region. The difference between the two assessments probably arises from a different temporal perspective: while the ESPON assessment is grounded in retrospective data, Stachowiak's notes also take a prospective look at the current regional dynamics.

The condition of Pécs turns out to be quite different, according to both ESPON and the Lovra, Szabó and Tóth study results presented here. Though located in the heart of Southern Hungary and despite its deep-rooted multi-cultural life, Pécs is a peripheral reality in the European geography of knowledge-based economies. Like Poznań, is still suffering from the demise of the old state-driven industry, but unlike the former, it has not yet seen the rise of a new entrepreneurial class, due

to the lack of industry, the narrowness and thinness of the regional market and the overriding role Budapest plays in more advanced activities. There is no lack of ferments in the knowledge-based activities however, as field investigation shows, but their engine lies mainly (maybe provisionally) in public educational and research centres, cultural programs and events, rather than entrepreneurship. The ESPON classification, according to which Pécs is an imitative and non-interactive area, with an urgent need for industrial restructuring, is thus consistent with the outcomes presented here, even though it does not seem adequately to feature the presence of high-quality knowledge-intensive activities in some specialised sectors, such as health science and ICTs.

The contributions to the anthology end with a chapter by Roberto Camagni on policies for enhancing creativity-oriented activities, according to the assumed hermeneutic approach. Being a regional scientist, his contribution pays more attention to the urban and regional sides, setting aside organisational issues. It could therefore be claimed that a further contribution dealing with this latter scale is needed to cover the range of scales to which the book refers. Such a contribution would however be quite redundant in the book's economy, given the number of works on the organisational scale which explicitly espouse a hermeneutic stance.[43] It is actually mainstream economics to remain impermeable to any hermeneutic suggestion, thus representing an exception within social sciences. An exception it deliberately embraced at the beginning of the last century, just labelling itself 'economics' to imitate natural science, and especially physics, and within physics, Newtonian Mechanism.[44] But on this side too it is hanging back, in that natural science is also opening itself to the hermeneutic perspective (Heelan, 1998). Given that impermeability, maybe the only suitable connection point between hermeneutics and political economy (rather than economics in the strict sense) lies in regional science, thanks to its familiarity with social sciences, and also humanities: this is precisely the approach this anthology opts for, and which Camagni also adheres to.

His contribution places the issue of policies within the longstanding debate which, starting from the Marshall notion of industrial district and through evolutionary economics, has arrived at the notions of 'innovative' and 'urban milieu' to render the generative power which remains associated with some structural elements of local socio-economic systems. The integration of the emotional/affective aspects within the milieu's constituent features, along with their symbolical fixation on the physical space through landscape, Camagni remarks, represents the

[43] Among many others which specifically deal with management, see Phillips and Brown (1993), Sköldberg (1998), Westwood and Linstead (2001), Linstead (2004), Thatchenkery (2004). In marketing see, for example, Thompson (1993), Verganti and Öberg (2013). Also accounting, the apparently most applicative realm within organisational studies, does not escape from a hermeneutic approach (cf. Llewellyn, 1993, among many others).

[44] "I believe in Newton's Principia Methods, because they carry so much of the ordinary mind with them", Alfred Marshall wrote in 1906 to Sir Arthur Lyon Bowley, an economic statistician (quoted in Pigou, 1925, p. 427).

awaited turning point finally to provide the notion of milieu with analytical consistency, and related policies with effectiveness. Thus, whilst evolutionary economics points to the relational aspects of the cognitive/creative process *within a positivist scaffold*, and the milieu approach *à la* GREMI stresses the role of immaterial assets, *without however coming to terms with positivism*, the hermeneutic turn makes a dialectical synthesis of the two, thus allowing analysts and policy-makers to envisage new and more effective strategies to enhance creativeness within local systems, at whatever scale. Besides/beside the tools those approaches have respectively devised—his final message is—the new action domain for local economic policies lies within the relationship between physical space and symbolic mindsets (along with the emotional aspects they entail), a relationship which represents the keystone of any milieu construction and governance.

References

Alonso, W. (1973). Urban zero population growth. *Daedalus, 109*, 191–206.

Asheim, B. T., Boschma, R., & Cookes, Ph. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge bases. *Regional Studies, 45*(7), 893–904.

Atlan, H. (1979). *Entre le cristal et la fumée*. Paris: Seuil.

Bateson, G. (1942). *Social planning and the concept of deutero-learning*. Paper presented at the Conference on Science, Philosophy and Religion, Second Symposium. New York: Harper. [Now in G. Bateson (2000). *Steps to an ecology of mind: Collected essays in anthropology, psychiatry, evolution, and epistemology* (pp. 159–176). Chicago: Chicago University Press].

Bauman, Z. (2010). *Hermeneutics and social sciences: Approaches to understanding*. London: Taylor and Francis e-Library.

Becattini, G. (1978). The development of light industry in Tuscany: An interpretation. *Economic Notes, 2*(3), 107–123.

Becattini, G. (1989). Les districts industriels. In M. Maruani, E. Reynaud, & C. Romani (Eds.), *La flexibilité en Italie* (pp. 261–270). Paris: Syros.

Belussi, F., & Caldari, K. (2009). At the origin of the industrial district: Alfred Marshall and the Cambridge School. *Cambridge Journal of Economics, 33*(2), 335–355.

Bennett, J. (2010). *Vibrant matter: A political ecology of things*. Durham: Duke University Press.

Bocchi, G. (2013, March). *Grammatica dell'innovazione*. Interview with Alessandra Favazzo, *Observer*, 29–31.

Buttimer, A. (1971). *Society and milieu in the French geographic tradition*. Chicago: Rand McNally & Co.

Camagni, R. (1991). Local milieu, uncertainty and innovation networks: Towards a new dynamic theory of economic space. In R. Camagni (Ed.), *Innovation networks. Spatial perspectives* (pp. 121–144). London: Belhaven Press.

Camagni, R., & Maillat, D. (2006). *Milieux innovateurs: Théorie et politiques*. Paris: Economica.

Capello, R., & Lenzi, C. (2013). *Territorial patterns of innovation: An inquiry on the knowledge economy in European regions*. New York: Routledge.

Compagnucci, F., & Cusinato, A. (2011). *Industrial districts and the city: Relationships in the knowledge age. Evidence from the Italian case* (Working Papers, No. 365). Università Politecnica delle Marche, Dipartimento di Scienze Economiche e Sociali. Available at http://econpapers.repec.org/RePEc:anc:wpaper:365

Compagnucci, F., & Cusinato, A. (2014). The knowledge economy: A new source of regional divergence? *Revue d'économie urbaine et régionale*, 2, numéro spécial "Compétitivité territoriale et localisation du travail et des entreprises", 365–393.
Cooke, Ph., De Laurentis, C., MacNeill, S., & Collinge C. (Eds.). (2010). *Platforms of innovation: Dynamics of new industrial knowledge flows*. Cheltenham: Edward Elgar.
Corboz, A. (1983). Le territoire comme palimpseste. *Diogène, 121*, 14–35.
Cusinato, A. (2012). La pianificazione del territorio nell'epoca della conoscenza. Il punto di vista di un economista. *Archivio di Studi Urbani e Regionali, 43*(103), 11–29.
Cusinato, A. (2015). Il paesaggio, tessera mancante nella nozione di milieu [Landscape: A missing Tessera in the notion of milieu]. *Scienze regionali*, *14*(2), 5–32.
de Certeau, M. (1990). *L'invention du quotidien. I. Arts de faire*. Paris: Gallimard.
Deleuze, G., & Guattari, F. (1986). *A thousand plateaus: Capitalism and Schizophrenia*. London: Continuum.
Doloreux, D., Freel, M. S., & Shearmur, R. G. (2010). *Knowledge-intensive business services: Geography and innovation*. Aldershot: Ashgate.
Dopfer, K. (2006). *The origins of meso economics: Schumpeter's legacy* (Papers on Economics and Evolution, No. 0610). Max Planck Institute of Economics.
Dopfer, K. (2007). The pillars of Schumpeter's economics: Micro, meso, macro. In H. Hanusch & A. Pyka (Eds.), *Elgar companion to Neo-Schumpeterian economics* (pp. 65–77). Cheltenham: Edward Elgar.
Dosi, G. (1982). Technological paradigms ant technological trajectories: A suggested interpretation of the determinants and direction of technical change. *Research Policy, 11*(3), 147–162.
Durkheim, E. (1895). *Le règles de la méthode sociologique*. Paris: Alcan.
Durkheim, E. (1898). Notes sur la morphologie sociale. *L'Année Sociologique, 2*, 521–522.
ESPON. (2012). *KIT—Knowledge, innovation, territory. Final scientific report, 3 volumes*. Milano: ESPON & BEST—Politecnico di Milano. Available at http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/kit.html
European Foundation for the Improvement of Living and Working Conditions. (2006). *Trends and drivers of change in the European knowledge-intensive business services sector: Mapping report*. Dublin: EMCC.
European Union. (2014). *Towards an integrated urban agenda for the EU: Draft opinion*. Bruxelles: Commission for Territorial Cohesion.
Florida, R. (2003). *The rise of the creative class: And how it's transforming work, leisure, community, and everyday life*. New York: Basic Books.
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*. Paris: La Découverte.
Gadamer, H.-G. (1975[1960]). *Truth and method*. London: Sheed and Ward.
Galison, P. (1997). *Image and logic: A material culture of microphysics*. Chicago: The University of Chicago Press.
Garofoli, G. (1992). *Economia del territorio. Trasformazioni economiche e sviluppo regionale*. Milano: Etas Libri.
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*. London: Sage.
Heelan, P. A. (1998). The scope of hermeneutics in natural science. *Studies in History and Philosophy of Science Part A, 29*(2): 273–298.
Hemlin, S., Allwood, C. M., & Martin, B. R. (Eds.). (2004). *Creative knowledge environments: The influences on creativity in research and innovation*. Cheltenham: Edward Elgar.
Høgni Kalsø, H., Vang, J., & Asheim, B. (2005). *The creative class and regional growth: Towards a knowledge based approach* (Paper No. 2005/15). Lund: Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE), Lund University.

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasy, feelings and fun. *Journal of Consumer Research, 9*(2), 132–140.
Khan, A. Z., Moulaert, F., & Schreurs, J. (2013). Epistemology of space: Exploring relational perspectives in planning, urbanism, and architecture. *International Planning Studies, 18*(3–4), 287–303.
Klamer, A. (1990). Towards the native's point of view: The difficulty of changing the conversation. In D. Lavoie (Ed.), *Economics and hermeneutics* (pp. 17–31). New York: Routledge.
Latour, B. (1993). *We have never been modern*. Cambridge, MA: Harvard University Press.
Lavoie, D. (Ed.). (1990). *Economics and hermeneutics*. New York: Routledge.
Le Goff, J. (1964). *La civilisation de l'Occident médiéval*. Paris: B. Arthaud.
Le Moigne, J.-L. (1990). *La modélisation des systèmes complexes*. Paris: Dunod.
Lenoble, R. (1969). *Esquisse d'une histoire de l'idée de Nature*. Paris: Albin Michel.
Leydesdorff, L. (2006). *The knowledge based economy: Modelled, measured, simulated*: Boca Raton, FL: Universal Publishers.
Libicki, M. C. (2011). The strategic uses of ambiguity in cyberspace. *Military and Strategic Affairs, 3*(3), 3–10.
Linstead, S. (2004). *Organization theory and postmodern thought*. London: Sage Publications.
Llewellyn, S. (1993). Working in hermeneutic circles in management accounting research: Some implications and applications. *Management Accounting Research, 4*(3), 231–249.
Luhmann, N. (1995). *Social systems*. Stanford, CA: Stanford University Press.
Lundvall, B.-Å. (Ed.). (1992). *National systems of innovation: Towards a theory of innovation and interactive learning*. London: Pinter.
Madison, G. B. (1990). Getting beyond objectivism: The philosophical hermeneutics of Gadamer and Ricoeur. In D. Lavoie (Ed.), *Economics and hermeneutics* (pp. 31–56). New York: Routledge.
Marshall, A. (1919). *Industry and trade: A study of industrial technique and business organization; and of their influences on the conditions of various classes and nations*. London: MacMillan & Co.
Meijers, E. J. (2008). Alonso's theory of 'Borrowed Size' revisited: Evidence for U.S. metropolitan regions. In P. Batey (Ed.), *Culture, cohesion and competitiveness: Regional perspectives* (pp. 1–25). Liverpool: University of Liverpool.
Meusburger, P., Funke, J., & Wunder, E. (Eds.). (2009). *Milieus of creativity: An interdisciplinary approach to spatiality of creativity*. New York: Springer.
Miles, I., Kastrinos, N., Bilderbeek, R., den Hertog, P., Flanagan, K., Huntink, W., et al. (1995). *Knowledge-intensive business services: Their role as users, carriers and sources of innovation* (European Innovation Monitoring System (EIMS) Reports). Brussels: European Commission.
Mirowski, P. (1990). The philosophical basis of institutionalist economics. In D. Lavoie (Ed.), *Economics and hermeneutics*. (pp. 74–110). New York: Routledge.
Monod, J. (1970). *Le hasard et la nécessité*. Paris: Editions du Seuil.
Morgan, K. (1997). The learning region: Institutions, innovation and regional renewal. *Regional Studies, 31*(5), 451–503.
Nguyên, T. T. (2010). *Knowledge economy and sustainable economic development: A critical review*. Berlin: Walter de Gruyter.
Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford: Oxford University Press.
Noorderhaven, N. G. (2004). Hermeneutic methodology and international business research. In R. Marschan-Piekkari & C. Welch (Eds.), *Handbook of qualitative research methods for international business* (pp. 84–103). Cheltenham: Edward Elgar.
Öberg, Å. (2012). *Innovation driven by meaning* (Licentiate Theses No. 159). Västerås (S): Mälardalen University, School of Innovation, Design and Engineering Press. Available at http://mdh.diva-portal.org/smash/record.jsf?pid=diva2:562894
Ochse, R. (1990). *Before the gates of excellence: The determinants of creative genius*. Cambridge: Cambridge University Press.

OECD. (1996). *The knowledge-based economy*. Available at http://www.oecd.org/dataoecd/51/8/1913021.pdf

Phelps, N. A., & Ozawa, T. (2003). Contrasts in agglomeration: Proto-industrial, industrial and post-industrial forms compared. *Progress in Human Geography, 27*(5), 583–604.

Philippopoulos-Mihalopoulos, A. (2013). Atmospheres of law: Sense, affects, lawscapes. *Emotion, Space and Society, 6*(2), 1–10.

Phillips, N., & Brown, J. (1993). Analyzing communication in and around organizations: A critical hermeneutic approach. *Academy of Management Journal, 36*(6), 1547–1576.

Piaget, J. (1967). *Biologie et connaissance*. Paris: Gallimard.

Pigou, A. C. (1925). *Memorials of Alfred Marshall*. London: MacMillan.

Piore, M. J., & Sabel, C. F. (1984). *The second industrial divide: Possibilities for prosperity*. New York: Basic Books.

Poincaré, H. (2011[1914]). *Science and method*. New York: Courier Dover Publications.

Porter, M. (1998). Clusters and the new economics of competition. *Harvard Business Review, 76*(6), 77–90.

Priddat, B. P. (2012). *Rationality, hermeneutics, and communicational processes: On L. Lachmann's approach of hermeneutical economics* (Diskussionspapiere No. 18/2011). Herdecke: Wirtschaftwissenschaftliche Fakultät, Universität Witten. Available at http://econstor.eu/bitstream/10419/54750/1/682736155.pdf

Rabinow, P., & Sullivan, W. M. (Eds.). (1979). *Interpretive social science: A reader*. Berkeley, CA: University of California Press.

Rector, R. A. (1990). The economics of rationality and the rationality of economics. In D. Lavoie (Ed.), *Economics and hermeneutics* (pp. 192–233). New York: Routledge.

Rovatti, P. A. (1992). *L'esercizio del silenzio*. Milano: Raffaello Cortina Editore.

Schumacher, E. F. (1973). *Small is beautiful: Economics as if people mattered*. London: Blond & Briggs.

Schumpeter, J. A. (1934[1911]). *The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle*. Cambridge, MA: Harvard University Press.

Scott, A. J. (1999). The cultural economy: Geography and the creative field. *Media Culture & Society, 21*(6), 807–817.

Sennet, R. (2006). *The culture of the new capitalism*. London: Yale University Press.

Sköldberg, K. (1998). Heidegger and organization. Notes towards a new research program. *Scandinavian Journal of Management, 14*(1/2), 77–102.

Simon, H. A. (1956). Rational choice and the structure of the environment. *Psychological Review, 63*(2), 129–138.

Simon, H. A. (1976). From substantive to procedural rationality. In S. Latsis (Ed.), *Method and appraisal in economics* (pp. 129–148). Cambridge: Cambridge University Press.

Soja, E. W. (1989). *Postmodern geographies: The reassertion of space in critical social theory*. London: Verso.

Sugrue, T. J. (1996). *The origins of the urban crisis: Race and inequality in postwar Detroit*. Princeton, NJ: Princeton University Press.

Swedberg, R. (2008). Social entrepreneurship: The view of the young Schumpeter. In C. Steyaert & D. Hjort (Eds.), *Entrepreneurship as social change: A third movements in entrepreneurship book* (pp. 21–34). Cheltenham: Edward Elgar.

Thatchenkery, T. (2004). Paradox and organizational change: The transformative power of hermeneutic appreciation. In D. L. Cooperrider & M. Avital (Eds.), *Constructive discourse and human organization* (pp. 77–101). Bingley: Emerald Group Publishing Limited.

Thompson, C. J. (1993). Modern truth and postmodern incredulity: A hermeneutic deconstruction of the metanarrative of "Scientific Truth" in marketing research. *International Journal of Research in Marketing, 10*(3), 325–338.

Torre, A. (2008). On the role played by temporary geographical proximity in knowledge transmission. *Regional Studies, 42*(6), 869–889.

Vang, J. (2005). *Rethinking the spatial organization of creative industries* (Paper No. 2005/10). Lund: Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE), Lund University.

Verganti, R., & Öberg, Å. (2013). Interpreting and envisioning: A hermeneutic framework to look at radical innovation of meanings. *Industrial Marketing Management, 42*(1), 86–95.

Visser, J., & Visser, Y. L. (2004). Ambiguity, cognition, learning, teaching, and design. *TechTrends: Linking Research & Practice to Improve Learning, 48*(1), 40–43.

Weber, E., & Van Bouwel, J. (2005). Coping with inconsistencies: Examples from the social sciences. *Logic and Logical Philosophy, 14*, 89–101.

Westwood, R., & Linstead, S. (2001). *The language of organization*. London: Sage Publications.

Windrum, F., & Tomlinson, M. (1997). Recent patterns of service innovation in the UK (Report for TSER Project 'SI4S'). Manchester: TSER.

Windrum, P., & Tomlinson, M. (1999). *Knowledge-intensive services and international competitiveness: A four country comparison* (Research Memoranda No. 023). Maastricht: MERIT, Maastricht Economic Research Institute on Innovation and Technology. Available at http://econpapers.repec.org/paper/dgrumamer/1999023.htm

Young, G. (2008). *Reshaping planning with culture*. Aldershot: Ashgate.

Zukin, S. (1982). *Loft living: Culture and capital in urban change*. Baltimore: Johns Hopkins University Press.

Zukin, S. (2010). *Naked city: The death and life of authentic urban places*. Oxford: Oxford University Press.

Part I

A Theoretical Framework

The New Understanding of Scientific Knowledge

Paolo Garbolino

Abstract

The so called *standard view* of scientific theories maintained that the theoretical side of science could, and should, be kept separated from its observational and experimental components and from the process of collection and organization of these components. This view went together with the *linear model* of the politics of science and technology. The standard view has gradually been superseded starting from the 1960s by a more sophisticated understanding of scientific practice in which theories and observations are intertwined and empirical evidence is the product of a complex practical activity. Together with the standard view, the linear model of the relationship between science and technology has faded away leaving room for more sophisticated theories like the *theory of the knowledge creation company*. This theory has a common background and shows some similarities with the new ideas about scientific practice, as the concept of *trading zone*.

1 Science and Technology: The Standard View

In the mid-twentieth century, the philosophy of science was dominated by a point of view strictly connected with the *logical positivist* tradition as developed before Second World War in Vienna by the so called *Vienna Circle*, where prominent figures were Moritz Schlick and Rudoplh Carnap, and in Berlin by Hans Reichenbach and Carl Hempel. It was this tradition that established philosophy of science as an autonomous branch of philosophy setting out its standards. The goal was to provide an analysis of the scientific method, of the nature of scientific theories and scientific explanation and the tool to be employed was symbolic

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logic. Even though Karl Popper (1959) criticized logical positivists' ideas about scientific method, his *falsificationism* shared with them the goals and the tools of philosophical analysis of science. This point of view has been so influential in university departments that it is called in the literature *the standard view* of philosophy of science.

The pillars of the *standard view* were the ideas that a clear-cut distinction can be made between how scientific hypotheses are discovered and how they are justified, that the business of philosophers of science is justification, that a division between an *observational language* and a *theoretical language* can be drawn, and that the knowledge content of a scientific theory can be fully expressed by a formal language. The distinction between the *context of discovery* and the *context of justification* allowed to leave the sociological and psychological components of the process of scientific theorizing out of the picture of the scientific method, and it went together with the idea that observational and experimental practices belong to the context of discovery, and therefore need not to be analyzed, and their outcomes can be distilled into a crystal–clear observational language that constitutes the neutral ground against which theoretical hypotheses can be tested.

As a consequence of these two ideas, it was believed that theories could be detached from the complex process of the collection and organization of scientific data behind them, that they could be represented as linguistic entities (sentences of a theoretical language) and that scientific data themselves could be posited as linguistic entities (sentences of the observational language) that have a direct relation of reference and truth with physical entities (sense data, numerical readings on instruments, etc.). The application of logics and some *cognitive virtues*, like simplicity, consiliency, predictive power, explanatory power, guarantee the choice of the overall best theory among the competitors, given the available empirical evidence.

Scientific change was seen as the process of successively incorporating earlier and successful theories into the framework of their successors so that factual and predictive control over nature cumulatively increases over time, and this cumulative progress is objective and universal. It was believed to be objective in two senses: the observational language is intersubjectively available to all impartial observers, and both observational sentences and theoretical sentences can be translated and formulated in the language of mathematical logic. Science is universal since the methodological norms of science are invariably instantiated in various cultures and at different times.

This idea of *scientific cumulative progress* had its counterpart in the idea of a *cumulative technological progress*, following naturally and smoothly from the increasing predictive control over nature provided by pure science, the *linear* or *osmotic model of R&D*: Aichholzer and Schienstock (1994), Ruivo (1994). Technology is applied science and scientific research is a sufficient and necessary condition for technological innovation (the *science push*): therefore, the goal of government must be financing basic research that is not rentable for private enterprises but will be beneficial for the economy and society at large: Bush (1945). This view of technological process was coupled with traditional

organization theory, which conceived of organization as a machine for information processing, that produces the knowledge needed for obtaining a given goal by the application of formal, systematic and codified procedures to quantifiable data.

2 The New Philosophy of Science

The *new philosophy of science* is a point of view with a strong historical and social orientation that has been largely influential in the period going from the 1960s to the 1980s. It is mainly related to the science historian Thomas Kuhn (1970) and the philosopher Paul Feyerabend (1975). Earlier authors who prepared the way are Willard Quine (1953), with his criticism of the possibility of distinguishing between theoretical and observational languages, and Norwood Hanson (1958), who strongly underlined that observations are always *theory laden*.

A common point of all these authors, even though they could put a different emphasis on it, was the rejection of the theoretical/observational sentence dichotomy on the basis of the claim that observational sentences are always seriously infected by theory, and therefore a pure observational language cannot exist. In fact, they privileged theory over observation, making explicit the view that scientific theorizing is always prior to good experimental practice whereas the standard view, although it is not the case with Popper, privileged observation over theory. As a consequence of the difficulty of tracing a border between theory and observation, they criticized the idea that there is *meaning invariance* of the observational sentences across theoretical change, thus putting at stake the cumulative view of scientific development. Together with meaning invariance, the objective basis of theory evaluation and theories choice was lost: logic plus implementation of cognitive virtues were no more sufficient to choose the best theory at the bar of evidence, and non epistemic factors, like social and psychological factors, entered the picture beyond the idealized logic of justification. A privileged, intersubjective access to the plane of observation, to what there is, providing one true description of the physical world, was negated.

According to Kuhn's famous book, *The Structure of Scientific Revolution*, scientists always look at the world wearing the glasses of a *paradigm*. His concept of paradigm has two meanings: in the first meaning, a paradigm is the entire constellation of beliefs, values, commitments, theories, techniques shared by the members of a scientific community; in the second, it is a particular item of this constellation, that is, the models and the exemplars of good scientific practice that exemplify the explicit and implicit rules that guide the problem-solving activities of scientists working within a paradigm. Theories are not superseded by their successors because of an accumulation of evidence against them, or because they are falsified, but because they are less good, in comparison to those theories that supersede them, for solving outstanding scientific problems, and at choosing new relevant scientific problems. Kuhn rejected the idea that knowledge is growing just in case our theories are succeeding in producing better representations of reality. For him a scientific theory is better than its predecessors only in the sense that it is a

better instrument for formulating and solving puzzles, and not because it is a better representation of what the physical world is really like.

But Kuhn's theory of paradigms could not provide an unproblematic account of scientific change: if paradigms are incommensurable because there is no meaning invariance across them, so too are the problems they define and the criteria of their solutions. Thus, the way was left open for people who claimed that, in the end, non-epistemic factors are decisive for theory choice. This step was taken by Paul Feyerabend and a new generation of sociologists of science, following in the 1970s the path opened by the *The Structure of Scientific Revolution*. Feyerabend claimed that the notion that progress in science is made through a paradigm is an illusion, as it is the idea that science is a problem-solving activity. He called himself a 'dadaist' and argued for theoretical pluralism, attacking what he considered the two fundamental claims of empiricism: that new theories must contain or be consistent with the results and the content of the theories they replace, and meaning invariance across theory change. If there is no meaning invariance and if theories can be logically inconsistent with one another, then there is no basis for a unique scientific method which overall guides scientific practice.

The new philosophy of science must be understood in the context of the 1960s: it had a feedback relationship with radical political movements, as for example *Science for the People* in USA, and in general with the social crisis of science at that time that called into question the faith in science and technology and their beneficial effect on society: Carson (1962), De Solla Price (1963), Rose and Rose (1976). The crisis of the standard view in the field of philosophy went hand in hand with the crisis of the linear *R&D* model and its view that science and technology, managed by experts, are capable of solving any kind of problem that can arise in connection with economic growth and its impact on society and the natural environment.

3 The Sociology of Science and STS Studies

The ideas of the new philosophy of science had an important impact on sociology of science in 1970s and 1980s. In the traditional approach, inspired by the works of Robert Merton (1973), the task of the sociologist was intended as the study of the system of social relations that allows scientific communities to implement the scientific method and extend objective knowledge. It was not the task of sociology to analyze the content of the product of scientific method. But now there was no more a unique scientific method, and there was nothing for philosophy of science to discover about how to reliably acquire knowledge of the world. If non-epistemic factors, which are the sociologist's business, play such an important role in the production of scientific results, then also the analysis of this product becomes sociologist's business: Barnes, Bloor, and Henry (1996).

The so called *strong programme in the sociology of knowledge*, developed by the Edinburgh School, claimed that social theory can describe and explain both the production of science and the product of science, because science itself is an

elaborate social system for deciding what to say, how to talk about the world, and for making social decisions about technical matters: Barnes (1974, 1977), Bloor (1991). The products of science, the *scientific facts*, are *artefacts of social practice* and scientific knowledge is whatever a cognitive community collectively endorses or agrees upon by the pragmatics of social consensus. Scientific change is a matter of linguistic redescription and the generation of new discourses compelled by interaction with phenomena and directed by changes in social interests and cognitive needs. Incommensurability is not a problem, since no one language of the scientific culture can be objectively preferred to any other.

From a philosophical point of view, these ideas reflect a sometimes uncompromising relativism and some form of *social constructivism*: Collins and Pinch (1993), Knorr-Cetina (1981), Woolgar (1988).[1] They have produced some interesting studies in the history of science as those by Shapin and Schaffer on the seventeenth century scientific revolution: Shapin and Schaffer (1985), Shapin (1994), and in the anthropology of science that look at how scientists actually work doing experiments in laboratories: Latour and Woolgar (1986), Collins (1992), Pickering (1984). Bruno Latour and Steve Woolgar interpret the laboratory as a literary text, where consensus is politically negotiated about what *inscriptions* of the text (traces, spots or points on screen or scales, recorded numbers, spectra and so on, the hard data of logical positivism) can be considered scientific facts. According to Harry Collins' analysis, what constitutes an experimental result is decided by negotiations within the scientific community, driven by factors such as career, social and cognitive interests of the scientists, or the perceived utility for future work. More recently Andrew Pickering (1995) has put forward that an experiment is a dialectic of resistance and accommodation between the experimental apparatus and its running, the theory of the apparatus and the theory of the phenomenon under study: a successful experiment realizes a mutual agreement between all these factors. In its strongest formulation social constructivism says that only social facts do exist, that is, facts about the existence of the *constructions* we call scientific facts.

It is true that there are no numbers, spots, spectra out there in the world, and that human practices performed in a socially organized context are necessary for accessing scientific facts, but one cannot infer from that that these facts are solely social constructs. It is true that laboratory made facts are produced, maintained and understood under controlled conditions, but one must not forget that these facts cannot be produced without the operation of underlying causal processes that can operate also in absence of theoretical knowledge and beyond the intentions of human agents. as the historian Carlo Ginzburg wrote:

> the fashionable injunction to study reality as a text should be supplemented by the awareness that no text can be understood without a reference to extra textual realities. (Ginzburg 1994, p. 295)

[1] For a critical approach to social constructivism, see Hacking (1999).

The tide of social constructionist theories that inflected many branches of the humanities also caused the birth of a new academic field: in the 1970s some American universities (such as Pennsylvania, Cornell, Carnegie Mellon and Stanford) began the first *STS* programmes aimed to social, political and economic analysis of science and technology. These studies were the academic response to the economic and political problems raised by the scientific-technological development and the dissatisfaction towards the traditional conception of science and technology: Mitcham and Mackey (1972), Spiegel-Rösing and De Solla (1977). The acronym *STS* has two different readings that indicate two different traditions in this field of study: González García, López Cerezo, and Luján López (1996). If we read it as *Science and Technology Studies*, it is a research field that refers to the European tradition, that goes back to the above mentioned sociology of science works, and had initially set its interests mainly on scientific theories, moving only at a later time to the study of technology, while maintaining a strong theoretical characterization: Bijker, Hughes, and Pinch (1987), Bijker and Law (1992), Collins (1990), Latour (1987), Jasanoff (1995), Webster (1991). If we read it as *Science, Technology and Society*, it indicates the American tradition that from the beginning has studied technology and its impact on society, paying particular attention to ethical and normative issues, and to social and political philosophy, starting with the pioneeristic work of Lewis Mumford (1934): Durbin (1987), Fuller (1993), Ihde (1979), Mitcham (1994).

The main currents in this field agree that is impossible to distinguish between science and technology, and that technological factors are very important for the development of pure science itself. The technology is understood as a social process and technological determinism is criticized, together with the "linear model", because in contemporary *sociotechnical systems* there are social factors (technical, organizational, cultural, political and economical) which interact with technological factors. Technological development is a process of variation and selection, and decisions about which of the technological variants are viable social choices are the result of negotiations between the actors of a network that includes scientists, engineers, business leaders, politicians: the interests of social actors shape technology, but this, in turn, changes social relations. In Latour's *actor-network theory* (1987) not only humans actors are nodes of this network but also material objects, and both are members of a new conceptual category, they are *actants*. Recently, it has been formulated the notion of *eco-technological systems* where technologies are integrated into broader social systems that may have similarities with ecosystems: Hughes (2006).

4 The Semantic View

Philosophers of science took two different paths to meet the challenges of the new philosophy of science and of deconstructionist theories: either they have turned to history to see how, in fact, science works or they have remained faithful to the idea of a formal analysis of science, but with a different concept of what a scientific

theory is. The latter way produced in the 1970s what is called the *semantic view* of scientific theories: van Fraassen (1980), Giere (1988), Sneed (1971), Suppe (1974), Suppes (2003). The semantic view considers a scientific theory not as body of propositions that can be literally true or false in the real world, but as a complex description that is true of some *models* of systems in the real world.

In mathematical logic a model is a structure that makes all the sentences of a theory true, where a theory is a (deductively closed) set of sentences in a formal language. For example, any structure in which all the axioms and theorems of Euclidean geometry are true is a model of Euclidean geometry. In this sense, a model is an abstract object, and a theory is viewed as a collection of many, alternative models with which we try to represent, explain and predict aspects of observed phenomena. The practice of science is trying to embed observed regularities within a model of a theory, so that any real system exhibiting that regularity may be treated as a system satisfying the theory. High level scientific hypotheses, as for example the fundamental law of Newtonian Mechanics ($F = m \times a$), are not literally true of any real system: they simply define a class of models, that is, the *class of Newtonian systems* whose members are all those structures to which the quantities F, m and a apply and for which the law is literally true.

Then the problem is how a model is connected with the world. Ronald Giere says that we make an hypothesis about the existence of a *similarity* in structure between the model and the real system. The problem is that hypotheses of this kind go beyond what the approach can afford and it is not clear how to choose what respects of similarity are those which are relevant. According to Patrick Suppes' view, a theory is a hierarchical set of models with different degrees of abstraction, ranging from empirical models or models of data, describing experimental evidence, to abstract mathematical models: data themselves are an abstraction from the practical activity of producing them. The plane of observation has became an eventful region where scientists produce, process, and fit observations into a model of the data. A criticism raised against the semantic view is that in this activity of data making many types of models are involved that are not structural models in the sense required by the theory. Therefore it can neither account for how these models are constructed nor for how they work.[2]

5 Knowing *That* and Knowing *How*

The other way to meet the challenge of deconstructionist theories was taking Kuhn's lesson to look at the history of science and the practices of science more seriously than Kuhn himself did, avoiding the tribute he still paid to the standard view idols. Indeed, the new philosophy of science maintained, in common with the

[2] This criticism has been put forward by Cartwright (1999), who has developed a different perspective especially focused on economic theories in 2007.

view it criticized, the idea that all scientific knowledge is propositional in content, and thus that all forms of *knowing-how* are to be transformed into *knowing-that*. The standard view privileged observation over theory, Khun and Feyerabend privileged theory over observation, concentrating on paradigms, conceptual schemes, and the methods they drive, but both failed to appreciate the common ground provided by instruments, experimental practices, shared skills, which makes judgments of commensurability (and incommensurability) possible. Paradigms do not carry with themselves a particular batch of instruments and experimental procedures that are understandable only in terms of that particular paradigm, but people working with different paradigms also share tools and procedures, direct experiences, and they are living in the same phenomenological world. Forerunners of this approach, under different aspects, can be considered Gaston Bachelard (1949) and Michael Polanyi (1964).

Starting from the 1980s, this new approach has challenged the dichotomy theoretical/observational by seeing experimentation and experimental techniques as central to scientific practice: *science is driven by practice* rather than by theory and observation, and often experiments have a life of their own, independent of theory: Ackermann (1985), Franklin (1986, 1990), Galison (1987, 1997); Gooding, Pinch, and Schaffer (1989), Gooding (1990), Hacking (1983), Hull (1988), Pickering (1992, 1995). The authors following this approach claim that science is largely skill-based, network-based and laboratory-based and can be located somewhere between the activities of individuals and the material, cultural and cognitive frameworks which they inhabit. Therefore, they attempt to reconstruct the *material culture of science*, that complex networks of skills, competences, negotiations, and intellectual and material resources from which stable patterns of scientific practice and experimental results emerge. Networks of this kind embody a *knowing-how* that cannot be captured by the notion that understanding is a *knowing-that*, abstractly expressed through representational and propositional tools, like sets of models and sets of sentences. Practicing a theory is not a matter of understanding a theory's formal expressions, but is rather the business of adopting and transmitting through practice a set of mental technologies used in contextualized applications of the theory to problem solving.

For example, Allan Franklin talks of *epistemological strategies*, to be applied in the design of experiments, that provide arguments for the correctness of the experiment even though they cannot be explicitly defined as a set of formal rules. This kind of approach shares many themes with social constructivism and the sociological approach outlined above, but a fundamental difference is that for people like Ian Hacking, Allan Franklin and Peter Galison, experimental results are, at the end, accepted because of epistemological arguments, while people like Bloor, Collins and Pickering deny that epistemological arguments play a decisive role.

Research cultures are constructed in local contexts but then they can travel beyond the confines of the scientific communities which give them birth and make possible communication among different contexts. This overall picture can explain why translation is possible between different communities: theories,

instruments, and experimental practices do not change together in one great rupture of paradigms, but usually they are changing at different times, piece by piece, and what are points of discontinuity in theory are not so in the *material culture of experiments*. Galison has put forward the concept of *trading zone*, that is, spatially located (laboratories), or virtual, zones (networks of labs connected by the web) where people meet, theoretical scientists meet experimental scientists, engineers meet scientists, scientific subcultures meet each other and where wordless interlanguages are spoken (*pidgins* or *creole* languages), that are embodied in objects and procedures. Knowledge moves across boundaries and coordination around specific problems and sites is possible even where globally shared meanings are not. Meanings do not travel all at once in great conceptual schemes or paradigms, but partially and piecemeal.

6 The Theory of the Knowledge-Creating Company

Michael Polanyi made an important distinction between *tacit knowledge* and *explicit knowledge*.

> When we are relying on our awareness of something (*A*) for attending to someone else (*B*), we are but subsidiarily aware of *A*. The thing B to which we are thus focally attending, is then the meaning of *A*. The focal object *B* is always identifiable, while things like A, of which we are subsidiarily aware, may be unidentifiable. The two kinds of awareness are mutually exclusive: when we switch our attention to something of which we have hitherto been subsidiarily aware, it loses its previous meaning. Such is briefly, *the structure of tacit knowledge*. Now to the distinction between tacit and explicit knowledge. Things of which we are focally aware can be explicitly identified; but no knowledge can be made *wholly explicit*. For one thing, the meaning of language, when in use, lies in its tacit component; for another, to use language involves actions of our body of which we have only a subsidiary awareness. Hence tacit knowing is more fundamental than explicit knowing: *we can know more than we can tell and we can tell nothing without relying on our awareness of things we may not be able to tell*. Things that we can tell, we know by observing them, those that we cannot tell, we know by dwelling in them. All understanding is based on our dwelling in the particulars of that which we comprehend. Such indwelling is a participation of ours in the existence of that which we comprehend; it is Heidegger's *being-in-the-world*. (Polanyi 1964, p. x)

Polanyi's ideas about the importance of the first, are particularly relevant because they have influenced Ikujiro Nonaka's *theory of the knowledge-creating company*: Nonaka (1994), Nonaka and Takeuchi (1995), Nonaka and Toyama (2003). Nonaka's theory embeds the concepts of tacit and explicit knowledge into a model composed by four modes of knowledge acquisition, namely, *socialization*, *externalization*, *combination*, and *internalization*, a model that has the form of a spiral, starting from tacit knowledge (knowing-how), passing through explicit knowledge (knowing-that), and ending again with new embodied tacit knowledge, where the interaction between tacit knowledge and explicit knowledge is amplified through the conversion of knowledge from one mode to the other.

Knowledge creation starts with *socialization*, the processes by which people convert their personal (tacit) knowledge, consisting of skills, mental models, and beliefs that shape the perception of the world, into shared experiences, which are mostly time and space specific.

> In the socialization process, the phenomenological method of seeing things as they are is effective. By 'indwelling' or 'living in' the world, individuals accumulate and share tacit knowledge about the world that surrounds them. (Nonaka & Toyama 2003, p. 5)

Then, in the *externalization* process, tacit knowledge is articulated into explicit knowledge by means of dialogue within the organization and with the help of metaphors, analogies, models, hypotheses. Explicit knowledge is manipulated and shared throughout the organization by building up theories, models, codified procedures, also making use of formal languages, during the *combination* process. This newly created explicit (and linguistic) knowledge is converted again into tacit knowledge by individuals through the *internalization* process, by learning by doing, developing shared mental models and technical know-how.

Art scholar Mary Jane Jacob has pointed out the parallels between Nonaka's theory of knowledge production and John Dewey's philosophy of *learning-by-doing*, where knowledge is conceptualized as a dialectic process of interaction between man and his environment going through active phases (*doing*) and passive phases (*undergoing*): Jacob (2013). A basic difference between the two models lays in the fact that the second one is a collective model:

> in contrast to Dewey's relational model, in which new ideas are formed in thoughtful reflection by the individual, Nonaka and Toyama's model places emphasis on the sharing and interaction of one's ideas in relation to those of others. Nonaka and Toyama employ the Japanese word *Ba* to denote this space of shared context. (Jacob 2013, p. 106)

This notion of *Ba*, a *knowledge-creating place* for firms, is similar to Galison's notion of a trading zone for scientific material culture:

> The knowledge-creating process is necessarily context-specific in terms of time, space, and relationship with others. Knowledge cannot be created in vacuum, and needs a place where information is given meaning through interpretation to become knowledge. […] Building on the concept that was originally proposed by the Japanese philosopher Kitaro Nishida (1970, 1990), we define *ba* as a shared context in motion, in which knowledge is shared, created, and utilized. *Ba* provides the energy, quality, and places to perform the individual knowledge conversions and to move along the knowledge spiral. (Nonaka & Toyama 2003, p. 6)

Ba is a dynamic self-organizing structure which is created and disappears according to the need of the organization, whose boundaries are fluid and persons can come and go, where contradictory beliefs are confronted and eventually can be synthesized: Nonaka and Toyama (2003), Nonaka, Toyama, and Konno (2000). *Ba* is a zone open for experimentation, communication and understanding, and where new knowledge can occur.

References

Ackermann, R. (1985). *Data, instruments and theory*. Princeton: Princeton University Press.

Aichholzer, G., & Schienstock, G. (Eds.). (1994). *Technology policy: Towards an integration of social and ecological concerns*. Berlin: De Gruyter.

Bachelard, G. (1949). *Le rationalisme appliqué*. Paris: Presses Universitaires de France.

Barnes, B. (1974). *Scientific knowledge and sociological theory*. New York: Routledge.

Barnes, B. (1977). *Interests and the growth of knowledge*. New York: Routledge.

Barnes, B., Bloor, D., & Henry, J. (1996). *Scientific knowledge: A sociological analysis*. Chicago: University of Chicago Press.

Bijker, W., Hughes, T., & Pinch, T. (Eds.). (1987). *The social construction of technological systems*. Cambridge, MA: MIT Press.

Bijker, W., & Law, J. (Eds.). (1992). *Shaping technology/building society: Studies in sociotechnical change*. Cambridge, MA: MIT Press.

Bloor, D. (1991). *Knowledge and social imagery*. Chicago: University of Chicago Press.

Bush, V. (1945). *Science the endless frontier*. Washington, DC: National Science Foundation.

Carson, R. (1962). *Silent spring*. New York: Houghton Miffin.

Cartwright, N. (1999). *The dappled world: A study of the boundaries of science*. Oxford: Oxford University Press.

Cartwright, N. (2007). *Hunting causes and using them: Approaches in philosophy and economics*. Cambridge: Cambridge University Press.

Collins, H. (1990). *Artificial experts: Social knowledge and intelligent machines*. Cambridge, MA: MIT Press.

Collins, H. (1992). *Changing order: Replication and induction in scientific practice*. Chicago: University of Chicago Press.

Collins, H., & Pinch, T. (1993). *The Golem: What everyone should know about science*. Cambridge: Cambridge University Press.

De Solla, P. D. (1963). *Little science, big science*. New York: Columbia University Press.

Durbin, P. (Ed.). (1987). *Technology and responsibility*. Dordrecht: Reidel.

Feyerabend, P. (1975). *Against method*. London: New Left Books.

Franklin, A. (1986). *The neglect of experiment*. Cambridge: Cambridge University Press.

Franklin, A. (1990). *Experiment, right or wrong*. Cambridge: Cambridge University Press.

Fuller, S. (1993). *Philosophy, rhetoric, and the end of knowledge: The coming of science and technology studies*. Madison, WI: University of Wisconsin Press.

Galison, P. (1987). *How experiments end*. Chicago: University of Chicago Press.

Galison, P. (1997). *Image and logic: A material culture of microphysics*. Chicago: University of Chicago Press.

Giere, R. (1988). *Explaining science: A cognitive approach*. Chicago: University of Chicago Press.

Ginzburg, C. (1994). Checking the evidence: The judge and the historian. In J. Chandler, A. Davidson, & H. Harootunian (Eds.), *Questions of evidence: Proof, practice, and persuasion across the disciplines* (pp. 290–303). Chicago: University of Chicago Press.

González García, M. I., López Cerezo, J. A., & Luján López, J. L. (1996). *Ciencia, tecnología y Sociedad*. Madrid: Tecnos.

Gooding, D. (1990). *Experiment and the making of meaning*. Dordrecht: Kluwer Academic.

Gooding, D., Pinch, T., & Schaffer, S. (Eds.). (1989). *The uses of experiment*. Cambridge: Cambridge University Press.

Hacking, I. (1983). *Representing and intervening*. Cambridge: Cambridge University Press.

Hacking, I. (1999). *The social construction of what?* Cambridge, MA: Harvard University Press.

Hanson, N. R. (1958). *Patterns of discovery: An inquiry into the conceptual foundations of science*. Cambridge: Cambridge University Press.

Hughes, T. (2006). *Human-built world: How to think about technology and culture*. Chicago: University of Chicago Press.

Hull, D. (1988). *Science as a process: An evolutionary account of the social and conceptual development of science*. Chicago: University of Chicago Press.
Ihde, D. (1979). *Technics and praxis: A philosophy of technology*. Dordrecht: Reidel.
Jacob, M. A. (2013). Experience as thinking. In M. Ambrozic & A. Vettese (Eds.), *Art as a thinking process: Visual forms of knowledge production* (pp. 100–113). Berlin: Sternberg Press.
Jasanoff, S. (Ed.). (1995). *Handbook of science, technology and society*. London: Sage.
Knorr-Cetina, K. (1981). *The manufacture of knowledge: An essay on the constructivist and contextual nature of science*. Oxford: Pergamon Press.
Kuhn, T. (1970). *The structure of scientific revolutions*. Chicago: University of Chicago Press.
Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Cambridge, MA: Harvard University Press.
Latour, B., & Woolgar, S. (1986). *Laboratory life: The construction of scientific facts*. Princeton, NJ: Princeton University Press.
Merton, R. (1973). *The sociology of science*. Chicago: University of Chicago Press.
Mitcham, C. (1994). *Thinking through technology: The path between engineering and philosophy*. Chicago: University of Chicago Press.
Mitcham, C., & Mackey, R. (Eds.). (1972). *Philosophy and technology: Readings in the philosophical problems of technology*. New York: Free Press.
Mumford, L. (1934). *Technics and civilization*. New York: Harcourt, Brace & Co.
Nishida, K. (1970). *Fundamental problems of philosophy: The world of action and the dialectical world*. Tokio: Sophia University.
Nishida, K. (1990). *An inquiry into the good*. New Haven, CT: Yale University Press.
Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science, 5*(1), 14–37.
Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company*. Oxford: Oxford University Press.
Nonaka, I., & Toyama, R. (2003). The knowledge-creating company revisited: Knowledge creation as a synthesizing process. *Knowledge Management Research & Practice, 1*, 2–10.
Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and leadership. *Long Range Planning, 33*, 1–31.
Pickering, A. (1984). *Constructing quarks: A sociological history of particle physics*. Chicago: University of Chicago Press.
Pickering, A. (Ed.). (1992). *Science as practice and culture*. Chicago: University of Chicago Press.
Pickering, A. (1995). *The mangle of practice*. Chicago: University of Chicago Press.
Polanyi, M. (1964). *Personal knowledge*. New York: Harper & Row.
Popper, K. (1959). *The logic of scientific discovery*. New York: Basic Books.
Quine, W. V. O. (1953). *From a logical point of view*. Cambridge, MA: Harvard University Press.
Rose, H., & Rose, S. (1976). *The radicalization of science: Ideology of/in the natural sciences*. London: MacMillan.
Ruivo, B. (1994). Phases or paradigms of science policy? *Science and Public Policy, 21*(3), 157–164.
Shapin, S. (1994). *A social history of truth: Civility and science in seventeenth-century England*. Chicago: University of Chicago Press.
Shapin, S., & Schaffer, S. (1985). *Leviathan and the air pump: Hobbes, Boyle and the politics of experiment*. Princeton, NJ: Princeton University Press.
Sneed, J. (1971). *The logical structure of mathematical physics*. Dordrecht: Reidel.
Spiegel-Rösing, I., & De Solla, P. D. (Eds.). (1977). *Science, technology and society: A cross-disciplinary perspective*. London: Sage.
Suppe, F. (Ed.). (1974). *The structure of scientific theories*. Urbana, IL: University of Illinois Press.

Suppes, P. (2003). *Representation and invariance of scientific structures*. Stanford: CSLI Publications.
Van Fraassen, B. (1980). *The scientific image*. Oxford: Clarendon Press.
Webster, A. (1991). *Science, technology and society* (New directions). London: MacMillan.
Woolgar, S. (1988). *Science: The very idea*. London: Tavistock.

A Musical-Philosophical Approach to Creativity & Economy: An Ethical Turn

Daniele Goldoni

Abstract

In this text I discuss the concepts of milieu and creativity, starting from a musical experiencing of space as an element of co-generative energy, when used in conjunction with open attitudes.

Music, or sound, is a significant indicator for a society. Plato knew this well—as do all traditional cultures. Thus, the discourse about music serves as an introduction to philosophical discourse.

I suggest to integrate some concepts, drawn from hermeneutics and other philosophic theories, with a considerably extended use of McLuhan's notions of message and of medium, in order to develop theoretical tools for an analysis of social, economic, non-verbal or even unconscious forms of power and conditioning. My thesis is that converging or conflicting (inter- and trans-medial) lines of forces constitute the spatial/temporal territories of those economic contexts in which individuals, groups and/or communities find their possibilities.

The present approach aims to show that the current insistence on *creativity* is the sign of an aestheticisation of the economy. This is the 'engine' that allows current global capitalism to function, when many of its traditional conditions (hierarchies, oppositions) are disappearing. From this point of view, this text might be inscribed within the tradition of the 'critique of the political economy', although it resorts to theoretical tools partially different from those of Marx and closer to Benjamin's awareness of ambivalence. What seems to be univocal can now conceal, and later reveal, unexpected consequences and new possibilities. The following pages propose a new possible approach to creativity, different from the dominant one, as a means of ensuring better relations between individuals and groups, and with one's milieu: a politics of friendship.

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1 Introduction

In this text I discuss the concepts of milieu and of creativity, starting from a musical experiencing of space as an element of co-generative energy, when used in conjunction with open attitudes.

Music, or sound, is a significant indicator for a society. Plato knew this well—as do all traditional cultures. Thus, the discourse about music serves as an introduction to philosophical discourse.

I suggest to integrate some concepts, drawn from hermeneutics and other philosophic theories, with a considerably extended use of McLuhan's notions of message and medium, in order to develop theoretical tools for an analysis of social, economic, non-verbal or even unconscious forms of power and conditioning. My thesis is that converging or conflicting (inter- and trans-medial) lines of forces constitute the spatial/temporal territories of those economic contexts in which individuals, groups and/or communities find their possibilities.

The present approach aims to show that the current insistence on creativity is the sign of an aestheticisation of the economy. This is the 'engine' that allows current global capitalism to function, when many of its traditional conditions (hierarchies, oppositions) are disappearing. From this point of view, this text might be inscribed within the tradition of the 'critique of the political economy', although it resorts to theoretical tools partially different from those of Marx and closer to Benjamin's awareness of ambivalence.

Indeed, the resistance of old media and of their cultural influence to 'new' ones, as well existing conflicts among the latter, constitute a too complex context to lead to determinism, even though there are dominant lines of power. And so, what seems to be univocal can now conceal, and later reveal, unexpected consequences and new possibilities. Many traditional hierarchies and oppositions, along with the very belief in the established economic order and in 'universal' information, are declining.

The following pages suggest that we see the focus of current economic policies on creativity also as a sign of ambivalence. They propose a new possible approach to creativity, different from the dominant one, as a means of ensuring better relations between individuals and groups, and with one's milieu: a politics of friendship. A contemporary repetition of the ancient notion of *oikonomia* is possible: to take care, and so find the law, the *nomos*, of the space and place we inhabit.

2 Prelude

2.1 In a Room . . .

One

I walk into a room. A large, empty room, with a wooden floor.

Nobody is there. I can hear the sound of my footsteps, even my breath.

I go out to grab a chair, walk back in and sit down.

Now I shut my eyes and listen to the sounds coming from the open window. Bird songs: of different pitches and from varying distances. I can mentally visualize one coming from my right: a blackbird. Another, further away: a magpie. And a seagull crying and moving to the left, as its cry gradually fades in the distance.

In the background I hear the traffic, from which emerge different sounds and different speeds. Here a car. There, on the other side of the street, a slow, heavy and noisy truck. Suddenly, the jarring noise of carpenter's saw. Then I hear the sound of a metal plate. And the steps of people passing by in the street, and their more and or less comprehensible words … This quiet observation, free from worries and judgements, gives me a good feeling about … About what? Nothing special. Or better: about living. I would say: this quiet awareness gives me the energy of life, for life.

Two

Four people come into the room. I open my eyes. They are carrying a low wooden stage. They put it near the wall opposite the door. Then they bring many chairs and set them in ordered, parallel rows, facing the stage. There is a distance of about five meters between the first row of chairs and the stage. The guys shut the window and leave the room. Silence.

A bell rings. People come into the room and take a seat. They do so with respect, quietly, almost shyly and religiously. With a few exceptions, they are dressed as for a special occasion. They are waiting.

A girl dressed in black, carrying a cello, enters and walks quickly towards the stage, accompanied by a great applause. She begins to play the *Suites* by J. S. Bach. We all listen with attention. We all enjoy this wonderful music: each according to her/his own ability to listen. Someone responds to the rhythm with a slight movement of the head, one reads the score that she/he had brought.

The concert is over and we are all under the beneficial spell of this music, which has enriched us with an inner song we can mentally repeat: almost an inner breathing which make us freer.

Three

People leave the room, except for myself and some other people. These are, incidentally, the ones casually dressed. We know each other. We create a space—we do not care for the stage—bringing some chairs in a circle. I take the trumpet that I held under my chair during the concert; the others take the instruments they had brought with them: an alto sax, two electric guitars, a keyboard, a double bass, a drum set.[1]

We start playing. We begin with a piece that is somewhat of an exercise in playing by listening. It is a composition by Pauline Oliveros called *The Tuning*

[1] These are now the instruments of the *Elettrofoscari* group, sprung from a permanent workshop for "all-round improvisation" (jazz, free improvisation and contemporary music) organized by the Ca' Foscari University of Venice.

Meditation. The drummer makes sounds by moving his fingers across the skin of the tom and the cymbals, the double bass player uses the bow. We play different pitches and timbres. Then we converge to one pitch; after that, we diverge again and find another point of convergence. Nothing is written, only this simple rule was given in advance: everyone can choose the pitch, the timbre, the time to enter or stop playing. A cloud of sounds takes shape with no hierarchy of timbres and pitches.

Then we play a second composition by Pauline Oliveros, *The Hearth of Tones*. It consists in playing on a D4. Everyone can enter or leave when she/he likes. We can change timbre, move very slightly away from the pitch, over or under it, in order to produce different superimposed frequencies (beats) and to control their pace: quicker or slower … Our listening changes: what at the beginning seemed to be only one tone—D4—is now a universe of sounds, a texture of timbres, micro-rhythms, breathings. Marvel and interest grow.

Now that we have cleansed our ears and minds, we are ready to improvise in another way. What are we going to play? Nobody knows. We play in circle. One begins. Perhaps the performer has an idea and wants to do something she/he has in mind, longs to perform well, to be appreciated, and tries to do her/his best. The music comes into being. Good, bad? In this context, we do not judge it with the usual parameters for pre-composed music. The audience and even ourselves, the musicians, are listening to something we have never heard before. Everyone is focused on what she/he is doing; everyone is driven by the music, even beyond the intention of giving a brilliant performance. We can all experience this form of listening, which in itself makes the music interesting. Maybe, in a moment something might not sound too 'correct' to our own ears or the player's: e.g. a lack of intonation … There follows a moment of hesitation. Is the music going nowhere? Or is it taking an unexpected turn? A second player grasps this new direction. She/he switches to the new timbres or new rhythm. What seemed to be an "error", now, in this context, becomes an opportunity. A third musician listens to the second, takes something from her/his music, develops it for a certain time, then leads it in another direction … When the circle is complete, we play together, listening to each other, not too loud, not too continuously, carefully avoiding overwhelming each other, and leaving enough time and space: everyone can hear what is happening in every detail, with the utmost clarity. We get a good mood, an open and happy feeling from one another. At the end we breathe better, we are full of energy. Aristotle described this as *energheia*[2]; Plato as *enthousiasmos*.[3] Nothing is abrupt—everything takes place quietly. We experience a quiet passion. We are relaxed. This is a kind of happiness. We can praise life through a very simple rite. And this is nothing special: anyone can do it any day in many normal places.

[2] Aristotle, *Metaphysics* XII, 1072 b 16–18. Aristotle, *Nicomachean Ethics* 1170 a 16–1170 b 8.

[3] Plato, *Phaedrus*, 249 e.

Four
Meanwhile, some people come into the room. They are silent, but with a very different attitude compared to the audience of the previous concert. They show no shyness. They feel at home, because the music they are listening to now does not place them on the other side, does not cause any separation, but includes them. Inclusion begins right from our practice, from the circle, from our way of placing ourselves and listening to each other. We ask the audience to participate more actively. Then, we perform *The Tuning Meditation* by Oliveros again with our voices, along with them. And this is beautiful. It is touching.[4]

2.2 Creativity

The four situations just exemplified present different organizations of space, sound, listening, relations between people, and approaches to sounds and settings. Each situation resulted in a good, albeit different, experience.

The first experience is the "simplest" one (which *may* occur almost in any place and at any time), although it is not the easiest: on the contrary, it is perhaps the most difficult.

In second one, the classical concert, the main creativity is attributed to the process of composition by the "author": J. S. Bach (absent). Only a second degree of creativity is attributed to the cello player's "interpretation" (present). The music may induce a sort of *desire* for creativity, an almost pre-creative attitude in the audience: the capability of paying attention to and understanding what is happening, perhaps an inner singing that desires to be repeated and continued on further occasions. But it may be that there is also only complacency on the audience's part in recognizing well known patterns or finding that the music matches their own personal taste.

The third situation shares with the first one the "spiritual exercise"[5] of feeling oneself free, of becoming part, by means of music, of the flow of life—interruptions and diversions included. Much of the "creativity" was ... *prepared* before the performance, through several exercises of attentive listening to the music, through the interplay between the musicians and the setting. But the main interest for creativity is in what happens in the appropriate moment[6]: music may go beyond some predetermined expectations and so the musicians are invited to answer in an appropriate, timely manner.

[4] Something similar happened at the end of a music concert by Pauline Oliveros performed, with the composer present, by the *Elettrofoscari ensemble* in "Santa Margherita" auditorium in Venice on January 27, 2012.

[5] I use the expression "spiritual exercise" in a sense somehow close to that of Hadot (2005).

[6] I have suggested the use of the "rhetorical" concept of "appropriate moment" (according to the meaning of the Greek word *kairòs*) instead of that of "real time" or "instant time", which is usually employed in the literature on improvisation (Goldoni, 2013c).

The fourth situation attempts to eliminate or at least diminish the boundaries and—to some extent—the hierarchies between the musicians and the listeners. The active participation of the audience and the dissemination of this creativity in other people are intrinsic to the relational and procedural nature of this kind of "creativity". This creativity is the result of an attitude which is free from aesthetic and behaviour biases, and—above all—stems from trust in the fact that nature, the environment and human activities can be listened to and observed with interest and pleasure, as signs of life itself. Thus even the exercises I performed on my own, alone in an empty room and listening through the open window, are fundamental premises for this "creative" musical experience.

Indeed, not least because there is no real beginning to the flow of life, which is always a repetition and a renewal of what was already there, instead of the modern concept of "creativity"—which suggests a complete break and fresh starting point, without "imitation" (see Kant, 1983[1790], §§ 46–47)—I would prefer to use the ancient words *mimesis* and *inventio* (Goldoni, 2013b). For what is new in human practices is always rooted in old ones, and somehow always constitutes a *mimesis*, that is a literal *meta-phorà*: a shift from one matter to another, from one lifestyle to another. However, I am willing to share the use of the word "creativity", provided some clarification is made first. When I think of creativity (or *mimesis*), this is *not* necessarily in relation to "innovation", especially as understood by economists: that is, as the implementation of a new profitable idea. Creativity is a new way of thinking and living, which may or may not be innovative. Creativity is also to listen to noises and the life with them, and find them beautiful; to find that something, which seems to be always the same and boring, like a repeated D 4, may be rich and different, interesting and even exciting. Some kind of innovation is to be found here, of course: within myself.

2.3 A Kind of Space, a Kind of Relation. Milieu . . .

Moments one, two, three and four in the room are somehow—each in a different sense—also a result of changes in attitudes and feelings through relations with and within space. In the traditional concert the main creative moment happened elsewhere, probably in a composer's room, with her/his instruments, some paper, a table, a pencil . . . The classical setting of the performance separates people's roles, even spatially: the composer may be absent, the performer must be present on stage, the audience sits in front of the stage. The classical setting elicits admiration, respect, emulation, but perhaps even frustration and envy through exclusion. Exclusion causes a certain loss of energy and happiness.

In moments one, three and four the creative process depends on the spatial arrangement in different ways: being alone in a free space open to the outside, or sitting in a circle, watching and listening to each other close-up, listening simultaneously to the same sounds and paying attention to the reactions of the musicians and of the audience. The participatory and sympathetic presence of a non-formal, non-prejudiced audience encourages and improves the "improvisation". This

belongs essentially to a certain way of making music. The setting, including the spatial conditions, cannot be separated from the results.

The setting of the musical performance may be a little model for what we describe as a "milieu". It is based on "live" relationships: sitting close to one another, seeing each other's faces, and interacting. It may give rise to free relations, free processes, thanks to a mutual agreement, together with particular spatial features. It produces even a certain kind of responsibility: each person is made directly accountable for what she/he is doing -for the same reasons, this setting may produce incompatibility in a clear way.

An economic "milieu" is much more complex than a room. Let us think of a city or district. Economic milieus work not only face to face but also by means of distance-media like writing, phones, the Internet. . . These are intertwined in such a way as to form networks of relations with close-media, like workplaces or meeting places and their atmospheres, in continuous, iridescent metamorphic changes, as we shall see in the next paragraphs. However, the musical example illustrates an experience of space. We have to think of space not only in the modern geometrical and metric sense, but as a place of ethically defined relations. In the musical example, the relations between people, and between the latter and their setting, were different for each one of the four situations described. The different intentions, ethical attitudes, inclusions and exclusions, and hierarchies turned the same metric space into several different places. More in general, we have a space insofar we are included within it or excluded from it, welcome or rejected; insofar as we "make room" for others or reject them, establish hierarchies or avoid them.

In the next steps I will present some ideas regarding:

- the economy as an inter- and trans-medial territory of conflicts.
- a criticism of the European policies for creativity in the economy and the ideological use of the concept of creativity.
- a philosophical approach to the ambivalence of the notion of "creativity" and its applications.

3 Modern Economy, Interpretations and the Media

3.1 The Economy Is Not the Subject of an "Objective" Science

Knowledge-based economy has suggested paradigm shifts for the interpretation and practice of production, compared to the dominant concepts in Fordist economy. Different skills are required. The useful knowledge is no longer formal and systematic, based on "hard" (quantifiable) data, quantified procedures, and universal principles. This knowledge depends on letting individual employees develop "tacit" subjective insights that are also related to images and symbols, and on testing their possible use by the company as a whole (Nonaka, 1991, pp. 96–97). These interpretative and subjective aspects free this economy from a strictly "objective" scientific approach.

I would add some observations that concern the economic field in a much more general sense. The distinction between production and information, between means of production and means of communication, is theoretically weak. In what we call "means of productions" receptions and interpretations too are significantly involved. Modes of production have always been also means of communication. Hunting, fishing, agriculture, arts and crafts have always communicated forms of living through their products. Industrial "mass" products organize mass consumers and their imagery (Duchamp's ready-mades and—in a different way—many of Warhol's works highlight this implication). Individualized products organize individualized imageries. This can give rise to habits which are stable for a certain time. However, their coding (in the form of moral, social and juridical laws) is contingent, because they have no stable conditions in an absolute sense. They are partly natural, partly contingent upon history. The limits between nature and culture change according to historical and cultural events, and there is no way of tracing them once and for all (I will come back to this philosophical thesis in the fourth part of the present text).

In the capitalist economy commodities spread their imageries through their existence on the market, which always produces exhibition spaces. Shop windows and advertising images on the TV screen are necessary consequences of the commodity form of things. Karl Marx used the word "fetishism" to indicate the illusion that things themselves—instead of social relations, which remain hidden—have this power of producing the space in which they act, almost as if they were people. Guy Débord, consistently with the extension, in late capitalism, of the commodity form to all human relations, applied the notion of fetishism to this whole, and concluded that the human space has become a "spectacle" (Débord, 1992[1967]). His prediction has come true to such an extent that not long ago an economics book was published that—in all seriousness and without the slightest irony—was given the subtitle *Work is Theatre & Every Business a Stage* (Pine & Gilmore, 1999).

The space of the commodity form requires its fulfilment by means of advertising and marketing. The direction of this process has always been from production to consumption, but there are also trends in the opposite direction, which seems to emphasize consumer choice (the sense of this "seems" will be precisely the subject of a discussion in the next pages of the present text). Marketing has changed. From the model corresponding to Fordist mass production (so-called marketing 1.0), it has passed to the segmentation of the market (2.0), and finally to a new phase in which consumers play an active part in orienting the production—"Marketing 3.0". This is the title of a recent book, subtitled *From Products to Customers to the Human Spirit* (Kotler, Kartayaja, & Setiawan, 2010). The subject of the offer is more differentiated and tends to coincide with individual interests.

This transformation of marketing converges with the fact that the so-called new media have become more and more internal to the production, insofar as this extends beyond the more evidently "tangible" aspects, and deeply involves customers. So-called "design thinking" implies ethnographic work and participatory planning that go deep into the cultural and social sphere (Calcagno, 2013

p. 37 ff.). The vocation of the market to expand indefinitely the exhibition space of the commodity has advanced to the point not just of incorporating "culture", as Adorno had described in *Kultur Industrie* (Adorno 1998[1947]) in relation to the American society of the 1930s and 1940s, but even of appropriating the human space-time horizon itself: experience. The title of the book subtitled *The Work is Theatre & Every Business a Stage* is *The Experience Economy*—henceforth, before reading Kant or Husserl, we must read this book which resets, brushing aside, elaborate philosophical pretensions!

This intimate incorporation of the economy entails the involvement of ethics at all levels, from the most immediately emotional (as in the case of so-called "emotional marketing" shows), down to habits and more elaborate systems of value. Conflicts happen not only in the field of the struggle for the appropriation of the means of production, but also in the areas of consumptions, of the ethical and juridical legitimation of the uses of social (or "common") wealth. Economic needs arise through interpretations of the rights to health, safety, culture and human dignity, urging economic thinking to deal with issues such as "well-being" (Kahneman, Diener, & Schwarz, 2003) and/or happiness (Bruni & Porta, 2006; Sen, 2011) and "relational goods" (Donati & Solci, 2011).

3.2 Theoretical Limits in Economics

Neoclassical economics believes it possible to find objective laws allowing calculations, taking as a fundamental parameter the relative scarcity of the resources apt to satisfy needs and desires. This thought *seems* rather reasonable when the economy concerns hunger, thirst, the basic need for clothes and housing, and so on. However, it should be noted that the assessment of what is "strictly necessary", while rooted in natural needs, varies greatly according to cultural criteria: it depends not only on the possibility for physical survival, but also on the way in which a way of life or a culture conceives of "normal" human existence—possibly articulated into different forms of "normality" relative to different classes, castes or orders. Anyway, this theory does not work when an activity, whether "necessary" or not, is performed with pleasure: in this case, it will probably be performed for the pleasure that lies beyond the strict satisfaction of a need, and this pleasure will produce a renewed desire. Many traditional activities, like hunting, fishing, agriculture, gardening, and crafting are often experienced both as necessary and as at least partially interesting—sometimes as enjoyable or even exciting. One could say that the reason is that they imply a "symbolic" and social meaning. But is there a human activity that is not "symbolic" and has no social meanings? The answer is: no. Even the most "necessary" and hard work suggests and indicates a network of human relations between people, groups and classes, or with nature. Indeed, when theory tries to distinguish the "symbolic" from the "necessary", it resorts to the use of the word "symbol" to suggest the existence of a surplus. It is a tacit assumption of modern economic thought that suggests this metaphysical distinction. In turn, modern economic thought is strongly indebted to

the modern metaphysical assumption of the existence of "objective" and necessary physical laws ruling human behaviour. Indeed, life is not "symbolic" (in this sense) but... real in all its relations and meanings, which always exceed the immediately "tangible" and "objective" individual things.

The skilful and successful exercise of an activity gives pleasure, and this pleasure reverberates on life itself. Life is all the more enjoyable, as Aristotle noted in the *Nicomachean Ethics,*[7] when the exercise of its activities is an "end to itself". Some types of workers—craftsmen, for example, and especially artists—know it very well. Neoclassical economics does not know how to cope with these types of "needs" and desires, whether experienced within a profession or not, in the general equilibrium theory if not by employing the same term that is used for drugs: *addiction* (See Candela & Scorcu (2004, p. 42); Zorloni (2013, p. 121 ff). See also, with explicit reference to drugs, Becker & Murphy (1988)). This approach implicitly presupposes a therapeutic, negative interpretation of desire: it is something painful or potentially dangerous, something in excess that should be removed by consuming a good that will eliminate it. The need for culture is interpreted as a perversion of desire.

A same concept is used to explain any "consumption" of art and culture. It should be noted that this gap in the theory is a serious one: nothing less than the entire field of education belongs to the domain of culture. Plato gave the name of *paideia* to the process of growth of culture, and he called Eros the *right* desire that triggers this process. In the modern age the acknowledgement of these type of "needs" has taken the form of political and juridical "rights" to education and culture, to compensate for their disavowal on the part of economics. Of course, I agree with the need to implement these rights. However, even the concept of "rights", in this context, shows just how reductive the approach to the issue actually is. A right to something is claimed when its value is denied by a dominant cultural system. The rights to culture claimed do not testify to any direct acknowledgement of the pleasure entailed by many practices, craft activities, and arts. Instead, they reveal a "negative" acknowledgement of the social discrimination faced by those who do not have access to culture and education.

This social circumstance has already been noted by several authors, from Veblen (1953[1899]) to Adorno (1998[1947]), to Bourdieu (1979). In *La distinction. Critique social du goût* the latter resorts to the concepts of "social capital", "cultural capital" and "symbolic capital" in order to analyse how culture and art can provide a location of power within the society. He captures a feature of European societies since the eighteenth century, when the economic bourgeoisie first used art and culture to legitimize itself as the ruling class. The entrepreneur, the trader or the professional enjoys the artistic "aura" and its "distinction" by participating in an "event" or buying a work of contemporary art at a dizzying price. The same is true today. In turn, cultural professionals ("intellectuals") and artists—if socially acknowledged—continue to enjoy the same privileges of the bourgeoisie. This is all quite true. I wish to note, however, that this analysis remains bound to a modern

[7] See above, note 2.

utilitarian prejudice. The fundamental heuristic use of the word "capital" betrays a conviction that human practices are essentially aimed—whether consciously or not—towards the attainment of positions of power. There is some truth to this. But the truth does not concern so much "power", as the fact that no one likes to be alone and everyone wants to be well received. And so, this is not the whole truth. While it is easy to understand how the "consumption" of art can conceal an interest in social distinction on the part of occasional, passive or superficial users, to what extent does this interpretation fit the actions of those who are deeply engaged in culture and art? It suggests the reduction of artistic or cultural practices to the incomplete and fundamentally *false* representation of an interest, in a game of positioning within force lines governed by a power system. It is like saying that anyone who studies, or practices an art, does so as an effort, with the purpose of making up for this effort, and even attaining a surplus, through her/his future social position. What we have here is the modern utilitarian horizon of "*do ut des*", although not in the sense of monetary exchanges. This interpretation conceals a movement which, although it does not appear on the glamorous surface of the media and of economic success, constitutes the vast field in which culture and art (even professionally practiced) find their vital root: the constant cultivation, by a lot of average people, of given practices throughout their lives, even when it is clear that they will gain neither social benefits from this, nor everlasting fame for themselves or their descendants.[8] Imagine giving a teenager an electric guitar and letting her/him listen to Jimi Hendrix or John McLaughlin, or giving her/him a trumpet and letting him listen to Miles Davis. Probably, she/he will not become an obsessive compulsive, omnivorous consumer (See Peterson & Rossman, 2007), but will try to imitate Hendrix or McLaughlin or Davis, to intuit and draw upon a little of their poetry. In order to do so, that instrument will be enough for the teenager throughout her/his life. At most, this young person might become curious of other instruments and spend a bit of money, but not too much: she/he might buy some used ones on eBay. She/he will try to get a computer to listen to streamed music or download it from sites such as *YouTube* or *Deezer*, and avoid buying CDs. If she/he will not be able to earn a living as a musician, she/he will practice music for her/his own pleasure, whenever she/he can, will meet others with the same passion, and build with them relationships in certain types of community.

Neither neoclassical economics nor most sociological approaches have the theoretical tools to understand the nature of those processes where the satisfaction of a desire, rather than consuming energies, increases them in proportion to their use and exercise. However this is exactly the idea behind ancient *paideia* and the desire mentioned by Plato in the *Symposium*. It is a desire that increases in proportion to its satisfaction. And this kind of desire is still acting upon us all. There is yet another ancient Greek word in the Western tradition: "energy". *Energheia* is the word that Aristotle uses to indicate a practice that is "end in itself" and which increases through its exercise. The idea still lives on through free artistic and cultural practices, although it is has been stripped of its ancient "aura".

[8] However, see Bourdieu (1994: chapter 5).

3.3 Modern Economy as an Inter- and Trans-media Field

The inclusion/exclusion opposition allowed Bourdieu to find similarities across different fields, in order to reveal how exclusions from power can be concealed by institutions and habits. I have already noted the reductive, utilitarian aspects of this concept of power. Here is a further question: is this main opposition sufficient to understand the specific features through which different force lines get the power to structure the various fields? Is it sufficient to understand whether and in what ways a certain "freedom" may emerge in some disconnections of these power lines? Foucault's concept of "bio-politics" (Foucault 2004[1978-1979]) is extremely effective in elucidating the nature of modern society. However, does this concept not offer a too univocal image of society, for those who are searching for gaps and disconnections in which to offer some resistance or alternatives? Walter Benjamin's analysis of the effects of the "media" of photography and cinema in mass society is exemplary, for me, because it does not indicate only one possibility, but a range of possibilities (what he calls the "aestheticization of politics" or "politicization of art") (See Benjamin, 2012[1935a]; Goldoni, 2013a). And so, looking for answers, I wish to borrow the notion of "medium" from McLuhan and his distinction between "content" and "message", extending it far beyond the theory of distance media to any use of bodies, thoughts or things and to the effects of these uses on individuals and society. This extension is also possible thanks to the contribution made by philosophers like by J. G. Herder, F. Hölderlin, G. W. F. Hegel, K. Marx, M. Heidegger, W. Benjamin, G. Débord, T. Watsuji; of geographers like A. Berque, A. J. Scott; of sociologists like E. Durkheim, H. Lefebvre.[9]

First, I wish to question the division between means of communication and means of production. Each use of things or production of things is a *communication*

[9] Herder conceived of life as a human relationship with the environment or nature as one inseparable unity, such that it is impossible to draw a line between what is human and what is natural. In this way, nature cannot be conceived only objectively, nor human action only subjectively. The relationship between human and nature is manifested in signs that can be brought to "expression" through various "organs". In the case of men, organs are those of their bodies in every respect, and "language". Each organ is a "medium" (Herder (1994[1787]), pp. 703, 710, 770–774; Herder (1989[1784–91]), book 3 chapters 3, 4, book 5 chapters 2, 3). This theory had a major influence on Goethe and his conception of the metamorphic relationship between man and nature, on Hölderlin's concept of "spirit" (as the result of the elaboration of the "signs" of the world or of a "sphere" through different organs, like language: see Hölderlin (1993[1797]); Goldoni, (2013a)), and on Hegel's theory of "spirit" (through logical dialectic). From here, the concept of medium was developed into the notion of "means of production" by Marx. Benjamin (2012[1935a]) widened the concept of "means of production" to include photography and the cinema. Débord (1992[1967]) extended the concept of "fetishism" to the whole society. The notion of instrument plays an important role in Heidegger's *Sein und Zeit* (1986[1927]) and in his later investigations of "technology" (Heidegger (1954)). In turn, Berque (2009) developed his theory of the "milieu" partly by engaging with Heidegger and Tetsuro Watsuji (2011), whose theory is explicitly indebted to Herder. See also Debray (1991). These concepts may be viewed in relation to McLuhan's notion of medium, and combined with it.

and, conversely, each *communication* "produces" something according to its medium (its "message"), insofar as it has effects on the organization of time, space, perception, imagination, and desire. Human bodies produce space and time through voices, gestures, actions, language, working, eating, traveling with one's hands or legs, and by many other means. Earth, air, water, food; rooms, walls, doors, roads etc. engender exclusions and passages, organize time and space. They thus produce and communicate at the same time: close media like the house, the store, the workplace, the hotel, the street, the square; the landscape, the city, the metropolis[10]; "distance" media like the market, money, print, firearms, industrial production, railways, cars, airplanes, missiles, drones. . .; the "new" media telephone, radio, TV, Internet. The economy lives through the messages of these (and other) media.

McLuhan's distinction between *content* and *message* (McLuhan, 1994[1964]) is crucial. This distinction allows us to understand how different media produce force lines along which life, desires and their energy can flow easily, while other directions are barred. These differences *cannot* be understood as long as the effects of the media are seen as being governed by their *content*. The use of a medium can conceal its message (its effects on the organization of space, time, desires, projects and practices) since its use (e.g. that of the mobile phone) seems to be justified by an increased efficiency of its content. But, in this case, its content is another, older medium: speech. Speech, as a medium, acts face to face, producing answers in the context of a conversation that takes place through a physical presence. The mobile phone operates anywhere, regardless of the actual location of the speaker, and suggests a faster mode of communication. Indeed, the "messages" of the two media work differently, and influence the content: mobile phone conversations—often had standing, in a public space—tend to be shorter, more synthetic, less analytically explanatory, and without complex narrative features. Often, there is no awareness of the specific effect of the "message" of a medium on its content. In addition, the more efficiently the "new" medium works, the more it induces a hypnosis, a narcissist "narcosis" with related habits, that will conceal the effect of the message.

Having said this, I wish to make the following brief observations.

There are dominant media in every society, in every age. In the Western modern age, the dominant media were money, firearms, and the press. In the contemporary globalized world the dominant media are money, information and especially the Internet, and the new technological military means of deterrence. Briefly:

(A) If the content of an exchange is the use value of a thing, its "message" is: "let us negotiate!". If the content of money is negotiation, its message is: "everything is negotiable". As the nature of the message is pragmatic—that is: I know that I *can* do something the moment in which I prove to *actually be able* to do it—it implies that "I can" becomes "I have to". Furthermore, if I *do not*, others will do it, threatening to deprive me of my possibilities—this being so-called

[10] See e. g. Simmel (1903); Walter Benjamin's essay on Paris (2011[1935b]) ; Lefebvre (1970); Scott (2008).

competition—and so "I *have to* do it". Therefore, the "message" of money is its power of negotiating without limits: it does not tolerate quantitative restrictions. This is what Marx noted by arguing that the meaning of money lies in making more money: D–D'. In other terms: capitalism *frees its message from its content*.

(B) If the content of the telephone is speech, its message is the power of speaking at any moment, at a distance. The message of the mobile phone is that everyone can speak anywhere. If the content of the Internet is a constellation of media (TV, cinema, music, writing with mobile characters, (virtual) money), the message is:

"you can see, show, listen to, make music, write, buy, sell a lot of things (the offer goes increasingly faster beyond the present quantitative and qualitative boundaries) in any part of the world, in every moment."

The impact of the interaction between money, the mobile phone and the Internet on the economy is quite evident (See also Logan, 2010, 116 ff., 235 ff.). Their combined message is:

"I can (I have to) increase the disposability of everything in any part of the world, at any moment!"

This is the essence of power over things, or of what Heidegger called the essence of technology (Heidegger, 1954). This way, money develops at the highest level an extra-national space and time, while it becomes more and more virtual. That is the current *financial capitalism*.

The intertwining of money and digital industries is not only an obvious effect of their great profits, but also a result and sign of an analogous tendency, within each of these media, towards an unlimited power over time and space.

(C) So-called information seeks to legitimate this power. If the content of the information is the news, the message of the TV or, somehow, even of the Internet is:

"What reaches the screen is true".

The "share" belongs to the structure of the truth of the medium.

The fact that economic power successfully buys information is not only the result of an obvious calculation, but the sign and effect of a deep sympathy between the two media.

These love affairs, marriages or even arranged marriages between different media happen by means of elective affinities, osmotic shifts of function from one domain to another.

Economics speaks of "externalities". I would rather speak of transmediality.

(D) The trans-national armed police control of conflicts (See Schmitt, 1974) requires money, the Internet and so-called information in order to gain legitimacy. In turn, money, the Internet and information require a trans-national armed police to govern the conflicts they produce. Their combined message is:

"What is profitable is right—it is not profitable to disagree."

(E) The dominant politics is the result of the ways in which these media cooperate: their combinations build geometries of convergent and partially intersecting surfaces, where the energies of individuals and societies are brought to flow. These surfaces become walls very difficult to cross for those who go against the flow. However, the media cannot work without zones of reciprocal friction and conflict.

3.4 The Persistence of Traditions: Conflicts

There is an obvious conflict between the political form of representative democracy—that is: between the "parliaments" based on the *old* medium of face-to-face dialogue and on personal accountability—and the fact that political and economic decisions respond to a different logic that ignores dialogic exchange and its material conditions. Political dialogue becomes a content of television, which deprives it of meaning for the benefit of own message, which is:

> "the very fact of being here justifies me, whatever I might say."

The conflict affects not only the relationship between economics and national and international politics, but also the relationship between economy and ways of life. The medium of political "dialogue" reflects in part—if only abstractly—proximate dialogic relations. The sense of justice that is worked out in a group or in a small community can find its projection—albeit an abstract one—in representative democracy. But the forces activated by the money-Internet pair make a clear break with tradition, and produce an unbridgeable gulf. Particularly evident, even in Europe, are the great transformations of the political governance that are becoming increasingly linked with this economy and less and less connected with parliaments. The growing popular distrust towards the capacity of traditional political institutions to govern the economy democratically is under everyone's eyes.

Misunderstanding and conflicts arise from this coexistence of old and new media. However, many old media have endured and it is unlikely that they will easily disappear: this is the case with the routes leading to neighbouring places on foot or by bicycle, motorbike, car, or boat. Paths, rivers, lakes, lagoons and seas, urban streets, squares, shops, cafés and tea houses: these "media" ensure the possibility of combining distance relationships and proximity, mediated also by a slow pace.

This balance between remoteness and proximity was the foundation of ancient life, of its ethics, politics of "friendships",[11] and political thought. In a sense, it was also the basis of its Medieval and, later, modern (and more subjective) repetition. That ethos has remained embedded in the Mediterranean and—with significant differences—in the continental "landscapes" of Europe, with their nature, communication routes, towns and villages, with their ancient historic centres and meeting

[11] Friendship was an important concept and fundamental practice in Athenian politics, as reflected in the works of Plato and Aristotle. See also Danani (2003).

places. These material conditions of human and environmental relations nourished the Renaissance European ideas of the dignity of life, of mutual respect and solidarity, of the right to education and freedom, and of politics based on dialogue and debate. All "democratic" practices have been marked by these features, while "mass" industrial production, mass armies, and the mass "public opinion", press, radio and phone prevailed over the old "media" and their life styles, setting the conditions for both democratic revolutions and totalitarian politics.

Conflicts and ambivalences also occur in the new media, as we can see in the different uses of the Internet. The battle for free and open information is absolutely necessary, although we must realize that, currently, the weight of "universal" information is more on the side of mass manipulation than on the side of liberation.[12]

4 Creativity in Context

4.1 European Policies for Creativity

May the acknowledgement of the decisive role of "creative" milieus be a counterweight to the lack of democracy produced by financial capitalism? Could it be so thanks to a model of economic democracy in which individual creativity can produce a participatory, intercultural environment? This seems to be a possibility indicated by the European Lisbon Strategies. They are no scientific literature but policy documents—with all the rhetorical and ideological burdens this implies, mixed with reasonable considerations on knowledge-based economy—that outline the policies for creativity actually practiced by the European Commission. They are also a source of inspiration for national and local policies, and therefore have an impact on our lives. Precisely for this reason it is interesting to devote some words about them in the context of this discussion. I will give a few quotations.

In the *Green Paper* (2010), *Unlocking the potential of cultural and creative industries* a bold philosophical statement is made:

> "The main assumption here is that creativity is not exclusively an innate gift. Everyone is creative in some way or another, and can learn to use his/her creative potential" (p. 18)

The need to implement this principle by means of these policies is thus explained in the Lisbon Strategy Evaluation Document (2010)

[12] The use of the Internet, despite its great (see Castells (2009)) and not yet totally explored potential, is not sufficient to guarantee democracy. The use of information via the Internet may collide with other traditional "means" of control over bodies and minds, such as religious speech and practice, or the military control of a territory, as has been the case—and still is—in the aftermath of the "Arab Spring", particularly in Egypt. Furthermore, people on the Internet are not always accountable for their messages. The emergence or latency of news also depend on computer skills that not everyone possesses or on secret information.

> "The original Lisbon Strategy was launched in 2000 as a response to the challenges of globalisation and ageing. The European Council defined the objective of the strategy for the EU "to become the most dynamic and competitive knowledge-based economy in the world by 2010 capable of sustainable economic growth with more and better jobs and greater social cohesion and respect for the environment"..." (p. 2)

The *Green Paper* then states:

> "In the recent decades the world has been moving at a faster pace. For Europe and other parts of the world, the rapid roll-out of new technologies and increased globalisation has meant a striking shift away from traditional manufacturing towards services and innovation. Factory floors are progressively being replaced by creative communities whose raw material is their ability to imagine, create and innovate. In this new digital economy, immaterial value increasingly determines material value, as consumers are looking for new and enriching "experiences". The ability to create social experiences and networking is now a factor of competitiveness. If Europe wants to remain competitive in this changing global environment, it needs to put in place the right conditions for creativity and innovation to flourish in a new entrepreneurial culture..." (p. 2)

The arts are said to play a crucial role in overcoming the boundaries between production and consumption:

> "Access to and participation in the arts are constantly changing shape while the frontiers between creators and consumers are blurred with the development of participatory technologies such as blogs, wikis etc.
>
> Subcultures are emerging that result in a multi-disciplinary mix of traditional and new artistic forms and content. While traditional institutions hold a special importance for accessing cultural services, there is a need to recognise and support new ways of experiencing culture, which plant the seeds of curiosity, analysis and demystification for a lifelong relationship with culture" (pp. 8-9)
>
> "Art and culture have a unique capacity to create green jobs, to raise awareness, challenge social habits and promote behavioural shifts in our societies, including our general attitude to nature. They can also open new avenues to tackle the international dimension of such issues" (p. 18)
>
> "A more intensive, systematic, and wide-ranging collaboration between the arts, academic and scientific institutions should be promoted, as well as private–public initiatives to support artist-led experimentation" (p. 9)

This goes in the direction of enhancing cultural differences:

> "the mobility of artists, cultural practitioners and works are also essential for the circulation of ideas across linguistic or national borders, and giving to all a wider access to cultural diversity" (p. 15)
>
> "... enhancing the capacities of developing countries in order to protect and promote the diversity of cultural expressions" (p. 16).

The policies focus on local and diffused creativity. Emphasis is placed on SMEs:

> "Micro, small and medium-sized enterprises (SMEs) are the engine of the European economy."[13]

"Clusters" and "meeting places" are "laboratories", seen as driving forces for creative innovation" (see p. 13)

[13] See *The new SME definition* by the European Commission, available on the web.

> "Creativity and innovation have a strong and distinctive regional dimension. Policies and support instruments need to be determined locally, building on local specificities and assets and tapping into local resources ("place-based development approach"). At the same time, effective coordination between different policy and administration levels is essential for success. Impact assessment and evaluation tools should be built into development strategies to support the design of evidence-based policies" (p. 14)

From the contributions in the present text it is clear that the notion of "cluster" is more reductive than that of "milieu".[14] The following statement, while foreseeing positive effects on the whole economy, recognizes that the "mechanism" has not been well documented (= understood?):

> "Although the specific mechanisms by which this occurs are not yet well documented, it seems that creative innovation services provided by CCIs[15] are inputs to innovative activities by other enterprises and organisations in the broader economy…" (p. 17)

These policies promise to give back to individuals that freedom of invention and experience that the economic "mass" policies of the 20th century allegedly failed to grant. The meanings of creativity that are referred to in the economic field nowadays indirectly derive from elements of European Romantic thought, as interpreted in North America by A. N. Whitehead (Whitehead, 2010[1927–1928]. See also Pessato, 2013). We can find some traces of them in recent texts by Florida (2011) and Landry (2006). They are consistent with knowledge-based management (Nonaka, 1991). Some of these ideas influenced the Lib-Lab policies of Tony Blair, and even the European *Green Paper*, through concepts which are ambiguously situated at the crossroads between neo-liberal and libertarian values (See Giddens, 1991; Leadbeater, 1999; McRobbie 2001).

[14] The difference between the cluster and other forms of spatial agglomeration (such as milieus and industrial districts) lies in the different nature of the agglomeration economies involved: technical-economic in the first case and ones of intangible nature in the second, such as trust, cooperation, collective learning, etc. In other words, the cluster concept has a spatial/functional matrix, the concept of milieu has a local (place)/structural array.

[15] *CCIs* = Cultural and Creative Industries. "Cultural industries" are those industries producing and distributing goods or services which at the time they are developed are considered to have a specific attribute, use or purpose which embodies or conveys cultural expressions, irrespective of the commercial value they may have. Besides the traditional arts sectors (performing arts, visual arts, cultural heritage – including the public sector), they include film, DVD and video, television and radio, video games, new media, music, books and press. This concept is defined in relation to cultural expressions in the context of the 2005 UNESCO Convention on the protection and promotion of the diversity of cultural expressions. "Creative industries" are those industries which use culture as an input and have a cultural dimension, although their outputs are mainly functional. They include architecture and design, which integrate creative elements into wider processes, as well as subsectors such as graphic design, fashion design or advertising (*Green Paper*, pp. 5–6).

4.2 A Creative Atmosphere

In this section I will be discussing what I might call "macro-atmospheres"—by analogy with "macro economy" and "political economy".[16]

The creative "air" that one can "breathe" in a "district" or in a "milieu", its "atmosphere",[17] is attractive and contagious. It can be quite euphoric. It certainly awakens and directs energies, and this has effects on social relations and the economy in general. A widespread atmosphere of this kind is no doubt the effect of certain "media", and of the relationships that they foster. It is not only an effect, but also a marker. Is it a clear, exhaustive index? In how many different ways, with different and even opposite meanings, and in how many structurally different circumstances may a creative atmosphere emerge?[18]

The more strictly economic reasons for the emergence of the concept of creativity are discussed in another chapter of this book (Chapter "A Hermeneutic Approach to the Knowledge Economy" by Cusinato). Here I am interested in the formation of an imagery and of lifestyles which—as should be clear from the previous section—are immanent to, rather than superimposed upon, the "messages" of the contemporary economy and its "media".

The notion of creativity was extended between the nineteenth and twentieth century from art to society and politics. While the Romantic artist was considered a sort of spiritual guide for his people, the reverse transition also occurred, so that politics was came to be regarded as a kind of art: the art of creating new peoples, a new humanity. It is not by chance that the word "avant-garde" was shared by the arts and politics, and that artistic avant-gardes such as Futurism recognized an affinity with supposedly avant-garde political movements such as Italian Fascism. Benjamin soon spotted the use of the concept of creativity by the Fascists and Nazis as a means of "aestheticizing" politics, building euphoric mass situations through the enveloping "aura" emanating from the leader. The euphoria of this creativity was expressed in terms of the enhancement of technological power, down to its extreme expression: war (Benjamin, 2012[1935a]) (from this point of view, I might observe that this fetishism of technology in the Nazi version pursued—very rapidly and hierarchically—the same identity of creation and destruction that Schumpeter identified in capitalism, where it was marked by much slower, discontinuous and pluralistically negotiated phases (Schumpeter, 1942, chapter VII)). Now, the project of enhancing individual creativity in the new economy *might seem* almost a

[16] This is related to Böhme's aim of using the concept of "atmosphere" for a "Kritik der ästhetischen Ökonomie": see Böhme (1993 p. 116), Böhme (2013, pp. 43–46 and 49–65).

[17] Marshall & Marshall (1889, p. 53) : it is the atmosphere of "districts" of small factories. The concept of "atmosphere" plays an important role in the text by Philippopoulos-Mihalopoulos in chapter "Milieu, Territory, Atmosphere: New Spaces of Knowledge".

[18] By contrast to the uniqueness of the index which Böhme (2003, p. 118) attributes to an atmosphere, the current use of "creativity" is in itself vague. Many forms of contagious enthusiasm, such as adolescents' keen interest in the use of digital devices, are easily recognizable in "creativity": which is the message? Is it unequivocal? Furthermore: we could recognize a lot of 'creativity' even in various destructive or even criminal activities. . .

different realization of the Neo-Platonist project of the Renaissance, taken up by Leibnitz and by the Romantics, and according to which each individual is a microcosm, i.e. a partial but consubstantial reflection of the macrocosm. The Romantics took up the idea, thinking that God—or nature—was immanent in every individual, and that especially the "creative" par excellence, the artist, embodies the microcosm. And so someone can ask: '*Everyone is Creative*'. *Artists as Pioneers of the New Economy?* (McRobbie, 2001).

4.3 A Real Possibility or an Aestheticisation of the Economy? Post-proletarians in a Euphoric Atmosphere . . .

I cannot avoid observing that what has not been made clear by the Lisbon Strategies is what they mean by culture and art, and what their approach to creativity might be. A UNESCO research shows how the "strategies" have been undertaken without previously establishing what "good cultural participation" is, and when it actually occurs.[19] In such an ambiguous context, the identification of shared parameters through which to evaluate the qualitative achievements of those policies is still missing. As a consequence, there is still no clear and shared method for evaluating the economic effects of the "cultural" and "creative" industries. [20]

Furthermore, the predicted job growth has not occurred, if not in fashion, design and especially digital technologies sectors—which were in any case expected to grow even without these policies. The *Evaluation* of the Lisbon Strategies admitted that their objectives had not been achieved.[21] The present global crisis demonstrates that the art/culture-creativity-economic innovation-growth sequence cannot be taken for granted. Unemployment rates are still growing.[22] The *Evaluation* stated that the cause of the failure to achieve the goals was the crisis.[23] What a discovery on the part of the European economic "strategists"! Were the "systemic risk of the financial markets, speculative bubbles (eg. in housing markets), and credit-driven consumerism" (even in relation to products of the so-called cultural and creative

[19] See *Measuring cultural participation*. 2009, *Handbook* 2 published in 2012 by UNESCO Institute for Statistics, on web. About the conceptual tools for evaluation see also Goldoni (2012a).

[20] See *Measuring the economic contribution of cultural industries. A review and assessment of current methodological approaches*, 2009, Handbook n. 1 Published in 2012 by UNESCO Institute for Statistics, available on the web.

[21] *Evaluation* pp. 3–4.

[22] *Evaluation*, p. 17. But what has happened to "flexicurity"? "... the success of the Flexicurity concept represents the ability of Lisbon to stimulate and frame policy debates and generate mutually acceptable solutions even though in many cases relevant measures still need to be implemented" (*Evaluation*, p. 3). As far as I know, there is no trace of "flexicurity" in Europe, except in Denmark (see Auer & Cazes (2003); Egger & Sengenberger (2003) with "light and shadows" (Amoroso)), and, for the artists, in some countries such as France, Belgium, Germany...

[23] *Evaluation*, p. 4.

industries and the art market[24]) and other such features of neo-liberal economic policy not under the eyes of these strategists?

If creativity is considered in merely formal terms, in terms of fluidity and speed of change for instance, without questioning its rootedness in a given way of life, milieu or "landscape",[25] and hence its effects on this life and relationships, without wondering whether its release of energies is productive or destructive—in short, without questioning its ethical implications—then creativity produces a euphoria that can be shared, but is essentially narcissistic. People invest energy in order to see themselves reflected as being ... energetic. This is the emerging message of the current apparatus of financial capitalism intertwined with the digital industries and digital information. Already long ago Lyotard, in a discussion with Deleuze, came up with the amusing but perfectly apt expression "*capitalisme énergoumène*" (Lyotard, 1973). Is this energy flow really democratic? Digital devices produce a new form of individuality, entering and modifying the intimacy of the personal mind. They *construct* individuals. However, this does not mean that individuals can successfully accomplish personal projects. Is it realistic to think that some new idea, born in a creative milieu, can change the prevailing lines of force by itself? Or is it more realistic to think that only those inventions that facilitate or increase these lines of force will be accepted?

Over 10 years ago A. McRobbie showed that these policies help big fashion companies, while the majority of young "creatives" are reduced to an economic condition of poverty and to subordinate roles that do not have anything creative about them. A rhetoric prevails that abuses of the glamor of the "artist":

> "Labour is, 'self-employment', set up your own business, be free to do your own thing. Live and work like an artist. And creative work is particularly appealing to youth because of the emphasis on uncovering talent, because of their proximity to the kinds of fields flagged up as already successful i.e. popular music, film, art, writing, acting, fashion, graphic design and so on" (McRobbie, 2001).

Scott (2008) has noted how often the policies for the knowledge-based economy, the culture economy and the implementation of the idea of "creative cities" produce new differences in wealth and power among élites and a multitude of underpaid workers, or unemployed. Inequalitities in job markets and marginalisation as effects of the creative industries are analyzed also by David Hesmondhalgh (Hesmondhalgh 2013, p. 17 ff, p. 228 ff).

It seems as though the subject of creativity is now mostly used to produce competition among the poorest, to further social disintegration and lower remuneration. In this sense, the "aura" of creativity will be enough to make those with precarious and poorly paid but vaguely "creative" jobs (one can always be assigned the task of inventing something!) believe they are in a glamorous position. And so

[24] See Ben Lewis's documentary *The Great Contemporary Art Bubble*, whose trailer is on *YouTube*.

[25] On this meaning of the word "landscape" see also Chapter "A Hermeneutic Approach to the Knowledge Economy" by Cusinato.

in the modern imagery continually recreated by the art market, "artists" perform a function far more important than the enrichment of a few artists, art dealers and auction houses: that of maintaining the system. By contrast, the unemployed can always be told that they are not creative enough. In this sense, the "creative" (the entrepreneur of himself) is the one who, unlike the old worker, has to invent everything: there are no longer any means of production for her/him. She/he no longer even has a job. The "creative" is the post-proletarian in a euphoric atmosphere. This euphoric atmosphere expresses the aestheticisation of life and of the economy (See Boltanski & Chiapello, 2005; Goldoni, 2013b; Reckwitz, 2013)—a phenomenon that stems from the fact that commodities create their own exhibition space: not only everything, but everyone is in a shop window. Well beyond the aestheticisation of politics, the economy creates individuals within a pervasively ambiguous atmosphere.

However, this is not an absolute claim I am making. The fact that the economy has the need to resort to creativity is not an obvious sign, but an ambiguous one, since the existence of widespread creativity is also the reflection of a profound change, whereby it becomes necessary to seize the opportunity to develop one's potential in responsible, supportive and non-narcissistic ways.[26]

Perhaps too the implementation of *Creative Europe 2020* will work better, hopefully distinguishing between the cultural and artistic development of people and strictly monetary gain, between neo-liberal and libertarian democratic perspectives.

5 In What Sense Is This Approach a Philosophical One?

5.1 Uncertainty, Ambivalence, Possibility

In the preceding pages I have spoken of economy as an inter- and trans-medial territory, but also as an intertwining of interpreted and interpretative practices. The main philosophical movement focusing on interpretation is called "hermeneutics". The complexity of inter- and trans-media relations can be understood through a hermeneutic approach (See chapter "A Hermeneutic Approach to the Knowledge Economy" by Cusinato), if the notion of "hermeneutics" is understood in a large sense—no less broadly than the term "medium" is to be understood, when compared to the narrower sense strictly derived from McLuhan.

The broader sense in which I propose to use this kind of "hermeneutics" makes it possible to avoid some of the criticism levelled against certain problematic aspects

[26] These observations show that the understanding of what may be perceived as a euphoric, artistic and creative climate requires an investigation that moves beyond its "aesthetic" "perception": since this may be an ambiguous "symptom" of the media that make up the context and express themselves through that "atmosphere". Thus, in order to unambiguously understand the context, a deeper analysis is required, able to recognize the specific "messages" of the media expressing that atmosphere.

of the theories known by that name. For instance, certain works by Heidegger, Gadamer, Ricoeur overemphasize (verbal) language.[27] Against this overemphasis I might recall that there are modes of "tacit", non-explicit knowledge (Gallo, 2013; Nonaka, 1991). Crafts, non-verbal arts, also mostly operate through this kind of tacit, non-explicit knowledge. Media such as money, weapons, the press, phone, radio, TV and Internet, or roads and cities, or musical instruments, food and clothing, work "tacitly", that is: their messages have effects on our perception and organization of time, space, sense perception and relations thanks to the specific features of their material connections. The fact that we can (and often must) talk about this, means that we—as humans—live in verbal world contexts, but it does not mean that acts of awareness always arise in a verbal manner and thanks to a verbal explication or elaboration. For example, to *see* or *hear* something as something in a drawing, a sound, or a piece of music is a form of "understanding" (*Verstehen*) or "interpretation" (*Deutung*)[28] and it is a precondition for possible, but not necessary, elaboration, e.g. through further drawings or sounds and not necessarily by means of a verbally explicit interpretation. Do I *prefer* a certain kind of music? This preference is a step towards what may become a more conscious choice, although this choice does not necessarily need to be verbally argued. It is also possible that I become aware of the fact that it depends on some listening I have made in the past, even without having to assign verbal language a *decisive* function in relation to either my preference or my awareness: a remembrance of *that* music while I am listening/playing *this one* is enough. And so on. Uses and preferences that are not made entirely consciously can be understood (*verstanden*) and even interpreted (*gedeutet*) and worked out by non-verbal acts of awareness. In this sense, it is necessary to integrate hermeneutics with an enlarged theory about "media" and their messages, which "trace"[29] memories, repetitions, the possibility of analogies, transgressions, and inventions. They form the "habits", the force-fields, the inter- and trans-media territories; they establish perceptions, ways of imagining things, desires, understandings, conceptualizations, and "schematizations" of the "taste" of which Adorno speaks in *Kultur Industrie* (Adorno, 1998[1947], pp. 144–146), yet far beyond his analysis. They produce—by means of their messages and even without words—images and narratives in which and through which the contingent world is represented. For example, so-called "city branding" is a rhetorical practice the effectiveness of which depends not only on verbal narration, but especially on the convergence between an

[27] See e.g. Derrida (1972, pp. 19–20), Goldoni (2003, pp. 71–96). Also: "In each hermeneutic discipline, interpretation is the hinge between linguistic and non-linguistic, between language and lived experience (of whatever kind)" (Ricoeur, 2004, p. 64) (quoted also by Cusinato in Chapter "A Hermeneutic Approach to the Knowledge Economy").

[28] I draw upon the terms *Verstehen*, *Deutung* and *Auslegung* used by Heidegger in *Sein und Zeit* (1986[1927], §§ 31–44), as well as the terms *sehen*, *hören, deuten* and *verstehen* used by Wittgenstein in the *Philosophische Untersuchungen* (see Wittgenstein (1984[1949–1950], part I, §§ 522-35, part II, XI). See also Goldoni (2007)) as a background for my observations. See also Cometti (2010); Rorty (1991).

[29] They are "writings" in a sense near to the by Derrida's notion of writing (Derrida, 1967).

economic message and the power of visual communication: thus, seductive narrations arise.[30]

So, the real issue about "hermeneutics" is a certain overestimation of language on the part of some of its major exponents. If hermeneutics is understood in that sense, then it should be abandoned. But on the other hand, hermeneutics still has something to say about the finitude of existence and the degree of indeterminacy it possesses, as well as the fact that awareness always comes late. As language, thought, arts, crafts and all forms of tool-making or using the body give different "expressions" to life, it is impossible to draw a boundary, defined once and for all, between nature and culture and, more in general, between choices and habits (as a second nature). When I ask where the boundary is, the question arises too late: when language and thought and other media and practices are already at work. In an absolute sense, the question is unanswerable. In a relative sense, the question may be understood in a specific context and contingently, in order to gain awareness of some "genealogies"[31] and/or conditionings. For example, I am aware that I have two hands in those contexts in which I use them for catching, stroking, working, writing, swimming, playing, being at rest, feeling pain, or not being able to use them[32]; or I can recognize a conditioning, which has become a habit, at a time when I encounter a different way of living, with its complex and not exclusively verbal features. A theoretical consequence of this existential circumstance is that it is impossible to *demonstrate* that human actions are absolutely determined. Rather, one can *experience* that constraints are often not unambiguous, but are marked by shifts and areas of uncertainty. That is exactly what I meant when suggesting that "media" provide as much of a conditioning as conflicting tendencies and, thus, partly undetermined contexts, in which to play out different possibilities.

I think that we need to grasp the constraints as well the conflicts and the possibilities, in order to achieve the highest possible degree of contingent liberation. In hermeneutics, ethics is even more important than interpretation. Interpretation, for Heidegger and Gadamer, is functional to a change in our lives through a greater awareness and liberation (See Gadamer, 1986[1960], p. 118). Space, according Heidegger's later *Zeit und Sein* (1962) is to make space (*Raum einräumen, d. h. geben*), to make space in the open (*das Offene*), to give a gift. In *Die Ende der Philosophie und die Aufgabe des Denkens* the *truth* becomes the open (*das Offene*), the *free* (*das Freie*), the *Lichtung* (Heidegger, 1969) in the sense of *erleichtern*: to lighten (See e.g. the conclusion of Heidegger & Fink, 1970). However, if my use of the word "hermeneutics" seems too generic or too extended, I could speak of "post-hermeneutics", or even better—to avoid yet another "post"—forgo all labels: probably the best choice.

[30] Urban space is recognized by organization theory as a subject and a source of "narration" and "discourse". See e.g. Czarniawska and Solli (2001).

[31] Understood in M. Foucault's sense.

[32] The way in which a physician, sports coach, family member or lover will understand and interpret my hands rests on other contextualized uses/observations.

5.2 Ambivalence in "Creativity"

I had left open the question of whether a repetition of the Neo-Platonist plan of the Renaissance, according to which each individual is a microcosm, is possible.

What appears to be dominant today can first conceal and then reveal new possibilities and consequences. The fact that a significant sector of the economy shows the need to identify with a word like "creativity" is a sign of a major change that is taking place. "Creativity" is a "symptom" of the spirit of our times, of its "tuning in" with life—but a symptom is not a diagnosis. Even if the dominant trend often seems to be unambiguous (e.g. according to the analysis made by Th. W. Adorno or M. Foucault), its dominance may hide some ambivalence, due to the conflicts between media like money, the Web, information, weapons, and other 'old' media, like personal bodies, or proximate spaces.

In this respect, the Internet constitutes an interesting field of ambivalence: on the one hand, it is used in social networking in a narcissistic way, as people try to substitute the universally legitimating stage of the press and TV with a new stage for a personal show. On the other hand, the Internet suggests a sober scepticism with regard to the supposed need for a universal stage and its alleged rules. Indeed, the effectiveness of the media depends on the beliefs that keep them in use. The effectiveness of mainstream "information" presupposes a belief in the idea of the need and possibility for a universal point of view one can identify with, in the shared spectacle of "public opinion". This belief has its ancient genealogy in faith in the existence of absolute divine judgement and its implementation by the late-antique and medieval Catholic (= universal) church, or Protestant communities, or the Orthodox church, as the historical embodiments of the Holy Spirit.[33] This implementation was influenced by ancient, medieval and early modern ways of life, with their related media. The disappearance of older ways of life undermines this current belief in the need for a universal point of view, and faith in the existence of "universal" objective information. This belief is currently sustained by the cooperation between communication, money, knowledge economy and an ideological use of creativity in order to persuade everyone to be an active and equitably positioned player on the world "stage".

This situation is, however, mobile and changeable. The economic order is socially unstable. It presupposes a belief in the division of labour and the existence of professions. But the divisions between trades rests on disappearing economic means and forms. The "profession" is an economic form inherited from a "profession of faith", as Max Weber has shown. These landmarks are vanishing, and along with them the old confidence in the economic order is wavering. We can see this decline also in the onset of a lasting, increasing unruliness in every space considered to be peripheral—from the suburbs of big cities to all the peripheries of financial and military capitalism. "Near" and "far" become less and less obvious notions. The European Middle Ages established a new privileged status for the city

[33] Agamben (2011) shows this theological genealogy of economy and government.

vis-à-vis the country; modernity did the same with the centre vis-à-vis the periphery. Modernity coincided with the exploration of the globe and the discovery of other lands and civilizations. Adventurousness is a typically modern cultural trait. Distance was more important than proximity. The three privileges (the city vis-à-vis the country, the centre vis-à-vis the periphery, far vis-à-vis near), combined, gave rise to the modern hierarchy between "capital" and "province". Now the Internet, combined with low-cost flights, is changing these values by bringing about a new mixing of near and far. Soon the "near" is going to be no less relevant than the "far". The old medium of space requires us to rethink the concepts of "near" and "far" by means of "proximity", that is the acknowledgement of the intrinsically ethical nature of each space and place.

The "proximity" in a milieu is not only metrical (even if metric distance is very influential): creative proximity is the meeting point where things evolve, where they can change in a close, even intimate field of thoughts, images, and desires: where everyone says "I think, I feel, I wish, I do". Metric proximity without an open willingness to meet otherness engenders no nearness. In this regard, there is a difference between creative practices triggered by messages obeying external rules, directed by the logic of profit or media legitimacy (and hence building up hierarchies and distance), and practices driven by a yearning for liberation, freedom, and the love of life itself. These are praxis, according to Aristotle's meaning of the term.

The initial example of music in a room can now be taken up as a simple model to understand different ways of achieving human relationships with and within space. A place is not neutral, for it is always emotionally and ethically defined: one finds oneself accepted or rejected. Affection is not only a human or an animal quality: it is immanent in every environment and landscape.[34] In the classic concert there a strict division of roles between composer, performer and listener, and space produces exclusions. Instead, in the example of free collective improvisation, space is inclusive. Here too there are roles, but they may be exchanged, due to the importance assigned to listening and the forgoing of the idea that high-quality music only comes in the form of written, complete works. What is important here is the process of mutual exchange and increase of energy. This simple musical example shows significant similarities with creative milieus. As in the case of musical interplay, in which there is no sharp separation between invention and execution, and in which roles can be played with flexibility within the group, the most significant practices in a milieu are those which come together in the moment of invention.

I can now add a further reason why I chose a musical example. Music, the sound that one hears, is a good indicator of what a society is. All traditional civilizations, such as the Greek—as Plato testifies in his own way in the *Republic* and *Laws*[35]—or the European Middle Ages and the different Ottoman, Indian, Africans cultures, among many others, have rightly assigned ethical significance to music. The

[34] On this ethical connotation of the notion of landscape, see also chapter "A Hermeneutic Approach to the Knowledge Economy" by Cusinato.

[35] Plato, Plato, *Republic* 395 c–403 c; *Laws* 653 b–660 d.

Western, globalized sound that is heard today is mostly at a loud volume. It is often listened to in a solitary way, with headphones, and in association with various other activities: driving a car, travelling by bus or subway, running, or swimming; it is experienced as the soundtrack to shopping in stores or supermarkets; or it is listened to in the search for a trance state, in disco clubs or rave parties. It seems as if people were trying to find some kind of continuity in sound that could lend identity to their own individual existences and relations with others, while these are constantly being challenged by the speed of information exchange rates and the economic conditions (See Goldoni, 2011). This sound is a tuning in, a *Stimmung*,[36] with the main messages of society. However, in these messages there are ambivalences. Therefore, *working* on sound, listening through music, is a step toward a more general awareness. The real life space becomes the place for an actual testing of possibilities and insights to be put into practice in everyday life: for policies of friendships (See Goldoni, 2012b). And this is the case with every true art.

Culture and art—partially already within a historical context that differs from that analysed by Bourdieu—no longer ensure any career or a social promotion, except for a very narrow élite. They are produced by a multitude of persons almost for free or, rather, as a means of gaining awareness of the nature of existence in a particular context. The destruction of the division of labor, of labor itself, is reducing life to a sort of pure existence, without real rights. The issue of what constitutes a "right" is now increasingly subject to negotiation. This implies a rediscovery and reinvention of the relationship of proximity, through an ethical reinterpretation of existence.

Ethics both depends and does not depend on media. Media are necessary means of expression of life itself. In this sense, ethics requires media. Ethics without media does not exist. Media create habits, addictions. Ethics constantly works for freedom from these addictions. An *ethical turn* towards space—with a free sense of gratitude towards life—is necessary, to create an open space where various media do not build up rigid hierarchies and obsessive attitudes, but can interact freely. The "centre" is here, now, in the awareness of space and relations. This is a possible, contemporary, repetition of the ancient meaning of *oikonomia*: to take care—and hence find the law, the *nomos*—of the 'house': the space and place we live in.

References

Adorno, Th. W. (1998[1947]). Kultur Industrie. Aufklärung als Massenbetrug. In: Th. W. Adorno. *Gesammelten Schriften* (Vol. 3, pp. 141–191). Darmstadt: Wissenschaftliche Buchgesellschaft.

Agamben, G. (2011). *The kingdom and the glory. For a theological genealogy of economy and government*. Redwood City, CA: Stanford University Press.

Amoroso, B. *Lights and shadows of the Danish Model*. http://www.raumplanung.tu-dortmund.de/irpud/presom/fileadmin/docs/presom/external/12th_workshop/Amoroso.pdf

[36] G. Böhme's theory of "atmospheres" is indebted to the theory of *Stimmungen* and tones developed by J. Böhme (2013, p. 163), which later also inspired Hölderlin's theory of *Stimmungen* and *Tönen* as the "spirit of a sphere": a natural-human context (Goldoni, 2013a).

Auer, P., & Cazes, S. (Eds.). (2003). *Employment stability in an age of flexibility. Evidence from industrialized countries*. Geneva: International Labour Office.
Becker, G. S., & Murphy, K. M. (1988). A theory of rational addiction. *Journal of Political Economy*, *96*(4), 675–700.
Benjamin, W. (2012[1935a]). Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit, Fünfte Fassung. In Benjamin, W. *Werke und Nachlass, Kritische Gesamtausgabe* (Vol. 16, pp. 207–250). Berlin: Suhrkamp.
Benjamin, W. (2011[1935b]). *Paris, die Hauptstadt des 19. Jahrhunderts*. In Benjamin, W. *Gesammelte Schriften* (vol. 5, I). Frankfurt a. M.: Suhrkamp.
Berque, A. (2009). *Écoumène. Introduction à l'étude des milieux humains*. Paris: Belin.
Böhme, G. (1993). Atmosphere as the fundamental concept of a new aesthetics. *Massachusetts Institute of Technology: SAGE Publications Thesis Eleven, 36*, 113–126.
Böhme, G. (2003). *Atmosphäre. Essays zur neuen Ästhetik*. Frankfurt a. M: Suhrkamp.
Boltanski, L. & Chiapello, E. (2005). *The New Spirit of Capitalism*. London: Verso.
Bourdieu, P. (1979). *La distinction. Critique social du goût*. Paris: Les Éditions de Minuit.
Bourdieu, P. (1994). *Raisons pratiques. Sur la théorie de l'action*. Paris: Les Éditions du Seuil.
Bruni, L., & Porta, P. L. (Eds.). (2006). *Felicità e libertà. Economia e benessere in prospettiva relazionale*. Milano: Angelo Guerini e Associati.
Calcagno, M. (2013). *Narrare terre di mezzo. Management arte design*. Napoli: Editoriale Scientifica.
Candela, G., & Scorcu, A. (2004). *Economia delle Arti*. Bologna: Zanichelli.
Castells, M. (2009). *Communication power*. Oxford: Oxford University Press.
Cometti, J.-P. (2010). *Qu'est-ce que le pragmatisme?* Paris: Gallimard.
Czarniawska, B., & Solli, R. (Eds.). (2001). *Organizing metropolitan space and discourse*. Malmö: Liber Ekonomi.
Danani, C. (2003). *L'amicizia degli antichi. Gadamer in dialogo con Platone e Aristotele*. Milano: Vita e Pensiero.
Débord, G. (1992[1967]). *La Societé du Spectacle*. Paris: Gallimard.
Debray, R. (1991). *Course de Médiologie Générale*. Paris: Gallimard.
Derrida, J. (1967). *De la grammatologie*. Paris: Les Éditions de Minuit.
Derrida, J. (1972). *Positions*. Paris: Les Éditions de Minuit.
Donati, P., & Solci, P. (2011). *I beni relazionali. Che cosa sono e quali effetti producono*. Torino: Bollati Boringhieri.
Egger, P., & Sengenberger, W. (2003). *Decent work in Denmark. Employment, social efficiency and economic security*. Geneva: ILO.
Florida, R. (2011). *The rise of the creative class: Revisited*. New York: Basic Books.
Foucault, M. (2004[1978–1979]). *Naissance de la Biopolitique. Cours au Collége de France 1978-1979*. Paris: Gallimard.
Gadamer, H. G. (1986[1960]). Warhrheit und Methode. In Gadamer, H. G. *Hermeneutik I*. Tübingen: Mohr.
Gallo, G. (2013). *Dall'economia alla semiologia. Saggio sulla conoscenza tacita*. Milano: Mimesis.
Giddens, A. (1991). *Modernity and self identity*. Cambridge: Polity Press.
Goldoni, D. (2003). Un 'filologo' e la Musa. Note per l'interpretazione. In M. Ruggenini & R. Dreon (Eds.), *Tra Venezia Milano e Trieste* (pp. 71–96). Padova: Il Poligrafo.
Goldoni, G. (2007). "Mein Stil gleicht schlechtem musikalischen Satz". Musique, langage et style philosophique chez Wittgenstein. In AAA TAC, *Acoustical Arts and Artifacts Technology, Aesthetics, Communication* (Vol. 1, pp. 75–85). Pisa Roma: Serra editore.
Goldoni, D. (2011). Fonoperiferie. In L. Michielon (Ed.), *La chiave invisibile. Spazio e Tempo nella filosofia della musica del XX e XXI secolo* (pp. 197–210). Mimesis: Milano.
Goldoni, D. (2012a). Cultural responsiblity. In T. Scovazzi, B. Ubertazzi, & L. Zagato (Eds.), *Il patrimonio culturale intangibile nelle sue diverse dimensioni* (pp. 319–336). Milano: Giuffrè Editore.

Goldoni, D. (2012b). Improvvisare. In R. Dreon, D. Goldoni, & R. Shusterman (Eds.), *Stili di vita* (pp. 59–91). Milano: Mimesis.
Goldoni, D. (2013a). *Gratitudine. Voci di Hölderlin*. Milano: Marinotti.
Goldoni, D. (2013b). Estetizzazione dell'economia. In P. D'Angelo, E. Franzini, G. Lombardo, & S. Tedesco (Eds.), *Costellazioni estetiche* (pp. 206–215). Milano: Guerini & Associati.
Goldoni, D. (2013c). Composizione e improvvisazione: dove sta la differenza? In *Ontologie musicali. "Aisthesis"* (Vol 3, pp. 133–153).
Green Paper. (2010). *Unlocking the potential of cultural and creative industries*. European Commission. Available online: http://eur-lex.europa.eu/legal-content/EN-IT-FR/TXT/?uri=CELEX:52010DC0183&from=EN
Hadot, P. (2005). *Philosophy as a way of life. Spiritual exercises from Socrates to Foucault, with an Introduction by A. Davidson*. London: Blackwell.
Heidegger, M. (1986[1927]). *Sein und Zeit*. Tübingen: Niemeyer.
Heidegger, M. (1954). Die Frage nach der Technik. In M. Heidegger (Ed.), *Vorträge und Aufsätze* (pp. 9–40). Pfullingen: Neske.
Heidegger, M. (1969). *Zur Sache des Denkens*. Tübingen: Niemeyer.
Heidegger, M., & Fink, E. (1970). *Heraklit*. Frankfurt a. M: Klosterman.
Herder, J. G. (1989[1784–91]). Ideen zur Philosophie der Geschichte der Menschheit. In J. G. Herder (Ed.), *Werke: in zehn Baenden* (Vol. 6). Frankfurt a. M.: Deutsche Klassiker.
Herder, J. G. (1994[1787]). Gott. Einige Gespräche. In *Werke in Zehn Bänden* (Vol. 4). Frankfurt a. M.: Deutsche Klassische Verlag.
Hesmondhalgh, D. (2013). *The cultural industries*. London: Sage.
Hölderlin, F. (1993[1797]). Fragment philosophischer Briefe. In F. Hölderlin (Ed.), *Sämtliche Werke und Briefe* (Vol. II, pp. 51–57). München: Hanser.
Kahneman, D., Diener, E., & Schwarz, N. (Eds.). (2003). *Well-being. The foundations of hedonic psychology*. New York: Russell Sage Foundation.
Kant, I. (1983[1790]). Kritik der Urteilskraft. In *Werke in Zehn Bänden* (Vol 8, 233 ff). Darmstadt: Wissenschaftliche Buchgesellschaft.
Kotler, P., Kartayaja, H., & Setiawan, I. (2010). *Marketing 3.0: From products to customers to the human spirit*. Hoboken, NJ: Wiley.
Kristeller, P. O. (1951). The modern system of the arts: A study in the history of aesthetics, Part I. *Journal of the History of Ideas, 12*(4), 496–527.
Kristeller, P. O. (1952). The modern system of the arts: A study in the history of aesthetics, part II. *Journal of the History of Ideas, 13*(1), 17–46.
Landry, C. (2006). *The art of city making*. New York: Routledge.
Leadbeater, C. (1999). *Living on thin air*. London: The New Economy, Viking.
Lefebvre, H. (1970). *La Révolution urbaine*. Paris: Gallimard.
Lisbon Strategy evaluation document of 02.02.2010. Available online: http://ec.europa.eu/europe2020/pdf/lisbon_strategy_evaluation_en.pdf
Logan, R. K. (2010). *Understanding new media. Extending Marshall McLuhan*. New York: Peter Lang.
Lyotard, J.-F. (1973). Capitalisme énergouméne. In J.-F. Lyotard (Ed.), *Des dispositifs pulsionells*. Paris: Les éditions 10/18.
Marshall, A., & Marshall, M. P. (1889). *The economics of industry*. London: Macmillan.
McLuhan, M. (1994[1964]). *Understanding media: The extensions of man*. Cambridge, MA: Massachusetts Institute of Technology Press.
McRobbie, A. (2001). *'Everyone is creative'. Artists as pioneers of the new economy?* Available online: https://www.opendemocracy.net/node/652
Nonaka, I. (1991). The knowledge creating company. *Harvard Business Review, 69*, 96–104.
Pessato, C. (2013). *Creatività. Dalle origini filosofiche all'impiego in ambito economico*. Degree thesis. Venice: Ca' Foscari.
Peterson, R. A., & Rossman, G. (2007). Changing arts audiences: Capitalizing on omnivorousness. In B. Ivey & S. Tepper (Eds.), *Engaging art: The next great transformation of America's cultural life*. New York: Routledge.

Pine, B. J., & Gilmore, J. H. (1999). *The experience economy: Work is theater & every business a stage*. Harvard: Harvard Business School.

Reckwitz. (2013). *Die Erfindung der Kreativität. Zum Prozess gesellschäftliche Ästetisierung* (Dritte Auflage). Berlin: Suhrkamp.

Ricoeur, P. (2004). *The conflict of interpretations*. London: Continuum.

Rorty, R. (1991). *Objectivity, relativism and truth. Philosophical papers I*. Cambridge: Cambridge University Press.

Schmitt, C. (1974). Der Nomos der Erde. In *Völksrecht des Jus Publicum Europaeum*. Berlin: Duncker & Humblot.

Schumpeter, J. A. (1942). *Capitalism, socialism and democracy*. New York: Harper & Brothers.

Scott, A. J. (2008). *Social economy of the metropolis: Cognitive-cultural capitalism and the global resurgence of the cities*. Oxford: Oxford University Press.

Sen, A. (2011). *The idea of justice*. Cambridge, MA: Belknap Press.

Simmel, G. (1903). Die Grosstädte und das Geistesleben. In *Die Grosstadt. Vorträge und Aufsätzte zur Städtaustellung, Jahrbuch der Gehe-Stiftung zu Dresden* (Vol. 9, pp. 185–206).

Veblen, Th. (1953[1899]). *The theory of the leisure class. An economic study of institutions*. New York: New American Library.

Watsuji, T. (2011). *Fûdo. Le milieu humain*. Paris: CNRS editions.

Whitehead A. N. (2010[1927–1928]). *Process and reality* (Gifford lectures). New York: Simon and Schuster.

Wittgenstein, L. (1984[1949–1950]). Philosophische Untersuchungen. In L. Wittgenstein (Ed.), *Werkausgabe* (Vol. 1, pp. 225–618). Frankfurt: Surkamp.

Zorloni, A. (2013). *The economics of contemporary arts. Markets, strategies and stardom*. Berlin: Springer.

Why Knowledge Is Linked to Space

Giorgio De Michelis

Abstract

This chapter wants to go back to the emergence of space and knowledge in human discourse and to their inextricable links to understand what happens to them with ICT.

In doing so, it adopts a phenomenological stance from which it emerges with great clarity that knowing is deeply grounded on space. From this viewpoint, knowledge is what links words and space coupling distinctions and sense making, so that words give sense to human actions and, conversely, actions give sense to human words. Even when it assumes highly abstract forms, knowledge cannot be liberated from its spatial ground: even when our discourse becomes abstract, in fact, it creates in metaphorical terms a new virtual space as its necessary counterpart. Knowledge is situated in space, time and human experience and it is at the level of situatedness that ICT systems can augment the capability to act and interact. Human-centered design, interaction design and situated computing are the three lessons we must combine in order to do it.

1 Introduction

We can cast the question of how knowledge is linked to space on a very concrete level. Suffice to consider how the spatial distribution of the documents containing the knowledge that interest us (in which room they are, how they are stored, how they are classified and ordered, etc.) conditions their accessibility, as well as the ability to add new documents to the existing collection. We can take a further step if we take into account 'tacit knowledge' (Nonaka & Takeuchi, 1995): the spatial distribution of the documents can be integrated with information on the location of

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people who are highly competent on the issue in hand, and the possibilities we have of interacting with them.

From this viewpoint, Information and Communication Technology (ICT) impacts this relationship on two levels: on the one hand, by creating communication channels allowing to interact at distance with other people, to access remotely documents stored in digital repositories, and finally, to tag documents and people so that searching becomes more efficient and precise; and on the other, by creating virtual spaces where such documents and people can be accessed.

It is a very pragmatic approach that, apparently, grants good results in terms of efficiency and effectiveness of knowledge management. It does not, however, work as expected, since it is unable to deal with the situatedness of human experience (Suchman, 1987). With this term we mean that every action and/or interaction we do is situated in a specific experience, where participants share the knowledge created in past actions and interactions, further conditioning them to new actions and interactions. Knowledge as a know-how, is therefore also situated in space, time and experience, and its distribution cannot be considered a problem of rationality: where a specific knowledge item should be placed and who can and/or needs to access it, are questions that do not bear single and unchanging answers.

We must not imagine, in any case, that knowledge becomes a fuzzy concept that is difficult to link to the Euclidean space where we (feel to) live our experiences. In fact, space itself should not be reduced to its Euclidean characterization, since, from a phenomenological viewpoint, it emerges in human experience exhibiting properties that cannot be reduced to uniform qualities of the external reality. Moreover, the emergence of space is strictly related with the experience of knowing, so that the complexity of knowledge is not separable form the complexity of space.

Going back to the emergence of space and knowledge in human discourse and to their inextricable links seems to me a necessary path, if we want to understand what happens to them with ICT: instead of looking at the superficial changes that are under our eyes it is more interesting to rediscover what characterizes the experience of space and knowledge beyond those that have appeared for centuries their physical limits.

The paper begins with a short foundational introduction, for continuing with a reflection about knowledge digitalization. A section on augmented places and some conclusive remarks complete it.

2 An Abridged Foundation

In his "Inoperative Community" Jean Luc Nancy (1986) affirms that 'being in the world' (*dasein*; Heidegger, 1927) is 'being with' (*mitsein*, ibidem): we live together with other people so that the community becomes'la position réelle de l'existence' (Nancy, 1986, p. 203). Introducing his book, Nancy grounds community on the existence of "a clinamen, an inclination or an inclining from one toward the other,

of one by the other, or from one to the other" (1986, p. 3). In his words, "Community is at least the clinamen of the 'individual.'" (ibid., p. 4): 'inclination' and 'clinamen' are both terms characterizing positions and movements, so that even the concept of community originates in a spatial discourse. But what links community and space is even deeper: saying that the very primary experience of being of any person involves other people, toward whom she is inclined and with whom she constitutes a community (Nancy, 1996; Agamben, 1990; Brown & Duguid, 1998; De Michelis, 2012; Esposito, 1998; Lave & Wenger, 1991, Nancy, 1986; Wenger, 1998), we affirm that its beginning is the perception of something (an entity) that is separated from herself—the other—with which she interacts and feels a trust relationship (towards which she is inclined). The distinction[1] between 'herself' and 'the other' (entity) brings forth what separates and connects them, where they are 'thrown' and co-exist: space.[2] The space, emerges, therefore, in her discourse at the very beginning of her (knowledge) experience and, as the medium of interaction between her and the other entity(ies), it will permeate it forever.

The plural, suggested as an alternative to the singular at the end of the previous paragraph, recalls that the very first distinction does not remain unique and stand-alone: other distinctions follow, posing the new problem of assembling them in a coherent way. This is not straightforward. Not only do new distinctions enable the emergence of a plurality of others, but they also question the nature of the self (sooner or later she will distinguish even her body as 'other') as well as the nature of the others entities and of the space(s) where the latter are immersed. Without trying to analyze all the steps characterizing the knowledge experience through which a person creates the world, giving sense to her life and facing the inevitable contradictions, we can recall that it involves creating abstract concepts for analyzing and categorizing entities and spaces.

New distinctions, in fact, may both further populate an interaction space that has already emerged in previous distinctions, or create new interaction spaces. A new distinction, in fact, may be incoherent in principle with previous distinctions. When this happens, it brings forth a new space where the interactions with the newly distinguished entity are situated. The growing diversity of spaces generated by knowledge experience requires that human beings analyze and categorize them, transforming the medium of distinctions itself into an object of distinction: any space is then analyzed from the point of view of its organization and of the entities populating it. Both the geometrical qualities of space and the potential for action and interaction made accessible by the entities populating it emerge at this moment

[1] We use here 'distinction' in a way that has much in common with the way Jean Piaget uses it (1964), even if we assume a more radical phenomenological viewpoint: perception and interaction are for us bound each other in an indissoluble way. We are not interested, instead, in the formal treatment of distinctions proposed, e.g., by George Spencer Brown (1972). Niklas Luhmann (2002) is also using 'distinction' in his social theory; his reference is to Spencer Brown's logical treatment of it, and, therefore, we do not need to discuss it here.

[2] The reader could ask: why not considering time at this point? Without discussing this issue, let me say that time is not a primitive concept and that its 'distinction' is not immediate.

as a way to make concrete the topological properties of the space as a medium. It is important to underline that the geometry of space does not emerge when a distinction is made, but only afterwards, when distinctions are categorized and organized: geometry is not a constitutive property of space. Rather it is a quality emerging as a means to confer coherence to our knowledge experience. But human experience is twice plural: several diverse entities populate several diverse interaction spaces and coherence is continuously broken by new distinctions caused by human actions and interactions and other events. This means that the re-organization of knowledge human beings continuously perform in order to align distinctions, is not a means for reaching complete coherence. Rather it is, per se, what they seek: what matters is leaning towards coherence, not coherence itself.

Even the geometrical characterization of space that we perform while reorganizing knowledge is a continuously renovating dynamic process. Within this process, the spaces emerging acquire geometrical qualities, reflecting the physical extension of the subject (and of the entities she distinguishes), and the Euclidean properties of her perceptions and/or interactions. But this does not avoid the fact that the spaces created in this way become incoherent. This may require that some spaces are not fully developed in geometrical terms or that new geometries are created to characterize them. What matters, in any case, is again leaning towards coherence.

Let us dedicate some more thought on how human beings face the irreducible plurality of their knowledge experience. The incoherence among distinctions emerges within the discourse human beings perform while reflecting on them: reflection on distinctions constitutes together the world where human beings live and the discourse about it. Any human interaction can be seen, therefore, as having the form of a language game (Wittgenstein, 1953) linking words to the things and beings populating a space. Emerging in the discourse of a person, an interaction space and what populates it allow her to give sense to her experience, appropriating that space.[3] The *space* where she and other human beings are thrown—space is intrinsically social!—becomes their *place*[4] (Harrison & Dourish, 1996), where they can act in accordance with their aims as well as give sense to their actions. This happens when the discourse switches from geometrical to functional language, where names and verbs characterize the things populating the place from the viewpoint of what a person can do with them, objectifying them. Giving sense and/or appropriating are performed, therefore, through the linguistic interactions of the people living together in a portion of space: the discourse continuously renovated through their conversations, continuously renovates the place where they live together and the objects populating it. This is possible because, on the

[3] The reader should note that here 'appropriation' does not pre-suppose the existence of the space that we appropriate: space emergence and its appropriation are contemporary events developing in the interplay between actions and perceptions on one part and discourse on the other.

[4] The diversity between space and place (Dourish, 2001; Harrison & Dourish, 1996) is the diversity between geometrical and functional discourse, and we should always remember that, but for extreme cases, we always oscillate between them.

one hand, their language game changes while they converse, on the other hand, beneath their place and its objects, there are a space and the things populating it that cannot be reduced to their functions and features remaining, ultimately, matters of concern open to new unexpected possibilities.[5] Appropriation is always contingent, partial and limited, and ceaselessly renewed. Any action and interaction performed in a place in accordance with its functional image, unavoidably modifies that place and imposes to its inhabitants to re-appropriate it, to renew their sense making. This is, simultaneously, a problem stressing the life of human beings but also their potential for innovation.

Why do I need such a foundational discourse in order to discuss the relationship between knowledge and space? Because within it, it emerges with great clarity that knowing is deeply grounded on space and intrinsically coupled with it. What is knowledge according to this view of human experience? Knowledge—we take into consideration here knowledge for action, in a sense that can be associated to Nonaka and colleagues work (Nonaka & Konno, 1998; Nonaka & Takeuchi, 1995)—is what links words and space coupling distinctions and sense making, so that words give sense to human actions and, conversely, actions give sense to human words. We don't need to evocate a reality out there to conceive the sense of our words: instead to look at a correspondence between words and reality, we can interpret the coupling between our discourse and our actions as the knowledge we create in our experiences. Even when it assumes highly abstract forms, knowledge cannot be liberated from its spatial ground: even when our discourse becomes abstract, in fact, it creates in metaphorical terms a new virtual space as its necessary counterpart. Knowledge is, therefore, intrinsically related with the distinctions we perform in terms of nominating and qualifying the distinguished things and characterizing their potential for interaction.

Without further developing this phenomenological account (Rorty, 1979) on knowledge and space, let me state that just as it is impossible to experience our social existence out of space, it is as impossible to escape spatial discourse. The phenomenological stance (De Michelis, 2008) adopted in these pages liberates our understanding from the idea that the appropriation of a space as our place presupposes our constitution as individuals[6]: we emerge as individuals together with the space where we are thrown and with the entities populating it. Our 'being with', in any case, projects our discourse in the social dimension: it is not by chance that language is the 'universal medium'. Again, we can avoid any naïf idea of discourse as a way for describing the world, to recognize, that language practice connects what is co-existent but irreducibly separated: conversing together we learn to associate to our common experiences the same phrasing. So space emerges in our discourse as a 'necessary condition' for our existence as social beings.

Language, as a collective medium, is what creates the conditions for sharing our experiences with the other people: the language games we play with them reflect the

[5] See: Latour and Weibel (2005), De Michelis (2014).

[6] On this point, see: Nancy (1986, 1996).

knowledge we share with them. Language is also the means through which we 'appropriate' space, transforming it in our place (Harrison & Dourish, 1996): but this 'placing' needs to be continuously renovated together with our identity and the sense of our experiences since unavoidable breakdowns dis-place the space where we live as well as put in crisis our knowledge (see, Telier et al., 2011, Chap. 7). Dis-placing and re-placing are the moves through which we shift between making sense and opening to innovation, being able to limit inconsistencies so that we can orient our practice to our aims. Knowledge experience cannot avoid reflecting this ambiguity of our spatial experience.

All what we have said up to now has relevant implications for our discourse about both space and knowledge, and, more importantly, about their mutual relations. Space emerges in our experience as the medium where we can give sense to our interactions with other entities: first, it has plural connotations, since considering it unique generates contradictions; second, all properties characterizing it in geometrical terms can not be assumed as constitutive; third, its connotations are unstable and evolve in time. Knowledge emerges in our experience, as the means through which we appropriate space(s), but appropriation is a continuously renovating process and it is always partial and incomplete.

The couple space—knowledge we have outlined in these pages is the natural medium where the 'actants' of Actor Network Theory (ANT; Latour, 2005) are immersed, but it is, also, well suited for characterizing milieus and, in particular, their spatial dimension. Let me recall, shortly, following the line of thought presented by Augusto Cusinato in his Introduction to this book (2015), Emile Durkheim theorization (1982) on social facts and milieus. Durkheim, willing to avoid a simplistic view of social facts as stemming directly from social interaction, views them related to the conditions in which social relations take place: (a) the spatial arrangement of the whole set of elements entering the social dimension (later labeled as *substratum*; Durkheim, 1898), (b) the social volume (or mass) and (c) the relational density inside the community concerned. If space, in fact, is characterized as we did above, then it emerges that, not only, we cannot reduce it to "the material support which communities use to firmly establish the system of mental categories and the configuration of social relationships" (Cusinato, 2015) but, also, we can affirm that space emergence, in its complexity and multiplicity, encompasses and justifies the creation of social volume and relational density within a community. Going back to ANT, it is clear that the network of human and non-human actors it proposes is suited to bringing forth the impossibility of abstracting communities (milieus) from their spatial arrangements. The spatial dimension of a milieu in our view is not a fixed arrangement where the community lives and creates knowledge, but, in its dynamic and manifold evolution, it is the condition for the development of social volume and relational density. Any intervention on a milieu, therefore, cannot be effective, if it does not face, primarily, it spatial dimension.

3 Knowledge and Digitalization

What happens to knowledge and space, with digital technologies? Information and Communication Technology has emerged in the twentieth century as a means for creating new media and new tools for data/information processing. Telephone, fax, e-mail, chats, etc. were multiplying the means for communicating at a distance both synchronously and asynchronously. Moreover, computers have allowed handling large amounts of data as well as to perform complex computations. But the diffusion and multiplication of media as well as the invisible integration of data/information processing modules within human-computer interactions so that machines appear capable to react to human actions in a plastic, almost 'intelligent' way, made technology always more transparent. Media and computing systems disappear (or better, look like if they had disappeared) but the space where they are situated (embedded) is irremediably changed, augmented, by them.

In this augmentation process, misplacing and replacing are multiplying their possibilities, since our image of space, on the one hand, is loosing some of its distinctive features (e.g., its Euclidean features) and, on the other hand, is becoming more plastic and flexible. For what regards the first point above, the notion of distance is progressively loosing sense: in cyberspace there are no distances, we are always together, and concepts like privacy need to be reinvented[7]; on the other hand, space changes form reacting to the actions and interactions of its inhabitants, even if it remains irreducible to their will.[8] The plasticity of augmented space allows to reframe both the practice of seclusion (I can decide to share a place with other human beings or not, at any time) and the potential for openness (whichever is the boundary of a place, I can pass through it), but it leaves human beings without a rational sharable criterion for making sense of spaces and places (human beings, in fact, invented ways to assign values to spatial positions through distances and boundaries, that become ineffective in augmented spaces). On the one hand, the physical constraints of space dissolve in augmented spaces, so that they are no longer capable to offer means for coupling movements with sense making interactions (consider how human beings have learned to use the near/far couple for indicating degrees of availability to other people); on the other hand, knowledge sharing with other human beings makes shared augmented space more crowded and therefore more confused. But augmenting a space may give to it new properties that can change our spatial sense-making.

New criteria can emerge if we listen to the lesson of situated action (De Michelis, 2007; Suchman, 1987; Winograd & Flores, 1986): we can articulate spaces and places in accordance with the different contexts where we act, with the

[7] This paper is not the right place to discuss this issue: let us take it as a reasonable hypothesis on the base of some evidences human beings share while participating in social computing systems like Facebook and Twitter.

[8] Again, without opening a discussion going beyond the scope of this paper, the reader can consider how rooms of any type are always more shaped by the information displayed on the screens hanging at their walls.

different stories we live ('stories and venues' is the metaphor inspiring the new operating system for workstations, itsme, we are developing in Milano; De Michelis, 2015a; De Michelis, Loregian, & Moderini, 2009). Misplacing and replacing can in fact be redefined as ways for, respectively, breaking the boundary of a story (and of its related place/venue) and redefining the place/venue associated to a story, after a breakdown. This new grammar for space appropriation allowing us to give sense to our lives, requires us to remember that misplacing and replacing are moves based on knowledge creation and sharing; that knowledge is what transforms a space into a place; and, finally, that misplacing reflects the 'discovery' of the irreducibility of anything to its objectification (De Michelis, 2014). After thousands of years, when the notion of space has been steady and immutable and we had no reason to reflect on it, we are now forced, for de-constructing it, to interrogate ourselves on the sense of space, and on its contribution to sense making.

The relation between space and knowledge has been also analyzed by Nonaka and Konno (1998), revisiting the concept of 'Ba': Ba is, according to the Japanese philosopher Kitaro Nishida, a shared space, which harbors meaning for emerging relationships. Ba is the space where knowledge is created through the interactions among human beings inhabiting it. According to Nonaka and Konno, Ba is not necessarily a physical space, but can be also virtual or mental, or any combination of them. The space emerging through distinctions we have introduced in the previous sections of this contribution, shares therefore its basic features with Ba and converges with it in grounding in space the creation and sharing of knowledge.

In both cases, anyway, knowledge management cannot be conceived in functional terms, since knowledge is always spreading light on something and, contemporarily, recognizing the limits of what we know about it. Assuming a phenomenological stance (De Michelis, 2008; Rorty, 1979), on the one hand, I consider the spatial organization of knowledge as constitutive of knowledge itself, since the latter emerges together with the social space where it is situated and, on the other hand, I want to show how knowledge reflects, in its irreducible multiplicity, the diverse social spaces (and aggregates) where human beings live their social experiences. In this way, we can avoid any reduction of knowledge to information as well as recognize its dynamic nature (what matters is not knowledge in itself, but the process of its creation!). Going back to milieus, it can be relevant to observe that their evolution in face of the augmentation of their places, cannot be fully captured by the changing figures of traditional sociological categories, but requires the discovery of new meaningful categories.[9]

[9] Understanding what is happening in the European cities, for example, cannot be performed only observing how the distribution of the inhabitants is changing within metropolitan areas, using the standard labor market classification. Rather it is necessary, in my opinion, to redefine the labor market in order to capture how work practice and human experience is changing.

4 Augmenting Places

What can we do to enrich our capability to manage knowledge, and to support knowledge creation and sharing? It appears immediately clear, from what we have said above, that developing systems for collecting and making information accessible is not enough. Our experiences tell us that creating repositories of information does not solve our problems with knowledge, since those repositories become frequently the problem we have to deal with.

I think that the inextricable links between knowledge and space teach us three important lessons for designing systems supporting knowledge management.

First (human-centered design), even when we are designing a specific artifact like a house, a chair or a computer, we must focus our attention on its stakeholders and on their experience, behavior and practice around that artifact. It is at this level, where we can understand that the 'thing' we are designing is a potential transformer of the space of possibilities of its stakeholders, where we use space in the rather unconventional sense outlined in the above pages, that design can fully develop its potential for innovation. For long time, we have considered human-centered design as a good practice for its being democratic, more responsive of human rights, more acceptable by users:[10] it is time that we affirm that this is still true, but, should not be disjoint from the trust that paying attention to the stakeholders increases the effectiveness of design outcomes on their practice. It is not necessary to underline that user-centeredness is particularly relevant when we deal with systems supporting knowledge management! Recently, a new buzzword has emerged in relation to the above issues: user experience design. We can take it for its clear reference to human experience, but we should remember that even when we design 'human experience', we design things that are going to populate and/or augment the space where human beings live.

Second (interaction design), design is always spatial: any new ICT based system transforms the space of possibility of action and interaction of its users as well as any new space modifies the way people access, create and share knowledge. The issue is designing, with the functions and features of the new system, new possibilities of interaction and not designing user-friendly interfaces for the functions and features of the new system. Having in mind things augmented with ICT, John Seely Brown and Paul Duguid suggested in 1994 that good design should look at their borders separating different functions or their being in use and not in use or, finally, their working correctly or not (Brown & Duguid, 1994). They claim that putting resources at those borders will allow continuity in switching among different ways of experiencing them, so that they enrich the potential of their users. I have rephrased their ideas claiming that good design should give to the system diversity and openness through continuity (De Michelis, 1998). Therefore, instead

[10] Participatory Design has been strongly influenced by a political inspiration, but today user-centered design can be redefined as a means for both respecting workers and creating more effective systems (see: Ehn, 1990; Telier et al., 2011).

of limiting design to the interfaces of new artifacts, we should enlarge our gaze to define the research agenda for ICT on the basis of the interactions we want/need to sustain.

Third (situated computing), the aim of design is creating spaces capable to place any action and interaction within its context, supporting seamless switches among contexts as well as openness of contexts. Rather than, dedicating our energies to create always more sophisticated virtual emulators of human beings and of their experiences, we should develop systems capable to transform the space where we live habilitating experiences that are not possible without them. We have called this new paradigm for the development of ICT applications *situated computing* and we are engaged in promoting it (De Michelis, 2015b). Situated computing may increase the capability of users of ICT systems to act as *bricoleurs* (Ciborra, 2002) avoiding to impose rigid procedures to their users.

5 Conclusion

This paper is just a fragment of a more comprehensive theoretical account of the spatial dimension of knowledge experience that I am developing as part of a characterization of interaction design as a new way of designing both spaces and ICT. I do not have philosophical ambitions and I work on these ideas from the viewpoint of a designer. Therefore the theoretical conceptualization will progress together with the systems it inspires.

Two are the main open questions I will pay attention to.

First, how to guide the joint design of a space and its technological support, considering both small (the screen of a tablet) and large (from buildings to cities) spaces? The aim should be to develop flexible spaces that are capable to situate their inhabitants within the stories they live. The challenge is to couple, through the new understanding of space we have outlined here, the architectural and technological design traditions, avoiding thus their simple juxtaposition.

Second, to what extent the idea of space as what separates and connects can sustain a more open conception of augmented physical spaces? The outcome of design should not be a physical space/place made flexible with ICT, but something we live as space, going beyond any reduction to the Euclidean notions. Along this perspective we can renew our understanding of the social dimension of space that social sciences have developed with concepts like the milieu.

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I hope that readers will find this text a stimulating reflection on several issues we often assume established and without questions. Enlarging the number of reflective practitioners in these years of big changes is my only objective.

References

Agamben, G. (1990). *La Comunità che viene*. Torino: Einaudi [English Translation: The coming community. Minneapolis: The University of Minnesota Press].

Brown, J. S., & Duguid, P. (1994). Borderline issues: Social and material aspects of design. *Human-Computer Interaction, 9*(1), 3–36.

Brown, J. S., & Duguid, P. (1998). Organizational learning and communities–of-practice: Toward a unified view of working, learning, and innovation. *Organization Science, 2*(1), 40–57.

Ciborra, C. (2002). *The labyrinths of information*. Oxford: Oxford University Press.

Cusinato, A. (2015). A hermeneutic approach to the knowledge economy. In A. Cusinato & A. Philippopoulos-Mihalopoulos (Eds.), *Knowledge-creating milieus in Europe: Firms, cities, territories* (pp. 97–136). Heidelberg: Springer.

De Michelis, G. (1998). *Aperto, molteplice, continuo*. Milano: Dunod Italia.

De Michelis, G. (2007). The contribution of the language-action perspective to a new foundation for design. In T. Erickson & D. W. McDonald (Eds.), *HCI remixed* (pp. 293–298). Cambridge, MA: MIT Press.

De Michelis, G. (2008). The phenomenological stance of the designer. In T. Binder, J. Loewgren, & L. Marlborg (Eds.), *(Re-)searching the Digital Bauhaus* (pp. 145–162). Berlin: Springer.

De Michelis, G. (2012). Communities of practice from a phenomenological stance: Lessons learned for IS design. In G. Viscusi, G. M. Campagnolo, & Y. Curzi (Eds.), *Phenomenology, organizational politics and IT design: The social study of information systems* (pp. 57–67). Hershey, PA: IGI global.

De Michelis, G. (2014). What design tells us about objects and things. *Design Culture*, 6(2), 187–202.

De Michelis, G. (2015a). Interaction design at itsme. In D. Randall, K. Schmidt, & V. Wulf (Eds.), *Designing socially embedded technologies in the Real World (pp. 158–173)*. Berlin: Springer.

De Michelis, G. (2015b). *Situated computing*. Aarhus: IDF. (forthcoming). In D. Randall, K. Schmiidt & V. Wulf (Eds.), *Designing socially embedded technologies in the Real World* (pp. 63–73)

De Michelis, G., Loregian, M., & Moderini, C. (2009). Itsme: Interaction design innovating workstations. *Knowledge, Technology & Policy, 22*, 71–78.

Dourish, P. (2001). *Where the action is: The foundation of embodied interaction*. Cambridge, MA: MIT Press.

Durkheim E. (1895/1982). *Le règles de la méthode sociologique*. Paris: Alcan [English translation: *The rules of the sociological method*. New York: Free Press].

Durkheim, E. (1898). Notes sur la morphologie sociale. *L'année Sociologique, 2*, 521–522.

Ehn, P. (1990). *Work-oriented design of computer artifacts*. Hillsdale, NJ: Lawrence Erlbaum.

Esposito, R. (1998). *Communitas. Origine e destino della comunità* [Communitas. Origin and destiny of community—In Italian]. Torino: Einaudi.

Harrison, S., & Dourish, P. (1996). Re-place-ing space: The role of place and space in collaborative systems. In *Proceedings of the 1996 ACM Conference on Computer Supported Cooperative Work* (pp. 67–76). New York: ACM Press.

Heidegger, M. (1927/2006). *Sein und Zeit*. Tübingen: Niemeyer [English translation: *Being and TIME*. London: SCM Press, 1962].

Latour, B. (2005). *Reassembling the social—An introduction to actor network theory*. Oxford: Oxford University Press.

Latour, B., & Weibel, P. (Eds.). (2005). *Making things public: Atmospheres of democracy*. Catalogue of the Exhibition at ZKM—Center for Art and Media—Karlsruhe, 20/03-30/10 2005. Cambridge, MA: MIT Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Luhmann, N. (2002). *Theories of distinction: Redescribing the descriptions of modernity*. Stanford, CA: Stanford University Press.

Nancy, J. L. (1986/1988/1991/1992). *La communauté désoeuvrée*. Paris: Christian Bourgois [German translation: *Die undarstellbare Gemeinschaft*. Stuttgart: Legueil, 1988; English transalation: *The Inoperative Community*. Minneapolis MN: University of Minnesota Press, 1991; Italian translation: *La comunità inoperosa*, Napoli: Cronopio, 1992].

Nancy, J. L. (1996). *Etre singulier pluriel*. Paris: Galilée.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company*. New York: Oxford University Press.

Nonaka, I., & Konno, N. (1998). The concept of "Ba': Building foundation for knowledge creation. *California Management Review, 40*(3), 40–54.

Piaget, J. (1964). Development and learning. In R. E. Ripple & V. N. Rockcastle (Eds.), *Piaget rediscovered* (pp. 7–20). Ithaca, NY: Cornell University Press.

Rorty, R. (1979). *Philosophy and the mirror of nature*. Princeton, NJ: Princeton University Press.

Spencer Brown, G. (1972). *Laws of form*. New York: Julian Press.

Suchman, L. (1987). *Plans and situated actions*. New York: Cambridge University Press.

Telier, A., Binder, T., De Michelis, G., Ehn, P., Jacucci, G., Linde, P., et al. (2011). *Design things*. Cambridge, MA: MIT Press*, to appear*.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. New York: Cambridge University Press.

Winograd, T., & Flores, F. (1986). *Understanding computers and cognition—A new foundation for design*. Norwood, NJ: Ablex.

Wittgenstein, L. (1953). *Philosophische Untersuchungen* [With English Translation, Philosophical investigations]. Oxford: Basil Blackwell.

The Firm as a Knowledge-Creating Milieu: The Role of the ICT

Carla Simone

Abstract

This chapter concerns the interplay between the Information and Communication Technology and the collaboration mechanisms supporting knowledge creation, as investigated within disciplines like Computer Supported Cooperative Work and Human Computer Interaction. The chapter proposes three interrelated ways to characterize the spatial substratum of the firm's milieu: the physical and the virtual space; its local and the global dimension; and finally the kinds of artifacts that populate this space; then, it discusses the technology as a key element of the milieu by considering information systems and collaboration technologies. The conclusions claim that the technology should be used to manage the complexity of the target reality and not as a means to introduce simplifications for sake of a misinterpreted efficiency at the organizational and technological levels.

1 Introduction

This chapter articulates the role of the milieu for knowledge creation by taking the firm as the reference scale. A firm is considered as an organization characterized by a specific mission and a well recognizable structure of (human) resources: these constitute the specific affordances and constraints within which the firm plays its game to survive in its socio-economic context.

Moreover, the role of the milieu in relation to knowledge creation is discussed from the perspective of the influence that the Information and Communication Technology (ICT) can have in this ambit. This perspective leads us to focus on the

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collaboration that necessarily occurs among the members of the organization to let them meet the firm's mission. Indeed, collaboration is a common factor of both the creation of knowledge (interpreted as the outcome of a social phenomenon) and of the creativity and innovation that are essential conditions for the firm's survival. In this view however, innovation is considered as the outcome of a persistent and collective attitude to shift the existing boundaries (in terms of, e.g., processes, resources, pre-understandings) and not of isolated and possibly individual performances (that in any case can punctuate the former).

The contribution of this chapter concerns the interplay between the ICT and the collaboration mechanisms supporting knowledge creation, which have been understood in several years of empirical investigations of different working environments. This effort involves several disciplines, but the focus here is on the contribution of the CSCW (Computer Supported Cooperative Work) and HCI (Human Computer Interaction) research communities. The aim is to point to the risk to break those delicate mechanisms with the introduction of an inappropriate technology on the one hand, and on the other hand to the possibility to leverage those mechanisms to identify appropriate functionalities that can enhance their effectiveness. The risk is related to the capability of the technology to change the nature of the milieu where the organization's actors interact; the potentiality is related to the capability of the technology to change the dimension of the milieu in which these interactions occur.

First, the chapter proposes three interrelated ways to characterize the space that constitutes the substratum of the firm's milieu: the physical and the virtual space; its local and the global dimension; and finally the kinds of artifacts that populate this space. Some key concepts are introduced to capture the relevant features of knowledge creation according to these three dimensions. Then, the technology is discussed in its role of key element of the milieu: this will be done in the light of the risk and of the potentiality that the research efforts and our direct experience have identified. Two main classes of applications are considered: information systems and collaboration technologies. The traditional approaches by which these technologies are deployed in the firms are confronted with some more innovative proposals that have been defined at the research level.

The conclusions claim that the technology has to be used to manage the complexity of the target reality and not as a means to introduce undue simplifications. Indeed, the organization policy makers and the technology designers have a long way to go to keep the firm as a knowledge creating milieu in front of the organizational and technological evolution, or better yet co-evolution as these two facets are strongly intertwined.

2 Dimensions of the Milieu

In the discussion about the firm as a knowledge-creating milieu, we emphasize not only the social nature of knowledge but also its operational/pragmatic value: in other words, we consider knowledge creation in action, in its capability to respond

to the new demands that emerge from new situations. To this aim it is useful to identify some dimensions along which the notion of milieu can be articulated. These dimensions offer a perspective that is compatible with the connotation of milieu taken in this book (see the introductory chapter) in that they propose a transversal reading of the three mentioned constituents of a milieu: the spatial arrangement, the social volume and the relational density. Moreover, they implicitly make reference to time as an additional relevant constituent as synchronous and asynchronous collaboration have different characteristics and implications on knowledge creation. The dimensions serve as analytical instruments: they don't want to propose any undue fragmentation in looking at the reality. They are only instrumental to the discussion of the role of ICT as a resource for the firm's milieu to foster knowledge creation.

2.1 Physical Space and Virtual Space

The role of a shared physical space in positively or negatively affecting collaboration[1] that involves knowledge intensive activities has been emphasized by several studies that fall under the umbrella of the CSCW discipline. Collocated actors can combine verbal communication with a variety of nonverbal means of communication. This combination enriches the communication contents with contextual information about the communicating people and the environment in which they cooperate: this kind of information supports the interpretation of the verbal content in a very effective way (Heath & Luff, 1992).

Moreover, collocated actors can have a direct perception of the behaviour of the other actors involved in individual or collaborative activities. As in the previous case this perception can enrich the context of interpretation of these activities and make the collaboration and mutual understanding smooth. But more importantly, collocation allows the actors to carefully observe how the other actors carry on their activities: observation is a premise for imitation that, in turn, is a basic means for connecting learning with situated practices. This is even more the case when collocated actors jointly perform activities and in so doing collaborate to develop new solutions for emerging problems. The physical space is also very important when actors share it asynchronously: the spatial arrangements of the resources that are used in the collaboration (not only people, but also documents, folders, devices, instruments, furniture, etc.) is a means to understand the current state of affairs as well as the conventions and rules adopted to accomplish the collaborative tasks. A nice example of the role played by a spatial arrangement is reported in (Schmidt & Wagner, 2004) in the domain of architectural design.

The mutual and collaborative learning that is made easier by the sharing of a physical space is dramatically challenged when actors share a virtual space, i.e.,

[1] Recall that collaboration is here considered as a basic ingredient of both creativity and innovation.

with the mediation of ICT. The abovementioned learning practices cannot be put to work any more unless the technology is able to reproduce them or to offer valid alternatives (Churchill, Snowdon, & Munroe, 2001). The number of failures caused by the introduction of ICT solutions within organizations testifies how difficult is this goal (Warkentin, Moore, Bekkering, & Johnston, 2009). Failures concern both the management of the coordination of activities and of the information therein involved that collaboration requires[2]; but especially they concern the organizational and technological interventions that fall under the umbrella of Knowledge Management where big investments are seldom followed by an adequate ROI. The reasons of the failures in both situations are manifold and their discussion is out of the scope of this chapter. Here we point only to the simplistic view that often characterizes the adopted solutions, especially when knowledge management is concerned: the physical space is surrogated by a common repository where pieces of information are accumulated and organized according to some "universal" criteria that allow for their easier retrieval. But the physical space is not a repository or a store, as we discussed above. The term place (as opposed to space) was proposed to emphasize the relevance of the "contents" that live in a space: people, information, conventions, work practices, social relations and so on (Harrison & Dourish, 1996).[3] These contents allow actors to give meaning to whatever happens in that space. In the same vein, a poor metaphorical use of the term memory (interpreted as a repository) has been aptly questioned in (Bannon & Kuuti, 1996).

On the other hand, a virtual space overcomes some of the limits of a physical space. It can be arbitrarily extended to include new contents, to reach new people, to allow for their interactions. It can make information persistent and accessible from any-where and at any-time. It can be, at least in principle, flexibly modified and adapted to the current situation and personalized to the current actors' needs. This brings to the next dimension.

2.2 Locality and Globality

The second dimension captures the old and well known tension between local and global that can be observed in several disciplines (from economy to computer science, to mention the ones that are here more pertinent). This dimension has surely an impact when firms are concerned. Indeed, firms increasingly take the structure of a network whose nodes correspond to the distributed (in terms of location and/or mission) units constituting them. Even small firms face the global dimension when they expand their production or commercial relations worldwide. Indeed, the opportunity to make available to their members possibly differentiated

[2] The crash of the Information Systems installed in big organizations has been the object of alive discussions among the ICT experts in Italy in the last couple of years.

[3] As in the introductory chapter, also here the notion of place recalls the concept of milieu, although with a different disciplinary background.

virtual working spaces forces the firms to manage the tension between locality and globality: here we focus on the impact of this tension on the theme of knowledge creation.

Locality does not refer to the spatial dimension rather on the strength of the ties that link the people acting in the organization, although the spatial proximity can be an enabling condition for this strength. This characterization of locality is well captured by the notion of Community of Practice (CoP) that has been introduced by E. Wenger in the late 1990s (Wenger, 1998a) as a conceptualization of the successful practices of knowledge creation and mobilization which he had observed in several organizational settings. The ties that link the members of a CoP are described as follows.[4] First, the members have to share a common mission that incorporates the institutional activities but is not limited to them: the relevant part concerns the (tacit) negotiation of the conditions for their accomplishment (e.g., the mutual responsibility, rhythms, interpretations). Second, the members have to be mutually engaged in keeping the community alive according to the common mission and to support the (peripheral) participation of (new) members by recognizing the value of their heterogeneity and diversity. Finally, the members have to share a common repertoire, that is the routines, words, tools, modus operandi, stories, symbols, actions and concepts that the community has adopted or defined and that are a constitutive part of its practices. A CoP identifies a situation where learning and knowledge creation are likely to most probably happen. They are the result of an emergent behaviour that the hosting organization can at most recognize, sustain and valorise: a CoP cannot be "built". CoPs are fragile constructions that at every stage of their evolution[5] can break down because of unanticipated reasons that can be endogenous or exogenous. At the same time they can become so strong that their members can conceive their evolution toward new form of cooperation—new CoPs or less engaging constructions that suit better their needs- still preserving the old relationships and adapt them to the new situation.

As suggested in (Lesser & Storck, 2001) to build understanding of how a CoP can create organizational value, it is useful to think of it as an engine for the development of social capital (Nahapiet & Ghoshal, 1998). The notion of social capital defines a reference model to "compute" a particular value of a firm,[6] that is its capability to learn and create knowledge through three facets[7]: the structural facet refers to network ties, network configurations and organization; the cognitive

[4] This notion has been reformulated in many ways, often distorting its original definition and creating alternative names: see (Andriessen, 2005) for a summary of this plethora of proposals. Here we adhere the original definition.

[5] Wenger (1998b) mentions the following stages: potential, building, engaged, active and adaptive.

[6] It can also be used to "compute" the nature of the networks of companies that are the object of the analysis reported in the contributions of the second part of this book: from loose structures, up to districts, until interorganizational CoPs.

[7] We use the term facet instead of the original term dimension to avoid confusion with the local and global dimensions. An alternative connotation of the social capital (Adler & Kwon, 2002) calls the

facet refers to sharing of codes, narratives and language; and the relational facet refers to the level of trust that is shared among the collaborating actors (Huysman & Wulf, 2006). Both notions—CoP and social capital—point in the same direction: a locality—a kind of milieu—that is to some extent circumscribed by its capability to play as a rich context for the people living in it.

The global dimension aims at breaking this boundary and points to the less known, to the differences, to the definition of possibly more formal but surely less rich relationships. It is difficult to characterize the global dimension in a systematic way since it encompasses a variety of situations depending on the goal of who looks for it. We can consider two paradigmatic situations: looking for information and looking for new relationships. What is collected is in general semantically poor, magmatic, contradictory, difficult to use for the purposes of who is making the search: at the global level approximation and quantitative (statistical) methods guide the search and the identity of the searcher is seldom taken into account, if not again using these quantitative methods.

From our perspective, the above situations are characterized by a common aspect: the possibility to broaden the local view (with new ideas, new people, new stimuli, etc.) has to deal with the difficulty to fully appropriate the novelty since (at least) two rich shared contexts are missing: the one of the searcher and the one of the found item. In other words, the global dimension offers a (significant) support for accessibility (to information and people) but a little support for the selection and the interpretation of the results. The typical de-contextualization implied by the global dimension asks for an overhead of effort to put the obtained results to work in the context of who made the search (Prusak, 2001). As for the locality, also the global dimension is not related to any spatial features, in this case the distance: this can make things worse but distance is not a determinant. The true issue is the de-contextualization that takes place every time something is made accessible but is separated from the context that generated it or where its creator operates.

This is the very nature of the tension between the local and the global when learning and knowledge creation are at stake. People try to overcome the problems it generates by applying different complementary strategies. On the one hand, they leverage the little context that any information carries with it, that is what is often called metadata: the author, the time and the location of its production, and so on. From these pieces of information they try to enlarge the context supporting the interpretation and the appropriation of what they have found. On the other hand, an alternative strategy is to look not for the information itself but for who could posses it or point to the person who could know who could help solving the problem at hand (Ackerman, Pipek, & Wulf, 2003). Both strategies share the same idea: to bring again the global dimension to a local one, by reconstructing a context of interpretation. This practice has been captured by the so called SECI model

same three dimensions with the terms: opportunity, ability and motivation, that perhaps better explain their meaning.

(Nonaka & Takeuchi, 1995)[8] that emphasizes the continuous integration of external stimuli and contents with their individual elaboration, and can be extended from the individual and the group to the group and the organization up to the organization and the network of organizations.

Looking at the global dimension not as an undifferentiated *unicum* but as a network of localities could give a better picture of the reality and suggest better strategies for supporting learning and knowledge creation within distributed organizations, this way overcoming the separation between local and global (Ellingsen, Monteiro, & Røed, 2013; Lanzara, 1999). This could be translated into the motto: preserve localities, focus on their interactions, leverage the often invisible work and means (Star & Strauss, 1999) on which these interactions are based to improve learning and knowledge creation within distributed organizations. This would be a profitable way to combine the two theoretical contributions mentioned above and to complete the framework with an additional concept that focuses on the interactions among localities. To this purpose the notion of boundary object (Star & Bowker, 1999) has been introduced: a boundary object enjoys the property to be sufficiently robust (in its formal structure) to keep its identity in living in a controversial place (at the cross of the boundary) and sufficiently plastic to be useful for all the localities that share this boundary. This notion has been proposed especially to discuss the relationship between classifications and standards and to stress the need of "multiplicity" to avoid the creation of "monsters". However, the concept has become very popular and has been applied to more general kinds of interaction among communities, often distorting its original connotation, as the author complaints (Star, 2010). For this reason in the following we will use an alternative notion to avoid increasing this noise.

3 The Artifacts Populating the Milieu

The dimensions discussed in the previous paragraphs consider the capability of the space to enable the construction or the reconstruction of the context where facts, actions and information take their meaning. However, the contents of this context (that is part of the milieu) have been only marginally referred to. The artifacts that people build and locate in the space play a relevant role in defining the context for the sense making that supports their collective action and knowledge creation. The nature of these artifacts is one of the relevant outcomes of several studies of the work practices that make collaboration smooth in routine and in unexpected situations: these studies have been conducted especially in the CSCW ambit

[8] SECI stands for "Socialization, Externalization, Combination and Internalization". This model has been criticized [see e.g., (Wilson, 2002)] for been too simplistic and unduly prescriptive with respect to the complexity of the learning by individuals. We share in part these criticisms but we believe that they are often based on a biased reading of the sometimes imprecise definition of the proposal.

(Kuutti, 2013). On the basis of these studies the role played by these artifacts is hereafter analysed in more detail.

There are artifacts whose role is to objectify the state of a collaborative distributed process: they can be called *coordinative artifacts* since they more or less explicitly show what has already been achieved in the process and what remains to be done and by whom. Examples of coordinative artifacts can be found in any situation where a (semi)structured document is "circulated" among stakeholders that inscribe it and in so doing let the collaborative process progress. For example, a bug report that coordinates the testing phase of a software product (Carstensen & Sorensen, 1996); a card that coordinates the work distribution in a (kanban) production system (Schmidt, 1994); or a Patient Record that is a web of artifacts that coordinate the care process at the patient bed among doctors and nurses (Bardram & Bossen, 2005).

There are artifacts whose role is to induce people to turn their attention to a specific fact or situation to make collaboration smooth and more situated in the current context: they can be called *awareness promoting artifacts*.[9] Examples of this kind of artifacts are typical alarm devices but also bulletin boards for different usages: from the explicit information contained in the list of approaching trains in a railroad station up to the more implicit and sometimes messy (for the external observer) information jotted down on a whiteboard in a hospital ward (Xiao, 2005).

Finally, there are artifacts whose role is to make permanent part of a repertoire that (typically) a CoP has defined and wants to explicitly share among its members: they have been called *knowledge artifacts* in (Cabitza, Colombo, & Simone, 2013) where they have been defined as[10] "a physical, i.e., material but not necessarily tangible, inscribed artifact that is collaboratively created, maintained and used to support . . . knowledge creation and exploitation, collaborative problem solving and decision making *within or across communities of practice*; . . . the representation language and the representations shared in such a knowledge artifact allow for an affordable, continuous and user-driven maintenance and evolution of both its structure and content *at the appropriate level of underspecification* (emphasis added)".

This definition allows for a uniform characterization of different situations in which members belonging to one or more CoPs interact to collaborate and put their knowledge in common. In the same paper two examples of knowledge artifacts are described: we point the interested reader to it for all the details. In both cases the knowledge artifacts were created to support the design of the product that characterized the mission of the organization: they were about the core knowledge that should at the same time make the reuse of past design experiences easier and foster the creativity toward the identification of innovative features by an

[9] The rich notion of *awareness* for sake of improving collaboration is thoroughly discussed in (Schmidt, 2002) and in the papers contained in the related special issue.

[10] This term has been defined in different and contradictory ways in the literature: for this reason we clarify the one we refer to in order to avoid misinterpretations.

interdisciplinary community of designers. In both cases the representation language and the constructed representations were based on a very limited (although open-ended) set of conventional symbols that denoted the "few aspects" and the "few relations" among them that the designers deemed as really matter in "their" interdisciplinary design practices for innovation in the two target application domains. The knowledge artifacts were highly underspecified if compared with the complexity of the problems at hand; however exactly this underspecification was a successful means that the designers used to generate new ideas and to create the new products without being laded with the useless details of each discipline. The underspecified artifacts were cheap to maintain, flexible to changes and extremely effective to sustain the interdisciplinary design because they had been constructed bottom-up, from the shared design local practices. In one of the two cases, a slightly modified version of the knowledge artifact[11] played the role of boundary object between the community of the designers and that of the people involved in the production of the innovative products. Interestingly, the same representations that were the starting point of innovation for the designers community were used to reach the opposite goal by the other community: the uniformity of the production. In other words, the "object" was sufficiently robust to survive the crossing of the border between the two communities and sufficiently plastic to be useful for them to fulfil their different goals.

We conclude this section with a consideration that holds for all the kinds of artifacts presented above. On the one hand, they are not so easy to be identified within an organization: the mechanisms that make them effective are often incorporated in the so called invisible work (Star & Strauss, 1999) that escapes a superficial analysis of the organizations [too often driven by a top-down approach that takes the management perspective only: the management trap mentioned in (Huysman & Wulf, 2006)] or that are unduly confused with the artifacts that are the institutional outputs of the business processes; on the other hand, for their very nature, they are the "killer factors" for the design of useful and usable technologies supporting collaboration and knowledge creation as they capture the true practices that make the organization survive and smoothly reach its mission.

4 The Role of the Technology

The previous sections should have clarified that the technology is a very influential component of the milieu as the ICT can have positive and negative effects on the collaboration (as a vehicle for knowledge creation) that happens in the milieu the ICT contributes to "augment". The point we want to make is that too often the technology is conceived and constructed with little consideration for its impacts on the milieu in which it is deployed: this is probably one of the basic reasons why we

[11] Basically, with the same structure but without the contents that were sensible for sake of innovation.

can observe small successes, if not failures, especially when knowledge is involved in the activities it supports. In speaking of technology it is useful to consider both the solutions that are available on the shelf or constructed for specific organizations and the solutions that are proposed by the research community: in the latter case the solutions reach the status of prototypes sometimes validated in real or realistic settings. Incidentally, in this way the issue of innovation can be looked at in this specific disciplinary (and economic) sector.

An evident issue concerns the tension between the real and the virtual that has been illustrated in the previous section. The evolution of the computational infrastructure (both in terms of transmission bandwidth and of computing power) suggested the idea to construct a virtual context that reproduces the real context: either directly (after the seminal work presented in (Benford & Fahlén, 1993) or metaphorically (Second Life[12] offers a typical approach). The resulting technologies did not meet their objectives: the technology was creating an expectation that the simulation did not fulfil. In the first case, the inhabitants of the artificial shared space were too limited in reproducing the richness of the verbal and non verbal languages the actors use in the real space; in the second case, the metaphoric virtual space was not easily integrated, at least cognitively, with the real one: this resulted in a useless duplication and in an overhead of cognitive effort that did not make sense in real organizational settings. In the course of the years, these technologies have changed their target: from supporting work to support mainly entertainment and education (Benford, Magerkurth, & Ljungstrand, 2005; Boulos, Hetherington, & Wheeler, 2007).

Then, the more practicable solution for ICT to support collaborations within distributed organizations has not to be sought in reproducing the real contexts but in offering alternative contexts, different from those ones but hopefully equally effective.

Within a firm two kinds of activities are nowadays supported by consolidated technologies: the activities that collect and make permanent the data that support the mission of the firm, and the meetings: the former are the realm of the database transactions; the latter are now made possible by connection-wise powerful videoconferencing tools. In database transactions people are marginally involved; videoconferencing tools make the technology disappearing (if the connections work!) and offer a mere memorization of what was going on. In-between there are the technologies where the interactions with the users and among the users is at core of the problem, that is where the context comes to the scene to support the sense making and the sense giving and therefore are still looking for adequate solutions: information systems and collaboration technologies. The former are focused on recurrent situations, on the availability of information and on its quality (Carlo Batini, Cabitza, Cappiello, & Francalanci, 2006); the latter are focused on emerging behaviours, on the negotiation of what is at stake and what has to be done in response to—and on how to deal with—situations that can be only partially

[12] http://secondlife.com/

anticipated. The question is then: which is the influence of these technologies on a knowledge creating milieu?

4.1 Information Systems and the Milieu

In the information systems ambit, the main representations of the knowledge therein involved are the conceptual models capturing the core of the application domain (information and processes) and how they are reified within the technology. Two main situations are relevant in this context in relation to knowledge creation.

The first situation encompasses the case when conceptual models have to be integrated in consequence of the firm evolution: the typical example is the merging of two organizations; or in consequence of the need to make information system interoperate for sake of information exchange to support services or cross checking: the typical example is the case of the Public Administration whose information patrimony has usually grown in a not systematic—if not chaotic—way that however takes into account local cultures and needs. The answer to this kind of breakdowns is usually found in approaches that aim to construct a conceptual model that, in a way or another, unifies the source ones (Batini, Lenzerini, & Navathe, 1986): this unification forces structural changes in the involved models, which have of course semantic and pragmatic implications. An alternative approach, that is taken by the current development of the so called Linked Data (Heath & Bizier, 2011), is to add levels of structure on top of the ones to be integrated: this increases the complexity of the solutions (Freitas, Curry, Oliveira, & O'Riain, 2012) and is likely to generate a sort of domino effect that involves the added layers. Despite their technical differences, these approaches are conceived trough technical tools (algorithms, heuristics) without considering the impact their application might have on the work practices of the target organizations. The breakdown generating the integration is not taken as an opportunity to compose the knowledge related to different work practices, to define changes as a compromise based on their reconciliation, to obtain a result that is more that the sum of the two parties in term of knowledge and learning. The value of a consistent and efficient result overcomes the cost of loosing part of the local knowledge and the related work practices. In other words, the attention is put on the uniformity of the abstraction instead of on the different contexts where the abstraction has to be interpreted. It is worth noticing that recently the academic research started a reflection on this issue in the framework of the most sophisticated approach to domain modelling, namely ontologies. Despite the rich semantics that they are able to express through concepts and relations among them, some authors start claiming that a deep interpretation of the constructions that make use of a given ontology requires a description of the context in which the ontology has been used and defined, also within the same application domain (Pike & Gahegan, 2009). This means that the straightforward translation of a conceptual model from a place to another in the milieu is risky as it fallaciously presupposes a common understanding at least of the very general concepts and relations. In addition, this means that a

reflection on what can be considered as pragmatically "the same" is likely to be part of the negotiation of the work practices to get things done (i.e., it should become part of the shared repertoire).

The second source of breakdown arises when the conceptual modelling incorporated in an information system does not fit the local needs: either because it is too rigid, to far away from what is needed in contingent or transient situations, or because the firm cannot afford the effort of its creation (typically, in the case of SMEs[13]). These two cases are generated in different circumstances: the first one as a sort of workaround to overcome the limits of the imposed technology; the second one as the response to the need to have an affordable technological support. However, the two cases share how the solutions to deal with the problem are created: their genesis reflects a bottom-up approach that is in the hands of the actual users of the information. Indeed, they create "their" applications that fit "their" needs, irrespective of any big system or of their limited technological skills. These applications have been "called shadow applications" because they are unrecognized as well as do the effort to construct them and the advantage they bring the organization effectiveness (Handel & Poltrock, 2011); these applications are built by using flexible tools that can be put to use, at least to some extent, by laymen in ICT.[14] What matters here is not whether these applications are efficient, well engineered or developed with sound methodologies: what matters here is the knowledge they testify, the learning process they trigger in the "*bricoleurs*" (Cabitza & Simone, 2015; Ciborra, 1992) constructing them: this knowledge concerns both the application domain and the technological issues that constitute the "infrastructure" (Pipek & Wulf, 2009) of the target milieu. This kind of knowledge and learning is almost disregarded by the official design practices although it could play a fundamental role in the design of applications that are likely to avoid the recurrent technological failures we mentioned above. The knowledge and learning of this kind are also disregarded by the management: either because it does not perceive their value or because the firms (specially the SMEs) usually don't reflect (and invest) on how to improve the management of their knowledge (re)sources.

4.2 Collaboration Technologies and the Milieu

Under the umbrella of collaboration technologies fall the applications devoted to manage information sharing (semi-structured information and documents), communication (threads of conversations) and partially business processes (structures

[13] EU SMEs in 2012: at the crossroads *Annual report on small and medium-sized enterprises in the EU*, 2011/12.

[14] This is what makes tools like spreadsheets killer applications within organizations. Moreover, this need triggered a research line called End User Development (EUD; Lieberman, Paternò, & Wulf, 2006) that proposes different solutions for an effective user involvement in a true "socially embedded technologies" development (Cabitza & Simone, 2015).

of coordinated activities).[15] The market offers off the shelf solutions that can be grouped under the Web 2.0 keyword[16]: these solutions can be customized to make their typical social networks functionalities fit different organizational settings, from general network of interest up to more structured distributed organizations. Since our goal is to articulate how these technologies impact the milieu for knowledge creation it is useful to make this analysis using the dimensions/facets of social capital that have been introduced in the previous section. We agree with (Huysman & Wulf, 2006) that most of the functionalities of the Web 2.0 applications are oriented to the structural dimension. Actually, accessibility to multimedia information and to people through different devices is the main goal as well as the notification of a series of events that concern them (update, modification, presence and the like). Very often these applications are introduced into the firms for sake of Knowledge Management as if searching, retrieving and reaching information and/or people would suffice to this aim. More rarely, the resulting Corporate Social Networks[17] are introduced with the by far more realistic motivation (and ambition) to trigger best practices that could play the role of an enabler of more effective knowledge sharing behaviours among the network's members (Alberghini, Cricelli, & Grimaldi, 2013).

The true problem with this class of technologies is that it is oriented more to the accumulation of information than to the construction of a context for its interpretation. This latter requires paying attention to the local practices, to identify specific application domain requirements, to reflect on the adopted design strategy: in other words, it requires an effort that is not limited to a shallow customization of general purpose and nowadays standardized functionalities.

An example of this more articulated approach can be found in the IBM project that, starting from the observation of this complex organization and from the "practical techniques that have to do with the cognitive and social factors that come into play in the creation and communication of knowledge", conceived a series of technologies, among which one that is called Babble, and that was deployed within the IBM itself (Thomas, Kellogg, & Erickson, 2001). This technology falls under the structural dimension of social capital as it handles synchronous and asynchronous communication; however, its innovative functionality is devoted to what is called "social translucence", that is "the creation, exercise and mutual observation of social behaviour". Babble supports the ongoing conversations by making visible in a visual way the level of people's participation,

[15] Nowadays, business processes management is a component of an information system. Here we consider a light version of it, that is the management of processes that are embedded in other collaborative applications and have in general a reduced complexity.

[16] Actually, we could also mention the Web 3.0 solutions that endow the former with Semantic Web functionalities, that however show the same criticality mentioned before regarding conceptual modelling, specifically ontologies.

[17] A Corporate Social Network is in general a WEB 2.0 application that is implemented on a platform that guarantees secure and constrained access rights compliant with the corporate's policies.

the involved topics and the current messages; moreover, Babble supports asynchronous communication by memorizing conversations and by making them accessible through a timeline that shows the communication peaks, who was involved as a speaker or a listener in the hot topics. This persistent and situated representation of the conversations is a resource for a reflection on what was going on: this reflection could foster a more aware participation in the collaborative processes as well as in the learning process of how topics were handled in a more or less successful ways.

Examples of technologies that refer to the cognitive and relational dimensions are more difficult to find: this is not surprising since these dimensions have to take seriously into consideration the context where these technologies are put to work. In consequence of this, these technologies are more dependent on the application domain (although some generalization could be possible if they are suitably designed), if not unique to the situation for which they have been conceived: hence, usually they are not widely spread and sometimes their description is not accessible at all, unless they have been constructed within research projects that document them.

An interesting example of a technology that has been demonstrated for a specific application domain is EDC (Envisionment and Discovery Collaboratories), although its architecture could support the translation of its main functionality in other application domains (Arias, Eden, Fischer, Gorman, & Scharff, 2000). Two are the main intriguing features of EDC whose combination supports the so called "action-reflection" loop, that is an elaboration of the "reflection-in-action" principle (Shoen, 1992). The first feature allows the actors to blend the physical and the virtual representation of the problem at hand (Fig. 1). Problem solving happens around an interactive table that is able to recognize physical objects positioned on it. In the experimental case, the issue was an urban planning problem, the table offered a map of the target territory and the objects were the typically involved entities: houses, bus stops, plants, gardens and the like.[18] This blended representation allows an easy interaction among interdisciplinary experts by supporting a "problem solving by playing" with the physical objects and by testing the current solution through the (software) simulation of its consequences on the overall environment. Actually, the technology let them focus on the common action (basically, a try-and-error approach) as a means to overcome the disciplinary differences and reduce the hopeless alignment of the different languages and the endless discussions about the premises of an optimal solution (e.g., a priori domain models). Here again, the underspecification of the blended representation plays a fundamental role in knowledge creation and innovation.

The second intriguing feature of EDC is the space for reflection that is separated from the space for action and at the same time is connected to it through the memorization of "experimented" solutions and the recovery of the (new) configurations produced by the reflection. Hence, action and reflection have the

[18] The current technologies could implement the same ideas in an easier way form the technical viewpoint; however the idea is still innovative and poorly supported by general purpose platforms.

Fig. 1 The action-reflection space in EDC (Arias et al., 2000)

same relevance in problem solving: the former look for a solution by applying existing "codes"; the second elaborates the proposed solutions and feeds the creation of the next one, possibly changing these codes. The reflection can be individual or collective; therefore this change can be the object of a negotiation: in any case it is a contribution to the evolution of the solution, that is a reflection-in-action.

There is an evident tension between the costs and benefits of an ad hoc-solution and those of the customization of a general purpose technology: one might wonder if a compromise can be reached. A possible way to find it is to reinterpret the role of some functionalities that are offered by the general purpose technologies (specifically, the above mentioned WEB 2.0 ones) in the light of the reflection-in-action principle, that is in the light of constructing a space that creates a context for interpretation and reinterpretation.

The introduction of WEB 2.0 technologies within the firms was motivated by the need to make the organization members actively contribute to the contents of the shared information space, typically to collect their work experiences: this is usually done by asking users to tell the story of the more significant episodes of their working life. The available means for this purpose are in general based on almost unstructured texts (produced as uploaded documents or constructed through any sort of writing tool of the platform) that are sometimes difficult to read and surely impossible to retrieve and compare in an efficient way for sake of re-use: the problem at stake is that action is fully separated from reflection, that is without any temporal or logical direct connection. A possible way to overcome this limit could be to define some general structures for these stories that take into account the goal for which they are told, their internal narration and plot, and how each story can be put into relation with other stories (as an enrichment, as a counterexample, as an evolution, etc.). To this aim the above mentioned IBM project aimed at defining a Story Markup Language (StoryML) by which to annotate the story contents according to these criteria. This is an interesting idea that however can generate

all the problems that any sort of standardized conceptual scheme is likely to raise (as already discussed). A by far less problematic solution would acknowledge and leverage the fact that work practices are often flanked by the usage of artifacts of the kind we have already described. Then, why not to tell the story "around" those artifacts leveraging a very common habit, that is adding annotations? Actually, almost all WEB 2.0 platforms support them with a dedicated functionality that allows one to share annotations among the platform users. Of course, this functionality should be reinterpreted in the light of the new goal: currently, annotations are supported as a marginal content that is not worth being valorised and made persistent, that is as a sort of scaffolding that has a limited usage and value.[19] On the contrary, they are a powerful means to keep trace of important pieces of information in a contextualized way though the links connecting them with the artifact in use; this is the case also when annotations are added after the use itself as the information inscribed in the artifact is able to recall in the mind of the competent actors the situation that was contextual to the inscription. In the light of this interpretation, an adequate functionality should allow a rich set of ways to link annotations to the source artifact and also to link annotations with other annotations (Cabitza, Simone, & Locatelli, 2012): this second possibility could be exploited to express conversations about a topic thus allowing a collective reflection, a negotiation of meaning; or to express stories when each annotation describes a particular frame of the overall story: in this case the links can generate an open-ended set of narrative structures, far beyond a predefined markup language.[20] Moreover, as annotations can be constituted of semantic tags (that is elements of predefined taxonomies) they can express relationships among the annotated sources and build a rich and annotated web of documents. Finally, as (semantic) annotations can have associated threads of conversations (as alluded above) they could support the collective definition of the meaning of those tags: in so doing, they help alleviating the rigidity of any conceptual model, however expressed, by creating a local context of usage of those tags.

5 Conclusions

The chapter started with the identification of some dimensions characterizing the milieu for knowledge creation when the perspective of a firm is taken (as a complement of other perspectives that consider different scales). These dimensions have been described leveraging some concepts and models that are currently used to investigate the theme of knowledge creation within organizations. The identified

[19] Typically, the annotation interface contains a cue (a tick icon) to check the annotation and make it disappear as "approved" or as "irrelevant", by the way without distinguishing between the two opposite meanings.

[20] Some available platforms allow one to associate a forum or to add a thread of comments to a resource (e.g., a document): however it is evident that this is a banal reuse of functionalities that have been conceived for other purposes and are quite rigid with respect what is proposed here.

dimensions and the related concepts serve as a background for the understanding of how the ICT can influence the milieu where knowledge creation takes place: ICT is nowadays a fundamental component of this milieu and can deeply influence its capabilities in reaching this goal. The picture shows contrasting trends that are motivated by the complexity of the problem at hand whose solution requires a deep understanding of the local situations and work practices: this investment is often considered as too expensive and generic solutions are adopted by applying a less demanding approach—let's make something available and let's see what will happen. The true risk is that the endeavour to support knowledge creation and innovation (that however requires a relevant effort as it involves organizational and technological issues) will not generate an acceptable ROI since knowledge promoting technologies can be simply forgotten or easily circumvented if perceived as not fitting the local needs; thus they are unable to generate the critical mass that is required to make them effective for the people and the organization they should support. The limits of this approach is also testified by the kind of analysis that follows the introduction of the technology as it is reported in the scientific literature[21]: the most used parameters refer to quantitative indicators like the number of accesses for each offered functionality, or to generic qualitative indicators such as the user perception of the utility or usability of the system, although some more adequate approaches have been defined (Rao, 2005). There are no indicators to investigate the real impact of the new augmented milieu on knowledge promotion and creation within the organization: the impact could be positive or neutral but also negative as an inadequate technology can break the good work practices and their delicate mechanisms. This phenomenon should be recognized and contrasted as soon as it appears.

Then, the organization policy makers and the technology designers have a long way to go to keep the firm a knowledge creating milieu in front of the organizational and technological co-evolution. This co-evolution should lead to a milieu that is open without imposing uniformity; where things are not searched for but collaboratively constructed; where this construction is traced and made persistent as part of the common repertoire; where the real and the virtual coexist in a harmonic way, thus cleverly bringing the Internet of Things (Atzori, Iera, & Morabito, 2010) in the organizational ambit; where the technological and organizational support of information management, collaboration and knowledge creation is conceived as a unique entity, as a unique goal (Cabitza & Simone, 2012; Newell, Huang, Galliers, & Pan, 2003).

[21] The results reported by other sources are in general biased in favour of the success of the initiatives, with little attention to a critical view of their outcomes.

References

Ackerman, M., Pipek, V., & Wulf, V. (Eds.). (2003). *Sharing expertise: Beyond knowledge management*. Cambridge, MA: MIT Press.

Adler, P., & Kwon, S.-W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review, 27*(1), 17–40.

Alberghini, E., Cricelli, L., & Grimaldi, M. (2013). KM versus enterprise 2.0: A framework to tame the clash. *International Journal of Information Technology and Management, 12*(3/4), 320–336.

Andriessen, J. H. E. (2005). Archetypes of knowledge communities. In *Communities and technologies 2005* (pp. 191–213). Dordrecht: Springer

Arias, E., Eden, H., Fischer, G., Gorman, A., & Scharff, E. (2000). Transcending the individual human mind—Creating shared understanding through collaborative design. *ACM Transaction on Computer-Human Interaction, 7*(1), 84–113.

Atzori, L., Iera, A., & Morabito, G. (2010). The internet of things: A survey. *Computer Networks, 54*(15), 1389–1286.

Bannon, L., & Kuuti, K. (1996). Shifting perspective on organizational memory from storage to active remembering. In *HICSS'96 : Proceedings of the Hawaii International Conference on System Sciences* (pp. 156–167). IEEE Computer Press.

Bardram, J. E., & Bossen, C. (2005). A web of coordinative artifacts: Collaborative work at a hospital ward. In *GROUP'05: Proceedings of the 10th ACM Conference on Supporting Group Work* (pp. 168–176). New York: ACM Press.

Batini, C., Cabitza, F., Cappiello, C., & Francalanci, C. (2006). A comprehensive data quality methodology for web and structured data. In *ICDIM'06: Proceedings of the First IEEE International Conference on Digital Information Management* (pp. 448–456). Bangalore: IEEE Computer Society.

Batini, C., Lenzerini, M., & Navathe, S. B. (1986). A comparative analysis of methodologies for database schema integration. *ACM Computing Surveys, 18*(4), 323–364.

Benford, S. D., & Fahlén, L. E. (1993). A spatial model of interaction in large virtual environments. In *CSCW'93: Proceedings of the 3rd European Conference on Computer Supported Cooperative Work* (pp. 109–124). Dordrecht: Kluwer Academic Publishers.

Benford, S., Magerkurth, C., & Ljungstrand, P. (2005). Bridging the physical and the digital in pervasive gaming. *Communications of the ACM, 48*(3), 54–57.

Boulos, M. N. K., Hetherington, L., & Wheeler, S. (2007). Second life: An overview of the potential of 3-D virtual worlds in medical and health education. *Health Information and Libraries Journal, 24*, 233–245.

Cabitza, F., Colombo, G., & Simone, C. (2013). Leveraging underspecification in knowledge artifacts to foster collaborative activities in professional communities. *International Journal of Human-Computer Studies, 71*(1), 24–45.

Cabitza, F., & Simone, C. (2012). Affording mechanisms: An integrated view of coordination and knowledge management. *Computer Supported Cooperative Work, 21*(2), 227–260.

Cabitza, F., & Simone, C. (2015). Building socially embedded technologies: Implications on design. In D. Randall, K. Schmidt, & V. Wulf (Eds.), *Designing socially embedded technologies: A European challenge*. Berlin: Springer.

Cabitza, F., Simone, C., & Locatelli, M. P. (2012). Supporting artifact-mediated discourses through a recursive annotation tool. In *GROUP'12: Proceedings of the 17th ACM International Conference on Supporting Group Work* (pp. 253–262). New York: ACM.

Carstensen, P. H., & Sorensen, C. (1996). From the social to the systematic. *Computer Supported Cooperative Work, 5*(4), 387–413.

Churchill, E., Snowdon, D., & Munroe, A. (Eds.). (2001). *Collaborative virtual environments: Digital places and spaces for interaction*. New York: Springer.

Ciborra, C. U. (1992). From thinking to tinkering. *Information Society, 8*, 297–309.

Ellingsen, G., Monteiro, E., & Røed, K. (2013). Integration as interdependent workaround. *International Journal of Medical Informatics, 82*(5), e161–e169.

Freitas, A., Curry, E., Oliveira, J. G., & O'Riain, S. (2012). Querying heterogeneous datasets on the linked data web challenges, approaches, and trends. *IEEE Internet Computing, 16*, 24–33.

Handel, M. J., & Poltrock, S. (2011). Working around official applications: Experiences from a large engineering project. In *CSCW'11: Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work* (pp. 309–312). ACM.

Harrison, S., & Dourish, P. (1996). Re-place-ing space: The roles of place and space in collaborative systems. In *CSCW'96: Proceedings of the 1996 ACM conference on Computer Supported Cooperative Work* (pp. 67–76). New York: ACM Press.

Heath, T., & Bizier, C. (2011). *Linked data: Evolving the web into a global data space*. San Raphael, CA: Morgan & Claypool.

Heath, C., & Luff, P. (1992). Collaboration and control. Crisis management and multimedia technology in London underground control rooms. *Computer Supported Cooperative Work, 1*(2), 69–94.

Huysman, M., & Wulf, V. (2006). IT to support knowledge sharing in communities, towards a social capital analysis. *Journal of Information Technology, 21*, 40–51.

Kuutti, K. (2013, September 21–25). "Practice turn" and CSCW identity. In *ECSCW'13: Proceedings of the European Conference on Computer Supported Cooperative Work, Paphos, Cyprus*. Berlin: Springer.

Lanzara, G. F. (1999). Between transient constructs and persistent structures: Designing systems in action. *Journal of Strategic Information Systems, 8*, 331–349.

Lesser, E. L., & Storck, J. (2001). Communities of practice and organizational performance. *IBM Systems Journal, 40*(4), 831–841.

Lieberman, H., Paternò, F., & Wulf, V. (Eds.). (2006). *End user development human-computer interaction series* (Vol. 9). Dordrecht: Springer.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review, 23*(2), 242–266.

Newell, S., Huang, J. C., Galliers, R. D., & Pan, S. L. (2003). Implementing enterprise resource planning and knowledge management systems in tandem: Fostering efficiency and innovation complementarity. *Information and Organization, 13*, 25–52.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company*. Oxford: Oxford University Press.

Pike, W., & Gahegan, M. (2009). Beyond ontologies: Toward situated representations of scientific knowledge. *International Journal of Human-Computer Studies, 65*(7), 674–688.

Pipek, V., & Wulf, V. (2009). Infrastructuring: Toward an integrated perspective on the design and use of information technology. *Journal of the Association for Information Systems, 10*(5), 1.

Prusak, L. (2001). Where did knowledge management come from? *IBM Systems Journal, 40*(4), 1002–1007.

Rao, M. (2005). *Knowledge management tools and techniques practitioners and experts evaluate KM solutions* (pp. 1–438). Oxford: Elsevier Butterworth–Heinemann.

Schmidt, K. (1994). Cooperative work and its articulation: Requirements for computer support. *Le Travail Collectif—Travail Humain, 57*(4), 345–366.

Schmidt, K. (2002). The problem with 'Awareness'. Introductory remarks on 'Awareness in CSCW'. *Computer Supported Cooperative Work, 11*(3), 285–298.

Schmidt, K., & Wagner, I. (2004). Ordering systems: Coordinative practices and artifacts in architectural design and planning. *Computer Supported Cooperative Work, 13*(5–6), 349–408.

Shoen, D. (1992). Designing as reflective conversation with the materials of a design situation. *Knowledge Based Systems, 5*(1), 3–14.

Star, S. L. (2010). This is not a boundary object: Reflections on the origin of a concept. *Science, Technology & Human Values, 35*(5), 601–617.

Star, S. L., & Bowker, G. C. (1999). *Sorting things out: Classification and its consequences*. London: MIT Press.

Star, S. L., & Strauss, A. (1999). Layers of silence, arenas of voice: The ecology of visible and invisible work. *Computer Supported Cooperative Work, 8*, 9–30.

Thomas, J. C., Kellogg, W. A., & Erickson, T. (2001). The knowledge management puzzle: Human and social factors in knowledge management. *IBM Systems Journal, 40*(4), 863–884.

Warkentin, M., Moore, R. S., Bekkering, E., & Johnston, A. C. (2009). Analysis of systems development project risks: An integrative framework. *ACM SIGMIS Database, 40*(2), 8.

Wenger, E. (1998a). *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University Press.

Wenger, E. (1998b). Communities of practice: Learning as a social system. *The System Thinker*, *9* (5).

Wilson, T. D. (2002). The nonsense of "Knowledge Management". *Information Research, 8*(1).

Xiao, Y. (2005). Artifacts and collaborative work in healthcare: Methodological, theoretical, and technological implications of the tangible. *Journal of Biomedical Informatics, 38*(1), 26–33.

Milieu, Territory, Atmosphere: New Spaces of Knowledge

Andreas Philippopoulos-Mihalopoulos

we require just a little order to protect us from chaos
Deleuze and Guattari (1994, p. 201)

Abstract

The three concepts of milieu, territory and atmosphere are examined here as spatialisations of knowledge production sites. The methodology of the chapter is situated in the writings of Gilles Deleuze, as well his work with Felix Guattari. The chapter begins in the middle (the *milieu*), namely without introduction but immersed already in the high velocity of the knowledge milieu. The milieu of the volume is seen here precisely as the space of the middle, which resists centrality, origin or hierarchy. The various milieus organise themselves in a spatial formation that can be called territory, itself organised by the emerging notion of *refrain*, namely the creative motif that streams throughout the spatial/territorial formation of the milieus. Refrains are open to the new, constantly changing yet informing of a particular knowledge variation, risky in that they might dissolve in the new combinations in which they throw themselves, yet displaying an order which is consistent rather than hierarchical. With this, the text reaches the point of atmospheric diffusion of the refrain. Atmosphere is a creative practice needed in order in turn to create the right conditions for further creativity. The text ends with a self-observation of its three 'passages' (from individual to collective, from conscious to non-conscious, and within space) and their effects on the notions used.

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1 In the Milieu

We begin right in the middle, in the milieu of the text. This is not an absolute middle. It has no pretences of being located in the centre of the text, or of symbolising the golden middle of classical harmony. This middle is a messy, hyper-complex, high-velocity milieu, in an intimate yet differentiated connection to its own space, where two things are rehearsed: on the one hand, the epistemologies of observing empirical realities of knowledge-creating enterprises and innovative entrepreneurial practices are being performed; and, on the other, the ontological shots at theorising on these terms, themselves undoubtedly steeped in epistemology. The present text serves as a folding of what follows in the book, in the hope that it will open some further lines of thought while reflecting the processes of contributing in and editing the book itself. Although not an introductory chapter (we have reserved a more articulate, step-by-step discussion of the concepts for the introduction), it aims at introducing some of the complex concepts that can be used in rethinking the process of knowledge-creation and creativity in relation to space, and more specifically urban space.

However enticing the process of clarifying and contextualising might be, this text tries to resist by returning to the middle. This is very important both for the argument of this chapter, and this volume as a whole. To begin in the middle is to denounce the possibility of an origin, a centre and a boundary. To begin in the middle abandons, not without a certain nostalgia, modernist illusions of control as well as postmodern delusions of harmonious pluralities. To begin in the middle, finally, is hardly a beginning. Rather, it is the moment in which one discovers that one has been 'thrown-in', without trace of original momentum that can be linked to one's situation in any causal way. But mark this: this discovery is not linked to a consciousness in the traditional, more or less phenomenological way. The discovery may well be a pre-conscious one, or simply a non-conscious one. Such discoveries are best consigned to the domain of posthuman affective flows, of which humans are only one part, the others being the hybrid, the technological, the inorganic, the 'natural', and so on. We study cities after all.

So we begin again, without ever properly beginning. The milieu is no centre: it is a movement along movement, something equivalent to stepping out of a door and being carried away by a crowd irresistibly pulling this and that direction. One finds oneself right in the middle of things, surrounded by a movement that cannot be controlled and further, whose flow is more one of Guattarian chaosmotics than Elysian fields. There is nothing reassuring in the milieu, nothing easy and manageable in the praxis of beginning in the middle. As Deleuze and Guattari (1988, p. 28) write, "the middle is by no means an average; on the contrary, it is where things pick up speed." The milieu is no boundary: it does not separate, although separations, distinctions and territorial conflicts take place all the time. In fact, the milieu contains (in the double sense of the word as content and limit) eruptions of conflict, mitigated only by the surrounding flows. The milieu contains its boundary function within its *medium* function: for while milieu is the middle, it is

also the medium that pushes a process to an end, its very own objective, which, in this case as we shall see, is territory and after that, atmosphere.

The middle does not allow for a perspective that calls itself an origin and from which all is centrally, panoptically surveyed. This chapter, and this volume as a whole, cannot offer *the* definitive point of observation that guarantees the way forward. At best, it adds another flow in what is already an overcrowded field. However, and rather emphatically, the offered flow is a parasitical one, in the sense intended by Michel Serres (1982): we offer a counter-flow, as it were, a parasite within the system, invited by the host yet always alien. We bug existing lines of communication and bring about a noisy fusion of system and milieu, firm and city, knowledge-creating process and creativity. We open up the dialectics of closure and openness, and see what happens.

Our methodology, largely based on Gilles Deleuze and Félix Guattari's writings,[1] is faithful to its milieu. Deleuze and Guattari (1988) use the example of the grass in order to describe the process. The grass grows without a central part or limits to its expansion, horizontally, spreading from a multiplicity of rooting, a system that is not systemic, taking advantage of the terrain. The grass begins in the middle, thrown into a milieu, becoming part of it, becoming the milieu. To begin in the middle is to find oneself folded between the multiplicity of the world without a discernible origin, a specific centre and determined territorial limits. To be thrown into the mobile multiplicity of the grass is to follow the blades waving in the wind: one loses one's origin, one's preconceived ideas of location and destination, one's belief in the importance of the centre. One is lost in a horizontal plane of movement, and on this plane one begins by ebbing and flowing between knowledge and ignorance. So what do you do? You cluster around similarities, you institute affinities, you even, without perhaps realising, become part of a collective atmosphere. At the same time, you mark your territory, you find a way of communicating your presence to the others, you hum your individuality. You do not lose your initial fascination for the unknown, the wanderlust of your creative energy, yet you harness it, you do not allow it to throw you into chaos. You keep on flirting with it.

Compare the milieu to Doreen Massey's definition of space in her seminal book *For Space* (2005, pp. 10–12): space is a product of interrelations and embedded practices, a sphere of multiple possibilities, a ground of chance and undecidability, and as such always becoming, always open to the future yet taking place on a plane of simultaneity which occurs among "intertwined, openended trajectories" (Massey, 2005, p. 113), peculiar delights of the middle, a parallel presence of avenues and dead-ends. This seeming openness is firmly conditioned: multiple possibilities indicate lack of direction and possibly destination; continuous becoming means also instability and unpredictability; interrelations denote a difficulty in pinpointing causality, origin, actants; simultaneity indicate an almost Spinozan lack of freedom. Allow us to add a Deleuzian understanding of spatiality that assumes

[1] Indicatively, see Hofsess and Sonenberg (2013) and Honan (2007), for two fascinating takes on rhizomatic methodology.

the guise of "the delicate milieus of overlapping perspectives, of communicating distances, divergences and disparities, of heterogeneous potentials and intensities" (Deleuze, 2004, p. 50). These descriptions of space are removed from the usual benign descriptions of geography or such simple binarisms between bad space (public) and good place (home), and rely instead on a complex, as yet value-free description of the space of milieu. For it is important to note the way in which space assumes the above characteristics of milieu: multiplicity rather than singular origin, unpredictability rather than the panoptical predictability of the centre, interrelation based on embeddedness rather than the separation of boundaries, and simultaneous interplay between chaotic spread and organised structure. These are all characteristics shared by both space and milieu. It is, I think, beyond doubt that milieu is thoroughly spatial. The question, however, is how the space of milieu becomes marked, becomes fully spatial, 'populated' by space as it were. We shall revisit this in the next section.

Let us return to our grass methodology. We opt for grass as opposed to tree, with its defined root, trunk and volume. As Deleuze and Guattari write, "arborescent systems are hierarchical systems with centers of significance and subjectification." (1988, p. 16). Instead, they urge us to "make rhizomes, not roots, never plant! Don't sow, grow offshoots!" (1988, p. 24). Offshoots and rhizomes are characteristics of the planar mobility with which Deleuze and Guattari describe the world. Rhizomes specifically encapsulate the ideas of horizontal, posthuman, heterogeneous growth that trammels Deleuzian/Guattarian thought, in that they do not constitute a linear, vertical construction but a surface where any modulation is absorbed, closed in and eventually spread in lake-like smoothness. However, even radical rhizomes have been routinely fetishised in the literature as the way to guarantee openness, flexibility and contingency. This marginalises the fact that rhizomes can also be co-opted, overcoded and used in ways that go against the very idea of rhizome.[2] This is an interesting example of the complexity of the middle: neither necessarily 'good' or 'bad', positive or problematic, the space in the middle is a space of struggle—in this case, against origins, boundaries, centres. Even better, the space in the middle is a space of encounters with other bodies, a space in which a body affects and is affected by other bodies. At this point, it is important to clarify two terms: first, that *bodies* here must be considered in the Spinozan/Deleuzian sense, according to which "a body can be anything: it can be an animal, a body of sounds, a mind or idea; it can be a linguistic corpus, a social body, a collectivity" (Deleuze, 1988, p. 127). Bodies circulate in the milieu and might eventually be deemed 'good' or 'bad'. It bears repeating that the milieu is not a space of judgement, of secure values, of fixed constructions. Rather, the space in the middle is precisely *in the middle*: neither this nor that side; but then again, it is not a boundary and therefore is not flanked by sides. It simply is, a movement amidst movement. Likewise, it offers no direction: just as the leaves of grass move with the wind,

[2] Although Deleuze and Guattari specifically write that the rhizome cannot be overcoded. See Michulak (2008).

the space in the middle consists of the *encounter* between the grass and the wind. *Encounter* is the second term that needs clarification: an encounter for Deleuze and Guattari pushes the encountered parties off their comfort zone of categories and identities, and throws them in a "mad becoming" (Deleuze, 2004, p. 141). The grass becomes wind and moves along the wind's breath, the wind becomes grass and spreads itself on the ground: becoming itself is pushed deeper in the middle, as it were. Finally, the space in the middle offers no chronology and no external causality: all is interfolded in simultaneity and immanence. The wind becomes the grass, the grass becomes tomorrow's grass, its beginning is in the middle, in the space of here, manically flapping around its movement.

2 The Territory of Milieus

Deleuze and Guattari (1988, p. 313) differentiate between various milieus: "an exterior milieu of materials, an interior milieu of composing elements and composed substances, an intermediary milieu of membranes and limits, and an annexed milieu of energy sources and actions-perceptions." All these together constitute the multiplicity of the milieu: "the milieu is not unitary: not only does the living thing continually pass from one milieu to another, but the milieus pass into one another, they are essentially communicating" (1988, p. 313). Imagine a series of papers folded into one another, their folds becoming one common fold that trammels all, yet remains different for each one of these sheets of paper: one milieu yet multiple, whose space extends and contracts in various directions. The spatiality of the milieu is complex, not only because of its amoeba-like quality that belies Euclidean understandings of space but also because of its blatant indifference towards questions of inside and outside. For while there are interior and exterior milieus (and some in-between and some exceeding), milieu as multiplicity unfolds itself across all such distinctions. Let's look at the example of a spider web that Deleuze and Guattari employ as perhaps the clearer indication of such indifference towards inside and outside: "an animal milieu, such as the spider web, is no less "morphogenetic" than the form of the organism" (1988, p. 51). The spatiality of the spider's milieu includes, while crossing, both the body of the spider itself and the web that the spider generates. The morphogenesis of the interior milieu (the body of the spider) is shared with the exterior milieus of oxygen, water, nourishment, climate, wall, web and so on. There is no difference between body and its surrounding space—indeed, there *is no such thing as surrounding space*. Body and surrounds are one ontology, indeed one milieu whose confines cannot be placed squarely and neatly around its own body, or even 'home': "the street enters into composition with the horse, just as the dying rat enters into composition with the air, and the beast and the full moon enter into composition with each other" (1988, p. 262). Each body (enterprise, creative gesture, intelligent chat, etc.) can never operate outside its milieus: its own internal milieu in direct ontological continuation with the milieus located between, around and even further outside its internal milieu. This is space and time in full material presence. The composition of the various milieus form an

assemblage (or *agencement* in the original French, which points more explicitly to its agentic qualities), namely a rhizomatic gathering of body and milieu around their reciprocal spot of determination: "one certainly cannot say that the milieu determines the form; but to complicate things, this does not make the relation between form and milieu any less decisive. . . The form. . .can only be constituted in an associated milieu that interlaces active, perceptive, and energetic characteristics in a complex fashion. . . and the form can develop only through intermediary milieus that regulate the speeds and rates of its substances" (1988, pp. 51–52). What is fascinating, and indeed relevant to the present discussion, is the impossibility of isolating either the role of space or the process of knowledge production from this reciprocal generation of milieu and form. The *constitution* of the assemblage both necessitates and relies on the generation of continuous knowledge (of self, of milieu and of the link between them, if one were pedantic enough to separate them), itself unfolding on a busy spatiality of material movements.

Let us look at the role of space more closely. While Deleuze and Guattari never make explicit references or give specific definitions to space and spatiality in general, it is clear that there are at least two basic spatial directions in the construction of a milieu: one that goes from external milieu to the body ('the form' or the interior milieu), and one that goes from the body to the external milieu (that includes exterior and annexed milieus, namely material such as nourishment, atmosphere, cultural and geographical specificities and so on, and the generated annex of the 'web', which could be seen as the sphere of influence of the body). A positive, form-generating milieu allows for the emergence of a strong assemblage that affects and is affected by other rhizomatic bodies in a way that the assemblage itself can manage. A problematic milieu may easily (but not necessarily—the causality is not inescapable) have the opposite effect. In their analysis of Kafka's work, Deleuze and Guattari write (1988, p. 214): "If Kafka is the greatest theorist of bureaucracy, it is because he shows how, at a certain level (but which one? it is not localizable), the barriers between offices cease to be "a definite dividing line" and are immersed in a molecular medium (*milieu*) that dissolves them and simultaneously makes the office manager proliferate into microfigures impossible to recognize or identify, discernible only when they are centralizable." In this case, bodies dissolve into a sea of weak forms, where individuality is subjugated to the overflowing bureaucratic milieu. These two directions are not simple external-internal links but lines that cross the space of every milieu's multiplicity.

It is clear that for Deleuze and Guattari, and for us here, space cannot be considered a container, a background or a mere question of measurement. Far from that, space is everywhere and every-body: bodies are space, just as milieus are space. Spider *is* space, rather than simply something that takes up space. Spatiality is not something assigned to one layer of a milieu. Rather, milieus are spatial through and through. Milieus, however, are also time. The spider web is constructed across space and time, just as the birth and death of the spider and the dissolution of its web extend across the wall corner and the days of its life. These milieus are repetitive, pulsating with rhythm: "every milieu is vibratory, in other words, a block of spacetime constituted by the periodic repetition of the

component" (Deleuze & Guattari, 1988, p. 313). This rhythm is not an ancillary trait of the milieu but the only way of its survival: "the milieus are open to chaos, which threatens them with exhaustion or intrusion. Rhythm is the milieus' answer to chaos" (Deleuze & Guattari, 1988, p. 313). Milieus emerge from chaos and never lose their rhizomatic openness to it, itself a force of attraction and destruction. Rhythm, however, is not a mindless repetition of the same, like meter or cadence would be. Rather, rhythm is the production of *difference* through repetition (Deleuze, 2004). Rhythm is knowledge-production at its most material: blocks of movement across time and space combine to build, every time anew, a form of identity that is radically divorced from similarity and fully given to the difference and individuality of every beat.[3] Rhythm always generates a different milieu, like a moving target whose sole aim is to escape the seduction of chaos. So, if rhythm organises milieu against chaos, what is it that organises milieus in relation to each other? Deleuze and Guattari offer what impressionistically seems a distinctly spatial answer: *territory*.

Territorial discourse is a complex one, and here we shall limit ourselves only to a few remarks. The relation between milieu and territory is one of emergence: a territory is built out of blocks of milieus: "A territory borrows from all the milieus; it bites into them, seizes them bodily (although it remains vulnerable to intrusions). It is built from aspects or portions of milieus" (Deleuze & Guattari, 1988, p. 314). Yet, territory is not a clear-cut spatiality (what would that be anyway?). Rather it is, again, a spatial and temporal process, an act with three movements in no causal order: reterritorialisation, deterritorialisation and territorialisation. "The territory is the product of a territorialization of milieus and rhythms" (Deleuze & Guattari, 1988, p. 314). Through territorialisation, milieus are being set up in relation to each other (not necessarily in oppositional relation) on the plane of material markings. Territory is our connection to the world, to the *Umwelt*, to the multiple milieu that includes our own body (with its own identity, spatiality and so on). Deleuze and Guattari (1988, p. 10) have woven a memorable and explicit connection between body and *Umwelt* in the following: "the orchid deterritorializes by forming an image, a tracing of a wasp; but the wasp reterritorializes on that image. The wasp is nevertheless deterritorialized, becoming a piece in the orchid's reproductive apparatus. But it reterritorializes the orchid by transporting its pollen. Wasp and orchid, as heterogeneous elements, form a rhizome." Territorialisation consists in spatial and temporal claiming. Such claimings are not necessarily in the nature of ownership; rather, they are mostly intended as *nomos*, namely as spatial distribution: "the *nomos* as customary, unwritten law is inseparable from a distribution of space, a distribution in space" (Deleuze & Guattari, 1988, p. 312). The nomic side

[3] This is what Deleuze and Guattari call *hacceity*, namely a departure from the limiting and fixing qualities of traditional identity politics, for a sort of identity of difference that "consists entirely of relations of movement and rest between molecules or particles, capacities to affect and be affected" (1988, p. 262). Hacceity is an understanding of identity as a hybrid collectivity that does not focus on the individual but on the connection of the individual with other bodies in the broader sense of the term.

of spatial distribution has to do with occupying certain spots against others in order to construct and maintain one's identity. While this may be converted into the logic of ownership, nomos does not contain the strict boundaries of exclusion and permanence that ownership has (see Brighenti, 2010; Philippopoulos-Mihalopoulos, 2012). The nomos of territorialisation is given to the milieus and the rhythms which it territorialises, entering into a relation of reciprocal determination. Thus, according to the needs of an interior milieu and the offerings of exterior milieus, the body may territorialise other milieus, and in the process modify itself according to the new data.

In his work on territorology, Andrea Brighenti has convincingly argued the following positions on territory: first, that a territory is not an object and should not be confused with the space where it takes place (Brighenti, 2006). Brighenti's position is that a territory does not have to be spatial. We will depart from this, in view of the above discussion and the connection between milieu and territory, and attempt to interpret it somewhat more broadly: while territory no doubt is also spatial, it cannot be thought of as exclusively spatial. Rather, and this accords with Brighenti's position, territory is the effect of various affective relations between actors. We will add to this that it remains a spatial, although not exclusively so, effect of affective relations. Second, although as we mentioned above, territory is not about ownership but about social relations, the latter are not necessarily devoid of hierarchical, modernist traits: "the focus of territory is not exclusion from a given area, but creation of ordered social relations, which are, in many cases, relations of dominance" (Brighenti, 2010, p. 67). With these two positions, Brighenti builds a processual, eventual understanding of territory, and as such given to the flows of affects between various bodies. We shall talk about affects below, but here suffice it to say that affects are the way in which bodies prove their power against each other. Thus, the affective nature of territory means that it can easily turn into dominance. This is controlled by legal instruments of boundary marking and maintaining, themselves however not immune to the seduction of power (Philippopoulos-Mihalopoulos, 2011). Further, Brighenti's discussion attempts at bringing together the spatial and the relational. However, while he answers the question of the passage from the material/spatial (say, spatiality of territory) to the immaterial/relational (say, social relations) through the use of technology (Brighenti, 2010), he omits to discuss the opposite, namely how the immaterial passes into material. The question is particularly relevant for our project: what is the reason for which creativity and innovation dwell in specific urban geographies, as the second part of this volume shows? We shall look into this in the following section, when the nature of creativity is explored.

3 The Emergence of Creativity

What makes an assemblage creative? The answer is simple, and can be sought in the reciprocal way in which body and milieu determine each other. As we have seen, milieus organise themselves around a rhythm. This rhythm is not identity (it is not

meter or cadence) but difference: each body differentiates itself, not only from other bodies but also from itself, through rhythm: "a milieu does in fact exist by virtue of a periodic repetition, but one whose only effect is to produce a difference by which the milieu passes into another milieu" (Deleuze & Guattari, 1988, p. 314). Through repetition of difference, a body pushes itself further, jumps milieu as it were. This is territory as process, namely an act that pushes a body always further, riding what Deleuze and Guattari have called *lines of flight*, namely lines that a body follows or carves anew that push the limits of the body's creativity always further. The creative energy of rhythm consists in the fact that it opens up spaces in-between milieus, between its beats, that allow one to move further, to another rhythmic configuration, another innovative formation. What is more, this pushing of the limits is visible to other milieus. It is all about creating and maintaining a distance with other milieus, while at the same time acknowledging an affinity with them: "the territory is first of all the critical distance between two beings of the same species: Mark your distance. What is mine is first of all my distance; I possess only distances" (Deleuze & Guattari, 1988, p. 319).

Although the above hardly needs spatial translation, it might be worth putting it more explicitly: the main condition for the emergence of creativity is the creation of difference through a repetitive rhythm that takes place in the space between propinquity with other milieus and distance from them. This is the reason for which similar knowledge-creating enterprises tend to congregate in specific urban areas, assembling themselves in clusters of affinity, yet attempting to differentiate themselves through their own rhythm: it is all about setting up adequate conditions for the emergence of creativity through innovative lines of flight. Each enterprise slices a piece of the spatial and temporal block of the collective milieu of similar enterprises in order to assemble around it the knowledge it needs in order to jump milieu and go beyond itself. As Brighenti writes, "the very production and accumulation of knowledge is a territorial move" (2010, p. 57). To simplify, knowledge requires territorialisation of a milieu, and creativity subsequently requires deterritorialisation of the same milieu and then reterritorialisation of the space between this and the next milieu. Knowledge does not necessarily lead to creativity, unless its very own gaps are covered by artful reterritorialisation, a different, new process of *becoming*, of changing oneself by passing into other forms of identity, even unsuspected ones: "one does not think without becoming something else, something that does not think—an animal, a molecule, a particle—and that comes back to thought and revives it" (Deleuze & Guattari, 1994, p. 42). But in order for territorialisation to be successful, there is a need for at least part of last night's territorialised space to be retained—hence, deterritorialisation is never a mindless erasure of the past but merely a reassembling of existing knowledge in order to configure it in new reterritorialising combinations.

We will follow Deleuze and Guattari and call each knowledge-creating enterprise's creative move, its *refrain*. A refrain is an expression of rhythmic difference that marks a territory against other territories. The discussion in Deleuze and Guattari spans various types of refrains, from bird songs to Wagnerian *leitmotifs*, all of which have the same function: to mark territory, and at the same

time to make this marking obvious to other refrain-singing rhizomatic bodies. Through a refrain, a territory acquires perhaps the most important of its characteristic: it becomes *expressive*, it assumes qualities that differentiate it from others. A refrain endows an assemblage with spatial range and temporal consistency: "professional refrains intersect in the milieu, like merchants' cries, but each marks a territory within which the same activity cannot be performed, nor the same cry ring out. In animals as in human beings, there are rules of critical distance for competition: my stretch of sidewalk. In short, a territorialization of functions is the condition for their emergence as "occupations" or "trades" (Deleuze & Guattari, 1988, p. 321). The most remarkable feature of a refrain is that it allows an assemblage to carry on altering itself, to remain rhizomatic by finding new spaces in-between and bringing forth new opportunities for jumping milieus; yet, at the same time, the refrain allows the assemblage to ground itself by literally bringing it down to earth: "the role of the refrain has often been emphasized: it is territorial, a territorial assemblage. . .it always carries earth with it; it has a land (sometimes a spiritual land) as its concomitant" (Deleuze & Guattari, 1988, p. 312). This posits some interesting questions in relation to globalisation and the supposed despatialised nature of the current economy, which typically omits to take into consideration the relevance of its spatial context. The globalised fantasy of an *über* ontology that manages to float, cloud-like, above spatiality and temporality, is routinely belied by the material presence of huge data storage facilities, call centres across the globe, or site-specific financial functions, to mention only a few examples,[4] and reveals the confusion between the dream of eliminating spatiality (which is impossible) and the reality of displacing it to other, economically more advantageous geographies.

Another characteristic of the refrain is its openness to the new, the environmental and the potentially risky. The refrain is the effect of a rhythmic transcoding, namely the openness of the assemblage to fragments of difference that become automatically part of the assemblage. This is neither mere adding-on to the existing language of the assemblage, nor however an ingestion of difference. Rather, through transcoding, creativity emerges as innovative reterritorialisation: "whenever there is transcoding, we can be sure that there is not a simple addition, but the constitution of a new plane, as of a surplus value. A melodic or rhythmic plane, surplus value of passage or bridging" (Deleuze & Guattari, 1988, p. 314). Transcoding carries on with territory-as-process while reminding the assemblage that its boundaries must remain both open and closed; both marked and ready to be permeated by new fragments of difference that come from different milieus and might have the potential of unsettling the existing assemblage. Yet it is within that risk that the creative potential also nests. This is particularly relevant to issues of creative identity, which are often tied down to obsolete similarities (with one's own past, with one's own collectivity and so on) and impede experimentation with other bodies for fear of being affected too much and thus losing one's 'identity'. But

[4] See my work on globalisation in Philippopoulos-Mihalopoulos (2007).

identity very quickly becomes mere shackles, if the practice of transcoding, namely openness to difference through heterogeneous assimilation, is not adopted.

This openness, however, does not mean that the assemblage is encouraged to return to chaos. Only flirting with chaos is allowed! And no doubt, flirting there must be. Flirting with chaos as the constant need for creativity that can come only through a mad becoming, an unthinking, a dizzy glance into the abyss. For "what would thinking be if it did not constantly confront chaos?" (Deleuze & Guattari, 1994, p. 208). Yet, as already mentioned, this creative thinking must be inserted in a plane of consistency, which retains its heterogeneity while displaying an openness to its altered states. Remarkably, to the question 'what holds things together?', one should refrain from answering in the traditional way of origin, hierarchy, centre, boundaries. Deleuze and Guattari (1988, p. 327) argue that it might well be "the most deterritorialized component, the deterritorializing vector, in other words, the refrain, that assures the consistency of the territory." The one that moves above the ground while grounding the assemblage is the one with the capacity to make the whole assemblage stick to its internal consistency. The refrain is not a strict boss or a rigid structure, but a medium of opening while repeatedly keeping to the rhythm of the assemblage's identity. This is the reason for which Deleuze and Guattari (1988, p. 336) call the refrain a *transversal*: "what holds all the components together are transversals, and the transversal itself is only a component that has taken upon itself the specialized vector of deterritorialization. In effect, what holds an assemblage together is not the play of framing forms or linear causalities but, actually or potentially, its most deterritorialized component, a cutting edge of deterritorialization."

The above discussion can be consolidated in three important findings: first, it is by now obvious that a refrain is a component of an assemblage, a collectivity, a pack of wolves scouring a territory. This means, quite simply, that knowledge-creating enterprises can never exist in spatial isolation but always in a collectivity. In these conditions, creativity might emerge. Still, creativity has to do with the ones who position themselves at the edge, humming an ever-altering refrain while pushing the boundaries of the assemblage on ever-new lines of flight. Second, there is no beginning or linear organisation in the creative assemblage. Rather it is a matter of "densifications, intensifications, reinforcements, injections, showerings" (Deleuze & Guattari, 1988, p. 328), namely differentiated viscosities of organisation that cluster around particular strengths while distributing strengths, gaps, intervals, inequalities. This is the meaning of beginning in the middle, namely taking into account one's milieu and progressing from it, in speed and pause, in trial and error, working inside whole reaching outside. Finally, the very act of consistency is creative, since it rides on the various rhythms rehearsed within, in the operation of transcoding without homogenising: "a superposition of disparate rhythms, an articulation from within of an interrhythmicity, with no imposition of meter or cadence. Consolidation is not content to come after; it is creative. The fact is that the beginning always begins in-between, intermezzo. . .What makes a material increasingly rich is the same as what holds heterogeneities together without their ceasing to be heterogeneous" (Deleuze & Guattari, 1988, p. 329). The above

elements, namely collectivity, absence of origin or linearity, and creative heterogeneity, will be of assistance in the following section, where the concept of atmosphere will be suggested as a way of thinking about organised milieus of creativity.

4 Creative Atmosphere Created

Atmosphere attracts. An atmosphere has it all: oxygen, water, horizon, future, comfort, productivity, belonging, imperceptibility. Above all, it is all there is:[5] life cannot survive outside it. Any venturing outside is premised on the condition that a small chunk of the atmosphere will be taken along, a *memento vitae* in a glass bowl. Atmosphere spans the geological, the psychological, the scientific, the political, the legal, and appears differently in each one of these. Indeed an atmosphere might appear different even to different individuals. Yet, and although connected to bodies and their affective connections, and occasionally apprehended by consciousness, atmosphere is not a phenomenological entity because it does not depend on apprehension.[6] If anything, atmosphere is preconscious and can only be apprehended post-facto.[7] Furthermore, atmosphere does not engage with the distinction between subject/object, but indeed with the indistinguishability between the two. Finally, atmosphere is properly speaking rhizomatic: it does not begin from one or the other side (subject/object, space/time, consciousness/body), nor does it have a prescribed direction of movement, but rather floats on the common surface of parallel unfolding, which is neither an in-between, nor a synthesis. Thus, I suggest that *atmosphere is the excess of affect that keeps bodies together; and what emerges when bodies are held together by, though and against each other*.

Deleuze and Guattari have not addressed the topic of atmospheres. We would like to place this atmospheric layer on top of their structures yet in intimate connection to them. In that sense, we suggest that atmosphere is a *refrain* of a material assemblage which spreads across a collectivity in ways that cannot be accurately predicted yet can be directed. Atmosphere is a little motivating rhythm that is whispered singsong in the ears of susceptible bodies: production, creativity, energy, feel-good, cosy, work-life balance. Or even more ambiguous ones: nationalism, supremacy, consumerism, sustainability. It emerges through the folds of an assemblage and locates itself on its edge, tracing the lines of milieus and holding it all together, an unsung anti-hero. An atmosphere, just as a refrain, is neither necessarily good, nor necessarily bad. It becomes, it alters itself, it succeeds or

[5] "Atmospheres are made available as total settings of attractions, signs and contact opportunities" (Sloterdijk, 2004, p. 180).

[6] This is explicitly against Gerhard Böhme's understanding of atmosphere as "the common reality of the perceiver and the perceived" (1995, p. 34). For my objections to this and further atmospheric analysis, see Philippopoulos-Mihalopoulos (2013).

[7] Marshall and Marshall's (1879), work on industrial atmospheres points to a historicisation and post-facto assessment of atmospheres, without, however offering the tools to reproduce them.

fails. The difference, however, is that an atmosphere is often engineered—an atmospheric feature that has managed to escape close scrutiny in most of the relevant literature.[8] Milieus, at least according to what we have discussed so far, are assemblages that fluctuate on the plane of reciprocal determination between body and surrounds. Territory is a mark that consolidates the milieu and expresses itself to others across time and space. While both the above share with atmosphere the non-phenomenological qualities of emergence and subject/object indistinction, they are not engineered, at least not in the non-rhizomatic way that an atmosphere might be. This means that atmospheres might well emerge, in the same way as milieus and territories do; and when they do, atmospheres catch on the rhythm and embody the refrain, and extend themselves over and between milieus and territories, glossing them over with a preconscious, fully corporeal desire to belong to the particular atmosphere (or not). Yet, at the same time, this atmospheric emergence can be constructed, orchestrated, directed, even engineered, with specific political, economic or legal objectives in mind and according to specific sensory and psychological affective controls that build on the relations of dominance that have been observed in territories.

The above is a distinctly posthuman understanding of atmosphere and as such requires a modification of the usual definition of affect. An overview of what an affect is and how it can be used in defining an atmosphere is beyond the scope of this text (see Philippopoulos-Mihalopoulos, 2013). Suffice it to say, however, that the affective discourse must reconsider the usual emotional, sensorial and discursive exclusions. The challenge is multiple: first, to understand affect as an indistinguishable totality of the above elements; second, to take affects, not as phenomenological, human-originating qualities but as ontological, posthuman attributes of an atmosphere. Thus, affect is posthuman in the sense that it neither originates nor ends necessary in humans. An affect is indeed acentral, in that it floats about rather than causally originating in one source. Finally, an affect always exceeds its body of origin, fully given to the way the air moves. This means that affects are always contextualised within an atmosphere, and must always be considered as elements of an atmosphere. So, let me suggest that *affect is the sensory, emotional and symbolic multidirectional flow, at the same time in and exceeding a body, that affects other bodies, and in so doing contributing to the emergence of an atmosphere*.

It is important, however, to venture even further. Although an affect is rhizomatic (i.e., excessive, acentral and posthuman), it *can* be manipulated or at least smoothed into a direction. As François Lyotard writes (1993), affects are the libidinal intensities that allow a system to direct desire. In that sense, as the connections between body and world, affects can be exploited and channelled in a predetermined direction that serves consumerist needs, capitalist abstractions, legal obedience and political placation. Or indeed less deleterious directions, such

[8] See however Choy (2011).

as creative regeneration, innovative thinking, knowledge-accumulation, and so on.[9] The moot point, however, is that one never knows exactly how the directing will work out. Just like anything that ventures outside a given milieu and engages in transcoding, there is risk. Affects may become far too excessive to be controlled. Especially when aggregated in the form of urban atmosphere, they will change in a volatile way. Urban atmosphere in particular is a risky thing, full of incalculable factors. As Nigel Thrift (2008, p. 170) writes, "cities can be seen as roiling maelstroms of affect." In view of such urban complexity, or what Sloterdijk (2005, p. 948) calls, "a place of enhanced improbabilities", affective orchestration is not always destined to succeed, even when established techniques of complexity reduction are followed, such as common rituals that enable the assembly of "agents of coexistence in the improbable" (Sloterdick, 2005, p. 948).

On this basis, atmospheres rely on affects, consist of affects and help maintain and direct affects. Atmospheres are (always) affective (Anderson, 2009). At the same time, they emerge in the space of affective excess in two ways. First, in terms of time. Massumi (2002, p. 35) defines affects as "virtual synesthetic perspectives anchored in (functionally limited by) the actually existing, particular things that embody them". An affect can never be fully captured and assimilated—it is both plural ('synesthetic') and future-tending ('virtual'). Massumi uses the virtual here in the Deleuzian sense of horizon of potentiality, of not yet but potentially actualised actuality. The affect's inability to be fully captured, the "escape of affect" (Massumi, 2002, p. 35) is at the same time its ability to capture the virtual. Although firmly rooted in the *here* of the body, the affect protends to its virtual becoming. Second, affective excess is material: "affects go beyond the strength of those who undergo them. . .Affects are *beings* whose validity lies in themselves and exceeds any lived" (Deleuze & Guattari, 1994, p. 164). An atmosphere relies on the affect exceeding the body of its appearance, since atmospheres establish themselves through imitation or contagion. In her psychoanalytical work on affective transmission, Teresa Brennan (Brennan, 2004, p. 170) has shown through clinical observation how affects are transmitted from bodies and spaces to other bodies and spaces. This is Sloterdijk's (2004) point when he refers to Gabriel Tarde's concept of imitation (1903). Affective imitation spreads like grass amongst the bodies and spaces of these bodies, co-originating in the various milieus and giving rise to an atmosphere.

To sum up, atmosphere is a spatiotemporal and corporeal emergence whose effect on society can be engineered towards specific goals. However, since its emergence and maintenance relies on the excess of affective contagion, there is no way in which one can be certain that the desired effect will be achieved. Atmosphere is, after all, air, gas, vapour, extending in uncontrolled ways and dissolving without notice. It is within these parameters that one can talk about an atmosphere conducive to knowledge or creativity. It is not merely a matter of

[9] See Böhme (1995), for architectural atmospheric construction and Borch (2011) on the potential of atmospheres for organisations, and more specifically, corporate bathrooms.

cosying-up the office space. The act of atmospheric engineering is itself creative, and has to take into account the following issues: first, the emergence of atmosphere is a collective event that relies on prior having taken into account the multiplicity of the milieu that are expected, actually or virtually, to take part in it. This requires an openness to the possibility of different milieus from the ones originally anticipated. Atmospheres evolve in surprising ways and unless one wants to bring in the oppressive presence of legal or peer-pressure coercion (with their own, distinctive atmospheres) or fall into existing patterns of social domination, one needs to be able to deal with affective escape of atmospheres. Second, atmosphere as refrain needs to be edgy yet familiar, catching on existing rhythms and repeating them, while at the same time creating a space of uncanny disjunction, an interval that invites the participating bodies to follow along. Atmosphere as refrain is a promise for further creative lines of flight. Third, atmosphere can only work in concrete spatial and temporal parameters that delineate it. In other words, atmosphere can only work within a territory. To put it even more radically, atmosphere is a process of constant re- and deterritorialising, moving along with the affective gestures of the bodies within, as well as anticipating those from the bodies without. Fourth, atmosphere is a totality that operates partly as a net of spatiotemporal affective movements, and partly as a space of exclusion of anything that might destabilise the interior stability of an atmosphere. This means that often atmospheres need to dissimulate themselves as the only space in which the specific event (whatever the main event of an atmosphere might be) can take place. This requires a strategy of dissimulation of the continuity that any atmosphere has with its outside (it is air after all), creating thus what Sloterdijk has called *bubbles*, namely immune totalities that exclude the outside while inside appearing safe and, in our case, creativity-conducive. Finally, although atmosphere is not an ethical space, it is nevertheless a space where ethical questions arise. Since atmosphere is all there is, it follows that inside an atmosphere there is hardly any space for questioning or resisting. This means that decisions that lead to the emergence and maintenance of an atmosphere must be placed within a milieu that enables horizontal cross-checking and cross-control.

5 Rhizomatic Passages

The present text has marked a rhizomatic strand that included several passages. From the various passages performed earlier, we choose three to consolidate here. The first one, and arguably the most important, is the passage from individual to collective. From milieu to territory to atmosphere, it is clear that knowledge-creation and creativity can only take place in spaces of collective articulation, namely organisation and expression. Right for the outset we dismissed the idea of a body as separate from its environment. Further, we saw how even a body's environment, that is the external milieu (itself part of the multiplicity of a milieu), is implicated in other milieu-formations of other bodies. Translated to an urban milieu, this means that the spatial affinity of collective knowledge-creating enterprises is a necessity without which individual bodies perish.

The second passage that we showed is the passage from conscious to preconscious, or even better to non-conscious. While conscience (in the sense of creative spirit, strategy, awareness etc.) is often hailed as central in knowledge-creating and creativity processes, a rhizomatic approach shows that conscience does violence to the affective movement within and between bodies, thus managing entirely to circumvent atmospheric considerations. This is particularly problematic for the new creative economy that relies on modern, rather than atmospheric, structures of hierarchy, origin and boundary creation, and which, consequently fails to move rhizomatically in the new territory.

Finally, the third passage is the one between space and space. The terms operate in several ways: from space as container to space as integral factor of knowledge-creation; from space as diffused globalised presence to space as concrete spatiality of knowledge deposition; and from space as important factor to space as fetish. The last one deserves a brief explanation. The way space has been dealt with here is obviously as a prime factor in all three configurations, namely milieu, territory and atmosphere. At the same time, however, we tried to avoid what often happens in the ambits of the fairly recent 'spatial turn' in humanities and social sciences, namely a fetishisation of spatiality in exclusion of other factors. Although not possible to expand on this here, it should suffice to say that space is seen as an enabler of new materialities, very much along the lines of atmospheric affects and body excess, with which new materialities space operates in conjunction rather than in opposition.

All three passages share the one characteristic of flirting with chaos. None of them is conclusive, authoritative or indeed safe. All of them allow a small amount of organisation to remain within the territory, while allowing chaos to ebb and flow on the territory's edge. Considering though that any territory is a rhizome, the above can only mean that the edge might well be located in the centre of it all, in the heart of the territory that we have called knowledge-creating space: indeed, in the middle of it all. The question, and perhaps the most important passage of all, remains the one between chaos (at the beginning, which is not a beginning) and chaos (at the end, which concludes nothing), with a bit or organisation in between to protect us from chaos.

References

Anderson, B. (2009). Affective atmospheres. *Emotion, Space and Society, 2*(1), 77–81.

Böhme, G. (1995). *Atmosphäre*. Frankfurt: Suhrkamp.

Borch, C. (2011). Foamy business: On the organizational politics of atmospheres. In W. Schinkel & L. Noordegraaf-Ellens (Eds.), *In media res: Peter Sloterdijk's spherological poetics of being*. Amsterdam: Amsterdam University Press.

Brennan, T. (2004). *The transmission of affect*. Ithaca, NY: Cornell University Press.

Brighenti, A. M. (2006). On territory as relationship and law as territory. *Canadian Journal of Law and Society/Revue Canadienne Droit et Société, 21*(2), 65–86.

Brighenti, A. M. (2010). On territorology: Towards a general science of territory. *Theory Culture Society, 27*(1), 52–72.

Choy, T. (2011). *Ecologies of comparison: An ethnography of endangerment in Hong Kong*. Durham, NC: Duke University Press.
Deleuze, G. (1988). *Spinoza: Practical philosophy* (R. Hurley, Trans.). San Francisco: City Lights.
Deleuze, G. (2004). *Difference and repetition* (P. Patton, Trans.). London: Continuum.
Deleuze, G., & Guattari, F. (1988). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). London: Athlone Press.
Deleuze, G., & Guattari, F. (1994). *What is philosophy?* (H. Tomlinson & G. Burchell, Trans.). New York: Columbia University Press.
Hofsess, B., & Sonenberg, J. (2013). Enter: Ho/rhizoanalysis. *Cultural Studies ↔ Critical Methodologies*. doi:10.1177/1532708613487877.
Honan, E. (2007). Writing a rhizome: An (im)plausible methodology. *International Journal of Qualitative Studies in Education, 20*, 531–546. doi:10.1080/09518390600923735.
Lyotard, J. F. (1993). *Libidinal economy* (I. H. Grant, Trans.). London: Athlone Press.
Marshall, A., & Marshall, M. P. (1879). *The economics of industry*. London: Macmillan.
Massey, D. (2005). *For space*. London: Sage.
Massumi, B. (2002). *Parables for the virtual: Movement, affect, sensation*. Durham, NC: Duke University Press.
Michulak, M. (2008). The rhizomatics of domination. In B. Herzogenrath (Ed.), *An [un]likely alliance: Thinking environment[s] with Deleuze/Guattari*. Newcastle: Cambridge Scholars Publishing.
Philippopoulos-Mihalopoulos, A. (2007). *Absent environments: Theorising law and the city*. New York: Routledge.
Philippopoulos-Mihalopoulos, A. (2011). Critical autopoiesis: The environment of the law. In B. De Vries & L. Francot (Eds.), *Law's environment: Critical legal perspectives*. The Hague: Eleven International Publishing.
Philippopoulos-Mihalopoulos, A. (2012). The Triveneto transhumance: Law, land, movement. *Politica & Società, 12*(3), 447–468.
Philippopoulos-Mihalopoulos, A. (2013). Atmospheres of law: Senses, affects, lawscapes. *Emotion, Space and Society, 6*(2).
Serres, M. (1982). *The parasite* (L. R. Schehr, Trans.). Baltimore: The Johns Hopkins University Press.
Sloterdick, P. (2005). Atmospheric politics. In B. Latour & P. Weibel (Eds.), *Making things public*. Cambridge, MA: MIT Press.
Sloterdijk, P. (2004). *Sphären III: Schäume. Plurale Sphärologie*. Frankfurt am Main: Suhrkamp.
Tarde, G. (1903). *The laws of imitation* (E. C. Parsons, Trans.). New York: H. Holt.
Thrift, N. (2008). *Non-representational theory: Space/politics/affect*. New York: Routledge.

A Hermeneutic Approach to the Knowledge Economy

Augusto Cusinato

If we didn't get into muddles, our talks would be like playing rummy without first shuffling the cards . . . (G. Bateson)
. . . as long as we know how to play rummy.

Abstract

Although mainstream economics continues to ignore the hermeneutic turn that occurred in the last century, enterprises are de facto adhering to it in their creative praxes. Having outlined a hypothesis about why and how this discrepancy happened, the chapter provides a reassessment of both the notion of the 'knowledge economy' and of the relationships between knowledge and creativity. Showing that a hermeneutic approach endows actors with incomparably higher creative potential than the usual cognitivist approach, the chapter further explores the spatial dimension which is inherent in hermeneutic practices. This exploration leads to a reassessment of Durkheim's seminal notion of generative milieu, with specific reference to collective learning. As a result, the concept of landscape turns out to be crucial in enhancing learning and creativity. With the aim of building a bridge between the theoretical and the empirical parts of the volume, this chapter finally provides an analytical frame for scaling milieus, from the dialogical to the organisational and further to the urban scales. In order to achieve this, it proposes the operational notions of 'Knowledge-creating Milieu' and 'Knowledge-creating Services'.

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1 Introduction

The assumption of mainstream economics—that the distinguishing feature of the knowledge economy is industry's massive and constantly increasing recourse to knowledge,[1] largely thanks to the advent of ICTs—is right but shallow. My opinion is that a deeper change is occurring within firms, which mainstream economics is not equipped to ascertain because of its persisting adherence to the triad individualism-behaviourism-cognitivism, on which it grounded its distinctiveness within social sciences and against the classical 'political economy'. Taking into consideration the long-running epistemological debate about that triad, which can be condensed as a criticism of modernism, a much wider horizon opens, ranging from sarcasm and irony against the naivety of moderns (and especially their presumption of having acquired a reliable way of progressively eschewing naivety from the scientific domain) to a more compassionate and ethical stance with regard to the fact that human beings are in any case destined to live with it.

Hermeneutics shares this latter acquisition: instead of proceeding towards the extreme (and ultimately authoritative) options of nihilism and/or relativism, it proposes a *praxis*, not for seeking the truth, but for unveiling those unconscious and ideological devices that drive viewpoints and eventually allow them to be affected by a sort of cognitive blind spots.[2] With specific reference to scientific method, these blind spots hinder subjects from devising empirical-logical tests which could be decisive in rejecting possible critical hypotheses, so that the very basis of logical-empiricism is subject/exposed to radical questioning.[3] The praxis that hermeneutics proposes fundamentally lies in shifting the cognitive focus from the relationship between mind and external objects to the relationship between minds. This needs to take place in order for it to be possible to perceive dissimilarities and, especially, traps in the ways relationships with and within 'things' are established. Interpretation rather than explication thus becomes the main cognitive stance (rather than 'tool'), which shifts the main focus of attention onto what the cognitivist approach sees as disturbances, such as ambiguities, dissonances, misinterpretations and slips.[4]

From the historical viewpoint, it would be reasonable to assume that the hermeneutic approach would essentially remain confined to the philosophical and aesthetic domains inside which it originally formed, and would in case pass 'by osmosis' into society at large mainly through cultural debate and generational turnover. Yet, and this is a crucial idea of the book as a whole, these steps are taken, not only at an unexpected pace, but surprisingly through enterprise.

[1] See the seminal works of Machlup (1962), Drucker (1968).

[2] Our recourse to this metaphor is designed to underline that fallacies rather than errors are at stake in this connection (Coe & Wilden, 1978).

[3] One among many: Von Glasersfeld (1984).

[4] Since it is impossible to recall here the course and the map of the hermeneutical debate, we can only quote the author who, in our opinion, best renders this epistemological but also ethical turn, Ricoeur (2004).

'Surprisingly' because enterprise is one of the most spectacular creations and the champion of modernity. As announced in the *Introduction*, the hypothesis is that, despite the patent lack of interest on the part of economics (Lavoie, 1990), this unexpected outcome rests on the concurrence of at least three conditions: (a) a resurgent interest in innovation, (b) the advent of ICTs and (c) the pragmatic realisation, within firms, of the greater creative power of a hermeneutic approach to knowledge and creativity[5] by comparison with the usual cognitivist approach.

Whilst the centrality that innovation has assumed in advanced economies does not deserve further examination within this chapter, some clarification is needed of the idea that ICTs are at the origin of a shift towards hermeneutic praxis within enterprise, just because the mainstream thought gives them a strengthening power with respect to the cognitivist approach to creativity. The next Section is devoted briefly to this issue. Section 3 examines the implications of a hermeneutic approach with regard both to the notion of creativity and connected praxes. After showing its greater heuristic and generative power, the Section attempts to systematise the debate about the triad of knowledge-space-creativity, which still suffers an inhibiting connection with the cognitivist approach. This leads to a reassessment of Durkheim's seminal notion of 'milieu' and the suggestion of the notion of "Knowledge-creating Milieu" as a basic analytical tool for examining that triad from a hermeneutic viewpoint. Finally, Section 4 provides a methodological frame for empirical investigation on knowledge-creating milieus at various scales (firm, city and region), which works as a bridge to the second part of the volume.

2 How Is the Hermeneutic Approach Entering Enterprise?

The hypothesis about how the hermeneutical praxis is entering the enterprise and, through it, probably society at large, is that this is happening, somewhat ironically, thanks to the advent of ICTs, which were expected to allow enterprises at most to enhance their modern/cognitivist approach to knowledge. Considering that enterprise is one of the main realisations of the modern ambition to dominate nature (and also society), and that the prospect of fulfilling that ambition has risen amazingly since industry and science joined forces in the second half of the nineteenth century, enterprise itself would appear as constitutionally far away and also reluctant with respect to the hermeneutic exercise: it actually seems not to fit well at all with the entrepreneur's urge to take decisions without hesitating, and overcome complexity through innovation.

[5] Since Schumpeter (1934 [1911]) distinguished between 'ideation' and 'innovation' within the creative process, and identified the entrepreneur's figure with this second kind of activity, mainstream economics has usually focused on 'innovation', leaving the question of ideation to other disciplines, such as psychology and applied research. Though the Schumpeterian distinction is crucial (and also captive) on the analytical plane, it does not fit well at the pragmatic level because innovation itself also entails ideation (Lane, Pumain, van der Leeuw, & West, 2009). This is why we prefer to make general recourse to the more embracing term 'creativity', which encompasses both activities, except when we refer explicitly to the mainstream economic approach.

To understand how that surprising event could have occurred, it is expedient to examine what took place within the communication circuits inside firms with the advent of ICTs.[6] Before then, communication necessarily required the intervention of the human factor, since the monitoring of automatic devices, based as they were on electro-mechanical technology, only worked in analogue mode, without any possibility of their being integrated into a complete monitoring system. Within this structural condition, the role of workers was also to make communication possible at the firm level, by translating (in the double sense of transferring and interpreting) the signals that were emitted by the different peripheral monitoring devices. However, this unavoidable human intervention means that communication at whole was pervaded by ambiguity, since individual mental habits[7] and related interpretative attitudes are idiosyncratic, not to mention that ambiguity can also be opportunistically produced (Cusinato, 1996). Even the most peripheral worker thus had at her/his disposal the power to condition the performance of the entire system, since s/he was able to affect communication, albeit at an infinitesimal level (Marcuse, 1964). It also becomes clear why (a) most of the top management's care was devoted to establishing detailed protocols in order to minimise ambiguity within the communication circuits (Alvesson, 1993; Sennet, 2006), and (b) the typical industrial enterprise assembled all productive phases within the same plant, the factory: if technical indivisibilities can explain the then large dimensions of plants, the proximity between technically divisible parts and phases of the productive process satisfied the need both to reduce the decay of informational contents and prevent free-riding within the communication.

The advent of ICTs has wholly upset this scheme. The fact that it is now possible fully to integrate the peripheral monitoring devices into a single "syntactic"[8] network thanks to the generalised recourse to digital language, has made the intervention of the human component in the codified communication circuits tendentially superfluous. It follows that for the first time *it has become possible* (*and convenient*) *to materially disembed syntactic/'monological' communication circuits from the previously single circuit*, *within which this kind of communication was inextricably entwined with the human/'dialogical' communication*.

This *material* separation has crucial consequences inside firms and industry in general. Firstly, the closeness between the human factor and routine activities is no longer necessary. Secondly, routine activities have become potentially foot-loose, except when there are technical indivisibilities. The major consequence has however consisted in the chance the firm now has to experience the higher creative potential of the human/'dialogical' communication, thanks precisely to its inherent ambiguity

[6] See Cusinato and Gibin (2009).

[7] In the sense Dewey (1922) gives this expression, as pragmatic routines and, more comprehensively, "energy organized in certain channels" (p. 76). Commenting on him, Bridge (2013) writes that habits are "[schemes of] implicit knowledge, repeatedly deployed to meet or select elements in the ongoing environment and developed through routine practices" (p. 306).

[8] The term is drawn from Nonaka and Takeuchi (1995).

(which thus becomes a resource).[9] The door thus opens to experiencing and eventually consciously adopting a hermeneutic approach to creativeness and innovativeness, and hence displacing focus from the material production of goods to the handling of those conditions that are suitable for generating "vision[s] to create something new" (Audretsch & Thurik, 1998, p. 23). When the hermeneutic chain has entered the firm praxis, boundaries between firms and the socio-cultural realm also become vaguer and more permeable than they where within a modern/cognitivist approach: rather, they become a new action-field for the firms themselves (Lash & Urry, 1994), and this is the possible way through which a hermeneutic attitude *pragmatically* enters society as a whole. If true, we could argue that, as often happens, the praxis also in this case precedes any theoretical achievement—"*l'intendance suivra!*", strategists wisely say—, as if society were now harvesting the fruits of the dense and also dramatic debate on modernity, even plainly bypassing it entirely. So, in conclusion, we advance the hypothesis that the peculiarity of the knowledge economy does not 'simply' consist in the nonetheless indisputable dominance that knowledge-based activities have achieved within the economic system (cf., for example, Drucker, 1968; Foray, 2000; Karlsson, Johansson, & Stough, 2013; Machlup, 1962; Madanipour, 2011; OECD, 1996) or in the more sophisticated realisation that firms have interiorised the practice of relational learning (cf. Florida & Kenney, 1993; Gibbons et al., 1994), but in *the pragmatic (*i.e., *maybe, unreflective) internalisation of hermeneutic practices as a core strategic activity*.

3 Knowledge and Creativity

3.1 A Hermeneutic Approach to Creativity

Knowledge is a complex topic to deal with, because it is coincident with the mind which has to conceptualise it. The earliest written notion of knowledge in Western culture tells us that knowing is 'having experience of'. Not every kind of experience involves knowledge however, but only those the individual realises mentally. 'Mentally realising' something—let us label it a—means giving it a sufficiently clear and distinct representation. At a first elementary step, this occurs when the individual becomes able to conceive $\neg a$, which entails including a in the binary set $\{a, \neg a\}$, thus giving steadiness to its image, in that the subject can find a again through the double negation: $\neg(\neg a) = a$ (Piaget, 1954). This ability does not entail any creativeness however, but only intelligence, because the individual remains confined within the mechanical opposition inside which $\neg a$ is the mere reflected image of a, though in negative. For creativity to take place, s/he has to learn to scatter $\neg a$ into a wider set of possible determinations, which finally leads her/him to substitute the complement $\bar{a}$ for the negation $\neg a$ and *build*/*create* the set $A = \{a, \overline{a}\}$.

[9] In this same sense, Rullani (2014), who writes "Automation changes the nature of the work within enterprises, by connoting it as highly generative knowledge-intensive work" (p. 53; my translation).

The fact that s/he learns to replace $\neg a$ with $\bar{a}$ has crucial implications. Considering that the subject works in a condition of bounded rationality, s/he can envisage only a few $i, j, \ldots$ determinations among all n possible complements to a, so that s/he is able to conceive only contingent sets $A_i = \{a, \overline{a}_i\}$, $A_j = \{a, \overline{a}_j\}$, …, with $1 \leq i, j, \ldots < n$, instead of the exhaustive set $A = \{a, \overline{a}\}$ s/he would be able to envisage in conditions of absolute rationality. Properties (i.e. meanings) concretely assigned to a therefore become equally various and contingent, depending on what specific $A_i = \{a, \overline{a}_i\}$ the individual chooses from the exhaustively unknowable set A, so that any A_i s/he conceives appears to her/him as original, i.e. *created*.[10]

It follows that:

(a) *creativity is a by-product*—the most amazing by-product one can conceive—*of bounded rationality*. From this viewpoint, a hypothetically omniscient individual cannot genuinely create anything, but only realise what s/he already has always known, as Alvesson (1993) acutely remarks, from a normative perspective: "Creativity could [. . .] be said to be something that is needed when knowledge is insufficient, and when we have enough knowledge we don't have to be creative" (p. 1000);

(b) *creativity entails a second-order contextualisation*. While in first-order contextualisation a is opposed to its pure negation, in second-order contextualisation $\neg a$ breaks down into a set of possible contingencies $\bar{a}_i$. A crucial difference occurs however between first- and second-order contextualisation: whereas in the first the individual deals directly with some notions s/he has about something real a (or s/he conceives as real) by setting it against its negation, in the second-order contextualisation s/he deals with the way(s) s/he conceives the negation itself, thus opening the door to innumerable possible though comprehensively unknowable complements (the set A)[11];

(c) *handling creativity entails further and maybe endless orders of contextualisation*. Once the individual has experienced the way(s) to contextualise mental processes, s/he may question the way(s) through which s/he has chosen a certain set $A_i = \{a, \overline{a}_i\}$ within a wider set A of possible determinations. By realising this, s/he learns about how to become creative

[10] It is also worth noting that the choice process of certain complementary sets $\bar{a}_i, \bar{a}_j, \ldots$ among the virtually n possible ones follows the rule of abduction. Within the complementary world to a, which practically encompasses the entire universe minus a, the subject selects only some subsets on the basis of contingent and ultimately imagined relations with respect to a (which correspond to analogies in the process of abduction). This remark makes it possible to match the above-depicted approach to creativity (we derive from Bateson, 1972) with the Peirce approach, according to which "abduction [. . .] is the only logical operation which introduces any new idea" (Peirce, 1934, p. 121).

[11] It is only by conceiving creativity as springing from second-order contextualisation that it becomes possible to overcome Alvesson's (1993) paradoxical remark which opposes knowledge to creativity. It actually holds up only within a first-order contextualisation, as said in point a), when the set complementary to the known object is exhaustive (as simply being its negation) or, more generally, only within a condition of absolute rationality, when all the possible determinations of the complementary set are knowable.

(in the sense we have just given this term), in that s/he becomes able to conceive alternative sets to A_i;

(d) *creativity has to do with ambiguity* in a twofold way. On the one hand, creativity can be viewed as the mental-and-social expedient humankind has found to cope with ambiguity and, more generally, with complexity and connected undecidability. When subjects are facing such a condition, they have two alternatives at their disposal: to resign themselves and put themselves into the hands of a metaphysical entity which would have the *capacity* for comprehending and resolving ambiguity, or audaciously circumventing it by resetting their view on things through abduction, and maybe betting on the reliability of the new view, as modernity assumes. Hence, it does not seem too unrealistic to argue that the "institutionalization of creativity" (Murata, 2003, p. 229) is a typical creation of modernity, the indispensable keystone to give consistency to the modernist fabric, and the from then on also the irrefutable endowment to any post-modern thought.[12] The so-called "creative class" would hence be any other than the modern—i.e. de-sacralised, mundane—version of the sacerdotal class. Both ultimately act as the ministers of ambiguity: the sacerdotal class by conferring it to the Creator's solving power, the creative class by taking it into its own hands, and both ultimately belonging to the common class of rhetoricians (Alvesson, 1993). On the other hand, creativity gives rise to further ambiguity. Once realised that any possible imagined/created set $A_i = \{a, \overline{a}_i\}$ is inherently a contingency within an ultimately unknowable set A of possible other ones, an aura of ambiguity rises around the meaning—any specific meaning—the individual can assign to a. It follows that, once modernity has institutionalised creativity within the social fabric, an endless self-nurturing, cumulative process of complexity circumvention and complexity generation takes rise: from then on, humankind is destined (or doomed?) to live together with creativity (Sardar, 2010).

This notion of creativity is consistent with Bateson's approach (Bateson, 1972), which identifies four levels of learning (Table 1). At the lowest level, *Learning zero* (*L0*), no kind of contextualisation and therefore knowledge occurs: every experience/notion is singular and impossible to connect to other experiences/notions.

In *Learning 1* (*L1*) the subject becomes able to re-cognise objects, because s/he contextualises them with respect to their negation. In turn, *Learning 2* (*L2*) differs essentially from *L1* in that it entails reflection on mental processes: the subject learns to contextualise the specific way by which s/he builds negations, by including it (the way) in a set of possible others. The main focus is no longer the qualities of the observed object (external to the mind), but the way(s) mind works in establishing relationships with it. Attainment of this capacity is possible only by learning to perceive/establish differences from other minds, which leads to the consideration that *L2* necessarily entails a relational context (even if not all such contexts are conducive to it). *Learning 3* (*L3*), which Bateson argues is very

[12] See Montuori (2011).

Table 1 Learning levels and the rise of creativity

Learning levels	Logical abilities	Knowledge contents	Learning abilities
0	$a\ {}^{b}_{c}\ \neg a\ \neg b$	Unrelated experiences	No intelligence
1	$A = \{a, \neg a\}$	Contextualisation of a with respect to its negation	Intelligence/ information building
2	$A_i = \{a, \overline{a}_i\}$	Contextualisation of a with respect to a contingent complementary set $\overline{a}_i$	Creativity
3	$A = \{A_i, \overline{A}_i\}$	Contextualisation of A_i with respect to a contingent complementary set $\overline{A}_i$	Creativity governance
4 (?)	...	...	...

difficult to accomplish and to observe in practice, finally appears when the individual learns to contextualise the specific way by which s/he contextualises the way(s) s/he relates to the external world. Becoming able to wield this kind of learning means to access the matrix of creativity itself, thus opening the door to dealing with it.

Moving a little aside from the chain of successively inclusive levels of learning described above, the *fil rouge* of hermeneutics appears to join them, which is the art of interpreting interpretations[13] through a progressive de/re-contextualisation of one's own interpretative viewpoint. The basic lesson of hermeneutics is that the interpretative ground, at whatever level it lies, is scattered with traps which are rooted in the unconscious and ideological realms, and can *systematically* hinder individuals from recognising some crucial elements for learning (one among many, Ricoeur, 2004). After this radical criticism, it is no longer possible to suppose that knowledge can rely upon a dependable criterion for assessing the convergence of mental representations to reality, i.e. truth: there is no reasonable way of rejecting the doubt that previously acquired attitudes (earlier than aptitudes) may induce subjects *systematically* to neglect some crucial null hypothesis, with the consequence that the key device to which logical-positivism has *entrusted* its reliability—logical-empirical testing—itself remains exposed to fallacy. In this 'new' epistemological condition,[14] humans have no alternative other than to engage in the fascinating and, at the same time, demanding exercise of applying the cognitive repertoire they have at their disposal at any given moment to their daily life, while being aware that it is ineluctably contingent, and with the only possible consolation that everyone else shares the same inescapable condition.

At least three issues are worth noting in connection with this acquisition. The first is that a hermeneutic approach to knowledge is the proper means of access to

[13] "Philosophy itself becomes the interpretation of interpretations", Paul Ricoeur (2004, p. 11) comments on Nietzsche's hermeneutic stance. About the art condition of hermeneutics, see Schleiermacher (1998).

[14] 'New' because it has risen from a criticism of modernity.

creativity and, mainly, creativity governance, because it induces subjects to deal with both their cognitive attitudes and aptitudes, whereas the positivistic approach focuses on the latter. Secondly, a hermeneutic approach to knowledge can only occur and develop within a social context (Madison, 1990). Whereas *L1* can come into being merely by establishing relationships between mind and things external to it, without the subject questioning the cognitive attitudes by which s/he does so, moving to superior levels of learning entails reflection on mind, and s/he clearly cannot do this by relying only upon her/his own mind. But when, where and how can subjects learn a capacity for appreciating differences in others' mental habits compared with their one's own, and for questioning them? *Dialoguing* is the main and probably the only way subjects have to reciprocally open their mind each other. So we shall now spend some lines exploring the structure of the dialogical experience, because this will allow us ultimately to recognise the third issue inherent in a hermeneutic approach, that is the relationship occurring between space and learning (and eventually creativity), which constitutes the central topic of this chapter and the book as a whole.

3.2 The Dialogical Experience

The precondition for a dialogical experience to take place is that the parties involved admit the idiosyncratic character of their respective mental habits, and they dialogue precisely in order to perceive the singularities of those habits through the ambiguities they both generate by exchanging their viewpoints. Although they appear to be exchanging referential meanings, they are in fact exchanging margins of ambiguity, which they both believe to be susceptible to interpretation by reshaping their own respective mindsets.[15] The primary condition for an individual to form an attitude for dialoguing—and therefore for dealing with mental habits—therefore consists in offering to share her/his own mind with others and 'betting' on reciprocation, with the rules and *temporal and spatial conditions* it has to comply to be effective. To apprehend them, it seems expedient to resort to a metaphor, and precisely to the scheme of the 'silent trade' Herodotus (484-425 B.C.) refers to in a passage of *Histories*, which is worth quoting in full:

> The Carthaginians say also this, namely that there is a place in Libya and men dwelling there, outside the Pillars of Heracles, to whom they have come and have taken the merchandise forth from their ships, they set it in order along the beach and embark again in their ships, and after that they raise a smoke; and the natives of the country seeing the smoke come to the sea, and they lay down gold as an equivalent for the merchandise and retire to a distance away from the merchandise. The Carthaginians upon that disembark and examine it, and if the gold is in their opinion sufficient for the value of the merchandise, they take it up and go their way; but if not, they embark again in their ships and sit there; and the others approach and straightway add more gold to the former, until they satisfy them: and they say that neither wrongs the other; for neither do the Carthaginians lay hands

[15] On the generative role of disagreement within a hermeneutical approach, see Ciancio (2012).

> on the gold until it is made equal to the value of their merchandise, nor do the others until the Carthaginians have taken the gold (Herodotus, 1890).[16]

Let us now detail the main requirements for exchanging something (be it "words, goods or women" as *the* anthropologist would say) in delicate/risky conditions similar to those just depicted:

- *reciprocal exposure of the parties involved*. Though the parties in the silent trade do not come into direct contact, they lay themselves open to each other in conditions of extreme vulnerability. The physical exposure of one to the other is not only the preliminary step for a mutually advantageous exchange to occur in a prospect of a 'repeated game', but also symbolises making her/him the gift of one's own safety—putting it into her/his hands—thus gambling on the willingness to reciprocate (Godbout & Caillé, 1993). "Copresence—Boden and Molotch (1994) write significantly—is 'thick' with information. [... It] delivers far more context than any other form of human exchange" (p. 259);
- *capacity to suspend urge*. In the scene quoted above 'waiting' is the key attitude for exchange to succeed. The scene develops in separate acts, which are divided by waiting pauses, and everything occurs as in slow motion. Dialogue too entails reciprocal 'exposure' of something precious between parties, which are somehow extraneous to each other, not because they do not reciprocally know, but because they start dialoguing by hypostatising that such extraneousness of respective mental habits is the pre-condition for exploring differences between them. And as with the silent trade of goods, exchanging 'minds through words' requires the parties to moderate any urge while being conscious that this exercise allows them to express their viewpoints (and ultimately their minds) with calm and confidence;
- *space interposition*. Along with time, space plays a crucial role within the above scene, because it is only thanks to the relative distance parties interpose between each other that they can reciprocally expose themselves and their goods without fearing attack. A third space is purposely created with respect to their own 'territories', where they alternately place offers and possibly achieve exchange. Again like the silent trade, the device the dialoguing parties resort to is the creation of a shared mental third space between them, with respect to which they repeatedly perform that double exercise of shuttling from/to it and sitting and waiting, which makes exchange possible[17];
- *sense of sacredness*. Respective 'private' spaces and the common space are sacred to the parties involved, as well as the 'goods' they lay in the common

[16] The Muslim traveller Ibn Battuta (1304-1369 A.D.) refers to similar practices alongside the Volga (Battuta, 1929).

[17] It is no accident that from Galison (1997) onward scientists of very different domains (Derry, Schunn, & Gernsbacher, 2001; Gorman, 2010, among others) have increasingly been concerned with the metaphor of "trading zones" to explain the socio-spatial conditions that make exchange possible between sub-cultures (including scientific sub-cultures).

space. Though goods in the metaphor and words in the dialoguing experience are destined to be picked up by the 'other', they remain untouchable until the parties have 'silently' agreed to exchange them;

– *silence*. Exchange happens without the parties bargaining verbally each other, because this would imply very close physical proximity, which is highly risky. This means that an enigma arises with reference to the dialogical experience, which can only happen through somehow intimate exchange of words. As we shall show a few lines below, the solution cannot be found anywhere other than at the symbolic level;
– *(cautious) openness to external space*. Silent trade is a form of long-distance exchange (Curtin, 1984). Though the Carthaginians are patient, silent, and focused on the restricted space of that small piece of the Libyan coast, they range across larger spaces, in which to launch ventures. The calm, the softness which connote their behaviour in fact constitute a short provisional pause within a wider exciting and maybe turbulent traffic net. The dialoguing condition too entails wider spaces around which to be allowed to range by the parties involved: to avoid entropy, the space of dialogue must remain cautiously open to the external world, and induce guests to make a mental shuttle between the two. Voices, buzz, and also noise coming from the external world must enter that protected space, albeit in a softened manner, to remind parties that their dialogical experience is a temporary though precious suspension of everyday social life, and not at all a comfortable refuge from it.[18]

An actual topology of space thus comes into being, where the topological character means that space assumes a generative power, in that it helps to mould the subjects' mental attitudes. In the case of silent trade, the interposition of a sacred space between respective territories induces them to experience the symbolic dimension, in that from then on that space serves to set and also fix a special kind of social relationship between them (a sort of "equilibrated reciprocation", according to the Sahlins (1974) tripartition of reciprocity. In the dialogical experience, where physical proximity matters a lot,[19] minds are the parties' private, intimate spaces and the third common space is essentially a mental creation, the symbolic repository of exchanged words, emotions and also silences. The fact that parties may reify that mental space into the short physical distance which lies between them, with its arrangement of objects, however simple it may be, is none other than the device they resort to ensure that their dialogical experience remains acknowledgeable in time, and to evoke the possibility that precious but always singular and frail experience may renovate.

With this, we are now reaching *the* crucial point, which concerns relationships between space and knowledge, and ultimately between space and creativity. This is

[18] See Goldoni, in this book.

[19] Only by being proximate each other parties can reciprocally show their full availability to open their mind each other, and also to be 'touched' in this very delicate part.

crucial because the question arises, on the normative side, if a deliberate physical arrangement of space, through design and maybe planning, can help to shape learning and creative attitudes. And this is even more crucial if we remember that learning and creativity have become the driving forces of socio-economic development. The next section will be devoted to dealing with this issue, which lies within (or beneath) most current contributions to the regional science, but remains (in our opinion) somehow inconclusive, due both to a certain ambiguity about the adopted notion of knowledge and the lack of consideration for the role the symbolic-and-emotional dimension plays within learning. Examination will bring us, firstly, to meet the well-known notion of 'milieu' in regional science, which we shall try to provide with a more substantial foundation than it has in that literature and, finally, to define two analytical tools—'Knowledge-creating Milieus' (KCM) and 'Knowledge-creating Services' (KCS)—which will prove to be particularly suitable for both theoretical and empirical investigations in the realm of the knowledge economy.

4 Space, Knowledge and Creativity

4.1 From Space to Milieu

The relationships between space and creativity is an issue which has attracted renewed interest on the part of economists since about the late 80s,[20] following a long period of neglect after the seminal works of Marshall (1898, 1919) and Schumpeter (1934 [1911]; 1939).[21] Our opening rationale regarding this issue rests on the intriguing evidence that this resurgent interest replicates the two authors' different and also divergent views of it. At first glance the difference reflects a diverse (and from the Schumpeter standpoint, incompatible) notion of the role space plays within the process of innovation 'production' and diffusion. According to him, space is a mere facilitator of (or impediment to) the diffusion of innovation, with no bearing on the agents' aptitudes and propensities towards innovation. Marshall's work, on the other hand, implicitly suggests that space, while undeniably playing this passive role, also plays a part in shaping those aptitudes and propensities.

The difference actually involves deeper aspects than those referring to the role of space as regards innovativeness, including the ontological status of the notions of space and of knowledge themselves. Though without making explicit reference to the above scholars, Capello (2007) renders the difference by distinguishing between a "physical-metric" and a "relational" notion of space, to signify the opposition between an abstract, a-historical and neutral idea of the material dimension within which events necessarily take place and a historicised image of context-specific

[20] For reviews, see Breschi and Malerba (2001), Simmie (2005), but there have since been many additions to the literature.

[21] Except by some not incidentally heterodox scholars (for example, Jacobs, 1961).

socio-spatial conditions, which are reputed to be conducive to particular economic outcomes (including a propensity towards innovation). The question thus remains whether space plays only the conventionally recognised functional role of making the 'production' and diffusion of innovation easier, or whether it also performs a generative role in enhancing (or hindering) creativeness.

The search for an answer entails recourse to a string of intermediate notions between 'space' and 'creativity', like knowledge, atmosphere, place, milieu, landscape. As discussed above, the first and inescapable notion coming into play in this connection is *knowledge*. While admitting that ideation stems from a re-combination of knowledge, a wholly different image of the relationships occurring within the space-knowledge-creativity triad stems from looking at the middle term from a purely informational-syntactic point of view, in the sense that knowledge is considered as processing information coming from the environment (*L1*), or according to a dialogical-pragmatic approach, in which knowledge equates to constructing information within a certain relational space (*L2* and following levels).

In the first case, space only intervenes as a repository for informational spillovers and the channel through which they spread into the surroundings. Schumpeter's thought is very clear-cut on this point: while stating that space makes the diffusion of innovation possible, he resolutely contended that it can perform any other role; according to him, innovation essentially comes first and space only has an instrumental function (Schumpeter, 1939). While agreeing with this functional approach, however, neo-Schumpeterian scholars partake of a more "differentiated"[22] notion of space with respect to the quasi-Euclidean image the founder maintained. According to them, important agglomeration economies (of whose soundness Schumpeter was rather sceptical, except for scale economies) may stem from spatial proximity between firms, institutions and other public goods with reference to knowledge creation, storage, elaboration and diffusion (for example, Etzkowitz & Leydesdorff, 2000; Lundvall, 1992). A geography of innovation *à la* Krugman (1979) thus becomes possible, owing to the variable thickness of informational spillovers in space, the working of self-reinforcing mechanisms between spillovers and innovation (Romer, 1986, 1990) and deliberate or fortuitous interaction between actors (Reich, 1992; Rogers, 1962). In any case, space, in their view, remains no more than the physical base on which those occurrences take place.

For their part, Alfred Marshall and his followers—who generally adhere to the regional science school—claim that space is not merely the passive support for innovation clustering and diffusion, but constitutes a condition for its emergence. In their view, 'space' openly refers to something more than its physical dimension for no other reason than that inert matter, by definition, has no generative power. With reference to some successful British "industrial districts", Marshall identified this 'something more' in what he called "*industrial atmosphere*", that is "secrets in the air" (Marshall & Marshall, 1879, p. 53) which "yield gratis to the manufacturers

[22] The term is also drawn from the taxonomy proposed by Capello (2007).

[...] great advantages, that are not easily to be had elsewhere" (Marshall, 1919, p. 284). More specifically, in his view 'atmosphere' refers to local and essentially immaterial public or club goods, such as informational spillovers, context-specific know-how, trustfully interpersonal relationships along with an associated reduction in strategic uncertainty,[23] and a spirit of emulation among agents.

Marshall did not, however, give a detailed explanation of the process through which a specific industrial atmosphere arises (and can also dissolve) and works, except for three aspects he mentioned somewhat in passing: (i) its endogenous nature; (ii) its indigenous, place-specific character and, finally, (iii) the mechanisms through which knowledge forms and flows within the local system, which may well rest on spillover diffusion, as "each man profits by the ideas of his neighbours" (Marshall & Marshall, 1879, p. 53), but also on learning, in that "where large masses of people are working at the same kind of trade, they educate one another" (ibid.), on emulation—"[Man] is stimulated by contact with those who are interested in his own pursuit to make new experiments" (ibid.)—and on interactions between producers and "representatives of merchants and large dealers" (Marshall, 1919, p. 284).

These insights into the content and ways of working of 'industrial atmosphere' have not yet succeeded however in dissolving the metaphorical aura which surrounds the term. Apart from admitting that such an atmosphere refers mainly to locally-specific immaterial public goods which, among other features, enhance learning and innovativeness, the question remains of how this actually takes effect. If learning simply occurs through informational spillovers, 'atmosphere' is no more than a synonym for a conductivity channel, i.e. an inherent property of physical space; if 'education' simply happens through (maybe involuntary) information exchange, without any emotional involvement of the parties, 'atmosphere' is reduced to the probability of interpersonal contacts; and if emulation merely consists of copying others' best practices, it turns out to be more the outcome of a mimetic ambience than a condition for its creation.

So there has to be something more in 'industrial atmosphere' (and 'atmosphere' in general) for it to possess a generative power, and a possible way to detect this 'something' is to delve into its metaphorical aura. The question has obviously not passed unnoticed within the scientific debate, and the notions of 'place' and 'milieu' are two main examples of how scholars have tried to cope with it. As regards 'place', the emphasis falls on the relational aspects which *take place* within a certain localised community. Augé (1995) notes that, in contrast to the abstractness, a-historicity and anonymity of 'space', 'place' is connoted "as relational, historical and concerned with identity" and stands for that system of local conditions which are required for the "organically social" to take form (pp. 77 and 94). "Place is space filled up by people, practices, objects, and representations", Gieryn (2000) writes more succinctly (p. 465). For his part, Farinelli (2003) underlines the emotional aspects which are inherent in local social

[23] See Camagni (1991).

relationships, noting that place is "a 'field of attention', the force of which depends on the emotional investment made by the people who inhabit it, [... and which] cannot be known from the outside, but only from the inside" (p. 121; my translation), thus throwing up a bridge between human geography and current reflexions on 'atmosphere'.[24] While agreeing with these views, Massey (2005) underlines the role that 'space' plays as a device for crystallising meanings and somehow annihilating the eroding work of time, in the face of which 'place', with/through its own evolving relational system, makes it possible to reconcile the spatial and temporal dimensions.

Independently of these variations, an active role is unanimously assigned to 'place', in contrast with the inertia of 'space': it helps to confirm collective and individual identities, to provide conditions for co-operation and to facilitate the *emplacement* of material and immaterial public goods.[25] But what is the role, if any, of the physical component of place—that is 'space', again—in these processes? Does it only work in a functional way, by providing the relational system with a material basis on which it can work and *fix* itself (Bagnasco, 1994) and, more broadly, by facilitating the actualisation of its innate potentialities? Or does it play an essential part in the relational system, by providing an original contribution to shaping (and not simply actualising) those potentialities themselves? Though it is known where the answer is to be sought, we are far from actually obtaining it: once it was admitted that physical emergences and their spatial arrangement have no generative power *per se* (Halbwachs, 1968), a substantial consensus grew around the idea that this generative power originates in/by their symbolic dimension. As Gieryn (2000) suggests in summing up a critical review of the notion of place in sociology, "places have power sui generis, all apart from powerful people or organizations who occupy them: the capacity to dominate and control people or things comes through the *geographic location*, *built-form*, and *symbolic meanings* of a place" (p. 475; emphases added). So, though the source of this generative power is indicated, how this power stems from "*geographic location*, *built-form*, and *symbolic meanings*" remains still largely unexplained.

The focus of this latter point on the enhancing/regulatory function of spatial arrangements on social action comes closest to providing an answer to the issue under examination, but it leaves still unresolved the question of their possible generative role, i.e. their capacity to induce people to act in a creative/innovative way. From that point of view, the actions people take within the constraints, pressures and incentives coming from a certain symbolic frame actually belong to a set of potential actions which could pre-exist people's decision to act. What is really at stake within a generative perspective is the idea that the arrangement of things fixed in space helps, through its symbolic meaning, to shape not only action within a certain set of potential moves, *but the composition of the set itself*. And the

[24] See, for example, *Emotion, Space and Society,* The journal of the Society for Study of Emotion, Affect and Space, Elsevier, http://www.sseas.org.

[25] For deeper examinations and critical reviews, see Werlen (1993), Gieryn (2000).

fact that the question has remained open can be deduced from a point Werlen (1993) lists among "Risky concrete research proposals" in the Appendix to his work, which concerns "the investigation of patterns of spatial arrangement as the intended/unintended consequences of actions *and as the occasion, furtherance or constraint of further actions"* (p. 208; emphasis added): here, "further" does not expressly mean "new and original", but neither does it exclude it.

A decisive answer *could* have come from Durkheim's work. In *Le règles de la méthode sociologique* (1895) he set out the rudiments for an 'organic'[26] theory of the generation of "social facts". He did so by reshaping the notion of milieu, which had already entered the debate about the role of the physical environment in shaping action and, more widely, culture.[27] Whilst not giving any definition of 'milieu', Durkheim outlined its constituent elements and the way they work to give rise to specific "social facts" (specific, in that they cannot be obtained otherwise), these elements being: (a) the volume, that is the number of people involved within a certain relational space, (b) the relational density inside them and (c) the way in which things are spatially arranged. When the first two variables cross certain thresholds, he stated, individuals experience sensations that they do not and cannot ordinarily feel, and which induce them to think and behave in ways other than they usually do.

Somewhat surprisingly, in commenting on these conditions, Durkheim made no further mention of the third element, as it has to be considered as a given condition, which reflects the extant social relationships. He actually concluded by stating that "[although] we are far from believing that we have uncovered all the special features of the social [milieu] which can play some part in the explanation of social facts [. . .] all we can say is that these [i.e. social volume and density] are the sole features we have identified and that we have not been led to seek out others" (Durkheim, 1895; English translation, p. 137). Three years later, Durkheim (1898) brought up this matter again, noting that social life rests on and is affected by a material "substratum", which "is composed of the mass of individuals who comprise the society, the manner in which they are disposed on the earth, and *the nature and configuration* of objects of all sorts" (quoted in Emirbayer, 2008, p. 77; emphasis added). How the substratum actually works in a generative way, however, again remained unexplained, except for a simile he provided by writing that "the constitution of this substratum directly or indirectly affects all social phenomena, just as all physical phenomena are placed in mediate or immediate relationship with the brain" (ibid.).

A hypothesis can be made by turning to Durkheim's remark about how societies symbolically project their system of relationships onto the physical environment. Symbols have the peculiarity of representing and also giving substance to otherwise ineffable signifieds (and consequently referents), as typically occurs with respect to social relationships: "*The symbolic has being; better, the symbolic produces being*",

[26] The term is not coincidental with reference to Durkheim.

[27] See Buttimer (1971).

writes Ferrel significantly (1996, p. 83; original emphasis).[28] The artifice human communities have found to represent notions which are 'beyond words' and make them safe from the contingencies (or "tactics"—de Certeau, 1984) of daily life has been their reification into physical items, possibly fixed in space. When charged with symbolic contents however, physical items not only and not so much *represent* certain signifieds which stand for certain referents, as occurs in the case of signs, but *replace* and, to a certain extent, *constitute* them. In these circumstances, it is the Word which *creates* the notion, and enables it to interact with the extant referents: without symbols and the connected rituals aimed at establishing and maintaining them as collective institutions, social relationships would turn out to be not only unsteady, ephemeral entities, but also impossible to realise mentally and to deal with practically.

Since symbols not only give origin to signifieds but also content to otherwise ineffable referents, the hypothesis can finally be made that *the vicissitudes of symbols affect mental representations and, through them, referents too,* i.e. *ultimately, social relationships*: a gesture or a lack of gesture can substantially change social relationships, as we all know well from daily experience. The crucial question however, is whether the same happens when changes occur in the material substratum (to make recourse to the Durkheimian lexicon) of symbols, that is concrete and spatialised items. Think, for example, of a traditional community and the damage caused by a natural event to a material item which is endowed with a symbolic content. Depending on the symbolic charge, it is not uncommon that the community interprets the damage as a sign sent by a transcendent entity in order to manifest her/his intention to put their relationship to the test. The traditional response is immediate action to repair the damage, usually by means of rituals, and the possible elimination or prevention of factors that could make it happen again. Repairing the material damage suffered by the symbolic item symbolically means exorcising the much more dreaded prospect that the injury will affect the mental system of representations and, through it, the relationship with the transcendent entity (which are both—relationship and divinity—imaginarily con-fused with/in the symbolic item) and, ultimately, social relationships (inasmuch as they are dissimulated).

In conditions of more cultural-and-social flexibility, the response may be quite different. Rather than immediately restoring the symbol's integrity, people (or, more likely, some of them) might wonder about the current relevance of the symbolic content fixed in it. This stage is accompanied by a relaxation in the hitherto necessary and rigid nexus between symbols, signifieds and referents, and a crucial opportunity thus arises to question the mechanism(s) of symbolic production. Once these people have become aware that symbols serve to convey (and fix)

[28] It is not possible to avoid quoting the extraordinary notion of 'symbol' Hugues de Saint-Victor (1096(?)-1141) gave by writing that it "is a bringing together, that is, a harmonizing of visible forms for the purpose of demonstrating things that have been stated *about what is invisible*" (translation from Latin quoted in Ricoeur, 2004, p. 55; emphasis added).

essential though ineffable contents (along with the prospect of handling them and, consequently, the underlying referents, i.e., the society itself), there is no longer an urge to repair the damaged symbol, because it no longer (or not so much) stands for something ineffable and untouchable, but something past or which could pass into a nearer or more distant future. From then on the symbol becomes a relict—a symbol, anyway!—of a past or different possible symbolic world: and if people continue to take care of it in these new conditions, their care *symbolically* serves to maintain the memory of that past or different symbolic world and, at a more reflective level, to call to mind that different symbolic worlds and different ways of looking at them are possible.

The latter kind of response allows people not only to distinguish symbols from their content, but to interact consciously with the process of symbolic production, which belongs to the *L3* experience. From then on they become able to look at a certain symbolic apparatus as one contingency among a set of possible others. And they also gain aptitudes and attitudes *to play* with it, not in the sense of trifling with it, but of enjoying a margin of freedom and creativity in interacting with it.

With these premises it becomes possible to look at 'milieu' in a more comprehensive way. In "cold" or "mechanical" societies, inside which social relations and the associated symbolic system are relatively firm, volume and relational density appear as the only necessary factors for (new) "social facts" to arise, as Durkheim states, whereas the spatial arrangement of symbolic items remains social-specific and rigid: possible changes are promptly corrected/reduced in order to avoid damage to the underlying symbolic system and the further underlying social system. This is maybe why Durkheim, referring mainly to "mechanical" societies, emphasised the conformative role of the material substratum, while neglecting its generative role: within this kind of society, the material substratum is in fact a datum, not a variable. On the contrary, in "hot" or "organic" societies changes in social relationships and, isomorphically, in the symbolic system are admitted, if not encouraged (Redfield & Singer, 1954). Once people become aware of the inherent contingency of any symbolic system, the spatial arrangement of things turns out to be a sort of canvas on which they can exercise their "heterogenetic" aptitudes for play with/in the symbolic dimension (ibid.). It is in the play-margin which forms between the relative steadiness of the symbolic system fixed in space—the *langue*—and the idiosyncratic impulses stemming from daily practices—the *parole* (de Saussure, 1983[1916]) or "idiolects" (Eco, 1979) or "tactics" (de Certeau, 1984)—that attitudes and aptitudes form to look at praxis as a malleable domain: which is precisely the domain of creativity and aesthetics (Böhme, 1993). From this point of view, the physical substratum of a heterogenetic society is no longer 'simply' the material support on which it fixes its symbolic universe, but the space within which it learns to give sense to things, to reshape it and to somehow re-create it. Within this symbolic/aesthetic/creational perspective, 'space' thus becomes *landscape*/*paysage*.

The notion and, before it, the experience of landscape occur just in that instant at which the subject realises the possibility of provisionally leaving aside—suspending—the concern with which s/he usually relates to the environment to

gain, maintain or also improve her/his material living conditions, and succeeds in adopting a more relaxed stance. This change of mindset does not have a rational foundation (rationalisation may come later, when the subject reflects on the experience s/he has made in changing viewpoint on the world, and on her/himself too), but rests on an emotional basis. The first written and also moving example[29] of how this change of perspective occurs and prompts the landscape experience is found in the Bible: Genesis (1:31) says that in the evening of the sixth day, when Creation had been completed (except for man and woman), God "saw every thing that he had made, and, behold, it was very good" (*The Holy Bible*, King James Version). When he "ended his *work*"—this is the term the Bible's translators use a few verses later (Genesis, 2:2; emphasis added), establishing an analogy between the act of creating and the human effort of working—God laid down his creative impulse and looked at the things he had created and at himself too (at the mix of aims, expectations, commitment, effort, pleasure and concern which accompanies any demanding work[30]), and finally said to himself: "Behold all that, and delight because your care and efforts have not been vain: everything is good". In that precise moment, God created the landscape too but, unlike all the other things he had created, he did not give it a name: so the landscape (and the emotional tie it subtends) became the first ineffable entity of Creation: by creating the landscape, God actually created the ineffable.

Like any emotional and aesthetic experience, the landscape experience also rests on a deep sense of taking leave: "The landscape has no history, one loses it as soon as one meets it" (Jakob, 2012, p. 46; our translation[31]). At the precise moment God invests things with His feelings, He becomes aware that from then on those feelings will not belong to Him anymore, but will follow the same destiny as the things themselves. This is maybe the reason why symbols are surrounded by an aura of the ineffable. They are called to carry out the otherwise unachievable task of perpetuating something which, like emotions and underlying relationships, is fleeting by its own nature: once originally experienced, an emotion can no longer be felt in its original form—"you could not step twice into the same river"!—, but only in that mixed form coming from the anguished awareness that it is going to be irremediably lost and the hope that other genuine emotions will come soon after. In this sense, God too, in giving rise to the original experience of landscape, somehow paradoxically felt the inexorable passing of time: just after *having* created the world, He had inexorably to take leave of his creative experience, though leaving the destiny of experiencing the real passing of time to the Creation itself.

From a stricter cognitive viewpoint, the landscape experience allows subjects to realise the extraordinary possibility of changing mental perspective—mental attitude—in viewing things. What until then had been seen as something to be mastered only by demanding work, from then on can become the pleasant,

[29] 'The first example' within the Judaic-Christian culture.

[30] Supposing that it is proper to bestow these feelings on God.

[31] See also Besse (2008).

harmonious fruit of their own or another's endeavour and care, irrespective of whether this other is an individual, a community, a transcendent entity or Nature: what matters is the feeling of freedom—of 'play', in the sense of free moving—the onlooker experiences by learning to see things differently from the usual (and constraining) way, to *create* different visions: the freedom of re-shaping their sense, her/his own image in relation to them and, most importantly, the possibility of sharing with others this very human experience.

At this point, one could however argue again that it is not physical space *per se* which matters in enhancing creativity, but the ability to re-interpret it as landscape. This is right, but physical space nevertheless comes into play within the perspective of landscape. As Massey (2005) and Liebst (2012) remark, the play of void and full spaces, barriers, corners and walks, in short the whole physical configuration of natural and built environment can enhance the attitude for imagining an infinite sequence of possible landscapes, as Giacomo Leopardi's poem *Infinite* admirably evokes:

Always dear to me was this hermit's hill,
And this hedge that always separates me
From looking at the distant horizon, but
Seated here and lost in an endless meditation
Which discovers a vaster space within,
Boundless silence and deep inner quiet,
My heart is nearly overcome. And like the wind
Murmuring among the leaves to which I compare
Its beating, this infinite silence, this inner voice
So with my mind I encompass an eternity,
And the seasons die, and the present lives
In that sound. And in the middle of all that
Immensity, my thought drowns itself:
Sweet to me, to be shipwrecked in this sea.[32]

The simple presence of an edge on the summit of a maybe modest hill in the Marche,[33] along with the murmuring of the wind among the leaves are enough, not only to free the poet's fantasy, but to mould it in a specific way: the imagining of "vaster spaces" ["un-terminated spaces behind it", with more literal adherence to the original version] and the past and the present seasons. Entering this creative experience in a more detailed way makes it possible to note that: (i) at its prime basis, there is the poet's inclination to feel—better, to induce—emotions, which acts as the 'efficient/moving cause' for the imaginative process will start; (ii) the specific kind of the physical environment—the material items with their spatial

[32] Translated by Richard Jackson, Numéro Cinq Magazine, 2(10), March 7, 2011. Available at http://numerocinqmagazine.com.

[33] Leopardi's native region in Italy.

arrangement and movement, the sounds and likely colours[34]—along with the poet's inclination, in that occasion, towards natural rather than human aspects,[35] provide the 'material cause', that is the specific set of elements to make use of to substantiate the creative process; (iii) it is however the barrier effect of the edge to the poet's sight to give finally form to the process, and to make it to 'precipitate' into a specific imaginative outcome. It was the poet, of course, who conferred such a role to the edge, in that he was mentally looking not at it but behind it, and this proves to be the decisive point in the creative process: only by hiding (a piece of) reality, only by interposing a wing to its view, only by suspending action and judgement, only by keeping silent (Brunello, 2014), does it become possible to trigger imagination.

The working of this mechanism of concealment was clearly described by Leopardi himself elsewhere:

> It is delightful and extremely emotional the view of the city light, where this is bevelled by the shadows, where the dark contrasts with the light, where the light degrades *poco a poco*, like on the roofs, where some hidden places conceal the sun sight, etc. The variety, the uncertainty, the impossibility of all viewing, and the possibility to ample vision through imagination as regards what one does not view, this all contributes to this delight. I say the same about the effects which are produced by trees, rows, hills, pergolas, farmhouses, haystacks, the unevenness of soils etc. in the countryside (Leopardi, 1901, p. 345; my translation).[36]

Creativity thus shows itself to be not simply re-combining knowledge in a new and useful way and, still less, the outcome of a problem-solving issue (cf. Jahnke, 2012). Re-combination certainly comes into play, but it is only the epiphenomenal aspect of the creative act. The most intriguing question at issue is not so much that a (useful) re-combination occurs, but *how* it occurs. If it happens within the range of the possibilities (and rules) of conventional knowledge, we are in the presence of 'mere' intelligence or literally inventiveness (i.e., finding). Genuine creativity requires not simply unknown but unexpected and original combinations, which do not wait to be discovered within the set of the possible ones associated with the conventional view of the world, but have to be built by somehow transgressing (literally, 'going beyond') it. The viewer's sight indeed goes beyond the bodies' material 'skin' to search for an image inside them, the image of her/his own interior landscape and the way(s) s/he (and people in general) mould it (Merleau-Ponty, 1964).

[34] See Goldoni, in this book.

[35] Nothing would have prevented the poet or another watcher in the same conditions seeing and singing (also) the human (or God's) hand under/within that little natural world, but Leopardi's well known anguished detachment from the common joys of social life and his 'religious atheism' can explain his inclination towards evocation of natural links.

[36] A very similar mechanism is described by Proust (1992): ". . . tout d'un coup un toit, un reflet de soleil sur une pierre, l'odeur d'un chemin me faisaient arrêter par un plaisir particulier qu'ils me donnaient, et aussi parce qu'ils avaient l'aire de cacher au delà de ce que je voyais, quelque chose qu'ils m'invitaient à venir prendre et que malgré mes efforts je n'arrivais pas à découvrir" (p. 172). See also Liebst (2012).

This achievement seems to be of some help in overcoming some vagueness about the actual role of space in creativeness which is readable in extant economic reflection on milieus and other contiguous notions (for example, Camagni & Maillat, 2006; Meusburger, Funke, & Wunder, 2009; Cappellin & Wink, 2009). It actually becomes possible to put forward the following chain of arguments:

(a) since any genuine cognitive experience entails taking leave from the so far existing practices of Self to explore some unknown territories,[37] it cannot be carried out without maintaining some ties, however frail, with that Self. 'Taking leave' does not mean abandoning it definitively, or breaking with it, since this would entail the risk of getting lost, if not raving. The device (at least) Humans have found to prevent themselves from falling into such a disaggregating condition, is to establish a net of emotional ties which allows them to lean out towards the unknown while preserving continuity with the Self and contact with the Others;

(b) that net of shared emotions is what makes a certain atmosphere to rise within the persons/bodies involved. This matches the notion of atmosphere Andreas Philippopoulos-Mihalopoulos puts forward in this book, namely "*the excess of affect that keeps bodies together; and what emerges when bodies are held together by, through and against each other*". Such an excess is the "social fact" stemming from (and inherent to) that net itself, namely sharing common emotions;

(c) the projection of such an atmosphere onto the physical space gives rise to the experience of 'landscape', which is the device individuals and communities take recourse to in order to give recognisable form to—and somehow to name—that essential though extremely volatile entity;

(d) the feeling of socially sharing a common atmosphere, which is symbolically fixed on a common landscape, is what transforms a local space into place, into that context-specific field of emotions Farinelli (2003) speaks about;

(e) when a certain place enjoys specific features, such as a degree of heterogeneity and relational density, it assumes a generative power, thus becoming 'milieu';

(f) finally to get to the notion of 'knowledge-creating milieu', it is worth remembering that not every kind of emotion is conducive to knowledge. Within the wider set of moral feelings, 'e-motion' (etymologically, 'moving from') designates a mental/experiential movement. Fear and panic, which are blocking feelings, do not properly belong to the realm of emotions, and actually hinder learning. Within real emotions, further distinction is possible, between backward and onward emotions. The first

[37] "The subjectification of learning can only occur through a certain quota of oblivion. This is why [Emilio] Vedova used to say that being a painter means living constantly on the «edge of a precipice», on the «edge of the void»" (Recalcati, 2014, p. 46; my translation).

ones, like nostalgia, bring the subject back to an already experienced condition and finally lock her/him into a self-nurturing, unproductive languor. On the other hand, not all onward emotions are conducive to knowledge: impulse, want, pre-tension are again idealisations of something already experienced, they are nostalgia cum aggressiveness rather than cum languor. It is only by moving onwards while agreeing to take leave from the Self, that subjects can experience/know something genuinely new. This means that a generic milieu turns into a 'knowledge-creating milieu' if endowed with a specific kind of atmosphere, which encourages people to 'take leave from', towards exploration of new experiential fields, without fearing of loosing themselves.

4.2 Scaling Knowledge-Creating Milieus

As illustrated above, the dialogical context is a basic socio-spatial device—a sort of gymnasium—for experiencing the creative power of a hermeneutic approach to knowledge and, more comprehensively, praxis. The dialoguing context is not the only kind of creative milieu however: other and more articulated socio-spatial devices enjoy such a generative power, so that, paraphrasing Durkheim, it can be viewed as the 'elementary form of creative milieu'. The present sub-section is devoted to portraying these other ideal-types of milieus and explaining their specificities in relation to the dialogical milieu, as regards constituent elements, ways of working and outcomes.

To this end, it seems useful to remark that the notion of milieu which Durkheim refers to is actually a specific kind of milieu. To understand this specificity, it is enough to compare his idea of milieu with the one we have just discussed when speaking about the dialogical experience: the main difference consists in 'volume', that is the number of people involved. When Durkheim (1895) speaks about 'volume', he is thinking of a number of individuals which is so great that reciprocal visual control becomes impossible, so that heterodox behaviours (i.e. novelties) can occur; and when he refers the notion of milieu to smaller communities, he is pointing to a condition inside which reciprocal control is deliberately suspended, as happens in the orgiastic rituals of the Australian aborigines he describes (Durkheim, 1912). In his work, 'volume' in fact stands for, and somehow masks, a deeper condition, which is 'heterogeneity' and, more precisely, 'heterogenesis', in the sense Redfield and Singer (1954) later gave this term,[38] to point to deviances (and related innovations, when certain deviances succeed in taking root within the social context) which arise within milieus characterised by relatively high social density.

Assuming heterogenesis rather than volume, it becomes possible to achieve a more general milieu structure from which to derive different forms of

[38] See also Pellicani (1992).

implementation, with crucial consequences for policies. A condition of heterogenesis can come into being in different ways: within a dialoguing context, it stems from the (few) participants' resolve to make the emergence of reciprocal idiosyncrasies possible and fruitful; at the other extreme, it can form unintentionally, within a sufficiently large number of people interacting in conditions of relative anonymity; or, finally, it can be the outcome of a deliberate temporary suspension of the ordinarily social conventions and rules. Three ideal-types of milieu hence appear: a small, carefully organised milieu, working through reciprocation (the dialogical context); a wider self-organising, evolving milieu, which works on impersonal rules (essentially, the city) and, in the intermediate position, an 'organised' milieu which is carved out of a hierarchical, such as the firm.[39]

While these three forms of milieu share a common structure, they differ in scale and, as well as scale, in distinct ways of working to enhance knowledge creation. The common structure is made of (a) a generator of heterodoxy or 'noise' (Atlan, 1979), 'creative chaos' (Nonaka & Takeuchi, 1995), 'buzz' (Storper & Venables, 2004), 'dissonance' (Cusinato, 2007), which may be represented by an individual, a group or society at large; (b) an interpreter, who is competent in *L3*, that is in contextualising heterodoxy into a sufficiently wide interpretative framework in order to look at it as expression of underlying though not immediately knowable mental habits, and (c) a noise regulator, which enables the interpreter to tune her/his exposition to noise in order not to succumb to it (Table 2).

As regards the dialogical milieu, interlocutors work as both 'noise' generators and interpreters. The moderating device is made up of the binding rules of reciprocity and a suitable arrangement of spaces (physical proximity between interlocutors, a common space among them, the outer space and a softened connection with it). The space arrangement works as a symbolic frame for evoking conditions of mind proximity, sacredness of respective mindsets, and the common space where the parties lay and collect reciprocally words and emotions.

With reference to the city, discourse becomes more composite. The idea that the city is a cognitive milieu entered economic thought through the work of Jean Rémy.[40] According to him, the city is a specific urban device in that it gives rise to specific economic outcomes, and especially knowledge. *"L'ailleurs pénètre la ville d'autant plus que s'accroissent le volume et l'hétérogénéité de la population"* (Rémy & Voye, 1992, p. 45).[41] It follows that, in a context of generalised anonymity, cultural niches emerge "*où, plus souvent que des sommes d'activité s individuelles on trouve les activités collectives les plus disparates et les plus susceptibles de se développer dans la marginalité, l'illégalité [...] et donc de*

[39] It is interesting to note that these three kinds of milieu and related ways of working echo the corresponding Polanyian forms of social integration: respectively, reciprocity, market and hierarchy (Polanyi, 1944).

[40] See Cusinato (2007), from which this part is partially drawn.

[41] Durkheim's influence is evident, though not explicitly acknowledged.

Table 2 Two ideal types of generative milieu

	Scale[a]	
Components	Dialogical context	City
'Noise' generator	Dialoguing parties (artificial device)	Social interaction (social device)
Recipient/ interpreter		People in general/meta-observer
'Noise' moderator device	"Silent trade" socio-spatial structure • Very small social volume • Physical proximity • Private/common spaces • Sacredness of spaces • Cautious openness to the external world	"Arena" socio-spatial structure • Great social volume • Physical proximity • Public space (the arena) • Private spaces (bleachers) • Semi-public spaces (niches) • Openness to the external world
Exchange object	Ambiguity	Spillovers
Exchange device	Reciprocity	Free collection (imitation, emulation, meta-interpretation, etc.)

[a]Organisations show hybrid characters between the two portrayed scales

susciter un sentiment de curiosité et de mystère[42]" (ibid.). Thus, the city becomes a generative milieu, and more precisely a "*milieu of milieus*" (Rémy, 2000),[43] made up of a number of sub-systems which generate sub-cultures, in the sense Hebdige (1979) gave this term. This milieu continuously produces deviances/variants/innovations thanks to the multitude of relations people and groups necessarily establish and nourish among themselves and with the external world. Contacts between infra-urban milieus do not merely result in composition between interpretative codes however, but they give rise to "*un 'pool' d'informations indéterminées [. . . dont] on ne connaît pas à l'avance le contenu pertinent, ni même la personne capable de le formuler*" (Rémy, 2000, p. 37).

In the city, unlike the dialogical context, relationships are generally impersonal and often also involuntary if not imposed; so heterodoxy stems from structural rather than artificial conditions. Competition in collecting spillovers and emulation rather than reciprocity are the main drivers of exchange, and the exchange object—be it noise, dissonance, deviance, 'cool' or something similar—is no longer a club good inside the little circle of interlocutors involved, but a pure public good. As a consequence, the city can be considered a genuine 'social' knowledge-creating milieu[44] by comparison with the artificiality of a dialogical milieu. The figure of the

[42] "Atmosphere", in our words.

[43] This formula and its heterogenetic content date back to Mauss (1924), who wrote that society, "*être à mille dimensions, milieu de milieux vivants et pensants, est agitée de toutes sortes de courants contradictoires et en tous sens*" (p. 131). I am indebted to Terrier (2011) for this suggestion.

[44] Where 'social' means 'structural', according to the Durkheimian approach.

interpreter also changes: s/he is a third party, playing the role of meta-observer with respect to the noise-generative device and noise itself (Atlan, 1979). In advanced economies recourse is generally made to a chain of highly specialised figures, the first and the last links of whom can be respectively identified in the cool-hunter and the 'post-modern' entrepreneur: the former being able to perceive those variants in cultural-behavioural habits which are susceptible to economic exploitation (Morace, 2007; Schubert, 2011), and the latter being able to turn the suggestions coming from the margins and mediated by the cool-hunter into innovative goods with high symbolic content (Schmitt, 1999). Between these two figures, a number of other professionals intervene to give rise to the so-called "creative class" (Florida, 2002; Florida, Mellander, & Adler, 2011): psychologists, designers, engineers, information and computer technicians, advertisers, influencers, publicists, and many others, who share the ability to deal with superior forms of *Learning*.

Urban space itself is organised in a suitable way for enhancing the milieu effect. Its general structure is the same as in the dialogical context, with the concomitance of private and common spaces to allow people to regulate exposure to noise. There are significant differences, however, in their functional and symbolic roles. Differences arise from the fact that in a dialogical condition the alternation of speaking and silent moments is handled by the parties involved, so they only have to acknowledge this faculty to each other and symbolically project it into a convenient arrangement of things within space. On the contrary, in an urban condition 'noise' ceaselessly stems from the social fabric and the only option people have is when, where, how much and how long to let themselves be exposed to and involved in it. It follows that in the city both psychological and spatial devices have to be devised, not to suspend noise but to make withdrawal from it possible: recourse to anonymity and spatial recesses are typical solutions in this connection. Anonymity, as Ricoeur (2003) recalls, has then to be viewed as "*une nouvelle distribution entre le privé et le public, et même plus fondamentalement comme une réaction de défense, mieux, comme une immunisation contre les interférences innombrables d'autrui, résultant de la multiplicité des contacts*" (p. 114). As regards private spaces, they can be wholly legally private spaces (as 'apartments' emblematically are), but can also be carved out of public spaces through the establishment of curtains, differentiated pathways, or also because of secluded niches which naturally form within the pulsating city life. There is actually an almost complete and continual range between the two extremes of wholly private and wholly public spaces, within which individuals and groups can variously fine-tune their degree of exposure/retirement to/from city excitement, buzz, noise, etc., with important effects on learning attitudes. As regards public spaces in particular, they work in a different way and also take on a different symbolic meaning with respect to the 'third' common space in the dialogical context: whilst this latter is established as a sacred place between parties, the typical urban public space is an *arena* for competition (Goheen, 1998), and competition takes place through exhibition (a sort of agonistic reciprocity; Mauss, 2007[1925]), emulation and freely collecting spillovers. Unlike the dialogical context, where the physical arrangement of the common space is extremely sober, to make as much room as possible for free

symbolic generation and interpretation, in the urban context, where concerns, noise and also chaos can seriously distract people from any propensity towards symbolisation, the quality of urban and architectural design matters a lot: from the foundation of the city, the public space—and urban landscape, in general—is the main vehicle by which the symbolic dimension is institutionalised, transmitted and instilled at the social level (Hall, 1998; Highmore, 2005; Wheatley, 1969). In line with the issue of superior levels of *Learning*, urban design becomes the emblematic public realisation of how the symbolic dimension can be moulded, giving rise to original and inspiring interpretations (Harmaakorpi, Karl, & Parjanen, 2008; Hutton, 2006).

At an intermediate scale, there are creative milieus within organisations. Organisations normally entail hierarchical rules, which are by their own nature the least conducive way of promoting creativity.[45] How to construct and govern (in the sense of 'governance') milieus of creativity within organisations hence becomes a very intriguing issue. If creativity stems from re-contextualisation of knowledge, it requires the availability of mental, relational and also physical spaces where people can detach from routines.[46] Relaxation matters, but not in the sense of simply gaining some margins of freedom from ordinary commitment and rules, but to make the demanding (and also involving) exercise of provisionally putting oneself aside from them, while remaining fully aware of being subject to them, so as to achieve original viewpoints of usual things (and rules themselves). In this connection, workplace design plays a crucial role for at least two reasons: first, because organisation of internal spaces and their distinctive furniture marks/symbolises the passage from one to another mental-and-relational condition; second, because it suggests how it can touch emotions, shape relational attitudes and induce people to take part to the creative issue (and play) (Carroll, 2013; Galison, 1997; Zelinsky, 2004).

The above considerations conclusively indicate that the smaller a milieu is in scale—essentially, volume—the more it is an artefact, and conversely, the larger it is, the more it assumes connotations of a social[47] device. This deduction is momentous from the normative viewpoint, because it allows policy-makers to assess how much room is for manoeuvre at the different scales, and what levers are available to mould the milieu's generative power: while in dialogical contexts the mental attitudes of intervening people play a prevailing role in ensuring that generative conditions arise, and the spatial arrangement is a mere projection of those attitudes, in medium- and large-sized milieus the relationship reverses, in that spatial arrangement (and the evocative power which is associated with it) influences participants' and/or bystanders' attitudes. Put differently (and more concisely), in small milieus the symbolic dimension in-forms space with itself, while the reverse occurs with increasing milieu size.

[45] For a review, Mannix, Neale, and Goncalos (2009).

[46] See both Simone and Crozza, in this book.

[47] See footnote 44.

5 Two Operational Tools

As outlined above, milieus are socio-spatial devices endowed with the power of generating "social facts". That power stems from the conjunction of specific structural properties—heterogeneity, relational density and a suitable physical-symbolic substratum—and works by acting on the mental-emotional attitudes of the people involved. From this point of view, *L3* and, more generally, the entire hermeneutical chain are typical "social facts", in that they cannot occur within relationships that subjects individually establish with the external material world, but only within certain socio-spatial conditions which stand outside their capacities of direct handling. Within this general notion of milieu, it possible to recognise the "Knowledge-creating milieus—KCMs", we depict as socio-spatial devices which, thanks to certain structural conditions (heterogeneity of mental habits, relational density, a specific atmosphere), foster attitudes and capabilities towards a hermeneutic approach to knowledge, which in turn is conducive to creativity.

Like milieus in general, KCMs are not empirically recognisable entities however, because besides observable elements, such as volume, density and the physical arrangement of space, they also rest on an element which is indiscernible to external observers, i.e. the symbolic meaning which the entire set of physical items and their reciprocal arrangement are vested with. This constraint can be partially bypassed in empirical investigation, by resorting to some indicators in official statistic sources:

(a) census data coming from the "*International Standard Classification of Occupations*—ISCO". ISCO aggregates jobs in ten major classes, and details them up to four digits, according to "'skill level' and 'skill specialization' required to competently perform the tasks and duties of the occupations" (ILO, 2007, p. 1), that is the workers' competence level. Taking Italy as the benchmark case, on the occasion of the 2001 Census,[48] the Italian National Institute of Statistics (Istat) re-classified occupations according to this criterion, but the data feature serious limitations which make them barely utilisable for our purposes: classification was made only at one digit level, so that inside Major Groups 1 and 2 (respectively, "Managers" and "Professionals", the two main classes which probably deal with superior forms of *Learning*) it is impossible to distinguish between the public and private sectors; as regards Major Group 3 "Technicians and associate professionals", the problem also arises of making a finer distinction between worker categories mainly devoted to shaping or applying interpretative attitudes (that is, in our approach, to *L2–L3* or *L1* practices). In addition, the data refer to the municipality where workers dwell, while it is essential to know the place where they work,

[48] The 2011 census results on this topic are not yet available when we are writing these notes (February 2014).

because it is there that they perform their creative attitudes in a relational working context;

(b) Industry and Services Census. In this case, the data lend themselves better to analysis of *Learning activities* because they refer to employees' working places; on the other hand, since they refer to 'local productive units', they include employees who are not directly involved in knowledge-creating activities within the productive unit considered, and leave out employees who work in this kind of activity but who belong to productive units which are not classified as knowledge-based activities. Knowledge-intensive manufacturing activities in particular cannot be practically identified within the current statistical classification of economic activities (NACE) because of their product-oriented rather than process-oriented approach.[49] This difficulty is much less constraining however when services are taken into consideration, because of a closer correspondence between their outcomes (on the basis of which they are statistically registered) and the processes they adopt to yield them. Within this option, which excludes manufacturing from being taken into consideration (though it seems plausible to suppose that many of them perform *L2* and *L3* activities[50]), we have decided to formulate the notion of "Knowledge-creating Services—KCS", as those service activities which are reputed to work systematically in *L2* or also *L3*, and we consider the connected local systems as indicative of the presence of KCMs. To render in detail the composite structure of KCS, we propose to distinguish between:

- *Core KCS*: services whose core activity consists in or presupposes recourse to *L3* practices;
- *Core-related KCS*: services whose core activity consists in knowledge application (*L1*), but which are indirectly part of *L2-L3* practices through systematic interaction with Core KCS;
- *Collateral Activities to KCS*: Service or manufacturing activities working at the *L1* level, which support the above categories.

A subordinate distinction is also made inside the first two categories, between the public and private sectors, depending on whether the activities normally work in the market or not. With reference to the "European Nomenclature of Economic Activities—NACE Rev. 2" as adopted by the Italian National Institute of Statistics in "ATECO 2007" (ISTAT, 2009), KCS are finally classified as shown in Table 3.

Some notes, finally, on how the KCS approach relates to other contiguous approaches within the wider class of "Knowledge Intensive Services". Four main alternative approaches are briefly recalled below:

[49] This problem was first pointed out by Machlup (1962), with specific reference to the notion of "knowledge industry", which he conceived.

[50] This limitation can be partially overcome by resorting to the classification into High-, Medium- and Low-Tech industry, as Compagnucci does in this volume.

Table 3 KCS classification

Private core KCS		Private core-related KCS	
Code[a]	Activity	Code[a]	Activity
58117	Book publishing	63117	Data processing, hosting and related activities
58137	Publishing of newspapers	62037	Computer facilities management activities
58147	Publishing of journals and periodicals	63997	Other information service activities n.e.c.
58217	Publishing of computer games	64207	Activities of holding companies
58291	System and network software publishing	71121	Surveyor activities
58292	Development tools and programming languages software publishing	71201	Car technical testing
58293	Application software publishing	71202	Technical analyses, testing and inspections
59111	Production of motion pictures for television and television programmes	74307	Translation and interpretation activities
59112	Production of institutional and promotional motion pictures	78100	Activities of employment placement agencies
59113	Production of motion pictures for cinema	82307	Organisation of conventions and trade shows
59127	Motion picture, video and television programme post-production activities	82917	Activities of collection agencies and credit bureaus
59207	Sound recording and music publishing activities	85527	Cultural education
60107	Radio broadcasting	90027	Support activities to performing arts
60201	Broadcast of general-interest television programmes	90047	Operation of arts facilities
60202	Broadcast of thematic television programmes		
62017	Computer programming activities		
62021	Hardware and software consultancy		
62022	Third party maintenance of computer sytems and applications		
63127	Web port als		
63917	News agency activities		
69107	Legal activities		
69207	Accounting, bookkeeping and auditing activities; tax consultancy		
70107	Activities of head offices		
70217	Public relations and communication activities		
70227	Business and other management consultancy activities		

(continued)

Table 3 (continued)

Private core KCS		Private core-related KCS	
Code[a]	Activity	Code[a]	Activity
71117	Architectural activities		
71122	Engineering, technical studies		
72117	Research and experimental development on biotechnology		
72197	Other research and experimental development on natural sciences and engineering		
72207	Research and experimental development on social sciences and humanities		
73117	Advertising agencies		
73207	Market research and public opinion polling		
74107	Specialised design activities		
74207	Photographic activities		
74901	Activities of quantity surveyors		
74902	Sundry professional, scientific and technical activities		
90017	Performing arts		
90031	Artistic creation related to fine arts		
90032	Other artistic creation		
94117	Activities of business and employers membership organisations		
94127	Activities of professional membership organisations		
94207	Activities of trade unions		
Public core KCS		Public core-related KCS	
Code[a]	Activity	Code[a]	Activity
85427	Tertiary education	84117	General public administration activities
86107	Hospital activities	84127	Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security
90017	Library and archives activities	84137	Regulation of and contribution to more efficient operation of business
90027	Museums activities	84217	Foreign affairs
99007	Activities of extraterritorial organisations and bodies	84227	Defence
		84237	Justice and judicial activities

Collateral activities to KCS	
Code[a]	Activity
33.20A	Installation of industrial machinery and equipment
46147	Agents involved in the sale of machinery, industrial equipment, ships and aircraft

(continued)

Table 3 (continued)

Collateral activities to KCS	
Code[a]	Activity
47417	Retail sale of computers, peripheral units and software in specialised stores
47617	Retail sale of books in specialised stores
47627	Retail sale of newspapers and stationery in specialised stores
47637	Retail sale of music and video recordings in specialised stores
58197	Other publishing activities
62097	Other information technology and computer service activities
77407	Leasing of intellectual property and similar products, except copyrighted works
81307	Landscape service activities
82207	Activities of call centres
95117	Repair of computers and peripheral equipment

[a]ATECO 2007

(a) "Knowledge-intensive Business Services—KIBS". 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 a first glance, this approach seems to be appropriate to render the specificity of knowledge-oriented activities. Being derived from an ICT approach, knowledge and learning are however interpreted in a very conventional, informational way, respectively as the acquisition and mastery of information, while no explicit attention is paid to how cognitive attitudes and interpretative habits form and evolve over time. Knowledge is therefore seen as more produced than generated, acquired rather than experienced, accumulated rather than articulated, recombined rather than hybridised, disseminated rather than connected, and finally applied rather than put to the test within a hermeneutic circle.[51] Also the often reaffirmed centrality of the conversion process of tacit knowledge into codified knowledge in enhancing innovation does not take into appropriate account the fact that this kind of experience provides extraordinary opportunities for dealing with idiosyncrasies in cognitive attitudes and having access to the hermeneutic dimension, which we judge to be the real source of creativity governance. Consequently, KIBS include the generality of business activities devoted to "symbolic analysis"—in the sense Reich (1992) gave that expression, which stands for 'formal, symbolised analysis'—independently of whether they pertain to the generation or the application of cognitive codes, and when codes are (although implicitly) considered, the key concern is to refine rather than articulate them. Having this ITC ancestry, KIBS classification thus embraces executive activities such as "Press distribution agencies", "Maintenance and

[51] We repeatedly write "rather than" because the two learning modalities are not alternative in practice: individuals actually make use of both, though not always being aware of this connection.

repair of office, accounting and computing machinery" besides genuine knowledge-creating activities, such as "Research [in the various domains]" and "Business and management consultancy activities" (Fig. 1); and leaves out, on the other hand, public entities, like universities, which are clearly devoted to dealing with cognitive attitudes and aptitudes, and which frequently interact with industry and other institutions in knowledge-creation (Etzkowitz & Leydesdorff, 2000; Lundvall, 1992).

(b) For its part, the original "Creative Industries-CIs" approach (DCMS, 2001) 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" (p. 4). Its main peculiarity is that it takes into consideration the entire value chain, from the ideation of a potential innovation to the factories and the retail shops where 'creative goods' are respectively produced, proposed and sold to final consumers. The key question is however how this approach selects the so-called creative value chains from the entire set of existing and other possible chains, once it is admitted that creativity permeates the economic system at large. The response given by the CIs approach is not convincing, because the choice is made by assuming a pure formal criterion, which consists in the appropriability of the creative act, through patenting (Howkins, 2002). Many other activities that are creative without being susceptible to patenting (such as many kinds of daily research and consultancy outcomes) are therefore omitted, whereas others that are not intrinsically creative (such as, for example, "Retail sale of second-hand goods") are included because they are supposed to belong to a value chain deriving from an original, though maybe distant, patentable activity.[52] The limits of this approach have not passed unnoticed. Potts et al. (2008) suggest that it is not so much ideation-and-production characteristics that define the symbolic content of a creative good, but the specific network kind of their final market: that symbolic content, its added value with respect to 'ordinary' goods, do not mainly depend on the way it is conceived and produced, but on the complex and evolving relationships which form between consumers and between them and producers, sellers and so on. These authors therefore propose to define CIs "in terms of the system of activities organized and coordinated about flows of value through the enterprise of novelty generation and consumption as a social process" and, according to Caves (2000), creative goods as "the subset of commodities and services over which consumers do not have well established decision rules for choice (and so must learn them) or where the 'use value' is novelty itself" (Potts et al., 2008, pp. 172–173).

This renewed approach to CIs significantly overlaps with our KCS approach (Fig. 1), on both the epistemological plane (in that it explicitly assumes a relational and evolving notion of knowledge) and the

[52] For a detailed discussion, see Dubina, Carayannis, and Campbell (2012).

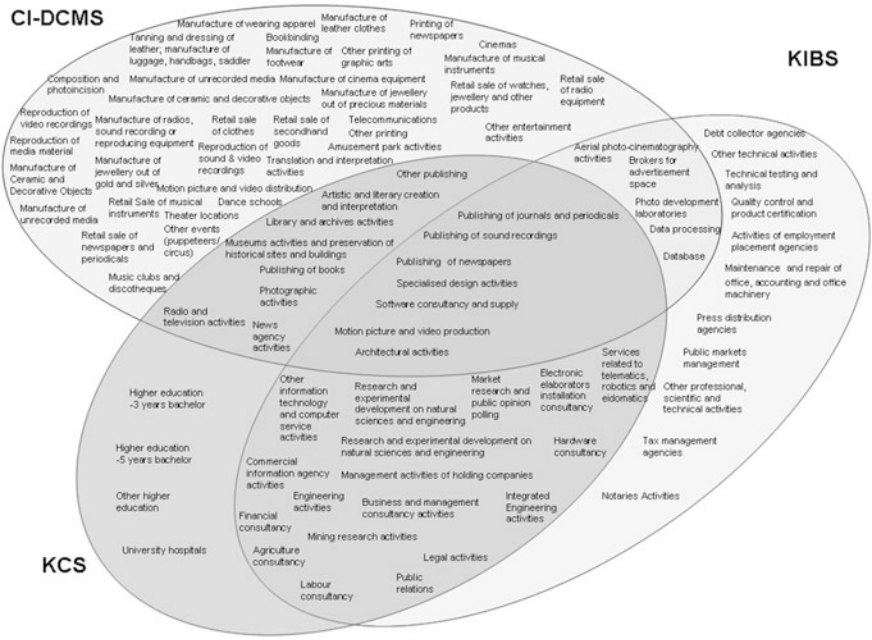

Fig. 1 Three classifications of knowledge intensive activities

methodological one (in that it focuses on the generative devices of the symbolic content of 'creative goods'). It does not wholly match with it however, because, although it looks at learning and creativity as stemming from a complex evolving network of agents, who do not solely respond to price but also to symbolic signals, it actually stays centred on marketable goods. Also within this domain, it exercises a further option, however, which marks a substantial difference from the KCS approach: whilst it reasonably rules out mature manufacturing industry because "social networks have relatively little role in explaining the dynamics of consumption or innovation in production" (ibid., p. 176), this CIs approach also excludes the primary sector, despite the fact that increasing cues of symbolisation are observable within it (think, for example, of marketing policies aiming to emphasise the immaterial value of products, like their 'controlled and certified origin' or their so-called 'biological' quality), or also excludes "skilled professions largely about learning and applying complex knowledge (law, dentistry, accounting, hairdressing, truckdriving, fire-fighting, teaching, etc.), except for the components of these industries that do involve social networks (e.g. the establishment of a new business, or

expansion of a new service, e.g. cosmetic dentistry)" (ibid.)[53]; on the other hand, it significantly[54] includes "the design of physical social spaces, such as urban design and architecture" (ibid., p. 177), though also in this sector there is no certainty that such activities are really innovative, in the sense the authors give this expression, of enhancing social networks.

(c) Subtler arguments are needed to examine relationships between the KCS and the "Synthetic, Analytic, Symbolic Knoeledge-based activities-SASKA" approaches. Asheim, Boschma, and Cookes (2011) distinguish between synthetic-, analytic- and symbolic-based knowledge, according to the scientific, pragmatic or artistic source of knowledge itself. While our approach focuses on the cognitive *process*, the SASKA approach focuses on the possible different *inputs* to such process, so that an I/O table of knowledge can be devised by the crossing of the two approaches, as follow (Table 4):

Compagnucci in this book shows how fruitful such a crossing can be.

(d) Finally, our notion of KCS is very close to Alvesson's notion of KIFOWs (Knowledge Intensive Firms Organizations and Workers), or simpler KIFs, because both explicitly share a hermeneutic stance, as appears from the following period: "An aspect that differentiates KIFOWs from non-KIFOWs is [. . .] *the degree of elaboration of the language code* through which one describes oneself, one's organization, regulates client-orientations as well as identity" (Alvesson, 1993, p. 1007; emphasis added). He goes even further: making reference to Meyer and Rowan's (1977) radical view, he argues that "Knowledge-intensive organizations—with a few exceptions—can [. . .] be viewed as providers of [. . .] institutionalized myths" (Alvesson, 1993, pp. 1003–1004), that is 'creative routines' (an oxymoron, to remark on their ambiguous character) for resolving ambiguities and related conditions of complexity/undecidability. "Knowledge-intensive service organizations—he significantly adds—thus become vital symbols for client organizations' elaboration of rules and requirements for rationality. [. . . They] are thus 'ambiguity-intensive' [. . .] are 'systems of persuasion'" (ibid., pp. 1004, 1007 and 1011). While substantially agreeing with this view, our focus in this book is on the constructive side of a hermeneutic approach to ambiguity, rather than the de-constructive one Alvesson emphasises. Hermeneutics has the (inexhaustible) mission of "removing masks [the Human being] wears or have been imposed to her/him" (Vattimo, 1981, p. 29; my translation)—but this task has both a regressive and a progressive face (Ricoeur, 2004): the

[53] Though it is not clear what "dentistry, accounting, hairdressing, truckdriving, fire-fighting" have to do with "skilled professions largely about learning and applying complex knowledge" or why "teaching" has nothing to do with creativity.

[54] To this book's aims.

Table 4 Input–Output knowledge table

	Output		
Input	Intelligence/application	Creativity	Creativity governance
Synthetic knowledge	L1	L2	Ø
Analytical knowledge			L3
Symbolic knowledge			

expressions "Knowledge-*creating* milieus" and "Knowledge-*creating* Services" we adopt here are intentionally meant to underline this onwards approach to hermeneutics, with specific references to economy, and society at large.

References

Alvesson, M. (1993). Organizations as rhetoric: Knowledge-intensive firms and the struggle with ambiguity. *Journal of Management Studies, 30*(6), 997–1015.

Asheim, B. T., Boschma, R., & Cookes, P. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge bases. *Regional Studies, 45*(7), 893–904.

Atlan, H. (1979). *Entre le cristal et la fumée*. Paris: Seuil.

Audretsch, D. B., & Thurik, A. R. (1998). *The knowledge society, entrepreneurship and unemployment*. Zoetmeer: EIM.

Augé, M. (1995). *Non-places: Introduction to an anthropology of supermodernity*. London: Verso.

Bagnasco, A. (1994). *Fatti sociali formati nello spazio. Cinque lezioni di sociologia urbana e rurale*. Milano: Franco Angeli.

Bateson, G. (1972). *Steps to an ecology of mind: Collected essays in anthropology, psychology, evolution, and epistemology*. Chicago: University of Chicago Press.

Battuta, I. (1929). *Travels in Asia and Africa: 1325–1354*. New York: Routledge.

Besse, J.-M. (2008). Landscape: Between loss and history. *Critique d'art* [En ligne], 32(Automne). Available at: http://critiquedart.revues.org/774.

Boden, D., & Molotch, H. L. (1994). The compulsion of proximity. In R. Friedland & D. Boden (Eds.), *NowHere: Space, time and modernity* (pp. 257–286). Berkeley: University of California Press.

Böhme, G. (1993). Atmosphere as the fundamental concept of a new aesthetics. *Thesis Eleven, 36* (1), 113–126.

Breschi, S., & Malerba, F. (2001). The geography of innovation and economic clustering: Some introductory notes. *Industrial and Corporate Change, 10*(4), 817–833.

Bridge, G. (2013). A transactional perspective on space. *International Planning Studies, 18*(3–4), 304–320.

Brunello, M. (2014). *Silenzio*. Milano: Feltrinelli.

Buttimer, A. (1971). *Society and milieu in the French geographic tradition*. Chicago: Rand McNally.

Camagni, R. (Ed.). (1991). *Innovation networks. Spatial perspectives*. London: Belhaven Press.

Camagni, R., & Maillat, D. (Eds.). (2006). *Milieux innovateurs: Théorie et politiques*. Paris: Economica.

Capello, R. (2007). *Regional economics*. New York: Routledge.

Cappellin, R., & Wink, P. (2009). *International knowledge and innovationnetworks: Knowledge creation and innovation in medium technology clusters*. Cheltenham: Edward Elgar.

Carroll, J. M. (2013). *Creativity and rationale: Enhancing human experience by design*. New York: Springer.
Caves, R. (2000). *Creative industries: Contracts between art and commerce*. Harvard: Harvard University Press.
Ciancio, C. (2012). Il disaccordo in ermeneutica. In M. C. Amoretti & M. Vignolo (Eds.), *Disaccordo. Annuario della Società Italiana di filosofia analitica (SIFA) 2012* (pp. 139–148). Milano: Mimesis.
Coe, M. R., & Wilden, A. (1978). Errore. In R. Romano (Ed.), *Enciclopedia Einaudi* (Vol. 5, pp. 682–711). Torino: Einaudi.
Curtin, P. D. (1984). *Cross-cultural trade in world history*. Cambridge: Cambridge University Press.
Cusinato, A. (1996). Heuristics between cognitivism and connectionism: The merging of a 'third best level' in problem solving. In E. Belussi & A. Cecchini (Eds.), *Artificial worlds and urban studies* (pp. 25–52). Venezia: Daest.
Cusinato, A. (2007). Da agglomerazione a milieu: L'interpretazione della città nell'economia urbana, a partire dai manuali pubblicati in Italia. *Scienze regionali*, *6*(3, Special issue), 41–65.
Cusinato, A., & Gibin, R. (2009). Modelli regionali di innovazione in Italia. In A. Bramanti & C. Salone (Eds.), *Lo sviluppo territoriale nell'economia della conoscenza. Teorie, attori, strategie* (pp. 57–78). Milano: Franco Angeli.
DCMS. (2001). *Creative industries mapping document 2001*. London: Department of Culture, Media and Sport.
de Certeau, M. (1984). *The practice of everyday life*. Berkeley, CA: University of California Press.
de Saussure, F. (1983[1916]). *Course in general linguistic*. Chicago: Open Court.
Derry, S. J., Schunn, C. D., & Gernsbacher, M. A. (Eds.). (2001). *Interdisciplinary collaboration: An emerging cognitive science*. London: Psychology Press.
Dewey, J. (1922). *Human nature and conduct*. New York: Henry Holt.
Drucker, P. F. (1968). *The age of discontinuity*. London: Heinemann.
Dubina, I. N., Carayannis, E. G., & Campbell, D. F. J. (2012). Creativity economy and a crisis of the economy? Coevolution of knowledge, innovation, and creativity, and of the knowledge economy and knowledge society. *Journal of the Knowledge Economy, 3*(1), 1–24.
Durkheim, E. (1895). *Le règles de la méthode sociologique*. Paris: Alcan. [English translation: *The rules of the sociological method*. New York: Free Press, 1982].
Durkheim, E. (1898). Notes sur la morphologie sociale. *L'année Sociologique, 2*, 521–522.
Durkheim, E. (1912). *Les formes élémentaires de la vie religieuse*. Paris: Alcan. [English translation: *The elementary forms of the religious life*. London: Allen & Unwin, 1915].
Eco, U. (1979). *A theory of semiotics*. Bloomington: Indiana University Press.
Emirbayer, M. (Ed.). (2008). *Emile Durkheim: Sociologist of modernity*. Oxford: Blackwell.
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.
Farinelli, F. (2003). *Geografia. Un'introduzione ai modelli del mondo*. Torino: Einaudi.
Ferrel, R. (1996). *Passion in theory: Conceptions of Freud and Lacan*. New York: Routledge.
Florida, R. (2002). *The rise of the creative class*. New York: Basic Books.
Florida, R., & Kenney, M. (1993). The new age of capitalism: Innovation-mediated production. *Futures, 25*(6), 637–651.
Florida, R., Mellander, C., & Adler, P. (2011). The creative class paradigm. In D. E. Andersson, Å. E. Andersson, & C. Mellander (Eds.), *Handbook of creative cities* (pp. 56–71). Cheltenham: Edward Elgar.
Foray, D. (2000). *L'économie de la connaissance*. Paris: La Découverte.
Galison, P. (1997). *Image and logic: A material culture of microphysics*. Chicago: The University of Chicago Press.
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*. London: Sage.
Gieryn, T. F. (2000). A space for place in sociology. *Annual Review of Sociology, 26*, 463–496.

Godbout, J., & Caillé, A. (1993). *L'esprit du don*. Paris: La Découverte.
Goheen, P. G. (1998). Public space and the geography of the modern city. *Progress in Human Geography, 22*(4), 479–496.
Gorman, M. E. (2010). *Trading zones and interactional expertise: Creating new kinds of collaboration*. Cambridge, MA: The MIT Press.
Halbwachs, M. (1968). *La mémoire collective*. Paris: Presses Universitaires de France.
Hall, P. G. (1998). *Cities in civilization: Culture, innovation, and urban order*. London: Weidenfeld & Nicholson.
Harmaakorpi, V., Karl, K., & Parjanen, S. (2008). City design management as a local competitiveness factor. *Place Branding and Public Diplomacy, 4*(2), 169–181.
Hebdige, D. (1979). *Subculture: The meaning of style*. New York: Routledge.
Herodotus. (1890). *The history of Herodotus* (G. C. Macaulay, trans.). London: MacMillan. Available at http://www.gutenberg.org/files/2707/2707-h/2707-h.htm.
Highmore, B. (2005). *Cityscapes: Cultural readings in the material and symbolic city*. Basingstoke: Palgrave Macmillan.
Howkins, J. (2002). *The creative economy: How people make money from ideas*. London: Allen Lane.
Hutton, T. A. (2006). Spatiality, built form, and creative industry in the inner city. *Environment and Planning A, 38*, 1819–1841.
ILO. (2007). *Resolution concerning updating the international standard classification of occupations*. Geneva: ILO. Available at: http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm.
ISTAT (2009). *Classificazione delle attività economiche, Ateco 2007. Derivata dalla NACE Rev. 2*. Roma: Istat. Available at: http://www.istat.it/it/strumenti/definizioni-e-classificazioni/ateco-2007.
Jacobs, J. (1961). *The death and life of great American cities*. New York: Random House.
Jahnke, M. (2012). Revisiting design as a hermeneutic practice: An investigation of Paul Ricoeur's critical hermeneutics. *Design Issues, 28*(2), 30–40.
Jakob, M. (2012). Natura, storia, paesaggio. In R. Dubbini (Ed.), *Paesaggi e storia* (pp. 33–49). Marsilio: Venezia.
Karlsson, C., Johansson, B., & Stough, R. R. (2013). *Knowledge & innovation in space*. CESIS Electronic Working Papers Series, No 305. Available at: http://ideas.repec.org/e/pka152.html.
Krugman, P. (1979). A model of innovation, technology transfer, and the world distribution of income. *Journal of Political Economy, 87*(2), 253–266.
Lane, D. A., Pumain, D., van der Leeuw, S. E., & West, G. (Eds.). (2009). *Complexity perspectives in innovation and social change*. New York: Springer.
Lash, S., & Urry, J. (1994). *Economies of signs and spaces*. London: Sage.
Lavoie, D. (Ed.). (1990). *Economics and hermeneutics*. New York: Routledge.
Leopardi, G. (1901). *Pensieri di varia filosofia e di bella letteratura* (Vol. 3). Firenze: Le Monnier.
Liebst, L. S. (2012). Intensifying the atmospheric: A post-phenomenological reappraisal of the ambiance of urban. In M. Greene, J. Reyes, & A. Castro (Eds.), *Proceedings: Eighth international space syntax symposium* (pp. 8105:1–8105:14). Santiago de Chile: PUC.
Lundvall, B.-Å. (Ed.). (1992). *National systems of innovation: Towards a theory of innovation and interactive learning*. London: Pinter.
Machlup, F. (1962). *The production and distribution of knowledge in the United States*. Princeton, NJ: Princeton University Press.
Madanipour, A. (2011). *Knowledge economy and the city: Spaces of knowledge*. New York: Routledge.
Madison, G. B. (1990). Getting beyond objectivism: The philosophical hermeneutics of Gadamer and Ricoeur. In D. Lavoie (Ed.), *Economics and hermeneutics* (pp. 31–56). New York: Routledge.
Mannix, E. A., Neale, M. A., & Goncalos, J. A. (Eds.). (2009). *Creativity in groups: Volume 12 of research on managing groups and teams series*. Bingley: Emerald Group.
Marcuse, H. (1964). *One dimensional man: Studies in the ideology of advanced industrial society*. Boston: Beacon.

Marshall, A. (1898). *Elements of economics of industry, being the first volume of elements of economics*. London: MacMillan.
Marshall, A. (1919). *Industry and trade: A study of industrial technique and business organization; and of their influences on the conditions of various classes and nations*. London: MacMillan.
Marshall, A., & Marshall, M. P. (1879). *The economics of industry*. London: MacMillan.
Massey, D. (2005). *For space*. London: Sage.
Mauss, M. (1924). Appréciation sociologique du bolchevisme. *Revue de Métaphysique et de Morale, 31*(1), 103–132.
Mauss, M. (2007[1925]). *Essai sur le don. Forme et raison de l'échange dans les société s archaïques*. Paris: Presses Universitaires de France.
Merleau-Ponty, M. (1964). *The primacy of perception: And other essays on phenomenological psychology, the philosophy of art, history, and politics*. Evanston, IL: Northwestern University Press.
Meusburger, P., Funke, J., & Wunder, E. (Eds.). (2009). *Milieus of creativity: An interdisciplinary approach to spatiality of creativity*. New York: Springer.
Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology, 83*(2), 340–363.
Miles, I., Kastrinos, N., Bilderbeek, R., den Hertog, P., Flanagan, K., & Huntink, W. (1995). *Knowledge-intensive business services: Their role as users, carriers and sources of innovation*. European Innovation Monitoring System (EIMS) Reports. Brussels: European Commission.
Montuori, A. (2011). Beyond postnormal times: The future of creativity and the creativity of the future. *Futures, 43*(2), 221–227.
Morace, F. (2007). *Real fashion trends. Il manuale del cool hunter-The cool hunter guide*. Milano: Libri Scheiwiller.
Murata, J. (2003). Creativity of technology: An origin of modernity? In T. J. Misa, P. Brey, & A. Feenberg (Eds.), *Modernity and technology* (pp. 227–253). Cambridge, MA: MIT Press.
Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford: Oxford University Press.
OECD. (1996). *The knowledge-based economy*. Paris: OECD.
Peirce, C. S. (1934). *Collected papers* (Vol. 5). Cambridge, MA: Harvard University Press.
Pellicani, L. (1992). L'individualismo metodologico. Una critica. In D. Antiseri & L. Pellicani (Eds.), *L'individualismo metodologico. Una polemica sul mestiere dello scienziato sociale* (pp. 129–176). Milano: Franco Angeli.
Piaget, J. (1954). *The construction of reality in the child*. New York: Basic Books.
Polanyi, K. (1944). *The great transformation: The political and economic origins of our time*. New York: Rinehart.
Potts, J., Cunningham, S., Hartley, J., & Ormerod, P. (2008). Social network markets: A new definition of the creative industries. *Journal of Cultural Economics, 32*(3), 167–185.
Proust, M. (1992). *A la recherche du temps perdu* (Du côté de chez Swann, Vol. 1). Paris: Gallimard.
Recalcati, M. (2014). *L'ora di lezione. Per un'erotica dell'insegnamento*. Torino: Einaudi.
Redfield, R., & Singer, M. B. (1954). The cultural role of cities. *Economic Development and Cultural Change, 3*(1), 53–73.
Reich, R. B. (1992). *The work of nations: Preparing ourselves for 21st century capitalism*. New York: Vintage.
Rémy, J. (2000). Villes et milieux innovateurs. Une matrice d'interrogations. In O. Crevoisier & R. Camagni (Eds.), *Les milieux urbains: Innovation, systèmes de production et ancrage* (pp. 33–43). Neuchâtel: IRER.
Rémy, J., & Voye, L. (1992). *La ville: Vers une nouvelle définition?* Paris: L'Harmattan.
Ricoeur, P. (2003). Urbanisation et sécularisation. *Autres Temps. Cahiers d'éthique sociale et politique, 76–77*, 113–126.
Ricoeur, P. (2004). *The conflict of interpretations*. London: Continuum.

Rogers, E. M. (1962). *Diffusion of innovations*. Glencoe: Free Press.
Romer, P. M. (1986). Increasing returns and long run growth. *Journal of Political Economy, 94*(5), 1002–1037.
Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98* (5, pt. 2), S71–S102.
Rullani, E. (2014). Territori in transizione. Il nuovo rapporto tra imprese e politiche territoriali per la rinascita industriale e l'innovazione. In R. Cappellin, E. Marelli, E. Rullani, & A. Sterlacchini (Eds.), *Crescita, investimenti e territorio: il ruolo delle politiche industriali e regionali* (pp. 43–57). Milano: Website "Scienze Regionali", e-book 2014. Available at www.rivistars.it.
Sahlins, M. (1974). *Stone age economics*. London: Tavistock.
Sardar, Z. (2010). Welcome to postnormal times. *Futures, 42*(5), 435–444.
Schleiermacher, F. (1998). *Hermeneutics and criticism: And other writings*. Cambridge: Cambridge University Press.
Schmitt, B. (1999). Experiential marketing: A new framework for design and communications. *Design Management Journal, 10*(2), 6–79 (Former Series).
Schubert, B. (2011). *The anatomy of 'cool' : A close reading of Scott's Westerfield's coming of age novel "so yesterday"*. Munich: GRIN Verlag.
Schumpeter, J. A. (1934[1911]). *The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle*. Cambridge, MA: Harvard University Press.
Schumpeter, J. A. (1939). *Business cycles: A theoretical, historical and statistical analysis of the capitalist process* (Vol. 2). New York: McGraw-Hill.
Sennet, R. (2006). *The culture of the new capitalism*. London: Yale University Press.
Simmie, J. (2005). Innovation and space: A critical review of the literature. *Regional Studies, 39*(6), 789–804.
Storper, M., & Venables, A. J. (2004). Buzz: Face-to-face contact and the urban economy. *Journal of Economic Geography, 4*(4), 351–370.
Terrier, J. (2011). *Visions of the social: Society as a political project in France, 1750–1950*. Leiden: Brill.
Vattimo, G. (1981). *Al di là del soggetto. Nietzsche, Heidegger e l'ermeneutica*. Milano: Feltrinelli.
von Glasersfeld, E. (1984). An introduction to radical constructivism. In P. Watzlawick (Ed.), *The invented reality: How do we know what we believe we know? Contributions to constructivism* (pp. 17–40). New York: Norton.
Werlen, B. (1993). *Society, action and space: An alternative human geography*. New York: Routledge.
Wheatley, P. (1969). *City as symbol: An inaugural lecture delivered at University College London, 20 November 1967*. London: H. K. Lewis.
Zelinsky, M. (2004). *The inspired workspace: Interior designs for creativity & productivity*. Gloucester, MA: Rockport.

Part II

Case Studies

The VEGA-*VEnice GAteway for Science and Technology Park*: Is It a Generative Infrastructure?

Michela Cozza

Abstract

Most literature has analysed Science Parks (SPs) as an economic space. However, I propose to analyse them as a *relational place* where knowledge and productive processes are intertwined. Applying the concept of *infrastructure*–as defined in Science and Technology Studies (STS)–this chapter is devoted to understanding if SPs are *generative infrastructures* which enact innovation. This concept is related to the *seedbed* metaphor meaning an environment where innovation can grow through *convergence* between people and things. This theoretical framework will frame the analysis of empirical data collected from my qualitative research on Italian SPs, conducted from 2011 to 2013. Precisely, I will present the case-study of *VEGA-VEnice GAteway for Science and Technology* and the failure of its project regarding the construction of the smart building Pandora. The case-study embodies common dynamics of Italian SPs, and it contributes to addressing challenges for future research.

1 Introduction

Science Parks (SPs) are an international phenomenon, however few academic studies discuss their performance from a sociotechnical perspective, analysing how social and material aspects are interrelated in generating innovation (Orlikowski, 2007). Theory about SPs is usually an inventory of their typologies, causations and outcomes. In this chapter I will present the case-study of an Italian SP, shedding light on aspects that influenced its capability to *generate* innovation.

Firstly, I will review the literature about SPs, and I will compare and contrast their definition with the concept of *innovative milieus* as discussed in this book. The

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metaphor of *seedbed* will support my reasoning. Then, I will pinpoint my analytical framework for interpreting the empirical data. The concept of *infrastructure*, as conceptualised in Science and Technology Studies (STS), will orient my understanding of SPs as possible innovative milieus. I will interpret innovation as a dialectical accomplishment enacted by a process of *convergence* between different actors. An *ecological approach* will be applied to the presentation of my case-study that is *VEGA-VEnice GAteway for Science and Technology*. Telling the history of this Italian park, I will shed light on the failure of its innovative Pandora project, managed by the past Director of VEGA, Michele Vianello. This story is meaningful to understanding the relationship between the process of infrastructural *disalignment* between heterogeneous actors and the *generativity* of innovation. My discussion is meant to be suggestive, rather than conclusive but, finally, it shows the possibility to extend the infrastructural framework to the understanding of the process of innovation within SPs. In the final remarks I will combine the previous concepts, addressing future research on SPs.

2 Literature Review: The Controversial Definition of SPs

Since the 1930s, when the very first SP was developed around Boston's Route 128, SPs have become an international phenomenon. However, there is not a single and uniformly accepted definition of them (Amirahmadi & Saff, 1993; Löfsten & Lindelöf, 2002). There are several terms used to describe similar developments, such as research park, technology park, business park, or innovation centre. Allesch (1985) focuses on the difference between research parks, innovation centres and science parks. According to him, in *research parks* young firms carry on research and development in relatively close cooperation with a nearby university or research establishment. Then, Allesch defines *innovation centres* as providing new technology-based firms (NTBFs) with an optimum chance of survival and development by offering an extensive range of services, the proximity to universities and the possibility of integration into the local and regional innovation network. Finally, the author describes *science parks* as an attractive way of locating industries near research establishments. The main limitation of the Allesch's classification is that actually SPs are, more often, a combination of these organisational models. MacDonald (1987) says that these models can be associated both with (a) property-based initiatives close to a place of learning, and (b) initiatives which provide high quality units in a pleasant environment.

According to the main international associations of SPs–such as the International Association of Science Parks and Areas of Innovation (IASP), the Association of University Research Parks (AURP) and the United Kingdom Science Parks Associations (UKSPA)–a SP (Durão, Sarmento, Varela, & Maltez, 2005): (1) should be economically sustainable, (2) it should have operational links with universities, R&D centres and/or other institutions of higher education, (3) it should encourage and support the start-ups and incubation of innovative, high-growth and technology based companies, (4) it should stimulate the transfer of technology and

business knowledge, and (5) it should be a property-based-initiative. However, Amirahmadi and Saff (1993) stress that the definition of SPs as property-based initiative is particularly vague because it can be confused with other similar business models.

The second aspect suggested by MacDonald–SPs are initiatives which provide high quality units in a pleasant environment–can be interpreted according to the Felsenstein's metaphor of *seedbed* (1994, pp. 93–94):

> implicit in the *seedbed* metaphor is the notion of the nurturing process that eventually creates an *environment for growth*. The science park as a seedbed therefore refers to the conditions created to promote *innovation* [...] As such, they are said to create a supportive environment for the development of innovation, creativity and entrepreneurship.

Actually, the worldwide history of SPs shows that they have not always been successful as *supportive environments*. For instance, Kihlgren (2003) analyses the SPs in St. Petersburg maintaining that they are lacking in collaboration with local industry. Similar results are attained by Ratinho and Henriques (2010) studying the Portuguese SPs. The authors conclude that the SPs contribution to job creation and economic growth is modest. Similarly, Watkins-Mathys and Foster (2006) examine the performance of hi-tech companies situated in science and technology industry parks in Beijing and Shanghai, highlighting the limited benefits of such environments for the national economy. Overall, these results show that the performance of SPs depends on a vast array of social, political and economic factors. However, other researchers have identified successful experiences, in different national contexts.

Starting from a longitudinal comparison between firms on and off SPs in Sweden, Löfsten and Lindelöf say that "the park *milieu* appears to have a positive impact on their firms growth as measured in terms of sales and jobs" (2002, p. 860, my emphasis). No Western countries have documented similar experiences. Vaidyanathan (2008), regarding the SPs in Taiwan, South Korea, Hong Kong and Malaysia, says that they are successful especially in attracting foreign investment and promoting growth of knowledge-based industries. Similarly, technology parks in India are export-oriented whereas the west SPs lack an analogous attitude. Vaidyanathan argues that SPs as *seedbeds* have a complementary set of expectations that relates to a spatial perspective, as Felsenstein specifies (1994, p. 94, my emphasis):

> the common ground between the behavioural and spatial conceptions of the seedbed lies in the notion of the seedbed as creating an environment. This environment, while occupying dimensions in geometric space, is not exclusively spatial. It represents a *milieu* in both the *functional* and *behavioural* sense, as well as the *geographic*.

From a spatial perspective, *exogenous* factors (e.g., city size, level of urbanization, institutional structures and community characteristics) contribute to nurture and promote innovation, becoming integral components of a seedbed environment. Also *endogenous* features (i.e., attitude towards knowledge) are crucial for innovation. Both exogenous and endogenous aspects usually influence the

performances of SPs orienting their success as a seedbed. The meaning of this metaphor is empowered when combined with the concept of *infrastructure*.

3 Theoretical Perspective

In STS literature, the concept of infrastructure refers to interrelated technical, social and organizational arrangements involving technologies, standards, procedures, practices and policies (Bowker, Baker, Millerand, & Ribes, 2010; Karasti, Baker, & Millerand, 2010). Superadded to the term *information*, infrastructure refers to digital facilities and services usually associated with the Internet. Internet is a generative infrastructure able to enact innovation (Monteiro, Pollock, Hanseth, & Williams, 2013). From this viewpoint, *generativity* is "the essential quality animating the trajectory of information technology innovation" (Zittrain, 2006). I maintain that an infrastructure displays its generativity in so far as it enables the continuous and rapid development of new innovative infrastructures. In this way, infrastructure contributes to the transformation of a set of isolated sociotechnical systems into an ecology of interacting human (people) and nonhuman actors (things such as devices and technological artifacts). A working infrastructure is characterised by *openness* to number and types of actors and *interconnections* of a multiplicity of purposes, agendas, strategies. It is a dynamically *evolving* ecology of people and things that *mutually constitute* themselves. The co-evolution of social and material factors also characterises the hermeneutic approach to knowledge adopted in this book and, specifically, by Augusto Cusinato's chapter.

Geoffrey Bowker and Susan Leigh Star (1999), with their famous book *Sorting Things Out. Classification and its Consequences*, have notably contributed to shedding light on the (information) infrastructure concept, showing that, first of all, it is the connection between classifications and standards as objects for the cooperation across social worlds (see "The Firm as a Knowledge-Creating Milieu: The Role of the ICT" by Carla Simone's). Classifications and standards are imbricated in everyday life. People classify objects, human beings, and data, and these classifications may or may not become standardized. According to Star and Ruhleder (1996), infrastructure is something that emerges in situ, in relation to organized practices, when it is connected to some particular activities. There are two relevant aspects of infrastructure. First, infrastructure typically exists in the background, it is *invisible* and taken for granted. People commonly envision infrastructure as a substrate that is something upon which something else "runs" or "operates". Infrastructure is put in the background where practices and activities sink (Bowker et al., 2010; Star, 1999; Star & Ruhleder, 1996). Second, infrastructure could be defined as a *relational property* associated to political, ethical and social choices (Clarke & Star, 2008). Such properties can be identified as "going backstage" (Goffman, 1956; Star, 1999) or doing an "infrastructural inversion" (Bowker & Star, 1999). This inversion allows us to recognise the depths of interdependence of social and material components that influence the

infrastructural *growing*[1] (Edwards et al., 2007; Edwards, Jackson, Bowker, & Williams, 2009). Methodologically, the infrastructural inversion leads to inquiry into the conflicting interests of different worlds (e.g., research, business). Studying this type of interaction favours a better understanding of innovation as a controversial process.

3.1 Infrastructural Convergence

Working infrastructure is based on the interactions between actors (humans and artifacts) (Suchman, 2000). This mutual engagement implies a number of secondary activities of mediating and controlling relationships between heterogeneous actors and their social worlds (Clarke & Star, 2008; Schmidt & Bannon, 1992; Strauss, 1978). To this end, the concept of *articulation work* (Strauss, 1988) refers to the work of putting together different tasks and coordinating the consequences of distributed activities (Gerson & Star, 1986; Star & Strauss, 1999). For instance, the articulation work is needed when an existing infrastructure *generates* new infrastructures interconnected with the generative one. Articulation work refers to the division, allocation, coordination, scheduling, meshing, connection of infrastructural activities, and it consists in managing tensions between divergent viewpoints, without silencing any voice[2] (Suchman & Trigg, 1993).

In SPs, "tenants"[3] have an evolving nature and different strategies, competing interests and objectives, discordant languages, specific knowledge and situated histories. This heterogeneity characterizes the identity of a park. Also the diversity of external factors (e.g., politics, industry) influences, for better or for worse, the parks' life. For instance, according to Amirahmadi and Saff (1993, p. 113, my emphasis):

> [policymakers] often see science parks as a panacea for solving a wide range of *divergent* economic, social, and developmental problems. Policymakers hope science parks will cure economic problems by providing employment, generating regional multipliers, promoting exports and foreign investment. They also look to science parks to promote regional equality, upgrade the skills of the local workforce, increase revenue to the university, and perhaps even improve the mental health to those employed in the tranquil surroundings.

Multiplicity and heterogeneity of actors influence their interaction (Bell & Callon, 1994; Bowker & Star, 1999; Hanseth, Monteiro, & Hatling, 1996). Then, to tackle this effect, a process of multiple translations is needed (Bruun & Hukkinen, 2003;

[1] According to Edwards, Jackson, Bowker, and Knobel (2007) the metaphor of "growing" rather than design or building infrastructure enables to capture, in their words, the "sense of an organic unfolding within an existing (and changing) environment (2007, 369).

[2] The capacity for appreciating differences in other's mental habit compared with one's own, and questioning them, is crucial for a hermeneutic approach, as suggested by Cusinato in this book.

[3] This is the term generally referring to organizations and institutions (such as companies, universities, research and development units, foundations and associations) working in different lines of business and fields of science and technology, located in a science park.

Latour, 1987; Law, 1992). The translation can generate ordering effects (Law, 1992) but, basically, it implies a translator, something that is translated and a medium in which that translation is inscribed. In other words, translation is a multifaceted interaction in which actors construct–through the translator's action–common definitions and new meanings, and co-opt each other in the pursuit of individual and collective purposes. This collaborative work can be interpreted as the seedbed for innovation because it enacts a process of *convergence*, that is the production of shared interpretations of things (Callon, 1986).

Convergence measures the extent to which the process of translation leads to agreement. More precisely it is the agreement regarding something genuinely new. However, even though the meanings associated with the word "convergence" refers to a general sense of commonality, uniformity, consensus, integration and homogeneity, convergence is "inextricably ambivalent, linked to distribution and diversity" (Pellegrino, 2008, p. 82). A successful process of translation generates a shared space (*alignment*), while an unsuccessful translation means that the actors are not able to communicate. Through a process of *disalignment* actors reconfigure themselves in separate spaces. A lack of agreement between actors should not be surprising because the convergence is neither obvious nor unproblematic. Conflict characterises the infrastructural life, even though literature often neglects the role of disagreement in innovative processes (Star, Bowker, & Neumann, 2003). Conflict can occur when an infrastructure develops while *bootstrapping* itself (Zittrain, 2006). I use this concept to denote the sociotechnical process according to which an existing infrastructure grows, empowering itself as *innovative milieu* by extending its networks and improving its material structure. Accordingly the infrastructural actors multiply, increasing also the intrinsic heterogeneity of the original infrastructure. For this reason, a working infrastructure needs standardisation because, by standards, different actors can cooperate sharing a common "language" or *modus operandi* (Star & Griesemer, 1989). At the same time, the infrastructure *must be flexible or open* (Hanseth et al., 1996) to different viewpoints (Galison, 1997). The balance between standardization and flexibility should characterise the infrastructural ecology.

4 The Ecological Approach

Looking at SPs as sociotechnical infrastructures allows an understanding of their complexity as *relational spaces*. Complexity is neither predictable nor quantifiable so that it becomes a research challenge.

I faced this challenge in conducting qualitative research–from April 2011 to March 2013–principally based on semi-structured interviews. The research was aimed at analysing SPs as sociotechnical infrastructures. The project involved six Italian parks: the Science and Technology Park Kilometro Rosso (Bergamo), the AREA Science Park (Trieste), the VEGA-Venice Gateway for Science and Technology (Venezia), the Toscana Life Sciences (Siena), the Technology Park of Lodi Cluster (Lodi), and the Technology Park of Navacchio (Pisa). Firstly, I selected

these parks in order to have a representative sample of the Italian scenario (three SPs are cross-thematic, the other three are thematic parks). Furthermore, applying this criteria of representativeness, I selected the SPs according to their shareholding (in this sample, one park is public, another one is private and four have a mixed nature) and I also considered the incubation of University spin-offs[4], as a typical activity of SPs (Carlile, 2004). Then, I defined a set of actors to interview:

- Academic experts on SPs and innovation processes (4)
- The President of the Italian Association of Science and Technology Parks (APSTI) (1)
- Coordinators[5] of three thematic APSTI's Committees (3)
- Professionals of academic Industrial Liaison Offices (5)
- Directors[6] of SPs (6)
- The President of the Italian Network for the Valorisation of University Research (Netval) (1)
- Business Incubator[7] managers (5)
- Founders of the University spin-offs localised into the SPs (10)

In this chapter I present the case-study of VEGA park that, at the time of my research, displayed different organisational features. Then, in preparing my contribution to this book, in July 2013 I came back to the research field in order to interview the architect originally involved in the construction of the VEGA building, and I interviewed again, one year later the first meeting, the founder of Unisky s.r.l which is the unique University spin-off hosted by VEGA. These two additional interviews were motivated by a meaningful change of the VEGA governing body that occurred after the end of my research. So in order to properly discuss the case-study, I took this initiative.

I completely transcribed all interviews. The software Atlas.ti supported the codification of the empirical data, according to the rationale of Grounded Theory (Glaser & Strauss, 1967). The iterative process of moving back and forth between

[4] A standard definition of "University spin-off" can be retrieved in Wikipedia: "University spin-offs transform technological inventions developed from university research that are likely to remain unexploited otherwise" (Wikipedia, 2013b). The number of University spin-offs' founders that I have interviewed at that time corresponds to the total number of spin-off localized into the involved Parks, taking into account one "unattainable" spin-off.

[5] One interviewed Coordinator is also Director of one involved park: I counted this person two times. Overall, there are seven APSTI Committees.

[6] In two cases, I interviewed the Director's spokesperson instead of the Director.

[7] At that time, one park didn't have an internal Incubator. A basic definition of "Business Incubator" or "Incubator" can be retrieved in Wikipedia: "Business incubators are programs designed to support the successful development of entrepreneurial companies through an array of business support resources and services, developed and orchestrated by incubator management and offered both in the incubator and through its network of contacts. Incubators vary in the way they deliver their services, in their organizational structure, and in the types of clients they serve" (Wikipedia, 2013a).

empirical data and emerging analysis made the data progressively more focused and the analysis successively more theoretical (Bryant & Charmaz, 2007). The codification was influenced by my STS background according to Susan Leigh Star's suggestion (2007) to distance yourself as a researcher from a strictly inductive approach, legitimising a more embedded pathway to Grounded Theory. I complemented the interviews with the analysis of documents about SPs, principally retrieved on websites, in magazines, and institutional reports. Web research was particularly useful to reconstruct Michele Vianello's perspective: he was the Director of VEGA till July 2013. Unfortunately, I was not able to interview him, but there is a remarkable amount of documentation on the web about his work as past VEGA Director. Vianello's role has often been publicly criticised in the media, but his work has also been frequently discussed as a positive contribution to the improvement and innovation within VEGA. These secondary sources of information enabled me to better understand the case overall.

5 VEGA-VEnice GAteway for Science and Technology

"Venice Gateway for Science and Technology" is the extended name of the greatest SP of the Veneto region, in Northern Italy. It is particularly interesting to consider this case-study because it enables us to pinpoint past and present troubles related to national SPs.

From a legal viewpoint, VEGA is a company founded in 1993 as part of a European project within the SPRINT Programme (DG12 of the European Commission). Until July 2013, the company was controlled by the Municipality of Venice, the Provincial Administration, the Chamber of Commerce, and also by the agency for regional development "Veneto Innovazione" and Enichem, which is both a State chemical company and the owner of the old industrial plants where VEGA is located. Several private companies and the two Venetian Universities were part of the company as well. However, this private-public partnership drastically changed after July 2013, shaping the recent history of VEGA. The park's site covers about 35 ha and its development involves four areas (Fig. 1).

Until now, the construction of VEGA corresponded to Area 1 (Fig. 2), while the neighbouring Areas 2, 3 and 4 have yet to be completed.

I will present area by area in order to give an overall image of this SP.

AREA 1 (about 9.4 ha) (Fig. 3). The VEGA project was born from the conversion of this first area where, until 1993, the raw materials for the production of chemical fertilizers were produced. Modern buildings have taken the place of the abandoned factories: more than 28,000 mq were built by VEGA with the help of EU funding, European Regional Development Funds, allocated and managed by the Veneto Region. The remaining 35,000 sq m were completed through the intervention of the first private investor: the company Nova Marghera.

AREA 2 (about 8.8 ha). In continuity with Area 1, Area 2–historically known as *Depositi Costieri* (Coastal Deposits) of Agip Petroleum–overlooks an important waterway that leads to the Venetian lagoon. Initially, the soil improvement was

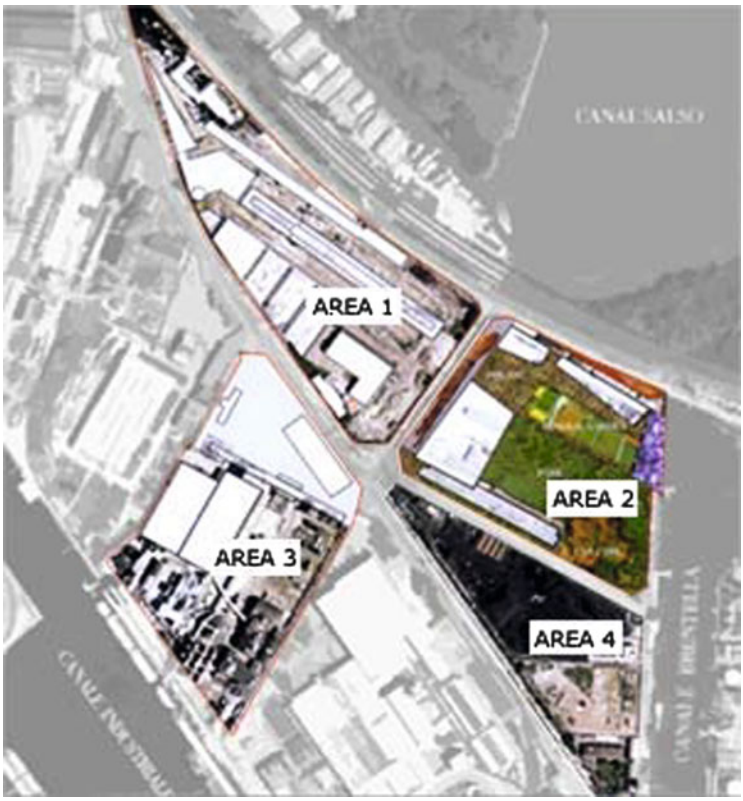

Fig. 1 The four areas of VEGA

carried out by Agip using biological technology. The further development of the area was assigned to VEGA and Condotte Immobiliari Società per Azioni (a private company).

AREA 3 (about 11 ha). It is the continuation of the road joining AREA 1 and AREA 2. It is named *ex-Complessi* ("ex-Compounds") because "complex" fertilizers (NPK—Nitrogen, Phosphorus and Potassium) were produced and stored here. This area is privately owned and is not yet completed.

AREA 4 (about 5.4 ha). This area is not yet developed and–as Area 3–it constitutes a site for the future development of VEGA. The project involves the functional and environmental redevelopment of an area named "ex-Cargo System", originally used as a coal deposit. This area is privately owned.

Historically, VEGA has been oriented by two missions (Bigliardi, Dormio, Nosella, & Petroni, 2006). The first aim is to contribute to the re-industrialization of the old part of the industrial manufacturing area of Porto Marghera, which up to the end of the 80s was one of the most industrialized areas in Europe with over 70,000 workers. This industrial area was populated by petrochemical factories that produced polymers and chemical products for agriculture and mechanical

Fig. 2 VEGA Area 1

components for heavy industry and steel. The second goal is to elicit advanced technology transfer to companies operating in the Province of Venice in order to improve the local technological knowledge. The companies and research laboratories located on the VEGA site–which are start-ups, high-tech companies and other enterprises (among which, one academic spin-off)–work mainly in the Nanotechnology, ICT and Green Economy fields. The description of the four areas and the identification of project's missions enable us to approach the Venetian SP from both a spatial and a relational viewpoint.

Fig. 3 View of VEGA Area 1

5.1 Zoom-in VEGA

In July 2013 I interviewed the architect involved in the original design of VEGA. He mentioned a problematic situation at the beginning of VEGA, sketching a condition of *disalignment* between different actors: the architect and his team, the interacting public and private organizations. Such *disalignment* deeply influenced the development of VEGA. Specific situations occurred, for example, during the construction of an underpass, a footbridge and a support beam.

> [VEGA] began with an international bidding competition [. . .] this bidding competition had to solve two problems: urban problems and architectural problems . . . then, [we could start talking about] the urban problems. We must connect [the park] to the university area in Via Torino (. . .). We had to establish a system of ways, tunnels (. . .). The [available] underpass (. . .) was [and is] owned by ANAS[8] and Ferrovie dello Stato[9]. These two organizations do not communicate with each other. [For this reason] we were running the risk of losing the European funding because we would not be able, at that time, to build the underpass without their active involvement (. . .). Our project envisioned also a footbridge (. . .) leading right in the middle of Via Torino (. . .), and there was another thing: now you see that there's a viaduct passing over the rail and down along Via della Libertà, and you see in the science park's building a big beam [for support] and a big hole. This was not a stylistic choice: the viaduct had to pass through (. . .) and this would have given rise to an extremely interesting circulation system (. . .). All these things were not completed (. . .). During the project realization I encountered many difficulties. The project was not realized with a computer programme, but was drawn in ink, with subsequent consequences: since we had to change it frequently in dialogue with the clients, we could not control the costs (. . .). When you launch a project like this, you need an administrative centre that updates the

[8] Anas is the technical manager of the Italian road and highway network.

[9] State Railways.

> costs in real time. So, in total solitude, the chief engineer of the Civil Engineering Office and I (. . .) removed [several] pieces of the project for the park's architectural design, cutting the related costs . . . If you look at it, the building does not have a piece of thermal insulation (. . .) nowadays, such a building would be unacceptable! (July, 23 2013, Venice)

The architect talked about other prickly situations due to political interests such as the operations of ordnance clearance and environment reclaim. Such interests damaged the development of VEGA. At the origin, it was planned to be a relational place rather than a space merely aimed to host different actors.

In this book (see "A Hermeneutic Approach to the Knowledge Economy" by Augusto Cusinato's), *place* means a space filled up by people, practices, objects, and symbolic representations. Here, the concept of place refers to human practices and interactions and the mutual shaping. A SP works as an *innovative infrastructure* when social and material factors are properly designed to *generate* convergence between actors. Such designs arise from a visionary management able to organise different viewpoints leading them to agreement. Then, the manager should know the available resources and be able to align actors according to a shared vision of innovation. At the managerial level, also the economic sustainability of material structure should be carefully evaluated (e.g., eco-save building) because it could influence the future infrastructural development. In order to further analyse the VEGA history, I give voice to the past Director of VEGA, Michele Vianello, presenting his striking Pandora project.

5.2 The Pandora Project

"Pandora" is the name of the fictional world imagined by James Cameron for his film "Avatar". In this film, Pandora's ecology forms a vast *neural network* into which the indigenous humanoid species can *connect* and *cooperate* to gain shared objectives. The choice to use this name for a new building at VEGA is not a coincidence, as Vianello writes[10]:

> A while ago, VEGA, the Venice science and technology park, still had some spare buildable land available on its site.
>
> So VEGA commissioned its professionals to construct an environmentally sustainable building covered with solar panels, with minimal energy consumption, and with water-recycling capabilities. A whole floor was envisioned as a garden. They scoured the market for the most innovative materials, including nanotechnology components and aerogels. In short, it was to be an environmentally virtuous building with futuristic architecture and components; a zero-emissions building. The result would have been a smart building, if the VEGA people had allowed themselves to be satisfied with the commonplace and gone ahead with the mooted design. But satisfied they were not. They believed that a building can be conceived as a barometer of environmental sustainability, as a living organism. But this dream can be achieved only if *people* and *objects* are allowed to *dialogue* with one another through the internet, if knowledge can be shared and spread, if a building can communicate with other buildings and with the surrounding environment, if an edifice becomes a means

[10] By courtesy of Maggioli Editore and the author, Michele Vianello.

> of displaying data. Their vision was not to settle for the ordinary but to *imagine* a different future, in the form of the Pandora project, a prototype building for intelligent cities. In the process of devising the Pandora design idea and selecting a name for the project, the cultural influence of James Cameron's superb film "Avatar" proved inspirational. As anyone who has seen the film will know, planet Pandora is a unique living organism, for its various different inhabitants interact together organically. The Pandora building is a single brain fed by the data generated by people, plants and things. Hence the idea of a "building-organism". Such a building can be conceived to accommodate a new generation of nomadic workers. Why limit yourself to constructing a building for generic office uses, albeit intelligent ones? This thought led to the idea of a structure where the rooms are unpartitioned—non-rooms—where internet connectivity is ubiquitous, where there are no desks, where shared spaces predominate, where space and time acquire a new dimension. Naturally, a culture imbued with a people-centred concept of work and with the use of social networking pervades the entire building. Thus, the sentiment-analysis data on the satisfaction of "Pandora's inhabitants" can be seen through the flutterings of the little Twitter birds. Above all, Pandora is the place of "flexible interactions" between people and between people and things.
>
> So how did the Pandora concept come about? It arose because the VEGA management decided to depart from convention, because they wanted to dream, to go beyond the obvious, to do something completely different from the surrounding environment, even from the buildings in the science and technology park.
>
> Porto Marghera is a place of rigid, heavy-industrial interactions, a place based on Fordist principles of working, a place where production has a major environmental impact. Porto Marghera is, in the popular sense, the emblem of twentieth-century methods of working and production.
>
> Pandora is the opposite: it is environmental sustainability; it is knowledge networks; it is *flexibility in spatial and human relationships*.

This story is drawn from the Michele Vianello's book titled "Smart Cities" (2013, pp. 112–114, my emphasis). I quote it extensively because this excerpt describes very well Vianello's vision, when he was Director of the VEGA. This project was designed by Vianello and his team with a group of researchers of the Massachusetts Institute of Technology. The smart infrastructure was designed starting from a new idea of work as people-centred, nomadic and socially networked. The Pandora project is, at the same time, a symbol and a developmental plan. Describing the Pandora building, Vianello talks about a new infrastructure *generated* by the existing one (VEGA) where social and material factors converge. In order to enable innovation, the working spaces were imagined as unstructured as much as possible ("non-rooms") and easy-fitting for the tenants. This "building-organism" was technologically advanced and open to social relationships, reflecting the idea of innovation as a dialectical process.

Among the remarkable amount of documents uploaded by Vianello on the web, I found two presentations[11] (http://www.slideshare.net/michelevianello; accessed 19 November 2013) of the Pandora building. It is sketched as a "flexible, light and eco-friendly building, based on an *interactive* architecture"; it is designed as "a creative laboratory, a mobile, changeable and plural space" and "a place that adapts to the characteristics of those who work inside, such as knowledge workers who

[11] "Il VEGA, l'innovazione, il riuso del territorio" and "Pandora un organismo vivente a Marghera".

treat numbers, images, symbols". Pandora is "a place with Internet-based sharing and sales systems" based on "new approaches to support learning, co-working and team working". These characteristics reflect the principal requirements of a generative infrastructure able to enact learning and knowledge processes while bootstrapping itself.

VEGA achieved the authorization to build Pandora in January 2013. However, the necessity to manage a growing economic loss threatened the park's development.

5.3 Coming Back to VEGA

The conversion of the Pandora "dream" into a "living-building" was interrupted because of "heavy economic losses"[12] that daily newspapers[13] attributed to expensive real estate politics. This event compromised the construction of the new building, nullifying the overall effort to innovate VEGA. Networking, technological innovation, environmental sustainability, cooperative work and learning processes were not the exclusive ingredients of Pandora: they appear in many of Vianello's online documents oriented by his vision about innovation.

However, due to the unsustainable financial situation of VEGA, the governing body decided to separate the property management of the park from its innovation management, employing new managers coming from the real estate industry. Michele Vianello disagreed with this politic choice and ultimately resigned. Effects of this change will be understandable in the future, but its symbolic relevance is clear. The separation between the property management and the innovation management is paradoxical, given that the innovation is a process requiring a convergent attention both to social and material dimensions. Seeing VEGA as a mere space (i.e., building) nullifies Vianello's efforts to innovate. Pandora would not have solved the pre-existing problems of VEGA. Even though smart technologies would have contributed to make this place attractive, the development of VEGA as an innovative infrastructure would have required a wider convergence of intentions between strategic entities such as politicians, the governing body of VEGA and the Director. Then, Pandora remained a visionary project aimed to transform the existing material structure of VEGA by generating new sophisticated sociotechnical infrastructures.

At the time of my research, the incubator manager and the founder of the University spin-off talked about the radical changes introduced by Vianello when he become Director. VEGA was previously characterised by its scant attention to

[12] Venice Mayor Giorgio Orsoni's answer about the Michele Vianello's responsibilities (http://consiglio.comune.venezia.it/?pag=risp_1_2437&m=; accessed 19 November 2013).

[13] In general, it is very hard to obtain such information from a park's administration and this is the reason why I have drawn such details from newspapers and other public sources.

the park as a relational place. Vianello's perspective was the reason why the spin-off decided to settle in this park, not elsewhere;

> Park in itself means nothing, of course. Basically, this park has quite a long history, it is the history of a park that has not been a real *system* [. . .] but a real-estate transaction so far. We [. . .] [appreciated] the *change of management* [. . .] What pushed us to settle here was the [Vianello's] new cultural and political model [. . .] strongly anchored to the social dimension [of innovation]. (June, 5 2012, Venice).

One year later, after Vianello's resignation, the same interviewee commented:

> [Current situation is] very different from Michele Vianello's project, that is the creation of a network structure [. . .] And this political and cultural model is in crisis because of an absolute and total reorientation towards a real-estate management. We really are in a dramatic situation. (July, 23 2013, Venice).

This research has taken place during a transition period in the history of VEGA, when the identity of the park seemed to go beyond a linear, closed and idiosyncratic system that is common for Italian SPs. From this point of view, I would stress that the VEGA Incubator–devoted to providing technological and business services to new firms–was built in 2012 by Vianello, 10 years after the park's creation. Vianello's idea of an Incubator was inspired by Google style, giving special attention to leisure spaces and aesthetic aspects (e.g., the colours of the walls) in order to favour knowledge and interaction among people. However, the pre-existing "positivist architecture" (Galison, 1997) of VEGA has limited also the sociotechnical improvement.

The delay of Incubator's development can be interpreted as the sign of an inherited managerial disinvestment in supporting the innovation of tenants. We could debate about how effective technology incubators in parks are, but this would lead out of the subject matter. However, I stress that there is scientific evidence that in Italy on-site incubator firms perform better than off-site incubator firms (Colombo & Delmastro, 2002). At the time of my research, VEGA hosted only *one* academic spin-off. This is a meaningful aspect because it shows the limits of VEGA as a unitary agent and an attractive seedbed for innovation across organisations (i.e., Universities, firms and politics). I do not mean that academic research is better or worse if it is transferred into SPs. I mean that innovation may also follow this trajectory and, if so, it requires a seedbed where it can become entrenched and grow. The late birth of VEGA's incubator and the scant presence of on-site incubator University spin-offs, are two signs of scarce infrastructural generativity.

6 Final Remarks

Literature about innovation processes has paid little attention to the relationships between social and material factors. However the interaction between social and material aspects deserves our attention because it reminds us of the complexity of innovation as a human, organisational and technological process. This complexity,

then, is related to the heterogeneity of actors and interests at stake. Throughout the chapter, I discussed the controversial nature of convergence as a basic accomplishment to produce innovative infrastructure. Furthermore, I stressed that bootstrapping can be a promising strategy in order to enable infrastructural growth, *generating* new related infrastructures. The concepts of bootstrapping and generativity are closely associated with the rationale of large-scale networks that historically are lacking within the ecology of Italian SPs. Conflicting interests and both local and national politics have made the process of convergence particularly frail within the Italian SPs, preventing a seedbed effect.

SPs cannot continue to be mere spaces unable to enact processes of articulation and innovation between tenants and external actors. It is all the more essential that they reinterpret their actual role taking into account the ongoing transformations both at the social and technological levels. Cusinato and Philippopoulos, in the introduction to this book, talk about "the changed epistemologies of collectives", stressing the increasing need of a pragmatic approach to knowledge. Such an approach is based on the capacity to scale up from local to social, recognising and legitimising the hybrid nature of all parties involved in innovative processes. This is a cultural change that could act as a turning point in the history of Italian SPs. SPs are actors within a larger and unpredictable sociomaterial assembly that need to be further analysed.

References

Allesch, J. (1985). Innovation centers and science parks in the Federal Republic of Germany: Current situation and ingredients for success. In J. M. Gibb (Ed.), *Science parks and innovation centers: Theirs economic and social impact* (pp. 58–68). Amsterdan: Elsevier.

Amirahmadi, H., & Saff, G. (1993). Science parks: A critical assessment. *Journal of Planning Literature, 8*(2), 107–123.

Bell, G., & Callon, M. (1994). Techno-economic networks and science and technology policy. *STI Review, 14*, 67–126.

Bigliardi, B., Dormio, A. I., Nosella, A., & Petroni, G. (2006). Assessing science parks' performances: Directions from selected Italian case studies. *Technovation, 26*, 489–505.

Bowker, G. C., & Star, S. L. (1999). *Sorting things out. Classification and its consequences*. Cambridge, MA: MIT Press.

Bowker, G. C., Baker, K., Millerand, F., & Ribes, D. (2010). Toward information infrastructure studies: Ways of knowing in a networked environment. In J. Hinsinger, L. Klastrup, & M. Allen (Eds.), *International handbook of internet research* (pp. 97–117). London: Springer. Accessed July 2, 2013, from http://interoperability.ucsd.edu/docs/07BowkerBaker_InfraStudies.pdf

Bruun, H., & Hukkinen, J. (2003). Crossing boundaries: An integrative framework for studying technological change. *Social Studies of Science, 33*, 95–116.

Bryant, A., & Charmaz, K. (Eds.). (2007). *The Sage handbook of grounded theory*. London: Sage.

Callon, M. (1986). Some elements of a sociology of translation: Domestification of the scallops and fishermen of St Brieuc Bay. In J. Law (Ed.), *Power action and belief: A new sociology of knowledge?* (pp. 196–223). New York: Routledge.

Carlile, P. R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organization Science, 15*(5), 555–568.

Clarke, A. E., & Star, S. L. (2008). The social world framework: A theory/methods package. In E. J. Hackett, O. Amsterdamska, M. Lynch, & J. Wajcman (Eds.), *The handbook of science and technology studies* (pp. 113–137). Cambridge, MA: MIT Press.

Colombo, M., & Delmastro, M. (2002). How effective are technology incubators? Evidence from Italy. *Research Policy, 31*, 1103–1122.

Durão, D., Sarmento, M., Varela, V., & Maltez, L. (2005). Virtual and real-estate science and technology parks: A case study of Taguspark. *Technovation, 25*, 237–244.

Edwards, P., Jackson, J. S., Bowker, G., & Williams, R. (2009). Introduction: An agenda for infrastructure studies. *Journal of the Association for Information Systems (JAIS), 10*, 364–374.

Edwards, P. N., Jackson, S. J., Bowker, G. C., & Knobel, C. P. (2007, January). *Understanding Infrastructure: Dynamics, tensions, and design*. NSF Report of a Workshop on "History & Theory of Infrastructure: Lessons for New Scientific Cyberinfrastructures". Accessed July 3, 2013, from http://deepblue.lib.umich.edu/handle/2027.42/49353

Felsenstein, D. (1994). University-related science parks-"seedbeds" or "enclaves" of innovation? *Technovation, 14*(2), 93–110.

Galison, P. (1997). *Image and logic. A material culture of microphysics*. Chicago: The University of Chicago Press.

Gerson, E. M., & Star, S. L. (1986). Analysing due process in the workplace. *ACM Transactions on Office Information Systems, 4*(3), 257–270.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategy for qualitative research*. Chicago: Aldine.

Goffman, E. (1956). *The presentation of self in everyday life*. New York: Doubleday.

Hall, P. (1991). Three systems, three separate paths. *APA Journal, 16*, 16–20.

Hanseth, O., Monteiro, E., & Hatling, M. (1996). Developing information infrastructure: The tension between standardization and flexibility. *Science, Technology, & Human Values, 21*(4), 407–426.

Karasti, H., Baker, K. S., & Millerand, F. (2010). Infrastructure time: Long-term matters in collaborative development. *Computer Supported Cooperative Work, 19*, 377–415.

Kihlgren, A. (2003). Promotion of innovation activity in Russia through the creation of science parks: The case of St. Petersburg. *Technovation, 23*, 65–76.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Milton Keynes: Open University Press.

Law, J. (1992). Notes on the theory of the actor-network: Ordering, strategy and heterogeneity. *Systems Practice, 5*, 379–393.

Löfsten, H., & Lindelöf, P. (2002). Science parks and the growth of new technology-based firms—Academic-industry links, innovation and markets. *Research Policy, 31*, 859–876.

MacDonald, S. (1987). British science parks: Reflections of the politics of high technology. *R&D Management, 17*, 25–37.

Monteiro, E., Pollock, N., Hanseth, O., & Williams, R. (2013). From artifacts to infrastructures. *Computer Supported Cooperative Work, 22*, 575–607.

Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization Studies, 28*, 1435–1448.

Pellegrino, G. (2008). Convergence and saturation. Ecologies of artefacts in mobile and ubiquitous interaction. In K. Nyíri (Ed.), *Integration and ubiquity. Towards a philosophy of telecommunications convergence* (pp. 75–82). Vienna: Passagen Verlag.

Ratinho, T., & Henriques, E. (2010). The role of science parks and business incubators in converging countries: Evidence from Portugal. *Technovation, 30*, 278–290.

Schmidt, K., & Bannon, L. (1992). Taking CSCW seriously. Supporting articulation work. *Computer Supported Cooperative Work, 1*, 7–40.

Star, S. L. (1999). The ethnography of infrastructure. *American Behavioural Scientist, 43*(3), 377–391.

Star, S. L. (2007). Living grounded theory: Cognitive and emotional forms of pragmatism. In A. Bryant & K. Charmaz (Eds.), *The Sage handbook of grounded theory* (pp. 75–93). London: Sage.

Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, "Translation" and boundary objects: Amateurs and professionals in Berkeley's museum of vertebrate zoology. *Social Studies of Science, 19*(3), 387–420.

Star, S. L., & Ruhleder, K. (1996). Steps toward an ecology of infrastructure: Design and access for large information spaces. *Information Systems Research, 7*, 111–134.

Star, S. L., & Strauss, A. (1999). Layers of silence, arenas of voice: The ecology of visible and invisible work. *Computer Supported Cooperative Work, 8*, 9–30.

Star, S. L., Bowker, G. C., & Neumann, L. J. (2003). Transparency beyond the individual level of scale: Convergence between information artifacts and communities of practice. In A. Peterson-Kemp, N. A. van Van House, B. P. Buttenfield, & B. Schatz (Eds.), *Digital library use. Social practice in design and evaluation* (pp. 241–269). Cambridge, MA: Massachussets Institute Technology.

Strauss, A. (1978). A social world perspective. *Studies in Symbolic Interaction, 1*, 119–128.

Strauss, A. (1988). The articulation of project work: An organizational process. *The Sociological Quarterly, 29*(2), 163–178.

Suchman, L., & Trigg, R. (1993). Artificial intelligence as craft-work. In S. Chaiklin & J. Lave (Eds.), *Understanding practice: Perspectives on activity and context* (pp. 144–172). New York: Cambridge University Press.

Suchman, L. (2000). Organizing alignment: A case of bridge building. *Organization, 7*(2), 311–327.

Vaidyanathan, G. (2008). Technology parks in a developing country: The case of India. *Journal of Technology Transfer, 33*, 285–299.

Vianello, M. (2013). *Smart Cities. Gestire la complessità urbana nell'era di Internet*. Maggioli Editore: Santarcangelo di Romagna.

Watkins-Mathys, L., & Foster, M. J. (2006). Entrepreneurship: The missing ingredient in China's STIPs? *Entrepreneurship & Regional Development, 18*, 249–274.

Wikipedia. (2013a). *Business incubator*. Accessed August 3, 2013, from http://en.wikipedia.org/wiki/Business_incubator

Wikipedia. (2013b). *University spin-off*. Accessed August 3, 2013, from http://en.wikipedia.org/wiki/Business_incubator

Zittrain, J. L. (2006). The generative Internet. *Harvard Law Review, 119*, 1974–2040.

Knowledge Economy and Competitiveness: Economic Trajectories of French Cities Since the 1960s

Fabien Paulus and Céline Vacchiani-Marcuzzo

Abstract

The French economy, as well as those of mature industrialized countries, is going through a period of intense change. This period is characterized by two major (and interrelated) trends: (a) a transition from the industrial age to what is more and more commonly referred to as the "age of the knowledge economy" and (b) a redrawing of economic geography at a global scale.

Numerous studies analyze the spatial impact of this change, and especially on cities. They focus on larger cities (globalization, metropolisation) and on specific territories (industrial districts, clusters. . .). Furthermore, the attention is put on location of innovation, innovative products, firms or activities, using mostly one-dimensional indicators (patents, scientific publication. . .).

We propose to discuss the adaptation of cities to the economic change in the context of a more general pattern. More precisely we analyze the linkage between the innovation process and the structure of urban systems. The structure of urban systems is a persistent configuration of relative and relational properties differentiating cities. The major structural features shared by all city systems are hierarchical differentiation and socio-economic specialization of cities. Feedback processes can be observed, through which social and technological change occurs in every town and city, while the particular features of this propagation of innovation determine functional and size differentiation among cities. While most innovations induce smooth change, without any deep structural transformation and only slightly affect the urban hierarchy (cities are co-evolving), some

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of them emerge in correlated bundles, which can accelerate the hierarchisation process, or even lead to the emergence of new types of cities, via specialization.

In order to assess this theory, we lead detailed analysis of the evolution of economic specializations of French cities, especially by the observation of Knowledge-creating Services (KCS). Our aim is to show how the urban hierarchy is linked to the hierarchical process of diffusion of innovation, spatial division of labour and dynamics of competition between cities.

We built an harmonized database on French cities (*aires urbaines*) depending on the proportion of employment in around 30 sectors of economic activity from the 1960s. Using factor analysis, we can finely describe the adaptation of each city to economic change, which then draw real trajectories. Furthermore, from the CLAP database (on location of firms with their employment and detailed economic activities), we lead analysis on KCS in French cities in 2008.

1 Introduction

The economy, and especially the French one, as well as economies of mature industrialized countries, is going through a period of intense change since 50 years. This period is characterized by two major (and interrelated) trends: (1) firstly, a transition from the industrial age to what is more and more commonly referred to as the "age of the knowledge economy" and (2) secondly, a redrawing of economic geography at a global scale. Numerous studies analyze the spatial impact of this change, and especially on cities (Fujita et al., 1999; Markusen and Schrock, 2006). They focus on larger cities (with the globalization or metropolisation process for example) and on specific territories (industrial districts, clusters. . .). Furthermore, the attention is put on location of innovation (Feldman and Audretsch, 1999), innovative products, firms or activities, using mostly one-dimensional indicators (patents or scientific publication . . .) (Frenken and Boschma, 2007).

In this paper, we propose to discuss the adaptation of cities to the economic change in France in the context of a more general pattern. More precisely we analyze the linkage between the knowledge and creative activity, the innovation process and the structure of urban systems. For that, we propose to analyse this linkage through the Knowledge-Creating Services classification (KCS), according to this book approach.

We consider cities as places of maximizing social interaction, innovation, hybridization and crossbreeding. They are matrix of emergence of creativity and particularly the larger ones. Thus, urban populations, and more generally all urban stakeholders as firms, local authorities and citizens, are at the heart of a competitive process of innovation search and adoption that is accelerated by the increased circulation of ideas, models, innovations and skills. The aim is to show how the urban hierarchy is linked to the hierarchical process of diffusion of innovation, spatial division of labour and dynamics of competition between cities.

2 Hypothesis

Our main hypothesis is that city size matters. Since larger cities are more diverse, both in terms of economic profile and of human and social capital, their functions demonstrate a higher level of complexity in terms of urban economy. In that way, the propagation of innovation among towns and cities has been formalized as a hierarchical diffusion process. Indeed, the largest cities are the first to capture the benefits of the innovation, and later on they let them filter down the urban hierarchy. Larger cities concentrate a larger part of anything «new» at any time and they become larger because they were successful in adopting many successive innovations. This is explained by the higher levels of information, of skilled labour and the diversity and capacity of infrastructures that are the distinctive attributes of large cities (Bretagnolle et al., 2009).

As a consequence, they have also developed broader diversity of activities, and attained higher levels of social and organizational complexity. These characteristics explain why they have a greater probability to adopt any further innovation at an early stage. Later, many of these innovations become part of the activity of all towns and cities, since they meet needs that become commonplace. But the functioning costs in these large urban areas are also much higher, and many activities are forced to migrate out to smaller settlements where they can sustain their economy (Pumain et al., 2009).

Besides the effects of hierarchical selection, there is a second type of asymmetry that is created in urban systems by the innovation process. Sometimes, the resources for which exploitation becomes profitable are not available in every location; this gives rise to urban specialization because the related economic activities can only develop in a few urban sites. Thus urban specializations are partly explained by the unequal diffusion of some innovation cycles that are linked to spatially concentrated resources. But they may also result from the hierarchical diffusion process itself. That is, when a plant relocates from a large city to a small town, this small town becomes specialized in the activity of the plant (Duranton & Puga, 2000, 2005).

3 Data: How to Approach Innovation Process

In order to approach innovation process in urban systems, we elaborate databases that combine demographic data and data related to urban industries and especially Knowledge-Creating Services categories. We lead analysis on 354 French cities which are defined as functional urban areas (*aires urbaines*). The data deals with population and employment from the seven censuses that occurred since the 1960s.[1] Each city is described by the share of employment in 32 economic sectors

[1] The analysis takes into account seven French Censuses (1962, 1968, 1975, 1982, 1990, 1999 and sometimes 2006).

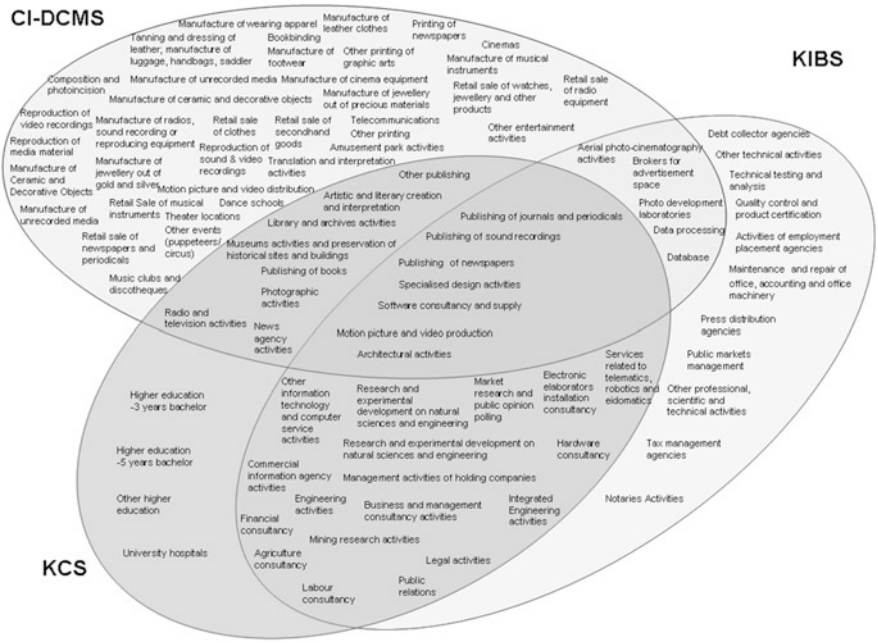


Fig. 1 Intersections between the three different classifications of knowledge-based economic activities (Compagnucci & Cusinato, 2011)

that have been harmonized following the NES—French national industry classification that was used until 2008. It is a challenge to harmonize the four economic activities nomenclatures that were used since 1962. But it is possible if we consider sectors not in their specific meaning but according to their stage in innovation cycles.

Finally, we use another source: the CLAP database (Located Data on Productive System) in order to circumscribe in the best way KCS. This is possible however only for one date, 2008. The CLAP database provides data about location of firms with their employment and detailed economic activities.

This approach to Knowledge-Creating Services (Fig. 1) differs from others classification like the Knowledge Intensive Business Services—KIBS (Miles et al., 1995) and the Creative Industries (DCMS, 2001) approaches. It differs from the former because it does not take into consideration those services that, although they have a high technological content, mainly make applicative use of existing knowledge, such as "Data processing", "Database activities", "Maintenance and repair of offices, accounting and computing machinery". By contrast, KCS include "Media" as well as other public activities, such as "Universities and Research Centres", that are not recorded by the others. On the other hand, KCS differ from Creative Industry classification because they do not encompass the entire creative chain (from the inventive conception and design to the manufacturing production and retail) but only the knowledge-intensive service components of this chain.

4 Main Results About KCS in French Cities

We introduce a difference among KCS,[2] between public and private sector because recurrent planning decisions in France have promoted decentralization of public services.

4.1 Localization of Private Core Knowledge Creative Services

We count 1.5 million employees in Private-core KCS in the French urban system in 1999. There is a strong differentiation between the share of employment in these creative services among cities (Fig. 2). Although, the mean is of 3.7 %, they represent more than 14 % in Paris, which is the higher score. Half of the employment in Private-core KCS is concentrated in Paris, but there is only 25 % of the total employment that is localized in the capital city. More globally, we can see that largest cities have higher concentration of Private-core KCS: Grenoble, Toulouse

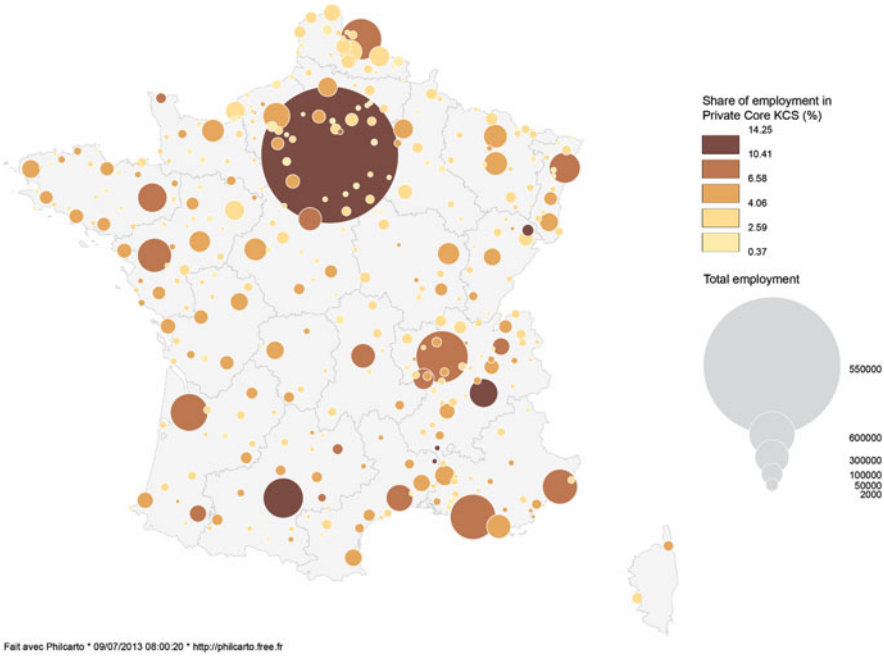


Fig. 2 Location of private-core KCS employment in the French urban system, 1999

[2] We use the KCS classification proposed by Augusto Cusinato in this book. This classification focuses on core, core-related and collateral services, both in public and private sectors. In our analysis, we only take into account the core and core-related KCS.

specifically, and also Rennes, Nantes, Bordeaux, Montpellier, Marseille, Nice, Lyon, Strasbourg and Lille.

On the other hand, smallest cities show a share of employment in Private-core KCS below the mean. We seem to have a strong relationship between city size and the weight of private core KCS. We will analyze more systematically this relationship using scaling laws after.

Nevertheless, there are some exceptions, anomalous to that relationship. We see that two small cities in the Rhône Valley have a strong share of employment in private core KCS: Pierrelatte and Bagnols-sur-Cèze. These two cities are well-known because they both have nuclear power plants. The choice of these cities has been made according to physical conditions (proximity of the river, not too close of a big settlement, etc.), and that lead to their attractiveness for other knowledge and high tech activities.

Finally, we can note that there is no clear regional differentiation even if the old industrial regions have a less share of employment in private core KCS (Nord Pas de Calais especially).

4.2 Localization of Public-Core Knowledge Creative Services

The pattern of the distribution is totally different for the Public-core KCS (Fig. 3). The largest cities, as Paris or Lyon, are not the places where the share of

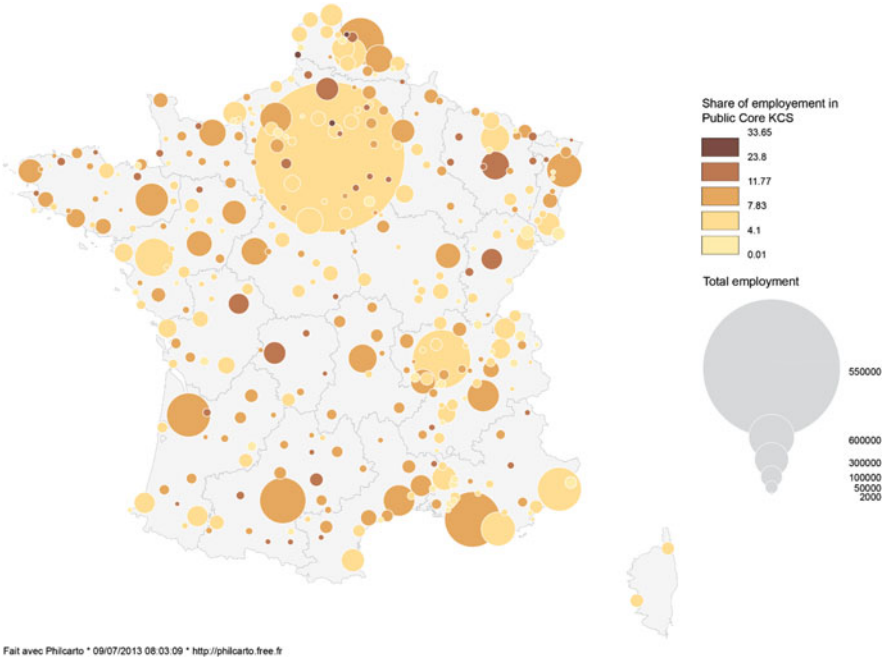


Fig. 3 Location of public-core KCS employment in the French urban system (1999)

employment in Public-core KCS is higher. But, the regional capitals as well as numerous medium-size cities are more concerned. Some small cities particularly show a strong share, as Berck, on the north coast, where there is a specialized hospital that host serious injured people from all around the country. This establishment is part of the public health system and there are also many training schools in this field of health studies. Another example with Poitiers, a city where the number of students is the highest in France compared with the total population. We find here a large part of employment in education system (University, etc.).

To pursue this approach of innovation in French cities by the prism of KCS, we propose to analyze in a systematic way the link between city size and distribution of employment in this kind of services.

4.3 City-Size and Distribution of KCS

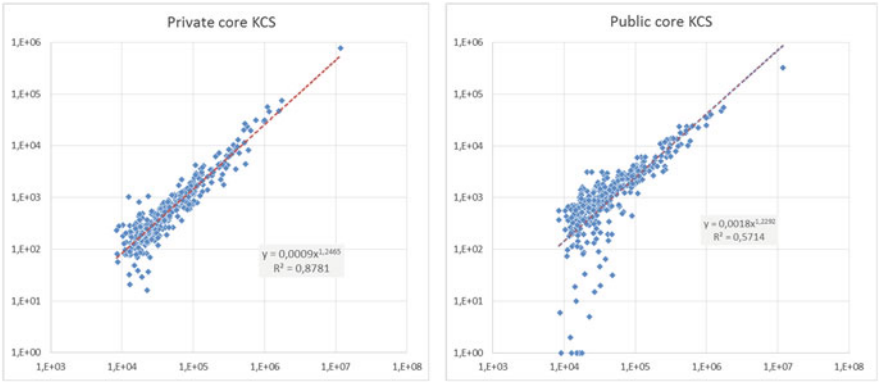
At a given moment, from our evolutionary theory of cities, it can be expected that the most advanced technologies concentrate in the largest cities, while current technologies are ubiquitous, and outdated technologies remain only in small towns (Pumain et al., 2006). The corresponding activities can then exhibit three different scaling parameters:

$$x = y^{\beta} (x \text{ is the number of employed in an urban industry and y is the size of the city})$$

Leading technologies, and especially KCS, which are at the top of current innovation cycle, have a $\beta > 1$. For commonplace, widespread technologies which corresponds to diffusion stage, $\beta = 1$ and in the case of mature technologies, decay or substitution stage, $\beta < 1$. We measure scaling parameters using data on economic sectors employment and city size population.

So, we ask the question of the scaling parameter of KCS, that we understand as the most innovative activities, in the way of our theory. It seems that it is verified, because the β is clearly above one (Fig. 4), for private and public core (1.24 and 1.23). The R^2 is very strong for Private-core KCS (0.88) but much less for Public-core KCS (0.57). We find similar results for Private-core related KCS, with a β of 1.17 (R^2 0.83) and Public-core related KCS with a β of 1.09 and a good fit for R^2 (0.91). These values allow to confirm that the classification KCS fits very well with our theoretical proposal (in terms of stylized facts) because it reveals the strong link between the size of the city and its ability to capture innovation, to catch the more innovative activities (with high level of skilled and tasks which require high knowledge) at early stage.

We find here a kind of paradox in the French urban system about the public services that is both concentrating power in the capital city, but also deploying a constant politics to decentralize public services all around the country. It was the case for the National School of Administration (ENA) in Strasbourg or the *Ecole Normale Supérieure* in Lyon and more generally the localization of decentralized state services (prefectures which are state local government), defence, public



***β*=1.24**
95% CL: 1.20-1.29
R^2=0.88

***β*=1.23**
95% CL: 1.11-1.32
R^2=0.57

Fig. 4 Private and public core KCS and city size

security, and also well-known festival like Cannes Film Festival or Avignon Theatre Festival.

If we have a look at others industry sectors other than just KCS, we can observe different beta parameters. The Table 1 computes scaling parameters for different economic sectors according to their stages in the innovation cycle. We propose this for France and USA, in a comparative way. It is quite interesting to observe very close results that suggest common processes. Among these business services, financial activities are a good proxy for measuring the leading current innovation cycle. In both urban systems, the β exponent is clearly above 1 and with almost the same value: 1.15 and 1.14 (but significantly lesser than Core KCS). Employment in hotels and restaurants in France can be conceived as a proxy of the innovation of tourism. This activity widespread during 1960s and can now be considered as a diffusing activity. The β exponent is very close to 1 and the quality of fit is very good, both in France and US. Only a few small towns have a higher proportion of employees in hotels and restaurants than on average in the urban systems. These cities are specialized and we can now raise the issue of the durability of their dynamism.

In some cases, we can identify some sectors which remain in small towns (mature sectors), and are characterised with β exponent below 1. Manufacturing as a whole is found much more in small cities than in larger ones ($\beta = 0.92$).

From these results, we have now some evidences of *three scaling parameters that link urban system hierarchy and stages in technological development*. An activity whose participation to the current innovation cycle is large scales superlinearly with city size. A diffusing one scales linearly and finally mature ones scale sublinearly with city-size.

We can first conclude that the distribution of employment by economic sectors among cities, is not completely stochastic, but depends on city size. The repartition of employment among cities is not simply a proportional process but there is a clear

Table 1 Synthetic view of different scaling parameters in economic activities (France and USA)

Stages in technological development Innovation cycle	Economic sector (NAICS/NES)	Power-law exponent (β)	
		France	US
Innovation	– Professional; scientific; and technical services/ Consultancy and assistance activities	1.21	1.21
	– Finance and insurance/financial activities	1.15	1.14
	– Wholesale trade/wholesale trade	1.11	1.09
	– Administrative and support and waste management services/renting and other business activities	1.07	1.11
Common place (adapting)	– Accommodation and food services/hotels and restaurants	1.04	0.98
	– Construction/construction	0.99	1.01
Mature	– Retail trade/retail trade	0.97	0.98
	– Health care and social assistance/health, social work	0.96	0.96
	– Manufacturing/manufacturing	0.92	1

superlinear effect whereby leading economic sectors, as KCS, are disproportionately located in the largest cities of national urban systems.

5 Trajectories of French Cities in Economic Space

After this cross-sectional analysis, to go further and to assess out theory, we analyse the evolution of economic activity over the time. For that, we built a harmonized database from 1962 to 2008 with industry classification. Given the spatial and temporal scale, we are forced to use categories whose content is not homogeneous in terms of product innovation and process. We made a principal component Analysis (PCA) on a table which describes cities according to the share of employment in economic sectors. The average structure of economic activities of the cities differs only slightly from the analyses on a single date.

The main differentiation (Fig. 5) between cities opposes manufacturing cities and others where services and retail are much more present. It will mean the process of expansion of the service sector, and correspondingly deindustrialization.

The second dimension differentiates cities according to substitutions occurring within the residential economy. It opposes the new "central services" (education, health, social work, banking and insurance), growing between 1962 and 1999, to retail trade and personal services.

The third dimension of the PCA (Fig. 6) is much more interesting for us, because it involve activities that are clearly related to knowledge, information and skill level, very closed to the KCS classification We can see that above, business services (consultancy and assistance, research and development) combine with art and recreational activities, and some high-technology industries (chemicals, pharmacy,

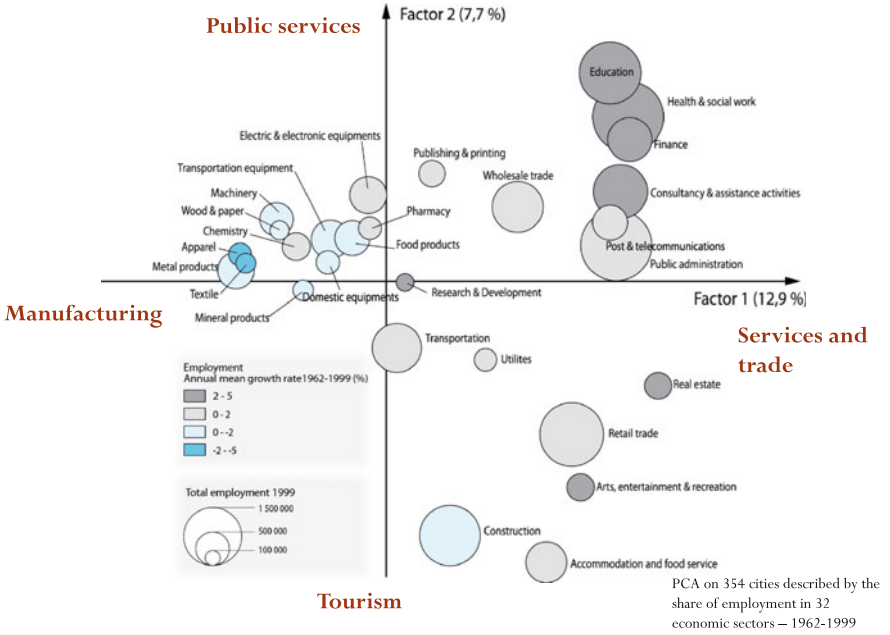


Fig. 5 Main features of the economic differentiation of French cities since 1962–1999

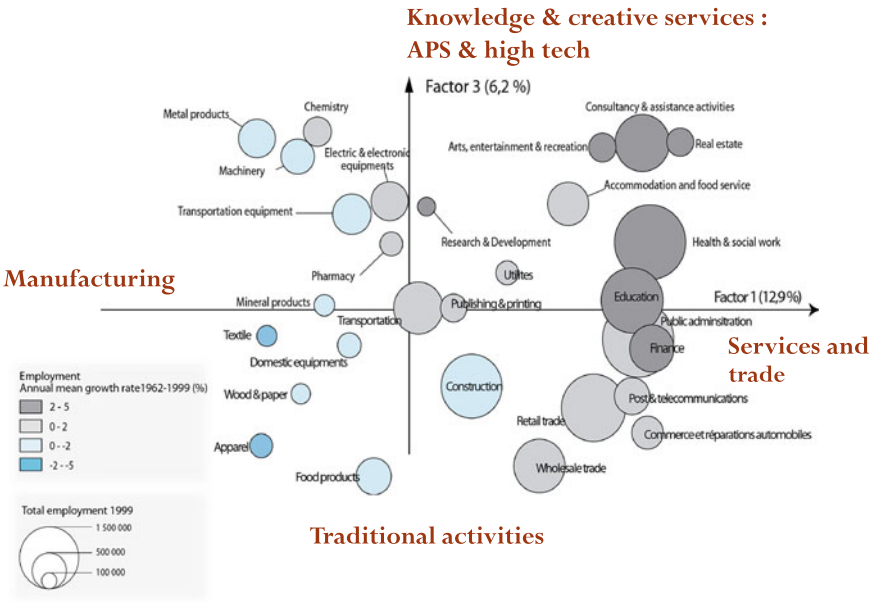


Fig. 6 Main features of the economic differentiation of French cities since 1962(2)

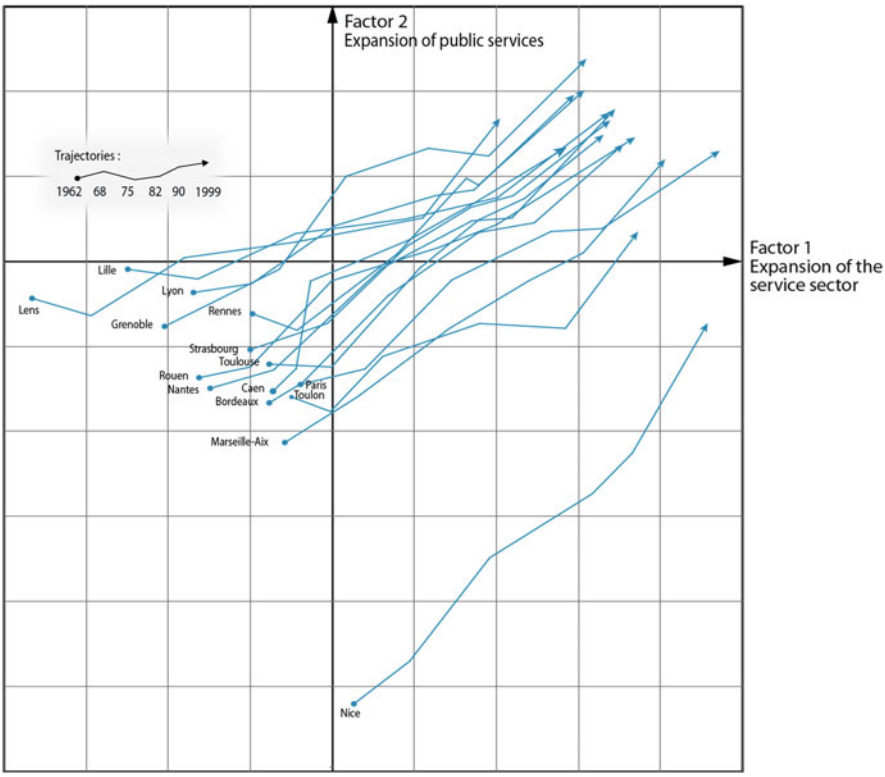


Fig. 7 Trajectories of main cities in the economic space 1962–1999: co-evolution

electrical and electronic equipment, mechanical . . .). Down in the figure, we find traditional activities like retail trade, personal services, agribusiness, apparel, wood and paper, construction which are activities where the skill level is generally lower. This dimension reflects the growth of a more technical economy with more skilled jobs in manufacturing (engineers, technicians) and the emergence of a knowledge economy.

We focus here on the trajectories of the largest cities in these three economic dimensions presented by the PCA to further compare the evolution of this upper class of cities.

What is remarkable on the Fig. 7 is the shape of these trajectories. It reveals the transformation of the economic profiles of all cities. The path from left to right means the expansion of the service sector; the path from the bottom up shows the development of education, health, and social work. Even if there are some differences in the adaptation of cities from time to time, with some cities adopting the change earlier, but the others often close the gap in the following periods. It reveals the co-evolution of cities, which mimic, compete with each other, by the game of urban actors (companies, governments, households, stakeholders).

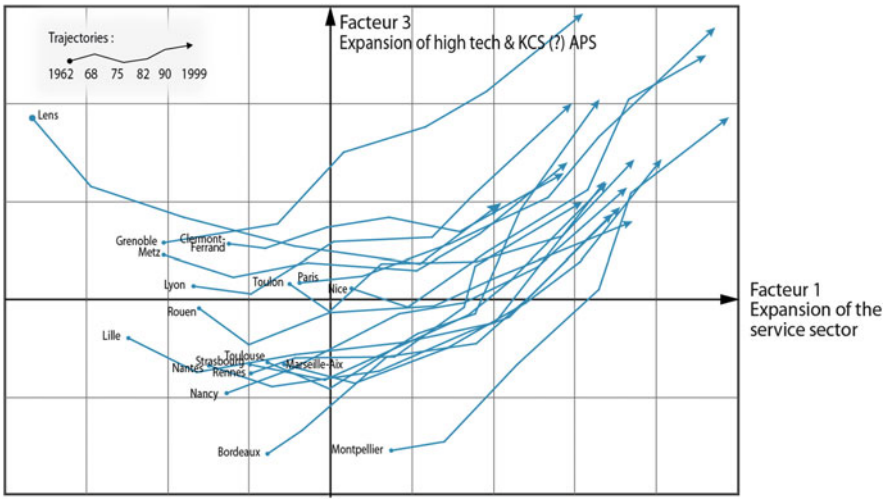


Fig. 8 Trajectories of main cities in the economic space 1962–1999: emergence of specialized cities in high-tech and KCS/APS

We can notice the trajectory of Nice. The city had known the same evolution but its strong specialization in tourism remain all along the period, so employment in accommodation and food services are much more numerous.

On the Fig. 8, we reproduce the first dimension on the horizontal axis, which is defined by a more important part of services in urban functions, while the vertical one represents the third dimension, which clearly shows a trend towards more innovative activities. Again, the trajectories are roughly similar. The development of specialized business, arts and recreational services, associated in some cities with high tech, expressed in most urban areas. Montpellier, Grenoble, Nice, Toulouse and to a lesser extent Bordeaux and Nancy are quite in advance, with a significant route along the third dimension from the period 1968–1975.

Inequalities are stronger between the leading group in 1999 (Grenoble, Paris, Nice, Montpellier, Lyon, Toulouse) and other cities than they were in 1962.

We can see that the trajectory of Lens, a north old manufacturing city, knows a development of KCS and High tech industry later. It is much more delayed compare with the others cities.

In order to have a synthetic view of those trajectories according to the size of the cities, we draw the mean trajectories of cities by classes of size (Fig. 9). The major process appears to be the co-evolution of cities, with trajectories that are substantially parallel (Paulus, 2007).

To this process of common adaptation of each city to economic development, we also notice time lags. Largest cities are, in mean, at the edge in this process of

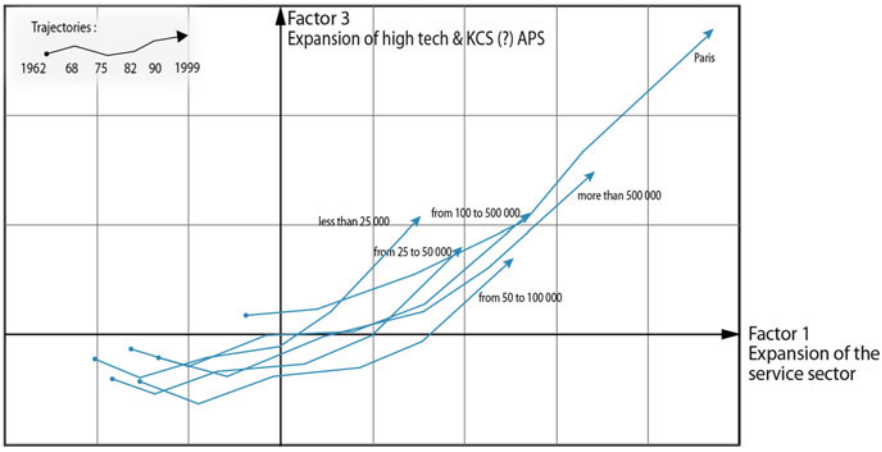


Fig. 9 City size and emergence of specialized cities in high-tech and KCS/APS

innovation and adaptation to economic change. Medium and small towns appear to be hampering in this dynamic.

6 Conclusion

The diffusion of innovation and specialization has consequences for the dynamics of systems of cities. We have different kind of activities. On one side, activities that can diffuse widely through the system lead to a strengthening of the larger cities. On the other side, there are activities which focus on a few specialized towns. These towns knew a strong development at the beginning of the innovation cycle but later, a relative weakness of their ability to adapt to a new cycle.

From the different analysis, we can advance that there is a specific contribution of the Knowledge-Creating Services classification to further understand the urban dynamics. Indeed, it seems a relevant aggregation in order to isolate innovation process in cities. In terms of analysis of functional structure and evolution of specialization in urban systems, the KCS classification is a good proxy revealing the similar dynamic of cities and their parallels trajectories. This case-study on French cities shows that the KCS classification has a good explanatory potential in terms of understanding the reinforcement of the high-level of skilled people and of social capital in big cities.

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References

Bretagnolle, A., Pumain, D., & Vacchiani-Marcuzzo, C. (2009). The organization of urban systems. In D. Lane, D. Pumain, S. Van der Leeuw, G. West (Eds.), *Complexity perspectives on innovation and social change* (pp. 197–220), chapter 5, ISCOM, Netherlands: Springer, Methodos Series.

Compagnucci, F., & Cusinato, A. (2011). *Industrial districts and the city: Relationships in the knowledge age*. Evidence from the Italian Case, Università Politecnica delle Marche, Dipartimento di Scienze Economiche e Sociali, Working Papers, n 365.

DCMS. (2001). *Creative industries mapping document 2001* (2nd ed.). London: Department of Culture, Media and Sport.

Duranton, G., & Puga, D. (2000). Diversity and specialisation in cities: Why, where and when does it matter? *Urban Studies, 37*(3), 533–555.

Duranton, G., & Puga, D. (2005). From sectoral to functional urban specialisation. *Journal of Urban Economics, 57*, 343–370.

Feldman, M. P., & Audretsch, D. B. (1999). Innovation in cities: Science-based diversity, specialization and localized competition. *European Economic Review, 43*, 409–429.

Frenken, K., & Boschma, R. A. (2007). A theoretical framework for evolutionary economic geography: Industrial dynamics and urban growth as a branching process. *Journal of Economic Geography, 7*(5), 635–649.

Fujita, M., Krugman, P. R., & Venables, A. J. (1999). *The spatial economy: Cities, regions and international trade*. Boston: MIT Press.

Markusen, A., & Schrock, G. (2006). The distinctive city: Divergent patterns in growth, hierarchy and specialization. *Urban Studies, 43*(8), 1301–1323.

Miles, I., Kastrinos, N., Flanagan, K., Bilderbeek, R., Den Hertog, P., Huntink, W., et al. (1995). *Knowledge-intensive business services: Users, carriers and sources of innovation*. Luxembourg: EC (DG13 SPRINT-EIMS).

Paulus, F. (2007). Trajectoires économiques des villes françaises entre 1962 et 1999. In D. Pumain & M.-F. Mattei (Eds.), *Données urbaines 5* (pp. 211–223). Paris: Economica.

Pumain, D., Paulus, F., Lobo, J., & Vacchiani-Marcuzzo, C. (2006). An evolutionary theory for interpreting urban scaling law. *Cybergeo, 343*, 20.

Pumain, D., Paulus, F., & Vacchiani-Marcuzzo, C. (2009). Innovation cycles and urban dynamics. In D. Lane, D. Pumain, S. Van der Leeuw, & G. West (Eds.), *Complexity perspectives in innovation and social change* (pp. 237–260). Dordrecht: Springer.

Geographies of Knowledge-Creating Services and Urban Policies in the Greater Munich

Chiara Mazzoleni and Anton Pechmann

Abstract

The Munich case study examined in this chapter highlights the development path and special features of the economic transition to knowledge-intensive and creative services in the city and its region. The latter is characterised as a polycentric area with an increasing interdependence between the traditional core and the smaller towns surrounding it. An attempt is made to show how these new economic centres have been developed through a singular interplay of different production sectors, a well-integrated transport system and economic policy strategies featuring clusters of highly innovative firms that have helped to prevent territorial imbalances and disparities in relation to employment and household income. Particular attention is paid to investigating how, within this framework, the location choices of knowledge-creating services have been exercised. The study also highlights how aggressive economic promotion of the city has contributed to exacerbating competition for space between economic activities and the emerging urban elite, giving rise to both a marked increase in housing market prices and social inequalities. The capacity of local government to mitigate these processes, to foster economic development and shape urban policies focused upon place regeneration and the recapitalization of the city is examined by considering Munich's peculiar institutional thickness and its integrated development strategy based on socially equitable land-use.

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1 Introduction

Munich, the third largest city in Germany, is one of the leading centres of knowledge-intensive and technology-intensive economic activities and one of the most successful cities in Europe in terms of long-term investment in cultural facilities, education and innovation. It is part of a balanced national urban system, the strongest and the most resilient in Europe, and occupies a good location as a node of major communication networks, which have played a significant role in its development. Overall, the recognized success of Munich and its urban region stems from its development path and the interplay of place, policy and politics (Evans, 2012).

Profoundly affected by the trend towards globalization and with a prominent position in transnational urban networks,[1] Munich lies at the centre of an urban region with over 2.9 million inhabitants, almost half of whom live in the city. The urban region includes the capital city of the *Land* of Bavaria and eight surrounding counties (*Landkreise*) that constitute l'hinterland of the city and which we refer to as the Munich metropolitan area (or the Munich region).[2] The Munich region in turn forms the heart of the Munich Metropolitan Region surrounded by the major regional centres.

The process of decentralization of productive activities and population, which was already well underway in the 1980s—stimulated not only by the lower levels of taxation in the municipalities of the hinterland,[3] but also by the old problem of limited available space in the central urban area—was given a further boost by the creation, brought about through public policies at the various levels of government, of specialised clusters of advanced producer services and high-tech firms in the municipal areas in the immediate vicinity of Munich.[4]

[1] In the 2010 edition of the Global and World Cities Research Network (GaWC), Munich is rated as an "alfa-city"—the second in Germany after Frankfurt—in terms of its connectivity, i.e. its level of interaction within the network of global cities. If we consider that the Mega-City Region of Munich, which includes the eight secondary urban centres that surround Munich itself, and if we examine the intensity of intrafirm connectivity of advanced producer service firms, it is clear why the city of Munich has established itself as "a central node and international gateway for smaller centres in the emerging mega-city region and acts as an important international knowledge-hub" (see Lüthi, Thierstein, & Goebel, 2010, p. 128).

[2] The regional planning association of the Munich region comprises, besides the city of Munich administrative area, the county administrative districts of Dachau, Ebersberg, Erding, Freising, Fürstenfeldbruck, Landsberg am Lech, Munich and Starnberg.

[3] The main sources of income for local authorities are business rates, income tax, retail and land use taxes and various local taxes (leisure, park management etc.) which municipalities have introduced to boost their revenues. With the highest investment rate of all German cities (705 € per capita in 2006, compared with Stuttgard 647 €, Dusseldorf 451 € and Frankfurt 383 €), Munich also continues to impose the highest city tax rates.

[4] The intense suburbanization process has significantly changed the balance between the city of Munich and its hinterland. While in 1970, 80 % of the regional population lived in the Munich conurbation (and 62 % in the city), in the early 2000s this figure was less than 75 % for the conurbation and 49 % for the city. The location of industrial companies and advanced service activities has proved especially beneficial to the area immediately around Munich, which has grown at an extraordinary rate since the 1990s and which now contains as many as five of the ten richest urban and rural districts in Germany.

The transfer of the airport and the creation of a huge international hub to the north of the city, near Freising, has also given rise to new functional urban area.[5]

One consequence of these developments is that large numbers of employment opportunities and labourforce shifts have been distributed relatively evenly around the Munich urban region compared with other urban regions in Germany, although the magnetic force of the city remain high, with about 60 % of the region's workforce employed there (von Streit et al., 2010). In general, these functional interrelations show the emergent pattern of the spatial development of the Munich region, characterised by the dialectic between polycentric and monocentric tendencies, which are results of the same trend towards a more knowledge intensive economy (Lüthi, Thierstein, & Goebel, 2007; Thierstein, 2008). This essentially argues—as the case of Munich highlights—that a crucial driver of territorially balanced urban systems and territorial performance is government capacity, at different territorial levels. This government capacity, particularly at the local level, is also responsible for the recent economic transition of the city towards a singular development model, that consists of an original combination of diversification of the productive sectors and economic policy strategies.

Starting from the 1990s, Munich and its suburban surroundings have grown into one of Europe's leading concentrations of ICTs production and services, which can be considered as a cross-sectional technologies, and they have strengthened the relational proximity by which knowledge-intensive firms reap the benefits of both agglomeration economies and global-scale production networks.

Despite the fact that Munich has one of the highest proportions of immigrants in Germany and that social inequalities do exist, the presence of a sound national tradition of social protection and the generosity of welfare programmes, combined with the planning and governance strategies pursued by local government, have helped to attenuate the disparities and mitigate the socially selective logic of the urban market.

This case study presents an opportunity to explore the relationship between the performance of the knowledge economy, its locational strategy, and strategic governance capacity in an urban region characterized by a significant social and environmental performance of urban deconcentration and political decentralization through the establishment of specialized clusters.

The structure of this case study is as follows. The next section, after a brief impression of the current economic situation of Munich and its metropolitan area, outlines the main features of the post-industrial transition. Some explanation is also given of the main factors which have contributed to the present economic vitality and social profile of Munich and chart its development path. The second section

[5] In the context of the urban region, Freising is the only functional area not to have Munich as the primary city in the connectivity-ranking of the new economic assets, especially in terms of advanced producer services firms (Lüthi et al., 2010).

examines the development of industrial clusters and their contribution to the diversification of the local economic base. The third section analyses the locational strategies of the knowledge-creating services (KCS) within the city and the metropolitan area and the fourth section tries to identify the main social and spatial implications generated by the emergence of the knowledge economy. The fifth section investigates how the policymakers have faced the unprecedent challenges and their impacts, in terms of social and economic inequalities.

2 Path Dependency and Development Trends of Munich and Its Metropolitan Area

Munich's tradition of science-oriented industry and the development of quality activities have received a strong impulse, especially in the second half of the nineteenth century and in the first decade of the twentieth century. In this period the city was transformed into a cultural, artistic and scientific centre of considerable importance (Hafner et al., 2007), in addition to its existing status as important financial centre. Major educational institutions and the most important cultural facilities were established at this time. The university system, in particular, played a decisive role in urban life,[6] first as the engine of the economic take-off, and then as a determining factor in the development of highly innovative clusters based on triadic relationship between university, industry and government in the knowledge society that evolved at the end of the twentieth century.

Other factors that later contributed to reinforcement of the economic base and knowledge infrastructure of Munich included the establishment of BMW at Oberwiesenfeld, in 1917, the foundation of the MAN-branch on the Northern fringe of the city, and the presence of a number of firms specializing in fine mechanical and optical products. The specific expertise of these latter industries and the development of the public broadcasters (von Streit et al., 2008), created favourable conditions for the development of several firms in the film industry; gathered in a central location in the city, they created a cluster that put down strong roots in time. The city was also the site of choice in the location strategies of important research institutes and a number of large business enterprises that moved there during the reconstruction period. Prominent in the latter group was Siemens, which had previously pursued its main activities in Berlin,[7] but had an important branch in Munich. The relocation of the Siemens headquarters and the implantation of an advanced manufacturing company in the city helped Munich to develop its position as a leading centre of advanced production and specialist technology and also

[6] Jean Gottmann was among the first to emphasize the function of this important institution as essential advanced service supporting the economic, urban and demographic development of cities (see Gottmann, 1961).

[7] The main reason for the relocation of the Siemens headquarters to Munich was that the company expected that it would not have to pay as much in war reparations in the American sector (Rode et al., 2010).

became the base of other major companies, especially in the insurance sector, including Allianz, which returned to the city where it was founded. The important headquarters of these large companies created the nucleus for the move to Munich of other German and international companies.

In addition, Munich became the home of numerous publishing companies, which moved there from

Leipzig and other large cities in East Germany, and a number of companies connected with the film industry that had left Berlin as a result of the appropriation of Berlin's Ufa Studios by the Soviet Union (Bathelt, 2011).

In the post-war period, the headquarters of the Max Planck Institutes for Biochemistry and Physics also moved from Berlin to Munich,[8] together with other important research centres of multi-national companies, which were attracted to the city by the presence of its leading research departments.[9] These various developments led to the formation of a stable, growth-oriented knowledge cluster.

The industrial development of the Munich region thus took place substantially after the Second World War and benefitted considerably from well-directed policy decision of the State of Bavaria.[10] It therefore received priority treatment for the development of several federal research and development institutions working in the field of nuclear and armaments research and having attracted relatively little heavy industry, Munich was scarcely affected by the serious decline suffered by this sector from the 1970s. The Olympic Games, allocated to Munich in 1966, gave a strong impetus to extensive associated infrastructural investment in the city and regional transport system[11] and in sports facilities.

Buti t was above all after the mid-1980s, due to a large extend to technology and arms policy (Castells & Hall, 1994),that the region experienced extraordinary structural, economic and social changes that led to the formation of its highly diversifies economic base, characterised by the very substantial presence of economic sectors with high knowledge content (Krätke, 2007).

The sectors that showed strong growth, especially in the 1990s, were those offering financial and insurance services,[12] the new media, with several private

[8] In later years Munich and its immediate hinterland were chosen not only for the administrative headquarters of the Max Planck Society, but also for the Institutes for Intellectual Property and Competition Law, Tax Law and Public Finance, Astrophysics, Extraterrestrial Physics, Plasma Physics and Quantum Optics (a Garching), and Neurobiology (a Martinsried).

[9] These included the European Research Center of General Electric and the major research and development facility of Pfizer.

[10] In the federal system of Germany, the Länder (states) are largely responsible for policies concerning research and development, university and education, culture and creative-cultural industries. Until the 1960s, Bavaria was an economically backward agrarian state, with unemployment rates well above the German average. Since then, Bavaria has evolved into one of the economically best performing federal states.

[11] With the financial support from the Federal government and the State of Bavaria, the first metro stations were opened, the circular motorway around inner city (*Mittlerer Ring*) was built and a regional railway network was developed.

[12] Munich is second only to Frankfurt in the German banking sector and it is the most important city in Europe as regards insurance.

broadcaster and other industry-related activities (Biehler et al., 2003). In addition to these, the biotechnology and life science sectors were marked presence and together with numerous ICT companies they helped the city to be characterized as an "innovation hotspot".

Over the last two decades the strategy of developing clusters in the more advanced economic centres, implemented jointly by regional and local governments, has also led to the consolidation of significant synergies between the business world and those of advanced research and education.

Because of this combination of conditions—historical, cultural, structural and institutional—Munich has developed into one of the most dynamic and economically prosperous urban agglomerations in Europe.

The city and its metropolitan area have long been amongst the leaders in the national rankings and have reinforced their role at a global level. The Munich region's share of national GDP is greater than its share of national employment (in 2007 these were 5.4 % and 4.1 % respectively: ESPON, 2012), and it is the economic driving force of a *Land* that makes the second highest contribution to the national economy and of an administrative district (*Oberbayern*) with a per capita income which exceeded the European average by 67.9 % in 2006.[13]

The most influential rankings show that Munich has also become one of the most attractive cities in Europe for foreign investors and entrepreneurs.[14]

The dominant sectors in the urban region are those of ICT, the automotive industry, the media, biotechnology and life sciences, corporate research and development and aerospace.[15]

The city is firmly rooted in the national economy, a fact which is recognizable from numerous global players of German origin that have their main headquarters there.[16] Nevertheless, there is also a substantial presence of large and medium-sized foreign businesses operating in a wide variety of sectors.[17] Functional networks, high-level infrastructures, a comprehensive, efficient, well-integrated transport system, the presence of important institutes of higher learning, several professional

[13] Europa—Press Releases—Regional GDP per inhabitant in the EU27, 2009.

[14] Over the last decade, Munich has consolidated his position among the top ten "leading cities for business" (European Cities Monitor) and has reached fourth place in the ranking based on assessment of the quality of life (Mercer Consulting) judged by political, social, economic and environmental aspects, and second place among the cities with the best infrastructure.

[15] The aerospace sector has become the most important in Germany, with specializations in the emerging satellite navigation industry, and as a classic high-tech research-intensive industry, it is constantly providing other industries and the Munich economic region with significant technological impulses (IHK-LH München-Referat für Arbeit und Wirtschaft, 2007).

[16] About 90 large companies have their headquarters in Munich, which is the home of global players such as Siemens, BMW, Linde, Infineon, MAN AG, Escada, Allianz, Munich Re, Knorr-Bremse AG, Rohde & Schwarz, HVB group, Hypo Real Estate and many others.

[17] The more than 1000 major foreign companies that had either their German or European headquarters in the city or were represented there in 2010, included Apple, Sun, Microsoft Germany, Oracle, Yahoo, McDonald's and Sony.

academies and vocational colleges, a range of private development and training facilities, which provide a constant flow of highly qualified people for the local market, and advanced services significantly broaden the range of benefits offered by the city.

It is also because of this combination of conditions that the occupational context of Munich appears particularly suitable for specialised professionals. Nearly 24 % of the population as the whole and 34.0 % of the population aged between 25 and 64 years were in receipt of tertiary education in 2007 (Evans, 2012). Munich also has one of the highest proportions of foreigners with secondary and tertiary education and highly skilled workers, compared with other German cities (Musterd & Murie, 2010). According to statistics issued by the Federal Ministry of Labour, 35.8 % of all employees in the city, and 33 % in the region are in highly skilled occupations. This aspect is peculiar to a city that has maintained an industrial profile and succeeds in being thoroughly competitive in the high-innovation sectors.

The significant professionalisation of the urban employment structure has coincided with an increase of low-skilled workers, especially in the service sector. Furthermore, the labour market is more polarized in the Munich region than in Germany as a whole. Although this fact has negative effects in terms of increase in income inequality, it is offset by a welfare system which tries to mitigate income disparities. Among the different policies adopted—as will be explained below—those related to integrated urban development strategy, the provision of affordable housing, social infrastructure and adult education and training are particularly significant.

The strong resurgence of Munich was in large part due to the role played by the *Land* of Bavaria from the 1960s.[18] It very actively promoted the transition of the region into a knowledge economy (van den Berg et al., 2005; Hafner et al., 2007; Willems & Hoogerbrugge, 2012), with systematic investments in its knowledge infrastructure.[19]

A new approach based on dedicated programmes which targeted support for innovation and technology was introduced by the state government in the 1980s. Again in the early 1980s, the city of Munich, the Chamber of Industry and Commerce and the Chamber of Handicrafts teamed up to launch the Munich's business center company (MGH) and established the first series of parks. It was created as a tool to support small and medium-sized enterprises, became a hot

[18] In the Federal Republic of Germany, the Länder have their own constitutions, administrations and parliaments and are key players in the area of knowledge economy strategies because they are largely responsible for culture, education, research and development policy and exercise a substantial influence on certain economic sectors, especially those of media and health-biotechnology.

[19] Currently the Munich region has a superb educational system, one of the highest ranked in Europe, and caters for a very large student population. More than 104,000 students are enrolled in higher educational establishments based within the region (as of the 2011/2012 winter semester), 14.2 % of whom are foreign students; a large proportion of graduates are recruited by local business.

export to many other cities in Germany, and gave rise to the development of technology centres.[20]

3 Formation of New, High Knowledge-Content Business Clusters and Diversification of the Economic Base

From the beginning of 1990s, Bavaria followed an entrepreneurship policy that fostered highly innovative firms, in part in order to withstand the possible threat of reduced economic attractiveness as a result of the reunification of Germany and the advantages offered by Eastern regions in terms of lower labour and land costs (Evans, 2012).[21] The measures taken were especially aggressive in the field of technological up-dating. The "Future Bavaria Initiative" (*Offensive Zukunft Bayern, OZB*), launched in 1994, pledged an impressive budget of 4.2 billion euros, generated by the privatisation and sale of public shares in a range of enterprises, and it was directed at the development of new technologies, at education, at research and at the implementation of important infrastructural, social and cultural projects throughout the region.

This was the context too of the great "High-Tech Offensive", started in 1999, which supplied venture capital, especially in more risky high-tech sectors, concentrated support on leading technologies, innovation networks and research facilities, start-up companies and related infrastructural investment.[22]

The "High-Tech Offensive" was followed in 2006 by the "Cluster Offensive", though this was financed at a lower level than the previous regional programmes, partly because the revenue generated by privatizations was now exhausted and partly because of the greater involvement of the private sector. For the period 2006–2009 the Federal Government also made considerable resources available through its High-Tech Strategy, most of them targeted at supporting research and development in key high-tech areas and promoting cluster development. One outcome of this combination of conditions is that the Munich region accounts for more than 40 % of the nation's entire volume in the IT-Industry (Duell, 2006).

[20] The Munich Technology Center (MTZ), founded in 1984, was one of Germany's pioneers in this sector.

[21] In order to attract possible investors from former Middle-and Eastern-German provinces—as reported by Hulsbeck and Lehmann (2007)—Bavarian politicians used their talents to convince various industrial leaders to relocate their companies to Bavaria, and this kind of talent has resulted in economical growth as well as corruption scandals (e.g. the "Amigo Affairs" of 1993 and 2004).

[22] According to the official statistics of the *Land* of Bavaria (Bayerische Staatsregierung), implementation of the *Zukunft Bayern* project, from 1994, involved total spending of 2887 billion euros, 49.1 % was used for training, research and high technology facilities, 15.1 % on support for start-ups and on infrastructures, 12.8 % on the labour marked and related social policies, 12.3 % on environmental policies and new energy and 11.9 % on cultural policies. As regards implementation of the High-Tech Offensive, there was a total budget of 1.35 billion euros, of which 49.1 % went on the creation of high-tech centres, 19.8 % on infrastructures, 13.2 % on new technologies and 13 % on incentives for businesses to relocate to the region.

Despite the different political composition of the two administrations,[23] they both consistently focused their efforts on keeping conditions for economic growth in Munich at the highest level: the Bavarian economic development policy especially benefited the Munich region, while the city of Munich played a complementary role, launching several projects to improve its knowledge base. The local government also provided land, space and premises for the development of new sectors (such as life sciences in Freiham, and new media in Kuntspark Ost) and the preservation of existing activities. This latter commitment took the form of the institution of *Gewerbenhoefe*, specific areas where neo-artisanal industrial concerns could be concentrated in order to provide them with a supportive environment with premises available on long-term, affordable lease arrangements (City of Munich-Department of Urban Planning and Building Regulation, 2005).

The Cluster Offensive sought to boost networking, knowledge transfer and collaboration between business, research activities and venture capital firms in five main fields (mobility, materials engineering, life sciences and environment, IT and electronics, services and media) with considerable importance for the future of the region (Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie, 2008; Evans, 2012).

The cluster is conceived as the most suitable environment for the fostering of direct contacts and informal networks based on frequent face-to-face interaction (Asheim, Coenen, & Vang, 2007; Storper & Venables, 2004), and for providing incentives to an open approach to knowledge as a resource and an inspiring climate. They are considered as important conditions to the attraction of creative people and highly qualified workers, and at the same time as a factor that contributes to the generation of agglomeration advantages. Among the clusters, as previously mentioned, there are many links between sectors belonging to different phases of the economic development of the Munich region (Schricke, 2013). As well as the aerospace cluster, the strongest developers are the audiovisual media and film production clusters and those of environmental technology and biotechnology-life sciences (Fig. 1).

The former includes many different media activities such as adversiting and the information services industry, and has a number of areas of excellence, such as the cinematographic industry. Within this cluster, a number of agents play a dominant role. These encompass private firms, which are the key drivers of economic growth and have strong networking capabilities with a substantial local basis, governmental agencies, business associations and private developers (Bathelt, 2011). The local government played an important role in establishing a supportive institutional structure for this industry (Kaiser & Liecke, 2007; Zademach, 2009). Due to the substantial agglomeration of media firms in the Munich region, it has grown to become the largest and strongest centre of the TV and film industry in Germany,

[23] The Bavarian State government has a consolidated conservative CSU majority, whilst the city government is traditionally oriented towards the Social Democratic Party, which more recently has ruled in coalition with the Green Party.

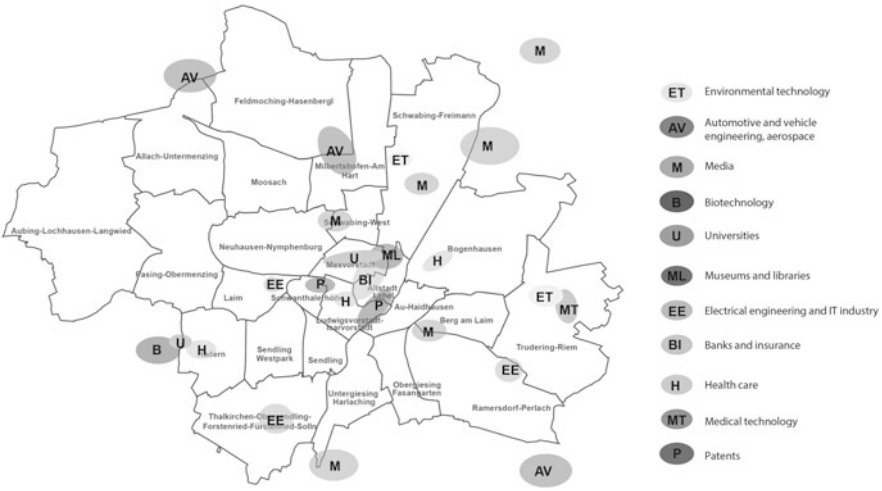

Fig. 1 Knowledge clusters in the Munich area. *Source*: City of Munich-Department of Labor and Economic Development (2005, p. 4)

with about 10 % of German media concerns. Munich also has developed into a world media city in terms of size and diversity (Biehler et al., 2003; Krätke & Taylor, 2004).

The biotechnology-life sciences sector began modestly in 1990 as a spillover from the pharmaceutical companies and during the 1990s it became a rich ecosystem in which some of the world leaders in the field are present, together with a large number of renowned research institutes.

The more dynamic and robust clusters are settled in small villages within the Munich city borders. The "Gene Valley" (the biotechnology park) is located in Martinsried/Großhadern, where about half of the Munich biotech companies are installed. Its development was strongly supported by the State of Bavaria, which set up a new financing and promotion company (BioM) in the form of a public-private partnership, owned by the pharmaceutical industry, banks, venture capitalist and several private investors (van den Berg et al., 2005).[24]

The Life Science Park is located in Freiham and is part of a new settlement that is spread over a large area. Further life sciences campuses (including medical technologies) are located in Garching and Weihenstephan.

The media clusters, which exhibit a hybrid structure that combines planned and directed elements with more spontaneous development, are located in Unterföhring (ProSiebenSat.1, Media AG, BR), Geiselgasteig (Bavaria Filmstadt) and Ismagin (Agrob Mediapark), and the support of the State policy programmes

[24] On the whole, about 200 biotechnology companies and several university departments and research institutes, employing over 13,000 staff are based in the biotechnology clusters, and almost half of the companies are financed through venture capital.

provided the grounds for the spontaneous growth of private broadcasters. In addition to these, the Media Works Munich Competence Centre and a number of "communication islands" located in the central urban area (mainly in Schwabing and in the Loden-Frey area), and in the older manufacturing cores, where there were many vacant production and factory buildings and intensive wider communication facilities.

The aerospace cluster is subdivided into several centres, including Ottobrunn, where the world's largest aerospace company (EADS) and its huge production and development facilities are located, Oberpfaffenhofen, which is home to a major site of the German Aerospace Center, and Garching. Together they account for 53 % of the employees in the aeronautic sectors and 80 % of the employees in the satellite navigation companies. Garching, in particular, has seen the formation of a significant concentration of research and scientific educational institutions,[25] and it is also home to the Garching Innovation GmbH, the Munich-based subsidiary of the Max Planck Society (IHK-LH München-Referat für Arbeit und Wirtschaft, 2007).

These clusters concentrate major company, renowned universities and scientific research institutes, technical service suppliers, business and technology centers, business incubators, as well as a multitude of small and mid-size suppliers, component producers and engineering companies. They are characterized by a close relationship between training activities and scientific research on the one hand and production sectors on the other and numerous connections have been established between them. These facts facilitate the development of synergetic effects and—as Stahlecker and Koch (2004) point out—"combined build the base for a high endogenous potential for the foundation of knowledge-intensive business services".

4 Main Features of the Tertiary Transition of the Urban Region

Although Bavaria has become predominantly a centre for service industries—which employ 64 % of the workforce—it retains a significant manufacturing sector, with 25 % of workers in 2011 (1,176,000 employees), more than half of whom work

[25] The Garching Research Center comprises several scientific departments of the two main university (TUM, LMU), the headquarters of the European Southern Observatory (ESO), the Federal Research Institute for Food Chemistry, the Bavarian Center of Applied Energy Research, the Reactor Safety Research, the General Electric Global Research Center, the Walter Meißner Institute (low-temperature physics) and the Leibniz-Rechenzentrum (central computing facilities for the Munich universities and other research institutes) of the Bavarian Academy of Sciences and Humanities, the BMW Motorsport (high performance motorsport vehicle research and development), and several Max Plank Institutes (for Astrophysics, Extraterrestrial Physics, Plasma Physics, Quantum Optics).

Table 1 Distribution of employment by economic sector in the city of Munich, 2011 (employees registered for social security)

Economic sectors	Employees (abs.)	%
Agriculture, mining	516	0.07
Manufacturing	95,007	13.39
Construction, energy and water supply	29,686	4.18
Retail, catering, transportation	130,351	18.37
Information and communication	54,795	7.72
Financial and insurance services	57,588	8.12
Property, consultancy, business services	160,113	22.56
Public administration	33,500	4.72
Education and teaching	29,891	4.21
Health and social sector	76,413	10.77
Other public and private services	41,720	5.88
Total	709,580	100.00

Source: Federal Employment Agency; City of Munich-Department of Labour and Economic Development (2013)

for high-tech companies (Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology, 2012).[26]

The city of Munich has established itself as a center of services—72 % of employees—while the manufacturing sector accounted for 13.39 % in 2011 (City of Munich-Department of Labour and Economic Development, 2013). According to data for 2011, provided by the Department of Labour and Economic Development (Table 1), the main source of employment for the overall total of 709,580 employees is property, consultancy and business services (22.56 % of employees), followed by retail, catering, transportation (18.37 %), manufacturing (13.39 %), health care and social work (10.77 %), financial and insurance services (8–12 %) and information and communication (7.72 %).

If we consider the information, communications and media industry[27] as one, accounting for 29,086 companies and 232,550 permanently employed staff in 2009, 75 % and 89 % respectively are sited in the city and the administrative county of Munich.

[26] A high proportion of oldest high-tech industries are located in the city of Munich. In 1987, there were 1325 high-tech companies registered inside the city limits. Analysis of the incidence of newly founded businesses in the high level technological sectors shows that, at the end of the 1980s, the city of Munich already led in these fields (Sternberg, 1998).

[27] Since 1999 the Chamber of Industry and Commerce for Munich and Upper Bavaria and the Department for Employment and Business of the city of Munich have analysed the development of this industry. In the 2010 survey (IHK-LH München-Referat für Arbeit und Wirtschaft, 2010) the economic sectors analysed have been the following: media (publishing, printers, sound processors, image and data carriers, film and video producers, broadcasters, manufacturers of radio and television programmes); advertising, market communication and research; journalism, information services and agencies; software, data and IT services, e-commerce; transport, cable and network operators; parts and components; terminal equipment and devices; distribution (commercial agencies and wholesalers).

Measured by the number of companies, the advertising, market communication and research sector, with 35 % of the companies—more than 80 % of which are located within the city boundaries—has overtaken the field of software, e-commerce, data and IT services (with 33 %) compared to 2007. The media sector accounts for the third-largest share of all companies working within the information, communications and media economy (with an incidence of 16 % of the total number of companies in the sector, 80 % of which are located in the city).

The creative field (Hafner et al., 2007)[28] encompasses artists, the cultural and creative professions and a mixture of more market-oriented lines, while the - knowledge-intensive industries include the segments of information and communications technology, banking, insurance, legal and other corporate services, research and development and higher education.

In 2004, some 28 % of the companies in the Munich region operated in creative and knowledge-intensive industries which gave work to 33.5 % of all employees who pay compulsory social insurance contributions.[29] This sector comprised more than 60,000 enterprises in the region, almost 60 % of which were located in the city of Munich. Considering the different segments, the proportion of employees was 12.7 % in creative industries, 4.4 % in information and communication technology, 7.1 % in finance, 6.8 % in legal and other corporate services, 2.5 % in R&D.[30]

The city of Munich had a higher proportion of creative and knowledge-intensive companies than the wider region. More then a third of the companies in the city operated in these industries which gave work to 37.45 % (about 250,000) of all Munich employees. The amount of employment in different sub-sectors was 13 % in the creative industries, 4.7 % in information and communication technology, 9 % in finance, 8.5 % in legal and other corporate services, and 2.2 % in R&D.

Between 2004 and 2007 there was a considerable reduction in the incidence of employment in the creative knowledge sector as a whole, both in the region and in the city of Munich (City of Munich-Department of Labour and Economic Development, 2008; von Streit et al., 2010).[31] In the same period, considerable jobs gains

[28] The definition of creative industries assumed in the ACRE Report covers the core aspects of the cultural segment, including journalism, films and video, television and radio, music, interactive leisure software, the visual and performing arts and the retail of cultural items, plus architecture, design, advertising and software engineering.

[29] Statistical analyses, derived from the ACRE Report 2.7, are based on data supplied by Bundesagentur für Arbeit (BAA). The figures concerning employment would be higher if freelancers, self-employed persons and civil servants were included in the employment statistics.

[30] Among highly the qualified professional group, the incidence of data processing experts, banking professionals, insurance experts, entrepreneurs, senior executives, division managers and electrical engineers is particularly significant in the Munich region.

[31] This trend confirms the general decrease in employees subject to social insurance contributions that started in 2000 in the sub-sector of creative industries, and led to drastic reductions in certain segments, above all the art/antiques trade and architecture as well as video, film, music and photography, and the emergence of other segments, such as computer games, software and electronic publishing, as well as Radio and TV, and advertising.

Table 2 Employees in the creative knowledge sector registered for social security, in absolute figures and in relation to all employees, in 2004 and 2007 (NACE classification of creative knowledge sectors)

	Munich region (*Planungsregion 14*)				Munich city			
	2004		2007		2004		2007	
	Employees (abs.)	%	Employees (abs.)	%	Employees (abs.)	%	Employees (abs.)	%
All sectors	1,069,510	100.00	1,102,318	100.00	663,961	100.00	673,398	100.00
Creative knowledge sector (altogether)	358,446	33.51	330,568	29.98	248,628	37.45	226,315	33.61
1. Creative industries	135,748	12.69	89,405	8.11	85,977	12.95	55,412	8.23
Advertising	7,243	0.68	8,204	0.74	5,107	0.77	5,903	0.88
Architecture	19,028	1.78	4,529	0.41	11,611	1.75	2,765	0.41
Art/antiques trade	31,796	2.97	2,591	0.23	20,871	3.14	1,715	0.25
Designer fashion	3,333	0.31	2,961	0.27	1,424	0.21	1,464	0.22
Video, film, music and photography	19,089	1.78	8,927	0.81	11,880	1.79	4,653	0.69
Music, visual and performing arts	5,170	0.48	5,497	0.50	4,653	0.7	4,922	0.73
Publishing	15,048	1.41	14,874	1.35	10,829	1.63	11,229	1.67
Computer games, software, electronic publishing	26,360	2.46	31,622	2.87	14,843	2.24	17,464	2.59
Radio and TV	8,681	0.81	10,200	0.92	4,759	0.72	5,298	0.79
2. Information communication technology	47,375	4.43	54,601	4.95	31,352	4.72	31,961	4.75
3. Finances	76,064	7.11	72,543	6.58	59,866	9.02	56,065	8.33
4. Law and other business services[a]	72,551	6.78	82,616	7.49	56,529	8.51	64,234	9.54
5. R&D and higher education	26,708	2.5	31,403	2.85	14,904	2.24	18,642	2.77

Source: Hafner et al. (2007, p. 58) (data source BAA 2006); von Streit et al. (2010, p. 10) (data source BAA 2010)

[a]Professional workers (such as lawyers and notaries) are not represented in the data

were made in the sub-sectors of law and other business services as well as in R&D and higher education (Table 2).

Although the area surrounding the city has been affected by high growth rates during the last decade, also as a consequence of the clusters growing stronger, the increased number of employees in the city has consolidated its supremacy in the field of high quality creative services.

Several of the recent research studies suggest that the balanced economic structure known as "Munich Mix" (*Münchner Mischung*)—i.e. an economic base both in the city and the metropolitan area composed not only of highly diversified sectors but also of dimensionally different businesses (from global players to small and medium sized enterprises, small start-ups and traditional crafts), and the close integration of high-tech companies and businesses in the manufacturing sector—is the distinctive feature of the transformations that have marked the recent economic transition of the city.

The peculiar combination of different production sectors and economic policy strategies, represented by clusters of entrepreneurial, research and training institutions with a quite homogeneous territorial diffusion, together with Munich's "institutional thickness"[32] are the most important ingredients of the economic success of the city (van den Berg et al., 2005; Bontje, Musterd, & Pelzer, 2001; Willems & Hoogerbrugge, 2012).

Munich is in fact characterized by political stability, a strong interventionist tradition and a potent technology-led development pursued by public institutions; a qualified critical mass consisting of a mix of high-value economic activity, high quality universities and a network of public research intermediaries; multiple connections and strong collaboration between elites (business, university and public research communities). Due to the close and intensive collaboration between private partners, public institutions and universities/research institutions, the "triple helix"—as identified by Etzkowitz and Leydesdorff (1997)—seems to be fruitful within the region.

These combined conditions "have helped Munich—as the EMI research report stated—to become a powerful policymaking machine" (Willems & Hoogerbrugge, 2012, p. 12).

They also help to produce a favourable local business climate and strong positive effects on the diversity and flexibility of the local labour market, which is characterized by the lowest unemployment rate of any large German city.

[32] According to the definition in use, the concept of institutional thickness refers to broader social, political, and economic structures, the qualities of the institutional arrangements, the legitimacy of institutions and their level of interaction in a region conducive to economic growth (Amin & Thrift, 1995; Rode et al., 2010).

5 Spatial Distribution of Knowledge-Creating Service Companies in the Munich Region

As well as determining a new framework for economic and social relations, the reorganization of the local economic systems has made the roles played by the territory more selective. Over the last two decades, a multi-layered suburbanisation process has enriched the suburban regional system through the emergence of new and more specialised functional structures within metropolitan regions. In the case of the urban region of Munich, the economic transition has been characterized, as has already been mentioned, by the formation of new centralities. Initially, this occurred spontaneously, through the relocation of several firms from the city centre towards the peri-urban fringes, and was subsequently consolidated by the cluster development policy. The process underlay the creation of close integration of the economic base of the urban region with the specialization of the city of Munich itself, and the simultaneous emergence of a number of minor centres that increased their capacity to attract.

The formation of a polycentric settlement structure and the creation of a highly integrated network of public transport and road infrastructures which fostered the increase of intraregional functional interconnections (commuter relations),[33] facilitated the spread of development opportunities for economic activities and residential functions for different segments of demand, thus helping to reduce territorial inequalities in relation to employment and household income.

This therefore is the framework for location decisions as regards advanced services expressly dedicated to the processing of cognitive codes, classified as Knowledge Creating Services (KCS). The analysis[34] not only considers KCS activities as a whole and broken down into three categories (Core KCS, Core-Related KCS and Collateral Services to KCS), but also separates them into two groups in relation to their yearly turnover.

[33] The intensifying interrelationship between the city, its surrounding region and the rest of Bavaria is reflected in the increased number of commuters. The Development Report 2005 (City of Munich-Department of Urban Planning and Building Regulation, 2005) shows that the overall number of individuals commuting into Munich rose by 25 % between 1995 and 2000, from 260,000 to more than 300,000 per day, whereas the number of commuting out of the city rose by 22 % to around 106,000. However, given that Munich remains the key economic centre of Bavaria, the outward movement of population generates a substantial amount of in-commuting.

[34] The analysis is based on the 2011 Register of Companies of the Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria. The database is divided into two business groups, according to the business's yearly turnover (with less or more than 17,500 €). Selected economic activities (the data of which are anonymous) are those classified as KCS, a total of more than 77,000, of which 55 % are located within the city of Munich. About half of these companies belong to the group with a yearly turnover of less than 17,500 €, which are not normally registered in any statistics. Most of these are very small service providers (consisting of one person) or businesses which operate in creative industries, mainly start-ups, but also include jobs that were previously subject to social insurance contributions, which have been converted into freelance jobs (see von Pechmann, 2012; Söndermann, 2006).

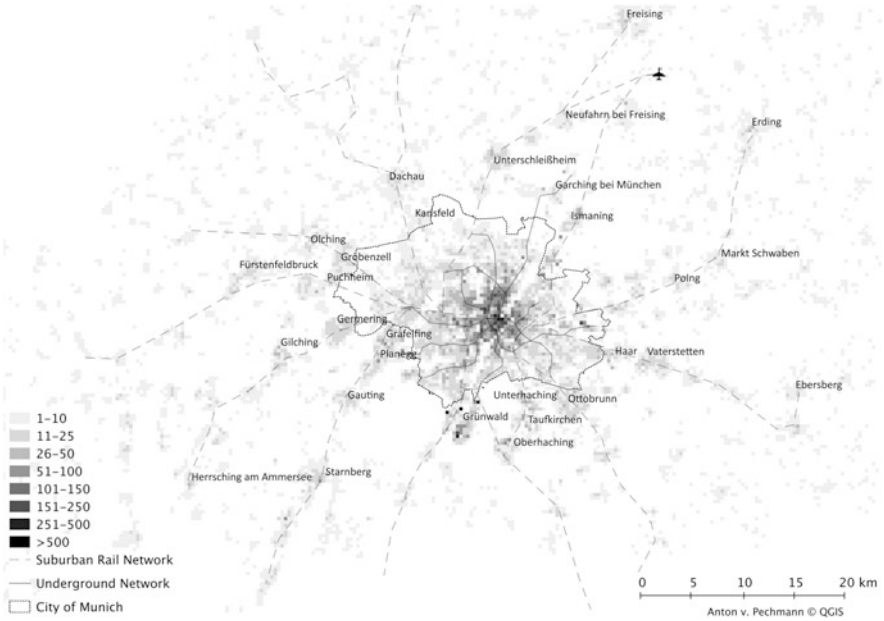

Fig. 2 Spatial distribution of KCS (all) in the Munich region (2011). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

The KCS as a whole (Fig. 2) are seen both to be concentrated in the central urban area, especially the part within the inner-city ring road system (Mittlerer Ring), the areas served by the underground railway system and the north-eastern part of Munich (the airport axis), and to be subject to a tendedency to gather as nuclei around the main interchanges in the rapid transit railway lines. Altogether, these locational dynamics are the outcome of a transit-oriented development, designed to maximize access to public transport (Fig. 3).

The most numerous of the KCS activities considered, at the level both of the city of Munich and its metropolitan area, are those classified as core KCS belonging to the segment of the business and management consultancy services, followed by the segments of advertising agencies, consultancy activities for hardware or software and other information service activities. These data confirm that Munich is a leading centre for management consultancy services. In this case the city—as Johannes Glückler (2007) has stated—functions as a "reputational node", because of these specific firms' proximity to the decision-making centres of industry and financial institutions, as well as to the central transport infrastructure, and is an important criterion in the choice of location.

The increased incidence of KCS firms outside the boundaries of the city of Munich has been especially marked in the suburban municipalities, most of which have become islands of prosperity, with a high leisure quality that provides

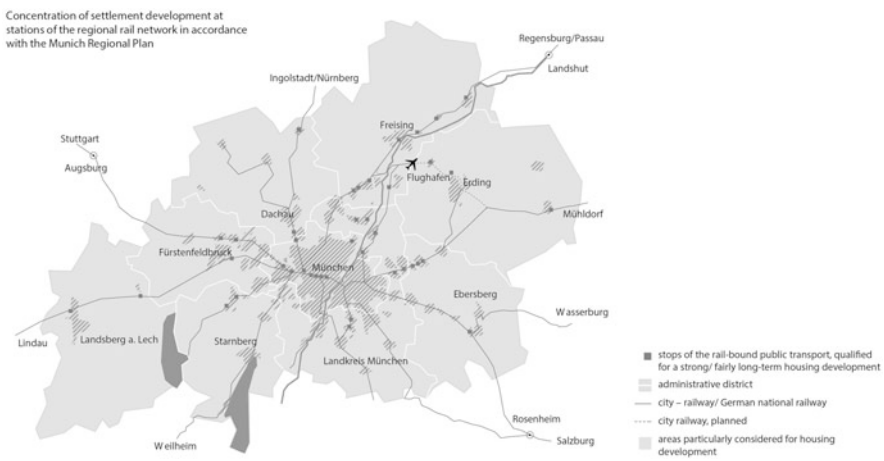

Fig. 3 Potential settlement areas at the stations of the regional railway system according to the regional plan of Munich. *Source*: City of Munich-Department of Urban Planning and Building Regulation (2005, p. 33)

exceptionally positive soft locational factors. In these areas there are established centralities or new ones have been set up.

The former consist of business parks, formed initially by businesses that had moved from Munich, and by prime residential zones, as in the cases of Oberhaching, Eching, Neufahrn, Germering and Vatersetten, or else of headquarters of important institutions or big businesses and multinationals that had settled in Unterschleißheim and Fürstenfeldbruck. Among the companies that have recently relocated to these suburban centres, there are numerous small and medium-sized companies belonging to the service sectors of information technology (mainly software), telecommunications, medical technology and environmental technology. Of these centres, those that are characterized by a higher concentration of KCS activities are in particular Germering and Vaterstetten, which—as well as the overwhelming number of business and management consultancy services and information technology activities—feature a significant presence of public relations and communication services.

The other centralities have grown from the formation of specialist clusters, especially in Garching, Ismaning, Ottobrunn, Taufkirchen and Grünwald (all of which lie within the Munich county administrative district). In these centres too the main activities belong to the segments of business and management consultancy services and consultancy services in the field of information technology. Ottobrunn, the home of prominent companies from the clusters of aerospace, energy, safety and satellite communications, is also home to numerous advertising agencies, while Grünwald, in part because of its proximity to Bavaria Studios—and to Pullach im Isartal—has a large number of financial service activities as well as many head offices and management consultancies.

There is also a significant concentration of KCS activities in the major centres of Dachau, Starnberg and Freising. Along with Grünwald, Starnberg is the wealthiest municipality in Germany and a popular recreation area. Freising is the largest centre (with about 50,000 inhabitants), in the vicinity of Munich airport, and has a high concentration of leading business sectors enterprises, and it is also home to a renowned university campus and numerous research institutions. Freising has a significant number of landscape and garden services activities which are collateral to KCS, while a large number of advertising agencies and head office activities are located in Starnberg, and advertising and market research services in Dachau.

Whereas, of the three categories under consideration, it is especially the activities classified as Collateral Services to KCS with a yearly turnover of less than 17,500 € that tend to congregate in the central urban area, in the vicinity of the underground railway system and in the suburban centres, Private Core KCS activities with a yearly turnover exceeding 17,500 € have a marked tendency to be located in the historical centre. The KCS with a yearly turnover of less than 17,500 € are most densely present in the central urban sectors of Maxvorstadt, Schwabing-West and Ludwigsvorstadt-Isarvorstadt (Figs. 4 and 5), close behind the historic city centre, and in those adjacent to Au-Haidhausen, Schwanthalerhöhe, Sendling, Laim and Neuhausen-Nymphenburg (Fig. 6). These districts, with the exception of Laim and part of Sendling and Neuhausen-Nymphenburg lie within the Mittlerer Ring.

The main cultural and educational infrastructure of the city is concentrated in the district of Maxvorstadt, whereas Schwabing is considered as Munich's bohemian neighbourhood due to its extraordinary high number of bars, clubs, movie theatres, bookshops and restaurants. This urban area has become a fertile ground for gentrification and the theatre of great social conflicts in recent years, and with its high cost of living it no longer offers favourable conditions for the settlement of small and new businesses in the cultural and creative industries.

The Ludwigsvorstadt-Isarvorstadt districts are among the central urban areas with the highest proportion of foreigners (who account for more than 27 % of the resident population). Ludwigsvorstadt is popularly called "the Little Istanbul", owing to the high concentration of Turkish markets, eateries and shops. The space around this old structure has been increasingly taken up by small start-up businesses and artists. Isarvorstadt is more residential in character and its heart is the most vibrant part of the borough. Within the neighborhood there is the distinctive "enclave" of Glockenbach, which still enjoys a reputation as one of the most distinctively alternative corners in Munich, with many art galleries, music stores and boutiques.

The Schwanthalerhöhe district lies to the north of the Theresienwiese (the large space that hosts the Oktoberfest), and at the beginning of 2000, the district still had a high incidence of foreigners and considerable poverty levels. During the last decade, the area has been affected by large urban regeneration actions and induced gentrification processes.

The Au and Haidhausen quarters are characterised by the presence of good condition housing, which fostered the formation of one of the largest areas of

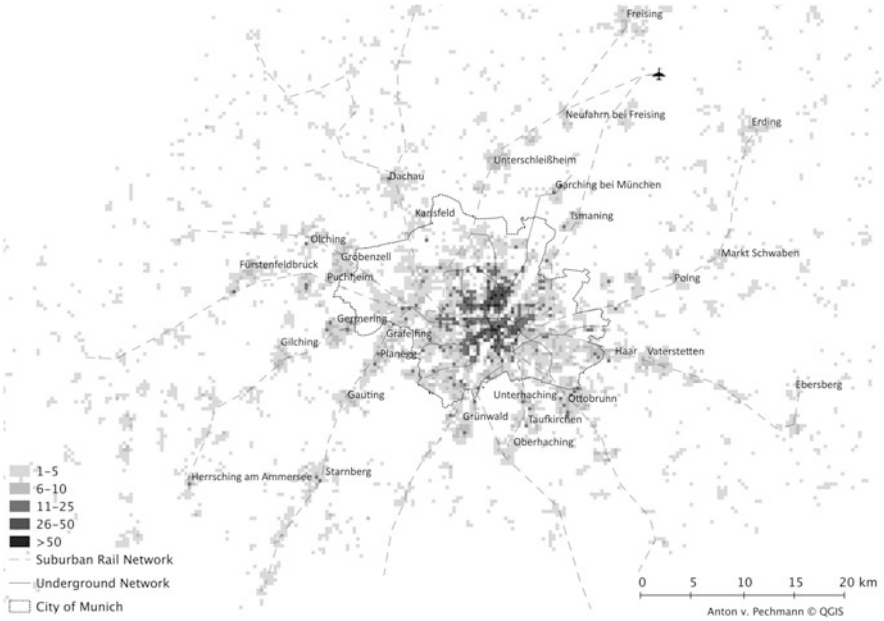

Fig. 4 Spatial distribution of Core KCS with a yearly revenue of less than 17,500 € in the Munich region (2011). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

redevelopment in the 1970s, alongside Schwanthalerhöhe with which these quarters share a high incidence of people with an immigrant background. Haidhausen in particular has preserved its historical urban fabric and competes with Schwabing as a trendy area to live in Munich.

Sendling is another mainly residential and multicultural quarter, with a large percentage of foreigners among its inhabitants. The squares around the historical centre of the quarter are the business points in Munich-South, with important educational facilities. Neuhausen-Nymphenburg is the district with the more relaxing atmosphere due to the presence of the Nymphenburg Place gardens, the Botanical Garden and several museums. Its more residential parts are characterized by the persistence of a historic urban fabric with well-preserved residential and office buildings.

Laim is a district outside the Mittlerer Ring that has a predominantly residential character and still retains much of the building fabric constructed during the inter-war period. Laim railway station is an important marshalling yard node of a large rail precinct. Recently the edge of the area along the railroad tracks has been affected by one of the redevelopment plans for new small business centres (the *Gewerbehof* programme).

All KCS with a yearly turnover exceeding 17,500 € show a marked concentration in the historic center and in its immediate vicinity, and a significant density in

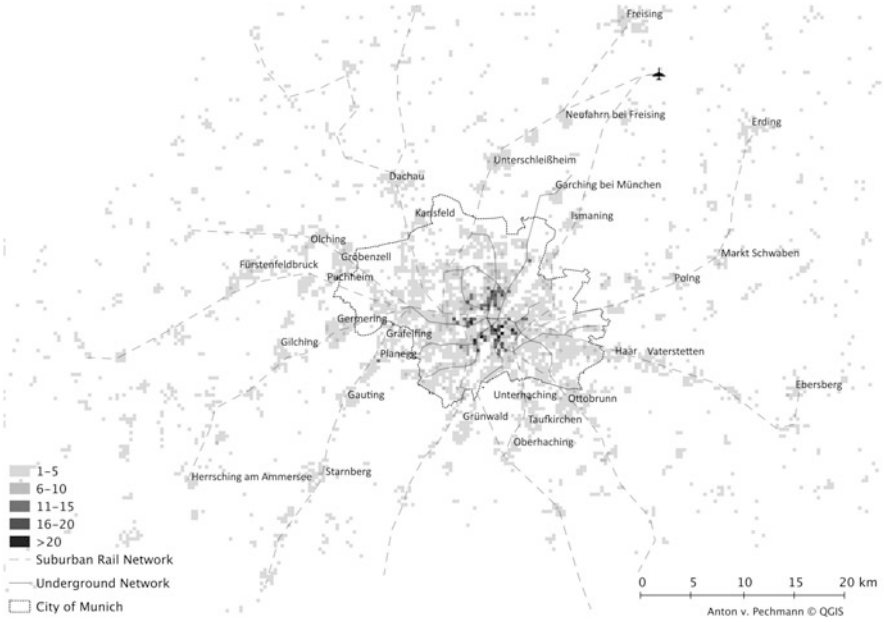

Fig. 5 Spatial distribution of Core-related KCS with a yearly revenue of less than 17,500 € in the Munich region (2011 data). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

Geiselgasteig, on the southern edge of Munich, where the Bavaria Film Studios are located, and in the suburb of Pullach (Figs. 7, 8 and 9).

As can been evinced from the study contained within the report of the Department of Labour and Economic Development (2005), the central area bounded by the Mittlerer Ring features the maximum interplay of agglomeration advantages and localized synergies generated within the multifaceted clusters of firms. Here in fact there is a high concentration of knowledge clusters, educational and cultural infrastructures, a diversified research establishment, government agencies, company headquarters, finance and law services, insurance companies, venture capital firms, publishers, multimedia, advertising and information services, new media companies, patent system, institutions and centres for technology transfer and for supporting start-ups.

While software firms and telecommunications companies[35] are less concentrated in the inner city, the media enterprises show a significant spatial concentration in the central area (Fig. 10).

[35] Munich is the second largest telecommunications centre in Germany and it is formed by small-scale service providers and shops and by major cable and network operators with global activities (e.g. Siemens AG, BT Germany, 02 GmbH).

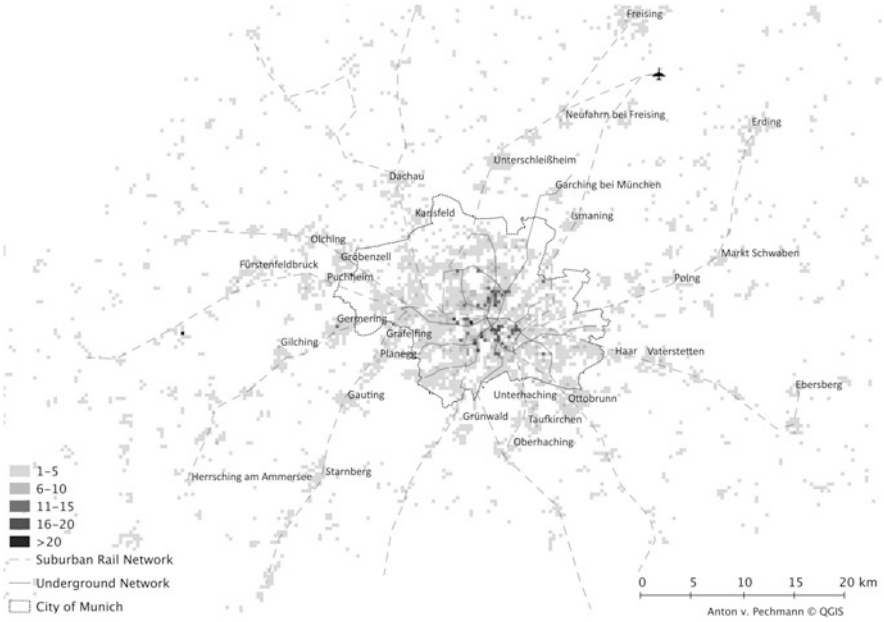

Fig. 6 Spatial distribution of collateral services to KCS with a yearly revenue of less than 17,500 € in the Munich region (2011). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

For these latter activities key advantages of this location include its proximity to other relevant agents and to customers, the presence of a vibrant mix of live entertainment venues, as well as image factors and a thriving urban culture. Otherwise the highly specialized media clusters located around Munich, such as the Media Park of Unterföhringor the Bavaria Film Studios, are perceived as "communication islands". Despite the close proximity of media firms, these remain insular in their activities and there is hardly any interaction between their employees (Bathelt, 2011).

We might say that the distribution of the different segments of the new economy classified as Core KCS activities on the whole coincides significantly with the inner-city space, where there is a high-density overlap of historical layers as well as social and economic relationships. Besides the presence of high-ranking cultural, educational and infrastructural facilities and social overhead capital, the inner city is characterized by the integrity of the urban form with its preserved textures, where streets and traditional blocks can be recognized as structural elements, and by the continuity and the quality of public space. Here the peculiarity of the built environment and social milieu, a highly diversified mix of functions, the presence of multifaceted entertainment districts, a dense network of commercial services and - high-quality recreational spaces all help to foster interaction, to reshape the

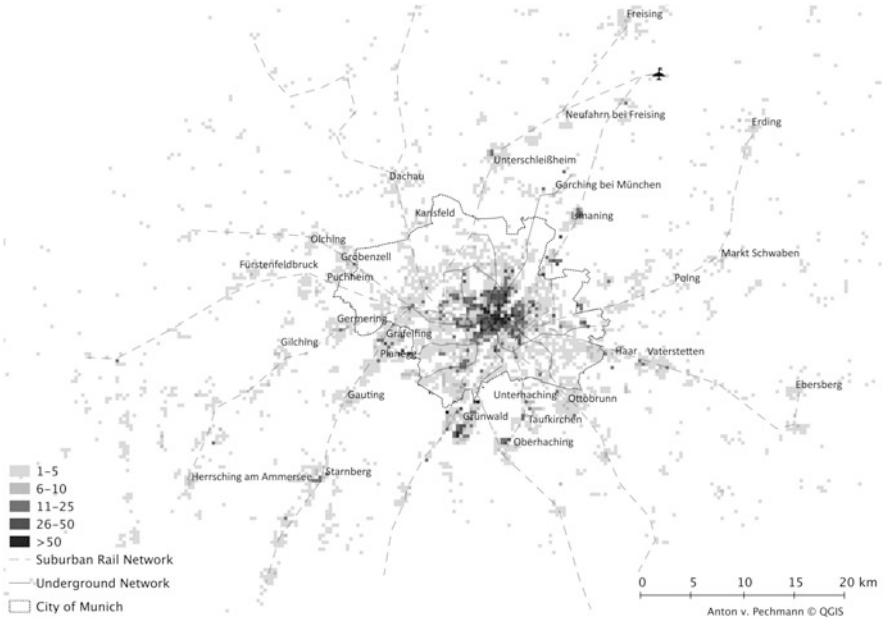

Fig. 7 Spatial distribution of Core KCS with a yearly turnover exceeding 17,500 € in the Munich region (2011). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

functional connection between fields of activities and to stimulate creative synergies. Combinations of attributes such as these in the city's core contribute to its special atmosphere—as Andreas Philippopoulos-Mihalopoulos points out in his contribution to this volume—and confirm its character as a potent source of localized competitive advantage, especially for the activities belonging to the creative and cultural economy, which have a transactions-intensive nature and mainly make use of the city's stockpile of knowledge, traditions, memories and images (Scott, 2007, 2010).

The dynamic of locational agglomeration of these activities confirms the strong impact of the new economy on the city (Scott, 2006) and shows how this is expressed in an urban development process which, though it engenders high levels of innovation and successful urban growth, is also rife with numerous social tensions.

In the case of Munich, the economic promotion of the city has been instrumental in exacerbating competition vis-à-vis new economic activities and emergent social classes. Although this trajectory has prevented the occurrence of a dualism between center and periphery within the urban region, it has nevertheless given rise to negative externalities, including more pronounced social and economic inequalities and the concomitant socio-spatial segmentation.

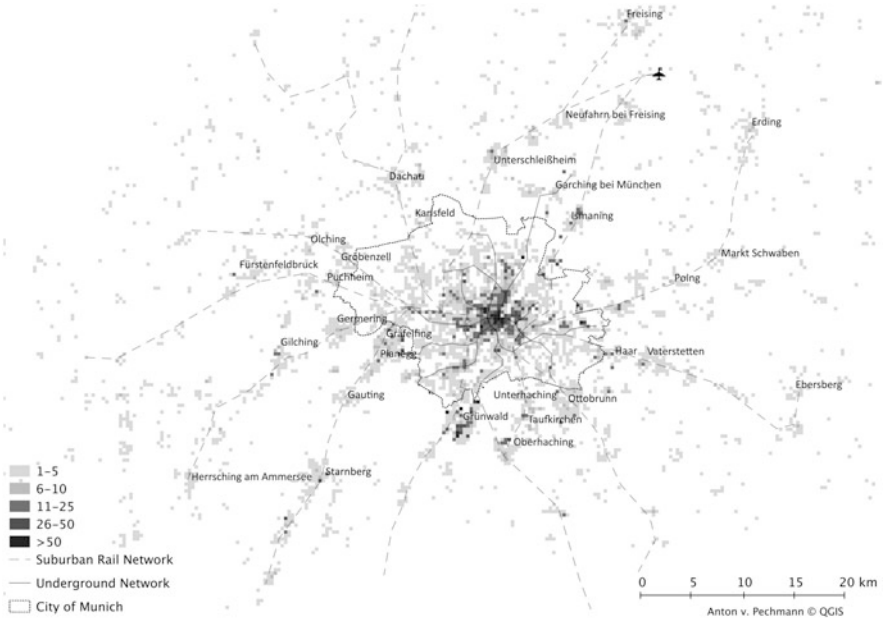

Fig. 8 Spatial distribution of Core-related KCS with a yearly revenue exceeding 17,500 € in the Munich region (2011). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

6 Demographical Development, Population Structure and Spatial Inequalities

Of the major European cities affected by intense processes of suburbanization of population and jobs in the 1970s and 1980s, Munich is one that has not suffered a rapid decline in population. Even the suburban migration flows did not lead to a negative balance for the city.

The presence of foreign immigrants is particularly high in the city and represents the most striking demographic change. In 2009, they formed 25 % of the population, the highest of all German cities.[36] In the Munich region the proportion of foreigners is lower, amounting to 17 % in 2004. However, the city attracts a large share of foreign workers, which in the same year was around 70 % of the total of the urban region (Hafner et al., 2007).

The economic success of Munich has been the main factor in attracting a substantial flow of foreign immigrants. This phenomenon started in the period of rapid economic growth, when Germany stipulated bilateral agreements on labour

[36] German Federal Statistical Office, 2009 data. If we consider the incidence of the population with a migrant background, the proportion rises to 35 % in the same year.

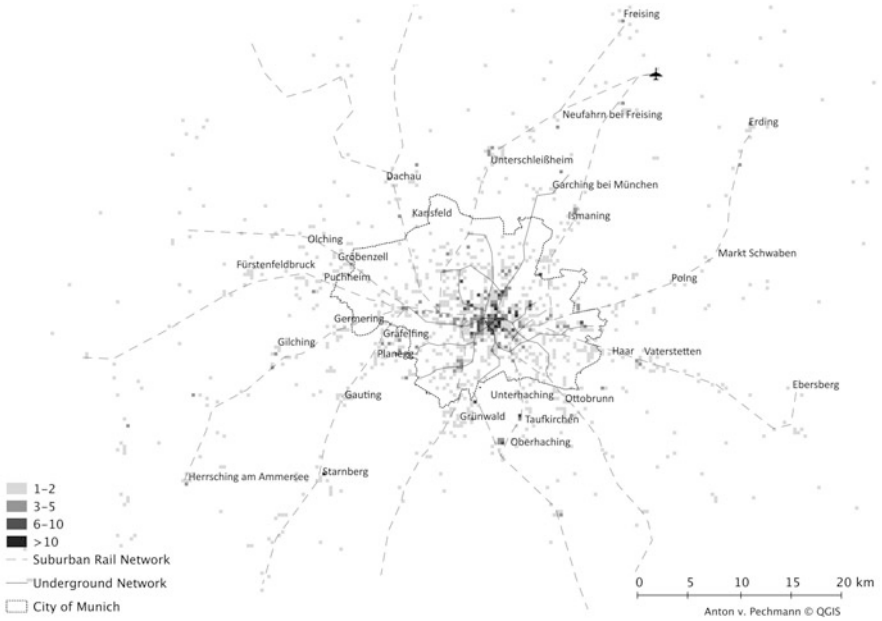

Fig. 9 Spatial distribution of Collateral Services to KCS with a yearly revenue exceeding 17,500 € in the Munich region (2011). *Source*: Chamber of Industry and Commerce (IHK) for Munich and Upper Bavaria, Register of Active Companies (our data processing)

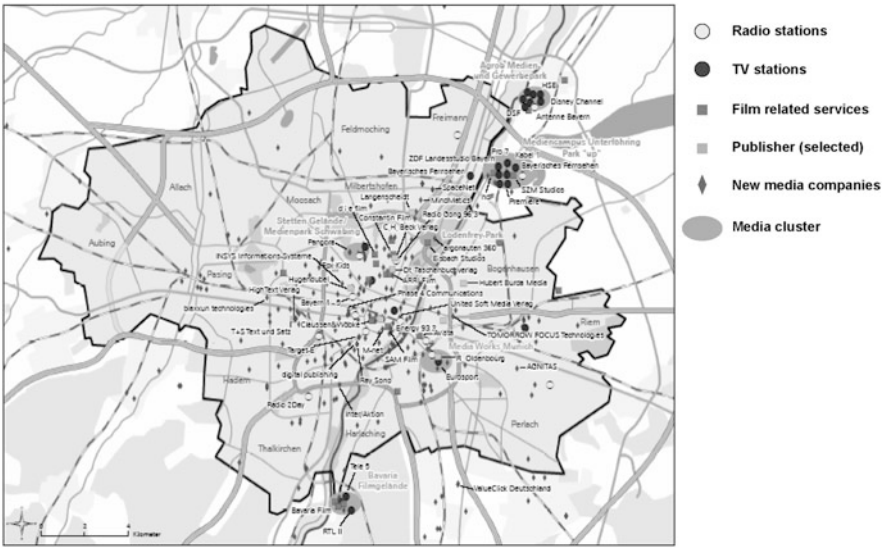

Fig. 10 Spatial distribution of media activities in the Munich area. *Source*: City of Munich-Department of Labor and Economic Development (2005, p. 30)

recruitment ("guest workers") with various Mediterranean countries, especially with Turkey, to cope with the labour shortage in industrial centres.

In recent years the pattern of foreigners coming to Munich has undergone a partial change. There has been an ongoing rise in qualification levels among immigrants, promoted by the federal government through targeted immigration polices. This positive trend adds to that of foreign students, whose presence has become significant, and in 2011 exceeded 14 % of the total number of students (City of Munich-Department of Labour and Economic Development, 2013). If on the one hand, the city is seeking to attract highly skilled foreign workers and foreign students, on the other it seems increasingly to encounter difficulties in stabilizing their presence, considering the high cost of living and the high selectivity towards the top end of the housing market.

Despite Munich's economic prosperity, selective immigration and suburbanization processes have generated considerable inequalities, and these have affected the spatial organization and the population structure, especially within the urban area. These inequalities have been exacerbated due to the chronic shortage of available and affordable housing in the city, the competitive pressure exerted on the urban area by advanced services and prospering business sectors as well as affluent high-income social groups and the related considerable rise of prices in land, real estate and housing. Taking into account the fact that Munich has the most expensive rental property market (with a residential rental index exceeding the national average by more than 70 %), and the highest prices for residential real estate, at the national level (LH München-Referat für Stadtplanung und Bauordnung, 2012a), we can understand how the housing market has become crucial as a location factor, for a considerable time in quantitative terms, and increasingly in qualitative terms.

The emigration of people with medium-high income has continued apace over a prolonged period, whereas within the urban area the supply of rental housing has continued to be substantial (approximately 70 %, in 2004), the highest among the German cities.

In the suburbs, according to the 2007 figures (Heins & Bucher, 2010), the share of households with children, young persons (under 18 years old) as well as people aged 65 years and over and indigenous population is higher than in the city of Munich. Although the city features a relatively young population structure (it has the lowest share of the under 18 age group), at the same time the working age population (25–64 years old) dominates its age structure; the share of the 20–39 age group (33 %) as well as singles and single-households is very high, whereas the percentage of the elderly (65 years and older) is the lowest in relation to the metropolitan area (17 %).

Furthermore, the share of unemployment in the city is somewhat higher than in the other counties of the urban region, there has been an increase in poverty and more vulnerable residents, especially among foreigners, and income inequality between the richest and poorest has grown. If in 2000, the city showed (LH München-Sozialreferat, 2010) a slight majority of economically privileged citizens (more than 12 %) compared with those living below the poverty level (10.1 %), the last poverty report issued by the City of Munich found that the share of people at risk of

poverty has risen in recent years, reaching 14.7 % in 2011 (LH München-Sozialreferat, 2012), a proportion slightly lower than the national average of 15 %. This is also evidenced by the increasing number of people dependent on social welfare, which is supported by municipalities and highlights another significant gap between the city and its surrounding counties. Whereas in the first decade of 2000, the number of residents receiving welfare in Munich's surrounding counties stabilized at around 2 %, in the city there was an increase which pushed the number of those in receipt of welfare up to 7.7 % in 2011. Amongst the latter, a disproportionate number are found in the non-German population.[37] In the same period the city has accounted for a high proportion (almost 75 %) of the total number of residents in the Munich region classed as long-term unemployed or in poorly paid and temporary employment (LH München-Sozialreferat, 2012), and also in this case foreigners are the part of the population most affected by the phenomenon.

Social and economic inequalities have spread across different parts of the city's districts and are clearly reflected in the housing market structure and the function and the building types of the area. Cross-analysis of the distribution of more vulnerable residents and foreigners in the urban districts highlights a strong relationship in the spatial concentration of these two categories (Figs. 11 and 12).

The greatest density of low-income residents and the far above average percentage of foreign residents are mainly in the northern (especially the districts of Feldmoching-Hasenbergl and Milbertshofen-Am Hart) and southern parts of Munich[38] (particularly the districts of Berg am Laim and Ramersdorf-Perlach). Further residential areas with a high proportion of low-income population are located at Aubing-Süd and Hadern, towards the western edges of the city.

Altogether it is a matter of urban precincts, predominantly with a residential character, mostly with fewer social facilities and a high concentration of state-subsidized housing.[39] An exception is the more recent residential development of Messestadt Riem, created through the regeneration of the area of the former Munich-Riem airport, in which a significant incidence of low-income residents can be explained by the presence of a large proportion of social housing and subsidised private ownership, mainly for young families with children.[40]

Pockets of poverty have also formed in districts closer to the city centre, such as - Sendling-Westpark and Au-Haidhausen, as well as in the district of Schwanthalerhöhe, where the recent redevelopment of the former trade fair site has allowed the creation of a significant share of subsidised housing.

[37] The section of the population most severely affected by poverty and in need of social assistance are children and young people up to 14 years old (12 % in 2011).

[38] With the exception of Feldmoching-Hasenbergl, these are the districts where recently (2007–2011) there has also been an increase in the numbers of people drawing social welfare, particularly among the non-German population (LH München-Sozialreferat, 2012).

[39] According to City of Munich's official statistics, in 2005, around 11 % of the city housing market stock were state-supported homes. This proportion places Munich in the mid-range among the major German cities.

[40] This also explains why the district of Trudering-Riem has had the highest increase of the population receiving social assistance (from 5.6 % in 2007 to 7.1 % in 2011).

Fig. 11 Foreign people in the city of Munich (2011). *Source*: LH München-Sozialreferat (our data processing)

Whilst in central and semi-central areas the process of replacing the existing population with others higher up the social ladder has been more marked in recent years, in areas with a higher concentration of elderly disadvantaged population (especially in the districts of Ramersdorf-Perlach, Milbertshofen-Am Hart and Trudering-Riem) there has been a reinforcement of disparities in the income sector and an increasing impoverishment of residents (LH München-Sozialreferat, 2012).

Due to the cutback of state-subsidised housing and state funding in general, since the 1990s the city government has treated localised and themed action programmes in these city districts with special development needs as strategic intervention, also participating in joint initiatives with the federal and regional governments.

The other side of the coin consists of the central residential areas characterized by high social prestige, such as Schwabing, Nymphenburg, Isarvorstadt (in particular the neighborhood of Glockenbach, recently gentrified by the fashion and design business), which comprise the old urban fabric, as well as Pasing, with its large settlement of villas and cottages, Bogenhausen (especially the residential area of Herzogpark), Harlaching, Solln and Prinz-Ludwigshöhe, whose edges along the river Isar are occupied by exclusive residential settlements.

Considering all these aspects, the Munich government has devised various policies in order to rectify the social imbalance of urban areas, establish affordable

Fig. 12 Per capita purchasing power by district in the city of Munich (€ 2011). *Source*: LH München-Referatfür Stadtplanung und Bauordnung (2012a, p. 50)

housing solutions for social groups more at risk, protect social stability and sustainable district development, and extend control of rents. These policy instruments have played a key function in the urban development process and attribute great importance to the issue of housing supply as well as the social spatial mix and varied public environments.[41]

7 Options and Capacities of Urban Governance in Addressing Key Social and Economic Challenges

As illustrated above, the trajectory of Munich's development towards an advanced service economy, strongly supported by aggressive location marketing promoting the Munich area, had the effect of increasing pressure in the urban core on

[41] The outcomes of these policies, in quantitative terms, can be considered significant. Since the launch of the housing policy action programme "Living in Munich" (*Wohnen in Muenchen*) in 1990, a total of 115,000 new housing units have been created and about 20 % of them have been financially supported (LH München-Referat für Stadtplanung und Bauordnung, 2012a).

economic activities to become more competitive and promoting the emergence of a new gentrified urban elite. These processes, while they did not lead to real social polarization, have nevertheless created new forms of social stratification, and have given rise to progressive replacement of the population.

For several decades, the urban middle classes have been the main driver of suburban growth and this is one reason why this component of the social structure of the city of Munich falls clearly below the national average.[42] The middle-class people living in inner Munich have experienced relative deprivation, as has happened in other emerging European cities, and they appear to be suffering from marked instability as regards both housing and work conditions.

The most significant factor underlying the vulnerability of this social group, which has no access to the subsidized housing market, is the increased value of housing units and consequently of the rental property market.

In the case of Munich, the disruptive effects of these processes have been alleviated by the particular structure of the existing housing stock and by public policies related to an integrated urban development strategy and embedded in an appropriate governance framework.

In relation to the former aspect, the presence of a significant proportion of old municipal housing stock built during the 1920s and the 1930s and in the period of post-war reconstruction by municipal companies (GEWOFAG and GWG)[43] for wide sections of the population, as well as of several apartment buildings owned by housing cooperatives, have ensured the stabilization of the tenant structure in the various urban areas and a local social balance.[44] This important stock of affordable rental housing is in addition to the vast amount of social purpose housing which was built in the years up to the 1970s.[45]

[42] LH München, Statistisches Amt, München 2006.

[43] GWG was founded in 1918 and it is one of the oldest local authority housing associations in Germany and a major pillar of publicly funded rental housing construction in the city of Munich. GEWOFAG was founded in 1928 and is a municipal company. Both these publicly owned companies currently manage a housing stock of more than 62,000 flats (publicly funded and privately financed), mostly concentrated in the urban districts of Milbertshofen-Am Hart, Ramersdorf-Perlach, Feldmoching-Hasenbergl, Moosach, Au-Haidhausen, Sendling-Westpark, Hadern, Berg am Laim, Giesing, Neuhausen and Sendling/Laim. Thirty percent of the privately financed stock is let to tenants on low and medium incomes. They support more than 100,000 tenants and the total housing stock managed amounts to almost 10 % of the total rented housing in the city of Munich.

[44] Recently these companies have undertaken as their primary task the extensive renovation and energy modernization of older buildings along with the preservation and maintenance of public spaces and green areas and the improvement of infrastructural services.

[45] From the end of the war until 1960, 134,500 apartments were built, 40 % of them state-subsidised housing, and until 1970 whole districts were developed, such as Neuperlach, Hasenbergl and Fürstenried-West, which contain a significant portion of public housing (Hafner et al., 2007).

A further large section of the rent sector was owned by a property management company (GBW), a former non-profit organization, that has so far ensured accessibility to affordable housing among middle income households.[46]

Local housing policies play a key role in the whole urban development process and are defined within a long-term, integrated and flexible framework—"Perspective Munich" (*Perspektive München*)—for the orientation of the development of the city, as well as the surrounding region. This policy tool, which aims to make the city a relatively unitary economic and political actor, is supported by the regulatory device and procedural principles of socially equitable land use (*Sozialgerechte Boden Nutzung*—SoBoN). Both are a clear expression of strong political leadership and its intention to pursue socially sustainable economic development, reconciling economic competitiveness, environmental sustainability and social cohesion. This intentionality is based on a vision of the future transformations of the city guided by an approach to spatial development which can be summarized as "compact, urban, green", and entails a responsible usage of land reserves and the creation of a high quality urban environment, assured by a mix of functions and living standards.

The principles of socially equitable land use, which allow the public administration to recapitalize the city, were initially introduced in Munich in order to address the serious imbalance between the housing demand structure and the supply structure (LH München-Referat für Stadtplanung und Bauordnung, 2006) and to bind the actors of urban transformation together in a long-term cooperative strategy. The SoBoN device, approved in 1994 and then translated into a legal measure at the national level, links the granting of new development—or urban transformation—rights to a willingness on the part of the property owners to contribute up to two thirds of the increase in land value to fund the physical and social infrastructure and other origination costs (e.g. technical infrastructures, community facilities, open spaces, green spaces, and the financing of state-subsidised housing). It has been applied to all projects for the redevelopment of disused sites, not owned by the municipality, and consolidated as indispensable factor both to prevent the opportunistic behaviour of private actors and to continue large-scale creation of scope for development (City of Munich-Department of Urban Planning and Building Regulation, 2005). Whereas redevelopment is predominantly carried out by private actors and is subject to a set of shared negotiation rules, the major transformation projects are promoted and implemented by the municipality in public areas or

[46] GBW manages more than 10,000 apartments in Munich, with about 85,000 tenants. Since almost all of GBW's shares are held by the state-owned bank BayernLB, the latter's decision to liquidate its holdings has given rise to widespread social strains. In order to maintain social stability, the local government plans to allocate more than 24 % of its 3-year expenditure budget (2012–2016) for housing and the possible acquisition of the shares in GBW company, while 32 % is reserved for educational infrastructure, child day care and nurseries (City of Munich-Department of Labor and Economic Development, 2013). More than half the city budget is thus being employed to prevent the displacement of tenants and to ensure good living conditions in different neighborhoods around the city.

purposely acquired (e.g. disused military barracks, railway and airport land) through pilot projects.

"Perspective Munich" is conceived as a process of managing the interdependences within the large field of economic and social actors, the various functional autonomies and administrative departments, as well as the different levels of the political-administrative system and the participative decision-making process. This strategic governance is also applied to each individual project, and is aimed at achieving the broadest possible consensus and the legitimacy of public action.

It requires continuous evaluation and updates to ensure that local government can react appropriately in the definition of the field of action of local policies, and operating targets are regularly reviewed and adapted to socio-economic and demographic changes.

"Perspective Munich", adopted by the city Council in 1998, is underpinned by long-term principles, such as economic prosperity, regional cooperation and governance, social balance and equity, reduction of sprawl and land consumption by the redevelopment of the city, and sustainable mobility. These principles are embodied in associated projects, focusing the financial, spatial and personnel resources of local government on areas of activity of strategic importance, and concretised through implementation-oriented strategic and thematic guidelines, as well as inter-departmental action plans, local or sectoral concepts and localised action programmes (City of Munich-Department of Urban Planning and Building Regulation, 2005). These latter refer both to sectoral policies[47] and specific urban areas,[48] and are budgeted, precisely scheduled and regularly updated.

Among the local concepts, one of the most important is the inner-city concept which defines guidelines and measures designed to ameliorate and upgrade the urban core where, as mentioned above, the impact of the structural change that has affected the economy[49] is stronger.

The planned interventions are designed to retain the established diversity of inner city utilization, promote residential use, improve the structure of public areas

[47] The most significant of the sectoral policies are: the long-term action programme "Living in Munich", concerning housing policies; the "Munich Employment and Qualification Programme", for the promotion of innovative labour market projects; the "Munich Gewerbehof-programme", aimed at safeguarding the craft trades and traditional industries, and the "Climate Protection Implementation Programme", aimed at making environmental protection an integral part of urban development.

[48] The main localized action programmes are the Middle Ring action programme, for improving the quality of life adjacent to this busy traffic artery, and the "Social City" programme, for the promotion of self-renewal processes in the city districts with a significant need for social environmental action.

[49] The inner city has been most affected by the gentrification processes and the resident population has consequently declined by up to 7000 inhabitants. Although in recent decades the availability of residential spaces has increased, the resident population has remained constant. This is due primarily to the fact that the housing demand of single-person households is particularly high in this area (LH München-Referat für Stadtplanung und Bauordnung, 2012a).

and accessibility infrastructure, while ensuring a sustainable urban form. Given the strong pressure exerted on the central area, a structural plan has been designed to extend it spatially, involving the large area located in front of the Ostbahnhof (Eastern railway station).

At the same time, to compensate for the strong selective function exercised by the urban market in the inner city, a number of exemplary urban regeneration projects, providing for new settlements of mixed character, both social and functional, have been carried out in disused areas at the edge of the city centre (i.e. Ackermannbogen and *Theresienhöhe*).

In the whole urban development process, local housing policies are consistently given priority and are one of the most important aspects of local government's responsibility to achieve sustainable district development.[50]

Different tools contribute to the implementation of housing policies: the long-term action programme "Living in Munich",[51] which defines targets and actions for new housing construction and housing stock policies and is subject to periodic updates in relation to current challenges in the housing market and consequent new priorities; the local authority sponsorship programme "Munich Model", which is a financing device consisting of three types of housing subsidies (i.e. for the rental, property and cooperative sectors of housing), the wide range of local housing funds, and the SoBoN device, which ensures the effective linking of the strategic and the operational dimensions of land management.

The main guidelines for the transformations and development of the urban area are defined by the land development plan, which identifies strategic areas within which both private investments and medium-term public investment in infrastructures and community facilities are to be directed. In order to achieve sustainable development of the city as a whole, attention has been concentrated on the reuse and revitalization of disused areas. About two decades ago the availability of land for residential purposes and the development of economic activities seemed

[50] The main ambition of these policies is to combine the supply of affordable housing with the concepts of social and functional mix and land use control, with pilot projects embodying the motto "compact, urban, green".

[51] The action programme "Living in Munich", launched in 1990, was then integrated into "Perspective Munich", and for the period 2001–2006 provided for the creation of an average of 7000 dwellings per year, over 25 % of which were built with public-sector subsidies. Due to the unfavourable economic climate, no more than around 4500–5000 units were completed each year between 2001 and 2004, while in the same period targets for subsidised housing construction were almost achieved (City of Munich-Department of Urban Planning and Building Regulation, 2005). With the programme update for the period 2007–2011, increased funds were disbursed by the municipality, and more effort was directed towards the rental sector, according to the "Munich Model for Rental Housing", which caters mainly for families with children belonging to the lower/middle-income group; the programme also attracted financial resources from the federal state, managed by local government to subsidize home-ownership by granting loans at affordable rates. The latest programme update for the period 2012–2016 identifies new priorities and provides for the construction of an average of 3500 housing units a year, of which over 50 % relate to subsidized units targeted at different demand segments.

very limited, but the subsequent privatisation of the rail and postal systems, the increase of disused industrial and commercial areas and the downsizing of the armed forces consequent on the reunification of Germany, are processes that have contributed decisively to change the situation. So the city had extensive supplies of land available for designation both for new settlements and to reserve for future community needs, as set by the long-term oriented land reserve policy of 2003.

In addition, further new residential accommodation was obtained through an increase in settlement density in the immediate catchment areas, which benefit from efficient public transport, as well as in the planned district centres and in district centres to be upgraded. The densification of the existing urban fabric has been, however, accompanied by measures to safeguard and strengthen green areas, which aim to create an extensive networking of open spaces.[52]

Within the framework of the programme Living in Munich and the financing device Munich Model, whose main intention is to keep families with children in the city, local housing policies have been implemented through several large-scale urban construction programmes over the last few decades. During this period, several redevelopment projects are regarded as exemplary implementation of the principles and strategic guidelines of the Perspective Munich programme, as well as being prototypes for the housing policies of Munich: "Messestadt Riem", "Theresienhöhe", "Ackermannbogen" and "Zentrale Bahnflaechen".

The first two relate to an integrated strategy for the conversion of large areas previously used for important urban infrastructures, namely the airport and the trade fair site.

Messestadt Riem is the most complex of the urban transformation projects; it is located at the eastern edge of the city and, involves reutilization of the area of the former airport, moved to the north of Munich, for the development of a new community of around 14,000 people, and the creation of the new trade fair facility. The urban planning concept envisioned a green place to live and work, due to the predominance of green areas, and provided for the creation of 13,800 jobs and various community facilities. As regards housing policy, the creation of the new residential settlement has imposed close links between the various subsidised and non-subsidised units, as well as applying the "one-third rule",[53] in order to ensure a social mix and facilitate social integration (City of Munich-Department of Urban Planning and Building Regulation, 2006a).

Although this new urban part is well connected with the central area through a metro line, has an ample supply of open spaces in both recreational and natural areas, social services and community facilities, presents a mix of building types catering for different sectors of housing demand, with a high proportion of public assistance and housing allowance recipients, and distinguishes itself by the

[52] Reduction of the existing deficit of green spaces in the various districts has been mainly assigned to the special redevelopment projects, particularly in areas bordering on the inner city.

[53] This measure applied to housing means the building of one third non-subsidised, one third subsidised according to the Munich Model, one third standard low-income housing.

presence of the trade fair and two business parks, it lacks urban character, despite its mixed-utilization characteristics. The conformation of the residential settlement seems still to be traditional, with the various buildings separated from each other by green areas and the presence of a large-scale shopping centre.

In the area previously occupied by the trade fair site, close to the historical centre, an urban regeneration project—Theresienhöhe—has been implemented as an exemplification of the Munich mix model. The area was municipally owned and, in order to achieve economically sustainable urban renewal and generate the revenue needed to build the new trade fair site, a large number of real estate lots were sold. Prior to the architectural competition, district residents and future inhabitants of the neighborhood were involved in the definition of the master plan for the area. The results of this participatory process became an essential part of the competition's mission statement.[54] The new settlement, which is spread over an area of approximately one-third the size of the historical centre, is configured as a mixed-use environment, characterized by high variety and density housing, with 50 % of the total housing units for publicly subsidised rent; it has more than 4000 workplaces, and its public spaces cover more than 50 % of the total surface area.

Among the different sites of the former military complexes, Ackermannbogen—south of the Olympic Park—is the first conversion project to turn a barracks into a residential and working neighbourhood. During the updating process, specific types of Munich Model housing subsidies were activated, first to make the rental housing market available for lower and middle-class income sectors, and then to promote the interests of cooperations and building associations, also through a significant increase in subsidy funds. The new neighbourhood is made up of four different sections separated by a central green axis, which in turn divides the settlement into individual residential areas, equipped with collective services (children's day care centre, nursery) and characterized by different housing typologies, and areas with prevalent mixed use.[55]

The largest precincts being restructured within the city boundaries consist of the central railway areas, that develop linearly from the main railway station via Laim to Pasing. Due to the privatisation of the German Federal Railway (DB) in the middle of the 1990s, more than 170 ha fell into disuse and became available for coordinated interventions of urban regeneration. A master agreement, signed in 1997 by the property subsidiaries of the German Federal Railway and the city of Munich, provided the opportunity to restructure these areas and to integrate the new built structures into the existing urban fabric. In total, areas holding up to 19,000 workplaces in the fields of trade, advanced services, new technologies and social services, as well as in the small business centres included in the *Gewerbehof*

[54] During the several meetings with the project's advisory group, real estate and business actors were also involved and the open planning process led to a high degree of agreement.

[55] In Ackermannbogen, some 40 % of the apartments are developed by building cooperatives and community building groups and a significant proportion of the "Munich Mix" for housing consists of rental housing promoted by income-oriented subsidy funds provided by the City of Munich and the Bavarian government.

programme, residential units for around 16,000 inhabitants and a significant variety of cultural and leisure facilities are being developed.

The orientation which has prevailed in these urban transformations and has achieved greater social consensus is substantially the predilection of traditional residential settlements, more dense than compact, which are not able to form an urban fabric, and are configured as "archipelagos" separated by green areas. The mixed use is then obtained through proximity rather than by integrating different urban functions and experimenting with new urban building typologies, as in the cases of Berlin and Hamburg. These aspects help to delineate the perceived atmosphere of the city as a very wealthy place, relaxed and almost like a big village (Hafner et al., 2007). For the majority of the creative knowledge workers the preferred residential location which corresponds best to their working patterns and lifestyles continues to be the inner city districts, which are the only ones to have a real urban atmosphere.

Although Munich's cultural qualities are certainly excellent and the percentage of foreigners is the highest in Germany, it does not have the image of being an important location for artistic and cultural experimentation, or of being a very international city, with a vibrant life and a multicultural flavor (Hafner et al., 2008).

As regards the localised and themed action programmes, one of the most significant concerns specific interventions in urban areas with special development needs. The city of Munich has focussed its special "Social City" programme[56] on two districts with overarching social and economic problems, specifically Milbertshofen and Hasenbergl. On the basis of an integrated approach, several projects combining physical with social, cultural and economic targets and aimed at enhancing social inclusion and educational qualifications and providing training and jobs were put into effect.[57]

The strategic instrument Perspective Munich encompasses almost all aspects of urban policy, including those concerning economic development, which involve the urban region. In this regard, the basis for metropolitan planning was provided by the transport development plan. The action plan defines a comprehensive and complex bundle of measures to ensure the functionality of traffic as well as ensuring its urban compatibility (City of Munich-Department of Urban Planning and Building Regulation, 2006b). It is strictly coordinated with the land utilization plan and

[56] This special programme consists of a joint initiative of the federal and state governments launched at the end of the 1990s to prevent rising social polarisation and its manifestation in urban space.

[57] The Social City programme was funded by the federal government, the government of Bavaria and the city of Munich, while the basic programme for urban development funding was funded by the government of Bavaria (60 %), and the city of Munich (40 %). The total funds allocated to the district refurbishment programme have been provided by public authorities, private organizations and public-private partnership (LH München-Referat für Stadtplanung und Bauordnung, 2011, 2012b). Since 2001 the regeneration programmes have also been started in other urban areas and the Social City programme has been extended to further districts situated on the Mittlerer Ring. The various actions of district refurbishment envisaged have been implemented with the active involvement of the inhabitants and the local actors at an early stage.

with further partial area and sectoral concepts which are mainly concerned with the areas of the Mittlerer Ring, parking, public metropolitan and suburban commuter railway systems, as well as cycle and pedestrian traffic.

Both the transport development plan and the Munich regional plan, together with the associations that have been formed between several local governments in order to protect recreational areas, carry out joint marketing, economic development and tourism initiatives, converge towards strengthening polycentric settlement structure. Despite these guidelines, the harmonisation and coordination of development processes at the urban region level are quite difficult to put into effect. They require a joint effort to improve cooperation between the multitude of small municipalities surrounding the city of Munich; since responsibility for land use regulation rests with the local governments, the spatial competition for jobs and housing, in view of the fiscal benefits, is very strong, and policy making and implementation are mostly fragmented. The city of Munich is actively promoting inter-authority procedures covering central aspects of planning at this level, but the pressure on land of the different interests involved in fostering urban growth remains strong, and the competition between outlying municipalities in attracting retail stores, housing and firms continues to manifest itself.[58] Given these conditions, and considering that regional cooperation has remained on a voluntary and consultative basis and no planning authority has been transferred to the regional level, in contrast to other German city-regions, there is at present no adequate institutional device ensuring that an integrated development strategy can be adopted at this level. Nevertheless the city of Munich is experimenting with innovative policies and projects to safeguard its land reserve and combat urban sprawl.[59]

Munich's economic policies, which have complemented those of the Bavarian government in many respects, seek to combine the promotion of employment with the development of skills for growth and social stability. Despite the significant decline in unemployment during the last few years and the good employment condition of the city, the local government's labour market policy has been further strengthened to cope with the increasing labour demand of foreign immigrants and to achieve labour market integration.

One of the main pillars of the local labour market policy is the promotion of innovative labour market projects, which is part of the Munich Employment and

[58] Municipalities are very interested to develop land because they retain a percentage of income tax generated in each Land, in accordance with their population size, and receive both transfer payments, depending on the extent of their service responsibilities, and property taxes (Evans, 2012).

[59] The success of Munich in the field of land consumption control has recently been recognized by the European Environment Agency which, in its report on urban sprawl in Europe, pointed out that "only Munich has remained exceptionally compact if compared to many other European cities and it is the only urban area among the 24 urban areas studied where the built-up areas have grown at a clearly slower pace than the population" (EEA, 2006, p. 46). According to the Agency, the lesson from Munich can provide the good practice basis for sustainable development that many other cities throughout Europe urgently require.

Qualification Programme (MBQ). This policy instrument is the most extensive local government programme on employment at the national level and is supported on a voluntary basis. It aims to provide suitable jobs and vocational training opportunities for various target groups, and improve the employment prospects mainly of those at a disadvantage on the city's labour market (LH München-Referat für Arbeit und Wirtschaft, 2011).

In accordance with its general orientation towards pro-active economic and labour market policies, Munich has for decades invested in several promotion programmes targeted at SMEs, and more recently micro-enterprises in the emerging sector of the creative economy, to enhance structural change and economic competitiveness. For this reason, improvement of the business start-up environment has increasingly become one of the main tasks of the local government.[60]

To support the development of small and medium-sized businesses, a special programme—the "Munich business park programme MGH" (*Gewerbehof-programm*)—and the Munich Technology Centre (MTZ), directed specifically at the handicraft and technology sectors, were established at the beginning of the 1980s. The long-term aim of the MGH is to establish a citywide network of centres for small businesses, safeguarding accommodation within the urban area for the craft trades, traditional manufacturing and commercial activities, which would otherwise be ejected from the market, owing mainly to the rise in property values. These small business centres are set up in redevelopment areas or in precincts affected by densification and functional diversification projects, in order to contribute to the formation of a mix urban fabric.[61]

Further programmes that help to strengthen the Munich's labour market and employment policies, and at the same time to increase social cohesion are those addressed directly to the inhabitants. They are designed in particular to strengthen the knowledge base, especially in the fields of adult education and schooling, and to develop childcare facilities. These programmes have recently been given priority by the various government levels.[62]

[60] The Munich Entrepreneurship Agency (MEB), founded in 1998 in cooperation with the Chamber of Industry and Commerce for Munich and Upper Bavaria, has established itself as key instrument of this policy. It is made up of several integrated services, including the "Munich fund" loan grants, provided by local saving banks for a defined period, to enable small enterprises to start their own business. As shown by a recent evaluation of the activities carried out by the MEB, about half of the service users have achieved tertiary education and more than 70 % have become individual entrepreneurs (LH München-Referat für Arbeit und Wirtschaft, 2010).

[61] The eight structures at present developed—which have a total rentable area of approximately a 100,000 m^2, and can accommodate more than 340 companies—guarantee long-term oriented rental contracts with lower rent, despite their central location in the city.

[62] In relation to childcare facilities, the local government has resolutely oriented the resources derived from the application of the SoBoN device towards the creation of kindergartens, allowing more than 80 % of children to use this service (LH München-Referat für Arbeit und Wirtschaft, 2012).

Munich has sought to consolidate its reputation as a city of knowledge and training and its leadership at the national level.[63] It is trying to meet the challenges that the knowledge society poses to the work environment by setting up new schools and strengthening the system of life-long adult training. In this regard, the activities of the *München Volkshochschule* (MVHS), the Munich adult education school for adults, have been further enhanced.[64] Currently, through this historic institution, which is the largest European adult education establishment in public responsibility, in addition to the employment and qualification programme and further education establishments, the city is able to offer a significant contribution to life-long-learning, also through cooperation with local businesses in training and further education opportunities.

Examination of the policies implemented by the city to strengthen the education and training systems shows how the local government considers investment in human capital and improvement of the functional interdependence between the training system and the labour market as essential both to the promotion of social inclusion and maintenance of the competitive edge of the Munich economy.

8 Conclusions

As we have tried to demonstrate, Munich's enhancement of its strong base of assets, which has been skillfully exploited by local leaders who developed the "institutional thickness" necessary to achieve long-term, focused policy interventions, has enabled the city to build its technological capacity, to become an important example of the national "triple helix system" and shape, together with more established regions of advanced manufacturing, Germany's distinctive "service-manufacturing-nexus" (Rode et al., 2010).

The creation by the State of Bavaria of an efficient and extensive network of mobility infrastructure on a metropolitan scale, such as the regional rail lines and the new airport, and the substantial investments this government has made in launching an aggressive technology-led development and promoting the spatial clustering of new specialised high-value activities in the metropolitan region, have responded to the productive and residential locational dynamics displayed in the

[63] With 39 general and 78 vocational training schools and 36 highly specialised vocational training centres operated by the municipality, Munich has the largest municipal school and training system in Germany.

[64] According to the report drawn up in 2005 (City of Munich-Department of Labour and Economic Development, 2005), in recent years, the MVHS has promoted several educational programmes every year involving overall more than 200,000 people. It organizes life-accompanying learning in several fields, frequently in cooperation with other Munich-based cultural and educational institutions, universities, societies and associations. The education programme for senior citizens alone has more than 10,000 participants per year. Courses, which can be attended by people from various walks of life and various backgrounds, are run at 95 schools distributed mainly in the inner city.

suburban areas of the city. This made it possible to shape a polycentric development of the urban region, which has been driven by activating forms of cooperation between the various local governments and by strategic plans aimed at coordinating the development of new settlements with the strengthening of the public transport network.

Although the voluntary body representing the city of Munich and its surrounding municipalities has made significant progress in this direction, the best results have been achieved in improvements to transportation systems, in major infrastructure investment and in the protection of green recreational areas. However, the multitude of small municipalities that make up the region have not yet really adopted as a common purpose the need to secure a coherent territorial approach to land management and planning in order to shape the context in which the market-driven locational choices and investment decisions (both of firms and households) are made. For this reason, the construction of an integrated development strategy at the urban region level, and the improvement of territorial governance on this scale are crucial and remain the main challenge facing Munich.

If on the one hand the economic and settlement development in the urban region is still configured as a balanced polycentric system which has benefited significantly in terms of employment and wealth distribution, and is characterised by good environmental conditions, on the other the development of highly attractive production sectors and the ongoing changes in the production system related to the strong tertiary transition of economy have generated disruptive effects, above all in the urban area. Like other global cities, Munich has in fact experienced an intensification of foreign immigrant flows, consequent growth in the multiethnic composition of its population and inequality in income distribution among social groups; at the same time, it has seen increasing concentrations of more vulnerable residents and a socially segmented internal structuring of the city. New social and territorial inequalities have in fact become apparent as a consequence of the rise of the new urban elite occupied in the service activities of the leading and more competitive economic sectors, as well as of the increasing housing costs. Despite the presence of a polycentric settlement structure, in this case too, the pressure and concentration of knowledge-intensive services in the inner city, especially those classified as Core KCS, have proved to be very high and have given rise to strong competition between economic activities within the urban area. Although Munich has invested heavily in enhancing its attractiveness, the impact of such processes has been much lower compared to other German cities. This is due to the fact that the effectiveness of the policies implemented by the local government, even more than the role played by a national welfare system with a solid tradition, has contributed significantly to attenuate economic and social disparities, while preserving economic diversification, reducing the formation of areas of social segregation and ensuring a high and widespread urban quality.

Munich has faced the challenge of balancing economic, social and environmental goals by developing—from as early as the 1990s—a strong governance framework, within which several programmes have been designed to maintain and improve its public assets, including the old municipal housing stock, to provide

new adequate and affordable housing, to mitigate the replacement of population and economic activities and ensure the preservation of the social and productive mix, along with the creation of public goods. Unlike cities—such as Milan, one of the case studies examined in this book—which have resorted to short-term reactive urban policies, substantially arising from profit-maximising motives, typical of the market-driven approaches to spatial development, and have seen the increasingly disruptive effects of spatial competition of social groups and economic activities, in order to grasp the opportunity offered by ongoing changes in the urban production system and generate investments, Munich has engaged in long-term efforts towards local capacity-building, both social and institutional. The Munich experience demonstrates effectively that an increase in the level of global competitiveness of cities, which continue to be a specific form of local society (Bagnasco & Le Galés, 2000), is not necessarily matched by an increase in their levels of inequality or social exclusion, especially if they are able to provide both appropriate tools and policies to ensure the development of "places of sociability" helping to strengthen economic transactions (Amin & Thrift, 2002).

But if on the one hand, Munich's territorial and spatial development has been properly concentrated on areas within the city, efficiently served by public transport, and focused on the reuse and regeneration of disused sites, as well as on the creation of new urban social and functional mixes, on the other the new districts do not differ in their configuration from traditional residential neighborhoods, despite the presence of other functions. The creation, in these new areas, of an environment with urban features, through a compact fabric and a strong function admixture, as well as a social mix, would have allowed the inner city to be expanded, offering greater location opportunities to the growing demand for centrality by advanced services, while at the same time reducing the congestion of the urban centre and improving its habitability.

This is another of the key challenges that faces Munich: considering that there are still numerous areas to be reused, especially the former barracks and the influx of population is expected to continue for the next 20 years, as is the development of knowledge intensive services, it is necessary to shift the focus of housing policy, which has been mainly on quantitative dimensions, toward qualitative aspects. The new urban regeneration projects should in fact provide for the building of diverse, high quality housing, reflected above all in the fine-grained mix of uses (e.g. living accommodation, workplace and leisure uses), in order to satisfy the housing demand of the new knowledge workers that the city needs to attract to maintain the competitive edge of its economy.

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References

Amin, A., & Thrift, N. (1995). Gobalisation, institutional 'thickness' and the local economy. In P. Healey et al. (Eds.), *Managing cities: The new urban context* (pp. 91–108). Chichester: John Wiley.

Amin, A., & Thrift, N. (2002). *Cities: Reimagining the urban*. Cambridge: Polity Press.

Asheim, B., Coenen, L., & Vang, J. (2007). Face-to-face, buzz, and knowledge bases: Sociospatial implications for learning, innovation, and innovation policy. *Environment and Planning C, 25*, 655–670.

Bagnasco, A., & Le Galés, P. (Eds.). (2000). *Cities in contemporary Europe*. Cambridge: Cambridge University Press.

Bathelt, H. (2011). Munich's media cluster at the crossroads. In C. Karlsson & R. G. Picard (Eds.), *Media clusters. Spatial agglomeration and content capabilities* (pp. 136–158). Cheltenham: Edward Elgar.

Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology. (2012). *Bavaria's economy. Facts and figures 2012*. Munich: Bavarian Ministry of Economic Affairs, Infrastructure, Transport and Technology.

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie. (2008). *Cluster-Offensive Bayern. Im Netzwerk zum Erfolg*. Munich: Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie.

Biehler, H., Pousinis, A., Sedlmaier, F., & Weber, N. (2003). *Standort München. Medienwirtschaft und Fahrzeugbau. Regionale Netzwerke und regionaler Arbeitsmarkt als Erfolgsfaktoren*. Schüren: Marburg.

Bontje, M. A., Musterd, S., & Pelzer, P. (2001). *Inventive city-regions. Path dependence and creative knowledge strategies*. Burlington: Ashgate.

Castells, M., & Hall, P. (1994). *Technopoles of the world: The making of 21st century industrial complex*. New York: Routledge.

City of Munich-Department of Labor and Economic Development. (2005). *Munich—City of Knowledge* (Issue No. 190). Munich: Department of Labor and Economic Development.

City of Munich-Department of Labor and Economic Development. (2008). *The role of creativity in Munich's economy* (Issue No. 222). Munich: Department of Labor and Economic Development.

City of Munich-Department of Labor and Economic Development. (2013). *Munich as a business location—Facts and figures 2013* (Issue No. 272). Munich: Department of Labor and Economic Development.

City of Munich-Department of Urban Planning and Building Regulation. (2005). *Shaping the future of Munich. Perspective Munich—Strategies, principles, projects*. Development Report. Munich: Department of Urban Planning and Building Regulation.

City of Munich-Department of Urban Planning and Building Regulation. (2006a). *Assessment of Messestadt Riem. Sustainable urban development in Munich*. Munich: LH München—München-Riem GmbH.

City of Munich-Department of Urban Planning and Building Regulation. (2006b). *Information about urban development. Transport development plan*. Perspective Munich. Munich: Department of Urban Planning and Building Regulation.

Duell, N. (2006). *Ideopolis: Knowledge city region. Munich case study*. London: The Work Foundation.

ESPON. (2012). Case study selection, methodology, data. In ESPON (Ed.), *SGPTD—Second tier cities and territorial development in Europe: Performance, policies and prospects* (pp. 81–89). Scientific Report 3.1. The ESPON 2013 Programme. www.espon.eu

Etzkowitz, H., & Leydesdorff, L. (Eds.). (1997). *Universities and the global knowledge economy: A triple helix of university-industry-government relations*. London: Pinter.

European Environment Agency. (2006). *Urban sprawl in Europe—The ignored challenge*. (Report No. 10). Copenhagen: EEA.

Evans, R. (2012). Munich. In ESPON (Ed.), *SGPTD—Second tier cities and territorial development in Europe: Performance, policies and prospects* (pp. 91–121). Scientific Report 3.2. The ESPON 2013 Programme. www.espon.eu

Glückler, J. (2007). Geography of reputation: The city as the locus of business opportunity. *Regional Studies, 41*, 949–961.

Gottmann, J. (1961). *Megalopolis. The urbanised Northeastern seaboard of the United States*. New York: The Twentieth Century Fund.

Hafner, S., Miosga, M., Sickermann, K., & von Streit, A. (2007). *Knowledge and creativity at work in the Munich region—Pathways to creative and knowledge-based regions* (Report 2.7). Amsterdam: ACRE.

Hafner, S., Heinritz, G., Miosga, M., & von Streit, A. (2008). *Requirements and demands of Munich's creative knowledge workers. Understanding the attractiveness of the metropolitan region for creative knowledge workers* (Report 5.7). Amsterdam: ACRE.

Heins, F., & Bucher, H. (2010). *Euro Standard in München and its region*. The ESPON 2013 Programme, DEMIFER-Applied Research Project 2013/1/3-Demifer Case Studies, ESPON. www.espon.eu

Hulsbeck, M., & Lehmann, E. E. (2007). Entrepreneurship policy in Bavaria: Between laptop and lederhosen. In D. B. Audretsch, I. Grilo, & A. R. Thurik (Eds.), *Handbook of research on entrepreneurship policy* (pp. 200–2012). Cheltenham: Edward Elgar.

IHK-LH München-Referat für Arbeit und Wirtschaft. (2007). *Aerospace and satellite navigation in the Munich region*. Munich: IHK-Referat für Arbeit und Wirtschaft.

IHK-LH München-Referat für Arbeit und Wirtschaft. (2010). *Location for information, communication and media, Munich 2010*. Munich: Referat für Arbeit und Wirtschaft.

Kaiser, R., & Liecke, M. (2007). The Munich feature film cluster: The degree of global integration and explanations for its relative success. *Industry and Innovation, 14*, 385–399.

Krätke, S. (2007). Metropolisation of the European economic territory as a consequence of increasing specialisation of urban agglomerations in the knowledge economy. *European Planning Studies, 15*, 1–27.

Krätke, S., & Taylor, P. J. (2004). A world geography of global media cities. *European Planning Studies, 12*, 459–477.

LH München-Referat für Arbeit und Wirtschaft. (2010). *Evaluierung der Gründungsberatung im Münchner Existenzgründungs-Büro, Kurzfassung*. Munich: Referat für Arbeit und Wirtschaft. *Der Weg in dieSelbständigkeit*.

LH München-Referat für Arbeit und Wirtschaft. (2011). *Munich employment and qualification programme (MBQ)* (Report 2011). Munich: Referat für Arbeit und Wirtschaft.

LH München-Referat für Arbeit und Wirtschaft. (2012). *Münchner Jahreswirtschaftsbericht 2012*. Munich: Referat für Arbeit und Wirtschaft.

LH München-Referat für Stadtplanung und Bauordnung. (2006). *München Modell*. Munich: Referat für Stadtplanung und Bauordnung.

LH München-Referat für Stadtplanung und Bauordnung. (2011). *Stadtteilsanierung Milbertshofen: Integrativ, Kooperativ, Aktivierend*. Stadtsanierung und Wohnungsbau—Soziale Stadt München. Munich: Referat für Stadtplanung und Bauordnung.

LH München-Referat für Stadtplanung und Bauordnung. (2012a). *Bericht zur Wohnungssituation in München 2010–2011*. Perspektive München/Analyse. München: Referat für Stadtplanung und Bauordnung.

LH München-Referat für Stadtplanung und Bauordnung. (2012b). *Stadtteilsanierung Hasenbergl: Vielfältig,Ganzheitlich, Quartiersbezogen*. Stadtsanierung und Wohnungsbau—Soziale Stadt München. Munich: Referat für Stadtplanung und Bauordnung.

LH München-Sozialreferat. (2010). *Interkultureller Integrationsbericht. München lebt Vielfalt*. Stelle für interkulturelle Arbeit. Munich: Sozialreferat.

LH München-Sozialreferat. (2012). *Münchner Armutsbericht 2011*. Munich: Sozialreferat.

Lüthi, S., Thierstein, A., & Goebel, V. (2007, August 20–23). *Places of flows in the mega-city region of Munich—Considerations for spatial development policies*. Paper presented at EUGEO First International Conference, Amsterdam.

Lüthi, S., Thierstein, A., & Goebel, V. (2010). Intra-firms and extra-firm linkages in the knowledge economy: The case of the emerging mega-city region of Munich. *Global Networks, 10*, 114–137.

Musterd, S., & Murie, A. (Eds.). (2010). *Making competitive cities*. Oxford: Wiley-Blackwell.

Rode, P., Nathan, M., von Streit, A., Schwinger, P., & Kippenberg, G. (2010). *Munich metropolitan region. Staying ahead on innovation*. London: LSE Cities Next Urban Economy Series.

Schricke, E. (2013). *Occurrence of cluster structures in knowledge-intensive services*. Working Papers Firms and Region, No. R1/2013. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI).

Scott, A. J. (2006). Creative cities: Conceptual issues and policy questions. *Journal of Urban Affairs, 28*, 1–17.

Scott, A. J. (2007). Quell'atmosfera che rende speciale una città. *Dialoghi Internazionali. Città nel mondo, 6*, 122–129.

Scott, A. J. (2010). Cultural economy and the creative field of the city. *Geografiska Annaler: Series B, 92*, 115–130.

Söndermann, M. (2006). Kulturwirtschaft und Kreativwirtschaft. Eine Neue Diskussion für Deutschland. In B. Fesel (Ed.), *Kultur und Kreativität als neue Wirtschaftsfaktoren* (pp. 8–20). Berlin: Jahrbuch Kulturwirtschaft.

Stahlecker, T., & Koch, A. (2004). *On the significance of economic structure and regional innovation systems for the foundation of knowledge-intensive business service. A comparative study in Bremen, Munich and Stuttgart, Germany*. Working Papers Firms and Region, No. R1/2004. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI).

Sternberg, R. (1998). München und Voralpen. In E. Kulke (Ed.), *Wirtschaftsgeographie Deutschland* (pp. 523–551). Stuttgart: Klett-Perthes.

Storper, M., & Venables, A. J. (2004). Buzz: Face-to-face contact and the urban economy. *Journal of Economic Geography, 4*, 351–370.

Thierstein, A. (2008). Monaco. Una megacittà-regione emergente. *Dialoghi Internazionali. Città nel Mondo, 9*, 14–29.

van den Berg, L., Pol, P. M. J., Van Winden, W., & Woets, P. (2005). *European cities in the knowledge economy*. Aldershot: Ashgate.

von Pechmann, A. (2012). *The spatial distribution of Knowledge Creating Services in the Greater Munich area through planning strategies*. Degree thesis, Faculty of Territorial Planning, University Iuav of Venice, Venice.

von Streit, A., Axtner, M., Buchwieser, S., Hafner, S., Heinritz, G., & Miosga, M. (2008). *Requirements and demands of Munich's creative knowledge enterprises. The managers' view* (Report WP6.7). Amsterdam: ACRE.

von Streit, A., Montanari, G., Popp, M., Hafner, S., Heinritz, G., & Miosga, M. (2010). *Policies and strategies for the creative knowledge economy in the region of Munich. How to enhance the city's competitiveness* (Report WP10.7). Amsterdam: ACRE.

Willems, K., & Hoogerbrugge, M. (2012). *Economic vitality of Munich*. The Hague: European Metropolitan Network Institute (EMI).

Zademach, H. M. (2009). Global finance and the development of regional clusters: Tracing paths in Munich's film & TV industry. *Journal of Economic Geography, 9*, 697–722.

Localisation Patterns of Knowledge-Creating Services in Paris Metropolitan Region

Fabiano Compagnucci

Abstract

Based upon an hermeneutic approach, which explicitly takes into account the role space plays within the knowledge economy, the article is aimed at providing the geography of knowledge-based activities in the Paris metropolitan area and at depicting the shape of their external economies and agglomeration forces. The added value supplied by this paper consists in: a) the spatial extent covered (the Paris Metropolitan Region), in order to consider the role that the pivot city and the surrounding towns/cities jointly play within the urban regional structure; and b) the improved explicative capability of a hermeneutic approach descending from its cross-fertilisation with the "knowledge source-based approach", which distinguishes between analytic, synthetic and symbolic services according to their prevailing source of knowledge. The proposed methodology makes it possible to depict the spatial relationships both within KCS and between KCS and manufacturing activities in a more appropriate manner.

1 Introduction

The aim of this chapter is to identify the geography of knowledge-based activities in the Paris Metropolitan Region (PMR) according to the hermeneutic approach which characterises this collective book. The localization of economic activities is a crucial issue in regional studies, in that it supplies a valid proxy to represent the working mechanisms of the market forces, the outcomes of previously implemented territorial policies, as well as helpful information for shaping future policies: while

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providing evidence of regional potential, in fact, it helps to identify possible lock-in conditions requiring targeted actions.

It is by now widely accepted, both in the academic and collective agents fields, that economic performances of countries, regions and cities are increasingly dependent on their capability to acquire knowledge and foster innovation and creativity. Acquiring knowledge allows firms and organizations to face global competition through innovation in products and processes while triggering a cumulative process: the more their knowledge base is developed at time "*t*", the greater their capability to absorb and handle new knowledge from various sources, local or external, so that their knowledge base at time "*t*+1" is greatly enhanced as is their capability to re-absorb more knowledge.

Most metropolitan regions and areas, which are simultaneously embedded at the local/regional level and connected to the global network, are generally considered the nodes where the majority of information fluxes converge to and information is processed (Lane, Pumain, van der Leeuw, & West, 2009). Thanks to absorptive and creative aptitudes, new information is transformed into learning, eventually leading to innovation. Regional science scholars have long investigated the reasons why cities attract economic activities in general and knowledge-based ones in particular. As Musters and Gritsai (2013) well summarise from a rich literature, urban areas usually succeed in providing standard location conditions (agglomeration economies, cluster opportunities, and urban externalities), soft conditions (peculiar environmental features which enhance urban attractiveness) and well established relational networks between individuals, firms and organization. In addition, when sharing the same territorial base, economic activities can take advantage from the so-called Jacob's externalities, in that economic heterogeneity facilitates the raising of network externalities (Capello, 2000) between different clusters based on different locations but situated within the same urban or metropolitan area. According to Boschma and Iammarino (2007), this is particularly true for related variety (advantages coming from the co-location of related industrial sectors in terms of shared or complementary competences), which is more likely supposed to induce effective interactive learning and innovation, while unrelated variety (advantages descending from the co-location of sectors that do not share complementary competences) mostly affect the risk spreading. What is however crucial, and makes the difference between the city and a simple urban agglomeration, is that cities can also count on path-dependent advantages springing from the political, economic and societal role they play within their respective national systems (Amin & Thrift, 1992; Camagni, 2012; Chinitz, 1961; Hall, 2004; Simmie, 2005).

It is also worth noting that economic geographers are increasingly focusing on the location patterns of knowledge-based activities, stressing the embeddedness of the action of local firms, as well as on the relational and place-dependent nature of their knowledge sources. As suggested by Phelps and Ozawa (2003), for instance, the content and role of external economies and agglomeration forces depend on place and time which they are referred to. Unlike Industrial Districts, for example, which obey to a relatively easy spatial rationale, are spatially bounded and belong to a certain industrial sector, an urban or metropolitan area is a much more complex

reality (Camagni, 1999). Its components, indeed, are generally characterised by different reference industries as well as different location rationales, which could be inspired by concentration (Storper & Scott, 2009), polycentricism (Meijers, 2005), dispersion (Parr, 2002), or even scatteration (Coffey & Shearmur, 2002).

The analysis of the regional knowledge-base has been further enriched by considering the nature of the knowledge sources. According to the "*knowledge base*" concept introduced by Asheim and Gertler (2005), firms and organization differently source knowledge in that innovation modes depending on the type of the involved economic activities. If scientific activities mainly rely on *analytic knowledge*, economic activities grounding on customer-supplier interactions more likely require *synthetic knowledge* while cultural production is more related to *symbolic knowledge*. In spite of the fact that economic activities are generally characterized by different mix of tacit and codified knowledge, inserting the above mentioned categories (analytic, synthetic and symbolic) should enrich the debate and overcome the dualistic question whether knowledge is codified or tacit (Johnson, Lorenz, & Lundvall, 2002, in Asheim, Boschma, & Tödtling, 2013), which is in fact an oversimplification as opposed to the increasing complexity of learning, creativity and innovation.

The explicit hypothesis underpinning these recent developments, in particular those regarding the crucial role played by both the *type* of knowledge base and the *local/regional socio-economic-institutional level*, bridge the regional innovation systems approach with the hermeneutic one.

Being based on learning in perceiving/establishing differences between cognitive attitudes, a hermeneutic approach, in fact, fully recognises the importance of context-specific, place-specific relational contexts (the *meso-dimension*). It further proves to give thickness to the notions of place, and milieu in particular, by showing how individuals, firms and organizations, which are anchored in specific relational systems, interact with territorial features in enhancing their creative attitudes and capabilities. Though in a different way, a hermeneutic approach also questions about the nature of the knowledge base too. By introducing the notion of Knowledge-creating Services (KCS), in fact, we distinguish between different economic activities depending on the fact they source directly or indirectly from *Learning 2* or *Learning 3* practices, which represent an original element within knowledge economy perspective.

Notwithstanding the evident interplays between the notions of regional innovation platforms (Cooke, De Laurentis, MacNeill, & Collinge, 2010) and generative milieu, both relying on a pragmatic notion of learning, some differences, however, persist between the two approaches, as Cusinato remarks in the general introduction. Nevertheless it seems interesting to incorporate the knowledge base concept into the theoretical frame this chapter refers to, in order to assess the potential improvements in its explanatory capability with respect to the milieu approach, the objective being to substantiate the benefits of the hermeneutic approach.

On these basis, the article aims to analyse and discuss the localisation patterns of knowledge-based activities in the Paris Metropolitan Region, testing whether activities based on different sources of knowledge behave homogenously from a territorial perspective or, otherwise, they require different environments. The final

aim is to argue whether their *location rationale* affects places' capabilities in fostering creativeness and innovativeness. In doing so, the first task to be accomplished regards the spatial identification of the PMR. Secondly, by means of descriptive statistics a list of stylised facts will be framed, regarding both KCS services and their relationships with manufacturing industry. Third, we will show how the interpretative capability of the hermeneutic approach can be improved by internalising the knowledge base concept within the KCS classification, further testing the results by means of centrality, concentration, and clustering indexes. The results will be finally discussed also taking into account the role played by previously implemented territorial public policies.

2 Paris Metropolitan Region: The Unit of Analysis

Given the key role played by the relational context, the identification of the territorial unit to which referring the analysis represents a crucial issue. Notwithstanding its wide relevance in regional sciences, this issue has not received the attention it deserved, being the spatial unit of analysis usually unsophistically chosen among the (given) administrative ones or on the base of data availability (Burger, van Oort, & van der Knaap, 2010).

How do we conceive the city and the metropolitan region? Which is the spatial extent we have to refer to? Are we interested in its administrative boundaries, its functional area or its regional dimension?

When seeking to answer these crucial questions, a clear overlapping with the evolutionary geography emerges again. Evolutionary geographers, when dealing with the relational dimension of external economies, must address the issue of the changing role played by cities in different places and different times.

A traditional manufacturing city, usually depicted as an urban centre surrounded by rural areas or suburbs, is characterised by different external economies promoting agglomeration, which, in turn, depends on uneven features (such as leading industry, productivity growth basis, division of labour, sources of accumulation, scale economies, and ownership of enterprises), as well as on its development stage (be it proto-industrial, industrial or late-industrial) (Phelps & Ozawa, 2003).

Even more than an industrial city, a post-fordist city, which mainly—but not solely—relies on the service sector, has a more diversified and spatially diffused economy, peculiarly shaping the form of agglomeration forces. Recurring to Alonso, who first introduced the concept of "borrowed size", we notice that, generally, within metropolitan areas, also small cities "apparently achieve sufficient scale for the functioning of a modern economy by borrowing size from one another. This phenomenon transforms the issue of the size and growth of a city by redefining it to include, in some degree, its neighbours" (Alonso, 1973, p. 200). External economies, in this view, are not bounded within a single location/city, being rather shared among functionally interrelated networks of cities (Phelps & Ozawa, 2003).

Accepting this idea means reconsidering the role a pivot city and the surrounding ones jointly play within the urban regional structure. In this sense, as noted by

Meijers and Burger, "it would make sense to study agglomeration externalities at the scale of the regional urban system rather than the single city, as interactions with nearby cities may also influence the presence of agglomeration externalities" (Meijers & Burger, 2010).

Although from a different perspective, also the hermeneutic approach also stresses and focuses on the relational features of milieus. Established the fact that innovation appears as knowledge recombination, the hermeneutic approach, according to a dialogical-pragmatic perspective, considers knowledge as the act of "constructing information within a certain relational space (Learning 2 and following levels)" (see the Introduction), the so-called Knowledge-Creating Milieu (KCM). As outlined in the introduction, KCMs can be depicted as socio-cultural systems which actively concur in shaping their cognitive, creative and innovative evolutionary paths, on the basis of certain structural conditions, such as heterogeneity of mental habits, relational density, a shared physical-symbolic apparatus, and openness to the external world, jointly acting *on the mental-emotional attitudes of the people involved*.

This entails that generative milieus can be conceived as multi-layered places, acting at various scale (firms, organisations, cities, regions), where innovation takes place through an interactive process based on the exchange and transformation of both tacit and codified knowledge (Chesbrough, 2003). As for the Paris case study, recourse to the daily urban space will be invoked. This latter includes the core of an urban or metropolitan area (the city of Paris, in our case), as well as its surrounding areas (suburbs and hinterlands) and cities, which are functionally interrelated with the urban core. In doing so, we aim to identify the larger spatial extent of Paris potential relational field onto which systematic face-to-face contacts between individuals, firms and organisations occur and are enhanced at the same time.

Of course, the importance of long-distance relationships is not neglected here. We assume, in fact, the globally networked character of Paris, as its ranking in different global cities classifications demonstrates. Until to the end of the twentieth century, Paris had the same ranking as New York, Tokyo and London, according to the Globalization and World Cities Research Network (GaWC, 2012), while in 2012, having meanwhile lost one position, it has been included into the Alpha+ category.[1] Furthermore, according to MasterCard Worldwide Canters of Commerce Index (Mastercard Worldwide, 2008), Paris ranks respectively seventh, when referred to the aggregated index, and fourth, when the capability to create knowledge is concerned.

By focusing on the local/regional level of the relational field, we stress the fact that, in addition to the crucial role played by outwards connections, a KCM can count on its internal one. Dealing with a metropolitan KCM, in fact, means referring to the spatial and relational extent which guarantees the coexistence of the

[1] First order Global Cities are classified according four categories: Alpha++ (New York and London), Alpha+ (including Paris), Alpha and Alpha−.

maximum level of heterogeneity (namely the maximum level of different interpretative codes) and shared physical-symbolic apparatus within the same daily urban system.

Under these hypothesis, the definition of Metropolitan Area (Insee, 2011) will be first adopted and then articulated on the basis of its underlying Employment Areas (Zone d'Emploi-ZE) (Insee, 2012). According to Insee, large urban areas are defined on the basis of demographic, labour market and functional (commuting flows) indicators. Precisely, they are constituted by a major urban centre (an urban unit offering more than 10,000 jobs) and its surrounding rings (all municipalities whose residents—at least 40 % of them—work within the urban unit or in another municipality of the rings). On the basis of given thresholds (at least 500,000 habitants and 20,000 urban managerial and professional occupations, such as design and research, intellectual services, business-to-business services, management, culture and leisure) a large urban area is defined as a metropolitan area.

Starting from the Insee definition of Paris metropolitan area (Fig. 1), all the underlying ZEs have been considered. The aim is to depict the internal territorial organization of the PMR on the basis of its labour market areas, which are, at once, the places where the bulk of the resident population lives and works in, and part of a wider ZEs network pivoting on the core one of Paris. The proposed methodology meets at the same time the need to use data concerning the work places of employees and to provide a spatial definition of KCM to which referring the analysis. PMR, in this view, represents the maximum territorial extent (identified in functional terms) within which daily face-to-face contacts (and, consequently contacts between different cognitive codes) are allowed.

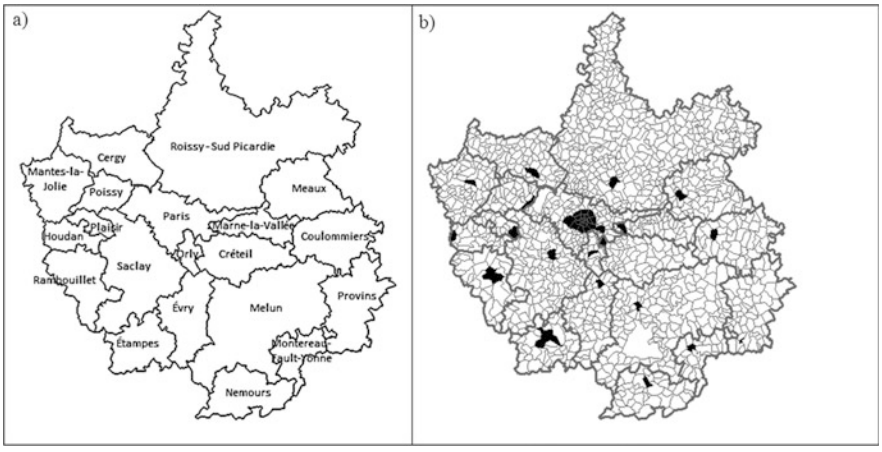

Fig. 1 Municipalities, ZEs, and ZEs' Urban cores of PMR. (**a**) Paris metropolitan region and its ZEs and (**b**) Paris metropolitan region, ZEs, municipalities and Urban cores (*black areas*). (An Urban core is represented by the centroid (or pivot) municipality of each ZE, that is the most important municipality in terms of employment opportunities. In most cases the name of each ZE is taken from its Urban core)

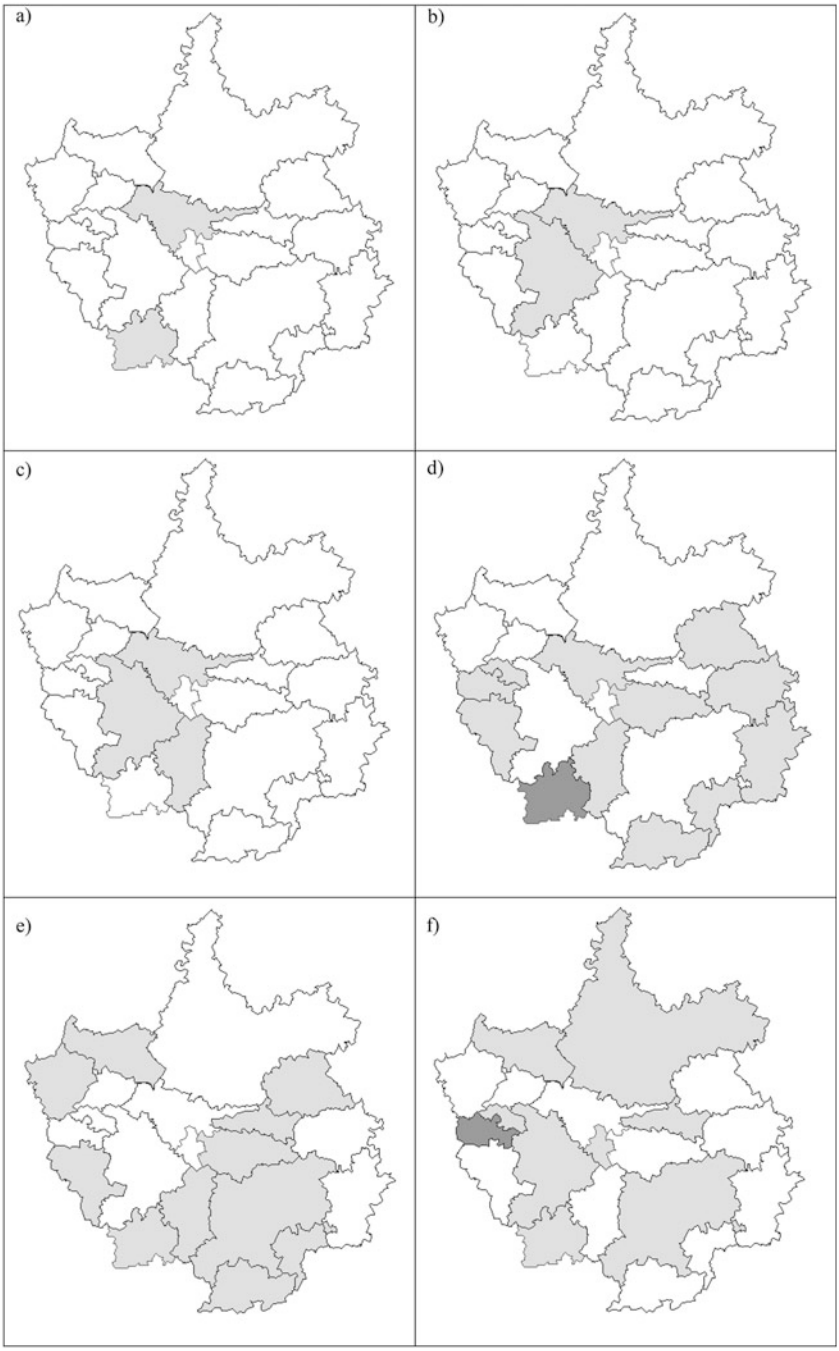

Fig. 2 LQs according KCS categories and ZE. (**a**) KCS LQ, (**b**) Private core LQ, (**c**) Private core-related LQ, (**d**) Public core LQ, (**e**) Public core-related LQ and (**f**) Collateral. (The scale of greys denotes the strength of LQs (*white* is lower than 1, *light grey* ranges between 1 and 2, *medium grey* between 2 and 5, *dark grey* is greater than 5). This key is to be used for all forthcoming figures)

Under the above mentioned hypothesis, we identify the Paris Metropolitan Region (Fig. 2) which represents the territorial proxy of the Paris KCM.

3 A Geography of KCS in the Paris Metropolitan Region: Main Stylised Facts

The empirical analysis will be based on CLAP 2008 database (*Connaissance locale de l'appareil productif*, Local knowledge of the productive system; Insee2008), which concerns the whole of French firms and employees on municipal level, with a five-digit detail. Data will be analysed using basic descriptive statistics, including the Location Quotient (QL).[2]

3.1 PMR and the National Context

According to the proposed definition, PMR is composed by 20 ZEs and covers an area of 14.191 km^2, hosting nearly 12 million of inhabitants and 5.5 million of employees, of whom 1.73 million belong to the KCS sector (Table 2).

These values, compared with national ones, highlight the very crucial role played by PMR, although some differences, according to the different variables involved in the analysis, emerge. While covering only 2.6 % of the national territory, PMR turns out as the main centre both in terms of residential and productive activities. In this regard, it is worth noting that its total employment share (24.3 % out of the total) slightly exceeds population share (19.4 % out of the total) indicating the centripetal economic force of PMR which extends over the whole nation (Gilli, 2011).

The economic role of PMR considerably differs when different economic sectors are concerned. As shown by Table 2, the gap between local and national shares and LQs attributable to KCS and manufacturing activities (respectively 29.8 % and 14 %, and 1.5 and 0.7) depicts the major role played by knowledge-based services. Furthermore, when considering KCS subdivisions, we realise that the specific asset of PMR relies on Private KCS. The share of Private Core KCS, in fact, almost covers the half of total French KCS employees (46.7 %), while the related LQ reaches the value of 2.7, which is the highest among those reported. Private Core-related KCS, for their part, slightly exceed 37 % of French total and their LQ amount to 2.2. On the contrary, PMR role according to Public KCS is less pronounced: both Public Core and Public Core-related KCS LQ values are closer to one, while their shares (respectively 21.5 % and 22 %) are lower than total employment share (Table 1).

As for manufacturing industry, a clear heterogeneity emerges between Hi-tech manufacturing industries and less technology intensive categories (Medium and

[2] For a detailed description of the Location Quotient, see Appendix.

Table 1 Population and employees—a comparison between PMR and France

	PMR	France	% PMR/France	LQ PMR
Sup (km^2)	14,191	543,965	2.6	
Population	12,038,267	62,134,866	19.4	
Total employment	5,547,307	22,799,082	24.3	1.3
Manufacturing employment	446,147	3,192,786	14.0	0.8
Hi-tech	97,348	333,991	29.1	1.7
Medium-tech	235,655	1,821,083	12.9	0.8
Low-tech	113,144	1,037,712	10.9	0.6
KCS employment	1,732,306	5,815,945	29.8	1.7
Private core	783,206	1,676,628	46.7	2.7
Private core-related	111,213	299,646	37.1	2.2
Public core	338,084	1,570,407	21.5	1.3
Public core-related	452,265	2,057,155	22.0	1.3
Collateral	47,538	212,109	22.4	1.3

Low-tech): the higher the science and technological level characterising the productive process and output, the higher the share and the value of LQ expressed by PMR. In this respect, Hi-tech manufacturing share and LQ amount respectively to 29.1 % and 1.5, while, Medium and Low-tech activities appear to be less important.

3.2 PMR Economic Structure

Moving from the comparison between PMR and the national level and focusing on PMR economic structure, its knowledge-led nature is confirmed. We notice that KCS employees amount to almost one third of total metropolitan employment (31.2 %).

Further, we can notice that Private Core KCS capture the lion's share, representing about a half of total KCS, being followed, in order of importance, by Public Core-related, Public Core KCS, Private Core-related KCS and activities Collateral to KCS (Table 3).

The contribution of manufacturing activities appears to be of less relevance, amounting to just 8 % of total employment. In this case Medium-tech activities capture the lion's share, slightly exceeding half of total manufacturing employment, while Hi-tech and Low-tech activities share almost equally the remaining part (Table 3).

Under the above considerations a first stylised fact can be depicted. It concerns the specific position PMR covers within the hermeneutic approach, given the crucial role played by KCS in general and by Private Core ones in particular, these latter being the most distinguishing knowledge-based services among those proposed.

Even though in a lesser degree and restricted to a technology-led perspective, hi-tech manufacturing activities represent a further peculiar asset of PMR economy,

Table 2 ZE areas, population and employment of PMR ZEs—absolute values

Cod_ZE	ZE	Sup (km^2)	Pop	Emp	Emp_man	Hi-tech	Medium-tech	Low-tech	Emp_KCS	Private core	Private core-related	Public core	Public core-related	Collateral
56	Roissy - Sud Picardie	3258	1,655,527	523,436	50,588	3868	34,185	12,535	92,799	15,705	5805	29,159	37,110	5020
1101	**Paris**	**552**	**5,851,493**	**3,353,561**	**190,061**	**44,675**	**82,245**	**63,141**	1,195,256	**628,370**	**77,102**	**212,167**	**253,366**	**24,251**
1102	Montereau-Fault-Yonne	310	315,444	138,076	11,508	1277	5339	4892	34,243	11,286	2463	7265	11,961	1268
1103	Coulommiers	660	61,160	13,374	2075	105	1031	939	2936	370	191	1282	1023	70
1104	Meaux	689	141,513	38,061	3957	100	2519	1338	9692	1156	580	3688	4046	222
1105	Melun	1838	379,272	117,997	13,877	4093	7698	2086	31,130	4710	1356	6520	17,236	1308
1106	Montereau	307	40,556	11,552	2436	0	2234	202	2600	187	39	1226	1058	90
1107	Nemours	556	48,696	13,098	2679	143	1994	542	2469	258	62	944	1127	78
1108	Provins	726	42,388	10,376	1505	1	1257	247	2398	346	110	1073	804	65
1109	Houdan	239	37,350	9986	998	340	353	305	2503	366	162	1065	630	280
1110	Mantes-la-Jolie	571	164,141	39,369	6385	1185	3361	1839	8197	1752	248	2360	3559	278
1111	Poissy	271	245,199	68,723	20,774	2183	17,239	1352	11,267	2332	955	1957	5471	552
1112	Rambouillet	547	70,693	19,015	3057	831	1450	776	4621	1145	308	1304	1711	153
1113	Plaisir	119	53,693	19,490	2741	1011	1536	194	4586	996	167	2024	1172	227
1114	Étampes	495	56,825	16,114	1237	33	856	348	5819	1737	82	2402	1422	176
1115	Évry	587	326,231	130,885	13,810	5499	5414	2897	40,971	9967	4738	8520	16,661	1085
1116	Saclay	1117	1,140,238	490,110	67,246	22,906	36,473	7867	152,118	76,142	10,119	21,234	38,140	6483
1117	Créteil	581	543,576	177,225	12,811	1075	8823	2913	50,383	4849	1699	17,576	25,276	983
1118	Orly	122	478,636	215,654	15,705	3401	6770	5534	44,264	14,894	3268	8057	14,594	3451
1119	Cergy	647	385,636	141,205	22,697	4622	14,878	3197	34,054	6638	1759	8261	15,898	1498
	PMR	14,191	12,038,267	5,547,307	446,147	97,348	235,655	113,144	1,732,306	783,206	111,213	338,084	452,265	47,538
	Tot France	543,965	62,134,866	22,799,082	2,208,157	333,991	836,454	1,037,712	5,815,945	1,676,628	299,646	1,570,407	2,057,155	212,109

Table 3 ZE areas, population and employment out of total PMR

Cod_ZE	ZE	Sup (km^2)	Pop	Emp	Emp_man	Hi-tech	Medium-tech	Low-tech	Emp_KCS	Private core	Private core-related	Public core	Public core-related	Collateral
56	Roissy - Sud Picardie	23.0	13.8	9.4	11.3	4.0	14.5	11.1	5.4	2.0	5.2	8.6	8.2	10.6
1101	**Paris**	**3.9**	**48.6**	**60.5**	**42.6**	**45.9**	**34.9**	**55.8**	**69.0**	**80.2**	**69.3**	**62.8**	**56.0**	**51.0**
1102	Marne-la-Vallée	2.2	2.6	2.5	2.6	1.3	2.3	4.3	2.0	1.4	2.2	2.1	2.6	2.7
1103	Coulommiers	4.7	0.5	0.2	0.5	0.1	0.4	0.8	0.2	0.0	0.2	0.4	0.2	0.1
1104	Meaux	4.9	1.2	0.7	0.9	0.1	1.1	1.2	0.6	0.1	0.5	1.1	0.9	0.5
1105	Melun	12.9	3.2	2.1	3.1	4.2	3.3	1.8	1.8	0.6	1.2	1.9	3.8	2.8
1106	Montereau-Fault-Yonne	2.2	0.3	0.2	0.5	0.0	0.9	0.2	0.2	0.0	0.0	0.4	0.2	0.2
1107	Nemours	3.9	0.4	0.2	0.6	0.1	0.8	0.5	0.1	0.0	0.1	0.3	0.2	0.2
1108	Provins	5.1	0.4	0.2	0.3	0.0	0.5	0.2	0.1	0.0	0.1	0.3	0.2	0.1
1109	Houdan	1.7	0.3	0.2	0.2	0.3	0.1	0.3	0.1	0.0	0.1	0.3	0.1	0.6
1110	Mantes-la-Jolie	4.0	1.4	0.7	1.4	1.2	1.4	1.6	0.5	0.2	0.2	0.7	0.8	0.6
1111	Poissy	1.9	2.0	1.2	4.7	2.2	7.3	1.2	0.7	0.3	0.9	0.6	1.2	1.2
1112	Rambouillet	3.9	0.6	0.3	0.7	0.9	0.6	0.7	0.3	0.1	0.3	0.4	0.4	0.3
1113	Plaisir	0.8	0.4	0.4	0.6	1.0	0.7	0.2	0.3	0.1	0.2	0.6	0.3	0.5
1114	Étampes	3.5	0.5	0.3	0.3	0.0	0.4	0.3	0.3	0.2	0.1	0.7	0.3	0.4
1115	Évry	4.1	2.7	2.4	3.1	5.6	2.3	2.6	2.4	1.3	4.3	2.5	3.7	2.3
1116	Saclay	7.9	9.5	8.8	15.1	23.5	15.5	7.0	8.8	9.7	9.1	6.3	8.4	13.6
1117	Créteil	4.1	4.5	3.2	2.9	1.1	3.7	2.6	2.9	0.6	1.5	5.2	5.6	2.1
1118	Orly	0.9	4.0	3.9	3.5	3.5	2.9	4.9	2.6	1.9	2.9	2.4	3.2	7.3
1119	Cergy	4.6	3.2	2.5	5.1	4.7	6.3	2.8	2.0	0.8	1.6	2.4	3.5	3.2
		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	% on total PMR				8.0	1.8	4.2	2.0	31.2	14.1	2.0	6.1	8.2	0.9
	Paris ZE/PMR	3.9	48.6	60.5	42.6	45.9	34.9	55.8	69.0	80.2	69.3	62.8	56.0	51.0

suggesting the existence of synergies and complementary externalities between these two industries, which will be subsequently investigated.

This first result fits with the fact that Paris is part of a wider Global Cities network, facing (and, at once, benefiting from) a global market whose core-activities presuppose Learning 2 and Learning 3 practices and consequently, the need for an inherent specialisation when willing to be part of it. With respect to manufacturing activities, the fact that Medium and Low-tech activities are numerically greater than Hi-tech ones, does not contradict the above conclusions. PMR, in fact, must provide a wide range of goods—from Hi-Tech to crafted ones—for its local market. Due to its size (nearly 12 million of inhabitants) part of this production necessarily locates within its metropolitan region notwithstanding related LQs do not suggest a specific specialisation in these industries. As for Hi-tech activities, we must take into account that a lower share of related employees is counterbalanced by higher level of productivity per worker. It is, in fact, assumed that labour productivity considerably increases moving from Low-tech to Hi-tech industries.

3.3 A Geography of KCS Within PMR

In order to provide a geography of KCS and to ascertain whether or not the five considered KCS categories are affected by similar or different location rationales, an analysis of their relative distribution and their LQs(according to the territorial level of ZE) has been performed (Tables 2, 3 and 4). The results will be interlaced with those descending from the analysis of manufacturing industries, aiming at stressing the existence of spatial complementarities or overlaps.

The very first stylised fact arising from the analysis concerns the crucial role Paris ZE plays within PMR, particularly in terms of knowledge-based services. Though it spatially covers only 3.9 % of total metropolitan region, the urban core of PMR concentrates 48.6 % of total population, 60.5 % of total employees and 69.5 % of total KCS employees (Table 3). On the contrary, manufacturing employees account for a lower share, equal to 42.6 %, depicting a two-tier pattern, further confirmed by LQs values: KCS tend to locate preferably within the urban core (LQ equal to 1.14) while manufacturing industries mostly spread outwards (LQ equal to 0.70) (Table 4).

By disaggregating KCS and manufacturing activities a more articulated situation emerges. As for KCS, we found that the concentration of its subdivisions within Paris ZE is considerably uneven. In particular, Private Core KCS are mostly located in the very centre of PMR (Paris ZE), their share amounting to 80.2 %. This evidence is in line with a vast literature regarding accessibility theories and willingness to pay for a central location (Alonso, 1964; Fujita, 1985), and with Global Cities concept (Sassen, 1991). Lower shares (even though higher than those affecting total employment) are related to Private Core-related KCS (69.3 %), Public Core KCS (62.8 %), Public Core-related KCS (56 %) and activities Collateral to KCS (51 %).

Table 4 ZEs' LQ according to the different industries

Cod_ZE	ZE	Emp	Emp_man	Hi-tech	Medium-tech	Low-Tech	Emp_KCS	Private core	Private core-related	Public core	Public core-related	Collateral
56	Roissy - Sud Picardie	0.69	1.20	0.42	1.54	1.17	0.57	0.21	0.55	0.91	0.87	1.12
1101	**Paris**	**1.24**	**0.70**	**0.76**	**0.58**	**0.92**	**1.14**	**1.33**	**1.15**	**1.04**	**0.93**	**0.84**
1102	Marne-la-Vallée	0.95	1.04	0.53	0.91	1.74	0.79	0.58	0.89	0.86	1.06	10.7
1103	Coulommiers	0.48	1.93	0.45	1.81	3.44	0.70	0.20	0.71	1.57	0.94	0.61
1104	Meaux	0.58	1.29	0.15	1.56	1.72	0.82	0.22	0.76	1.59	1.30	0.68
1105	Melun	0.68	1.46	1.98	1.54	0.87	0.84	0.28	0.57	0.91	1.79	1.29
1106	Montereau-Fault-Yonne	0.62	2.62	0.00	4.55	0.86	0.72	0.11	0.17	1.74	1.12	0.91
1107	Nemours	0.58	2.54	0.62	3.58	2.03	0.60	0.14	0.24	1.18	1.06	0.69
1108	Provins	0.53	1.80	0.01	2.85	1.17	0.74	0.24	0.53	1.70	0.95	0.73
1109	Houdan	0.58	1.24	1.94	0.83	1.50	0.80	0.26	0.81	1.75	0.77	3.27
1110	Mantes-la-Jolie	0.52	2.02	1.72	2.01	2.29	0.67	0.32	0.31	0.98	1.11	0.82
1111	Poissy	0.61	3.76	1.81	5.90	0.96	0.53	0.24	0.69	0.47	0.98	0.94
1112	Rambouillet	0.58	2.00	2.49	1.80	2.00	0.78	0.43	0.81	1.13	1.10	0.94
1113	Plaisir	0.79	1.75	2.96	1.86	0.49	0.75	0.36	0.43	1.70	0.74	1.36
1114	Étampes	0.62	0.95	0.12	1.25	1.06	1.16	0.76	0.25	2.45	1.08	1.27
1115	Évry	0.87	1.31	2.39	0.97	1.09	1.00	0.54	1.81	1.07	1.56	0.97
1116	Saclay	0.93	1.71	2.66	1.75	0.79	0.99	1.10	1.03	0.71	0.95	1.54
1117	Créteil	0.71	0.91	0.35	1.17	0.81	0.91	0.19	0.48	1.63	1.75	0.65
1118	Orly	0.98	0.91	0.90	0.74	1.26	0.66	0.49	0.76	0.61	0.83	1.87
1119	Cergy	0.80	2.00	1.87	2.48	1.11	0.77	0.33	0.62	0.96	1.38	1.24

In terms of LQ we can notice that Paris ZE performs quite well with respect to Private KCS, whose value amount to 1.33 (Private Core KCS) and 1.15 (Private Core-related KCS). On the contrary, the relative presence of Public KCS is not particularly distinguishing, as the LQ values of Public Core KCS (1.04) and Public Core-related KCS (0.93) show. Collateral KCS play an even less important role, which accounts for the lowest LQ (0.84) among KCS.

Under these evidences and taking into account the major role played by Paris ZE in absolute terms, a second stylised fact can be stated. Private KCS, whose location choices are mostly shaped by market decision, are considerably concentrated within the centre of PMR. Public KCS, which rely on services (universities, hospitals and by general public administration activities) whose location is mainly public policy-oriented, appears to be more evenly distributed across the metropolitan region.

These different patterns depict a clear correlation between "private" Learning 2 and 3 practises and the need for centrality and agglomeration, which is more pronounced than for Public KCS. This remark holds with respect to Core-related KCS as well, in the sense that Private Core-Related KCS more likely tend to concentrate within Paris ZE than Public Core-Related KCS. The former, which relies on market dynamics, appears benefiting to a greater extent from a central location, which further implies proximity interactions with Core KCS. On the contrary, the latter are more evenly distributed across territory due to the fact that services they supply require closeness to citizens/end users. Collateral activities to KCS, finally, are those less depending on a central location.

Taking into account these different location rationales, a third stylised fact can be pointed out, concerning the evidence that the higher is the level of Learning practices involved in a given KCS service, the higher the willingness to choose a central location. Within both Private and Public KCS, in fact, the share of Core activities—namely those directly involved in Learning 2 and 3 processes—is remarkably higher than the share of core-related ones. This fact suggests that, in general, the upper part of the hermeneutical chain, both private and public, is strictly correlated with volume, relational density and physical-symbolic substratum, which are key factors characterising the central area of PMR.

By enlarging the analysis to the other PMR ZEs, further useful factors emerge in order to depict the geography of KCS.

As for KCS, in addition to Paris only Saclay (8.8 % out of total KCS employees) and Roissy (5.4 %), which host respectively several research centres and the Charles de Gaulle airport, show a KCS employment base considerably higher than that of the other ZEs. However, LQ analysis points out that only Paris (LQ equal to 1.1) and Étampes (LQ equal to 1.2) have a relative higher concentration of KCS (Fig. 2a): Given the size of the latter (0.5 % of total population and 0.3 % of total KCS) we can affirm that, when considering KCS as a whole, Paris ZE is the only metropolitan knowledge pole that can be taken into consideration.

On the contrary, when considering KCS subdivisions, a more articulated situation can be outlined. In particular, with regard to Private KCS, we notice that when moving from activities which are *directly* part of Learning 2 and 3 practises (Private Core KCS) towards activities which are *indirectly* part of Learning 2 and 3 practises

(Private Core-related services) the spatial extent of concerned territory increases: if Private Core KCS are considered, two ZEs show LQ values higher than 1 (Paris and Saclay, whose LQ amount respectively to 1.33 and 1.13), while, when Private Core-related KCS are taken into account, they amount to three (Paris, Saclay, and Évry, whose LQ are equal respectively to 1.15, 1.03 and 1.81) (Fig. 2b, c).

In this regard two important considerations can be stressed.

First, the fact that a higher relative presence of Private Core KCS extends outside Paris ZE (including Saclay, which borders Paris in the South-west) suggests related firms could have chosen a more peripheral location benefiting from lower land rents and congestion costs, while remaining close to the metropolitan centre and keeping on to take advantage from its agglomeration economies.

Actually, the fact that Saclay is specialised in Private Core KCS depends on the interplay between market forces and the outcomes of a precise public policy intervention,[3] the so-called "Campus of Saclay Plain". Saclay,[4] actually, had been planned as a scientific pole just after the Second World War, when several public research centres (such as CNRS-National Centre for Scientific Research, CEA-National Atomic Energy Commission, ONERA-National Office for Aerospace Studies and Research) were delocalised into this area. After their relocation in Saclay, they were followed, in successive waves, by several public universities (HEC business school, Polytechnique, Supélec-École supérieure d'électricité, etc.) and, finally, during the last decade, by private research centres (Thomson-CSF, Danone, Thales, Kraft). Therefore, at least for the Paris case study, a wider location of Private Core KCS has been triggered by public policy interventions. By locating their facilities within the area, in fact, Private Core firms, while benefiting from lower congestion costs and land-rent, can take advantage of synergies and complementary networks springing from proximity with other knowledge-based activities.

Secondly, the fact that Évry (which ranks sixth among the 20 ZEs considered in terms of population size and host 4.3 % of total Private Core-related employees) has the highest LQ in Private Core-related KCS (Table 4), suggests that private activities indirectly participating to Learning 2 and 3 practices can be located in a more peripheral position than Private Core ones. Figure 2a, b, indeed, show that when shifting from Core to Core-related KCS, concerned territory expands.

On the contrary, when considering Public KCS, the context radically changes. As for Public Core KCS we observe a sort of buffer zone (the first ring of ZEs surrounding Paris one) in which LQs are lower than one, followed by a second ring in which they are higher than 1 (Fig. 2d, e). Here again, this location rationale appears to be inspired by public policies: if ZEs bordering Paris can benefit from its central market in terms of public services, farthest ZEs need to be supplied by

[3] The case of Saclay suggests that a considerable share of Private Core employees actually work for public institutions, such as the National Atomic Energy Commission which employs approximately 6000 workers.

[4] Saclay is 25 km far from Paris.

locally settled facilities. As a result specialisation in Public Core KCS is more sprawled across all PMR than that concerning Private Core KCS.

A similar location pattern also affects Public Core-related KCS, with the difference that, belonging to the lower part of the hermeneutical chain, their location is even more sprawled across PMR.

Finally, collateral activities to KCS, whose nature is the less distinguishing from a hermeneutic perspective, show LQ values higher than one in the edges of PMR, further confirming the hypothesis that a direct correlation between propensity to choice a central location and the upper part of the hermeneutical chain (and vice versa) exists.

3.4 Manufacturing and KCS Services

The analysis of manufacturing activities leads us to a third stylised fact. According to the data, the related share of these activities in Paris ZE is considerably lower than KCS one (42.6 % against 69 %, Table 3). This evidence is in line with the fact that, in general, manufacturing activities suffer from congestion externalities, are land-consuming(a factor of production relatively scarce within urban centres) and source of various impacts on the surrounding environment, being consequently located in the edges of cities or in their hinterland.

When focusing on their subdivisions,[5] however, some interesting remarks can be pointed out. In particular, location choices of manufacturing activities appear to be reversed with respect to KCS, in the sense that the lowest the technological level of concerned activities the highest the likelihood to choose a central location. Low-tech manufacturing share and LQ, in fact, show the highest values in Paris ZE, amounting respectively to 55.8 % and 0.92 (Tables 3 and 4). These activities appear to be relatively more attracted to a central location than Medium and Hi-tech manufacturing activities, in that they can benefit from city brand, the urban atmosphere, and its symbolic dimension. Medium-tech activities, on the contrary, are mostly located outside Paris ZE (their share and LQ with respect to Paris ZE amount respectively to 34.9 % and 0.58), while Hi-tech industries have an intermediate position (their share and LQ amount respectively to 45.9 % and 0.76). These latter, as stressed by many scholars (Asheim et al., 2013; Shearmur, 2012), are

[5] Manufacturing industry has been articulated according the OECD definitions: High-technology industries include aircraft and spacecraft, pharmaceuticals, office, accounting and computing machinery, radio, TV and communications equipment, medical, precision and optical instruments; Medium-technology industries include electrical machinery and apparatus, n.e.c., motor vehicles, trailers and semi-trailers, chemicals excluding pharmaceuticals, railroad equipment and transport equipment, n.e.c., machinery and equipment, n.e.c., building and repairing of ships and boats, rubber and plastics products, coke, refined petroleum products and nuclear fuel, other non-metallic mineral products, basic metals and fabricated metal products; Low-technology industries include wood, pulp, paper, paper products, printing and publishing, food products, beverages and tobacco, textiles, textile products, leather and footwear, manufacturing, n.e.c.; recycling (OECD, 2011).

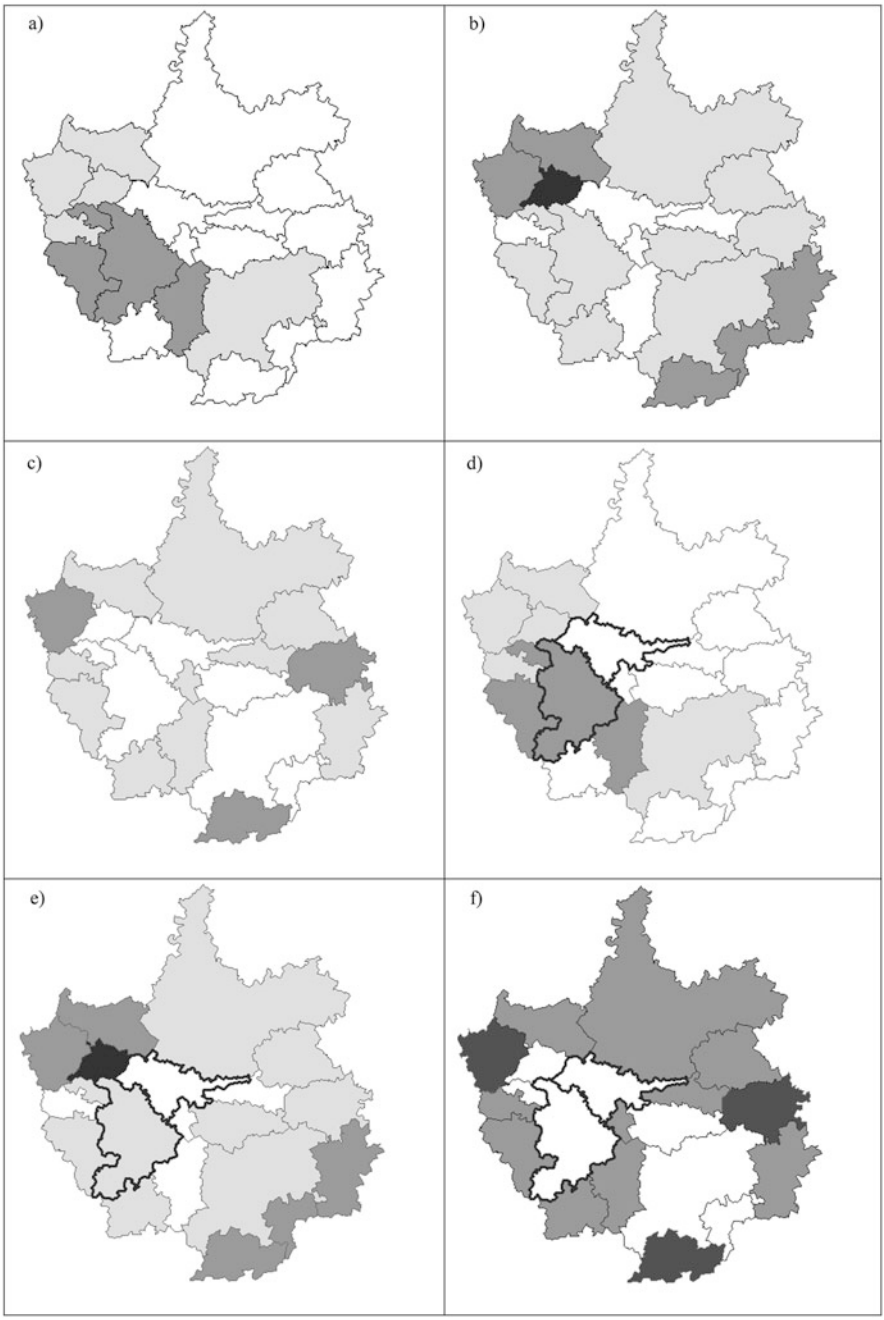

Fig. 3 LQs according to manufacturing categories and ZE. (**a**) Hi-tech, (**b**) Medium-tech, (**c**) Low-tech, (**d**) Private core KCS (*black bordered*)—Hi-tech (scale of *greys*), (**e**) Private core KCS (*black bordered*)—Medium-tech (scale of *greys*) and (**f**) Private Core KCS (*black bordered*)—Low-tech (scale of *greys*)

usually less dependent on a central location, benefiting, above all, from the presence of the so-called knowledge infrastructure expressed at the entire metropolitan region level.

The final step of the analysis regards a comparison between location patterns of Private Core KCS and the different types of manufacturing activities in order to depict spatial overlapping and complementarities. As shown by Fig. 3d–f, two different patterns can be depicted. When considering Private Core KCS and Hi-tech industries, Saclay turns out as the place where the co-location process between knowledge-based services and Hi-tech-based manufacturing reaches its maximum extent. This evidence lets us hypothesize a greater importance of location economies and economies of related variety than urbanization ones. On the contrary Medium and Low-tech industries are characterised by complementary patterns compared with Private Core KCS (with the exception of Saclay) letting us suppose a less relevant role played by agglomeration economies between these type of industries (the higher the values of Medium and Low-tech LQs, the higher the distance from Private Core KCS poles).

Relationships between Hi-tech manufacturing and Private Core KCS will be deeper analysed in the next paragraph, after having cross-fertilised the hermeneutic approach with the knowledge source-based approach proposed by Asheim and by making recourse to the LISA indicator on a municipal level.

4 Hermeneutic Approach and Knowledge Source-Based Approach: Is There Room for Improvements?

The aim of this paragraph is to ascertain whether or not there is room for improvement of the interpretative capability of the above illustrated hermeneutic approach. In particular consequences in terms of localisation patterns will be assessed when cross-fertilising the hermeneutic approach with the "knowledge source-based approach" proposed by Asheim.

To this end, Private Core KCS will be further disaggregated in analytic, synthetic and symbolic services according to their prevailing source of knowledge which characterises a given service (Table 5).

Under this perspective, three types of Private Core KCS will be considered:

(1) analytic Private Core KCS, which are mainly composed by science-based services grounding on codified knowledge;
(2) symbolic Private Core KCS, whose activity mostly rely on re-shaping cognitive codes and where tacit knowledge also matters;
(3) synthetic Private Core KCS, which are context-based services, importantly grounding on tacit knowledge.

Although each proposed category of Private Core KCS is "composed of more than one knowledge base, (. . .) one knowledge base will represent the critical

Table 5 Private core KCS according to the their prevailing source of knowledge (analytic, synthetic and symbolic)

NAF rev. 2	Description	Source of knowledge	NAF rev. 2	Description	Source of knowledge
5811Z	Book publishing	Symbolic	6920Z	Accounting, bookkeeping and auditing activities; tax consultancy	Synthetic
5813Z	Publishing of newspapers	Symbolic	7010Z	Activities of head offices	Synthetic
5814Z	Publishing of journals and periodicals	Symbolic	7021Z	Public relations and communication activities	Symbolic
5821Z	Publishing of computer games	Symbolic	7022Z	Business and other management consultancy activities	Synthetic
5829A	System and network software publishing	Symbolic	7111Z	Architectural activities	Symbolic
5829B	Development tools and programming languages software publishing	Symbolic	7112B	Engineering. Technical studies	Synthetic
5829C	Application software publishing	Symbolic	7211Z	Research and experimental development on biotechnology	Analytical
5911A	Production of motion pictures for television and television programmes	Symbolic	7219Z	Other research and experimental development on natural sciences and engineering	Analytical
5911B	Production of institutional and promotional motion pictures	Symbolic	7220Z	Research and experimental development on social sciences and humanities	Analytical
5911C	Production of motion pictures for cinema	Symbolic	7311Z	Advertising agencies	Symbolic
5912Z	Motion picture, video and television programme post-production activities	Synthetic	7320Z	Market research and public opinion polling	Synthetic
5920Z	Sound recording and music publishing activities	Synthetic	7410Z	Specialised design activities	Symbolic
6010Z	Radio broadcasting	Symbolic	7420Z	Photographic activities	Symbolic
6020A	Broadcast of general-interest television programmes	Symbolic	7490A	Activities of quantity surveyors	Synthetic
6020B	Broadcast of thematic television programmes	Symbolic	7490B	Sundry professional scientific and technical activities	Synthetic
6201Z	Computer programming activities	Synthetic	9001Z	Performing arts	Symbolic
6202A	Hardware and software consultancy	Synthetic	9003A	Artistic creation related to fine arts	Symbolic
6202B	Third party maintenance of computer systems and applications	Synthetic	9003B	Other artistic creation	Symbolic
6312Z	Web portals	Symbolic	9411Z	Activities of business and employers membership organisations	Synthetic
6391Z	News agency activities	Symbolic	9412Z	Activities of professional membership organizations	Synthetic
6910Z	Legal activities	Synthetic	9420Z	Activities of trade unions	Synthetic

knowledge input that the knowledge creation and innovation processes cannot do without" (Asheim et al., 2013).

By performing share and LQ analysis on the basis of analytic, symbolic and synthetic source of knowledge, a more articulated context than that depicted by Private Core KCS emerges. Analytic, symbolic and synthetic-based services, indeed, perform quite differently according to different location patterns.

In particular we observe that the share of symbolic services attributable to Paris ZE amounts to 87.4 % out of total PMR (while Private core KCS as a whole amount to 80.2 %), to 80.5 % with regard to synthetic activities and "only" to 53.3 % when analytic services are concerned (Table 6). These evidences are confirmed by the analysis of LQs, which are higher than 1 in the cases of symbolic and synthetic services (respectively 1.47 and 1.32) but lower than 1 in the case of analytical services (0.88) (Table 6), while Private core KCS as a whole amount to 1.33.

Even though in a basic and preliminary way, the classification of KCS according to their source of knowledge appears to enrich the analysis and to better detail KCS localization patterns.

By comparing the above reported results with those referred to the whole Private Core KCS category, different specialisation pattern can be framed. Figure 4, in fact,

Table 6 Analytic, synthetic and symbolic private core KCS shares and LQ per ZE

	%			LQ		
	Analytic	Symbolic	Synthetic	Analytic	Symbolic	Synthetic
Roissy - Sud Picardie	1.4	1.5	2.3	0.15	0.16	0.24
Paris	**53.3**	**87.4**	**80.5**	**0.88**	**1.47**	**1.32**
Marne-la-Vallée	1.4	1.3	1.5	0.55	0.49	0.62
Coulommiers	0.0	0.0	0.1	0.00	0.21	0.21
Meaux	0.0	0.1	0.2	0.00	0.16	0.26
Melun	0.2	0.4	0.7	0.07	0.22	0.33
Montereau-Fault-Yonne	0.0	0.0	0.0	0.00	0.05	0.15
Nemours	0.0	0.0	0.0	0.00	0.09	0.18
Provins	0.0	0.0	0.1	0.00	0.18	0.29
Houdan	0.0	0.0	0.1	0.24	0.28	0.25
Mantes-la-Jolie	0.4	0.1	0.2	0.57	0.22	0.32
Poissy	0.1	0.2	0.4	0.08	0.20	0.28
Rambouillet	0.2	0.2	0.1	0.49	0.70	0.31
Plais ir	0.6	0.1	0.1	1.68	0.22	0.27
Étampes	0.0	0.1	0.3	0.00	0.21	1.07
Évry	2.7	0.4	1.5	1.13	0.19	0.61
Saclay	30.6	5.9	8.8	3.47	0.49	1.07
Créteil	0.4	0.7	0.6	0.13	0.21	0.19
Orly	8.7	1.0	1.5	2.23	0.26	0.38
Cergy	0.1	0.5	1.1	0.06	0.18	0.42
	100.0	100.0	100.0			

Fig. 4 LQs according analytic, synthetic and symbolic private core KCS and ZEs. (**a**) Private core KCS, (**b**) Analytic KCS, (**c**) Symbolic KCS and (**d**) Synthetic KCS

depicts a sort of two-tier pattern: from one side Paris ZE emerges as the unique centre providing symbolic services; from the other Saclay stands out as the most important analytic-based services centre (LQ equal to 3.47), surrounded by other three ZE with the same specialisation (Plaisir, Creteil and Orly) (Fig. 4a). Synthetic activities, whose nature is prominently context-oriented, appear to be the *trait d'union* between the two previous categories.

In order to refine the territorial detail of the analysis and to identify possible clusters of services according to their different knowledge source, we made recourse to the LISA indicator, which has been performed at a municipal level on the basis of related LQ. Results are reported in Fig. 5, confirming the above described evidences. As for analytic Core KCS we observe a well spatial bounded

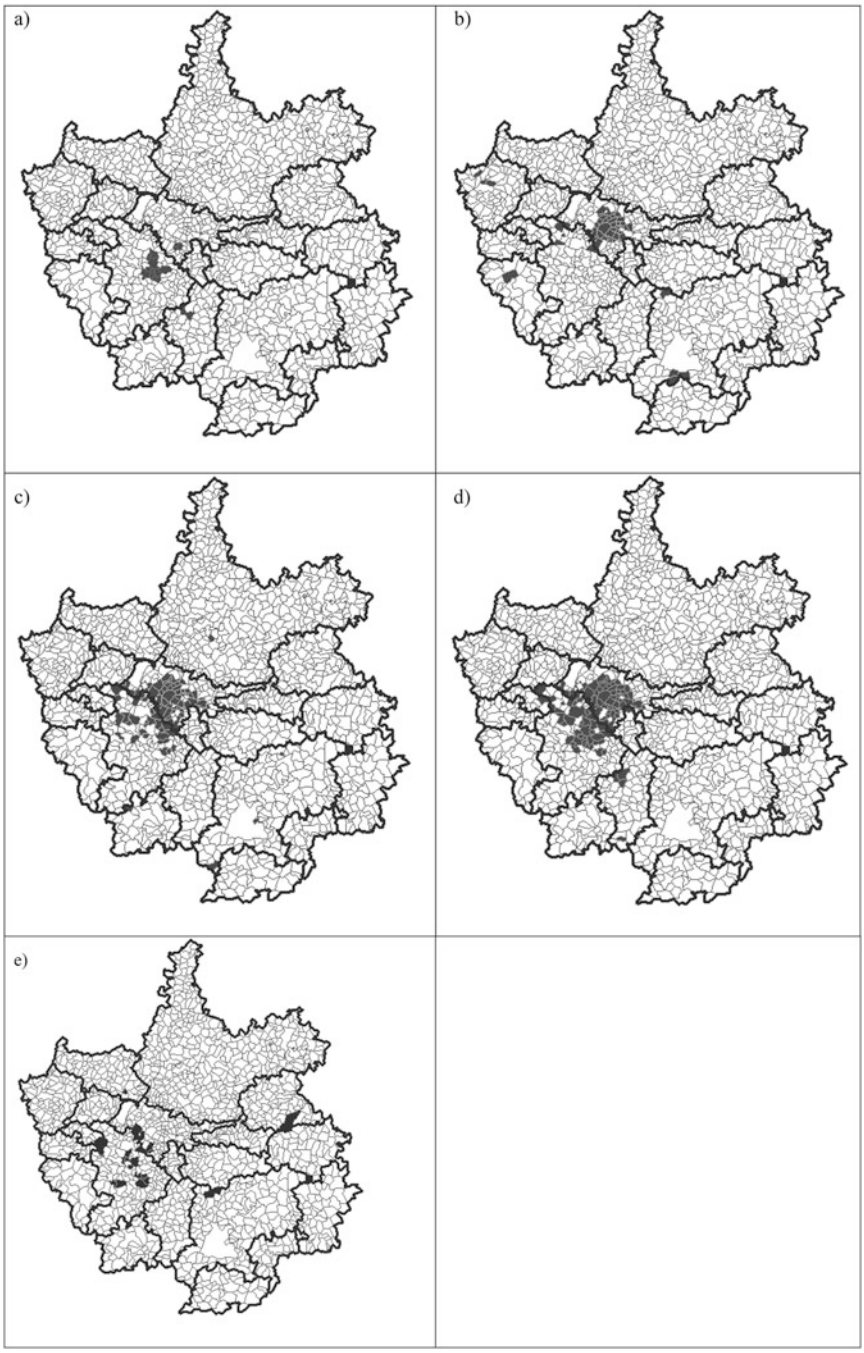

Fig. 5 Cluster of municipalities (*dark grey*) resulting from LISA performing. (**a**) Analytic KCS, (**b**) Symbolic KCS, (**c**) Synthetic KCS, (**d**) Private core KCS and (**e**) Hi-tech

Table 7 Relative Entropy index (RE), Delta index and Modified Wheaton index (MW) in PMR

	RE	Delta	MW
Population	0.49	0.50	0.68
Tot employees	0.41	0.61	0.77
KCS	0.34	0.68	0.82
Private core	0.23	0.79	0.90
Private core-related	0.33	0.69	0.83
public core	0.41	0.61	0.77
Public core-related	0.43	0.57	0.73
Collateral	0.44	0.60	0.73
Analytic private core		0.84	0.80
Symbolic private core	0.17	0.78	0.93
Synthetic private core	0.23	0.60	0.89
	0 = Max concentration	1 = Max concentration	1 = Max centrality

cluster composed by 14 municipalities pivoting on Saclay. We further observe proximity/overlapping relationships between the analytic cluster and the hi-tech ones located within Saclay ZE (Fig. 5a, c), which appear to be the only spatial relationship between Private Core KCS and Hi-tech manufacturing.

Symbolic Private Core KCS, on the contrary, pivot on the urban core of PMR. The related cluster, in fact, concerns almost the whole of Paris *Arrondissements* (with the exception of the 4th, 12th and 19th), plus the first and second rings of western and northern surrounding municipalities, which are, however, included within Paris ZE. This result stresses the crucial role played by the "urban environment" with respect to this kind of activities.

The cluster of Synthetic Private Core KCS, finally, nearly overlaps with the ensemble of symbolic and analytic clusters. Notwithstanding its continuum character across Paris and Saclay ZEs, a two-tier rationale could be inferred, in the sense that its northern part is supposed to be the expression of Paris urban core, while the southern one to rely and results from the development of the Saclay area.

The last step of the empirical analysis consists in testing the location patterns previously depicted by means of centrality and concentration indexes. In particular the Relative Entropy index, the Delta index and the Modified Wheaton index[6] will be performed, aiming at overcoming eventual bias related to size, number of sub-areas which compose each ZE and to take into account ZEs' distance from the Core Business District—which is represented by Paris ZE (Table 7).

The Relative Entropy and Delta indexes provide us with information on how certain phenomena are distributed across space, giving count of their degree of concentration.

In doing so, the Relative Entropy index allows results not to be biased by the number of sub-areas involved in the analysis, while Delta index takes into account

[6] For a detailed description of the mentioned indexes, see Appendix.

their territorial extent. Results coming from the calculation of both indexes provide converging evidences, while confirming previously highlighted patterns.

According to the Relative Entropy index concentration phenomena considerably differ among KCS sub-categories. Private KCS tend to be more concentrated than Public KCS, while Collateral KCS are those (relatively) more sprawled across PMR. Symbolic and Analytic Private Core KCS, moreover, are those affected by the higher degree of concentration.

The same pattern is depicted by the Delta index, with the only exception that Symbolic Private Core KCS, which are slightly less concentrated than Analytic Private Core ones when ZEs' territorial extension is considered.

The Modified Wheaton index, finally, by supplying information on the localisation pattern of economic activities on the basis of their distance from the CBD, confirms the above results. The fact that among analytical, symbolical and synthetic service the former are supposed to be the less affected by proximity with the CBD, perfectly fits with the existence of the related cluster in Saclay ZE.

In conclusion we may affirm that articulating Private Core KCS category according to their main source of knowledge appears to provide a more stylised geography of knowledge-based services, to positively affect the interpretative capability of the hermeneutic approach and, as a consequence, its effectiveness when willing to shape public policies.

Similar considerations hold when the geography of KIBS activities (see Introduction) is considered. As shown by Fig. 6, ZEs with KIBS and Private Core KCS LQ higher than one perfectly overlap, concerning Paris and Saclay ZEs. As for related clusters some differences emerge, depending on the different economic activities concerned by the two approaches. It is worth noting, in fact, that KIBS

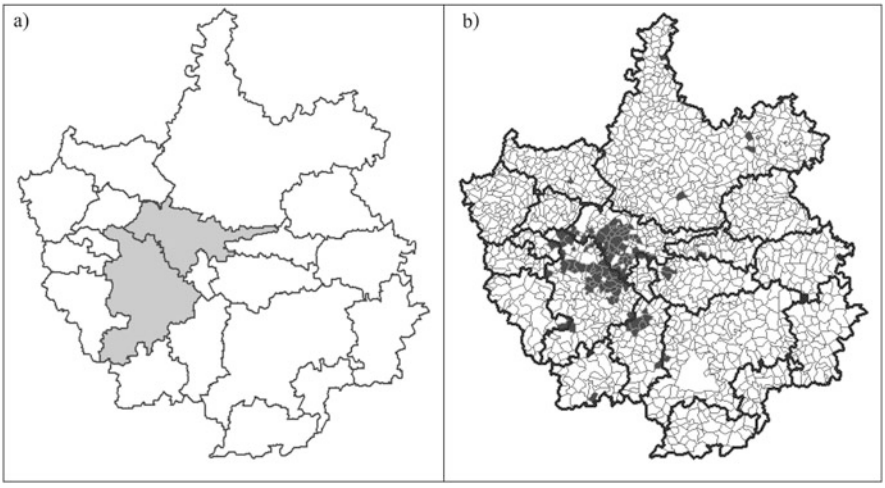

Fig. 6 KIBS LQs and clusters. (**a**) KIBS LQs and (**b**) KIBS clusters

cluster appears to be less centred onto Paris municipality (and Paris ZE at large) than Private Core KCS (in that, for instance, it involves "only" 10 *Arrondissements* out of 20 against the 17 of the KCS). This evidence can be explained by the fact that KIBS classification puts together services that the hermeneutic approach considers as belonging to different Learning practices.

5 A Critical Discussion of the Main Findings and Concluding Remarks

The attempt to identify the geography of knowledge-based activities in the PMR allows us to express some critical reflections on the usefulness and pertinence of a hermeneutic approach when investigating the generative knowledge potential from a territorial perspective.

By disaggregating between Private and Public KCS, and, further, in Core and Core-related KCS, different location patterns can be depicted. The crucial role played by the very urban core of PMR in hosting KCS being understood, we observe that:

(1) Those KCS whose core-activity directly consists in or presupposes Learning 2 or Learning 3 practices (Core KCS) more likely concentrate in the very centre of PMR (Paris ZE), more so than services which occupy the lower part of the hermeneutic chain (Core-related KCS and Collateral activities to KCS).
(2) A remarkable difference in spatial behaviour emerges between Private and Public KCS. All performed indicators (LQ, concentration and centrality) show that the former are more concentrated than the latter, suggesting a higher degree of dependency on a central position related to Private KCS.
(3) The subdivision of Private Core KCS in analytic, symbolic and synthetic activities depicts a more stylised context with respect to the standard provided taxonomy, suggesting that different sources of knowledge preferably require or ground on different metropolitan environments. Within PMR, analytic activities are supposed to be mostly public policies-led, symbolic ones urban atmosphere-led, while synthetic KCS could be defined as milieu-led
(4) The most important form of spatial interaction between KCS and manufacturing regards the overlapping and proximity relationships between Analytic KCS and Hi-tech industry. The co-location of their respective clusters within Saclay ZE let us suppose they can benefit from agglomeration economies and economies of related variety allowed by spatial proximity. The fact that Low-tech industry shows the highest share among manufacturing ones within Paris ZE is worth to be noticed even if is less important in absolute terms. This evidence could imply a sort of relationships between traditional productions and the symbolic values expressed by Paris urban environment.

These stylised facts suggest some critical remarks.

First, notwithstanding a sizeable literature stressing the role of service industries in fostering the process of spatial diffusion of economic activities in contemporary agglomerations, we did not find unambiguous evidences of this point when referring to KCS activities. Evolutionary geographers and economists have stressed the changing localisation patterns of economic activities, particularly for service industries, within modern metropolitan regions. They argue that localisation patterns of economic activities increasingly depend on the whole regional economic structure instead of single well-bounded places (Parr, 2002), and that "the potential for a cluster to develop in a given location thus depends not only on the local business base, but also on its location relative to other clusters" (Bennett, Coles, & McDonald, 1999, p. 399), implying a lower degree of localisation constraints. By our side, we actually notice different location behaviours depending on whether or not KCS directly participate to Learning 2 and 3 practices (Core vs Core-related KCS). This result, at least for PMR, suggests that the location rationale of service industries depends on the Learning level they work at. In particular, when indirectly involved in Learning 2 and 3, KCS show a lower degree of localisation constraints: the less distinguishing the source of knowledge, the more diffused their location. On the contrary, Private Core KCS are characterised by a higher degree of concentration and centrality: the more distinguishing the source of knowledge, the more concentrated the concerned KCS.

Furthermore, a lower degree of centrality and concentration seems to depend on the Private or Public nature of KCS. The formers, which are more likely affected by market forces, tend to be more concentrated than the latter ones. Public KCS location rationale, in fact, mostly depends on public policy choices, which aim at counterbalancing centripetal forces triggered by market forces, and realising a more articulated urban design. This result appears to depend on Ile de France Regional planning regulations which have been pursuing polycentrism as the corner stone of urban planning during the last 50 years (Thiard & Berger, 2006). It further stresses the crucial role that collective agents could, or even should, play in shaping local development trajectories.

Finally, choosing to adopt the Asheim taxonomy within the hermeneutic approach makes it possible to achieve an interesting explicative added value. According to the literature, empiric evidence suggests that:

(1) Symbolic Private Core KCS, grounding on media, fashion, advertising, and design activities, and recurring to Learning 2 and 3 practices devoted to handle social norms and habits, mainly depend on "everyday culture of specific social groupings" (Asheim et al., 2013). As confirmed by the analysis, these latter are clearly affected by urban environment and atmosphere, being the activities with the highest degree of territorial anchorage among those considered;
(2) Analytic activities, on the contrary, less depend on a specific urban environment. The Saclay-based cluster confirms the hypothesis according to which analytic KCS, being science and codified knowledge-based, mostly rely on relational fields involving universities and research centres rather than on the symbolic apparatus. On the other hand it is worth noting that: (a) the spatial and

relational proximity with the city of Paris represents obviously a crucial element in the development of the area; and (b) this peculiar localisation choice results from a series of targeted public policies which have being implemented (in different waves since the end of the Second World War) aimed at decentralising and decongesting the urban core of Paris, towards a more balanced metropolitan polycentric structure (Thiard & Berger, 2006). Furthermore, public and private establishments settled there on the basis of a clear chronology: public research centres first, followed by public universities, and, finally, by private research centres. A collective choice, in other words, created a suitable and favourable environment for the later settlement of the private sector.

(3) Synthetic activities, mainly relying on customer-supplier relationships and, in the case of Paris, on global networked activities of the several multinational hosted by the capital, obviously benefit from the urban environment (Sassen, 2010), as empirical results suggest. In addition, by virtue of their interlinking nature, they also settled in the Saclay area, as private research centres did, after the coming of public knowledge infrastructures. As a result, the Saclay area can be considered nowadays the second metropolitan cluster in synthetic activities.

The analysis according the knowledge source of KCS finally allows us to depict spatial relationships between KCS and manufacturing activities more appropriately than using the standard hermeneutic taxonomy: a further confirmation of its explicative added value.

Appendix

(1) The Location Quotient (LQ) is defined as follows:

$$LQ = \frac{\frac{e_{i,j}}{e_j}}{\frac{E_i}{E}} \tag{1}$$

where $e_{i,j}$ is the number of employees in the industry i of the sub-area j (ZE or municipality in our case), e_j is the total number of employees of sub-area j, E_i is the total number of employees in the industry i in the total area (PMR or ZE in our case), and E is the total number of employees in the total area.

(2) Relative Entropy (RE) index is calculated according to the following formula:

$$RE = \frac{\left(\sum_{i=1}^{n} PDEN_i \times \log \frac{1}{PDEN_i}\right)}{\log(N)} \tag{2}$$

where:

$$PDEN_i = \frac{DEN_i}{\sum_{i=1}^{n} DEN_i}$$

DEN_i represents the density of a given variable in the sub-area i, and n is the number of considered sub-areas.

The main advantage of using the *RE* index is that the number of sub-areas involved in the analysis does not affect the results. The index ranges between 0 and 1: the closer it is to 1, the less population or jobs are concentrated, and vice versa. The disadvantage, on the contrary, is that *RE* cannot be used when zero-densities appear.

(3) Delta Index is calculated as follows:

$$\delta = \frac{1}{2}\sum_{i=1}^{n} \left|\frac{x_i}{X} - \frac{a_i}{A}\right| \tag{3}$$

Where $\frac{x_i}{X}$ is the share of a given variable in sub-area i with respect to total area and $\frac{a_i}{A}$ is the share of the extension of the sub-area i on the extension of the total area.

The index allows us taking into account the spatial extension of a sub-area i when aiming at assessing concentration with respect to a given phenomenon. It ranges between 0 and 1: higher values of Delta Index indicate a greater concentration of a given variable in a relatively small number of sub-areas, while, when closer to 0, a more uniform distribution affects the area.

(4) Modified Wheaton (*MW*) measures the speed at which the cumulative proportion of employment increases along the radius joining the CBD with the farthest sub-areas, and is calculated as follows:

$$MW = \frac{\left(\sum_{i=1}^{n} E_{i-1} DCBD_i - \sum_{i=1}^{n} E_i DCBD_{i-1}\right)}{DCBD*} \tag{4}$$

Where E_i is the cumulative proportion of the population or employment in the sub-area i; $DCBD_i$ is the distance between the sub-area i and the CBD; $DCBD*$ is the distance between the CBD and the farthest sub-area i. MW ranges between 0 and 1, with 1 representing a perfect centralisation.

(5) Spatial autocorrelation index of Anselin (1995), also known as LISA (Local Indicator of Spatial Association) is calculated as follows:

$$LISA = \frac{(X_i - \overline{X})\sum_{j}^{n} W_{ij}(X_j - \overline{X})}{\sum_{i}^{n} (X_i - \overline{X})^2 \Big/ N} \tag{5}$$

where N is the total number of sub-areas, X_i and X_j population or employment in the sub-area i and j and W_{ij} the weights matrix related to the Euclidian distance between i and j. LISA enables us to identify sub-areas where variables values

are strongly positively (or negatively) associated with one another, depicting a cluster.

References

Alonso, W. (1964). *Location and land use*. Cambridge, MA: Harvard University Press.

Alonso, W. (1973). Urban zero population growth. *Daedalus, 109*, 191–206.

Amin, A., & Thrift, N. (1992). Neo-Marshallian nodes in global networks. *International Journal of Urban and Regional Research, 16*(4), 571–587.

Anselin, L. (1995). Local indicators of spatial association-LISA. *Geographical Analysis, 27*(2), 93–115.

Asheim, B. T., Boschma, R., & Tödtling, F. (2013). Knowledge sourcing, innovation and constructing advantage in regions of Europe. *European Urban and Regional Studies, 20*(2), 161–169.

Asheim, B. T., & Gertler, M. S. (2005). The geography of innovation: Regional innovation systems. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 291–317). Oxford: Oxford University Press.

Bennett, P., Coles, D., & McDonald, A. (1999). Risk communication as a decision process. In P. Bennett, & K. Calman (Eds.). *Risk communication and public health* (pp. 207–221). Oxford: Oxford University Press.

Boschma, R., & Iammarino, S. (2007). *Related variety and regional growth in Italy*. SPRU Electronic Working Paper Series, 162.

Burger, M. J., van Oort, F. G., & van der Knaap, B. (2010). *A treatise on the geographical scale of agglomeration externalities and the modifiable areal unit problem* (ERIM Report Series Research in Management, ERS-2008-076-ORG). Rotterdam: Erasmus Research Institute of Management.

Camagni, R. (1999). The city as a milieu: Applying GREMI's approach to urban evolution. *Revue d'Economie Régionale et Urbaine, 3*, 591–606.

Camagni, R. (2012). Creativity, culture and urban milieux. In L. Fusco Girard, T. Baycan, & P. Nijkamp (Eds.), *Sustainable city and creativity: Promoting creative urban initiatives* (pp. 183–198). Aldershot: Ashgate.

Capello, R. (2000). The city network paradigm: Measuring urban network externalities. *Urban Studies, 37*(11), 1925–1945.

Chesbrough, H. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business School Press.

Chinitz, B. (1961). Contrasts in agglomeration. *American Economic Review, 51*(2), 279–289.

Coffey, W., & Shearmur, R. (2002). Agglomeration and dispersion of high-order service employment in the Montreal metropolitan region, 1981–96. *Urban Studies, 39*(3), 359–378.

Cooke, P., De Laurentis, C., MacNeill, S., & Collinge, C. (Eds.). (2010). *Platforms of innovation: Dynamics of new industrial knowledge flows*. Cheltenham: Edward Elgar.

Fujita, M. (1985). Existence and uniqueness of equilibrium and optimal land use: Boundary rent curve approach. *Regional Science and Urban Economics, 15*(2), 295–324.

GaWC. (2012). http://www.lboro.ac.uk/gawc/world2012t.html

Gilli, F. (2011). The "Paris Basin", a metropolitan region. *Cybergeo: European Journal of Geography, 578*. doi:10.4000/cybergeo.24913.

Hall, P. (2004). Creativity, culture, knowledge and the city. *Built Environment, 30*(3), 256–258.

Insee. (2011). http://www.insee.fr/fr/ffc/ipweb/ip1333/ip1333.pdf

Insee. (2012). http://www.insee.fr/fr/ppp/bases-de-donnees/donnees-detaillees/atlas-zone-emploi-2010/pdf/atlas-ze-2010.pdf

Johnson, B., Lorenz, E., & Lundvall, B.-Å. (2002). Why all this fuss about codified and tacit knowledge? *Industrial and Corporate Change, 11*(2), 245–262.

Lane, D. A., Pumain, D., van der Leeuw, S. E., & West, G. (Eds.). (2009). *Complexity perspectives in innovation and social change*. New York: Springer.

Mastercard Worldwide. (2008). https://www.mastercard.com/us/company/en/insights/pdfs/2008/MCWW_WCoC-Report_2008.pdf

Meijers, E. J. (2005). Polycentric urban regions and the quest for synergy: Is a network of cities more than the sum of the parts? *Urban Studies, 42*(4), 765–781.

Meijers, E. J., & Burger, M. (2010). Spatial structure and productivity in US metropolitan areas. *Environment and Planning A, 42*(6), 1383–1402.

Musters, S., & Gritsai, O. (2013). The creative knowledge city in Europe: Structural conditions and urban policy strategies for competitive cities. *European Urban and Regional Studies, 20* (3), 343–359.

OECD. (2011). http://www.oecd.org/science/inno/48350231.pdf

Parr, J. B. (2002). Missing elements in the analysis of agglomeration economies. *International Regional Science Review, 25*(2), 151–168.

Phelps, N. A., & Ozawa, T. (2003). Contrasts in agglomeration: Proto-industrial, industrial and post-industrial forms compared. *Progress in Human Geography, 27*(5), 583–604.

Sassen, S. (1991). *The global city: New York, London, Tokyo*. Princeton, NJ: Princeton University Press.

Sassen, S. (2010). The city: Its return as a lens for social theory. *City, Culture and Society*, *1*(1), 3–10.

Shearmur, R. (2012). The geography of intrametropolitan KIBS innovation: Distinguishing agglomeration economies from innovation dynamics. *Urban Studies, 49*(11), 2331–2356.

Simmie, J. (2005). Critical surveys edited by Stephen Roper innovation and space: A critical review of the literature. *Regional Studies, 39*(6), 789–804.

Storper, M., & Scott, A. J. (2009). Rethinking human capital, creativity and urban growth. *Journal of Economic Geography, 9*(2), 147–167.

Thiard, P., & Berger, M. (2006). Le polycentrisme de l'aire métropolitaine de Paris: rhétorique de la planification territoriale ou organisation métapolitaine de l'espace? *Territoires en mouvement, 2*, 3–14.

Knowledge-Creating Activities in Contemporary Metropolitan Areas, Spatial Rationales and Urban Policies: Evidence from the Case Study of Milan

Chiara Mazzoleni

Abstract

This chapter deals with the structural shift in the economic base of the city of Milan and its metropolitan area, characterized by a great tradition of manufacturing and industrial districts, towards knowledge-based services directed mainly at the financial sector. This case study shows that, though the post-industrial transition of the city had not a significant impact on the employment structure, from the point of view of professionalization, it has exacerbated inequalities in income distribution and has caused the formation of new social and territorial polarization as a consequence of the fierce competition for space between the population and economic activities. Analysis of the locational behaviour of the knowledge-creating services provides evidence of the disruptive results—such as the under-capitalization of the urban area, the worsening of housing problems, the strengthening of the monocentric urban structure and the intensification of territorial imbalances—of neo-liberal policies and a service economy substantially left to market forces, in a territorial context with dense functional interrelations and faced with intense urban sprawl, the growth of traffic flows, as well as increasing housing costs, especially in the urban core.

This chapter is a development of ideas set out in the earlier essay "La transizione dell'economia urbana verso i servizi avanzati: il profilo di Milano", *Dialoghi Internazionali. Città nel mondo*, 17, 2012: 118–141. Regarding the database used for the case study of Milan, special thanks are due to Paolo Casati of Studiolabo and to Lidia Mezza and Maria Elisabetta Romagnoni of the Studies and Strategic Support Service of the Milan Chamber of Commerce. The data processing and geo-referencing as well as their rendering into map format were performed by Andrea Mancuso.

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1 Introduction

One of the principal characteristics of contemporary capitalism is the growing importance, in terms of economic development, incomes and employment, of activities connected with the knowledge economy, and above all those sectors whose outputs have a significant cognitive, symbolic and cultural content (Rullani, 2004; Scott, 2001, 2008).

This transformation of the economic basis of the city, reflecting the autonomy and importance acquired by the service sector within the economic fabric, has also changed the value of the core of the metropolitan area. This core has become the place where cognitive resources are concentrated, an environment within the metropolis devoted to experimentation with ecosystems of innovation, consisting mainly of micro-enterprises and clusters of new economic activities (Hutton, 2006, 2009). Many of these activities have developed with a logic of their own, not only functional to the industry, and represent the latest phase in the development of the urban service economy.

These clusters and ecosystems are characterized by activities of high mobility, choice of location being guided by a combination of professional criteria and cultural, social and personal factors, and draw on combinations of attributes that are a potent source of localized competitive advantage. The factors determining this situation are the economies of agglomeration and urbanization, a high concentration of activities, professional skills and expertise, material goods and services, the presence of main institutions, cultural amenities, shopping facilities and well-appointed residential enclaves, and a dense social milieu, which favours the development of a complex network of interactions and knowledge, producing mutually reinforcing synergies (Meusburger et al., 2009).

This milieu, similar to what Allen J. Scott (2006) has defined as a "creative field", operates on different scales, but with greater intensity in the metropolitan core, and facilitates processes of grass-roots generative development and the "socialized" production of human capital, knowledge and skills.

On account of these special attributes, the core has also become the strategic space needed by the headquarters of enterprises operating in international markets, especially multinationals, which by conquering this space are able to accumulate the special type of intangible capital defined by Saksia Sassen (2010) as "urban knowledge capital", which is a key aspect of the economic function of a city integrated into the global networks.[1]

The value of the core has been enhanced above all by the presence of specific traditions and cultural conventions, the existence of many disused industrial buildings which have acquired a new symbolic-representative significance, and

[1] The term "economic heritage", proposed by Giulio Sapelli (2011) in a hermeneutic sense, has many affinities with the expression of urban knowledge capital. As well as stocks of fixed capital and the organic composition of capital in its various forms, this heritage consists of intangible assets, principally cognitive ones, and a complex of intangible values represented by the capital of institutional and social relations, the accumulation of which is fostered by the spatial collocation.

the particular conformation of the built environment. This environment is characterized for the most part by a compact urban fabric which offers advantages of proximity, facilitating the development of relational dynamics and informal relationships, and the exchange of tacit knowledge. Such knowledge is "viscous", more easily accessible in places of interaction[2] where there is no separation or demarcation between the various functional fields. The core is also the area in which employment tends to be characterized by the presence of high-end segments of the new economy and relational capital is at a premium.

This particular environment, which often coincides with gentrified inner city neighbourhoods, is however far from being a fully self-organized entity. It is in fact susceptible to various types of distortion and crisis, caused not only by great uncertainty and the effects of global competition, but also by the production of negative externalities and serious economic, social and territorial inequalities, which put both the political sphere and forms of social co-existence under pressure. And it is in their capacity to tackle these phenomena, which have a strong local impact and produce serious social tensions, reshaping a locality both physically and socially, that the effectiveness of public policy and the competence of governmental institutions must be measured.

The specific features of these clusters and the different spatial configurations these complex mixes of productive activities and services have assumed in the contemporary city depend on various factors. These have to do with the particular vocation and economic specialization of the city, the articulation and diversification of the productive fabric of the urban region, the degree of synergy between investment projects, research centres, advanced training facilities and enterprises, the availability of appropriate venues, and the incisiveness of measures taken by public and social institutions.

This latter factor has increasingly become a precondition of the quality of the developing urban economy and society, given the widening sphere of action of local government.[3] The most distinctive aspect of the new service economy is an extreme fragmentation of activities, under the strong pressure of entrepreneurial and professional individualism.

While, on the one hand, the multiform world of professions and activities that has been generated structures the space of urban relationality, creates social capital and facilitates the formation of "generative milieu", on the other it competes not only in taking advantage of the economic opportunities available, but also in the use of public assets, the exploitation of the economies of urbanization and the physical appropriation of space and its positional values.

[2] I. Helbrech, *The Creative Metropolis. Services Symbols and Spaces*, Paper presented to mark the anniversary of the *Gesellschaft für Kanada-Studien*, Grainau (Germany), February 1998.

[3] The local authorities are responsible for promoting mechanisms of strategic governance to mobilize the many local actors and their resources in the economic development and redevelopment of the urban space, and also for defining appropriate measures to mitigate the (economically and socially) destructuring effects of the development of the knowledge economy and the integration of the city into the global economic networks (Le Galés, 2003; Scott, 2010).

Considering that the spread of the new economy tends increasingly to impact the intra-urban area and opens the way to major changes in its organization, in the present circumstances of considerable reductions in public spending on different forms of redistributive policy, applying effective corrective measures to regulate the complex relations between the public sphere and market dynamics is an even more crucial political challenge.

Within this framework, the specific characteristics of the post-industrial transition of the city and its spatial dynamics, the influence of space and the environment on the formation of new activities of high cognitive and creative content within the urban fabric, and the adequacy of public policy and regulatory mechanisms in promoting and governing this transition and its social impacts are here investigated in the case of Milan. Taking into account both the urban and metropolitan areas,[4] we first analyse the general aspects of the change in their economic base. We then examine the localized strategies of the knowledge crating services within the metropolitan and urban areas, relating them to transformations in the social structure, as well as to city-planning policy and the different forms of regulation adopted by local government. Our examination shows that, in the case of Milan, to a greater extent than other European cities, there is acute tension between the political and economic spheres. This relates to the fact that the form, content and trajectory of both the post-industrial transition and the urban diffusion pattern are the uneven effects of a political-economic change within which neo-liberal impulses have been intensified rather than mitigated.

Here, in fact, social inequalities have been accompanied by territorial ones, caused by processes of urban sprawl, by the relationships developed between the centre and peripheral areas and by flows of population crossing the urban territory, each following its own logic, as well as by urban property market trends (Ranci, 2010). Here, in addition, the dynamism of economic activities and the innovative character of spontaneous processes of urban regeneration connected with the emerging cognitive and creative economy have not been matched by the willingness of the public institutions to perform a regulatory role, much less a role in guiding the process of transformation, and to derive from these dynamics forms of renewed political action and the resources required for implementing local redevelopment and social cohesion programmes.

2 Characteristics of the Post-Industrial Transition of Milan

In the Italian national context, Milan, a city with a great manufacturing tradition, has played and continues to play a vital economic role. After the enormous change that affected the city and its hinterland in the 20 years from 1951 to 1971, a trend

[4] The metropolitan area is generally accepted as coinciding with the Province of Milan, as it was configured prior to the institution of the Province of Monza-Brianza. It is here regarded as the two provinces taken together.

away from big-company capitalism to a form of "district" capitalism based on small and medium-sized enterprises (SMEs) and specialized service activities began to gather pace. This form of capitalism drove national economic development from 1970 to 2000 and delegated to the city of Milan a large proportion of the specialized service functions it needed, exceeding the skills generated at local level by the industrial development of the districts.[5] The city in fact provides managerial and professional skills involving a high intensity of knowledge and creativity, i.e. high-added-value activities, for many enterprises supplying material products, some of them located in the urban and metropolitan area, and a large number in other districts of central northern Italy, which look to the service sector of Milan for intellectual and relational input (Rullani, 2012). Since the 1970s, we have therefore seen the consolidation of a functionally complementary relationship between Milan's conversion to service activities and the development of manufacturing industry in the various districts of its urban region[6] and the Centre North. It is on the strength of this relationship that the city has become an indispensable nexus of the national production system and had established its role as a laboratory of change and of Italy's interconnection with the global economy.

The drastic scaling down of the weight and functions of Milan's manufacturing base (according to census data, the number of persons employed in manufacturing in the province fell by nearly half between 1971 and 2001, from 805,529 to 477,841) has been largely compensated for by the expansion of the service sector (281,000 new jobs, largely in business services, where employment increased from 35,000 in 1971 to 126,000 in 2001) and by financial and insurance services (with an increase over the same period from 45,138 to 89,300 employees). The latter services, operating in conjunction with the multinationals based in Milan, constitute the country's largest and most internationalized system and have helped to establish the city as a leader in this field (Table 1).

This metamorphosis of the economic base of the metropolitan area is closely reflected by the significant change in employment in manufacturing and in the service sector as a proportion of overall employment in the province which

[5] The external acquisition of factors of production (materials, energy, components, processing by third parties, services, consultancy and knowledge), measured in terms of the relationship between added value and turnover, on the part of small enterprises in various sectors of industry increased from 69.3 % in 1990 to 80.4 % in 2008, according to data supplied by Unioncamere and Mediobanca, based on the turnover of a sample of companies (see F. Coltorti, "Tra il piccolo e il grande. Ruolo delle imprese di dimensione intermedia in Italia e in Europa", report submitted to the Union Chambers of Commerce and the Industrial union of Turin, 24 October 2011, Mediobanca, Milan).

[6] Among the various industrial districts of the Milan urban region, three have specially benefited from their territorial proximity to Milan: Brianza, East Milan and Lecchese. The first one is the oldest and more competitive Italian furniture district and has developed several synergies between furniture, mechanical and textile industries. The second is a relatively young district specialised in the production of electric, electronic and medical equipment and it developed mainly thanks to FDI and the location choice of two giants in ICT (IBM and ST Microelectronics). The third has long-standing expertise in the metal-engineering industry.

Table 1 Employment by economic sectors in the Province of Milan, 1951, 1971, 2001 (employees in absolute figures and changes 1951–1971, 1971–2001, in %)

Economic sectors	Employees 1951	Employees 1971	Employees 2001	Changes in %	
				1951/1971	1971/2001
Mining and quarrying	1,683	2,829	3,302	168	117
Manufacturing	542,822	804,529	477,841	148	59
Construction, water supply, electricity, gas	57,121	90,612	103,461	159	114
Services as a whole	228,465	456.173	736.947	200	162
Wholesale	39,953	92,015	121,635	230	132
Retail trade	71,509	128,954	132,055	180	102
Accommodation and food service activities	26,298	33,662	63,588	128	189
Transportation and storage	34,788	65,439	88,482	188	135
Information and communication	8,539	19,919	32,175	233	162
Financial services	17,254	29,414	65,815	171	224
Insurance services	5,008	15,724	23,385	314	149
Property, consultancy, business services	9,918	35,178	126,272	355	359
Creative, arts and entertainment activities	4,047	4,888	9,837	121	201
Other personal services activities	11,160	30,980	73,703	278	238
Employees (total)	850,534	1,354,143	1,321,557	159	98
Enterprises (total)	107,012	171,801	276,083	161	161

Source: Rullani (2012, p. 46)

occurred in the second half of the twentieth century: while the percentage of workers employed in manufacturing decreased from 64 to 36 % between 1951 and 2001, those employed in services increased from 27 to 56 %.

This was in the context of an overall employment situation in which the number of jobs increased rapidly in the first 20 years, then remained virtually stable for the next 30. While, the phenomenon we are describing is, on the one hand, symptomatic of the model of territorialized capitalism, which has undergone a radical transition in its urban form, on the other it is a manifestation of an equally profound change in the social composition of the metropolitan area (Bonomi, 2008).

The city, which has maintained its strong local centre of gravity, has also begun to trade and do business over a vast national and international area, thanks to its location at the confluence of the principal mobility infrastructures, becoming the "network city" of an interconnected and pluri-localized production system, as well as a "gateway": an economic and commercial platform exercising a strong capacity of attraction on the macro-regional scale (Magatti, 2005).

Since 2000, Milan has extended its gateway role, presiding over trade and exchange with the wider world, which is much to the advantage of the industrial

interests of the whole of Italy's Centre North. This role is both physical, where its logistical function is concerned, and financial and symbolic-relational, on account of the city's abundance of venues (trade-fair centre) and its concentration of events and communication services (Rullani, 2012). In addition, Milan has become one of Europe's most competitive metropolises and, nationally, is the city that has most benefited from globalization, having consolidated its function as a focal point of the global network (Taylor, 2011).

Because of Milan's international vocation and entrepreneurial dynamism, incomes are much higher than those of people in other metropolitan areas and provinces.

The Milan area is the principal crossroads of financial and productive flows, concentrating more than 42 % of the enterprises active in the Lombardy region, and this has enabled it to maintain a high level of productivity, local GDP accounting for 9.5 % of Italy's GNP in 2009 (Milan Chamber of Commerce, 2012; Monza and Brianza Chamber of Commerce, 2010). The city retains its national primacy in advanced services and the biotechnology sector and, internationally, has established itself in electronics, photonics, the production of new materials and, above all, in the creative industries sector, in particular in fashion and design (Camagni et al., 2008). The labour market that takes shape around the agglomeration of producers of these latter systems, which generate outputs with high levels of aesthetic or semiotic content, has acquired "a patina of place-specific colour"—as Allen Scott (2006, p. 7) defined it—in that it has become a locus of peculiar traditions, sensibilities, and norms that hang like an atmosphere over the local community. This atmosphere continues to be of prime significance as source of unique competitive advantages.

Although the manufacturing sector has continued to lose jobs, the city retains a diversified productive structure and still has strong links with the production system of its urban region, organized in a polycentric network and characterized by a number of strategic sectors. This system remains competitive, being able to draw on an abundance of local resources and the presence of the most important national university institutes and research centres, mainly concentrated in the central urban area, as well as a variety of specialized services and the headquarters of many international companies. It forms a kind of "archipelago economy"—to quote Pierre Veltz (1996)—made possible by its enhanced integration of economic activities and consisting in the co-habitation of forms of inter-relationship and interdependence, with both short and long networks interconnecting the poles of the district-based territorialized production systems and the large centres that function as systems of proximity.

The Milan area's specialization in advanced services, within the network of interchange with the other cities of the urban region and the Centre North, gained strength after 2000, as shown by the pace at which industrial workers moved into business services (approximately 0.5 % per annum in the years 2000–2007). At the same time, the added value contributed by business services, compared with added value for Milan as a whole, increased from 30 % in 2000 to 35 % in 2007, an incidence many percentage points higher than that recorded in most of the territorial

systems more affected by the development of district-related capitalism, like those of the North East (Rullani, 2012).

The structural shift in the economy of the Milan metropolitan area has been even more intense in the central urban area, characterized by an economic base increasingly orientated towards advanced services for production, which have grown significantly since 1991 (in terms of both the number of enterprises and of employment). The sector providing high-intensity knowledge and creativity services accounts for a large part of this process of internationalization.

In the city of Milan, prior to the 2008 crisis, service activities as a whole, excluding commercial activities, accounted for more than 41 % of employment, residual manufacturing industry for only 14 %, while the metropolitan area and region still retained a significant manufacturing base, with respectively 22 % and 30 % of workers engaged in industry (Necchi & Mariani, 2009).[7] The volume of employment in advanced services—information and communication, finance and insurance, professional scientific and technical services, production support—increased even more markedly in the following period (2001–2008), reaching 30 % of total employment in 2008.[8] The concentration of activities in this services sector (according to the localization index) confirms that the metropolitan area is specialized in information and communication services, and in insurance and finance. As a proportion of all private service activities, employment in financial intermediation accounted for 13.5 % at metropolitan level. Seventy-six percent of those engaged in this activity are concentrated in the urban core, a figure which provides further evidence of the role assumed by the financial sector, which more than any other identifies Milan as a focal point of the global economy. Milan in fact hosts the main Italian banking groups and several foreign banks, and is the home of the Italian Stock Exchange, with 225 financial companies and about 130 national and international intermediaries.

If we examine the territorial distribution of employment in the creative industries—industries which are distinguished by a high degree of coexistence of different activities, are especially active in the process of cross-fertilization (Lazzaretti, 2008) and give meaning and value to the new technologies—in 2008 the Milan Metropolitan area presented a high concentration of creative workers, with an incidence of employment in this category of more than 16.6 % and a location quotient of 2.08, an indicator that set the area apart, not only within Italy but also from other European metropolitan areas. In this case, too, the central urban area has absorbed a high percentage of employees working in creative enterprises, particularly those that form the design and fashion "ecosystem".

Another important aspect of the changes that have affected the production system of Milan is the replacement of medium and large-scale enterprises by a dense network of small and very small businesses (entities with fewer than ten members of staff), which in 2006 accounted for 94 % of the total. This type of

[7] The data reported in this study have been combined with Asia data for 2008.

[8] Source: Statistical Register of Active Enterprises, Asia 2008.

entrepreneurship, consisting to a large extent of one-man businesses (which account for 40 % of the total) is distinctive of the productive fabric of the metropolitan area. Even so, there continues to be a far from negligible presence of large companies, which still account for a significant share of employment (Camagni et al., 2008), especially in the telecommunications and communication sectors, as well as in large-scale retailing. We are therefore seeing a polarization of business systems: on the one hand, big players, largely globalized, which have developed standard platforms; on the other, micro-firms which are developing innovative products and services and performing high-added-value activities and having recourse to external platforms for only some of the activities in the value chain. Compared with other European metropolitan centres, Milan does not, however, seem to have developed the same capacity to produce and use ICT technologies. It lacks its own ICT platform and its innovation-oriented services are poorly differentiated and lack the organizational structure that would enable them to develop, not only locally but also in the sphere of global flows (Verganti, 2012).

In the central urban area, the presence of micro-enterprises is much more marked, especially those that supply services geared to innovation and high-intensity knowledge activities. This phenomenon, which has gathered pace over the last decade, highlights a further aspect of the shift to service activities in the economic base of the urban area: the driving role assumed by "knowledge workers" and by creative enterprises supplying services geared to innovation.

The high-knowledge-intensity micro-services which previously supplied innovative services to local enterprises and had little place or importance in the processes of innovation and in generating development have become an autonomous economic reality, quantitatively important and central to the growth of employment, developing both product and process innovation and performing high-added-value activities for manufacturing enterprises, as well as operating directly on the global market. For the actors involved in shaping these fragmented and highly atomized eco-systems of creativity and innovation, very much akin to craft enterprises, the main concern is not so much potential clients as the environment in which they can operate. Increasingly, this environment is the urban milieu, now confirmed as a factor that can exercise a profound influence over professional development and the formation of new businesses.

3 The Principal Characteristics of Activities Connected with the Knowledge Economy

Analysis of the distribution of economic activities in the metropolitan area,[9] particularly in the manufacturing sector, shows the presence of a monocentric urban structure which has grown in a radio-centric manner, with a strong settlement

[9] The data used are those of InfoCamere relating to the Register of Active Enterprises owned by the Chambers of Commerce and Industry of Milan and Monza-Brianza. On the whole, in 2011, the manufacturing firms are about 40,000, while firms classified as KCS are more than 37,000.

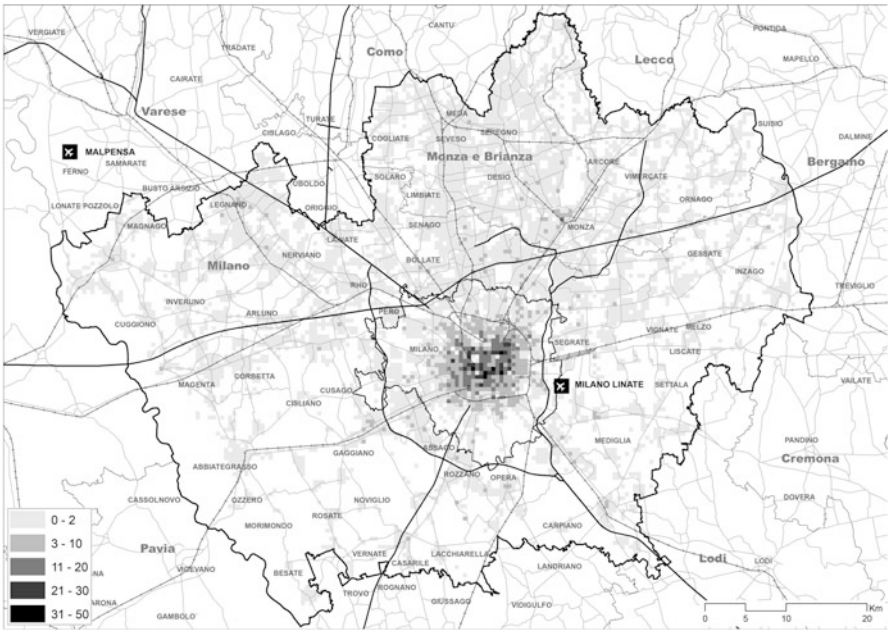

Fig. 1 Spatial distribution of manufacturing industries in Milan metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

thickening, especially along the radial axis in the northern part of the metropolitan area, where the main industrial district have been developed, and along the western ring-road (Fig. 1). The Brianza industrial district, particularly well-known for its furniture industries, has a multi-sectorial matrix and is characterized by the presence of both SMEs[10] and a number of large companies. The latter form the more dynamic group, with a managerial form of organization, specializing predominantly in either product or market niches and engaged in external cooperation with advanced services, universities and research centres, with a view to developing innovative products.[11]

The eastern part of the metropolitan area shows a more fragmented productive structure along the ring-road, with some important poles specialized in biotechnology industry, which are located quite close to the urban core. Although the biotechnology cluster is supported by a well-developed local healthcare infrastructure and is a promising local high-tech sector, its development is limited by the lack

[10] These are mainly small-scale enterprises with a distinctive family-style management model and little relationship with structures supporting innovative processes.

[11] Assindustria Monza e Brianza-Nomisma, *Brianza globale. I percorsi dello sviluppo*, Research report, Monza 2000.

of coordination between universities and by the fragmented local networks of firms and organization.

While the ring-belt around the city accommodates several industrial settlements, the core of the Milan metropolitan area concentrates a system of firms specialized in advanced functions and concept-oriented high-level services. These assets are not only geographically concentrated but have developed close functional interactions. Inside the urban core, there is also a concentration of high-tech industries[12] (Fig. 2), due in particular to the proximity to the codified knowledge provided by universities and related research centres. There is also a significant density of high-tech enterprises along the axis connecting Sesto San Giovanni, an area with a long history of major industrial activity, Monza, Desio and Seregno, along the western ring-road, and in the area of Vimercate, where a high-tech district[13] has been formed. This brings together a number of companies operating in the fields of industrial electronics, information technology, telecommunications, energy and engineering, including some multinationals.

Analysis of activities with a high cognitive and creative content reveals the factors that most influence their choice of location and shows the main strengths and weaknesses of the way in which the territorial structure is currently organized.

In our analysis—as Cusinato has specified in this volume—we used a classification based on identification of advanced service activities expressly dedicated to the formulation of cognitive codes,[14] referred to as Knowledge Creating Services (KCS). Taking the metropolitan area, we examined the distribution of KCS activities as a whole and as subdivided into the two categories of Core KCS and Core-Related KCS, and into specific activities, as well as the support services connected with them (Collateral KCS). We also considered in greater detail the location within the urban area of a number of advanced sectors belonging substantially to the creative economy field.

The representation, based on the territorial density of activities, confirms a high concentration of advanced services of high cognitive content in the metropolitan core (Fig. 3). Outside this core, the distribution of Core KCS + Core-Related KCS, and of particular specialized functions, tends to conform to the same pattern as for the location of manufacturing activities (Figs. 4, 5 and 6), with nuclei of greater density coinciding with the larger towns of the Brianza (Sesto San Giovanni, Monza, Lissone, Desio e Seregno), along the route to Como. A tendency towards polarization in the central urban area is also evident in the case of Collateral KCS (Fig. 7), of activities connected with public relations and communication,

[12] Within the manufacturing sector, high-tech industries have been selected and considered separately, in accordance with the classification in common use.

[13] The high-tech district includes the "Green & High-Tech" technological centre.

[14] The classification adopted is that formulated by the SET Research Unit of IUAV University, Venice (cf. Compagnucci & Cusinato, 2011). For the database, we drew on various sources: the Milan Chamber of Commerce Companies Register (industries operating in 2011 classified by sector of activity on the basis of their main declared activity), the Yellow Pages, the Camera della Moda, Studiolabo, and universities' websites.

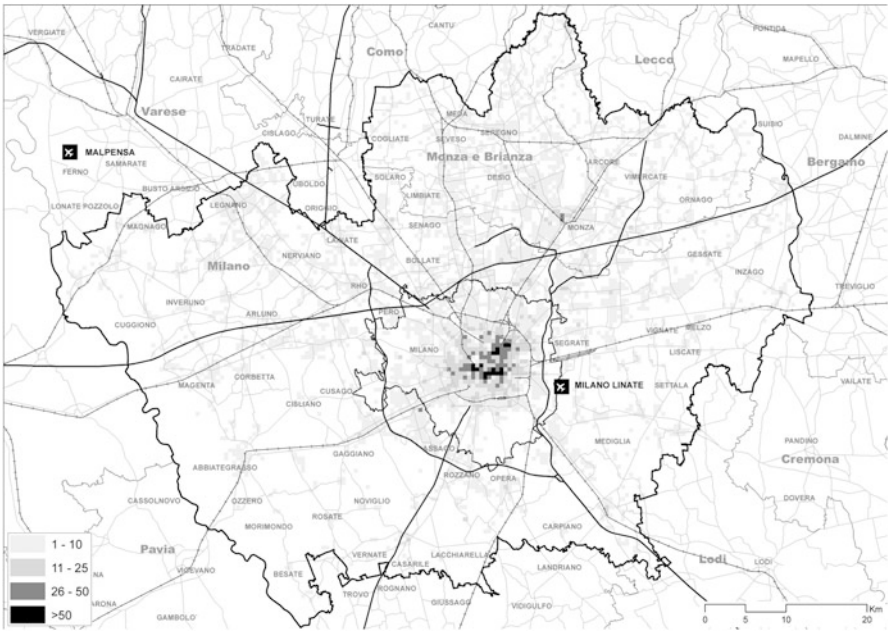

Fig. 2 Spatial distribution of high and medium-high technology industries in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

publishing, advertising, film and television production, and of holding companies engaged in managerial functions, R&D activities and activities in the fashion and design segments (Figs. 8, 9 and 10). Where the fashion segment is concerned, Milan has consolidated its position as the centre for the whole region: in 2006, it accounted for 38 % of enterprises operating in the sector (Donzelli, 2007), in particular those belonging to the fashion design and styling segment, as well as for the segment's principal public and private training centres. In 2009, 12,000 fashion industry businesses were operating in the city, with 800 showrooms and around 6000 sales outlets (Jasson & Power, 2010).

Examining the distribution of these activities, we find a greater polarization in the location of law firms, chartered accountants' and the headquarters of holding companies in the central area, delimited by the inner ring-road of the *Bastioni Spagnoli* and characterized by a compact built environment of large blocks and historic buildings, while architectural firms and design and engineering studios are distributed almost uniformly throughout the central and semi-central areas (Figs. 11, 12 and 13).

From the inner circle, defined by the ring of the *Navigli*, to the next circle of the *Bastioni Spagnoli*—now a potent factor in the spatial structuring and economic and symbolic hierarchisation of the city (Bolocan Goldstein, 2009)—and out into some areas of the second belt, we also find a spread of services connected with fashion

Fig. 3 Spatial distribution of KCS (all services) in the city of Milan (2011). *Source*: Chamber of Commerce and Industry of Milan: Register of Active Companies (our data processing)

and design, activities associated with communication and the production of intangibles, and above all exhibition venues, which have been increasing due to a proliferation of temporary events, in particular fashion shows. As a result, significant groupings of showrooms and similar venues are to be found, not only in the central area, in particular the "fashion quadrilateral" (an area long abandoned by its inhabitants and now devoted to elite consumption), but also in the historic neighbourhood around *Brera*, in the *Isola* district and the areas adjacent to the *Navigli*, at *Porta Genova* (Via *Savona* and Via *Tortona*) and *Porta Vittoria*, and in the vicinity of the *Romana* railway station, an historic industrial and working-class suburb (Fig. 14).

These functional transformations of the built heritage are also affecting the city's major historic establishments, such as the *Frigoriferi Milanesi*, and most of the old industrial buildings located in the central and semi-central areas. This is the urban environment most affected by the molecular transformation of the built heritage (conversion of attics and "lofts", redevelopment of industrial premises for service/managerial activities), a process which has been able to exploit the "porosity" of this environment, as well as the ineffectiveness of city-planning and other regulations. It has also suffered from colonization and contamination by stronger systems (especially those of finance and fashion), which have led to greater business dynamism and specialization in the area. Here, recent changes driven by the growing importance of intangible activities are to a large extent connected with

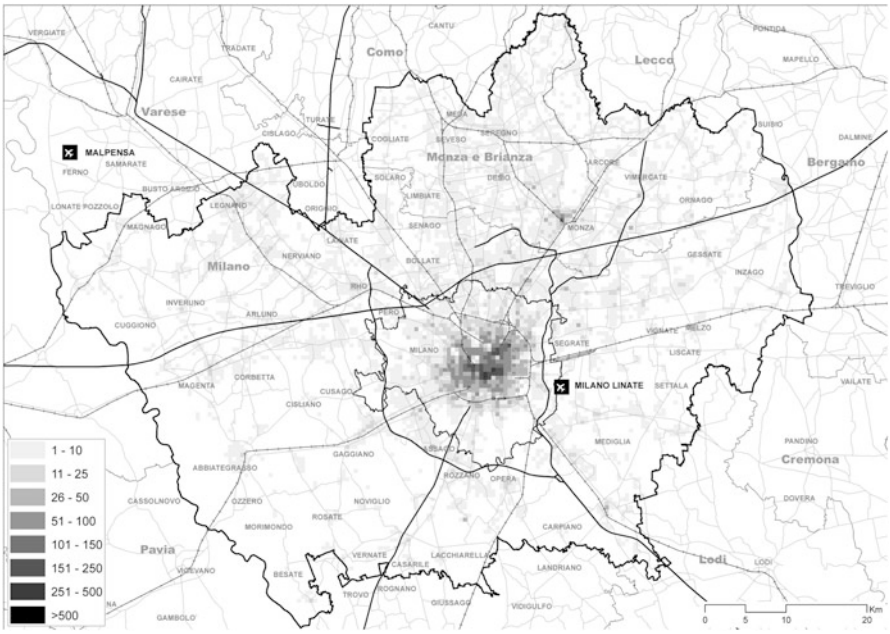

Fig. 4 Spatial distribution of KCS (all services) in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

alternatives to events held on the Trade Fair (*Fiera*) site (*Salone del Mobile*), Milan's main "showcase" for its wares, and we have seen an overlapping of the "*Fuori Salone*" phenomenon and the post-industrial redevelopment of the city.

As well as causing a steep rise in property values, with real estate now selling at monopoly prices, and periodically subjecting the city to excessive congestion due to the pull of its wide gravitational field, this intensification of fashion-and-design-related activities has attracted large numbers of workers from outside the city.

Also on account of the cumulative dynamic of activities in its central area, Milan continues to be a major pole of attraction for flows of workers. Whereas, in 2006, 46 % of those working in Milan were commuters, over the last decade commuting has increased, partly because younger workers are coming in from the towns of the city's hinterland.

As well as the extreme congestion of the city centre caused by the excessive concentration of flows of workers (making longer or shorter journeys), this analysis shows that the semi-central areas (traditionally inhabited by the middle classes, and also the working class) are now under pressure from the more specialized businesses of the new urban economic base. It is therefore easy to understand how the stresses and strains of the property market, caused by sky-high prices and rigidity of supply, are among the main factors that have induced broad strata of the population, most of them young, to abandon the city, and have led to the

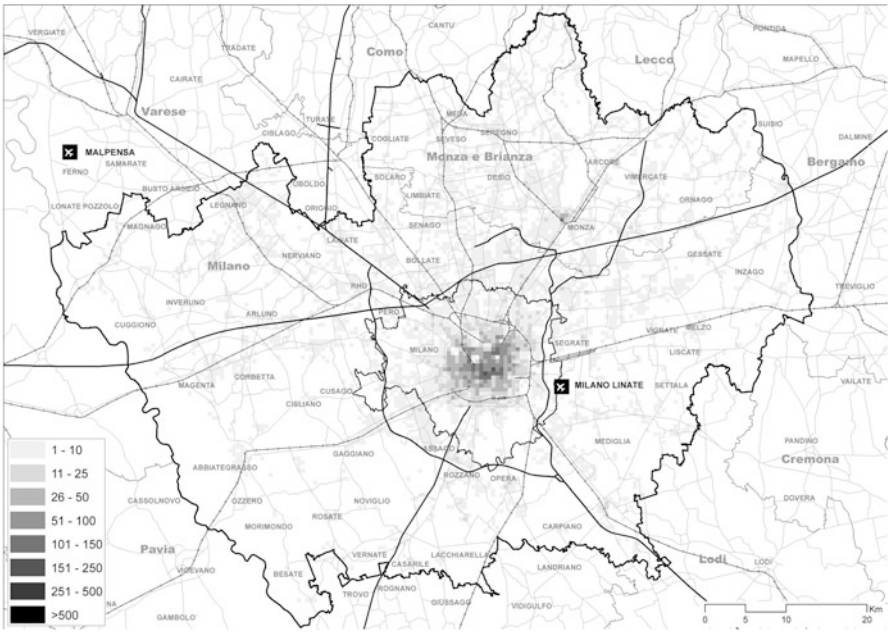

Fig. 5 Spatial distribution of core KCS in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

polarization of the present settlement pattern within the urban area, which manifests itself in the form of very segmented urban neighbourhoods (Ranci, 2005). This tensions have become even more acute in recent years, during which we have seen a concentration of real-estate investment in the central areas, especially those close to the city's higher quality urban renewal projects. Until the mid-2000s, the main thrusts of real-estate development tended to extend beyond the boundaries of the province, towards the hub of *Malpensa* and in the north-east of the metropolitan area, despite the inability of the transport network to adequately cope with the pressures. Since 2006, however, (according to *Osmi Borsa Immobiliare*) the market seems to be driven primarily by operations in the core of the urban region (especially within the circle of the *Bastioni Spagnoli* and in the *Montecity-Rogoredo* area, along the tram route to San Donato Milanese), in the prestige residential and executive housing sectors, sustained by the accessibility of the rail network, despite the vast amount of unleased housing stock (Gaeta, 2012).

While, on the one hand, the spatial organization and changes in the production system and settlement patterns of the metropolitan area have presented great opportunities, on the other they have caused seriously negative externalities and diseconomies of agglomeration, as well as profound territorial inequalities.

The spread of settlement, the relocation of industrial activities and the specialized production that historically has characterized the industrialization in

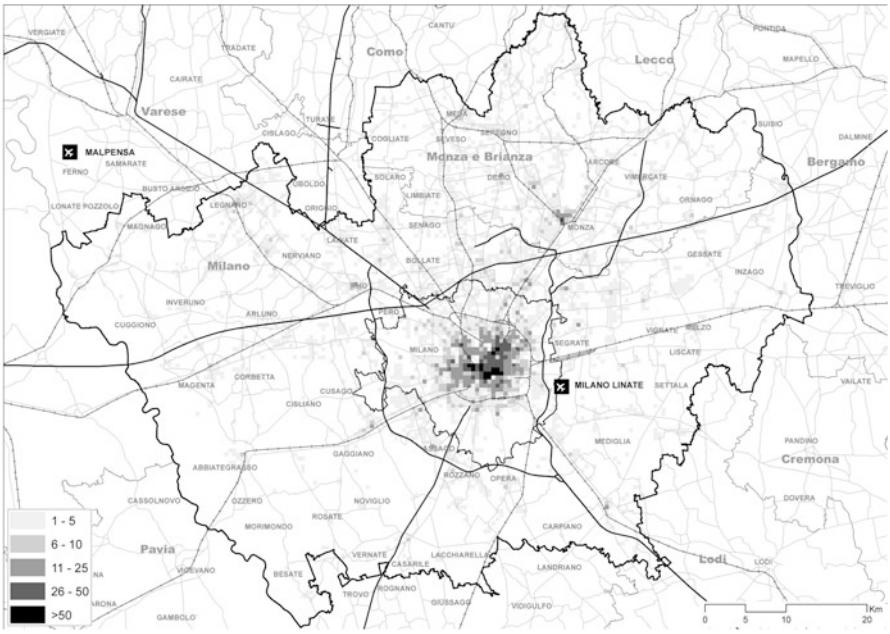

Fig. 6 Spatial distribution of core-related KCS in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

the Alto Milanese (area to the north of Milan, including Malpensa airport), where the principal productive industries have become established, has not resulted in a well-structured and autonomous polycentric system. The area to the north of Milan, subject to constant urbanization, has experienced a highly concentrated pattern of settlement, particularly dense along the principal (and increasingly clogged) transport arteries, which have attracted the large retail and entertainment structures. All this has brought about a considerable increase in population density, a very high level of land use (approaching 80 %) and high levels of congestion, which also extend to the secondary road network (Provincia di Milano-Centro Studi PIM, 2009). The demand for mobility in the metropolitan area has greatly increased,[15] but public transport has become less and less competitive, particularly on secondary railway lines serving commuters. The situation is aggravated by the fact that the national and international east-west and north-south routes which need to bypass

[15] Over 40 % of total mobility in Milan consists in movements in and out of the city, with around half of these journeys to and from the 39 municipalities of the first and second belts. Every day, some 850,000 people travel into Milan to work, study, access primary services and go shopping. For similar reasons, every day almost 270,000 residents travel out of the city. All told, the territory of the municipality of Milan has to cope with almost 5.3 million daily journeys (Comune di Milano-Agenzia Mobilità Ambiente Territorio, 2013).

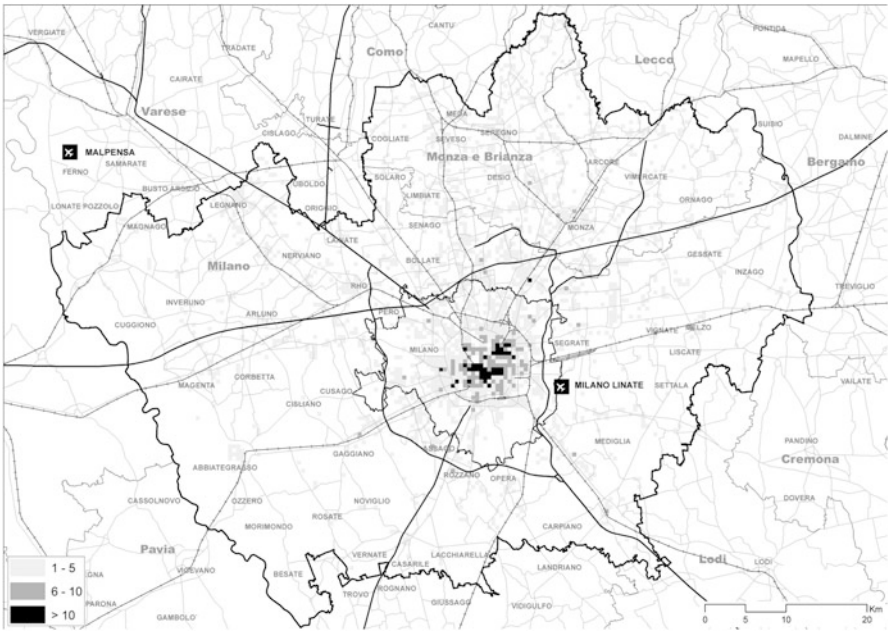

Fig. 7 Spatial distribution of collateral services to KCS in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

the centre of Milan have no alternative but to use the city's ring-roads and railway network, which are already performing the tasks of providing both local and regional mobility. This has resulted in the saturation of the main access routes. In 2009, public transport accounted for around 45 % of journeys into the city centre, but only between 10 and 20 % of circular journeys between one outlying area and another.

While the pressure exerted on the central urban area by economic activities and flows of commuters has not diminished, neither has there been a reduction in the difference in income levels between this central core and the wider metropolitan area. The reversal of the trend of income levels begun in 1991 was also confirmed more recently (2005–2009): during this period the average income of city-dwellers grew significantly more than that of their counterparts living in the province of Milan, and even more so in the region (Percoco, 2009).

Despite these aspects of the labour market and productive structure that characterize Milan's transition to a service economy, the change has not been accompanied by a corresponding increase in levels of education. Although the city is home to the principal centres of excellence where university education is concerned, in 2008 a relatively small proportion of the population of working age held a university degree (just over one quarter), which put Milan very low down in

Fig. 8 Spatial distribution of fashion and design activities in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

this respect in the ranking of European cities (Necchi & Mariani, 2009; OECD, 2006).

Furthermore, the driving financial and advanced services sectors do not seem to have had such a significant widespread impact on the urban employment market, from the point of view of professionalization. The urban employment structure—as Roberta Cucca has pointed out[16]—is only weakly oriented towards professionalism: the very low percentage of highly-qualified people in management roles registered in the 2001 census (professionals and managers 8 %, medium skilled workers 46 %, clerks and service sector employees 12 %, low skilled workers 34 %) is not comparable with the situation existing in other European cities, even if it seems to be moderately increasing, according to the Excelsior system. The strong development trend of these sectors seems to have been to the advantage of a tiny group of high income earners, while other people involved appear stuck in medium qualified jobs, and this seems to have led to more inequalities in term of income distribution (D'Ovidio, 2009).

[16] R. Cucca, "Unequal development. Economic specialization and social inequalities in six European Cities", Paper presented at the 23rd *ENHR-European Network for Housing Research Conference*, 5–8 July, Toulouse 2011.

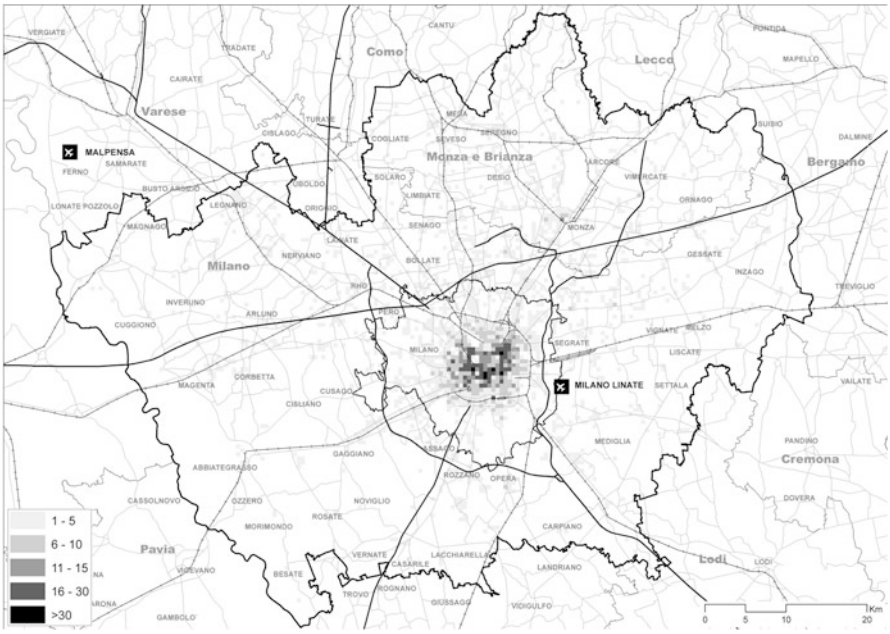

Fig. 9 Spatial distribution of advertising industries in Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

Taken together, the dynamics at work over the last 20 years have led to the dispersal of businesses and people within the metropolitan area and region, but at the same time to a concentration of service functions in the central urban area, replacing the resident population and gradually reducing the urban middle class (Ranci, 2005).

The decades-old social composition of the city, with a substantial working-class population, the white-collar and technical classes produced by large-scale industry and public services, and a vast traditional middle class consisting of small businessmen, artisans and shopkeepers, has undergone a gradual contraction, particularly in its middle strata, and has been affected by social mobility, both upwards and downwards, a phenomenon that has been less and less regulated buy public policy (Bonomi, 2008).

Since 1973, when the number of people living in Milan reached a peak of more than 1,730,000, the city has continued to haemorrhage population, the number of inhabitants dropping to 1,256,000 by 2001. The demographic growth recorded between 2001 and 2010 (fewer than 100,000) can be ascribed mainly to foreign immigration. This is a fairly recent phenomenon, considering that the incidence of foreigners as a proportion of the total population increased from 9 % in 2000 to 16.4 % in 2010, according to data provided by the municipal authorities.

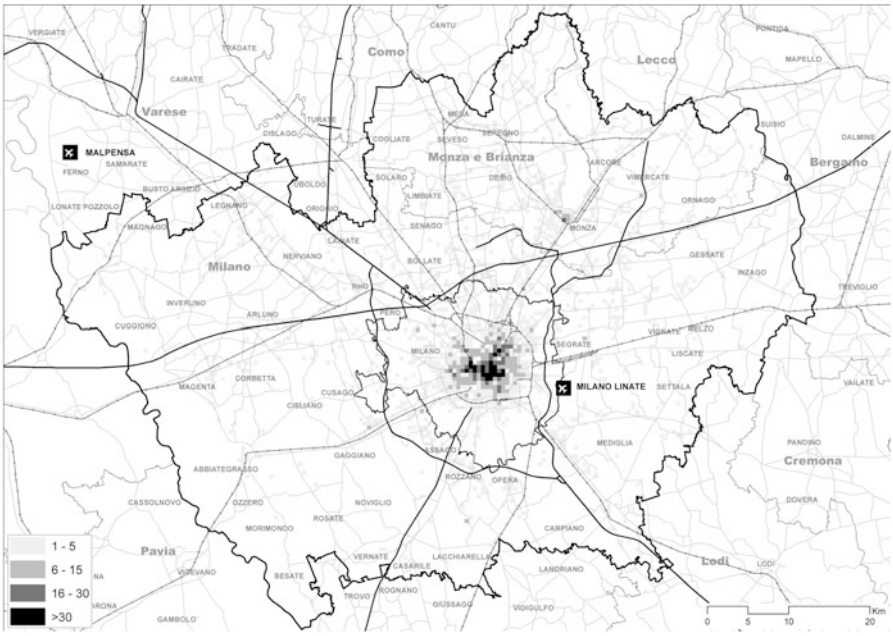

Fig. 10 Spatial distribution of business and management consultancy service sin Milan Metropolitan area (2011). *Source*: Chambers of Commerce and Industry of Milan and Monza-Brianza: Register of Active Companies (our data processing)

The processes that have taken place have been determined primarily by a marked structural change in the central area, as well as the selective mechanisms of the housing market. On the one hand, these processes have led to the formation of an urban region in many ways integrated in terms of its labour market and consumption patterns, and having a critical mass that has enabled it to attract private investment, services, the headquarters of multinationals and investment in fixed social capital, and to position itself among the principal European urban areas. On the other hand, these same processes have caused a large migration into the metropolitan area, growing levels of commuting into the central urban area, and thus very large flows of people who "invade" the city every day, with socially disruptive effects. All this is demonstrated by a copious literature which emphasizes how the dispersal and fragmentation of settlement patters, high levels of commuting and the inadequacy of the public transport infrastructure, have had negative effects for the stability of relationships and for the formation of social capital. The combination of these conditions in fact reduces the possibility of establishing stable connections, results in weak ties (Granovetter, 1973, 1983) and tends to widen the gap between work and private life.

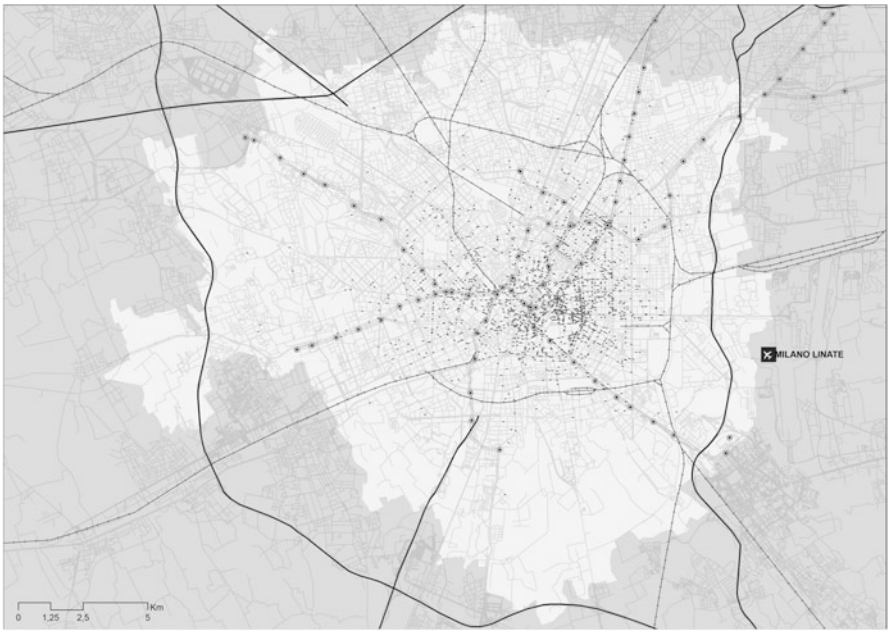

Fig. 11 Spatial distribution of law firms in the city of Milan (2011). *Source*: Yellow Pages (our data processing)

4 Distribution of Population and the New Geography of Social Inequality

Examination of the spatial distribution of the population, considered in relation to that of businesses in advanced sectors of the economy, reveals the principal mechanisms that have combined to determine the economic and social patterns of the central urban area. This, as we have said, is an environment in which opportunities are very selectively distributed and the tensions produced by the reorganization of the economy clearly evident, as a result of the fierce competition caused by the integration of the city into the circuits of the international market.

As well as serious imbalances between city centre and outlying areas in the economic and occupational structure, further imbalances have arisen in the central nucleus, in particular in neighbourhoods where the foreign immigrant population is most concentrated, and these are reflected in the distribution of population. The inequalities that originate where new-economy sectors have flourished, in regard to incomes and access to the amenities and the collective equipment of urban space at large, assume particularly intense manifestations—as Allen Scott (2006) says—in places where employment tends to be dominated by high-end segments of the new economy, the sources of localized competitive advantages are unequally distributed within the urban area, and there is a lack of public policy. This latter aspect is

Fig. 12 Spatial distribution of architectural firms in the city of Milan (2011). *Source*: Yellow Pages (our data processing)

particularly important in a context where, faced with a reduction in the quantity and quality of public goods, public action has been very weak in activating and regulating the processes of urban transformation capable of generating these goods, and there has been an inequitable interpersonal distribution of spatial capital.

Since 1991, social inequalities have become more pronounced in Milan's metropolitan area, where the core has assumed a functionally more specialized configuration, socially more segmented and with greater differentiation of incomes.

Compared with other metropolitan areas in Italy, in 2001 a high proportion of Milan's population (around 15 %) was concentrated in marginalized areas with a higher risk of deprivation, where the various forms of hardship and social exclusion reinforced one another. By examining the representation of the distribution of socio-economic disadvantage in Milan's urban area, elaborated by Randini (2008) for the years 1991 and 2001, it is evident that the highest concentrations of disadvantaged population[17] are mainly located at the edge of the urban area, above all in areas with high percentage of public housing. Analysis shows clearly also a tendency, confirmed by other analysis reported below, to an accentuation of social and spatial polarization, that has arisen between the central area, encompassing the band of the first twentieth-century urban expansion, and the

[17] The identification of the most disadvantaged social aggregates was performed considering three main forms of disadvantage, i.e. low education, unemployment and housing for rent.

Fig. 13 Spatial distribution of accounting firms in the city of Milan (2011). *Source*: Yellow Pages (our data processing)

periphery, along the main north and south lines, characterized by greater social disadvantage (Fig. 15).

Analysis of the distribution of incomes within the central urban area (Necchi & Pavanati, 2008) for the period 2000–2004 shows that the chief beneficiaries of economic growth were above all people on medium-high and high incomes (the first two quintiles, corresponding to 7.9 % of all taxpayers in 2004), who increased by 35.5 %, while the number of persons on low incomes (the last quintile, the largest slice of taxpayers, approx. 62 %) remained more of less stationary. The income class that registered the most substantial contraction was the middle-to-low segment (penultimate quintile), whose numbers fell by 12.1 %. A further indicator of major economic inequalities is the difference in annual average income between taxpayers in the first and last quintiles, which in 2005 reached a ratio of more than 1:22 (D'Ovidio, 2009).

The transition to a service economy and the internationalization of the urban market, together with the tendency of advanced services and creative industries to become concentrated in the highly specialized metropolitan core with its greater social homogeneity, side-lining areas not involved in the development of the new economy, has had serious repercussions for the socio-economic system. The joint effect of these processes has been to bring about trajectories of social inequality, reflected in a more pronounced functional and social differentiation of space and in a worsening of the living conditions of traditionally well protected social classes, in

Fig. 14 Spatial distribution of showrooms and side-events (*Fuorisalone*) in the city of Milan (2011). *Source*: Studiolabo and Chamber of Fashion database (our data processing)

particular a large proportion of the urban middle class. Although these trajectories are common to all large metropolitan areas in Europe, they can be aggravated or, on the contrary, attenuated by the local dynamics of advanced economic activities, the structure of the labour market, the different forms of public policy adopted, the role of urban renewal in local development policy, and the dynamism and cohesion of the institutional environment.

In the case of Milan, social inequalities have become more, not less, acute as a result of these factors. They have impacted the distribution of incomes, favouring an increasingly well-off urban upper class concentrated in the sectors of finance, fashion and advanced services, as well as the labour market and the spatial distribution of the population. They are the combined effect of a sharp rise in the cost of living, the selective action of very high property prices and rents, and a tendency if many neighbourhoods to a greater downward segregation and polarization, in particular neighbourhoods with a greater concentration of disadvantaged groups (Torri & Vitale, 2009).

We are seeing the exacerbation of a phenomena that the city had begun to experience in the 1980s, when the shift to a service economy was already in progress and there was intense investment activity, especially in real-estate development, encouraged by a substantial slackening of planning controls in the urban area, which soon proved to be a potent vector of corruption, leading to a major upset in the local political and administrative system.

Fig. 15 City of Milan 2001: Exclusion-attraction of disadvantaged settlements by census sections. *Source*: M. Randini (2008, p. 348)

This inevitably raised questions as to the effectiveness of the instruments intended to manage these changes, and flagged up a substantial and prolonged deficit in planning controls and the inadequacy of regulatory policy (Mazza, 2004b).

The widening of the social and economic gap, which is evident in the income structure and the labour and housing markets, has been more pronounced than in other European cities (OECD, 2006; van den Berg et al., 2005). It has strongly impacted the demographic structure and has been further reinforced not only by the radial conformation of the city, but also by a low level of connectivity between different areas, an insufficient and unequal transport infrastructure, and a striking concentration of opportunities, services, facilities and highly qualified employees in the historic centre of the urban area lying within the circle of the *Bastioni*, where intense competition for space is a longstanding phenomenon.

The representation of the outcomes of this process confirmed the presence of a double axis of inequality (Necchi & Contini, 2006). The more striking of these two forms of inequality was that between centre and periphery, while the other was

between North and South, resulting from the different development trajectories that have distinguished the northern areas, more affected by the establishment of major manufacturing industries, from the southern part of the city. The central area, historically home to the major universities, the stock exchange, the headquarters of the major banking groups, the "fashion quadrilateral", the main public institutions and a concentration of cultural facilities, was characterized by a higher social and economic level, with a large percentage of graduates (43.8 % of residents) and highly qualified employees (50.7 %), a higher incidence of one-person households, a lower incidence of elderly residents and a small proportion of unemployed people. Similar characteristics were also found in the semi-central zones of the first belt and in two zones not contiguous with the centre, though here there were also areas of social and housing deprivation, especially in neighbourhoods of less recently built public housing, and areas with a higher proportion of elderly residents and larger numbers of immigrants. The gap between the central and semi-central areas, on the one hand, and the peripheral areas, on the other, was further accentuated in the distribution of productive activities and employment: the centre in fact accounted for 47 % of local business units and 38 % of employment, had a larger incidence of self-employed people (29.5 % of all employees in the area) and persons employed in forms of work intermediate between self-employment and dependency on an employer.

The peripheral zones, more markedly residential, mostly disadvantaged in terms of their transport connections with the central area, with a greater incidence of elderly residents and a low percentage of graduates and highly qualified workers, were more diverse and heterogeneous in character. In these areas, consolidated settlements of less recently built housing and areas of working-class accommodation, often more dilapidated and with a greater incidence of social deprivation, coexist with more recently built settlements, with a greater housing density, a younger population, fewer single-person households and better provision of collective facilities. This was particularly true of areas of the northern outskirts served by the underground. The presence of a socially diversified population (including a proportion of foreign immigrants) in each neighbourhood is characteristic especially of the second urban belt, but should not be ascribed to policies explicitly geared to reducing inequalities and encouraging a social mix. This social morphology is rather the result of a combination of factors: the low incidence of large concentrations of public housing, widespread home ownership, the fragmentation of operations to replace/redevelop the residential fabric and the consequent juxtaposition of urban areas that look like enclaves, through a process that has gained strength in the last few years, following the proliferation of major real-estate operations (Bolocan Goldstein & Bonfantini, 2007). We can therefore see that, although the social polarization occurring in Milan does not have very obvious spatial connotations, it is very evident in the distribution of incomes and well-being, and lies behind the high rate of replacement of the resident population.

5 The Challenges Facing the New Urban Economy, Given the Weakness of Public Policy

It is widely recognized that the concentration of more highly skilled and specialized new-economy businesses in inner city areas and the rise of development trajectories disconnected from the living space of the population and the space of flows of goods, persons, and information, as governed by the dynamics of the global economy, have introduced growing tensions into their physical and social fabric.

Connected with the concentration of knowledge-based businesses, which are playing a driving role in global economic competition but are more difficult to recognize and monitor, there is also an emergent problem that requires special attention on the part of local government authorities, if they are to devise adequate policies. It concerns the ability not only to attract but also to retain cognitive resources and encourage their consolidation, because—as Richard Knight (1995) has pointed out—the impact of the restructuring of sectors connected with the new knowledge economy has a greater incidence on the economy and on the environment, since this impact is indirect, cumulative by nature and manifests itself over longer times periods, compared with the decline of industrial activities, the impact of which is direct and immediate.

The major European cities which have developed an advanced knowledge economy and a global vocation have faced up to the tensions caused by the dynamics of these sectors, tackling the changes that have occurred in the urban economy and the effects of growth, as well as the associated problems of fairness and quality of urban life, with clear regulatory intentions and complex projects to upgrade the public sphere. They have experimented with different processes of strategic governance allocating economic and financial resources with a view to rebalancing territorial inequalities and thus affirming the role of the public administration as principal agent of development and social regulation (Le Galés, 2003; Mazzoleni, 2011; Ranci, 2010). This is evident from some of the cases referred to in this work, particularly that of Munich.

Milan, however, though able to rely—for more than two decades—on a solid centre-right majority and substantial cultural conformity, has generally responded to these tensions reactively, revealing uncertainty and structural weakness. It has responded with partial and fragmentary interventions lacking an overall framework of reference, i.e. without being able to formulate a shared strategy and recognizable public plan.

The urban condition of Milan and its metropolitan area has been the subject of many studies. It has been interpreted as the outcome of an incomplete modernization evident in the relationships that have become established between the economy, society and politics, and in particular in the blatant inadequacy of the city's governing classes (Magatti, 2010; Sapelli, 2010). The latter seemed uninterested in formulating innovative urban and metropolitan development strategies and in building an image to match the status of the city, and incapable of achieving coordination between institutions and the main local players, as it happens in stable forms of urban governance (Lascoumes & Le Galès, 2010).

The most recent major project to transform the city based on a strategic vision, making a connection between land usage and the transport system of the urban region, was to create new railway infrastructure crossing the city from north-west to south-east (*Passante* Plan). First proposed in the 1960s as part of the Intercommunal Plan, and the subject of a City-planning Document (*Documento Direttore*) in 1982, this development would have enabled the external railway system to come right into the urban area, thus becoming the key link in the urban public transport system. Associated with this development was the attribution of new functions to vast areas of industrial buildings undergoing to disuse, all part of a plan to define new urban polarities, including the relocation of important functions and public services, which would have helped to break up the traditional monocentric urban layout. If this plan had been put into effect in this phase of decline in manufacturing, it would have been possible to implement policies to rebalance and redistribute economic activities on an urban and metropolitan scale, including the siting of positional assets and prestige functions in important urban settings, some of which are even now still under discussion. And it would have been possible to promote forms of coordination on the part of the various business and institutional players in funding urban renewal policies and constructing territorial capital (Camagni, 2008).

The most significant transformations of industrial areas, however, have occurred in complete contrast with this plan, through operations that were exempted from its obligations, in agreement with the major institutional and functional actors, as illustrated by the case of Technocity. Proposed by the new property/finance company founded by the Pirelli group as an advanced multi-functional technological centre, on the lines of science parks elsewhere, the operation degenerated into a more traditional, primarily residential investment, with some university functions and only 15 % of the usable area devoted to productive and research activities.

The 1980s also saw the dissolution of the district agency, which was "not even able to maintain its once-important role as an informal arena for negotiations between the parties on development options" (Balducci, 2005, p. 239). No large-scale infrastructure projects got off the ground (the *Passante* Plan was completed some 30 years later, but without the proposed closure of the ring). This has led to a large disparity, in terms of living conditions, concentration of forms of social deprivation and distribution of the benefits of urban change, between the inner circle of the city and the outer one, including the municipalities of the first belt, which are most affected by the negative repercussions of the dynamics of the urban property market.

Subsequently, during the long cycle of real-estate development, particularly in the decade 1995–2005, the transformation of the urban area of Milan was characterized by the "mono-centred" policies of the municipal government, deregulation where development operations were concerned, and a lack of coordination between mobility and planning policy. In terms of the spatial and social quality of the changes, the results of this period were highly controversial (Riganti, 2007). Planning policy consisted mainly in contractual instruments and discretionary procedures to facilitate urban redevelopment in ways diverging from the official plan, involving incremental adjustments, so that the profits of property development

were shared between landowner, developer and local authority in proportions depending on the circumstances of the decision-making policy and market constraints.

It has been emphasized that Milan's booming property cycle was exceptional, in both its financial and its territorial dimensions (Memo, 2007), in the fact that it was intimately connected with a period of radical change in city-planning instrumentation, and the type of players involved in the urban property market (Pasqui, 2007).

The end of the 1990s and the first decade of the twenty-first century were a time of global-scale financial investment in real estate, characterized the relative solidity of the property market, and recourse to the Integrated operational plans (*Piani integrati di intervento*), which are shaped by the new regional urban planning instruments. During this period, the pressure of the interests mobilized by financial capital and the new housing market had its full impact on the core of the metropolitan area. It particularly affected the areas within the circle of the *Bastioni* and around the infra-urban stations of the *Passante* Plan, exploiting the advantages of their location and the concentration of positional assets in these areas. City-planning policy and regulatory activity throughout this period was reduced essentially to rubber-stamping the contractual transformation of the city on a piecemeal basis, with the administration playing a mostly marginal role and exercising a great deal of discretion in valuing new projects.

The reason behind this more recent tendency on the part of a new type of "city builders" (finance and insurance companies, banks, big developers and multinational groups) to focus their development plans on more central areas is the large disproportion that has been created between established economic activities and functions of high value, on the one hand, and the scarcity of available land, on the other. This tendency, fostered by the administration's policies of attracting businesses and encouraging inter-urban competition, has reconfirmed the monocentric character of the Milanese property market, which the large-scale redevelopment of disused industrial areas, from *Bicocca* to Santa Giulia, was supposed to reverse. The outcome of these new developments have been somewhat negative, as demonstrated by the experience of the new district of Santa Giulia (in the south-east of the city, on the edge of the municipal area), which bears witness to the failure of a decentralized settlement.

The monocentric tendency is exemplified by the redesign of large portions of the consolidated urban fabric, including the historic *Fiera* (Trade Fair) district, an area of more than 350,000 square metres, in a strategic central position with good services, the promotion of which has had a big impact on the dynamics of the urban property market.[18] This is an impressive urban redevelopment project, the outcomes of which are as yet uncertain, but it highlights a tendency towards a

[18] Begun on the basis of a Programme Agreement in the mid-1990s with a view to redevelopment, the transformation of the historic area of the Trade Fair has since been managed by the owners of the area (Ente Fiera) through a newly set up engineering and contracting company, created to manage the process of transforming Milan's trade-fair system and operating on behalf of the big investors who had founded Citylife S.p.A.

"media approach" to city-planning policy typical of city marketing strategies. It is intended to change the identity and urban balance of Milan by introducing new "skyscraper city" stylistic elements, reshaping the city's image with iconic buildings (Sklair, 2006) that display complete indifference to the existing context.

Partly for this reason, the operation has been bedevilled by conflict between key actors with different interests, first of all the inhabitants of the district. Instead of playing a driving role in the thinking behind and management of this project, the municipal administration has favoured opportunistic manoeuvres on the part of the technicians and operators involved, and has played no more than a remedial role in the face of the critical situations and social conflicts that have arisen.

Against this background of poor regulation, the investors' real-estate development strategies, instead of meeting the needs of the economic players operating in advanced and innovative sectors, have been geared to residential function provided for the affluent new urban classes. The initial plan for a mix of functions, with spaces for service/managerial activities, shops and prestigious urban amenities (exhibition venues and museums), has been changed, partly because of an oversupply of office space. So there has been more emphasis on residential accommodation (an increase from 55 to 70 %) and properties which are symbols of luxury living. The fate of the planned cultural facilities (initially a museum devoted to design, since become a contemporary art museum) is uncertain. This would seem to confirm that the private developer intended to exploit these attractive elements mainly for marketing purposes, as well as confirming the inability of the public institutions to provide adequate cultural infrastructure.

This centripetal tendency, together with the "regressive introversion" of city-planning policy (Mazza, 2004a), has weakened, if not thwarted, the strategy based on a system of urban centralities advocated in the official planning documents. This provides further confirmation not only of the spinelessness of the local authorities in managing urban change, but also of their incapacity to cope with the dynamics driving things at metropolitan level, in particular the territorial strategies of the principal autonomous bodies fulfilling key functions (*Fiera*, universities, major hospitals, research centres), for which a multi-centre settlement pattern would be more advantageous.

Without a recognizable city plan and a transparent framework of conditions regulating bargaining between public and private interests, without guarantees of the synchronization of housing developments and the building of public works, most of the changes in the urban area have depended on a series of contractual documents, which in the event have produced only very limited public benefits.[19] The result is that the bargaining compensations deriving from the new executive instruments have proved totally inadequate to meet the demand for public services, far less the demand for housing at controlled/affordable prices, and more generally

[19] According to a study conducted on the Integrated Intervention Programmes, the public benefit achieved through the main urban transformation stood on 8 % of the value generated by these (Camagni, 2008).

to find appropriate solutions to the big changes in the demand for housing[20] and reduce the inequalities in the territorial provision of public transport infrastructure, and public facilities and services.

We can therefore rightly claim that local government policy has been geared above all to the redevelopment of urban areas which has offered great investment opportunities to local entrepreneurs and global players and encouraged their opportunistic strategies,[21] and has delegated social policy to other institutions and a mixed bag of players. The various forms of vulnerability and social deprivation, now transferred to the area of housing, have on the whole aggravated the problems of a system characterized by the pervasive role of family economies, the backwardness of the private sector and the chronic inadequacy of public intervention.

Although the Urban Policy Document - *Documento di Inquadramento 2000* - had forcefully raised the issue of Milan's relationship with its urban region, the city has continued to grow within its confines, through ad hoc contracts that have spawned vast quantities of housing, in line with a recurrent but limited formula (residential settlement-offices-green spaces-large shopping centres). The result has been the formation of agglomerations of poor quality, lumping together separate functions and spaces, with most of the residential accommodation designed to meet top-end-of-the-market demand. The city has also been encircled, to the point where the areas of the first belt are saturated, by mobility infrastructure required by the ever-increasing flows of traffic and by logistics/distribution facilities, which have occupied disused industrial areas or as yet unbuilt-on interstitial sites and have become the focus of the latest property-market strategies (Dallari & Curi, 2010). As a result, even the more peripheral disused sites, if adjacent to major mobility infrastructure and therefore accessible, have seen a steep increase in property prices. This has occurred, for instance, in the old industrial areas redeveloped to house the various service activities connected with the fashion and design sectors in the new creative districts, which have developed spontaneously. Here market prices have risen in response to their positional advantages, combined with monopoly returns.

Urban change has therefore been characterized by the use of inadequate systems to regulate and reduce the entropy of the widespread initiatives to transform the built environment, brought about by intense changes in practice in the use of urban space, and by public inertia with regard to decision-making. This inertia has long

[20] As regards the extension of housing risk, the public institutions have played a marginal role. However, traditional social institutions and private-sector social agencies (above all social solidarity organizations—Onlus—and various Foundations) have to some extent compensated for their inadequacy.

[21] To demonstrate the role played by the real-estate sector, overall investment in works of urban transformation and housing from the late 1990s to 2005 is estimated to have been worth more than 10 billion euros, 87 % of it in the construction sector and the remaining 13 % in business services. In 2006, according to municipal data, more than 8 % of urban territory (more than 13 million square metres) was undergoing redevelopment, with 80 % of this area allocated to complex programmes, mainly on extensive sites (Memo, 2007).

delayed the major projects for the strategic areas of the city, as their content has been adapted and readapted, and has left many initiatives uncompleted. The issues on the public policy agenda have therefore borne little relation to the spontaneous dynamics of operators in the emerging sectors of the economy. This has led to inefficiency in the production of public assets and territorial capital, as well as a serious reduction in the quality and quantity of personal and business services.

A significant case is the redevelopment of the *Garibaldi-Repubblica* district, one of the few extensive disused areas in the city historic centre.[22] For decades, this district has been discussed and coveted, with a consequent accumulation of interests, expectations and disputes, and since 2001 has been the subject of an integrated intervention programme. Of the three planned development operations, the institutional pole was to have accommodated the new municipal and regional government buildings, the "campus" was intended to become a park, while the Fashion City (*Città della Moda*) was supposed to enhance the city's principal productive assets (fashion and industrial design), with high-level training facilities included.

The decision to create a "fashion citadel", when the dynamics of the fashion industry had already produced a widespread "fashion city", showing a preference for the quality of the consolidated urban fabric, the transition areas (Savona and Tortona) and the industrial archaeological heritage, at the same time expressing a propensity to maintain a well-structured system of relationships with the urban space, confirms the inability of the political leadership within the city government to interpret the meaning of the current changes.[23] The outcome is the concentration in a single district of massive amount of expensive real estate, which has caused an exponential increase in property prices in surrounding areas (up 80 % in just 5 years), as well as an overproduction of office and residential accommodation which fails to meet the emerging demand, not least the demand for new spaces expressed by the fashion sector.[24]

[22] Seventy-eight percent of the area of *Garibaldi-Repubblica* is in public ownership (Municipality of Milan and Italian State Railways), with the remainder divided among several owners.

[23] The operation as it was carried out (the new "business district" occupying an area of 290,000 square metres, with more than 3,120,000 square metres of useable floor space), extended to connect three projects, has suffered many changes. The effect has been to reduce the institutional pole, increase the residential accommodation (luxury apartments), seriously marginalize the quota of subsidized housing (a mere 5 % of the total residential space) and raise the profile of a number of global players. The development, consisting of a series of oversized buildings (very similar to those proposed by the Citylife project), which will house the headquarters of large financial institutions and insurance companies, has thus done no more than repeat the by now outdated "business centre", with the addition of shops, hotels and residential accommodation.

[24] Writing of the semantic and symbolic expansion of districts or clusters of creative industries, and the large investments made by a growing number of cities in promoting them, Graeme Evans (2009)— in an internationally broad comparative analysis of urban-planning policies intended to create "spaces of invention"—refers to the case of Milan and its "Fashion City" to point out that some of these developments "are highly speculative and dependent upon major property investment" and may never materialise.

Entrepreneurship geared to incremental growth where the governing principles adopted by the previous centre-right administration in dealing with problems that required above all a private-led mobilisation of the market. This would seem to be confirmed by the dynamics of the urban property market and in particular the major changes to the urban fabric. Moreover, the long gestation of the major urban renewal projects and the prevalence of contingent actions substantially in line with the interests of the big developers have led to a gradual shelving of the commitments to create strategic urban facilities, particularly of a cultural nature. The consequences of this approach for the built environment and for urban life are especially evident in the fragmentation of the city, the decay of public assets, the deterioration of housing conditions and an increase in social and economic inequalities.

A further and no less alarming consequence, manifested in a territorial segmented development dynamic which also affects the urban region, is the growing gap between the functional city and the physical city. While in the former the positive connectivity and interdependence of the strategic functions constituting Milan's status as a global nexus prevail, the latter is largely undercapitalized (not only in quantitative terms but in terms of its many imbalances, the high social costs of mobility and low energy efficiency), with poor spatial connections internally and increasing difficulty in integrating its various parts (Bonomi, 2008; Camagni, 2011).

This being the case, there was a danger that the final decision taken by the administration shortly before the recent change in city government, consisting in the adoption of a new master plan, would only make the problem worse. The plan confirmed the longstanding limitations of Milan's city-planning, due to the absence of a strategy for the metropolitan area in the medium-to-long term, and outlined a scenario of unrestricted growth.

The unjustified planned increase of around 500,000 people over 20 years, obtained by indiscriminately increasing the building index in urban areas suitable for building and unused standard areas, to which had been added the virtual building rights deriving from the application of equalizing measures (generating an additional area in excess of 100 million square metres), revealed a huge gap between demographic trends, the sustainability of the new building potential and the conjectures of the city-planning policy document (Palermo, 2011).

The first decision taken by the newly installed centre-left city government was to revise the plan. They reopened a dialogue with the various area councils (*Consigli di Zona*), interrupted for more than two decades, and drastically reduced the building indices. They downsized plans to redevelop various areas and build new districts, introduced rules limiting the flexibility of functional uses, excluded the green belt to the south of the city (agricultural park) from the equalization system that permitted the totally unregulated transfer of huge volumes of the consolidate fabric (ensuring that substantial unbuilt areas can remain free), and fixed the increase in population at 155,000 additional inhabitants, including those to be settled in the districts then under construction.

In addition, to cope with the serious housing problem, they laid down the principle that all significant redevelopment operations must contribute to the building of a "solidarity city", by providing for the construction of quotas of social housing covering more than one hectare in areas being converted to other uses, and changing the rules of the plan to allow an increase in volumes to operations that included either quotas of subsidized housing or the creation of various public facilities. They also completed the agreement between municipal administration, regional government and Italian state railways that contains plans for settlement on former railway yards and guarantees significant public participation, with the priority aim of improving rail transport in the metropolitan area. The disused railway areas, more than a million square metres in total distributed along the railway lines in different parts of the city, are currently the most important strategic resource in which to invest to equip the belt outside the circle of the *Bastioni* with public spaces of quality and housing solutions accessible to people on middle-to-low incomes, in particular those in danger of losing their homes. These are the first important signals of a change in direction in the urban development policy of the new municipal administration.

6 Conclusions

Milan has been experiencing a time of transition to a service economy, during which we have seen radical changes in its economic and social structure, its status and image. This period has been characterized by approaches to the management of the urban area disconnected from the processes of social innovation, the on-going weakness of territorial and functional connections between the city and its urban region (despite a proliferation of spatially important changes and molecular initiatives), and a model of economic development that is competitive but poorly integrated, because of an absence of effective policies to mitigate its disruptive effects.

This latter aspect, in particular, has led to a number of socially alarming factors: a marked dislocation of the social fabric and an emergent polarization in the distribution of incomes (making Milan the most unequal city in Italy), and in its settlement processes (OECD, 2006), a lack of flexibility in the urban property market resulting in chronic housing problems, the poor quality of public space, widespread gentrification of population groups and economic activities and, last but not least, a profound demographic crisis.

We should therefore not be surprised that Milan has gradually lost its ability to attract new businesses and that, for several years, it has been ranked very low down among European cities for its level of pollution, quality of life and the ease with which one can move about the city, as evidenced by the most recent European Cities Monitor report (2011).

Against the background of a crisis that is systematic rather than cyclical, the situation facing the city's ruling elite is not without its good points, including a clear service-economy vocation still based on relations with the manufacturing system,

especially in the most competitive creative industry sectors. But there is also the difficult legacy of urban change and the transition to a service economy left to market forces, with inadequate public policy-making, a lack of institutional coordination of the different scales involved, and obstinately introverted city-planning choices. Recently, with the institution of the "metropolitan city" and the forthcoming determination of the new planning authority, a rethinking of some of the policy and regulatory instruments for managing economic and social processes has become a matter of crucial importance.

As a city, Milan is integrated into the global networks, where the advantages acquired by involvement in the more competitive new economic activities of the advances services sector (KCS), on which its attractiveness to outsiders largely depends, have until now enabled it to coexist with growing internal disruption and disparities, a low quality of urban living, the increasing selectivity of the market (in both the property ownership and rental sections), and serious deficiencies in its transport infrastructure. But how much more inequality, especially with regard to the new housing situation, and how much more inefficiency will the city be able to cope with? This is the most difficult challenge that Milan, a city on shaky foundations that has not yet completed its transition to the new form of cognitive capitalism, will have to face.

References

Balducci, A. (2005). Una visione per la Regione Urbana Milanese. In M. Magatti (Ed.), *Milano, nodo della rete globale. Un itinerario di analisi e proposte* (pp. 231–264). Milano: Bruno Mondadori.

Bolocan Goldstein, M. (2009). *Geografie milanesi*. Santarcangelo di Romagna (RN): Maggioli.

Bolocan Goldstein, M., & Bonfantini, B. (Eds.). (2007). *Milano incompiuta. Interpretazioni urbanistiche del mutamento*. Milano: Franco Angeli.

Bonomi, A. (2008). *Milano ai tempi delle moltitudini*. Milano: Bruno Mondadori.

Camagni, R. (2008). Il finanziamento della città pubblica. In M. Baioni (Ed.), *La costruzione della città pubblica* (pp. 39–57). Firenze: Alinea.

Camagni, R. (2011). Rendita e qualità urbana: conflitto o sinergie? In A. Arcidiacono & L. Pogliani (Eds.), *Milano al futuro. Riforma o crisi del governo urbano* (pp. 105–124). Milano: Et al./ edizioni.

Camagni, R., et al. (2008). *Il fattore territorio nel sistema economico milanese. Elementi per uno scenario metropolitano al 2020, dossier*. Milano: Provincia di Milano.

Camera di Commercio di Milano. (2012). *Milano Produttiva 2011*. Milano: Bruno Mondadori.

Camera di Commercio di Monza e Brianza. (2010). *Rapporto Brianza 2010. Imprese e territorio*, Supplement to "Il Giorno", Tuesday, November 16.

Compagnucci, F., & Cusinato, A. (2011). Nuova economia urbana. Tendenze localizzative. *Dialoghi Internazionali. Città nel mondo, 15*, 224–235.

D'Ovidio, M. (2009). Milano, città duale? In C. Ranci (Ed.), *Milano e le città d'Europa tra competitività e disuguaglianze* (pp. 9–72). Santarcangelo di Romagna (RN): Maggioli.

Dallari, F., & Curi, S. (2010). *Network Milano. Morfologia dei flussi logistici internazionali*. Milano: Bruno Mondadori.

di Milano-Agenzia, C., & Territorio, M. A. (2013). *Piano Generale del Traffico Urbano—Stato di attuazione e aggiornamento*. Milano: Comune di Milano.

Donzelli, R. (2007). *Il sistema moda milanese*. Milano: Camera di Commercio di Milano, Servizio Studi e Supporto Strategico.

Evans, G. (2009). Creative cities, creative spaces and urban policy. *Urban Studies, 46*(5–6), 1003–1040.

Gaeta, L. (2012). Una corsa al centro: Milano e la crisi immobiliare. *Dialoghi Internazionali. Città nel mondo, 17*, 28–37.

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78*(6), 1360–1380.

Granovetter, M. (1983). The strength of weak ties: A network theory revisited. *Sociological Theory, 1*, 201–233.

Hutton, T. A. (2006). Spatiality, built form and creative industry development in the inner City. *Environment and Planning A, 38*(10), 1819–1841.

Hutton, T. A. (2009). Trajectories of the new economy: Regeneration and dislocation in the inner City. *Urban Studies, 46*(5/6), 987–1001.

Jasson, J., & Power, D. (2010). Fashioning a global city: Global city brand channels in the fashion and design industries. *Regional Studies, 44*(7), 889–904.

Knight, R. V. (1995). Knowledge-based development: Policy and planning implications for cities. *Urban Studies, 32*(2), 225–260.

Lascoumes, P., & Le Galès, P. (2010). Exploring governance in a multilevel polity: A policy instruments approach. *West European Politics, 33*(1, Special Issue), 1–21.

Lazzaretti, L. (2008). The cultural districtualization model. In P. Cooke & L. Lazzaretti (Eds.), *Creative cities, cultural clusters and local economic development* (pp. 93–120). Cheltenham, UK: Edward Elgar.

Le Galés, P. (2003). *European cities. Social conflict and governance*. Oxford: Oxford University Press.

Magatti, M. (2010). Perché Milano non riesce ad essere se stessa. Ristrutturazione spazio-temporale e classi dirigenti. *Dialoghi Internazionali. Città nel mondo, 14*, 13–17.

Magatti, M., (Ed.) (2005). *Milano, nodo della rete globale. Un itinerario di analisi e proposte*. Milano: Bruno Mondadori.

Mazza, L. (2004a). Introduzione. In L. Mazza (Ed.), *Prove parziali di riforma urbanistica* (pp. 5–24). Milano: Franco Angeli.

Mazza, L. (2004b). Due domande per Milano. In L. Mazza (Ed.), *Prove parziali di riforma urbanistica* (pp. 25–33). Milano: Franco Angeli.

Mazzoleni, C. (2011). La creació d'un milieu i la nova economia urbana: Reptes i opcions per a les polítiques públiques [The creation of a milieu and the new urban economy: Challenges and options for public policies]. In A. Lopez Corduente (Ed.), *22@ Barcelona. 10 anys de renovació urbana/10 years of urban renewal* (pp. 242–245). Barcelona: Ajuntament de Barcelona.

Memo, F. (2007). Nuove caratteristiche del sistema immobiliare e abitabilità urbana: alcune riflessioni sul caso di Milano. *Sociologia Urbana e rurale, 84*, 103–123.

Meusburger, P., Funke, J., & Wunder, E. (Eds.). (2009). *Milieux of creativity: An interdisciplinary approach to spatiality of creativity*. Heidelberg: Springer.

Necchi, F., & Contini, R. P. (Eds.). (2006). *8° Censimento generale dell'Industria e dei Servizi del Comune di Milano 22 ottobre 2001*. Quaderni di Documentazione e Studio n. 46, Settore Statistica-Servizio Statistiche Economiche. Milano: Comune di Milano.

Necchi, F., & Mariani, P. (Eds.). (2009). *Osservatorio Lavoro del Comune di Milano 2007–2008*, Milano dati—Serie economia e lavoro, n. 14. Milano: Comune di Milano.

Necchi, F., & Pavanati, P. (Eds.). (2008). *Redditi degli Individui e delle Famiglie Milanesi*, Milano dati—Serie economia e lavoro, n. 11, Settore Statistica. Milano: Comune di Milano.

OECD. (2006). *Territorial reviews—Milan, Italy*. Paris: OECD.

Palermo, P. C. (2011). Milano-bigness. Quando la crescita non è sviluppo. In A. Arcidiacono & L. Pogliani (Eds.), *Milano al futuro. Riforma o crisi del governo urbano* (pp. 127–156). Milano: Et al./edizioni.

Pasqui, G. (2007). Chi decide la città. Campo e processi nelle dinamiche di mercato. In M. Bolocan Goldstein & B. Bonfantini (Eds.), *Milano incompiuta. Interpretazioni urbanistiche del mutamento* (pp. 49–64). Milano: Franco Angeli.

Percoco, M. (2009). *La distribuzione del reddito in Lombardia*, IReR, Lombardia 2010-Rapporto di legislatura. Milano: Guerini e Associati.

Provincia di Milano-Centro Studi PIM. (2009). *Consumo di suolo. Atlante della Provincia di Milano*, Quaderni del Piano territoriale, n. 28. Milano: Provincia di Milano.

Ranci, C. (2005). Problemi di coesione a Milano. In M. Magatti et al. (Eds.), *Milano, nodo della rete globale. Un itinerario di analisi e proposte* (pp. 265–300). Milano: Bruno Mondadori.

Ranci, C. (2010). Introduzione. In C. Ranci (Ed.), *Città nella rete globale. Competitività e disuguaglianze in sei città europee* (pp. 9–18). Milano: Bruno Mondadori.

Randini, M. (2008). Le geografie sociali di Torino, Milano, Roma e Napoli. In M. Cremaschi (Ed.), *Tracce di quartiere. Il legame sociale nella città che cambia* (pp. 323–358). Milano: Franco Angeli.

Riganti, P. (2007). Mobilità senza rete. Usi del suolo e trasporti nella regione urbana. In M. Bolocan Goldstein & B. Bonfantini (Eds.), *Milano incompiuta. Interpretazioni urbanistiche del mutamento* (pp. 97–106). Milano: Franco Angeli.

Rullani, E. (2004). *La fabbrica dell'immateriale. Produrre Valore con la Conoscenza*. Roma: Carocci.

Rullani, E. (2012). Nuova città, nuova impresa. Milano nel capitalismo globale della conoscenza. In M. Magatti & G. Sapelli (Eds.), *Progetto Milano. Idee e proposte per la città di domani* (pp. 39–74). Milano: Bruno Mondadori.

Sapelli, G. (2010). Un'organica debolezza con radici lontane. *Dialoghi Internazionali. Città nel mondo, 14*, 18–29.

Sapelli, G. (2011). Sul patrimonio economico milanese e oltre. In Camera di Commercio di Milano (Ed.), *Milano Produttiva 2011* (pp. 85–89). Milano: Bruno Mondadori.

Sassen, S. (2010). Global inter-city networks and commodity chains: Any intersections? *Global Networks, 10*(1), 150–163.

Scott, A. J. (2001). Capitalism, cities and the production of symbolic forms. *Transactions of the Institute of British Geographers, 26*(1, New Series), 11–23.

Scott, A. J. (2006). Creative cities: Conceptual issues and policy questions. *Journal of Urban Affairs, 28*(1), 1–17.

Scott, A. J. (2008). *Social economy of the metropolis. Cognitive-cultural capitalism and the global resurgence of cities*. Oxford: Oxford University Press.

Scott, A. J. (2010). Cultural economy and the creative field of the city. *Geografiska Annaler, Series B, Human Geography, 92*(2), 115–130.

Sklair, L. (2006). Iconic architecture and capitalist globalization. *City, 10*(1), 21–47.

Taylor, P. J. (2011). Advanced producer service centres in the world economy. In P. J. Taylor et al. (Eds.), *Global urban analysis: A survey of cities in globalization* (pp. 22–39). London: Earthscan.

Torri, R., & Vitale, T. (Eds.). (2009). *Ai margini dello sviluppo urbano. Uno studio su Quarto Oggiaro*. Milano: Bruno Mondadori.

van den Berg, L., Pol P. M. J., Van Winden, W., & Woets P. (2005). *European cities in the knowledge economy*. London: Ashgate.

Veltz, P. (1996). *Mondialisation, villes et territoires. L'économie d'archipel*. Paris: PUF.

Verganti, R. (2012). L'innovazione. Milano negli ecosistemi della creatività. In M. Magatti & G. Sapelli (Eds.), *Progetto Milano. Idee e proposte per la città di domani* (pp. 109–126). Milano: Bruno Mondadori.

The Knowledge-Creating Sector in Poznań

Krzysztof Stachowiak

Abstract

This chapter aims to look at the emergence of knowledge-creating activities in the post-socialist city of Poznań, Poland, where profound changes have occurred over the last 25 years. The post-1989 transition to a market-oriented economy, along with the growing importance of knowledge activities, has induced the re-creation, or in some cases the creation, of a milieu facilitating this new type of economy to develop. In particular, the chapter looks at the role of space and a spatial arrangement in knowledge-creating activities, and through landscapes of creativity it analyses the transformation of a space into a milieu. It is argued that the institutional change which occurred in socialist cities and induced the socio-economic transition did not happen in a vacuum, but in a particular spatial framework. Old industrial activities became irrelevant very fast, new activities have appeared, yet the old spaces have been dominant. Not only the 'new' has to co-exist with the 'old', but in order to grow, it had to adapt to the existing spatial arrangement. Also, the city had to catch up with general trends of the formation of a new knowledge economy, therefore changes were revolutionary rather than evolutionary, which contributed to tension building up between urban areas as places for human activity and as assets. Problems of the post-socialist urban transformation have been addressed in a number of works. However, relatively few studies have been devoted to the place and role of the knowledge-creating sector in this process. This chapter also seeks to contribute to a better understanding of the role of a knowledge-creating milieu in a post-socialist city.

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1 Introduction

Change lies in the nature of a dynamic system such as a city or region. Individual cities experience many kinds of change, depending on their geographical location, position in the national urban system, or historical past. Poznań as a post-socialist city is a place where profound changes have occurred over the last 25 years. The post-1989 transition from a socialist to a market economy took place simultaneously in many spheres: political, economic, social and cultural. On top of all this, some global shifts, such as the transition from an industrial to a knowledge economy, have shaped the way the city works today.

Urban areas have always performed a wide range of functions. Shelter, security, social interaction, and the sale and purchase of goods and services are among the traditional roles of a town or city. The relative importance of each of these functions has changed over time, and such changes have created new demands for land, floorspace and infrastructure, and the provision of a range of accompanying facilities. Not surprisingly, some traditional urban areas, either in their entirety or in particular town districts, may discover that a previous function or sectoral specialisation is no longer required, and that the facilities associated with this function are now redundant. In addition to the role of urban areas as a location for the human functions of living, working and recreation, the physical structures of towns and cities also represent a massive source of wealth. The distinction between the use of the built environment for human activity and its market role can be "summarised as the difference between use and exchange values" (Feinstein, 2001, p. 1). This difference, which is reflected in the evolution of tension between urban areas as places for human activity and as assets, lies at the heart of a number of urban problems.

Towns and cities change over time, and this process can be viewed as both inevitable and beneficial. It is inevitable because the operation of the political, economic and social systems constantly generates new demands (and shocks) as well as fresh opportunities for economic progress and civic improvement. It is beneficial because, although many may deny it, the very existence of these substantial forces of change creates opportunities to adjust and improve the condition of urban areas. As Mumford argued, "in the city, remote forces and influences intermingle with the local: their conflicts are no less significant than their harmonies" (Mumford, 1940, p. 4). It is desire to respond positively to such influences that has caused politicians, developers, landowners, planners and citizens alike to search for an answer to the question of how best to improve and maintain the condition of towns and cities.

This chapter aims to look at the emergence of knowledge-creating activities in the post-socialist city of Poznań. The transition to a market-oriented economy, along with the growing importance of knowledge activities, has induced the re-creation, or in some cases the creation, of a milieu facilitating this new type of economy to develop. In particular, the chapter looks at the role of space and a spatial arrangement in knowledge-creating activities, and through landscapes of creativity it analyses the transformation of a space into a milieu. It is argued that the

institutional change which occurred in socialist cities and induced the socio-economic transition did not happen in a vacuum, but in a particular spatial framework. Old industrial activities became irrelevant very fast, new activities have appeared, yet the old spaces have been dominant. Not only the 'new' has to co-exist with the 'old', but in order to grow, it had to adapt to the existing spatial arrangement. Also, the city had to catch up with general trends of the formation of a new knowledge economy, therefore changes were revolutionary rather than evolutionary, which contributed to tension building up between urban areas as places for human activity and as assets.

The sudden change in the political and social systems in Central and Eastern Europe at the start of the 1990s was a critical juncture on the development path of the region's cities. Problems of the post-socialist urban transformation have been addressed in a number of works (see e.g. Dutkowski, 2000; Kotus, 2006; Parysek, 2006, 2009; Parysek & Mierzejewska, 2006; Sailer-Fliege, 1999; Stanilov, 2007; Tsenkova & Nedović-Budić, 2006; Węcławowicz, 2013; Young & Kaczmarek, 1999, 2008). However, relatively few studies have been devoted to the place and role of the knowledge-creating sector in this process (Stryjakiewicz & Męczyński, 2010; Stryjakiewicz, Męczyński, & Stachowiak, 2014). This chapter also seeks to contribute to a better understanding of the role of a knowledge-creating milieu in a post-socialist city.

2 Poznań Transition Path to the Knowledge Economy

Poznań is one of the oldest, largest and fastest-growing cities in Poland. Located in the west-central part of the country (*Wielkopolska* region), halfway between Warsaw and Berlin, it is not only an important node of transport, but also a business hub (Domański, 1999). With its 550,000 inhabitants (2013), Poznań is the fifth largest city in Poland (after Warsaw, Łódź, Cracow, and Wrocław). It is also considered one of the Polish business cities and trade capitals as well as largest industrial centres in terms of employment and technological progress. As a result of the loss of communist markets, the old industries have collapsed or reduced their output due to the low technological level and competitiveness of their products. Firms that are adapting to global changes now play a key role in the economy, usually thanks to foreign investors (Parysek & Mierzejewska, 2006). The city is characterised by a high quality of its human capital, a low unemployment rate, and a high level of entrepreneurship.

The changes introduced in Poland in 1989 appeared simultaneously in the economic and political spheres. Political changes consisted in the substitution of socialist institutions by democratic ones, first at the central level (free elections and parliamentary system), then at the local level (introducing self-government), and finally in 1999 at the regional and sub-regional levels as a result of a new territorial division and the introduction of *voivodeships* (regions) and (sub-regions). Economic changes mostly involved the liquidation of key institutions of the socialistic economy and substituting them by market institutions, simultaneously with

restructuring and privatisation processes. Although all these changes were very rapid, a new institutional order in the economy was emerging gradually. Already in 1990 it was clear that Polish capitalism would be different from the West European version. The dominating role of the state in reforming the economy and the political sphere, the relatively high share of the public sector in the economy, and the importance of state regulations (like subsidies, subventions, and permissions)—all that caused the participation of the state in economic processes to be greater than in Western Europe, making the relations between the state and the private sector more complex (Stryjakiewicz & Męczyński, 2010).

The new political and economic situation of the 1990s allowed the rebirth of entrepreneurship in Poznań and was a starting point for building a knowledge-creating region there over the next two decades. It was a 'creative response' (Schumpeter, 1947) to the previous economic system where entrepreneurial and creative private businesses were very limited. Poznań became one of the leaders of the transformation. One of the main reasons behind it was that the city was quick to make use of its advantages, such as the geographical location (proximity to Warsaw and Berlin, and to Germany in general), a relatively high level of development, a diversified economic structure, skilled labour, the tradition of good work, and the milieu. This helped it to build a competitive advantage over other cities in Poland. Because of the lack of domestic capital in the first phases of the economic transition, which was the case for the entire economy, a crucial role in its modernisation was played by foreign investors. The competitive advantage of Poznań helped it to attract international companies which built their factories, generated jobs and transferred technology there. Foreign investment made in Poznań over the first decade of transition (1990–2003) exceeded US$3.5 billion, which accounted for almost 5 % of total foreign investment in Poland. This equalled more than US$6000 of FDI per capita and was only second to Warsaw (Parysek & Mierzejewska, 2006, p. 300). The impact of foreign investors on the local development of Poznań was visible in the regional multiplier effect (Stryjakiewicz, 2005). It showed in a rapid increase in the number of private businesses, not only in manufacturing (supply networks of transnational corporations), but also in services, since many tasks were outsourced by enterprises run by foreign investors. In addition, the dynamic development of auxiliary businesses took place in the city and its surroundings. They included companies offering trade, financial intermediation, repairs, household servicing as well as other services and communal, social and individual activities.

In addition to the impact on entrepreneurship, economic changes also affected the spatial development of the city. Suburbanisation processes began, which was manifested by a decrease in the number of central city residents in favour of neighbouring communes. The migration of Poznań inhabitants from the centre to neighbourhood areas was accompanied by growing investments in single-family housing in the suburban areas. This indicates a rising economic status of Poznań inhabitants.

Today, Poznań is a city generally well perceived by the inhabitants of other Polish regions, attractive to live and work in. Its milieu is a product of history, an

urban layout with a historic centre and numerous architectural monuments, cultural institutions, higher schools, wedges of greenery, retail outlets, practically an absence of degraded areas, and finally order and cleanliness. The city's attractiveness is enhanced by its good location in terms of transport, a diversified economic structure, a low unemployment rate, a relatively low crime rate, and the feeling of safety in the place of residence (for detailed data see: Statistical yearbook of Poznań city, 2013, pp. 36–47). The cost of living, while rather high in the Polish conditions, is lower than in the other major cities, like Warsaw, Gdańsk, Gdynia or Wrocław. The costs of housing and municipal services tend to be higher than in other cities. According to Ziółkowski (1999), Poznanians are perhaps less spontaneous and extroverted, but very reliable and hard-working. All this makes Poznań a place where people are glad to live and work in, and which tourists are glad to visit. The attractiveness of the city for workers of the knowledge-creating sector will be dealt with in further sections.

As to the position of Poznań in the European network of metropolitan regions, it is defined by the following features:

- In comparison with the biggest European cities, Poznań's metropolitan functions are not fully formed yet. Of all Polish urban areas only Warsaw is listed as one of the major metropolises on the European continent (Taylor & Walker, 2001), with other Polish cities regarded as lower-ranking. Poznań is gradually turning into another such metropolis. It is the seat of a growing number of branches of international economic and financial corporations, and offers international air, rail and coach connections (Śleszyński, 2007). It is the venue of an increasing number of commercial fairs and exhibitions for firms from all over the world. The city has developed a specific milieu noted and found attractive by crowds of tourists and investors alike. The development by Poznań of both, metropolitan functions and metropolitan spatial structures is going on, but its significance is primarily of a national scale.
- Poznań's location halfway between Warsaw and Berlin puts the city under strong competitive pressure from those two capitals. Poznań and its region try to capitalise on their location, for example by opening towards the western neighbour and developing transborder co-operation. The city closely watches such conceptions as that of the Berlin-Poznań-Warsaw trajectory (Domański, 1999) or of a new Central European mini-pentagon based on the Berlin-Dresden (or the 'Saxon Triangle' including also Lepizig, Halle and Chemnitz) -Wrocław-Poznań-Szczecin network of metropolises (Krätke, 2001). Those conceptions, however, do not always find favour with the central authorities. Hence the future position of the Poznań metropolitan region will depend heavily on political decisions and the degree of decentralisation of the Polish power system.
- The discontinuity of the city's development path and its inability to keep up with global processes under the communist system (as in other cities of the Eastern bloc) have serious implications for accommodating creative knowledge. Breaking out of the crisis of the 1990s and giving the economy growth dynamics were among the fundamental conditions for initiating social changes, which, however,

still lag behind those in the advanced countries. Equally delayed is the process of the emergence of a creative class, although progress in this respect is enhanced by both, the increasing popularity of the knowledge-based economy as a growth model and an educational boom resulting in the rising higher-school enrolment among the young generation. A crucial deterrent to change, however, is a bad budgetary situation of both the state and local authorities, which is manifested in their low level of support for culture, arts, architecture, publishing, and the R&D sector. The inflow of immigrants has been relatively low, but there has been an alarmingly heavy outflow of young, educated and talented people seeking jobs in the European Union states. As in the majority of post-socialist countries, the processes of economic and social transformation (including the development of the creative knowledge sectors) are most readily visible in metropolitan areas, and this is also the case in Poznań.

In spite of all the above-mentioned reservations, Poznań is one of the most dynamic Polish cities, a leader in the process of social and economic transformation. It also has assets that can push it to become a creative and knowledge-based metropolitan region. So far, this type of development path has been far from common in post-communist East-Central Europe (Stryjakiewicz, Burdack, & Egedy, 2010). There are signs, however, that this unfavourable situation is gradually changing. Poznań provides many examples of this change.

The economy of Poznań is diversified with a dominating service sector, which accounted in 2011 for 73 % of the city's gross value added (Statistical yearbook of Poznań city, 2013, pp. 249–250). The diversification of the economic profile and the balanced growth potential (also in demographic terms) are the strongest points of the study area. Other strong points include:

- Efficient institutions and well-managed city finance,
- Success in attracting foreign direct investment,
- Historically developed features of human capital: entrepreneurship and high work skill standards,
- A high quality of life (in relation to other Polish metropolises),
- A recognised quality of higher education (with its 233 students per 1000 inhabitants, Poznań ranks second among the Polish cities),
- A rich cultural milieu (especially music and dance), and
- Availability of attractive housing.

In turn, among the city's weaknesses one can list:

- Moderately favourable conditions for investment,
- Inadequate promotion of its image (including cultural assets), and
- Deficient air connections.

The research results presented by Stryjakiewicz, Kaczmarek, Męczyński, Parysek, and Stachowiak (2007) show Poznań to follow two pathways towards a

creative and knowledge-based city. One can be termed a catch-up process imitating the development paths of Western-type metropolitan regions. The other, which can be called endogenous, utilises local tradition and resources, including human capital. The latest period (from 2000 onwards) has been characterised by an impressive growth dynamics of the creative and knowledge-intensive sector in Poznań. Its development accelerated when Poland opened its borders after 1989 (World Bank, 2002); the next growth impulse was Poland's accession to the European Union in 2004. This development rests on several 'pillars', such as higher education, a well-developed ICT sector, an innovative business environment, cultural potential and heritage (especially musical events), and traditional artistic crafts.

3 Poznań as a Knowledge-Creating Milieu

In geographical literature, creativity appears as an essential factor of regional development, as Törnqvist's *Creativity and the renewal of regional life* (1983) originally maintained. There he introduced the notion of a "creative milieu", which he saw as possessing three kinds of features or resources: (1) a large and spatially dense body of information readily transferable within such an area, (2) a body of knowledge based not only on the accumulation of data, but to a large extent on the accumulation of knowledge over time, as in university centres, and (3) expertise in specified types of activity. The combination of those three types of resources is a condition for the emergence of a fourth, namely creativity, which means an ability to create new forms and values, whether material (e.g. products) or immaterial (e.g. symbolic values, ideas). In the 1980s the "creative milieu" concept found widespread application, especially in regional studies and theories of regional development (Andersson, 1985) and later on in innovation studies (Camagni, 1995). In turn, Malecki (2000) highlighted the significance of knowledge and creativity in the formation of regions' competitive advantages (cf. also Musterd, Bontje, Chapain, Kovács, & Murie, 2007; Stryjakiewicz & Stachowiak, 2013).

According to the World Bank (2002), a knowledge economy plays an important role in a city's economy, contributing to its economic wealth and well-being. This contribution results from the effective investment in people and ideas that create a milieu where the best practices are employed to produce and exchange information, to enhance creativity, and to apply it to innovative goods and services. It requires a highly skilled labour force, up-to-date knowledge, effective use of technology, and broad city resources that foster a productive urban economy and the urban fabric as a whole. In this process communication, good governance and partnerships are developed with all major stakeholders. In Poznań there are at least a few key 'pillars' that constitute a milieu in which the city can develop and accommodate knowledge-creating activities: (1) higher education, (2) ICT infrastructure and activity, (3) an innovative business environment, and (4) culture and the cultural heritage.

3.1 Higher Education

Poznań is a city with a substantial scientific and intellectual potential. It takes third place among the Polish cities (after Warsaw and Cracow) in terms of academic enrolment. At more than 128,000, Poznań students constitute 7.6 % of all students in Poland, while its inhabitants account for 1.4 % of Poland's total population (2012 data). Out of that number, more than 74 % are enrolled in Poznań state schools. With its index of 232.8 students per 1000 population, Poznań along with Cracow (239.9) is a national leader, leaving behind Lublin (222.0), Wrocław (208.8), Gdańsk (175.7), Warsaw (145.6), and Łódź (127.3) (Statistical yearbook of Poznań city, 2013).

Higher schools are engaged not only in teaching but also in research activity. There are two Centres of Excellence operating at the Poznań University of Technology. A centre of excellence is a scientific unit or its part (an organisationally distinct team of scientific workers) involved in research and international co-operation on a continuous basis, especially within programmes of the European Union, in order to advance science in fields regarded under the state's scientific policy to be of special significance to the national economy. The centres are intended to reinforce research collaboration at the domestic and international scales. They are sites where basic and applied research, including development work, is carried on, research projects and programmes are implemented, and educational and training activity is conducted.

Two Centres of Excellence have also been set up at Adam Mickiewicz University, both in the Chemistry Faculty. One, the Silicon Chemistry Centre, specialises in basic and applied research in this field. It has been operating since 2000 and is part of a network of research centres of the intermediary unit, the Poznań Scientific-Technological Park of the AMU Foundation, and domestic producers of organic silicon compounds. The work is financed from the PHARE and Sci-Tech II funds. The other Centre was established in 2003 within the Fifth Framework Programme of the EU. Its research focuses on environmental protection issues.

Poznań higher schools have launched several initiatives aiming at a more vigorous promotion of their achievements. In 2004 a Centre for Innovation and Technology Transfer was opened at Adam Mickiewicz University. Its basic objectives are to initiate, co-ordinate and conduct activities designed to develop innovative and entrepreneurial attitudes among the academic community, to help with the transfer of technologies worked out at the University to broadly understood social and economic practice, and to commercialise the results of the research carried out at AMU. The Centre moves towards its objectives through the building of an information and consultation centre for enterprises and local government units interested in collaboration with the University. It also organises meetings and other promotional actions intended to present the AMU research, training and consultation offer among the business circles of the city, region and country, as well as abroad.

3.2 ICT Infrastructure and Activity

Since 1993, Poznań has been equipped with a modern network infrastructure in the form of the POZMAN computer network. It has been built and is operated by the Poznań scientific circles. Using the state-of-the-art technology, the network enables public utility, educational, research and business institutions to actively participate in the process of building an information society. It also provides a basis for developing advanced digital services for the city residents. Connected to this network is one of the largest high-capacity computing centres in Poland.

The POZMAN network is connected to the national research broadband network POL-34/155 that links metropolitan networks. It also has connections with the biggest Polish telecommunications operators as well as a fast connection with GÉANT, the European research network. In 2012 the connection had a capacity of 10 Gbit/s.

The services rendered via the POZMAN network include access to the Internet and data transmission. The network makes the Internet accessible to all the Poznań higher schools and scientific institutes, state and local-government administration (the City Hall alone uses 15 optical-fibre connections in branches distributed throughout Poznań), public utility institutions, and many enterprises. The network relies on a system of optical-fibre connections and covers practically the whole of Poznań.

One of the most notable infrastructural facilities and services for the knowledge economy is provided by the Poznań Supercomputing and Networking Centre (PSNC). It is a leading research and computing centre in Poland. PSNC focuses on using, innovating and providing optical networking, high-performance computing, middleware services, and advanced Web-based applications to enable advances in eScience and engineering. In 2012, PSNC had 260 workers conducting applied research in four complementary departments: Applications, Supercomputing, Network Services, and Future Networks. The state-of-the-art technologies implemented there ensure Poznań the top place among information centres in Poland and Europe. Initially the PSNC offer was mainly addressed to the scientific circles, but today it embraces an equal proportion of other firms. Its services include the connection to the Internet and the creation of virtual networks for businesses. Apart from the management of the POZMAN city network, the Poznań Supercomputing and Networking Centre participates in work on the Polish Optical Internet PIONIER. The Poznań Optical Internet started to be built In 2001. Under the PIONIER project, an All-Polish Optical Network is being constructed which will allow the use of advanced computing structures and information services based on digital libraries and portals. The PSNC scientists are major players in the creation of new network solutions. They were co-ordinators of the European GridLab programme.

In addition to the existing infrastructure and institutions of the ICT sector, new projects are being developed which introduce advanced technologies into the city's and region's economies. One of them is the Wielkopolska Centre for Advanced Information Technologies (WCAIT), regarded by the regional authorities as a key project in the region. The centre aims to bring enterprise and research together to

maximise the benefits of the regional research infrastructure and boost the successful use of emerging ICT technologies. In 2007, Wielkopolska decided to build an open regional initiative to enable the diffusion of new ICT solutions. The setting up of an ICT research-driven cluster was an essential part of this plan, as ICT development was the main priority of the regional strategy.

3.3 Innovative Business Environment

One of the main challenges in building a sustainable knowledge economy in Poznań was lack of institutions intermediating between science and business. During the 1990s and 2000s there was a rather poor relation between the city's high research and educational potential and its economic growth or the marketisation of its research results. A measure of this situation is the small number of patent applications and licence-implementing agreements at the Poznań higher schools. In 1995 the Scientific-Technological Park of the AMU Foundation was established in the city—the first institution of this kind in Poland to operate in the market conditions. It carries out research and didactic activities and offers training and services to small and medium-sized enterprises (SMEs) (rental of space, technological consulting, production of aids, international co-operation guidance, and technology and innovation transfer guidance) as well as to the R&D sector of the city and region. In the part of the Park termed the Innovation Support Centre the R&D staff offer their technological solutions to enterprises at home and in the EU, or respond to technological requests from abroad (under the Innovation Relay Centre project). On the other hand, the Centre collects requests for technologies from the SME sector, city and region, and looks for them on the European markets. It is also a regional contact point of the European Union's Research and Development Framework Programme which enables the interested R&D units and innovative SMEs to join the Community's R&D projects. The Centre also co-ordinates the European RIS project, 'Innovative Wielkopolska', which involves the working out and implementation of a strategy of innovative economic growth for the region based on the experience of European regions, and other measures supporting the establishment of knowledge-based firms (of the 'start-up' or 'spin-off' type).

3.4 Culture and the Cultural Heritage

Nevertheless, Poznań's economic base has grown more on the codified-knowledge side (industries related to ICT) than on the creative side. This may be explained both by the history of the city as a trade centre and the difficulty for economic actors to consider cultural activities in economic terms. Even though culture was a salient feature of society at the time of the socialist state, it was very rarely seen as an economic good.

Despite the relative advantage of its knowledge economy, Poznań is one of the most important cultural centres in Poland with a dynamic and diversified range of

artistic activities. The rhythm of the city's cultural life is set by various annual events, for instance the Poznań Musical Spring Contemporary Music Festival, the Malta International Theatre Festival, or the International Biennale of Contemporary Dance. The most prominent cultural event is the Henryk Wieniawski Violin Competition held every 4 years. Poznań is also a dynamic centre of the alternative theatre and the venue of the afore-mentioned prestigious international Malta and Masks festivals. The *Ale Kino!* International Young Audience Film Festival, also held in Poznań, is the only event in Poland dedicated to the art of making films for children and youth. Since 2011 the *Transatlantyk* Poznań International Film and Music Festival has been organised in the city. The founder and director of the festival is the Oscar-winning Polish composer Jan A.P. Kaczmarek.

Regular cultural projects and events are provided by over 80 cultural institutions in Poznań. In all, there are nine theatres and musical institutions which can seat more than 3300 people, 50 galleries, and 21 museums. Theatres and musical institutions give some 2700 performances and concerts a year. Although Poznań is the largest museum centre in Wielkopolska, its nine major museums are visited by a mere 140,000 people a year, i.e. approximately 50 visitors a day per museum. It is mainly due to the fact that the museum facilities are too small and obsolete. There is insufficient space to exhibit and store their collections, often vast and unique. For instance, the Museum of Musical Instruments, one of the most important museums of this type in Europe, cannot develop due to limited exhibition space.

4 Geography of the Knowledge-Creating Sector in Poznań and Its Region

The development of the knowledge-creating sector in Poznań accelerated after Poland opened its borders in 1989, but the most dynamic growth was observed after the country joined the European Union in 2004. This event gave rise to a host of programmes and initiatives which, with the EU financial backing, became the driving force of change in Poland (as was the case with, e.g., the urban renewal programme) which also favoured the development of creative and knowledge-intensive industries. Today, the development of the knowledge economy rests on several pillars. One of the most essential is the network of higher education institutions and their activity in the field of creating and disseminating knowledge, especially that related to ICT. Nevertheless, co-operation between science and the economy is still considered unsatisfactory. This is largely due to institutional limitations, or more precisely to an insufficient legal and organisational framework (Stryjakiewicz, Burdack, & Egedy, 2010).

Poznań has a population with good standard of living compared with the national average. This includes relatively high wages and good housing conditions. In addition, the ethnic structure is highly homogeneous; the number of foreigners is small, as in the majority of Polish cities (Kotus, 2006). This relative homogeneity of the population in terms of income and ethnicity can cause some obstacles to developing the city as a knowledge-creating milieu. This could be favourable in

the first stages of the development of a knowledge-based city: the supply of creative goods by newly established producers could be made easier by a less diversified demand (Chapain, Lange, & Stachowiak, 2010). However, in a long run, such homogeneity might not serve as an advantage for further building of the knowledge-creating milieu since cultural diversity is regarded as one of the main pillars of a creative city (see e.g. Boschma & Fritsch, 2009; Catungal & Leslie, 2009; Florida, 2002; Krätke, 2011). This is a challenge for policymakers in Poznań, and so far only a few attempts have been made to meet it (Stryjakiewicz, Kaczmarek, Męczyński, Parysek, & Stachowiak, 2010). As shown further in the chapter, this is not only a problem for Poznań, but also for other European cities. Interestingly, while examining the spatial mobility of the 'creative class' in the European context, Martin-Brelot, Grossetti, Eckert, Gritsai, and Kovács (2010) have shown that such factors as cultural diversity and openness were not important reasons for creative-knowledge workers to live in a particular city (with the exception of Amsterdam and Barcelona). Overall, in all the 11 cities surveyed, cultural diversity was ranked 23rd and openness 17th out of 26 possible choices (Martin-Brelot et al., 2010, p. 862).

The challenges of the development of Poznań's knowledge-creating sector were connected with its development path. A study of managers of its knowledge-creating firms revealed that the post-socialist economic changes led to the formation of two groups of managers (Stryjakiewicz, Męczyński, & Stachowiak, 2008). One embraced people who took advantage of their contacts established while they had worked in the public sector to open their own businesses in the early 1990s. The other group included entrepreneurs of a younger generation who finished their education after the systemic change. Often gathering experience in foreign corporations, they went on to launch firms of their own based on the new standards of doing business. In addition, their formal and informal links with other businesses were, and still are, of crucial importance for their position on the market. The scale of those links determines not only the standing of a firm, but also of the city where it is based. Many firms are not fully mature yet, and they still have not got well-developed networks. Even though the establishment of creative firms in Poznań was quite successful after 1989, they still have to go through a process of maturation.

For the purposes of this study, a classification of the knowledge-creating sector (KCS) was adopted. The analysis included indices involving the number of entities in the particular sub-categories (private core, private core-related, public core, public core-related, and collateral services). To this end, use was made of a density index showing the number of entities per unit area. The index fully reflected spatial differences in the operation of firms of this sector. For dynamic comparisons, 2 years were selected: 2001 and 2009. The KCS classification follows the Polish Classification of Activities, which corresponds to the NACE classification. Because of limited data availability, not all NACE codes were covered (especially public core-related KCS were not included; however, since the share of this subgroup is rather small, it did not affect the general picture). A full list of the sectors included can be found in the appendix.

Table 1 Spatial structure of the knowledge-creating sector in the Poznań metropolitan region, 2001–2009

	Core city		Suburban area		Total	
	Number	%	Number	%	Number	%
(a) Number of KCS entities, 2001						
Private core KCS	6101	83.2	1230	16.8	7331	100.0
Private core-related KCS	3294	78.0	927	22.0	4221	100.0
Public core KCS	36	61.0	23	39.0	59	100.0
Collateral services to KCS	1480	81.4	339	18.6	1819	100.0
Total	10,911	81.2	2519	18.8	13,430	100.0
(b) Number of KCS entities, 2009						
Private core KCS	9811	77.8	2794	22.2	12,605	100.0
Private core-related KCS	4072	74.2	1418	25.8	5490	100.0
Public core KCS	51	65.4	27	34.6	78	100.0
Collateral services to KCS	3966	75.2	1309	24.8	5275	100.0
Total	17,900	76.3	5548	23.7	23,448	100.0
(c) Change, 2001–2009						
Private core KCS	3710	60.8	1564	127.2	5274	71.9
Private core-related KCS	778	23.6	491	53.0	1269	30.1
Public core KCS	15	41.7	4	17.4	19	32.2
Collateral services to KCS	2486	168.0	970	286.1	3456	190.0
Total	6989	64.1	3029	120.2	10,018	74.6

Source: own compilation based on data provided by Statistical Office in Poznań (business register)

A particular geographical feature of the knowledge-creating sector in the Poznań metropolitan region is its concentration in the core city. Out of a total of 23,448 entities in 2009, over 81 % conducted their activities in the city of Poznań (Table 1). Most of the KCS entities are private (both private core and private core-related KCS), accounting for 77 % of the total KCS number, while public KCS entities account for less than 1 %. KCS entities are located mainly in the city centre and in the densely populated areas around its core (Fig. 1). Since 96 % of all entities of the knowledge-creating sector in Poznań city are micro-sized (employing fewer than ten people), a relatively large concentration of them occurs not in the central business district but in other areas. Those knowledge-creating milieus can mostly be found in residential areas, especially in older neighbourhoods close to the city centre, like Łazarz and Grunwald, as well as on block-of-flats estates, typical of the socialist period of housing construction (Piątkowo and Winogrady in the northern part of the city as well as Rataje and Żegrze in its south-eastern parts). Very often, these firms are based in private flats, often home and workplace in one. Over the study period (2001–2009), they also showed the greatest growth dynamic: their number increased by 76 %. It was only big units, i.e. those employing more than 250 workers, whose number had dropped. This resulted largely from a decline in the proportion of big units in the Poznań suburban area. Since the knowledge-creating entities in Poznań are mostly small, private and independent, personal factors were of great importance in their development (Stryjakiewicz, Męczyński & Stachowiak,

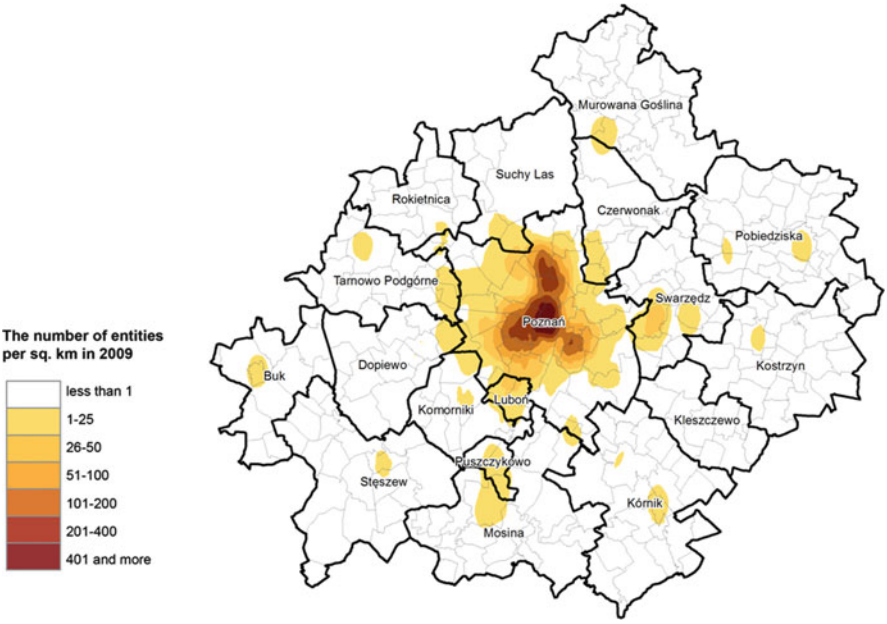

Fig. 1 Density of entities of the knowledge-creating sector in 2009. *Source*: own compilation based on data provided by Statistical Office in Poznań (business register)

2008). They usually did not expect any public support, but stressed its significant role in the creation of favourable conditions for socio-economic growth, which was a challenge for the whole of the national economy. They perceived domestic rather than international competition as the most important challenge. Among the Polish cities, Wrocław seems to be Poznań's strongest rival in the future development of the knowledge-creating sector.

In the period 2001–2009, the number of entities in the knowledge-creating sector (KCS) in Poznań increased by 64 %. The growth was the biggest especially in the number of micro- and small entities (an increase of 76 and 59 %, respectively). It is interesting that the largest increase in the number of entities (in absolute terms) appeared not in the city centre, but in adjacent areas, such as the district of Łazarz, where the total number of creative entities rose by 857, as against 804 in the centre (see Fig. 2). There are several reasons responsible for this situation. One of them is immediate adjacency of the Poznań International Fair, where entities classified as collateral services to KCS account for 21 % of the total (as compared against 13 % in the entire city). The district of Łazarz was an object of several urban renewal projects, started in 2006, restoring the glamour of its original nineteenth-century architecture and urban structure. This was followed by its gentrification and restoration of an image aimed to build a reputation of a relatively affluent and fashionable area (see Fig. 3, right). Its role in the city is compared by city hall officials to the position of Notting Hill in London. Apart from Łazarz, high growth in the

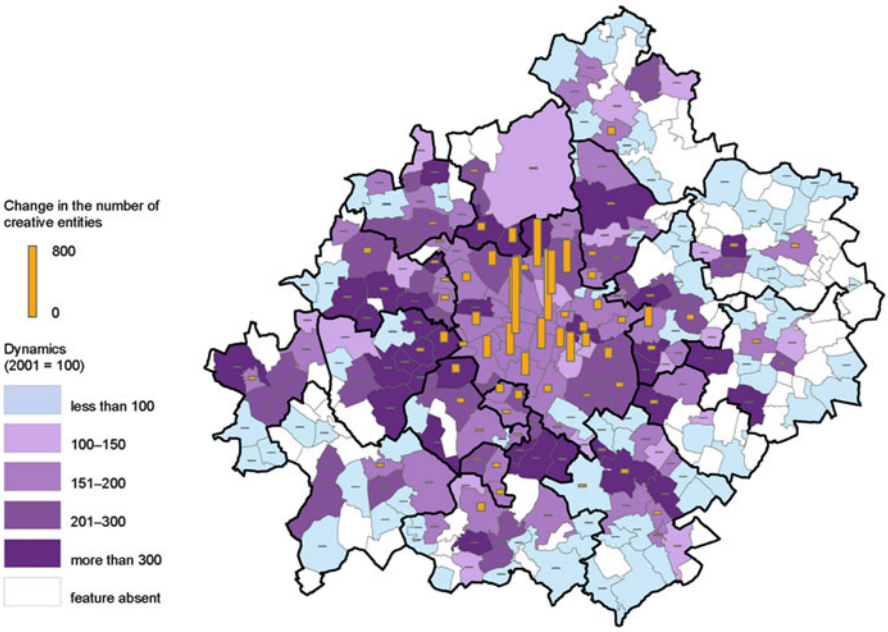

Fig. 2 Change in the number of entities of the knowledge-creating sector, 2001–2009. *Source*: own compilation based on data provided by Statistical Office in Poznań (business register)

Photo by Anna Bilska Photo by Krzyszof Stachowiak

Fig. 3 Two types of sub-city level milieus for the knowledge-creating sector in Poznań: a socialist housing-estate (*left*) and older districts with the predominance of nineteenth century architecture (*right*)

number of KCS entities was also recorded in one of the older districts adjacent to the city centre, Jeżyce (to a great extent similar to Łazarz), in housing-estate areas (such as Piątkowo, Winogrady, Rataje, and Żegrze—see Fig. 3, left), and those outside the city which experience a housing boom today (the Suchy Las suburban commune north of the city, and the town of Swarzędz in the east). In total, over the

Table 2 Structure of the knowledge-creating sector by entity size in the Poznań metropolitan region, 2001–2009

	Micro	Small	Medium	Large	Total
(a) Proportion of KCS entities (in %), 2001					
Private core KCS	95.5	3.5	1.0	0.1	100.0
Private core-related KCS	98.8	1.0	0.2	0.0	100.0
Public core KCS	45.8	27.1	11.9	15.3	100.0
Collateral services to KCS	96.2	3.1	0.5	0.2	100.0
Total	96.4	2.8	0.7	0.1	100.0
(b) Proportion of KCS entities (in %), 2009					
Private core KCS	96.4	2.9	0.7	0.1	100.0
Private core-related KCS	98.8	0.9	0.2	0.0	100.0
Public core KCS	55.1	33.3	10.3	1.3	100.0
Collateral services to KCS	96.8	2.7	0.4	0.1	100.0
Total	96.9	2.5	0.5	0.1	100.0
(c) Change in number of entities, 2001–2009 (in %)					
Private core KCS	73.6	44.1	15.5	14.3	71.9
Private core-related KCS	30.1	15.9	71.4	100.0	30.1
Public core KCS	59.3	62.5	14.3	−88.9	32.2
Collateral services to KCS	191.9	154.4	111.1	0.0	190.0
Total	75.6	58.5	28.7	−40.0	74.6

Note: the following definition of firm size is applied: micro (under 10 employees), small (between 10 and 49 employees), medium (between 50 and 249 employees), large (250 and more employees)
Source: own compilation based on data provided by Statistical Office in Poznań (business register)

years 2001–2009 the Poznań metropolitan area gained 10,018 entities of the knowledge-creating sector, which meant an overall increase of 75 % (Table 2).

As to employment, according to the only available data, the creative knowledge sector[1] accounted for 17.5 % of total employment in Poznań and its region in 2009, up nearly 3 % points from the 2001 figure of 14.8 % (Stryjakiewicz et al., 2007). Among the creative knowledge industries in the city, in terms of employment, were: law and other business services, publishing, advertising, and architecture. The role of cultural industries (including the media) was mediocre. However, the nearby town of Swarzędz (located east of Poznań) is very well known for its furniture handicraft.

[1] The classification of the creative knowledge sector adopted by Stryjakiewicz et al. (2007) included two main groups: (1) creative industries: advertising, architecture, arts and antiques trade, crafts, music and the visual and performing arts, publishing, video, film, music and photography, and (2) knowledge-intensive industries: financial intermediation, ICT manufacturing, ICT services, law and other business services, R&D, and higher education. This range of industries covers to a large extent the KCS classification adopted in this book, hence the data might serve as a reference point.

5 City Environment for Workers of the Knowledge-Creating Sector

In the industrial age, companies and investors strongly relied on 'hard' location factors, which include the availability of certain resources such as a suitable labour force and office space, or the level of wages, accessibility, etc. While these 'hard', more classic location factors are still very important, the role of 'soft' location factors has gained in popularity as a means to explain location patterns of businesses, especially branches of the 'creative industries' (see eg. Florida, 2002). 'Soft' factors include the quality of the environment, functioning of the housing market, or a lively cultural scene (Musterd et al., 2007).

Stryjakiewicz et al. (2008) conducted a study aimed to identify factors making workers of the knowledge-creating sector seek a job and a place of residence at a specific location in Poznań and its metropolitan area. In particular, the study focused on the relative importance of so-called 'soft' location factors, such as the quality of space, attractiveness of the residential environment and meeting places, a tolerant atmosphere, the cultural heritage, a subjective feeling of security, and job satisfaction. Those elements are essential factors influencing milieu creation. The study rested on a questionnaire survey embracing three main pillars of relations between workers of the knowledge-creating sector and a place, namely satisfaction with the city, satisfaction with the job and work environment, and satisfaction with the neighbourhood or area and dwelling.

As regards satisfaction with the city environment, workers of knowledge-creating firms exhibit some distinctive traits. Most of them live in the central city—in the very centre or just outside it—and are satisfied with their place of residence. It gives them a sense of security and meets their most essential needs in terms of basic services, as well as spatial preferences connected with proximity to work. While choosing a specific location, they pay the greatest attention to the cost and size of an apartment. Of equal importance are such soft factors as the atmosphere of the neighbourhood and the quality of the environment. The rating of the overall quality of life in the neighbourhood inhabited by the respondents does not depend on their income or age, however. Likewise, these elements have nothing to do with residential appeal. What primarily differentiates the investigated group is the type of work they perform. In particular, this applies to soft factors related to the quality of the environment they live in. They are more inclined to rate these elements favourably. They seem to prefer them to such hard factors as, for example, apartment maintenance costs.

According to Lawton, Męczyński, and Barber (2013, p. 107), "throughout recent decades, largely due to the intensification of inter-urban competition on a European and global scale, the conscious reordering of place, or 'place-making', has become an increasingly important feature of urban planning practice." Place-making involves not only action towards attracting creative and knowledge workers to the city but also, once they are there, to keep them in the region. Therefore Florida (2002, 2005) maintains that the attraction and retention of creative people is the key driver for urban economies. Both soft and hard location factors can play either

attracting or retaining role. In the case of Poznań, a predominant role in attracting creative and knowledge workers to Poznań is played by 'hard' conditions. The research carried out by Stryjakiewicz, Grzywińska et al. (2008) showed that the main factor attracting people involved in the knowledge-creating sector to the Poznań metropolitan area was employment. A well-developed and diverse job market created opportunities for satisfactory jobs (Benz & Frey, 2004; Bingley & Westergaard-Nielsen, 2003; Martin-Brelot et al., 2010). Furthermore, employment played a significant role in preventing the migration of workers from the region. The jobs let them realise their plans and covered their costs of living. The workers underlined that their jobs were not only a source of income but also of personal satisfaction, thanks to which they achieved creative fulfilment and self-realisation. This is the reason why the working environment plays such an important role, sometimes even more important than the salary. Besides employment, another important factor was the possibility of receiving good education. The large number of higher-education institutions attracted people from outside the region. During 5 years of college not only did they study, but also made acquaintances and worked, thus identified with Poznań more strongly. This influenced their decision about settling and working in Poznań after graduation. Therefore, education, like employment, was an attracting and a retaining factor. This was the case predominantly with workers and transnational migrants (Stryjakiewicz, Grzywińska et al., 2008).

A retaining role was played both by 'soft' and 'hard' factors. 'Soft' factors often influenced the decision concerning staying in the region, even though in Poznań they played a less significant role than the 'hard' ones. The above-mentioned working environment, the quality of the city environment, and the quality of life were all indicated most frequently among the 'soft' factors. The quality of the environment, connected particularly with the location of the city, its image, and the accessibility of services and entertainment, were chosen more often by workers and managers than transnational migrants, who tended to indicate the quality of life connected with the cultural offer of the city. The soft factors had basically a retaining character, which means they played a part in the decision to stay in Poznań rather than moving elsewhere. Embeddedness in the place, the development of social ties (the family, friends, professional relationships), and the quality of the city's living environment were the chief soft factors influencing the decisions of workers of knowledge-creating firms.

In addition to soft and hard factors, a third type emerged from the research as important, namely personal trajectories (Stryjakiewicz, Grzywińska et al., 2008). Personal trajectories were nearly as significant a factor influencing the location decisions of those working in the knowledge-creating sector as employment. Most of the workers came to Poznań for their family or life partner. The rooting in the social and family structures influenced the decision about staying in the city or moving to Poznań. Even part of transnational migrants changed their working and residence place and followed their partner, stayed in Poznań and started a family.

Those outcomes show the main significance of 'hard' factors in Poznań. Yet according to Florida (2002), the 'creative class' is attracted to environments that offer everyday interaction between people within diverse and 'tolerant' areas with

Table 3 Importance of various factors for choosing creative knowledge workers to live in a particular city[a]

City	Personal trajectory	Hard factors	Soft factors	Total
Amsterdam	39.1	35.1	25.7	100.0
Barcelona	62.4	26.3	11.3	100.0
Budapest	70.1	24.6	5.3	100.0
Dublin	58.9	39.4	1.7	100.0
Helsinki	50.5	39.0	10.4	100.0
Leipzig	50.5	46.8	8.6	100.0
Milan	50.5	31.4	4.7	100.0
Munich	31.8	58.1	10.1	100.0
Poznań	74.8	22.3	2.9	100.0
Riga	80.0	17.1	2.9	100.0
Toulouse	47.7	40.7	11.6	100.0
Average	54.1	36.2	9.8	100.0

Source: Martin-Brelot et al. (2010, p. 865)
[a]Numbers show the percentage of respondents who have chosen a particular group of reasons as the most important

an active street life. Thus, to attract such workers, city authorities must place an emphasis on both, legible elements of place-making, such as the creation of 'creative quarters' with a focus on the amenity preferences of the 'creative class', and, to a lesser extent, the formulation of a policy promoting tolerance and diversity (Lawton et al., 2013). All this involves 'soft' factors and it would suggest that the position of Poznań is unfavourable for further development of a knowledge-creating milieu. However, empirical research aimed to examine this aspect in detail shows that Florida's hypotheses are not always valid outside North America. Frenkel, Bendit, and Kaplan (2013) investigated the choice of a residential location of knowledge workers at the intra-metropolitan level in Tel-Aviv. It turned out that the most important factors were the municipal socio-economic level, housing affordability, and commuting time, while substantial secondary factors were cultural and educational land-use and a culture-oriented lifestyle. Martin-Brelot et al. (2010) showed that the role of soft location factors in the decisions of creative workers did not seem to be as relevant as implied by Florida and others. What is more, these factors play only a marginal role in attracting members of the creative class to a city. Table 3 demonstrates variations between the 11 European cities examined concerning the types of reason why workers of creative-knowledge firms chose to live and work in a particular city. The reasons were grouped into: 'personal trajectory' (the attachment of a person to a geographical location resulting from his/her previous life course), 'hard factors' (e.g. job opportunities, education infrastructure), and 'soft factors' (such as the quality of life, quality of space, social fabric of the city etc.). According to this research, personal trajectory factors prevailed in the post-socialist cities (Riga, Poznań and Budapest). The authors suggest that "these cities were reintegrated into the circulation of global capital

only recently, and they have been less affected by international migration of talent compared to the West European cities" (Martin-Brelot et al., 2010, p. 864).

In the case of Poznań, as for other post-socialist cities, it is still necessary to improve its infrastructure and create modern spaces and activities, the deficit of which is a legacy of communism. The specificity of metropolitan regions in the post-communist countries in Central and Eastern Europe shows, among other things, in their delayed entry onto the path of development of creative regions. The knowledge-creative sector is often over-represented in the capital cities, and the policy of support for the sector is sometimes inadequate, particularly at the central level. The development strategies of cities and regions focus primarily on 'hard' conditions, which is understandable to some extent, given the years of neglect, for example in physical infrastructure. Left in the background are factors associated with the development of social and human capital. There are also no specific initiatives in the field of public-private partnership, which is an important factor in the development of creative cities and regions in the advanced West European countries (cf. Stryjakiewicz, Grzywińska et al., 2008).

6 Conclusions: New Forms of a Milieu-Creating Socio-Spatial Arrangement

Poznań has followed two pathways to a creative and knowledge-based city so far: a catch-up process imitating the development paths of Western-type metropolitan regions, and an endogenous path focusing on utilising the local tradition and resources, including human capital. The present period, starting from the beginning of the twenty-first century, is characterised by high growth dynamics of creative and knowledge-based industries. However, this is too short a time span and the scale of the process is too small to make far-reaching generalisations. Nevertheless, in Poznań the transformation into a knowledge-creating milieu is embedded in deeper structural changes, both social and economic. The connection between knowledge, innovation and place is path-dependent and place-dependent, and rests on territorial relationships. In a post-socialist city in transition, such as Poznań, the new human activity that started in the city after 1990 requires adapting the old or building a new spatial arrangement. Such new forms of a milieu-creating socio-spatial arrangement, characterised in greater detail below, include: renewing and re-imagining older districts and bringing new life to them; introducing new creative spaces in the city and combining its commercial status with its creative potential; and establishing creative hubs where knowledge, new values and experiences might be shared. Each of these new forms have emerged in Poznań in recent years, pushing the city forward on a path towards a creative and knowledge economy.

Developing a knowledge-creating milieu requires specific spaces where creative activity might take place. Very often knowledge-creating entities need a hand, as they are too small to create affordable space by themselves. One of the main tools aiming at developing a socio-spatial arrangement for the milieu in Poznań has been the urban renewal programme launched by city authorities in 2005. The programme

seeks to help a city area to break out of a crisis by removing the factors which have caused its degradation. Regeneration of particular urban areas is carried out by eliminating redundant elements from their space and bringing in new elements. First, the Śródka area in the city centre was revitalised as a pilot programme. With the participation of the inhabitants and entities which run their businesses there, new concepts of further development were invented and discussed. Several initiatives were also undertaken, like some cultural and social events. For example, in October 2006 an international art exhibition, RE: GENERATION, was held there on the initiative of the InterCity Association under a larger project entitled Artistic District. Further stages of the urban renewal programme covered older districts of the city located a few kilometres from the centre (such as the above-mentioned Łazarz), and in 2013 a third edition of the programme was launched, focusing on still other parts of the city and using more extensively such EU programmes as Jessica.

One of the best examples of new creative spaces in Poznań is StaryBrowar (the Old Brewery)—a centre of trade, arts and business in the heart of the city which was completed in 2003. According to the survey conducted by Stryjakiewicz, Grzywińska et al. (2008), it was the second most popular creative place in Poznań. Even though there is a multi-storey shopping mall with its shops in the core of the centre, one can also make use of other services that are on offer, like restaurants, an art gallery, concert and conference halls, etc. Dozens of cultural events take place there every year. Painting, sculpture and photography exhibitions, meetings, concerts, theatrical and musical performances, conferences, scientific presentations and chess competitions are only some of them. It is also a place for many happenings and off-culture events, etc. For many residents and visitors it is a prestigious place. The building owes that partly to its architecture, which reflects its industrial past (a former brewery), and to many elements of unconventional modern architectural solutions. The centre has been awarded prizes in several architectural competitions, e.g. it was the winner of an International Council of Shopping Centres award for the Best Shopping Center of the World in the category of medium-sized shopping centres in 2005. Since its launch in 2004 it has become the shopping and architectural symbol of Poznań, increasingly associated with cultural functions, as well as a new cultural milieu of the city.

An example of a creative hub is the Concordia Design, established in 2012 and focusing mainly, although not exclusively, on the design and development of new services and products. Concordia Design serves as a place for work, for meetings, and for organising various events. Its offer is addressed to business communities as well as individuals, both adults and children. Companies and local government institutions can participate in its modern training courses (for open or private groups) or use consultancy, e.g. regarding methods of developing and launching new products and services. A part of the venue is a business incubator where dozens of firms (21 in 2014) from the creative industries operate. The offer for individuals cover a wide range of activities: for adults, there are various workshops (e.g. to develop their passions), exhibitions, concerts, performances, thematic conferences, and other special events; children, in turn, can enjoy creative workshops, family

Sundays, as well as the Design and Creativity Festival. In addition, Concordia Design is located in the very centre of Poznań, in a renovated Old Printing House from the nineteenth century. The renovation process has maintained the unique ambience of the building, and the old walls are now fitted with cutting-edge solutions and facilities, making the place distinguished in Poznań and very popular among the residents.

Such places as the Old Brewery or Concordia Design, along with new or reshaped districts like Łazarz, have become symbols of change towards a new economy. They are also vital symbols of the transformation of the city space and of the emergence of new activities such as the knowledge-creating sector. These 'flagship' projects are followed by numerous smaller initiatives, both public and private, changing not only the physical structure of the city, but most of all its social fabric. The socialist city was predominantly industrial and associated with heavy spatial structures and limited social networks based of private entrepreneurship (Domański, 1997). Several processes of the post-socialist era, like renewal projects, culture-led regeneration, gentrification, or creative entrepreneurship, have induced the emergence of numerous milieus, some of which have turned into important hubs and contributed to the city's overall creative milieu. Space is being physically transformed (via urban regeneration, the Old Brewery providing an example), and this transformation introduces new meanings into the city. Such spaces serve as creative spaces, or ones where values are negotiated and shared.

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References

Andersson, Å. (1985). Creativity and regional development. *Papers in Regional Science, 56*(1), 5–20.

Benz, M., & Frey, B. S. (2004). Being independent raises happiness at work. *Swedish Economic Policy Review, 11*, 95–134.

Bingley, P., & Westergaard-Nielsen, N. (2003). Returns to tenure, firm-specific human capital and worker heterogeneity. *International Journal of Manpower, 24*(7), 774–788.

Boschma, R. A., & Fritsch, M. (2009). Creative class and regional growth: Empirical evidence from seven European countries. *Economic Geography, 85*(4), 391–423.

Camagni, R. P. (1995). The concept of innovative milieu and its relevance for public policies in European lagging regions. *Papers in Regional Science, 74*(4), 317–340.

Catungal, J. P., & Leslie, D. (2009). Contesting the creative city: Race, nation, multiculturalism. *Geoforum, 40*(5), 701–704.

Chapain, C., Lange, B., & Stachowiak, K. (2010). Des villes de taille moyenne peuvent-elles devenir des villes créatives? Examples trois villes de l'Europe centrale et occidentale. In C. Berneman & B. Meyronin (Eds.), *Culture et attractivité des territoires: Nouveaux enjeux, nouvelles perspectives* (pp. 155–194). Paris: L'Harmattan.

Domański, B. (1997). *Industrial control over the socialist town: Benevolence or exploitation?* Westport: Praeger.

Domański, R. (Ed.). (1999). *The changing map of Europe: The trajectory Berlin-Poznan-Warsaw*. Warszawa: Oficyna Wydawnicza "Rewasz".

Dutkowski, M. (2000). The changing post-socialist metropolitan areas in Poland. In Z. Chojnicki & J. J. Parysek (Eds.), *Polish geography: Problems, researches, applications* (pp. 60–67). Poznań: Bogucki Wydawnictwo Naukowe.

Feinstein, S. S. (2001). *The city builders: Property development in New York and London, 1980–2000*. Lawrence: University Press of Kansas.

Florida, R. (2002). *The rise of the creative class: And how it's transforming work, leisure, community and everyday life*. New York: Basic Books.

Florida, R. (2005). *Cities and the creative class*. New York: Routledge.

Frenkel, A., Bendit, E., & Kaplan, S. (2013). Residential location choice of knowledge-workers: The role of amenities, workplace and lifestyle. *Cities, 35*, 33–41.

Kotus, J. (2006). Changes in the spatial structure of a large Polish city: The case of Poznań. *Cities, 23*(5), 364–381.

Krätke, S. (2001). *Regionale Wirkungen der EU-Osterweiterung*. Informationen zur Raumentwicklung, 11/12. Bonn: Bundesamt für Bauwesen und Raumordnung.

Krätke, S. (2011). *The creative capital of cities: Interactive knowledge creation and the urbanization economies of innovation*. Oxford: Wiley-Blackwell.

Lawton, P., Męczyński, M., & Barber, A. (2013). Policies towards place attraction and policies for place retention. In S. Musterd & Z. Kovacs (Eds.), *Place-making and policies for competitive cities* (pp. 105–126). Oxford: Wiley-Blackwell.

Malecki, E. J. (2000). Knowledge and regional competitiveness. *Erdkunde*, *54*(4), 334–351.

Martin-Brelot, H., Grossetti, M., Eckert, D., Gritsai, O., & Kovács, Z. (2010). The spatial mobility of the 'creative class': A European perspective. *International Journal of Urban and Regional Research, 34*(4), 854–870.

Mumford, L. (1940). *The culture of cities*. London: Secker & Warburg.

Musterd, S., Bontje, M., Chapain, C., Kovács, Z., & Murie A. (2007). *Accommodating creative knowledge: A literature review from a European perspective*. ACRE report 1. Amsterdam: AMIDSt.

Parysek, J. J. (2006). Processes affecting the development and transformation of towns in Central European states: The case of Poland. *Quaestiones Geographicae, 25*, 29–36.

Parysek, J. J. (2009). Urban development in Poland after 2003: Legal regulations and reality. *Quaestiones Geographicae, 28*, 39–49.

Parysek, J. J., & Mierzejewska, L. (2006). Poznan. *Cities, 23*(4), 291–305.

Sailer-Fliege, U. (1999). Characteristics of post-socialist urban transformation in East Central Europe. *GeoJournal, 49*(1), 7–16.

Schumpeter, J. (1947). The creative response in economic history. *Journal of Economic History, 7* (2), 149–159.

Śleszyński, P. (2007). *Gospodarcze funkcje kontrolne w przestrzeni Polski* [Economic control functions in Poland's space]. Warszawa: Instytut Geografii i Przestrzennego Zagospodarowania PAN.

Stanilov, K. (Ed.). (2007). *The post-socialist city: Urban form and space transformations in Central and Eastern Europe after socialism*. Dordrecht: Springer.

Statistical yearbook of Poznań city. (2013). Poznań: Statistical Office in Poznań.

Stryjakiewicz, T. (Ed.). (2005). *Impact of foreign investors on regional and local development: The case of GlaxoSmithKline Pharmaceuticals S.A. in Poznań*. Poznań: Bogucki Wydawnictwo Naukowe.

Stryjakiewicz, T., Burdack, J., & Egedy, T. (2010). Institutional change and new development paths: Budapest, Leipzig, Poznań, Riga and Sofia. In S. Musterd & A. Murie (Eds.), *Making competitive cities* (pp. 93–112). Oxford: Wiley-Blackwell.

Stryjakiewicz, T., Grzywińska, E., Kaczmarek, T., Męczyński, M., Parysek, J. J., & Stachowiak, K. (2008). *Poznan welcomes talents: Understanding the attractiveness of the metropolitan region for creative knowledge workers*. ACRE report 5.8. Amsterdam: AMIDSt.

Stryjakiewicz, T., Kaczmarek, T., Męczyński, M., Parysek, J. J., & Stachowiak, K. (2007). *Poznan faces the future: Pathways to creative and knowledge-based regions*. Amsterdam: AMIDSt.

Stryjakiewicz, T., Kaczmarek, T., Męczyński, M., Parysek, J. J., & Stachowiak, K. (2010). *Poznan as a creative knowledge region: The views of high-skilled employees, managers and transational migrants*. ACRE report 10.8. Amsterdam: AISSR—University of Amsterdam.

Stryjakiewicz, T., & Męczyński, M. (2010). Creative urban processes in post-communist metropolises: The case of the Poznan metropolitan region. *International Journal of Sustainable Development, 13*(1–2), 69–83.

Stryjakiewicz, T., Męczyński, M., & Stachowiak, K. (2008). *The attractiveness of the Poznan metropolitan region for the development of the creative knowledge sector: The managers' view*. ACRE report 6.8. Amsterdam: AMIDSt.

Stryjakiewicz, T., Męczyński, M., & Stachowiak, K. (2014). The role of the creative industries in the post-socialist urban transformation. *Questiones Geographicae, 33*(2), 19–35.

Stryjakiewicz, T., & Stachowiak, K. (2013). Creative sector: A newly emerging opportunity for local development or a challenge to local governance? In P. K. Pradhan, J. Buček, & E. Razin (Eds.), *Geography of governance: Dynamics for local development* (pp. 57–66). Bratislava: International Geographical Union, Commission on Geography of Governance.

Taylor, P. J., & Walker, D. R. F. (2001). World cities: A first multivariate analysis of their service complexes. *Urban Studies, 38*(1), 23–47.

Törnqvist, G. (1983). Creativity and the renewal of regional life. In A. Buttimer (Ed.), *Creativity and context* (Lund studies in geography, series B: Human geography, Vol. 50, pp. 91–112). Lund: Gleerup.

Tsenkova, S., & Nedović-Budić, Z. (Eds.). (2006). *The urban mosaic of post-socialist Europe*. Heidelberg: Physica-Verlag.

Węcławowicz, G. (2013). *Transnational development strategy for the post-socialist cities of Central Europe*. Warsaw: Institute of Geography and Spatial Organization, Polish Academy of Sciences.

World Bank. (2002). *Developing the knowledge economy: How cities help national programs in three EU accession and an ECA country. Review of Poznań Knowledge Economy Foundation*. Poznań: World Bank Competitive Funding Scheme.

Young, C., & Kaczmarek, S. (1999). Changing the perception of the post-socialist city: Place promotion and imagery in Łódź, Poland. *The Geographical Journal, 165*(2), 183–191.

Young, C., & Kaczmarek, S. (2008). The socialist past and postsocialist urban identity in Central and Eastern Europe: The case of Lodz, Poland. *European Urban and Regional Studies, 15*(1), 53–70.

Ziółkowski, M. (1999). Mentalność Wielkopolan. Rzeczywistość, stereotyp czy perswazyjne argumenty? [The mentality of Wielkopolska. The reality, stereotype or persuasive arguments?]. *Przegląd Zachodni, 55*(4), 11–30.

The Knowledge-Creation Potential of Pécs

Éva Lovra, Éva Szabó, and Zoltán Tóth

Abstract

Pécs is the fifth largest city in Hungary in terms of population, and the nine active ethnic minority councils indicate the multicultural nature of the region. The status of Pécs, compared to other Hungarian and European cities, is based on three main factors: the health and environmental industries, which have largely replaced previous mining and manufacturing industry; the cultural industry, which is based upon the history of the city; and higher education. Pécs was a European Capital of Culture in 2010, and since then, it has continued to host significant cultural events. The University of Pécs is one of the most important institutions of higher education in the country in terms of student numbers and scientific performance. There is an increasing number of services and industrial sectors that cater for cultural and knowledge-creating activities. The following study shows how the knowledge-creating sector in Pécs is developing and illustrates that there is further potential in the future.

1 Between Tradition and Future Potential

Pécs, as the centre of the South-Transdanubian region, has an extensive history of being a melting pot of different nations, cultures, economic activities and educational opportunities at all levels, that has continued up to the present time. The geographical location of the city has not only influenced its economic development, but also strengthened its multifunctional and multicultural character. Pécs is

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now trying to complement this patrimony with the potential coming from the new, quaternary sector.[1]

Pécs is the fifth largest city in Hungary, in terms of population, and the nine active ethnic minority councils (German, Roma, Croatian, Serbian, Bulgarian, Polish, Greek, Ukrainian, Ruthenian) show the borderless nature of its culture and education. It is the only town in Hungary where the Roma language is an official language, taught from the kindergarten to the university, and at the highest level of research in Roma studies. As one of the Europe's oldest university towns (the first university in Hungary was founded in Pécs in 1367), it has served and is still serving the region, being the main contributor towards knowledge-creation strategies. This complements the existing cultural features of the city, notably its being a UNESCO Heritage site.

The position of Pécs with respect to other Hungarian and European cities is based on three main attributes: (a) the health and environmental industry, (b) the cultural industry and (c) higher education. As regards the 'material' industry, the economy of Pécs has obviously changed over the centuries, but this change has accelerated over the last few decades when, after a period of industrial development, the region was plunged into recession. The city is bordered by the Mecsek hills to the north and a relatively flat area to the south, and these features formed the basis for the main industries in the past. At one time Pécs was a regional centre in primary (coal mining and later uranium mining) and secondary industries (manufacturing and food production), but these activities declined following the socialist period. Mines, a great source of income for Pécs, closed down, and this left many inhabitants economically disadvantaged, giving rise to phenomena of urban marginality and in some cases segregation (Hardi and Nárai, 2012).

Over the last decade, however, in response to programmes aimed at triggering a knowledge-based sector, those negative outcomes and related stereotypes lessened, and social-urban divisions decreased to some extent. The University of Pécs, in cooperation with the Municipality, played a major role in urban rehabilitation projects of the poorest and most neglected areas (Faragó, 2012). In addition, economic activity was further stimulated in preparation for Pécs becoming an European Capital of Culture in 2010.

The economic data on Baranya County, which surrounds the city of Pécs, show that the region is still behind the national average performance. In terms of industrial output per capita, the county ranks last. In 2010, according to the Central Statistical Office (CSO), the Hungarian GDP was 9449 euro (about 2.665 million HUF[2]) per capita, while in the Baranya County it was only 1.797 million HUF (Fig. 1). Disparities with other regions are also increasing to the detriment of the county: whereas in 1994 it ranked 9th out of the 19 counties in terms of GDP per capita, it ranked only 15th in 2010.

[1] Quaternary sector: Research and development, Information Technology and High-Tech industry.

[2] Official average exchange rate in 2010 was 282 HUF per EUR.

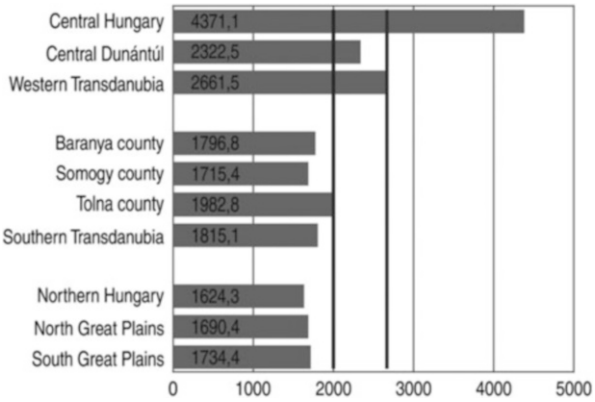


Fig. 1 Hungarian GDP per capita by region and county, 2010 (1000 Hungarian Forints) (Counties of Dél-Dunántúl region include Baranya, Somogy, and Tolna). First *vertical line* from *left*: Average GDP per capita for the Transdanubian region, second *vertical line* from *left*: Average GDP per capita for Hungary (*Source*: Dél-Dunántúli Statisztikai Tükör 2012/11 KSH)

This has happened even though the county utilised resources available from the European Union ("Objective 1", to promote the development and structural adjustment of regions that are lagging behind), and a highway connecting Budapest and Pécs was built.[3] Since domestic and foreign investment is weak, there is lack of funds to revive local industry. The contribution of the Baranya County to the national added value is rather low, and mainly coming from the public sector. In 2010, while counting 4 % of the national population, more than 5 % of the national GDP was provided by the public administration of the county (defence, education, health care and social services), compared to manufacture which only contributed 2.2 %. As regards information and communication technology, the contribution was lower still, at only 1.4 % (Integrated Urban Development Strategy 2011, 2013).

Within the county, the role of the service sector is prevalent.[4] In 2013, the total employment was 83,146 employees in Baranya County and from that sum, 60,668 people were involved in the tertiary sector, equal to 73 %.[5] Education has gained nearly one sixth of total workforce: 13,491 employees make a living in this branch. In the material production, the number of employees decreased significantly in recent years: in 2008 it was 23,990 and in the fourth part of 2013 it dropped to 18,557,[6] while the number of employees working in mining has become

[3] Highways may have negative effects however on peripheral regions, such as Baranya County, because the reduced transport cost make it profitable for industries to move towards the country's richest regions, where agglomeration and urban economies are higher, as it happened in the South of Italy in the 1960s (on behalf of Augusto Cusinato).

[4] According to the Integrated Urban Development Strategy 2014, the rate is 75 %.

[5] Source: http://statinfo.ksh.hu/Statinfo/haViewer.jsp

[6] Source: http://statinfo.ksh.hu/statinfo/haViewer.jsp

insignificant. The construction industry employed only 3,578[7] people in the county and 855 in Pécs and, because of the recent unfavourable economic situation, it is resulting in further decreases.

With new challenges and the rise of a tertiary sector (trade and logistics), the role of Pécs in the regional economy has changed significantly. The city has changed from being an industrial town towards a service centre. The annual data from CSO show that in 2011 education has one and half times the number of full-time employees that industry (respectively, around 9,500 and 6,100; Table 1), and that a significant part of the employees (64 %) work in other sectors of business services.

The University has approximately 6,000 employees from Pécs' active population, which is about 110,000. More than 20,000 students are taught in the ten faculties, and the most important local economic activity has become knowledge export abroad and knowledge transfer to Hungary (mainly to the Central Hungary region, including Budapest). These developments are important for Pécs's competitiveness since knowledge-creation has become crucial both in Europe and in the global market. Pécs is striving to become a national stronghold of knowledge-based economic development, as well as an internationally acknowledged participant in creative industries, education and science. The developing international and domestic connections provide the city with another potential to create a more effective economy and knowledge-creating milieu, which also suggests that the primary and secondary sectors are no longer relevant in Pécs.

The city's current situation is based on three main factors, which have played an important role in the city's economic history, and continue to be relevant for further development. These factors are:

- the rich cultural heritage, which is related to the Turkish and Latin culture (till to the seventeenth century), German and Latin influence (at the end of the eighteenth century) and the Hungarian period (twentieth century). These features contributed to Pécs being included among the cultural capitals of Europe, and its nomination as a "European Capital of Culture 2010" in 2005. In 2000, the inner city was also designated as a UNESCO World Heritage site, in recognition its Paleo-Christian cemetery;
- the 'Pécs Pole Programme' (*Pécs Pólus Program*), that was prepared with support from the European Union between 2007 and 2013. The Pole Programme is based on the environmental, cultural and health care industry and their mutual cooperation. The aim is to transform the structure of the urban economy through the sharing of knowledge between the different sectors;
- education, and especially the University of Pécs, which play a significant role in the creation of a knowledge-based environment. The university has taken on an important role not only in knowledge creation, but also in breaking down segregated areas and the fight against related negative stereotypes.

[7] Source: http://statinfo.ksh.hu/Statinfo/haViewer.jsp

Table 1 Employees in Pécs city in units with more than four employees (CSO 2011)

NACE codes	Part-time employees in units with more than 50 employees	Full-time employees in units with more than 50 employees	All-in units with more than 50 employees	Fulltime employees in units with more than 4 employees
A-Agriculture, forestry and fishing	. . .	. . .	. . .	439
B- Mining industry	. . .	. . .	. . .	10
C-Manufacturing	268	3,807	4,075	4,730
D-Electricity, gas, steam and air conditioning supply	1	866	867	866
E-Water supply; sewer-age; waste management and remediation activities	17	539	556	558
B + C + D-Industry not including water distribution	269	4,673	4,942	5,606
B + C + D + E-Industry	286	5,212	5,498	6,164
F-Construction	30	343	373	855
G-Wholesale and retail trade; repair of motor vehicles and motorcycles	472	3,429	3,901	4,364
H-Transporting and storage	195	2,955	3,150	3,033
I-Accommodation and food service activities	78	449	527	762
J-Information and communication	4	276	280	392
K-Financial and insurance activities	204	777	981	816
L-Real estate activities	6	104	110	155
M-Professional, scientific and technical activities	118	519	637	665
N-Administrative and support service activities	33	528	561	630
O-Public administration and defence; compulsory social security	66	4,706	4,772	5,322

(continued)

Table 1 (continued)

NACE codes	Part-time employees in units with more than 50 employees	Full-time employees in units with more than 50 employees	All-in units with more than 50 employees	Fulltime employees in units with more than 4 employees
P-Education	492	6,459	6,951	9,507
Q-Human health and social work activities	224	730	954	2,167
R-Arts, entertainment and recreation	. . .	. . .	. . .	676
S-Other services activities	53	170	223	233
ALL	2,261	26,657	28,918	36,180

. . . = Not available data

Under the ECoC 2010, four important investments were prioritised: the construction of the Conference and Concert Centre, the South Transdanubian Regional Library (the so-called "Knowledge Centre"), the Zsolnay Cultural Quarter, and the revitalization of public parks and spaces. These investments were devised to support both science and culture, which in combination with renovating neglected suburbs, serve to promote the cultural and knowledge-creation potential in the city (Pirisi et al, 2008).

Also present in Pécs are nearly 1600 non-governmental organisations (foundations, associations, organisations, public corporations, professional chambers and representative bodies), which not only play an important role in the areas of culture, education and the social economy, but also provide a crucial connection between different sectors. These sectors include culture, education, healthcare, social services, urban renewal and economic development, environmental protection, defence of rights, sports, hobbies and recreational activities.[8]

Despite Pécs's important role, the Southern Transdanubian region remains one of Hungary's economically underdeveloped regions. CSO data in 2009 show that industrial production fell about 15 % in relation to the previous year, and new initiatives to stimulate industry and cultural activities have been substantially ineffective. Since the end of the 1990s the driving forces of the local economy (coal and uranium mining) have vanished, and have yet to be replaced. As a result of limited job opportunities in both the city and the county, younger people tend to migrate to Budapest or to leave the country altogether.

One of the main weaknesses of the city and the region actually is decreasing population. Over the past 30 years, the population of all the three counties of the

[8] These public and private sectors are working together with civil organizations on development projects, like rehabilitation, renewal and pro-bono cases (human services, publishing, broadcasting, education, art-architecture etc.).

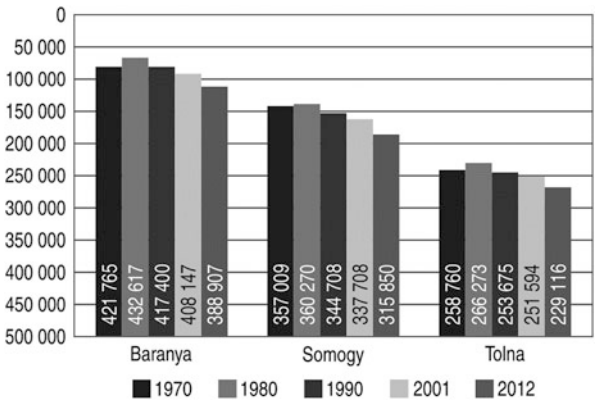


Fig. 2 Population trends by counties of the South-Transdanubian Region (Dél-Dunántúl). (*Source*: Dél-Dunántúli Statisztikai Tükör, 2013/7 KSH, 1)

Transdanubian (Dél-Dunántúl) region decreased, which corresponds with the national trend of declining birth rates, but is also partly due to migration. The population of Pécs reached a peak in 1989 when it had 183,000 inhabitants, but due to the traditional industry demise, changes in demographic behaviour and sub-urbanization, the population dropped to 152,459 in 2013. The balance between births and deaths is negative: the number of live births in the county capital was around 1,400–1,500 per year (Baranya county: about 3,200) since the turn of the century, while the number of deaths was about 2,000 (Baranya: 5,200). In the years between 1995 and 2004 more people left the city than moved to Pécs and, although this migration trend has reversed, the population is still decreasing (Fig. 2).

As the population of the city slowly ages, the new generation, who should have a valuable role in extending their knowledge, will also vanish over the long term. According to CSO (2013), the percentage of the population who were in the 20–29 year-old age group in the South Transdanubian region was 15.11 % in 2003, and dropped to 11.98 % in 2013.

Even though the population of the region is decreasing, the unemployment rate remains high. In 2001, it was 7.7 % in the Transdanubian region, while in 2012 the rate climbed to 12.7 %. In the third quarter of 2013, the national unemployment rate in Hungary slightly decreased to 9.8 %, but in Baranya County it was 14.5 %.

2 Dominant Economic Factors in Pécs

2.1 An Industry in the Search for New Horizons

Pécs has strong industrial roots based on the geographic situation and the territory itself. The presence of high quality black coal in the Mecsek Hills influenced the city's development following the Second World War. At that time there was a tendency to create industrial cities through centralised planning, to develop the economies of both larger towns and economically impoverished regions. Even though a significant light industry sector already existed in Pécs and the Baranya

County,[9] it was heavy industries in the primary and secondary sectors that were the driving economic force during that period.

Studies[10] show that the Pécs Coal Mines (*Pécsi Szénbányák*) became the largest industrial organisation in the city in the mid 1950s. In addition, uranium mining was also developed. At the end of the 1960s, because of changes in the system of economic management, a partial downturn in mining and the changing energy structure, modernisation became a priority. This prompted the leadership of Baranya County to come up with plans for the long-term industrial management in the county. Planners recognised that mining no longer served the mainstay and advancement of development, and that its one-sided structure should be supplemented with a more multi-functional strategy.

The influence of external dependence, a decline in the coal mining industry and a lack of significant investment for developing new industry were all factors that resulted in the failure of the previous project, and gave rise to redefining development strategies, which were based on that part of the existing industry that was independent of the shrinking mining industry. However, significant development was only seen in the late 1980s, when it became clear that the mining industry was no longer sustainable, and the establishment of new industries, industrial parks, job retraining initiatives along with development in the infrastructure became urgent and inescapable.

After the change of regime in 1989, Baranya's economy was in bad shape for a variety of reasons. The industry itself had not advanced sufficiently to survive the era; the economic structure changed dramatically in the early 90s, and there was a crisis of deindustrialisation caused by the disappearance of the socialist supported industry. From the 1990s to the beginning of the twenty-first century, Baranya Country had the lowest proportion of per capita industrial output in Hungary, and also the region's traditional heavy and light industries entered a period of rapid decline. From Pécs' previous industries (leather, mining and food), only the tobacco factory and brewery have survived, although the Zsolnay Porcelain Factory is also still operating.

Since the early 1980s, a process of tertiarisation has occurred and from the beginning of the 1990s, partially resulting from market and economic structural rearrangement, this transformation has had a positive effect on local development processes. The structural rearrangement was insufficient however, for lack of strategy and planning, and inadequate management. The de-multiplier effect of the recession and the growing importance of certain components of the service-based economy that are not involved in producing material items, marked an improvement in the tertiary sector, which was based on the development strategy

[9] Cigarette factory (BAT Pécsi Dohánygyár Kft.), porcelain factory (Zsolnay Porcelánmanufaktúra Rt.), brewery (Pécsi Sörfőzde Rt.), shoe manufacture (Szigetvár), cement plants (Duna-Dráva Cement in Beremend, LaFarge Cement Plantin Királyegyháza), electronics manufacturer (Elcoteq Magyarország Kft.), diary factory (Új-MiZo Rt.).

[10] Pirisi, Stefán, and Trócsányi (2009).

of a knowledge-based economy. The knowledge-based and innovation-oriented economy thus emerged as a possible solution to revive the shrinking economy and industry in Pécs. Strategic tools of this process included existing and planned industrial parks, university R&D programmes, initiatives in the health industry, development of the tertiary and quaternary sectors, and supporting mutual cooperation between the industrial and cultural economy.

These conditions have been enacted by the government development strategy, the Pole Programme (*Pólus Program*). As said above, through this initiative Pécs focused on three target sectors—the health, the environmental and the cultural industries. These changes are apparent not only in industry, but also in higher education, as well as the administrative, cultural and economic fields.

In the environmental and health industries, more than 19 billion HUF were spent in overhauling the health care infrastructure between 2009 and 2013. The funding of this development was primarily through the New Széchenyi Plan and the city's own resources. Pécs also managed to renovate and modernise various specialist clinics; it started works on a regional blood centre and an oncological centre; completely renovated the so-called "400 bed hospital" and extended a research centre through grants awarded by the European Union and the New Széchenyi Plan. There are more and more new clusters focusing on the improvement of health care and environmental industries, for example biological and biotechnological research, which are considered traditional in South-Transdanubia and particularly in Pécs. The majority of the cluster members represent small and medium-sized enterprises, but there is also cooperation with micro enterprises.

Recent studies show however that the economic situation in Baranya County and especially Pécs is improving at a rate below the national average. Researches by the Chamber of Industry in Pécs-Baranya County show that the business cycle performance is under the country's index of 9 %. The registered value of Baranya's economic fluctuation was −32.21 %, while the county's regional index was −3.16 %, and for Hungary it was +4.22 % in the first quarter of 2011 (Fig. 3), which shows that the county economy is characterized by a prolonged recession.

2.2 Culture-Based Urban Development in Pécs and Its Regional Influence

Pécs was 'crippled' through the closure of the coal and uranium mining industries, as well as the failure of traditional industry, which means that the city had to look for new opportunities and resources to survive the recession. As mentioned above, the urban development plan, devised in 1990, gave priority to the tertiary sector, and especially culture-based development. Being located away from Budapest, Pécs was historically able to develop its own unique culture. This culture had the backdrop of an architecture that embraces the values of a variety of historical eras. In addition, the university continues to be one of the most important institutions in the city. Other cultural institutions include museums and galleries, which are located on a single museum street in the historical downtown.

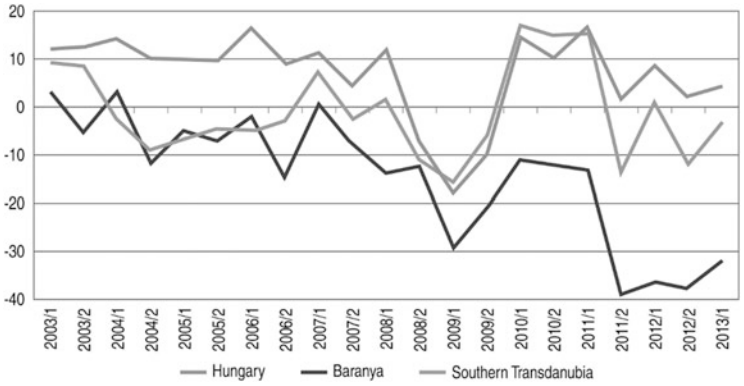


Fig. 3 Business cycle rate of the Hungarian economy (*upper line*: Hungary, *middle line*: Southern Transdanubia, *lower line*: Baranya County) (*Source*: Weller, PBKIK, 2013)

As a result, an application was submitted to UNESCO to include the whole historical city centre as an area of recognition, under the name "Stratification of Cultures in the Historical Downtown of Pécs". The title of the submission referred to the collection of Roman and early Christian monuments existing together with medieval Hungarian, Renaissance, Ottoman heritages, as well as baroque and modern architectures. ICOMOS (International Council on Monuments and Sites) eventually narrowed the selection to focus on the early Christian cemetery which was awarded the "World Heritage" status in 2000.

Pécs' culture and World Heritage Sites also contributed to the city applying for inclusion as the European City of Culture in the autumn of 2005. One year later, the European Union Cultural Council announced that Pécs would share the status of European Capital of Culture, together with Istanbul and Essen. The application laid great emphasis on the different nationalities living in the city and access to the southern Balkan region and their involvement in the European Capital of Culture project.

To effectively manage the high quality events which were planned on that occasion, many old facilities had to be replaced with new projects. Included amongst them were the construction of one of the most modern conference centres and concert halls in Europe (15,000 m^2); the South Trans-Danubian Regional Library and Knowledge Centre (9000 m^2); a large exhibition space; the then abandoned, partly ruined Zsolnay factory was turned into the "Zsolnay Cultural Quarter". The cultural district (including 22,000 m^2 of buildings and a 15,000 m^2 public park) provides a variety of cultural functions, and also hosts the University's Faculty of Arts, in the backdrop of modern and traditional architectures. As part of the investment of the ECoC project, 70 urban public spaces and parks were renovated, making up an area of approximately 583,000 m^2 (Figs. 4 and 5).

Investment under the scheme of the ECoC was also carried out in the poorer eastern parts of the city inhabited by older rundown coal mining communities, which helped to provide vital rejuvenation in these areas.

Fig. 4 Renewal of Széchenyi Square (photo by the Author)

Fig. 5 Detail of the Zsolnay Cultural Quarter (photo by the Author)

2.3 The University's Role in the Knowledge-Based Development in Pécs and Its Regional Influence

The role of the University of Pécs in the knowledge-creating sector is important for both the city and the region. The major challenge for the university is to pro-mote knowledge to affect positively all levels of society and to decrease the gap between

Fig. 6 The Faculty of Engineering and Information Technology (photo by the Author)

social groups. Of special importance are the Roma studies that not only promote the education of this ethnic group, but also create an open-minded environment that helps break down segregation and stereotypes.

Studies in natural sciences and technology are also considered a priority, but the present economic situation means that well-paid jobs for new graduates in these fields are limited in the region. As a consequence, the interest in studying natural sciences and technology is decreasing.

The University is a decisive participant to the economy of Pécs. The contribution of the university and its students are estimated to make up about 15–20 % of the Pécs' GDP (IUDS 2014–2030, p. 10). The University, and the especially the Faculty of Engineering and Information Technology, face the challenge of strengthening their connection with the representatives of the industrial sector, utilizing the research and innovation potential to the fullest possible extent and through launching dual training. This relationship is of primary importance because, due to the unfavourable economic environment, state funding in higher education is decreasing, and this lack can be partly compensated through private grants. It is also important to note that, due to the human capital migration to Budapest and the other developing centres, the city is less and less capable of retaining graduate students. With greater collaboration between the university and industry, it is also hoped that less graduates will leave the region (Figs. 6 and 7).

Fig. 7 Szentágothai Research Centre, the science building (photo by the Author)

3 The Geography of Knowledge-Creating Services in Hungary

The present study is based on comparing five service sub-sectors of Knowledge-creating Services—KCS, as established in Cusinato (2012): Core KCS, Core-related KCS (separated into the public and the private sectors) and Collateral Activities to KCS.[11]

The group of activities within the Private Core KCS combines not only those activities that predominantly belong to the cultural economy sectors, but also academic, research, technical and economic advisory activities, as well as R&D service activities. A range of Private Core-Related KCS were selected from the cultural economy, which include those creative activities that tend to accompany and supplement Private Core KCS but belong to the sector supporting services. Public KCS integrates the basic services in the studied area, such as education, health, public administration and justice-related activities.

The Collateral Activities to KCS cannot be categorized as easily as the main and related sectors. They essentially combine trade and service activities dealing with material items that are connected to those sectors.

With reference to the TEÁOR-NACE classification (TevékenységekEgységes Ágazatainak Osztályozási Rendszere—Statistical Classification of Economic

[11] The KCS classification we make use of in this case study is shown in the Appendix.

Activities in the European Community),[12] the CSO (Central Statistical Office) provides information for economic activities at the national, regional and county levels, expanded to four-digits codes. It is important to note that CSO data are only available for companies, associations, NGOs, etc. with more than four employees. The database, however, provides only two-digits of economic activities for smaller territories, i.e. cities and towns. During the first phase of the research work, the study was based on the CSO data using the two-digits classification (for smaller territories) that gives a fair comparison at the national level and for regional distribution. In order to establish a more detailed depiction of the knowledge-creating sectors in Pécs, the research used four-digits company data from the Pécs-Baranya Chamber of Commerce and Industry (PBKIK). This private database contains information about the number of companies and employees and their location by postcode within the Baranya County and Pécs.

Tables 2 and 3 show the level of specialisation in KCS of the Hungarian provinces, which is calculated using the "Density Localisation Quotient" (DLQ), as follows (Fig. 8):

$$DLQ = \frac{E_{k,i} / P_i}{E_k / P}$$

where:

$E_{k,i}$ is the number of the employees in the considered KCS sector k, in region i,
P_i is the number of inhabitants in region i,
E_k is the number employees in the considered KCS sector k, in the country
P is the country population.

Central Hungary (which includes Budapest) has the highest DLQs in every KCS sector (Tables 2 and 3). All remaining regions show a total KCS DLQ lesser than 1, which suggests that Budapest and its surroundings play a highly dominant role in the provision of knowledge-based services: while having 30 % of the country population, it holds 52 % of national employees in this sector. This centripetal role is particularly strong in the most sophisticated kind of KCS, i.e. Private Core KCS: with respect to them, Central Hungary counts 76 % of the national employees, with DLQ equal to 2.540, while the remaining regions show DLQs ranging from 0.229 (Northern Hungary) to 0.461 (Western Transdanubia).

Though at lesser levels, also the geography of the other sectors of private KCS (Private Core-related KCS and Collateral Activities to KCS) shows an analogous pattern of regional concentration. Central Hungary has DLQs which are respectively 1.884 and 1.704 as to Private Core-related and Collateral Activities to KCS,

[12] TEÁOR codes correspond to the European Union's NACE Rev.2. In Hungary, the categorization of industries is done with reference to the so-called TEÁOR-NACE codes (TEÁOR-NACE—Tevékenységek Egységes Ágazatainak Osztályozási Rendszere—Statistical Classification of Economic Activities in the European Community). This information is published by the Central Statistical Office (CSO).

Table 2 KCS employees and population in the country, regions and Baranya County[a]

Spatial unit	Private-core KCS	Private core-related KCS	Public core KCS	Public core-related KCS	Collateral services to KCS	Total KCS	Population
Hungary	151,333	16,575	322,713	25,896	711,636	1,610,392	9,957,731
Central Hungary	115,211	93,613	110,839	130,909	363,594	814,166	2,985,089
Central Transdanubia	5,777	10,823	33,083	16,459	60,759	126,901	1,090,346
Western Transdanubia	6,961	9,933	3,242	17,362	4,668	113,356	993,439
Northern Hungary	4,111	8,751	3,593	23,047	49,514	121,353	1,182,530
Northern Great Plain	731	16,253	43,606	29,057	7,661	172,836	1,473,036
Southern Great Plain	7,265	13,334	38,183	25,711	67,558	152,051	1,299,418
Southern Transdanubia	4,698	13,043	28,652	16,415	46,921	109,729	933,873
Baranya County	2,589	8,557	10,039	7,067	22,255	50,507	397,973

[a]*Sources*: CSO (2012) at the national and regional levels. Chamber of Commerce and Industry of Pécs-Baranya County (2013) at the Baranya County level. It should be considered that data at the county level are based upon a voluntary declaration from the companies themselves

Table 3 KCS DLQ distribution by region (Own edition)

Spatial Unit	Private core KCS	Private core-related KCS	Public Core KCS	Public core-related KCS	Collateral KCS	Total KCS
Hungary	1.000	1.000	1.000	1.000	1.000	1.000
Central Hungary	2.540	1.884	1.146	1.686	1.704	1.686
Central Transdanubia	0.349	0.596	0.936	0.580	0.780	0.720
Western Transdanubia	0.461	0.601	1.007	0.672	0.657	0.706
Northern Hungary	0.229	0.445	0.938	0.749	0.586	0.635
Northern Great Plain	0.327	0.663	0.913	0.759	0.728	0.726
Southern Great Plain	0.368	0.616	0.907	0.761	0.727	0.724
Southern Transdanubia	0.331	0.839	0.947	0.676	0.703	0.727
Baranya County	0.428	1.292	0.778	0.683	0.782	0.785

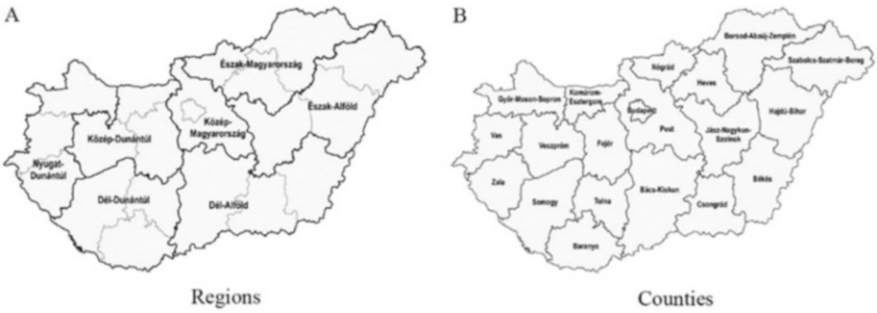


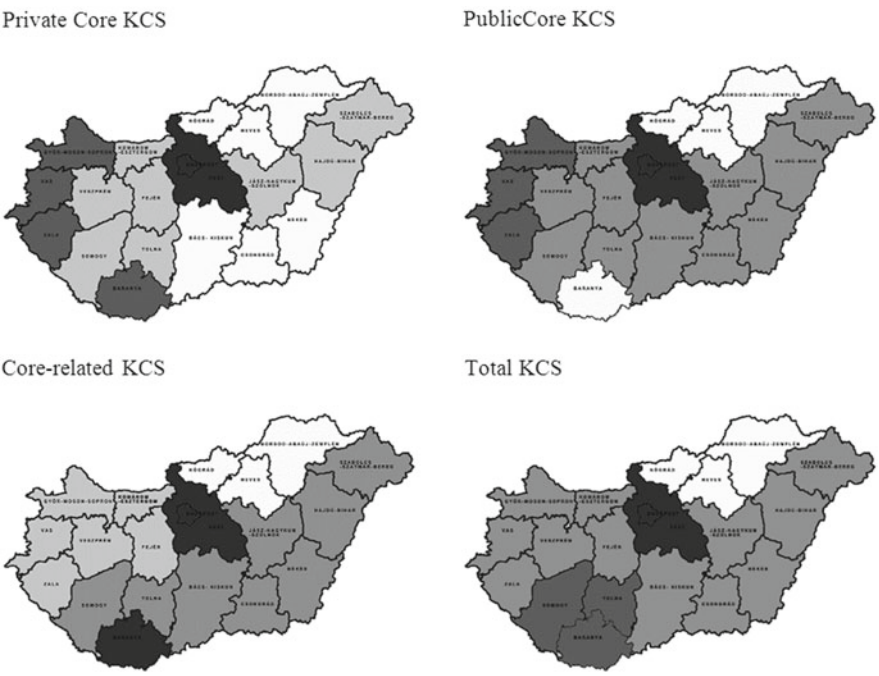
Fig. 8 Regions and counties in Hungary (Source: d-maps)

while no other region exceeds 1 (the maximum value is observable in the Southern Transdanubia, with DLQ = 0.839 in the Private Core-related KCS sector).

Unlike the very polarised condition of Private Core KCS, Public Core KCS show a much more distributed geography, according to the outcomes of other case studies (see Vacchiani-Marcuzzo and Paulus; Compagnucci in this book). While central Hungary has the highest DLQ among regions (1.146), it does not indicate at all a condition of absolute dominance within the national scene. As a proof, in the remaining regions DLQs range from a minimum of 0.907 (Northern Hungary) to a maximum of 1.007 (Western Transdanubia). This confirms that the geography of public services follows a policy-driven rather than market-driven rationale.

Examining the second-order public KCS rank (Public Core-related KCS), the primacy of Central Hungary (with DLQ = 1686) and the peripheral condition of the remaining regions (all with DLQ < 1) become however again evident.

In general, the most underdeveloped region in KCS is Northern Hungary, with Total KCS DLQ = 0635. Only in the Public Core-related KCS sector it ranks second to last, rather than last. On the other extreme, Southern Transdanubia ranks second in the country panorama as to Total KCS DLQ. This is essentially due to the role Public Core KCS and Private Core-related KCS play in the region, and especially Pécs. Thus, while not having an important role in the most skilled KCS (Southern Transdanubia ranks only five of seven among regions in Private Core KCS), it benefits of both an advanced public sector (mainly university), but also a rising private KCS sector, as we shall see in more detail in the following sections (Fig. 9).



SHADE/DLQ	Private Core KCS	Public Core KCS	Core-related KCS	Total KCS
	0.000 – 0.325	0.000 – 0.800	0.000 – 0.600	0.000 – 0.650
	0.325 – 0.400	0.800 – 0.950	0.600 – 0.680	0.650 – 0.722
	0.400 – 1.000	0.950 – 1.100	0.680 – 0.900	0.722 – 1.500
	Over 1.000	Over 1.100	Over 0.900	Over 1.500

Fig. 9 KCS Density Location Quotient per county, own edition. (Since DLQs for KCS groups show extremely different ranges, quartile scales have been applied. The scale of *grey* denotes the strength of the DLQ as mentioned in the Table)

4 The Geography of Knowledge Creating Sectors in the Baranya County

The area of Baranya County is 4429.6 km^2, and 2013 population amounts to 377,142 inhabitants. The County is divided into ten provinces and includes 301 settlements overall, among which Pécs is the most important with almost half the total population (Fig. 10 and Table 4). Recent data from the Chamber of Commerce and Industry of Pécs-Baranya lists 28,000 enterprises in the private and public sectors, of which micro and small firms make up 5,741 units (mainly in

Fig. 10 Provinces in Baranya County (*Source*: ksh.hu)

Table 4 Settlements and population in the Provinces of Baranya County (Source: ksh.hu)

Provinces	Main city	No. of settlements	Towns	Population (1st January 2013)	Area (km^2)	Density (pop./km^2)
Bólyi	Bóly	16	1	11,879	220.03	54
Hegyháti	Sásd	25	2	12,662	360.72	35
Komlói	Komló	20	1	35,084	292.48	120
Mohácsi	Mohács	26	1	34,901	600.98	58
Pécsi	Pécs	40	2	180,138	623.07	289
Pécsváradi	Pécsvárad	17	1	11,787	246.44	48
Sellyei	Sellye	38	1	14,383	493.69	29
Siklósi	Siklós	53	3	36,106	652.99	55
Szentlőrinci	Szentlőrinc	21	1	15,044	282.43	53
Szigetvári	Szigetvár	45	1	25,158	656.76	38
Baranya County	Pécs	301	14	377,142	4429.6	76

Table 5 KCS enterprises in Baranya County by size[a]

Provinces	Large	Medium	Small	Micro	Other	Total
Bóly	1		3	112	64	180
Hegyhát			3	70	39	112
Komló		1	10	283	163	457
Mohács		1	16	287	199	503
Pécs	2	10	132	4,441	2,407	6,992
Pécsvárad			4	100	63	167
Sellye			1	40	33	74
Siklós		1	5	174	103	283
Szentlőrinc			1	80	41	122
Szigetvár	1		2	154	74	231
Baranya County	4	13	177	5,741	3,186	9,121

Source: PBKIK

[a]Categories: Large Enterprise: 251—up employees; Medium-sized business: from 51 to 250 employees; Small businesses: 11–50 employees; Micro business: 2–10 employees; Other (self-employed): 1 person. "Business venture: a human activity whose main aim is to satisfy the entrepreneur need to achieve profit. Company: organizational framework for the legal entity business" (Chikán, 2008)

private businesses). The number of medium-sized and large enterprises is very low, with only 17 companies having more than 50 employees.

As regards KCS in the Baranya County, the statistics of the Chamber of Commerce and Industry show that the province of Pécs plays a leading role with 6,992 enterprises (Table 5). It counts 77 % of total county KCS businesses, while having 48 % of population. With reference to KCS sectors, the concentration is even higher in the Public Core KCS, where Pécs province counts 84 % of total county activities, which confirms the public-side driven character of the local economy. According to the database of the Chamber, there would be 3,186 enterprises which employ only one worker, but accordingly to the practice of Hungarian companies we have to count two people, since small businesses usually have one owner and one who is a silent partner. Other 5,741 enterprises employ two to ten people, most of them specialise in the knowledge-creating public sector.

Examining the distribution of KCS DLQs (Tables 6, 7 and 8), the county geography substantially repeats the national condition, though at a lower scale. Only the central province of Pécs shows DLQs higher than 1, both in total and with respect to every KCS sub-sector (except Sellye, which show to be highly specialised in the Public Core-related KCS sector, because of the presence of an activity on the four in the whole county).

In Pécs province, the Total KCS DLQ rate is 1.605, making it stand out among the ten districts in Baranya County. Statistical data[13] shows that the province has

[13] Source: http://www.jaras.info.hu/

Table 6 KCS enterprises by Provinces in Baranya County by KCS sector (Source: PBKIK, 2013)

Provinces	Private core KCS	Private core-related KCS	Public core KCS	Public core-related KCS	Collateral KCS	Total KCS
Bóly	109	29	0	0	42	180
Hegyhát	69	16	0	0	27	112
Komló	241	68	11	0	137	457
Mohács	302	87	10	0	104	503
Pécs	4,120	1,121	223	3	1,525	6,992
Pécsvárad	103	24	4	0	36	167
Sellye	58	4	0	1	11	74
Siklós	167	27	8	0	81	283
Szentlőrinc	67	18	2	0	35	122
Szigetvár	134	29	6	0	62	231
Baranya County	5,370	1,423	264	4	2,060	9,121

Table 7 KCS density in Baranya County by Province (per thousand inhabitants), own edition

Provinces	Private core KCS	Private core-related KCS	Public core KCS	Public core-related KCS	Collateral KCS	Total KCS
Bóly	9.18	2.44	0.00	0.00	3.54	15.15
Hegyhát	5.45	1.26	0.00	0.00	2.13	8.85
Komló	6.87	1.94	0.31	0.00	3.90	13.03
Mohács	8.65	2.49	0.29	0.00	2.98	14.41
Pécs	22.87	6.22	1.24	0.02	8.47	38.81
Pécsvárad	8.74	2.04	0.34	0.00	3.05	14.17
Sellye	4.03	0.28	0.00	0.07	0.76	5.14
Siklós	4.63	0.75	0.22	0.00	2.24	7.84
Szentlőrinc	4.45	1.20	0.13	0.00	2.33	8.11
Szigetvár	5.33	1.15	0.24	0.00	2.46	9.18
Baranya County	14.24	3.77	0.70	0.01	5.46	24.18

the highest annual income per capita (1,903,000 HUF), and the lowest proportion of job seekers among the active population (7.4 %), and the highest the number of enterprises per 1,000 people (165).

Regarding Private Core KCS, the Pécs province makes up three quarters of the county's KCS units (4,120 out of 5,370) with a DLQ equal to 1.606, which is to be expected due to the city's regional role. No other district shows values higher than 1 in this sector, so that Pécs plays a centripetal role. The situation is similar

Table 8 KCS DLQ in Baranya County, own edition

Provinces	Private core KCS	Private core-related KCS	Public core KCS	Public core-related KCS	Collateral KCS	Total KCS
Bóly	0.644	0.647	0.000	0.000	0.647	0.627
Hegyhát	0.383	0.335	0.000	0.000	0.390	0.366
Komló	0.482	0.514	0.448	0.000	0.715	0.539
Mohács	0.608	0.661	0.409	0.000	0.546	0.596
Pécs	1.606	1.649	1.768	1.570	1.550	1.605
Pécsvárad	0.614	0.540	0.485	0.000	0.559	0.586
Sellye	0.283	0.074	0.000	6.555	0.140	0.213
Siklós	0.325	0.198	0.317	0.000	0.411	0.324
Szentlőrinc	0.313	0.317	0.190	0.000	0.426	0.335
Szigetvár	0.374	0.306	0.341	0.000	0.451	0.380
Baranya County	1	1	1	1	1	1

regarding Private Core-related KCS and Collateral KCS, and even more marked for Public Core KCS. In the city of Pécs, outstanding regional functions are provided in the field of health care, secondary and tertiary education, scientific and research activities, as well as by institutes of general education, theatres and the specialized cultural centers of various nationalities (Croatian, Roma, German) and religions (Orthodox, Evangelist, Muslim etc.). The most important institutes of state administration, banks and the regional centers of large companies are also present. In addition, Pécs, as the capital of the county, provides those fundamental social, educational, and cultural activities that are lacking in the other provinces of Baranya County: in this way it condenses the main activities of knowledge creation and plays a crucial role in the formation of a knowledge-creating environment in Hungary.

In other provinces, the KCS DLQ is much lower, ranging between 0.213 and 0.627, compared to the Baranya county. Four provinces (Bóly, Mohács, Pécsvárad, and Komló) show slightly higher values. In these provinces, statistics actually show that the unemployment rate is lower and the annual income per capita is higher than in the other provinces. The Bóly and Mohács provinces are also characterized by strong logistic and geopolitical potential. The presence of industrial parks, protected natural territories, the Danube-Drava tourist axis and agricultural innovation, as well as geothermal energy, biomass, solar-energy and cross-border projects provide good opportunity also for KCS.

The favorable position of the Pécsvárad province is mostly explained by history. Stephen I, the first king of Hungary, founded an abbey in Pécsvárad, and the town was built around it. The other settlements in the province are also rich in traditions and attractions.

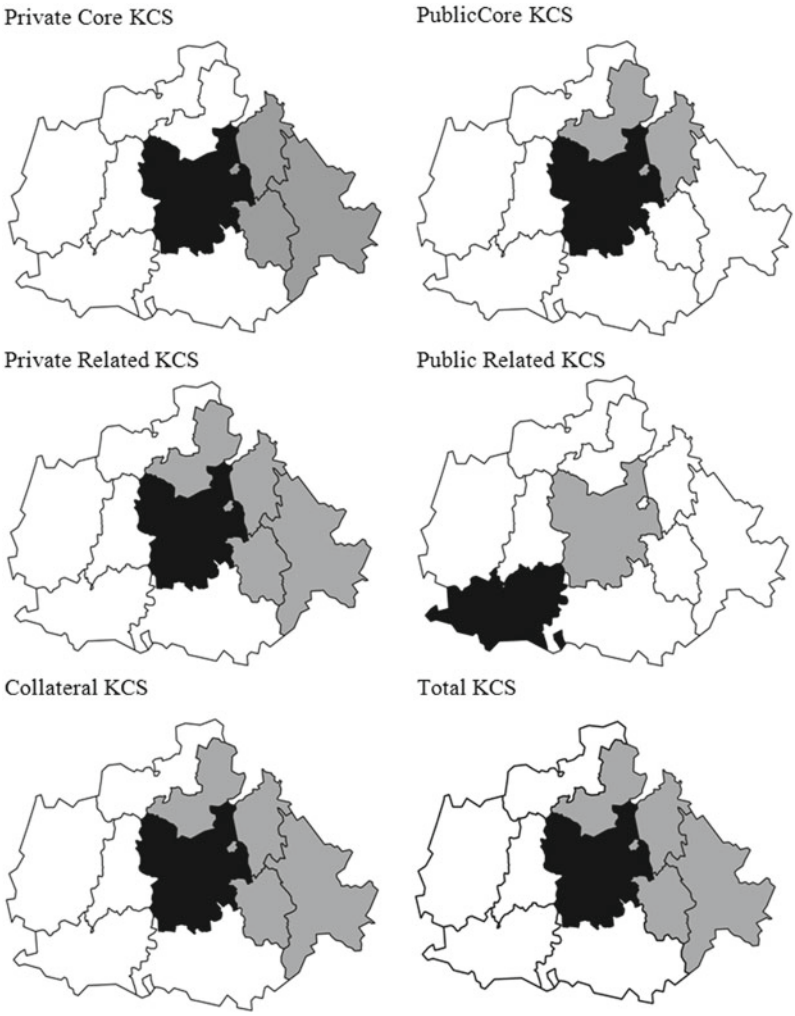
The level of entrepreneurship in Komló province is enhanced by the support of the local government, and the highest number of schools per municipality is here. In addition, sport and cultural events, and the industry trade fair increases the KCS.

The county's other five provinces (Szigetvár, Hegyhát, Szentlőrinc, Siklós, Sellye) compared to the previous ones have less favorable indicators: the KCS DLQs values are varied from 0.380 to 0.213. These districts are characterized by low population density and high proportion of job seekers and low average income. Szigetvár and Siklós may have slightly better opportunities due to the cultural and historical background and thermal spa facilities, but this cannot be seen in the KCS data.

The Siklós province, which has the third economic potential in the area (by CSO), is the thermal water based tourism and health center in Harkány. The economic implications of these factors (health industry, tourism, and mining) gave the opportunity to the Siklós area to become one of the developing areas in the County. An exception is the South-Eastern part of the Province, which borders the region Sellye, and where the process became typical in Baranya (the population changed and the slum process/segregation began).[14]

The most deprived province in KCS is Sellye province, with a total DLQ of only 0.213, even though it has one of the four important Public-related KCS activities in the County (the other three being located in Pécs). The Sellye Province is considered by CSO as an economically and socially backward region. In the seventeenth and eighteenth centuries, the agriculture of the province (formerly known as "Ormánság") was flourishing compared to other provinces, as a result of the favourable environmental conditions. This period of prosperity later went into decline however at the beginning of the nineteenth century, followed by a deterioration in living standards. As a result, it became customary for families to only have one child, and following the Second World War, children from the most educated classes left the region. Their role in society was taken over by poorer and less educated families. Nowadays, this low-density area is full of micro towns (villages), and both the population density and the average monthly salary per inhabitant are the lowest in the county. The unemployment rate and the number of socially disadvantaged are extremely high (Fig. 11).

[14] *A Sellyei(-Siklósi) KSH-térségrövidleírása by Teréz Kovács*: http://www.mtaki.hu/data/files/394.pdf.



SHADE /DLQ	Private Core KCS	Private Core-related KCS	Public Core KCS	Public Core-related KCS	Collateral KCS	Total KCS
	0.00–0.60	0.00–0.45	0.00–0.44	0.00–1.50	0.14–0.50	0.00-0.50
	0.60–0.90	0.45–0.85	0.44–0.88	1.50–3.50	0.50–0.85	0.50–1.00
	0.90–1.20	0.85–1.25	0.88–1.32	3.50–5.00	0.85–1.20	1.00– 1.25
	1.20–1.60	1.25–1.65	1.32–1.77	5.00–6.60	1.20–1.55	1.25– 1.61

Fig. 11 KCS DLQ by province in Baranya County, own edition. (The scale of grey denotes the strength of the KCS DLQs with reference to the average County values. Since DLQs of the KCS groups show extreme variability on scales, quartile scales have been applied, see table)

5 The Geography of Knowledge-Creating Services in Pécs City

The importance of Pécs in the KCS sector is obvious when compared to the provinces of Baranya County. The summarized KCS employee's database for Pécs from 2013, shows that the city provides those fundamental social, educational, cultural activities that are missing from other provinces of Baranya County. As shown above, the province of Pécs concentrates 77 % of total county KCS businesses, while having 48 % of population, but within the province, the role of the capital Pécs is not similar. Pécs actually condenses only 79 % of total KCS activities in the province, while counting 84 % population, with the consequence that Total KCS DLQ is 0.9364 regarding to the number of activities.

The relatively low index maybe surprising, but one explanation can be that the value does not specifically reflect the weakness of the city, but shows that the province is almost as strong as the city itself with respect to the KCS sector. The catchment area of Pécs, and the other settlements in its district, show favorable geographic and economic characteristics for enterprises. Many people choose the city to live in and companies are likely to base their headquarters here as well, but operative units chose a more sprawled location pattern. For Pécs province, the high DLQ value is also due to the general weakness of the rest of Baranya County with respect to KCS, with a high number of small villages, underdeveloped infrastructure and poor, uneducated inhabitants.

Data provided by the Chamber of Commerce and Industry of Pécs-Baranya (number and nature of the enterprises for each Zip code in Pécs city), is based on voluntary reports, which means that it is not exhaustive. The location of the KCS activities within the borders of the city was analysed according to their postal codes, though the various Zip areas are not fully consistent with the administrative borders of Pécs city (Fig. 12).

The density of KCS activities is the most significant in the four downtown districts and the historic quarter (between 200 and 516 enterprises/km^2) (Table 9 and Fig. 12). The most frequent activities are the following: accounting, bookkeeping and auditing activities, tax consultancy, quantity surveyors, business and other management consultancy activities, engineering, technical studies.

As regards the infra-urban KCS geography by Zip codes, the most KCS densities can be observed in four urban areas (258–516 enterprises/km^2):

5.1 Zip 7621—Downtown (Inner City)

This district is the historical centre of the city, which lies on the intersection of the axis of the urban structure. It contains numerous World Heritage monuments, and it also is the city commercial, institutional and cultural centre. It is thus easily understandable that the knowledge-creating businesses are the densest in the city

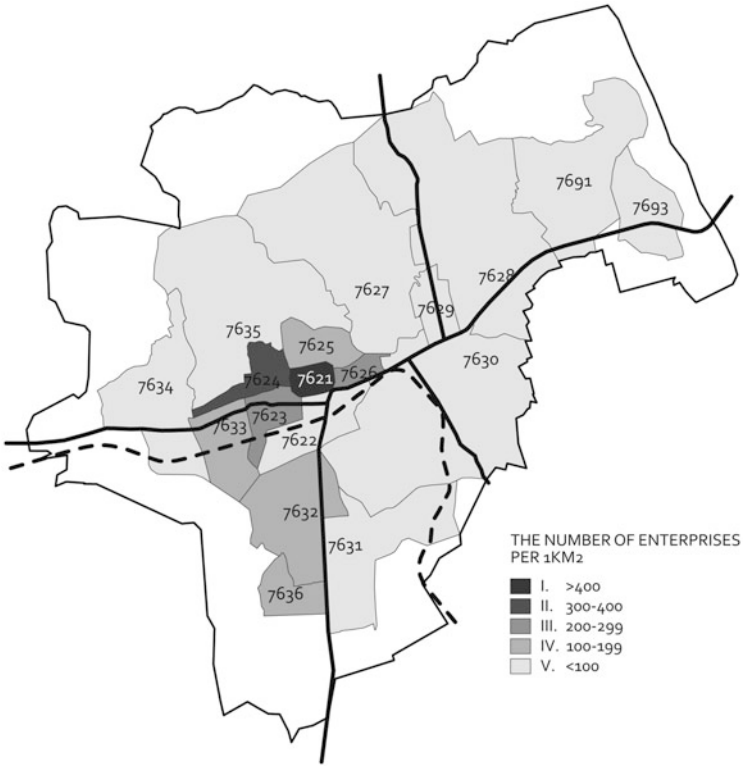


Fig. 12 Pécs—Geographic distribution of KCS entities with accordance to km^2 of the concerned areas (our own editing)

(516 per km^2 respect to the average city value of 55), especially regarding enterprises in the Private-Core KCS.

5.2 Zip 7624 Szigeti (Island) Suburb, Rókus-hillside, Alsómakár

The district was the western gate of the historic city and most of the suburb was developed at the beginning of the eighteenth century. This area is enclosed by high density traffic routes, especially Highway 6 which defines the southern border of the suburb. Various educational institutions, including several faculties of the University of Pécs, secondary and elementary schools, and kindergartens can be found in this area. The favourable geographical position, good transport connections with other areas of the city and the numerous educational institutions attract a wide range of business activities, especially Private-Core KCS, the Private Core Related KCS and Collateral Sector. The area actually ranks second as to KCS density (379 businesses/km^2).

Table 9 Distribution of KCS businesses in the Pécs city according to Zip codes (2013, own edition)

Zip code	Private core KCS	Private core-related KCS	Public core KCS[a]	Public core-related KCS	Collateral KCS	Total KCS	Area (km^2)	Total KCS/km^2
7621	240	54	20	0	96	410	0.794	516
7622	106	19	3	0	28	156	2.481	63
7623	246	61	14	0	115	436	1.513	288
7624	339	115	8	0	128	590	1.558	379
7625	250	45	21	0	12	328	1.788	183
7626	98	31	13	1	41	184	0.712	258
7627	200	71	8	0	200	479	12.549	38
7628	66	10	1	0	74	151	16.493	9
7629	76	34	1	0	26	137	1.540	89
7630	147	44	6	0	60	257	15.801	16
7631	80	17	6	0	35	138	6.354	22
7632	431	141	18	1	210	801	5.326	150
7633	159	57	13	0	92	321	2.702	119
7634	220	76	14	1	91	402	5.979	67
7635	228	70	20	0	91	409	11.856	34
7636	148	47	9	0	55	259	1.662	156
7691	34	9	0	0	14	57	8.100	7
7693	14	5	0	0	7	26	3.188	8
Pécs	3082	906	175	3	1375	5541	100.396	55
Pécs DLQ[b]	0.8839	0.9549	0.9272	1.1816	1.0653	0.9364		

[a]In Pécs, numbers of Public Core KCSs are in private hands (like private owned clinics, schools, museums, galleries etc.). In this case they have been recorded as business activities

[b]With rapport to Pécs province

5.3 Zip 7623 Ispitaalja (Hospital Space)

This district was named after a medieval hospital, and lies to the north-west of the railway station. The suburb has a sports hall, as well as several educational and medical institutions, and a good transport network provided by the intersecting Highway 6.

5.4 Zip 7626 Budai Suburb

The suburb served as the eastern gate of the city until the end of the eighteenth century. After the expulsion of the Ottomans, from the early eighteenth century, and the process of rebuilding, this part of the city started, and now many industrialists settled down here. The newly designed Zsolnay factory and quarter, which serves as a cultural district nowadays, two university faculties, as well as several health and commercial institutes are all present in this area.

Other four districts indicate a KCS medium density (100–199 enterprises/km^2). This medium density is caused, in one case, by proximity to the downtown, and in the other three cases by extensive residential housing.

5.5 Zip 7625 Tettye, Mecsek Hillside

This district is the northern gate of the city and many artists and intellectuals live here. The hills which characterise it are a popular recreational area and there are opportunities for walking in the nearby forest. As a consequence, whilst this area ranks fifth in Total KCS density, it ranks third as regards the number of Private core KCS.

5.6 Zip 7636 Málom Valley

Nowadays on the outskirts of Pécs, Málom Valley is inhabited since AD 1200, and was previously a separate municipality. The forest and lake make it a popular tourist area and it is also a venue for music festivals. Since the 1990s, new residential subdivisions have been built here. It ranks sixth as to KCS density.

5.7 Zip 7632 Garden City (Kertváros)

Although the Garden City district was inhabited since the beginning of the twentieth century, when the swampy marshland was drained from the site, the first significant residential development was in the 1930s, for officers and factory workers. In particularly, it is worth noting this peripheral part of Pécs has most of Private Core KCS enterprises (431) in Pécs, which suggests that even though this

part of the city is functionally a residential area, it supports a variety of smaller advanced companies. More and more people are engaged in activities that are independent from state institutions and are able to make a living in the market. This concentration of services implies (especially since we are talking about private enterprises), that industrial activities are decreasing, and there is increasing scope for services in the city. According to the summarized sector in Pécs, most small private businesses (about 141 companies), related to the private sector are located in the outskirt of Pécs city, the Kertváros district. The majority of these companies have less than 50 employees. This concentration indicates the importance of private KCS in this suburban environment, in addition to public institutions. In Pécs, it is interesting to note that the majority of businesses in the collateral sec-tor, about 211 organisations, are operated from the high density housing estates of Kertváros. By comparison, in the city centre of Pécs, this is limited to only 96 registered organisations in this sector. The largest quotient of these enterprises also belong to associations which employ between one and ten employees.

In the neighboring Megyer district, a large multistoried public housing estate was constructed in the 1960s, and is served by numerous commercial, service and educational institutions. This is also where the city popular weekend market grounds are, as well as an Expo Centre and the city's first shopping mall. The high population density and institutions could explain the high number of the businesses in this district.

5.8 Zip 7633 Uranium City (Uránváros) District

This is one of the western, residential areas of the city that was created in the 1960s after the opening of the uranium mines. Many educational centers, sports halls, cultural institutions enrich this densely populated area, which places in the upper part of districts involved in KCS.

In the remaining Zip areas, the number of KCS activities are quite low ($<$99 enterprises/km^2). Attention should be drawn to the 7629 Meszes district which, although its numerous population on account of its public housing estates, shows a KCS density higher than the city average value. Another territory which stands out is the 7622 Siklósi suburb, which was historically the southern gate of the historical core city, and now has a significant traffic route which crosses it. Another territory, the 7634 Ürög, Rácváros (Rác-City), used to be a village (dating back to the thirteenth century) but now makes up the western part of the city.

The other eight districts (defined by their Zip codes) all have low density in terms of KCS activities. Some of these are sparsely populated, hilly residential areas (7635 Donátus, Bálics, 7631 Postavölgy and 7630 Újhegy), and other ones were previously rural territories which have been integrated into Pécs (7691 Somogy, Vasas and 7693 Hird), or the former iron-worker districts (Szabolcs 7628, 7627 Pécsbánya), which are inhabited mainly by poorer segregated classes.

6 Summarized Geography of the KCS Distribution

When looking at the number of people working in KCS sub-sectors in Hungary, the majority of them work in Collateral Services, that is in the subsidiary sector (711,636 units on about 1.6 million Total KCS), while Private Core KCS employ the fewest number of people (151,333 units). The high proportion of employees working in Collateral KCS is an indicator of the weak economic structure of the country: there are few people working full-time in the cultural industry, in publishing companies and research institutes, as well as and in the areas of information services and engineering activities. Taking individual regions into consideration, there are important differences in proportion and range. With reference to the number of employees, Budapest and its region play an overwhelming role: more than half of the country employees in KCS work herein. The second biggest employer is in the Northern Great-Plain region, which count 172,836 employees. In terms of density with rapport to population, the second rank region is the Southern Transdanubia (117.50 KCS employees per 1000 population, respect to 272.74 of the Central Hungary). Similar ratios are observable in the Southern Great Plain and Central Transdanubia, South Transdanubia, while the remaining regions rank at little distance (Table 10).

Regional disparities widen however a lot when Private-core KCS are taken into consideration. While Hungary counts 15.20 employees per thousand inhabitants, in Central Hungary the figure rises at 38.60, while in the remaining regions it ranges from 3.48 in Northern Hungary to 7.01 in Western Transdanubia. The Baranya County ranks towards the upper extreme, with 6.51 employees per thousand

Table 10 KCS density, own edition (employees per thousand inhabitants)

Spatial unit	Private core KCS	Private core-related KCS	Public core KCS	Public core-related KCS	Collateral services to KCS	Total KCS
Hungary	15.20	16.65	32.41	26.01	71.47	161.72
Central Hungary	38.60	31.36	37.13	43.85	121.80	272.74
Central Transdanubia	5.30	9.93	30.34	15.10	55.72	116.39
Western Transdanubia	7.01	10.00	32.63	17.48	46.99	114.10
Northern Hungary	3.48	7.40	30.38	19.49	41.87	102.62
Northern Great Plain	4.96	11.03	29.60	19.73	52.01	117.33
Southern Great Plain	5.59	10.26	29.38	19.79	51.99	117.01
Southern Transdanubia	5.03	13.97	30.68	17.58	50.24	117.50
Baranya County	6.51	21.50	25.23	17.76	55.92	126.91

inhabitants. Regional disparities are also with regard to the other classes of private KCS (Core-related and Collateral KCS), but at a lower level: while the ration between densities in Central Hungary and the most deprived region is 11 as regards Private Core KCS, it lessens to 4 with reference to Private Core-related KCS and to 3 in case of Collateral Services, which proves that urban agglomeration economies lessen with the lessening of sophistication in knowledge-based services.

The proportion of Public Core KCS in relation to the population of the whole country, as well as the individual regions, is similar in all regions, except Western Transdanubia and Northern Hungary (Nógrád, Heves and Borsod-Abaúj-Zemplén County), where it is ten times lesser. There are surprisingly wide differences in Public Core-related KCS among regions. In comparison to the density of employees working in Central Hungary (43.85 per thousand inhabitants), the value in other regions is very lower, with the lowest being in Central Transdanubia.

These indicators correlate to the level of schooling and geographical location of individual regions. The situation is better in the western areas, which are closer to Western Europe than in the eastern and southern zones, which are economically marginal regions. But also central counties, like Nógrád, Heves and Borsod-Abaúj-Zemplén, suffer weaker performances due to their nearness to Budapest.

The provinces of Baranya County were examined separately, with the aim of showing the role of Pécs and the Pécs region. We can state that the Baranya County at a whole also belongs to the marginal regions, which have not yet fully exploited the potentials of the quaternary sector. Examining the counties KCS proportions, the leading role of the Pécs district is clear, though the role of the city of Pécs does not appear as dominant in some KCS activities as one would have expected.

The present study does not focus only on the proportion and coverage of the knowledge-creating functions, but also looks for the potentials existing in these economic kinds of activities. As regard the policy side, the goals are to develop the local economy along with to upgrade the segregated settlements and areas of the city and the county, and incorporate them into the developing network as well.

7 Conclusions

The special situation and the basic problems of the Hungarian economy are rooted in the fact that the beginning of the economic transformation and the intensification of globalisation processes occurred simultaneously (Enyedi, 2003). The various regions and counties are placed at very different levels regarding the relations university-economy-government. The central region, together with Budapest, is in the most favourable position (the collaboration of the three spheres has an important effect on knowledge creation). In the western area, there are more and more foreign companies mainly settled in the global competitive sphere, which determine the direction and intensity of research and development. As a consequence, this area is less characterised by programmes aimed at eliminating segregation and improving the living standards of disadvantaged groups. In contrast, this is what characterises the economies and, within it, the knowledge-creating sectors

of the eastern and southern areas (and among them, the Baranya county and Pécs city). The reason of this condition is that Budapest and the north-western part of the country find easier to create connections with the European economy than the eastern and southern Hungarian areas.

As regards Pécs, though industry used to have an important role in its economy, the city has recently changed towards a more cultural and knowledge-based economy. This process is steadily happening but the transition is still insufficient. The cultural industry in the city creates a connection between the different sectors as, for example, the food and light industry sectors; environmental projects (including recycling); communications (media, printing, minor services), and also financial services.

The opportunities to create a city-hub for knowledge creation depend on better cooperation between institutions, business services, and also the university development programmes, which support education, job creation and the cultural industry. Over the last 20 years, science and culture have played a much bigger role in the economy of the city than in the previous decades. There are many experts from the municipality and also individual consultants which are working in an interrelated way on the issue of urban development. They are unanimous in their opinion that the city does not meet the requirements for sustainable development, which is partly due to the demise of traditional industry, the marginal location within the country and continual public budget deficit. The development strategies of the last years concentrated on sectors, such as the environment and health care industries which are undeveloped in other regions, without leading however to significant results. Although the number of cultural events has risen, this has not resulted into significant extra-income for the city; similarly, it was hoped that investors would have arrived from abroad, but they have not appeared.

This aim for local development can be better pursued by devising more market-oriented policies in the knowledge and science-based sectors, an issue that the Pécs University has the ability to support thanks to its strong ties with the economic sector. For this reason it has launched numerous initiatives and directly targeted co-operation with industrial participants from the region, to create more effective training. This serves to strengthen small and medium-sized enterprises and make them to become real market players.

Appendix

KCS classification is based on the NACE. For regional data, we used two digit classification. The availability of more detailed data at the county level allowed us to use the four digit classification for Baranya County.

Private Core KSC
S94.2.0—Activities of trade unions
S94.1.1—Activities of business and employers membership organisations
S94.1.2—Activities of professional membership organisations

R90.0.1—Performing arts
R90.0.3—Artistic creation
J58.1.1—Book publishing
J58.1.3—Publishing of newspapers
J58.1.4—Publishing of journals and periodicals
J58.2.1—Publishing of computer games
J58.2.9—Other software publishing
J59.1.2—Motion picture, video and television programme post-production activities
J59.2.0—Sound recording and music publishing activities
J60.1.0—Radio broadcasting
J60.2.0—Television programming and broadcasting activities
J62.0.1—Computer programming activities
J62.0.2—Computer consultancy activities
J63.9.1—News agency activities
M69.2.0—Accounting, bookkeeping and auditing activities; tax consultancy
M70.1.0—Activities of head offices
M70.2.1—Public relations and communication activities
M70.2.2—Business and other management consultancy activities
M71.1.1—Architectural activities
M71.1.2—Engineering activities and related technical consultancy M72.1.1—Research and experimental development on biotechnology
M72.1.9—Other research and experimental development on natural sciences and engineering
M72.2.0—Research and experimental development on social sciences and humanities
M73.1.1—Advertising agencies
M73.2.0—Market research and public opinion polling
M74.1.0—Specialised design activities
M74.2.0—Photographic activities
M74.9.0—Other professional, scientific and technical activitiesn.e.c.

Private Core-related KSC
R90.0.2—Support activities to performing arts
R90.0.4—Operation of arts facilities
P85.5.2—Cultural education
N82.9.1—Activities of collection agencies and credit bureaus
82.3.0—Organisation of conventions and trade shows
N78.1.0—Activities of employment placement agencies
M74.3.0—Translation and interpretation activities
M71.2.0—Technical testing and analysis
M74.3.0—Translation and interpretation activities
K64.2.0—Activities of holding companies
J63.9.9—Other information service activities n.e.c.
J59.1.1—Motion picture, video and television programme production activities

J62.0.3—Computer facilities management activities
J63.1.1—Data processing, hosting and related activities
J63.1.2—Web portals

Public Core KSC
U99.0.0—Activities of extraterritorial organisations and bodies
R91.0.1—Library and archives activities
R91.0.2—Museums activities
Q86.1.0—Hospital activities
P85.4.2—Tertiary education

Public Core-related KSC
O84.1.1—General public administration activities
O84.1.2—Regulation of the activities of providing health care, education, cultural services and other
O84.2.2—Defence activities
O84.2.3—Justice and judicial activities

Collateral Activities to KCS
C33.2.0—Installation of industrial machinery and equipment
G46.1.4—Agents involved in the sale of machinery, industrial equipment, ships and aircraft
G47.4.1—Retail sale of computers, peripheral units and software in specialised stores
G47.6.1—Retail sale of books in specialised stores
G47.6.2—Retail sale of newspapers and stationery in specialised stores
G47.6.3—Retail sale of music and video recordings in specialised stores
J58.1.9—Other publishing activities
J62.0.9—Other information technology and computer service activities
N77.4.0—Leasing of intellectual property and similar products, except copyrighted works
N81.3.0—Landscape service activities
N82.2.0—Activities of call centres
S95.1.1—Repair of computers and peripheral equipment

References

Central Statistical Office (Központi Statisztikai Hivatal): CSO data 2011-2014.
Chikán, A. (2008). *Vállalatgazdaságtan*. Budapest: Aula Kiadó.
Cusinato, A. (2012). Milieus and knowledge-creating services: Two interpretative tools for the knowledge economy. In R. Cappellin, F. Ferlaino, & P. Rizzi (Eds.), *La città nell'economia della conoscenza* (pp. 105–126). Milano: Franco Angeli.
Enyedi, G. (2003). *Városi világ—városfejlődésa globalizáció korában. Habilitációs előadások 4. PécsiTudományegyetem Közgazdaságtudományi Kar Regionális Politika és Gazdaságtan Doktori Iskola*, Pécs.

Faragó, L. (2012). Urban regeneration in a “city of culture”: The case of Pécs, Hungary. *European Spatial Research and Policy, 19*(2), 103–120.

Hardi, T., & Nárai, M. (Eds.). (2012). *Térszerkezet és területi folyamatok: Tanulmánykötet RechnitzerJánostiszteletére* (p. 253). Pécs: MTA KRTK Regionális Kutatások Intézete.

Integrált Városfejlesztési Stratégia (Integrated Urban Development Strategy). (2011). Pécs: PécsMegyei Jogú Város Önkormányzata (2008).

Integrált Városfejlesztési Stratégia 2014–2030 (Integrated Urban Development Strategy). (2013). Pécs: Pécs Megyei Jogú Város Önkormányzata (internal publication).

KSH. (2010/6), (2013/7). *Dél-Dunántúli Statisztikai Tükör*. Accessed: 25 Sept 2013. http://www.PBKIK.hu/hu/ugyfelszolgalat/cikkek/tovabbra-is-a-valsagjelek-dominalnak-baranya-megye-gazdasagaban-62371.

Pirisi, G., Stefán, K., & Trócsányi, A. (2008). The role of cultural economy in the revival of cities: Endowments and chances of the city of Pécs. In D. Lóczy, J. Tóth, & A. Trócsányi (Eds.), *Progress in geography in the European capital of culture* (pp. 11–23). Pécs: Imedias Publisher.

Pirisi, G., Stefán, K., & Trócsányi, A. (2009). A kultúra fővárosaelőtt: A bányászat szerepe Pécs dinamikus funkcionális morfológiájában [Before being a cultural capital: The role of mining in the spatial, functional restructuring of Pécs]. In T. Csapó & Z. Kocsis (Eds.), *A közép- é s nagyvárosok településföldrajza* (pp. 257–269). Szombathely: Savaria University Press.

Weller, J. (2013). *Továbbra is a válságjelek dominálnak Baranya megye gazdaságában*. PBKIK. Accessed 23 Oct 2013. http://www.pbkik.hu/hu/ugyfelszolgalat/cikkek/tovabbra-is-a-valsagjelek-dominalnak-baranya-megye-gazdasagaban-62371.

Towards Creativity-Oriented Innovation Policies Based on a Hermeneutic Approach to the Knowledge-Space Nexus

Roberto Camagni

Abstract

The hermeneutic approach to a proper understanding of the processes of knowledge creation that is proposed by the editors of this book is indubitably a cognitive turn in the economic literature on innovation, and it may be a first step in the construction of a new scientific paradigm. What is more interesting for a regional scientist is the new interpretation of the generative role of space that the hermeneutic approach proposes. This interpretation, which is mainly presented in the general introduction and in the contributions of the two editors, builds and accumulates new fruitful perspectives on the achievements of the neo-Marshallian school (Becattini, Rivista di economia e politica industriale, 1, 35, 1979; Becattini, Industrial districts and inter-firm cooperation in Italy. International Institute for Labour Studies, 1990; Garofoli, Economic Notes, 19 (1), 37–54, 1989; Vazquez-Barquero, Endogenous development: Networking, innovation, institutions and cities. Routledge, 2002; Boix & Trullen, Papers in Regional Science, 84(4), 551–574, 2007) and of the 'evolutionary regional economics' research programme carried forward by the GREMI network with the concept of innovative milieu as a relational space and an operator for the reduction of dynamic uncertainty in innovation processes (Aydalot, Milieux innovateurs en Europe. GREMI, 1986; Camagni, Innovation networks: Spatial perspectives. London: Belhaven-Pinter, 1991; Camagni & Maillat, Milieux innovateurs. Théories et politiques, Economica, 2006).

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1 Introduction

The hermeneutic approach to a proper understanding of the processes of knowledge creation that is proposed by the editors of this book is indubitably a cognitive turn in the economic literature on innovation, and it may be a first step in the construction of a new scientific paradigm. In fact, it explores the deep-lying roots of creativity and innovation as cognitive processes and links them with such relational spaces as the—abstract—'milieu' and the—real—city. Accordingly, the hermeneutic approach positions itself on a long-standing scientific trajectory which originated with the work of Joseph Schumpeter (1934, 1939) and was relaunched by the evolutionary paradigm in the 1980s (Dosi, 1982; Dosi et al., 1988; Lundvall, 1988; Nelson & Winter, 1982) and the more recent studies on the role of knowledge and knowledge creation in economic development (Cappellin, 2007; Cappellin & Wink, 2009). It thus characterizes itself as a critique of the limits of the logical-positivist and cognitivist approach.

What is more interesting for a regional scientist is the new interpretation of the generative role of space that the hermeneutic approach proposes. This interpretation, which is mainly presented in the general introduction and in the contributions of the two editors, builds and accumulates new fruitful perspectives on the achievements of the neo-Marshallian school (Becattini, 1979 and 1990; Brusco, 1982; Garofoli, 1989; Vazquez-Barquero, 2002; Boix & Trullen, 2007) and of the 'evolutionary' regional economics research programme carried forward by the GREMI network with the concept of the *innovative milieu* as a relational space and an operator for the reduction of dynamic uncertainty in innovation processes (Aydalot, 1986; Camagni, 1991; Camagni & Maillat, 2006).

This paper thoroughly inspects this second scientific trajectory and underscores the novelties brought by the new paradigm (Sect. 2). It then elaborates a logical framework on which new place-based innovation policies and new policy styles could be devised (Sect. 3). Some tentative conclusions will follow (Sect. 4).

2 The Knowledge-Space Nexus: From the Neo-Marshallian to the Evolutionary to the Hermeneutic Approach

In regional science the scientific trajectory from a neo-Marshallian to a hermeneutic approach to the knowledge-space nexus was, and is, characterized by a significant presence of Italian scholars (Calafati, 2009; Capello, 2009; Ciciotti, 2009; Garofoli, 2009). For many decades, in fact, economic space was interpreted outside the usual geographical-geometrical dimension in 'relational' terms as 'territory'—a "set of functional and hierarchical relationships embedded in geographical space" (Camagni, 1980)—and as a socio-cultural system (Becattini, 1979).

In particular, the Marshallian industrial district, often simplified and misinterpreted as a mere specialized and flexible clustering of firms, was defined as "a socioterritorial entity which is characterized by the active presence of both a community of people and a population of firms in one naturally and historically

bounded area", sharing a "system of values (which) constitutes one of the preliminary requirements for its development and one of the essential conditions of its reproduction" (Becattini, 2004, pp. 19–20[1]). It generates a "localised thickening of inter-industrial relationships" and institutions, providing strong local externalities (Becattini, 2004, p. 16).

The role of socio-economic proximity was interpreted as making the market work more efficiently (Becattini, 1990). In fact, the economic behaviour of local agents in "a community market" is regulated by social norms and sanctions which punish opportunistic behaviour (Dei Ottati, 1995). Reputation represents, as in 'repeated games', an intangible asset that ensures reduction of transaction costs and a firm's survival. A sense of belonging to a specific community and social identity underpin trust relations which foster collective action and inter-firm cooperation in the form of incomplete, informal and flexible contracts. These local synergies give rise to increasing returns and locational advantages for district firms: interestingly, the agglomeration economies emphasized by the NEG school in the same years (Krugman, 1991; Fujita, Krugman, & Venables,1999) stem in this case from local synergies rather than from the pure indivisibilities and pure pecuniary externalities considered by that school.

Of course, the Marshallian message concerning the 'mysteries of industry' circulating 'in the air' was well understood by the industrial district school. Nevertheless, the presence of social and relational capital and the sharing of competences and know-how was not conceptually utilized in a cognitive direction, but mainly in regard to the reduction of production and transaction costs, risk-sharing among firms and collective action; and for interpreting the competitiveness of small firms systems rather than for interpreting innovation processes as static externalities rather than dynamic ones.

On the other hand, a different research programme starting from similar conceptual premises concerning the role of institutional features generating trust, sense of belonging and local identity, directly addressed innovation processes by proposing a novel theoretical interpretation of the local space: a programme that was called "evolutionary regional economics" (Calafati, 2009). Conceptual pillars were found, first of all, in the Schumpeterian (Mark 1) concept of a 'creative destruction' process subverting any static equilibrium condition—leading to a zero-profit state—through waves of endogenous energy: innovation processes led by entrepreneurial spirits (Schumpeter, 1934, 1939). The second pillar was the full inclusion in the theoretical scheme of the presence of uncertainty, static and dynamic, and of the impossibility of a substantive rationality to cope with it (Arrow, 1969; Simon, 1972).[2] Imperfect markets; risks of opportunistic behaviour; limited capacity to collect, select and transcode information; and in a dynamic context, typical of innovation processes, an imperfect capacity to assess decision outcomes and imperfect control of other actors' moves: all these call for devices and operators able to

[1] English translation of a seminal paper published in Italian (Becattini, 1979).

[2] Cusinato (2015) interestingly underlines the "amazing" fact that creativity is indirectly implied by—as a by-product of—bounded rationality.

reduce uncertainly. Large firms respond through size and acquisitions ('hierarchy')[3] or with cooperative agreements (Williamson, 1985); small firms find support and conditions to prosper in the local 'milieu'.

Thus, the third pillar, which introduced a theoretical conceptualization of the role of space in evolutionary processes, specifically regards the local 'milieu', defined as a set of territorial relationships coherently encompassing a production system, different economic and social actors, a specific culture and a representation system, and generating a dynamic collective learning process (Crevoisier & Maillat, 1991; Perrin, 1995). Its crucial role is that of a "collective operator reducing the degree of static and dynamic uncertainty of firms by tacitly or explicitly organizing the functional and informational interdependence of local actors and informally performing the SSSTTC functions" of information search, selection and transcoding; market signalling; ex-ante coordination of economic actors enhancing collective action; transformer of external energies to the needs and uses of local firms; tentative and partial control on competitors, other actors and the direction of technological progress (Camagni, 1991, p. 132). It is important, in the context of this book, to underline the relational, interactive and collective nature of this cognitive process and the role of the milieu in "allowing [transaction] costs reductions and enhancing the effectiveness of dynamic decision-making process of local firms" (ibid., p. 130): the sharing of linguistic and cultural codes, trust, local identity and sense of belonging, easy cooperation capability and wide internal mobility of specialized labor within the local space represent the fuel of these cognitive processes.

Further interpretative developments were achieved when the milieu concept was used to understand the cognitive nature of the city: a social construction oriented to interaction, exchange and economic efficiency, historically known as the birthplace of creativity and socio-cultural innovation; a special form of milieu, despecialised and diversified, hosting possibly multiple milieus (Camagni, 1999; Crevoisier & Camagni, 2000; Cusinato, 2007). The proximity of differentiated elements, the presence of a relational thickness (or a 'dynamic density' *à la* Durkheim) and the coexistence of both interconnections and anonymity generate casual contacts, a multiplicity of opportunities, redundancies and access to "a pool of indeterminate information" conducive to new knowledge creation: "the milieu effect in the city does not mostly follow from programmed encounters for the resolution of limited technical problems" but from unintentional and random links (Rémy, 2000, pp. 36–37; my translation).

Especially when speaking about the city, but also in the case of specialized industrial districts and milieus, the dimension of external accessibility and interaction is crucial. In fact, there is a high risk of being locked-in a self-referential set of

[3] The large company is able to control complexity and uncertainty by managing bounded rationality: R&D divisions mainly perform the selection and 'transcoding' functions of information; the necessary internal integration of departments is guaranteed through informal meetings or formal coordination; market demand and needs may be artificially driven; competitors may be controlled through agreements, financial power, other forms of 'suasion' (Camagni, 1991). This represents one of the possible organisational forms of a milieu.

codes, symbols, behavioural habits and competencies, with potentially disruptive effects in terms of evolutionary and creativity perspectives. This risk is overcome through the establishment of multiple interconnections with the external world, in terms of physical infrastructure, transport and communication services, trade and cooperation agreements, immaterial networks in the fields of finance, diplomacy, economic decision-making and culture.

External networks were pointed to as a second 'operator' allowing uncertainty reduction for both the firm and the specialized milieu and the enhancement of their creative capability (Camagni, 1991). In the case of the city, they are the drivers of its intrinsic centrality and the means through which the urban milieu opens up to the external world (Rémy, 2000).

The concept of localized collective learning processes, in the economic and institutional fields, was subsequently developed and utilized to interpret knowledge creation in high-tech urban districts, valleys, routes, glens, through both theoretical and econometric analyses (Capello, 1999; Keeble & Wilkinson, 2000).

In the evolutionary perspective, abstract space becomes a 'place' and a 'territory' encompassing at the same time a system of localized competences, skills and pecuniary externalities (agglomeration economies), a system of socio-cultural relationships, values and representations (identitarian capital), a set of shared beliefs, linguistic and interpretative codes (cognitive capital), a set of accepted rules and economic practices (institutional capital). These are different forms of territorial capital (Camagni, 2009) which do not derive from geographical proximity alone but also from organisational and cognitive proximity (Asheim, Boschma, & Cooke, 2011; Boschma, 2005; Torre & Wallet, 2014; Rallet & Torre, 1995).

In the case of cities, also the urban form and the spatial arrangement of physical space appear to matter in the generation of urban development. Compactness, conducive to contacts and easier face-to-face interaction; long-distance cooperation networks in the scientific and research fields; a polycentric structure of the metropolitan and regional urban system: these proved to be at the basis of both levels and increases in productivity/attractiveness of EU cities in the first decade of the present century (Camagni, Capello, & Caragliu, 2013, 2014). Interestingly, urban size alone, though linked to the productivity levels of cities as a consequence of static agglomeration economies, does not seem to be statistically significant in the explanation of dynamic agglomeration economies, i.e. it is not the best indicator of ongoing innovation processes (Camagni, Capello, & Caragliu, 2014).

Innovation may also come about following differentiated spatial 'patterns' linked to the differentiated availability of territorial capital (particularly urban structure, accessibility, general development level, specialisation) and cognitive inputs (education, skills, R&D, entrepreneurship). A recent inquiry on the regional dimension of the knowledge economy in the European spatial realm (Capello & Lenzi, 2013) shows the existence of three main patterns (and their variants), understood as "different modes of performing and linking the different phases of the innovation process" (p. 9), that is: a science-based endogenous pattern, a creative application pattern and an imitative pattern. The various components of the cognitivist, linear model of innovation—knowledge → invention → ideation → innovation → development—are broken down, separated, differently allocated in time and space, and

finally recomposed following a relational logic of inter-regional cooperation and exchange. Innovation assumes a *relative* connotation—as a localised novelty in products, in technological or commercial processes, in organisation *with respect to the past*, not with respect to some best practice realised elsewhere—and, interestingly, it does not empirically exhibit a hierarchical sequence among the different patterns in terms of economic outcomes (productivity or GDP increases, innovation density). These results open new ways to devise renewed normative guidelines for "smart innovation policies" (Camagni & Capello, 2013).

Therefore, in the evolutionary theorization, space matters when is understood as milieu: a relational, identitarian and cognitive space. It shapes propensities to cooperate and innovate; it furnishes the cognitive preconditions for innovation through the presence of context-specific know-how, density of information spillovers, trust in interpersonal relationships; and it reduces the strategic uncertainty intrinsic in any innovation process. Urban milieus add to the conceptual picture an original and potentially creative coexistence between homogeneity and heterogeneity/diversity[4]; their stronger image in internal and external social representations; their nature as interconnection nodes among different long-distance transportation, communication and economic/political networks.

All these conceptual elements are largely similar to and compatible with the characterization of the 'generative milieu' hypothesized by the hermeneutic approach: social volume, diversity; relational density; image space and material substratum. The conceptual definition of the role of space in innovative and evolutionary processes is clear; but it is also true that a last step is lacking. This concerns the way in which new knowledge is generated (the "how") (Cusinato, 2015) at both the micro and meso level of analysis. In the evolutionary paradigm, the entrepreneur somehow remains separated from his/her context or milieu: this latter supports him/her in the innovation process and cognitively interacts with him/her, but the two remain distinct, and they are distinctly defined from the outset—an effect of the original methodological individualism permeating economic thought.[5] The missing link consists in the fact that the context and the entrepreneur evolve together, closely bound up with each other in a process of knowledge creation and accumulation permeated by an interactive learning logic and a procedural rationality *à la* Simon (1972). "Knowledge ⋯ emerges together with the social space where it is situated and, on the other hand, ⋯, knowledge

[4] The city "produces intelligence: it chokes internal uniformity and develops with the shock of diversity" (our translation) (Ansay & Schoonbrodt, 1989, p. 18).

[5] In an only partially different context, when discussing territorial competitiveness, the present author emphasised the need to overcome methodological individualism by giving full recognition to the role of territory: "if individual firms and individual people undertake collective activities, facilitated by (and creators of) trust and local social capital; and if significant cognitive synergies, readily apparent in the local *milieu,* result from their various interactions; and finally if these actions and these processes draw additional vitality from cooperation with local public administrations; then it appears justifiable to go beyond methodological individualism - which regards only single firms as operating and competing - arguing the logical validity of a 'collective' concept such as that of *territory*, and to affirm that territories compete among themselves, using the creation of collective strategies as their instrument." (Camagni, 2002, p. 2406).

reflects, in its irreducible multiplicity, the diverse social spaces and aggregates where human beings live their social experiences" (De Michelis, 2015). And knowledge does not pre-exist innovation and creativity: "knowledge is co-essential to creativity" (Cusinato & Philippopoulos-Mihalopoulos, 2015).

The emotional and symbolic dimension plays a constituent role in this process of knowledge creation and creativity. Social and reciprocal 'recognition' is the expected reward and "gives sense to the entire process" (ibid.). Relational emotions (i.e. affects) like those felt in, and thanks to, the milieu atmosphere induce people to explore new re-combinations of existing knowledge and beyond. The place becomes a 'field of emotions'—a 'landscape' recognized, interpreted and appropriated by a collectivity of people in an identitarian sense. Physical elements and the spatial arrangement of public and private spaces matter in this context because of their symbolic meanings.

Creativity emerges not just at the basic level of processing information (L1 in Cusinato's work, according to Bateson) but also at the higher levels of processing interpretative codes as the reflexive assessment of mental processes through dialogue, relationality and the recognition of others' mindsets (L2), and as the capacity to change cognitive codes and beliefs (L3).

Years ago, the present author proposed a theoretical taxonomy of the roles of the (large) city based on a double entry matrix crossing the spatial logic (territorial and network approach) and the cognitive logic (functional and symbolic approach). The city was supposed to perform four interconnected roles: as a pure cluster / agglomeration supplying density and diversity, proximity, reduced transaction costs; as a node interconnecting multiple transportation, communication and economic networks; as a milieu reducing dynamic uncertainty and a substrate for collective learning processes; and as a symbol of territorial control and mastery producing symbols, codes and languages (Camagni, 2001). The cumulative interaction among these roles was presumed to be at the basis of the historical success of the city as a particular socio-spatial form of organization, but also to be conducive to possible contradictions concerning the limited ability of planning to master a rapidly increasing physical size, in the presence of enhanced potential effects of new communication technologies and the crucial role played nowadays by cognitive processes.

The same scheme can now be revised and enlarged to encompass other constituents underlined by the hermeneutic paradigm and thus complete the conceptual picture (Table 1). The two spatial logics are maintained—territorial and network—and an extra dimension is added besides the functional and the cognitive ones, namely the symbolic dimension. This last dimension encompasses processes by which urban spaces are recognized, appropriated and attributed sense by a local community. The city itself becomes an image-space, a 'landscape'; the emotional dimension becomes bound up with the spatial dimension within the milieu. As a synthesis of the different dimensions encompassed, the city is interpreted as a 'knowledge-creating milieu': a generator of symbols, codes, and languages capable of blending different forms of knowledge—analytic, synthetic, artistic (Asheim et al., 2011)—all simultaneously present in it, even if they are differently located in specific but interlinked urban places.

Table 1 The roles of the (large) city: a theoretical taxonomy

Hermeneutic logic	Spatial logic	
	Territorial dimension	Network dimension
Functional dimension	*City as agglomeration* • Volume and density of contacts • Internal heterogeneity • Specialization • Concentration of externalities • Reduction of transaction costs • Spaces for selective or casual meetings • Coexistence of interaction and anonymity	*City as interconnection* • City as a node in multiple and interacting transport, economic and communication networks • City as interconnection between place and node
Cognitive dimension	*City as Milieu* • Relational density • Sharing of languages, codes, values • Sense of belonging, identity • Substratum for collective learning • Uncertainty-reducing operator through: Socialized transcoding of information Ex-ante co-ordination of private decisions (collective action)	*City as global interaction* • Link among global milieus • Global exchange of codes and languages • Interaction in 'augmented' spaces • Gateway for global reach • City as control over space and time • City as symbol of territorial mastery • City as powerhouse/transformer of internal and external energy
Symbolic dimension	*City as landscape* • Image—space • Affect—atmosphere—emotion • Shared symbolic representations • Public spaces symbolically recognized and appropriated by a local community in an identitarian way	*City as knowledge-creating Milieu* • Creation of symbols, codes, and languages • Fostering reflexive forms of learning • Blending of different forms of knowledge: analytic, synthetic, artistic

Source: adapted and enlarged from Camagni (2001)

Paraphrasing Cusinato, (2015), we can assume that the knowledge-creating milieu is a socio-spatial device that, thanks to the five structural conditions—volume of contacts and heterogeneity of mental habits, interconnection of multiple networks, relational density and socialisation, global openness and interaction, shared symbolic representations and meanings attributed to physical spaces—drive and accompany reflexive forms of learning conducive to creativity.

The separation between the subject and the spatial context, which is still present in the cognitive, evolutionary approach to creativity and innovation, is overcome as the creative subject becomes him/herself part of the creative milieu, and as the act of innovation becomes part of a hermeneutic, socialized, reflexive and contextualized process of knowledge creation.

3 Towards Creativity-Oriented Development and Innovation Policies

Any normative and policy reflection almost necessarily implies—and in fact has implied in the recent experience of regional policies in the EU countries—some degree of positivism and functionalism, and the use of some simplified cause-effect approach in the identification of policy levers. The effectiveness of policy suggestions is expected to be liable to some more-or-less precise ex-ante assessment, which appears legitimate to require as far as public resources are concerned.

This condition has evident shortcomings. Firstly, simplification of the logic pushes towards the identification of single development drivers valid in any spatial context. This attitude may be acceptable in the case of some relevant and *necessary* preconditions for growth, such as the availability of basic infrastructure and accessibility devices, which nevertheless have almost always proved not to provide *sufficient* conditions for the generation of a durable development. In the case of more selective and sophisticated policies, like knowledge and innovation ones, this same attitude—evident in traditional sector-based approaches to the knowledge economy (targeting high-tech sectors) or function-based approaches (targeting R&D functions)—have proved to be not just ineffective but even plainly wrong, with the consequent waste of public money (OECD, 2011; Barca, McCann, & Rodriguez-Pose, 2012; Camagni & Capello, 2014).

Furthermore, a strategy supporting single actors—like firms, research units, high-education institutions—often turns out to represent a prize to potential opportunistic attitudes hiding goals that are very far from the ones expected by policy-makers (Camagni & Capello, 2009).

The cognitive and evolutionary approach to innovation policies introduced a first novelty in policy frameworks and practices by stressing the importance of the relational, cultural and psychological elements that define the preconditions for knowledge creation, development, transmission and diffusion (Foray, 2000). Especially in contexts characterised by a plurality of agents—like cities or industrial districts—knowledge evolution "is not the result of individual efforts in R&D within individual firms, but rather the combination of complementary capacities

and of widespread interactive learning processes, which involve many 'customers' and 'suppliers' along a well-defined filière or supply chain" (Cappellin, 2003, p. 307). Interactive learning processes are indicated as the core processes on which policy attention should be focused; and given the localised nature of these processes, places and territories should be targeted and their specificity taken into consideration by so-called 'place-based' policies (Barca, 2009; OECD, 2009).

Operationally, some of the suggested strategies referred to a policy intervention addressed to the interaction areas between the three main sub-systems participating in the process of knowledge creation and innovation: society (and general education systems), science/technology, and economy/entrepreneurship. The interaction areas were indicated in the integration between R&D institutions and the general and higher education system; in the presence of efficient transcoding and transfer systems to translate research outputs into a language that firms can understand and use; and in the presence of knowledge-oriented entrepreneurship and in learning-oriented labour markets (Fig. 1) (Camagni & Capello, 2009). Public resources should be allocated, not to the individual actors (universities, research centres, companies), but to joint projects developed in cooperation among them on a local/regional dimension and facilitated by local public administrations.[6] A conjoint econometric analysis based on direct investigation of 160 firms confirmed the important role of three elements—transcoding and transfer agents (in this case, efficient science parks), the absorptive capacity of firms (accumulation of firm-specific knowledge through R&D), and territorial relational capital in the form of local but external sources of knowledge (interaction with competitors, providers, customers, universities and knowledge facilitators such as advanced tertiary activities)—in the innovation performance of individual firms (ibid.). Most of these relational activities and functions are directly or indirectly performed by the KIBS—knowledge-intensive business services—or the KCS—knowledge-creating services—mentioned by the recent literature (Cappellin & Wink, 2009; Cusinato, 2015) which act as knowledge catalysts through their bridging role.

In more general terms, the paradigm shift brought about by the new cognitive approach entailed the consideration of new elements and processes, sometimes enlarging, but mostly superseding, the previous strategies in regional and development policies:

- Intangible factors, like human capital and knowledge, and the 'operators' that could translate potential into actual growth projects;
- Relational factors creating synergies, promoting co-operation and partnership, exploiting the richness of local relationships that define a productive 'vocation', local know-how and local culture: social and relational capital;

[6] The recent French strategy of building regional 'pôles de compétitivité', to date quite successful (Musso, 2014), is based on similar conceptual premises.

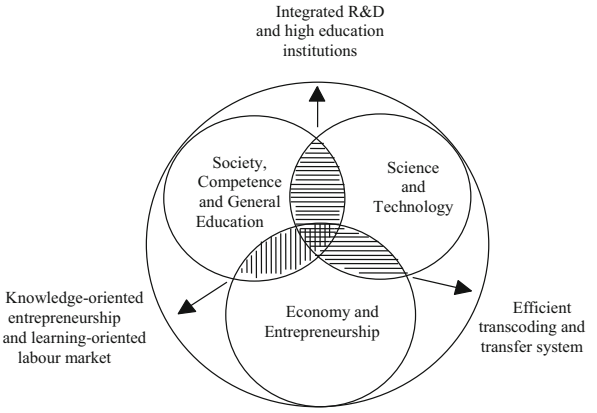

Fig. 1 An integrated approach to the knowledge society: the three relational pre-conditions. *Source*: Camagni & Capello (2009)

– Advanced communication networks and communication services in order to gain a global reach on markets, information, business opportunities: public and club goods addressed to the efficiency of territory.

But also, and perhaps more importantly, a change in policy styles was seen as crucial. It resided in the goals of (Camagni, 2008):

– Preparing territories for innovation, enhancing their adaptability to a changing external context, promoting their openness and receptivity to new business ideas and organisational styles, rather than forcing the locational decisions of single firms;
– Collecting the knowledge tacitly embedded in local entrepreneurship and local intermediate institutions, attracting them into the process of local strategic planning and design of new development projects in a cooperative game;
– Negotiating the terms for fruitful co-operation between territories and firms, rather than just supplying favourable location factors;
– Reinterpreting a bottom-up, 'generative' approach to development, rather than a top-down, 'competitive' one where regions and cities fight against each other to attract a given (and increasingly scarce) amount of public resources and private investments, in a zero-sum game.

These proposed goals and policy styles conveniently fit into the upper four boxes of Fig. 1, representing their possible normative counterparts. But the new hermeneutic approach adds a new symbolic dimension to the picture, requiring some extra elements to be kept in mind. These refer to the emotional and identitarian dimension of creative spaces and the socialized processes of recognition and appropriation of spaces themselves by local communities. These processes are difficult to replicate, and even to stimulate or enhance, using levers that almost necessarily depend on decisions external to the community. Creative milieus are in fact almost

"invisible from outside" (Cusinato, 2015). It is therefore difficult for them to become policy targets and recipients.

However, some important conditions for renewed policy styles in the hermeneutic perspective can be envisaged. The first concerns the process of policy design, which should be inclusive, being based on the empowerment of a floor, as wide as possible, of local stakeholders, institutions, associations and individuals. Citizens' participation in urban decision-making seems crucial: diffused imagination and grass-roots experience can be more easily given voice and translated into actual projects (Camagni, 2011). Urban strategic planning can also gain creativity and robustness when it abandons the old-fashioned corporate-like procedures typical of the 1990s and acquires an inclusive character by promoting citizens' participation and public/private partnership (Healey, 2001).

The second condition refers to the necessity to consider the physical dimension of places—not, of course, in the sense of the pure real estate business, as often happens when the construction or reconstruction of buildings and sites is involved. Public spaces play a important role in fostering interactions and casual encounters, providing opportunities for the self-organisation of movements, alliances, parties, associations (the Greek *agorà* and the Italian *piazza*). But also semi-public or 'club spaces' like the Roman *thermae*, the medieval monasteries, the post-medieval universities, the modern academies and also the recent hubs and airport lounges, edge cities, commercial and art galleries, congress centres and wharfs may perform the same functions, since they all share the same close attention to symbolic meanings, prestige messages, and images of friendly, inclusive and relaxing spaces.

The third condition regards the necessity to devise complex and integrated strategies in order to cope with the complex task of enhancing creativity. Nor in this field do mono-dimensional and simplistic recipes work. Acting on the provision of localised urban amenities in order to attract the 'creative class' (Florida, 2005) and disregarding the activation of local knowledge and identities may perhaps enhance urban tourism, but it will not enhance knowledge and creativity. Urban policies can greatly help the creation of an urban atmosphere, particularly in some places or districts which may be attractive to cultivated and creative people. But it is the pre-existing presence of these people that cumulatively adds vibrancy to these places, not vice-versa. Milan would have never attracted the talents working in the fashion world only thanks to the allure of the *Navigli* canals or of the central 'fashion *quadrilatero*', and without being the centre of the highly integrated fashion, design and communication industry (magazines, advertising and commercial television). And the fashion industry would not be in Milan without its previous historical specialization in textiles, clothing, advanced textiles machines, followed by CAD-CAM technologies and complemented by international fairs, handicraft clothing production (e.g. for the *La Scala* opera performances), industrial design and … a touch of Italian taste (Camagni, 2011). There is an evident path-dependency in such historical cases. It develops not just along pre-determined technological trajectories and proximities but also among often random cognitive proximities and within corresponding physical contexts.

The development of (and policy support for) cultural activities may be crucial in this picture in numerous respects. Firstly, in the education field, cultural activities help generate a special form of knowledge where curiosity and creativity are central. Secondly, they create the atmosphere, the attention, the enjoyment, and finally the willingness to pay for the products of human imagination and talent. Thirdly, they merge with other knowledge producing channels, such as scientific education, on-the-job learning, learning-by-cooperating, with outcomes that are highly conducive to creativity.

The fourth condition regards the necessary continuity of both policy interventions and targeted communities/stakeholders joining the innovation process. One-shot games generate opportunism rather than cooperation; they foster recombination and *bricolage* on existing information and consolidated knowledge, rather than reorientation of cognitive elements and exploration of new languages and codes. Policy-makers should be fully aware that they are acting on difficult and slow processes and not on-the-spot decisions.

The fifth condition has to do with the need to devise and pursue spatially differentiated strategies, not only in the sense of a necessary start from local specificities and vocations, from (micro) excellence fields and traditions, but also in the structural sense of the specificity of the cognitive 'patterns' present in the different spatial contexts. These patterns may be summarised and perhaps classified in a 'meso' dimension encompassing production structures (modern/traditional), technological *filières* (high-tech/low-tech), urban structure (large/small city), formal knowledge production (present/absent), thus enlarging the already proposed classification of "spatial innovation patterns" (Capello & Lenzi, 2013). The identification of meaningful patterns is likely to suggest meaningful and differentiated general strategies for each of them, on which (micro) local specificities interpreted by local stakeholders could build appropriate and realistic innovative projects.

The strategy for achieving and enhancing urban creativity cannot but be a complex and integrated one. Utilising the concept of "territorial capital" (Camagni, 2009), it should encompass and support three forms of capital—cognitive capital, relational capital, and environmental capital—and it should be managed with new governance styles.

Cognitive capital furnishes not just competence and know-how, but especially knowledge, learning-to-learn capacity, serendipity and, as a consequence, adaptability and an ability to drive change. A particular role should be attributed to the catalysts of knowledge exchange and interaction that are the 'knowledge creating services' supplied by professionals or by ad hoc structures, namely efficient science parks for technology transfer and adoption. Relational capital provides openness and trans-territorial linkages but also the capacity to cooperate with local and external partners and an exposure to novelty. Environmental capital encompasses all manifestations of physical capital, ranging from pure transport and communication infrastructure to urban settlement form and structure, from the presence of cultural heritage to the quality of the natural and built environment: all these elements impinge on local efficiency and potential. Concepts like Allen Scott's

"creative field" (Scott, 2006) or "creative milieu" seem particularly appropriate, because they suggest bringing together the three forms of territorial capital.

A crucial role is to be attributed to local governance. Owing to the frequency of market failures in the field of urban policies and the consequent need for the ex-ante coordination of actors, for collective action and the collective sanctioning of opportunistic behaviour, new governance styles are needed. They should address interaction and processes more than individual actors and individual decisions; be open to public/private partnership; and implement the creative management of cross externalities among the different competences, disciplines, functions, social groups and classes acting within the city (Camagni, 2011).

4 Towards Some Conclusions

The hermeneutic approach intended to gain deeper understanding of the processes of knowledge creation that is proposed in this book is, in my opinion, a cognitive turn in the economic literature on innovation, and it may be a first step in the construction of a new scientific paradigm. It builds heavily on the achievements of a long-standing scientific trajectory addressing the role of space—and of local 'territory' in particular—in economic development and innovation processes, which ranges from the neo-Marshallian approach to 'district' areas (Becattini, 1979), through the evolutionary approach to 'innovative milieus' (Camagni, 1991), to the more recent elaborations on the cognitive role of cities (Camagni, 2001; Rémy, 2000) and the processes of knowledge creation (Cappellin & Wink, 2009). On top of this trajectory the hermeneutic approach explores the sources of creativity and knowledge in depth, and it adds a symbolic-and-emotional dimension which links together places ('landscapes') and local collectivities, physical contexts and economic actors in a single process of knowledge creation. Cognitive codes are interchanged, recognized and reconstructed in a socialized process, showing the co-essential nature of knowledge and creativity.

The main message that emerges from these advances for innovation policies is that attention should be paid not just to traditional functional elements (human capital, externalities, or external linkages, although these maintain their importance), but mainly to symbolic and cognitive elements (codes, representations, languages, values) replicating the ways in which individuals, groups and communities fully develop their creative potential through synergy, associative thinking, interaction and cooperation in meaningful and recognized places.

Since this concerns representations, mental and identitarian constructs, and cognitive codes, the task of policy-makers is not easy, and a drastic change in policy goals and styles is required. This change can be summarized as follows:

– policy strategies should assume an evolutionary character, backing the technological trajectory of each region: fostering convergences, complementarities, contaminations and cross-fertilizations with other sectors / technologies; boosting diversifications and branching; enhancing the adaptation capability of

the existing regional knowledge base through the creative use of available territorial capital;
- the previous strategy cannot be implemented without the decentralisation of strategic planning and projects design through the involvement of local information, competence and knowledge and the engagement of intermediate institutions, local entrepreneurs, stakeholders and citizens. These actors should give rise to interactive participation and partnership processes of policy construction, including direct responsibility for implementation or co-financing;
- the 'bridging' role of some local forms of social capital, and of some tertiary activities in knowledge creation and exchange, should be supported and enhanced through appropriate incentives; public intervention and support should be addressed to interaction and cooperation processes and to joint projects rather than to individual actors; cooperation should also be solicited with partners external to the region / city (researchers, institutions providing existing appropriate knowledge);
- a place-based policy should not only emerge bottom-up from the above mentioned processes; it should also target local places, supporting processes of empowerment, recognition and identity construction around symbolic spaces;
- knowledge creation should be directly targeted: increasing the sources and scope of 'analytic', general purpose local knowledge; widening the application fields of this knowledge ('synthetic' knowledge in the sense of Asheim et al., 2011); importing the knowledge which is lacking through co-operation agreements and inflows of specialists and researchers; merging analytic/synthetic knowledge with artistic knowledge;
- prizing creativity in all its forms.

References

Ansay, P., & Schoonbrodt, R. (Eds.). (1989). *Penser la ville: choix de textes philosophiques*. Bruxelles: AAM Editions.

Arrow, K. (1969). Classificatory notes on the production and transmission of technological knowledge. *American Economic Review, 1*, 29–35.

Asheim, B., Boschma, R., & Cooke, P. (2011). Constructing regional advantage: Platform policies based on related variety and differentiated knowledge base. *Regional Studies, 45*(7), 893–904.

Aydalot, P. (Ed.). (1986). *Milieux innovateurs en Europe*. Paris: GREMI.

Barca, F. (2009). *An agenda for a reformed cohesion policy*, Report to Commissioner for Regional Policy, Brussels, April.

Barca, F., McCann, P., & Rodriguez-Pose, A. (2012). The case for regional development intervention: Place-based vs. place-neutral approaches. *Journal of Regional Science, 52*(1), 134–152.

Becattini, G. (1979). Dal settore industriale al distretto industriale: alcune considerazioni sull'unità di indagine dell'economia industriale. *Rivista di economia e politica industriale, 1*, 35–48.

Becattini, G. (1990). The Marshallian industrial district as a socio-economic notion. In F. Pyke, G. Becattini, & W. Sengenberger (Eds.), *Industrial districts and inter-firm cooperation in Italy*. Geneva: International Institute for Labour Studies.

Becattini, G. (2004). *Industrial districts: A new approach to industrial change*. Cheltenham: Edward Elgar.

Boix, R., & Trullen, J. (2007). Knowledge, networks of cities and growth in regional urban systems. *Papers in Regional Science, 84*(4), 551–574.
Boschma, R. (2005). Proximity and innovation. A critical survey. *Regional Studies, 39*(1), 61–74.
Brusco, S. (1982). The Emilian model: Productive decentralisation and social integration. *Cambridge Journal of Economics, 6*(2), 167–184.
Calafati, A. (2009). Macroregions, local systems and cities: conceptualization of territory in Italy since 1950. *Scienze Regionali—Italian Journal of Regional Science, 8*(3), 11–34.
Camagni R. (1980). "Teorie e modelli di localizzazione delle attività industriali". *Giornale degli Economisti*, March-April.
Camagni, R. (1991). Technological change, uncertainty and innovation networks: Towards dynamic theory of economic space. In R. Camagni (Ed.), *Innovation networks: Spatial perspectives* (pp. 121–144). London: Belhaven-Pinter.
Camagni, R. (1999). La ville comme Milieu: de l'application de l'approche GREMI à l'évolution urbaine. *Revue d'Economie Régionale et Urbaine, 3*, 591–606.
Camagni, R. (2001). The economic role and spatial contradictions of global city-regions: The functional, cognitive and evolutionary context. In A. J. Scott (Ed.), *Global city-regions: trends, theory, policy* (pp. 96–118). Oxford: Oxford University Press.
Camagni, R. (2002). On the concept of territorial competitiveness: sound or misleading? *Urban Studies, 13*, 2395–2412.
Camagni, R. (2008). Towards a conclusion: Regional and territorial policy recommendations. In R. Capello, R. Camagni, U. Fratesi, & B. Chizzolini (Eds.), *Modelling regional scenarios for the enlarged Europe* (pp. 283–306). Berlin: Springer.
Camagni, R. (2009). Territorial capital and regional development. In R. Capello & P. Nijkamp (Eds.), *Handbook of regional growth and development theories* (pp. 118–132). Cheltenham: Edward Elgar.
Camagni, R. (2011). Creativity, culture and urban milieux. In L. Fusco Girard, T. Baycan, & P. Nijkamp (Eds.), *Sustainable city and creativity* (pp. 183–198). Farnham: Ashgate.
Camagni, R., & Capello, R. (2009). Knowledge-based economy and knowledge creation: The role of space. In U. Fratesi & L. Senn (Eds.), *Growth and competitiveness in innovative regions: balancing internal and external connections* (pp. 145–166). Berlin: Springer.
Camagni, R. & Capello, R. (2013). Towards a conclusion: Smart innovation policies. In R. Capello, & C. Lenzi (Eds.), *Territorial patterns of innovation: An inquiry on the knowledge economy in European regions* (pp. 301–326). New York: Routledge.
Camagni, R., & Capello, R. (2014). Rationale and design of EU Cohesion policies in a period of crisis. *Regional Science Policy and Practice*. doi:10.1111/rsp3.12047.
Camagni, R., Capello, R., & Caragliu, A. (2013). One or infinite optimal city sizes? In search for an equilibrium size for cities. *Annals in Regional Science, 51*, 309–341.
Camagni, R., Capello R. & Caragliu A. (2015). "Static vs. dynamic agglomeration economies: Spatial context and structural evolution behind urban growth", paper presented at the 61st North American meeting of the RSAI, Washington, November 12–15; forthcoming on *PIRS-Papers in Regional Science*.
Camagni, R., & Maillat, D. (2006). *Milieux innovateurs. Théories et politiques*. Paris: Economica.
Capello, R. (1999). Spatial transfer of knowledge in high-technology milieux: Learning vs. collective learning processes. *Regional Studies, 33*(4), 353–365.
Capello, R. (2009). Thirty years of regional science in Italy: Retrospects and prospects. *Scienze Regionali—Italian Journal of Regional Science, 8*(3), 101–129.
Capello, R., & Lenzi, C. (Eds.). (2013). *Territorial patterns of innovation: An inquiry on the knowledge economy in European regions*. New York: Routledge.
Cappellin, R. (2003). Territorial knowledge management: Towards a metrics of the cognitive dimension of agglomeration economies. *International Journal of Technology Management, 26* (2–4), 303–325.
Cappellin, R. (2007). Learning, spatial changes and regional and urban policies: The territorial dimension of the knowledge economy. *American Behavioural Scientist, 50*(7), 897–921.

Cappellin, R., & Wink, R. (2009). *International knowledge and innovation networks: Knowledge creation and innovation in medium technology clusters*. Cheltenham: Edward Elgar.

Ciciotti, E. (2009). Innovation, technological diffusion and regional development. *Scienze Regionali—Italian Journal of Regional Science, 8*(3), 81–100.

Crevoisier, O., & Camagni, R. (Eds.). (2000). *Les milieu urbains: Innovation, systems de production et ancrage*. Neuchâtel: GREMI—EDES.

Crevoisier O., & Maillat D. (1991). Milieu, industrial organization and territorial production systems: Towards a new theory of spatial development. In: Camagni, R. (Ed.), Innovation networks: Spatial perspective (pp. 13–34). London, New York: Belhaven Press.

Cusinato, A. (2007). L'interpretazione della città nell'economia urbana. *Scienze Regionali—Italian Journal of Regional Science, 7*(3), 67–82.

Cusinato, A. (2015). A hermeneutic approach to the knowledge economy. In A. Cusinato & A. Philippopoulos-Mihalopoulos (Eds.), *Knowledge-creating Milieus in Europe: firms, cities, territories*. Heidelberg: Springer.

Cusinato, A., & Philippopoulos-Mihalopoulos, A. (2015). Introduction. In A. Cusinato & A. - Philippopoulos-Mihalopoulos (Eds.), *Knowledge-creating Milieus in Europe: firms, cities, territories*. Heidelberg: Springer.

De Michelis, G. (2015). Why knowledge is linked to space. In A. Cusinato & A. Philippopoulos-Mihalopoulos (Eds.), *Knowledge-creating Milieus in Europe: Firms, cities, territories*. Heidelberg: Springer.

Dei Ottati, G. (1995). *Tra mercato e comunità: Aspetti concettuali e ricerche empiriche sul distretto industriale*. Milano: Franco Angeli.

Dosi, G. (1982). Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change. *Research Policy, 11*, 147–162.

Dosi, G., et al. (1988). *Technical change and economic theory*. London: Pinter.

Florida, R. (2005). *Cities and the creative class*. New York: Routledge.

Foray, D. (2000). *L'Economie de la Connaissance*. Paris: La Découverte.

Fujita, M., Krugman, P. R., & Venables, A. J. (1999). *The spatial economy*. Cambridge, MA: MIT Press.

Garofoli, G. (1989). Industrial districts: Structure and transformation. *Economic Notes, 19*(1), 37–54.

Garofoli, G. (2009). Regional and local development. *Scienze Regionali—Italian Journal of Regional Science, 8*(3), 35–58.

Healey, P. (2001). New approaches to the content and process of spatial development frameworks. In *Towards a new role for spatial planning*. Paris: OECD.

Keeble, D., & Wilkinson, F. (Eds.). (2000). *High-technology clusters, networks and collective learning in Europe*. Aldershot: Ashgate.

Krugman, P. (1991). *Geography and trade*. Cambridge, MA: MIT Press.

Lundvall, B. A. (1988). Innovation as an interactive process: From user-producer interaction to the national system of innovation. In: Dosi et al., 349–369.

Musso, P. (Ed.). (2014). *L'imaginaire industriel*. Paris: Manucius éd.

Nelson, R., & Winter, S. (1982). *An evolutionary theory of economic change*. Cambridge MA: Harvard University Press.

OECD. (2009). *Regions matter: economic recovery, innovation and sustainable growth*. Paris: OECD.

OECD. (2011). *OECD Regional Outlook: Building resilient regions for stronger economies*. Paris: OECD.

Perrin, J. C. (1995). Apprentissage collectif, territoire et milieu innovateurs: un nouveau paradigme pour le développement. In Ferrão J. (ed.). *Politicas de inovação e desenvolvimento regional e local, Edição do Instituto de Ciencas Sociais de Universidade de Lisboa* (pp. 99–128). Reprinted in Camagni R. and Maillat D. (2006).

Rallet, A., & Torre, A. (1995). *Economie industrielle et économie spatiale*. Paris: Economica.

Rémy, J. (2000). Villes et milieu innovateurs: Une matrice d'interrogations. In O. Crevoisier & R. Camagni (Eds.), *Les milieux urbains: innovation, systèmes de production et ancrage* (pp. 33–43). Neuchâtel: EDE.

Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge MA: Harvard University Press.

Schumpeter, J. A. (1939). *Business cycles: A theoretical, historical and statistical analysis of the capitalist process* (2 Vols). New York: McGraw-Hill.

Scott, A. J. (2006). Creative cities: Conceptual issues and policy questions. *Journal of Urban Affairs, 28*(1), 1–17.

Simon, H. (1972). From substantive to procedural rationality. In C. B. Mc Guire & R. Radner (Eds.), *Decision and organization*. Amsterdam: North Holland.

Torre, A., & Wallet, F. (Eds.). (2014). *Regional development and proximity relations*. Cheltenham: Edward Elgar.

Vazquez-Barquero, A. (2002). *Endogenous development: Networking, innovation, institutions and cities*. New York: Routledge.

Williamson, O. (1985). *Economic institutions of capitalism*. New York: The Free Press.

Conclusions

Augusto Cusinato and Andreas Philippopoulos-Mihalopoulos

Abstract

This book's aim is to provide a fresh insight on the knowledge economy and its driving forces. The book has demonstrated that there is a widening discrepancy between the way mainstream economics understands the relationships between knowledge and creativity, and the step(s) a typical enterprise exposed to the global market is taking to deal with them. Whilst mainstream economics continues to cling firmly to a logical-positivist notion of knowledge, enterprise is experiencing a hermeneutic turn under the pressure to provide ceaseless innovation in an increasingly competitive market. From being the alleged champion of modernity, enterprise is, somewhat surprisingly, becoming the laboratory inside which this cognitive turn is finally entering *the social fabric*, after being long confined to the philosophical, aesthetical and literary debate. The time thus seems to have come to scrutinise the above-mentioned discrepancy: how it has arisen, what consequences follow in the theoretical and the applied domains, and on what conditions it can eventually be overcome. This is the rationale on which this book is based.

This book's aim is to provide a fresh insight on the knowledge economy and its driving forces. The book has demonstrated that there is a widening discrepancy between the way mainstream economics understands the relationships between knowledge and creativity, and the step(s) a typical enterprise exposed to the global market is taking to deal with them. Whilst mainstream economics continues to cling

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firmly to a logical-positivist notion of knowledge, enterprise is experiencing a hermeneutic turn under the pressure to provide ceaseless innovation in an increasingly competitive market. From being the alleged champion of modernity, enterprise is, somewhat surprisingly, becoming the laboratory inside which this cognitive turn is finally entering *the social fabric*, after being long confined to the philosophical, aesthetical and literary debate. The time thus seems to have come to scrutinise the above-mentioned discrepancy: how it has arisen, what consequences follow in the theoretical and the applied domains, and on what conditions it can eventually be overcome. This is the rationale on which this book is based.

These concluding pages are devoted to offering a provisional assessment of such an approach with respect, first, to the ongoing theoretical debate and observable facts and, second, with respect to its explanatory power, its interdisciplinary potential, and its ability to help in practice. Assessments are carried out on four levels: the *epistemological level*, which is concerned with how beliefs and especially pitfalls form in the way(s) we (the authors, in this connection) look at 'reality'; the *heuristic level*, which pertains to the internal consistency and explicative power of theories concerning how 'reality' works; the *methodological level*, which deals with procedures to assess the reliability of those theories and, finally, the *normative level*, on which theoretical developments are applied on policy level.

1 Assessments on the Epistemological Level

On the first level of analysis, we have asserted that the widening discrepancy between the ways mainstream economics on the one hand, and enterprise on the other, look at knowledge and creativity, is ascribable to the epistemological status of economics itself. Aiming to accomplish the emancipation that economic conduct had achieved from any form of moral and/or political tie, the founders of neoclassical economics deliberately left aside the classical 'political economy' in order to free it from any residual historical contingency, and finally enable it to gain 'scientific' status, according to the logical-positivist idea of science. No longer being compelled, as classical economists were, to open any economic treatise with a dissertation on both the cause of value and the structure of the social formation under examination, neoclassical economists took recourse to what seemed (and still seems) to be an unvarying feature in any situation of limited resources with alternative uses: the rationale of conditioned optimisation. In that way, they believed they were establishing not only the *physics* of the rational choice but, through the transposition of the Newtonian Mechanism from nature to society, also *the physics of society* as a whole. This essentially meant to deny any room to phenomena (and related notions) which transcend the mechanical aggregation of individual behaviours, and to place de facto economics outside the domain of social sciences, with which it maintains only nominal ties (Löwe, 2013; Swedberg, 1990).

The situation has not substantially changed with the rise of an evolutionary approach within economics, and the shift it entails from physics to biology as the reference model. Although evolutionism looks into the changes occurring in individual inner properties (a topic which remained extraneous to traditional neoclassical thought), the process by which changes occur remains a black box: successful change (i.e. innovation) is viewed as the outcome of a natural (market-driven) process of selection among a randomly generated set of possible changes. It is time therefore to open that black box in order to ascertain what processes are actually at work in triggering evolutionary paths when intelligent agents are involved: i.e. processes which are not random, but learning ones, which work according to certain recognisable or conceivable—and therefore governable—rules.

In this connection, the book's message is that (a) such a block within mainstream economics depends on the divide which positivism, firstly, and logical-positivism later, established between the explorative and the testing phases within the scientific process; (b) this divide is epistemologically unfounded, in that it neglects a pivotal parameter: tests suffer the same blind spots or misrepresentations that characterise pre-analytical visions, that the logical-empirical method claims to be able to avoid or to overcome (see Garbolino, in this book) and (c) the divide is also a hindrance to entering analytically the core of the creative process, thus seriously limiting possibilities to govern it (in the sense of 'governance'). Reconciling the ideational and the testing sides would not only respond to the criticism that postmodern thought has put forward since about the beginning of the last century, but would also fit with the shift now occurring within enterprise strategies from the material/innovative to the ideational/creative concern.

Such a reconciliation is possible, and is also consistent with the aim of building suitable/"satisficing"[1] representations of the present-day economic affairs, on condition that economic theory also gets in touch, at last, with the hermeneutic turn which is gaining ground in the social sciences, and also organisational studies. In order to make the governance of creative processes possible, this book has taken a gamble on the expediency of integrating the interpretative/hermeneutic turn within economic thought, precisely through seizing upon the extant original join between knowledge and entrepreneurial praxes.

The real question at stake is not whether the book has won the bet, because this would mean falling again into the trap of believing that a last word on these affairs is possible, but whether it has placed a good bet. The tentative answer can only come after an assessment of the heuristic, methodological and normative levels: if a hermeneutic approach provides economic theory with finer and more consistent analytical tools than the conventional approach and, at the same time, endows action with more effective practical tools, then the book has taken a promising track. Let us then address these levels.

[1] The neologism is drawn from Simon, (1956).

2 Assessments on the Heuristic Level

The first achievement of the book we hold to be of some relevance on the heuristic level is that of having drawn certain notions (which recur in the economic discourse and, especially, in regional science) out of the metaphorical realm by endowing them with analytical content. The first notion is '*atmosphere*' (see Philippopoulos-Mihalopoulos's and Cusinato's contributions). 'Atmosphere' is a term Marshall repeatedly mentioned to point to "something being in the air" which yields place-specific collective advantages. In that context, the term maintained a metaphorical sense because, apart from some insights Marshall offered into its referential content, an aura of the ineffable has remained about it. By admitting that knowledge essentially consists in 'having experience of' rather than collecting-and-processing information, it has become possible to give such aura an expressible content and to render it an essential component within the triad space-knowledge-creativity. 'Having experience of'—the line of reasoning was—entails, first, exposing the Self to irreversible change, which requires that the subject is willing to 'move irreversibly from' what s/he was hitherto and, secondly, inhabiting a new condition and participating intimately in its rhythm. This move becomes possible only if the Self can rely on the belief that, after moving from her/himself, s/he can ideally find her/himself again through the net of symbolic relationships s/he already enjoys (and on which her/his identity hinges). 'Atmosphere', in this context, means a field of collective and shared affects, which allows the cognitive experience to turn into creativity. Finally, to give atmosphere relative solidity and make it publicly recognisable—in a few words, to institutionalise it as a local common good, in the sense Marshall gave to the term—communities fix it symbolically on the most steady physical-and-public item they have at their disposal, namely the physical space of belonging—territory—, thus turning atmosphere into landscape/*paysage* (see Cusinato).

To sum up the steps: knowledge entails the intervention of the emotional component; this component entails a shared field of affects (atmosphere); atmosphere needs a certain degree of solidity to become publicly recognisable and sharable; and landscape is the device humans have devised to make this possible. Through this evolution, atmosphere achieves an analytical status within the knowledge-creating process, and landscape becomes the operational device to interact with it: acting on the physical support of landscape entails intervening in the symbolic system the community concerned has fixed on it, and further on, touching collective and individual attitudes towards learning and creativity.

Implications on the normative side are easily imaginable, but we shall deal with them later. In the meantime, let us note that the fact that atmosphere and landscape matter in shaping knowledge-creating attitudes, is not enough to make them practically effective. Encouragement to explore unknown territories must be accompanied by a perception that there is something worth exploring. This leads to the second notion this volume has tried to endow with analytical content, namely the '*milieu*'. There has been no lack of efforts in this direction in recent decades, especially in regional science, but at least one element was lacking to free 'milieu'

from indeterminacy. Scholars generally (though tacitly) agree with Durkheim on the idea that 'heterogeneity' and 'relational density' help a place to acquire generative power, and also in admitting that its 'material substratum' plays a role. The discourse, however, remains inconclusive in this last connection, with the result of jeopardising the analytical content of 'milieu'. The cause of this persistent uncertain condition rests on an unachieved last step: the acknowledgement that space works within milieus through its symbolisation into landscape (with some scholars very close to it, such as Perrin, 2006[1995]). Landscape, milieu and atmosphere constitute the three elements necessary to build an analytical bridge between space and knowledge. In this book this outcome is to be found especially throughout the contributions to the first part[2]: from the vivid setting of that relationship by De Michelis, to the evocative and ethic-intensive contribution by Goldoni, to the applications Simone makes of both notions to the organisational scale and, finally, to the attempts of Philippopoulos-Mihalopoulos and Cusinato to provide this framework with analytical and operational content.

From the hermeneutic approach adopted, it has also become possible to assess issues of the *knowledge economy*. The positivist understanding of the term, according to which only measurable subjects matter, is simply a knowledge-intensive based economy. Taking our cue from previous attempts in the literature, which aim to shift the focus from a quantitative to a qualitative approach, this volume maintains that the decisive point in taking a qualitative approach to the knowledge economy does not simply consist in moving from a solipsistic to a relational viewpoint on knowledge (as *Mode 1*/*Mode 2* does), but in investigating the different kinds of *learning* which come into play within those viewpoints. It is one thing that a group of observers, endowed with different competencies and also interests should discuss the various images they form of a certain 'object', assuming that those images really mirror the object although from different perspectives; and quite a different thing that they should investigate the premises that lead them to form different images about that same referential entity. In the first case, the observers' mental, affective, corporeal and other premises are not put explicitly into question, and the connected kind of learning can be labelled as 'relational *L2*' (i.e. *Mode 2*). In the second case *L3* practices come into play, entailing shifts both in the subject of the knowledge and, crucially, the way of knowing it. The subject shifts from the 'entity' which is assumed to lie externally to mind, towards the observers' minds and especially their inescapable cognitive fallacies, while learning shifts from inquiring about the subject under examination towards exploring ways of learning in relation both to one's own and the others' cognitive attitudes. The hypothesis this anthology has consistently put forward is that the knowledge economy is ultimately characterised by the increasing recourse enterprise and industry at large make to *L3* practices in order to cope more successfully with the rising urge to shape creative processes.

[2] With the exception of Garbolino, whose contribution was intentionally devoted to outlining a preliminary epistemological framework.

Before passing onto the methodological level, we should note that the most radical question arising from the above discussion concerns the suitability of economics (also in its evolutionary version) to deal with generative processes, since the intimate pragmatics of 'the physics (or the *bio-logics*) of society' hinders them from coping with 'un-measurable' entities, such as those belonging to the emotional and the symbolic domains. We shall encounter this issue again, when dealing with normative aspects.

3 Assessments on the Methodological Level

Methodological issues build a bridge between the theoretical and the empirical domains. Two main notions have been established to make the above theoretical framework suitable for both theoretical and applied practices. First, a milieu is not an observable entity. Because of atmosphere, landscape, and social relationships at large, the presence of milieu can only be indirectly inferred by recourse to cues and indicators. The way the book has pursued this aim is to start from certain observable phenomena or symptoms concerning the supposed working of a generative socio-spatial device (such as Cozza's VEGA Park case, and the organisational claim of fostering innovative attitudes), or the presence of the three canonical conditions that make a socio-spatial entity to work as a milieu at the various scales considered: volume/heterogeneity, relational density and space/landscape. With relation to the specific subject of this book—investigation of the socio-spatial conditions of creativity—the notion of milieu as a generative device of 'social facts', has been incorporated into the notion of "Knowledge-creating milieu—KCM", a formula which simultaneously conveys (a) the idea that structural elements are at work in generating social facts, (b) the idea that individual learning attitudes depend on specific social assets like territory, place, atmosphere and landscape and, finally, (c) the focus on knowledge-creation, as the real premise for creativity. A connected methodological suggestion is that KCMs work differently according to scale. Whereas in their elementary form, namely the dialogical context, artificial elements prevail, at the other extreme, namely, the city, social/'natural' elements dominate the scene; and whilst in the first condition, interaction essentially happens through reciprocation, in the second it normally occurs through competition, with imaginable implications for policies in the two circumstances.

The second bridging notion is "Knowledge-creating Services—KCS", which is related here to the assumed hermeneutic stance. KCS are services devoted to dealing with cognitive codes and mental habits, by reshaping them and thus creating knowledge at the *L3* level along with related conditions for creativity governance. KCS lie at the very core of urban and regional KCMs, and interact among them and with industry in fostering creativity and also innovation sensu stricto. This happens to such an extent that it becomes relevant to consider a fourth helix to the *Triple Helix* model that Etzkowitz & Leydesdorff (2000) set up in order to provide the then emerging relational approach to knowledge—'*Mode 2*'—with an analytical basis. Such a helix would not be placed into the civil society as, for

example Carayannis and Campbell (2012) do, but within this dust-like, rapidly evolving system of knowledge-intensive activities working at the intersection between *L2* and *L3* practices.

The heuristic power of these notions can only be assessed in comparison with similar notions of Knowledge Intensive Services, and mainly KIBS, which is the most widespread one in literature, with reference to their capacity to outline stylised facts, shed light on new relevant aspects and drive action. The French case study (Paulus & Vacchiani-Marcuzzo) has shown that KCS at large are a peculiar urban phenomenon and that cumulative urban economies are central in the sector. The corresponding share of employees is superlinearly related to city size, especially as regards private KCS. Unlike them, public KCS locations are clearly affected by more policy-driven than market-driven rationales, though a similar, albeit weaker correlation between KCS density and city size can also be observed.

Comparison of case studies on the metropolitan and the urban levels corroborate these outcomes (Table 1 and Fig. 1). Focusing on the core urban area (which is defined by the city administrative limit), a high positive correlation can be seen between city size and KCS spatial density, with r^2 equal to 0.95 and 0.92 and *b* equal to 0.70 and 0.62 on the logarithmic scales, as regards respectively Total KCS and Private-core KCS[3].

The same case studies show finer results however, making it possible to assess the weight of urban agglomeration economies. They prove that Private-core KCS in particular compete strongly for central locations: the ratio between Private-core KCS and Total KCS entities rises exponentially with the core-city size, which points to their strict connection with cumulative urban economies (Fig. 2).

The Greater Munich (Mazzoleni & Pechmann) and the Paris Metropolitan Region—PMR (Compagnucci) case studies also show that KCS location patterns depend on their specific knowledge base. As regards the Greater Munich area, besides the overwhelming centripetal role played by the inner city, a system of KCS clusters is observable in the wider metropolitan area, located beside/within clusters of high-tech or creative industry activities, thus confirming that Marshallian agglomeration economies are importantly at work as well as urban ones. More specifically, the partition Compagnucci introduces within KCS according to their different knowledge base, enables him to shed light on how different classes of KCS follow different location patterns in the PMR: the analytical knowledge-based KCS tend to cluster spatially near high-tech industry; the synthetic knowledge-based KCS are more susceptible to traditional manufacture location, while the symbolic knowledge-based KCS show a marked preference for central urban locations. These outcomes, which also entail important consequences on the normative level, are dealt with in the following section.

[3] The Munich case is not comparable, due to different criteria of collecting data.

Table 1 Spatial density of KCS entities in the case-studies examined

Area	Year	Population	KCS entities		sq. Km area	KCS spatial density		b/a
			Total (a)	Private-core (b)		Total	Private-core	
Paris core city	2008	2,233,818	120,271	99,283	105.25	1142.72	943.31	0.83
Paris Zone d'emploi	2008	5,851,493	*173,740*	*140,582*	*551.51*	*315.03*	*254.90*	*0.81*
Paris Metropolita Region	2008	12,038,267	*228,503*	*177,731*	*14,191.03*	*16.10*	*12.52*	*0.78*
Milan core city	2001	1,256,211	58,088	34,571	182.07	319.04	189.88	0.60
Milan Province	2001	3,707,210	*92,066*	*50,441*	*1,984.39*	*46.40*	*25.42*	*0.55*
Poznań core city	2009	554,221	17,900	9,811	261.91	68.34	37.46	0.55
Poznań Metropolitan Region	*2009*	*873.479*	*23,488*	*12,605*	*2,161.90*	*10.85*	*5.83*	*0.54*
Pécs core city	2013	152.459	5,213	2,832	162.61	32.06	17.42	0.54
Pécs province	2013	*180.138*	*6.992*	*4.120*	*623.07*	*11.22*	*6.61*	*0.59*

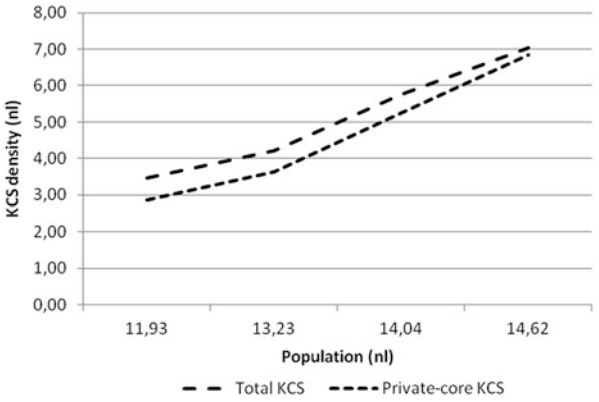

Fig. 1 KCS spatial density with rapport to core-cities population

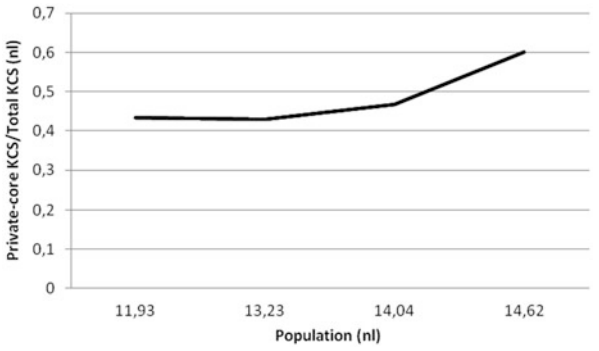

Fig. 2 Shares of Private-core KCS in relation to Total KCS entities in the core-cities examined

4 Assessments on the Normative Level

The assessments given above provide an adequate basis on which to think of policies at the various levels and scales we have examined. On the epistemological level (at which it is more appropriate to speak of 'guiding principles' than 'policies'), the main issue concerns the obsolescence, not so much of the internal consistency and effectiveness of the logical-positivistic approach, but rather the clear-cut partition it establishes between the explorative-ideational and the validation phases, with respect to the strategic importance the first phase is now assuming *within enterprise* in response to the pressure for creativity governance. As a consequence, the concern for testing the reliability of assertions is destined increasingly to go together and to hybridise with freely conceived mental associations—i.e. abduction—which are the cradle for creativity. This does not entail any rejection of logical-positivism in favour of full adhesion to free associationism, but it does acknowledge that the time has come to question the former's self-stated centrality if not absolutism. This ultimately entails an acknowledgement of the circularity occurring between the explorative and the confirmative stages within the

cognitive/creative process, and the role the emotional and the symbolic dimensions, along with their derivatives of atmosphere, landscape, place and milieu, play within it.

With regard to economic theory, the question that arises is whether *economics*, with its endowment of individualism, behaviourism and cognitivism, can cope appropriately with such a change of paradigm, and whether a 'new political economy'[4] (sporadic traces of which are recognisable within the current debate) could fit better, thanks to its capacity for taking un-measurable aspects (like, essentially, social relations) into consideration. The difference between the 'old' or 'classical' political economy and a possible 'new' one would concern the kind of social relations to be taken into consideration: not only 'production relations', but also subtler, plastic, symbolic and affective relations and associated notions (like atmosphere, place, landscape). These are important from a generative viewpoint: precisely the kind of matter that Marx confined to the domain of "superstructures", with the air of superfluity if not ideology with which he endowed the term. Our suggestion is that a new political economy should be grounded on the idea (an idea, in any case!) that superstructures eventually become incorporated into the infrastructure in the course of social praxis,[5] according to a sort of 'pragmatic circle'. This subject matter, however, clearly exceeds this book's aims.

On a more practical level, the main lesson is that the purpose of fostering creativity through creativity governance entails building suitable milieu conditions at various scales. Convenient degrees of heterogeneity, relational density and appropriate atmosphere, symbolically fixed in space through the 'landscape operator', are the ingredients for a knowledge-generative milieu to arise *in a certain place*. The ways of achieving and nurturing heterogeneity vary according to milieu scale. In the dialogical context, heterogeneity is produced by the (few) people involved. At the urban scale, it is a by-product (maybe the most astonishing by-product) of social interaction, while at the organisational scale it is a mix, mostly depending on the organisational size.

Not all kinds of heterogeneity are conducive to learning, however, but only the ones people experience as dissonance, namely potentially interpretable noise. Deliberate interventions to engender/shape heterogeneity within a certain milieu must therefore be fine-tuned according to the scale of the milieu and people's interpretative (and not absorptive!) capacities. In general, heterogeneity can be nurtured by acting on the openness of the local system and/or on social volume, in a condition of proximity among stakeholders. Acting openly is possible at every milieu scale, but care is needed so that external stimuli can be interpreted as dissonance rather than noise or shocks: competent 'transducers' must be at work at the milieu borders, to ensure that the energy coming from outside becomes quantitatively and qualitatively compatible with the internal 'digestive' structure

[4] Where *pòlis* significantly means 'many' prior to 'city' and 'politics'.

[5] An issue which is (or was?) not extraneous within the neo-Marxist debate (cf. Godelier, 1978), and which might interestingly be exposed to the interpretative turn.

(see Camagni, in this book). Transducers are leading figures, such as the *hommes d'affaires* in the indigenous communities, or consultants, 'gatekeepers', institutions but also, we suggest among others, KIS/KCS in more advanced economies, to be considered both individually and as systems.

Unlike openness, acting on volume to foster heterogeneity is not normally possible within organisations, but only at a wider social level. At this level, since volume works together with density in fostering heterogeneity, a key lesson arises about the importance of clearly identifiable and structured urban milieus in relation to the surrounding 'countryside' and, symmetrically, the negative role of extreme urban sprawl as a source of cultural entropy. This is another way to maintain that 'the city matters'—as it has always mattered—as the main source of socio-cultural heterogenesis (cf. Hall, 1998; Andersson, 2011a, b, among others). Within the city, an important means of enhancing aptitudes for dealing with heterogeneity and especially for interpreting noise as dissonance is represented by exemplary interventions on the urban physical fabric, to show how new, interesting and inspiring solutions can take shape: this is the domain of arts, architecture, urban design and planning, which deserves far more attention from economics than currently occurring.

Interventions on the physical space which are intended to interact with the symbolical dimension call into play the issue of landscape. Like milieu, landscape is not an object which exists per se, but only the image-space deriving from the projection individuals and communities make of a certain symbolic universe on the surrounding physical space. Intervening on the latter with the aim of acting on the underlying emotional component (in order to mould creative attitudes, in our case) requires that 'place makers' (whether policy-makers, urban designers and planners, or civilian groups) firstly declare their intention of acting on a *support* (the physical arrangement of things) in order to mould its palimpsestic *symbolic content*; and, secondly, that they be willing to interact with the community concerned regarding the cultural and symbolical relationships it establishes between the two terms, and which it experiences in terms of landscape. From this point of view, it is not an exaggeration to suggest that the experience of landscape design is the most fecund exercise a society can undertake in the post-modern condition—that is a condition within which society itself has become able (and is also called) to deal with its own interpretative habits. So—the message finally is—*space matters in enhancing creative attitudes in the knowledge age in as much as it is experienced and dealt with as landscape*. Somehow surprisingly, the most explicit references in this connection come from case studies on the smallest urban realities examined above, Poznań and Pécs: this is perhaps a symptom of the rising awareness that even small- and medium-sized cities now form of the role urban landscape, with its dense symbolic endowment, plays in moulding urban atmosphere, and attracting and/or retaining knowledge-based activities or, more widely, the creative class (Compagnucci & Cusinato, 2015).

Two other lessons belonging to the realm of urban policies arise from comparison of case studies regarding greater metropolitan areas: Paris, Milan and Munich. It is evident that they differ considerably in size and urban structure, and that this has crucial effects not only on the KCS geography (the direct subject matter of the

case studies), but also on the social structure. Unlike the other two metropolitan regions examined, the urban structure of Milan is strongly monocentric, with the centre located in *Piazza del Duomo*. The spatial distribution of economic activities around it follows the classical bid rent curve, with the most profitable activities placed in the inner city and the other ones progressively located at an increasing distance according to their willingness to pay decreasing urban rent. Maps regarding KCS and manufacture geographies in provincial Milan show that the most sophisticated ones, such as Private-core KCS, strongly compete for a central location, whereas competition decreases with the lessening of the learning level involved: Collateral Services catering for KCS and manufacturing activities actually show a less pronounced attraction towards central locations and, what is particularly meaningful, sprawl around *the* centre, according to the radial pattern of transport routes departing from it.

Substantially different is the situation of the other examined greater metropolitan regions, which share a networked urban model. The primary centres are clearly identifiable, coincident with the inner city and also strongly attractive to high level, highly profitable activities. However, unlike Milan, a system of urban clusters is also identifiable in their surrounding areas, many of which are characterised by industrial specialisation (high-tech manufacture, with their possible sectorial differentiations into the automotive, chemical, biotechnological and cultural industries, healthcare and related research centres, and so on). The KCS geography also follows an articulated location pattern, with the symbolic knowledge-based services competing for inner location, and the analytical and synthetic knowledge-based services generally following high-tech and medium-low-tech industry. Furthermore, as the Munich case shows, the cultural industry may also follow a networked location pattern, so that the symbolic knowledge-based KCS are not exclusively attracted by the inner city, but cluster according to their affinity to specific branches of the cultural industry, such as film-making.

This assessment of the different urban patterns in the greater metropolitan regions also serves to shed light on a critical issue concerning the chances for further developments in the KCS sector, and the local economy as a whole, once it is clear that it is an increasingly knowledge-based economy. If KCS prove to be differently susceptible to urban and Marshallian agglomeration economies according to their specific knowledge base, in the presence of a monocentric urban pattern, like Milan, all kinds of KCS compete for central locations, with the consequence that they contribute substantially to raising urban rent, thus creating barriers for their own further development. But where competition for a unique central location is not so strong because of the presence of a networked urban-and-industrial metropolitan pattern, there are many more opportunities for high-level KCS development, thanks to the fact that they can locate in differentiated specialised centres, according to their affinity with specific kinds of knowledge-based industries. Further investigation on this topic appears to be crucial to the design of suitable urban and metropolitan policies in the knowledge age.

Investigations respectively conducted by Mazzoleni, and Mazzoleni & Pechmann on the Milan and Munich cases make it possible to point out two other

aspects. First, the different urban patterns of a monocentric and networked form have crucial social consequences. In the Milan area, the strong competition for central location traces a clear-cut social boundary between the dominant core city (Mazzoleni identifies it with the inner ring of the 'Spanish Bastions') and a dependent periphery. Though enclaves of poor dwellers exist in some interstices within the core city, and affluent dwellers in the neighbourhoods, Mazzoleni maintains that this kind of urban structure fuels increasing socio-spatial polarisation, if not marginalisation.

Rather different appears the condition in the Munich metropolitan region. As observed above, the core city here too exerts a formidable attraction for sophisticated service activities. Unlike Milan, however, Munich has a planned satellite system of specialised and well-connected minor urban centres, which offer suitable locations for both specialist activities and dwelling for skilled workers. This networked system acts as a spatial device for distributing high-level economic activities and highly-paid workers according to a polycentric pattern; it also entails containment of socio-spatial differentiation, to such an extent that phenomena of hard urban polarisation are not manifest.

These different regional patterns are the outcome of very different urban and regional policies. In Milan, we are in the presence, not of an absolute lack of such a policy, but of a policy which has long followed rather than preceding private initiative along with the dominant lobbies' interests in urban land use. As a result, important opportunities for establishing a long-term oriented metropolitan design have been lost due to the private agents' 'constitutional' inability to conceive and govern such a general design over time. On the contrary, a long-term and consistently implemented policy lies at the basis of the Munich metropolitan structure, with the advantages that follow in terms of location opportunities and development for highly advanced activities, and in terms of social cohesion.

A closely connected topic concerns the role small and medium-sized cities (SMCs) can play in the knowledge era. If the hypothesis is that certain kinds of KIS/KCS derive considerable benefits from urban economies, SMCs clearly cannot compete with major cities in this sector (as the Pécs case shows). Some not insignificant opportunities remain however, because of the links between high-tech industry and manufacturing with respectively analytic and synthetic knowledge-based KCS, which can be summarised as follows:

(a) SMCs belonging to a metropolitan region can benefit from a networked urban pattern—the so-called "borrowed size effect" (Alonso, 1973), inside which specialised industrial branches cluster in SMCs around the major city;
(b) in the case of monocentric metropolitan regions the opportunities for SMCs are lower because of the lack of specialised and distinctive industrial clusters. SMCs can however work as secondary places for Core-related KCS or Collateral activities for KCS, according to the bid rent rule, and/or residential places for 'creative' workers having a preference for smoother amenities;

(c) as regards SMCs lying outside greater metropolitan regions, the key conditions for playing a role in the knowledge value chain are to be inserted within an industrial region or to be a place for public KCS (as the French case and, at a lower scale, the Pécs case show), or finally being an albeit second-order node within a wider net of dynamic economic relationships (as the Poznań case shows). In these circumstances, SMCs can work as both providers of second-order knowledge-based services in favour of the local system and as *relais* between the local industrial systems and major cities, or among major cities.

5 Guidelines for Policies

The above discussion shows that there is ample room for policies aimed at enhancing creativity, in line with a milieu-based approach. The distinctive feature of this approach lies in the preference given to interventions on the structural rather than the functional level within the socio-spatial connection. This structural feature has been often indicated in this anthology as well as elsewhere[6] in (a) *heterogeneity* of visions, interests, skills, competences, behaviours and, more comprehensively, habits, within the community involved[7]; (b) *relational density*, i.e. the frequency with which exchanges of signs and goods (not to mention the anthropologists' rougher triad) occur within that community; (c) the symbolically vested local space, i.e. *landscape*, which acts as a catalyst for releasing the generative potential of the first two elements.

Faced with this frame of reference, policies must prove themselves capable of moulding the above structural arrangement in order to create conditions for a place to turn into a generative milieu, or an existing milieu to work more effectively. This they can achieve by removing blockages (think, for example, of a prisoner's dilemma-like situations), providing new structural building blocks and/or establishing new connections between them. Unlike individual action, collective/public action can cope better because it operates on the same institutional level on which structures work. This realisation would be decisive in the debate about the suitability (if not legitimacy) of public intervention in enhancing the generative power of milieus, and especially cities (Andersson, 2011a, b). While rigid coercive policies, like conformative planning, may be unsuitable for such a task in a complex, evolving condition (Moroni, 2011), admitting this and concluding that cities in the creativity-led era need less or no government in urban design and also planning is problematic. As Healey (2004) writes, first, "governance and creativity

[6] But limited to the first two of the elements mentioned below, as Cusinato has shown.

[7] The term 'community' means that there has to be a minimal common basis of shared values and also visions etc. among participants, so that it becomes in any case a matter of 'related heterogeneity'. This expression clearly echoes the debate about the role of related and unrelated variety in economic development (Frenken, Van Oort, & Verburg, 2007).

are not opposed but are intertwined phenomena. Some modes of governance may restrict creativity in evolutions in economic and social life and in ways of managing collective problems of urban existence. Others may help to release creative energy" (p. 100); and, second, government is not opposed to governance, in that it is a possible tool among others, which can be decisive in some contingencies to make the debate to 'precipitate' into decision, that is, to turn collectively arisen ideas into innovations.

Thus, the efficient way of accomplishing such a task rests on the recognition that the components of a milieu form a system, so that agency can be effective only by intervening on the systemic level, independently of the starting point. In fact, heterogeneity without relational density remains sterile, whereas the reverse locks communities into repetition; similarly, heterogeneity in the absence of a minimally shared symbolical apparatus remains noise, and relational density without it will probably turn into destructive creativity[8].

It follows that strategies aiming, for example, at improving the milieu effect through augmented heterogeneity (by variously levering on volume, variety and/or openness of the local system) must also intervene on the social and institutional level to adjust both relational density and the common symbolic universe. Urban planning & design and, more generally, governance, seem to be the leading way. The by now rich urban literature and practice maintain (and also prove) that the size and density of building areas, the arrangement of infrastructural networks, and the discerning and careful design of public spaces along with the presence of high-level economic activities and amenities influence both volume and internal and external connectivity, thus fostering the *mixité* effect; but the theme of urban landscape governance too is becoming crucial within that debate, because of the catalyst effect it is credited with.

From this perspective, the urban fabric appears as a text or more precisely, a palimpsest on which social actors, individually and collectively, overwrite their stories, like wall-writers daily do to give themselves social *voice* (Alonso, 1998; Lachmann, 1988; Moreau & Alderman, 2011). Such a text responds to two structural aims, of a retrospective and prospective kind. Since learning (especially *L3*) substantially entails continuous 'leave taking' from already experienced/known terrains and, ultimately, from any transient Self, the landscape experience provides individuals and groups with the indispensable reference frame to maintain retrospectively a tie with their endlessly successive experiential conditions, thus making learning possible. On the prospective side, learning entails building new playmargins beside/besides one's own mental habit (Huizinga, 1944), and the landscape experience provides people with the raw material—the substratum—to create such play.

Landscape policies must therefore accomplish at least two tasks. First, to ease the maintenance of ties with the 'realisations', in terms of landscape palimpsests, of

[8] This is a quite different condition from the Schumpeterian "creative destruction", which is based on an extremely thick and ordered relational structure, the market.

preceding symbolic universes, which means that policy makers have to cultivate both their physical support—the urban space—and the actants' interpretative competences. This entails training actants to cultivate their interpretative (rather than merely absorptive) capacities through dedicated education, by supporting them through bridging/bonding mediators with internal and external heterogeneity, such as transcoders (Camagni, in this book), gatekeepers, and also KCS (or similar KIS categories), and finally by encouraging them to play with dissonances (to "flirt with chaos", in Philippopoulos-Mihalopoulos' words). Second, policies have to enrich the physical urban text with examples of how the multiplicity of 'codes' which lie incorporated within the landscape palimpsest can be combined with the heterogeneity of extant cultural habits to yield new play margins for exploration experiences (Dembski, 2013; Landry, 2011).

The specific lesson this anthology ultimately offers is that landscape and related policies and practices are the keystone for any strategy concerning the (generative) milieu issue, in that they allow the emotional component of learning to come into effect through *L2* and especially *L3* exercises, the hotbeds of creativity and creativity governance. Somehow paradoxically, these policies and practices build a bridge between the most *immaterial* component of the material life—the structure and working of social relationships—and the most *material* element of the symbolic social life—that is the physical support of landscape. Through them, space acquires an explicit *generative* connotation, thus transcending (by encompassing them) the *receptive*, *instrumental* or else *theatrical* connotations the current debate on landscape usually confers on it (Heinen, 2013).

This topic finds its best rendering within the "symbolic markers" approach, according to which "[they] are defined as symbolic projects that are part of a wider strategy and signify *a new understanding* of the [. . . urban] area" (Dembski, 2013, p. 2016; emphasis added). They are the matter of urban and territorial transformation projects, which are promoted, not so much for functional reasons, but for the impact they have on the "audience's" symbolic systems (Löw, 2008). It ultimately follows that the key mission of urban planners and designers on the boundary between the modern and the post-modern epochs is not so much that of vesting urban transformation projects with landscape contents to a solely aesthetic goal, but of employing them as opportunities to learn how and to what extent it becomes possible to move from already experienced symbolic landscapes *to create* new ones, similarly to what occurs in the arts. Sociologists, geographers, designers and planners are becoming much more aware than economists of these landscape implications of urban policies.[9] The ongoing centrality that the socio-spatial connection is assuming in the debate on knowledge generation and creativity governance cannot but encourage them to cope with issues that, owing to their extraneousness to the positivist canons, are (de)qualified as 'metaphysical', and

[9] See, for example, Waldheim (2012), Kahn, Moulaert, & Schreurs (2013), Madanipour (2013), though the generative role of landscape remains somehow unexpressed in their works.

ruled out of the scientific domain: without realising however that exploration comes to pass beyond the positivist stance.

References

Alonso, A. (1998). Urban Graffiti on the City Landscape. Paper presented at the Western Geography Graduate Conference, San Diego State University, February 14. Available at http://www.asu.edu/courses/aph294/total-readings/alonso%20--%20urbangraffiti.pdf.

Alonso, W. (1973). Urban zero population growth. *Daedalus, 102*(4), 191–206.

Andersson, Å. E. (2011a). Creative people need creative cities. In D. E. Andersson, Å. E. Andersson, & C. Mellander (Eds.), *Handbook of creative cities* (pp. 14–55). Cheltenham: Edward Elgar.

Andersson, D. E. (2011b). Creative cities need less government. In D. E. Andersson, Å. E. Andersson, & C. Mellander (Eds.), *Handbook of creative cities* (pp. 327–342). Cheltenham: Edward Elgar.

Carayannis, E. G., & Campbell, D. F. J. (2012). *Mode 3 knowledge production in quadruple helix innovation systems: 21st-century democracy, innovation, and entrepreneurship for development*. New York: Springer.

Compagnucci, F. & Cusinato, A. (2015). Il ruolo delle piccole e medie città nell'economia 3.0. Evidenze dal caso italiano, *Scienze Regionali*, forthcoming.

Dembski, S. (2013). In search of symbolic markers: transforming the urbanized landscape of the Rotterdam Rijnmond. *International Journal of Urban and Regional Research, 37*(6), 2014–2034.

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.

Frenken, K., Van Oort, F., & Verburg, T. (2007). Related variety, unrelated variety and regional economic growth. *Regional Studies, 41*(5), 685–697.

Godelier, M. (1978). Infrastructures, societies, and history. *Current Anthropology, 19*(4), 763–771.

Hall, P. G. (1998). *Cities in civilization: Culture, innovation, and urban order*. London: Weidenfeld & Nicholson.

Healey, P. (2004). Creativity and urban governance. *Policy Studies, 25*(2), 87–102.

Heinen, H. (2013). Space as receptor, instrument or stage: Notes on the interaction between spatial and social constellations. *International Planning Studies, 18*(3–4), 342–357.

Huizinga, J. (1944). *Homo Ludens: A study of the play-element in culture*. New York: Routledge & Kegan Paul.

Kahn, A. Z., Moulaert, F. & Schreurs, J. (2013). Epistemology of space: Exploring relational perspectives in planning, urbanism, architecture. *International Planning Studies, 18*(3–4), 287–303.

Lachmann, R. (1988). Graffiti as career and ideology. *American Journal of Sociology, 94*(2), 229–250.

Landry, C. (2011). A roadmap for the creative city. In D. E. Andersson, Å. E. Andersson & C. Mellander (Eds.), *Handbook of creative cities* (pp. 517–536). Cheltenham: Edward Elgar.

Löw, M. (2008). The constitution of space: The structuration of spaces through the simultaneity of effect and perception. *European Journal of Social Theory, 11*(1), 25–49.

Löwe, A. (2013[1935]). *Economics and Sociology*. New York: Routledge.

Madanipour, A. (2013). Researching space, transgressing epistemic boundaries. *International Planning Studies, 18*(3–4), 372–388.

Moreau, T. & Alderman, D. H. (2011). Graffiti hurts and the eradication of alternative landscape expression. *Geographical Review, 101*(1), 106–124.

Moroni, S. (2011). Land-use regulation for the creative city. In D. E. Andersson, Å. E. Andersson, & C. Mellander (Eds.), *Handbook of creative cities* (pp. 343–364). Cheltenham: Edward Elgar.

Perrin, J.-C. (2006[1995]). Apprentissage collectif, territoire et milieu innovateur: Un nouveau paradigme pour le développement. In R. Camagni & D. Maillat (Eds.). *Milieux innovateurs: Théorie et politiques*. (pp. 99–128). Paris: Economica.

Simon, H. (1956). Rational choice and the structure of the environment. *Psychological Review, 63* (2), 129–138.

Swedberg, R. (1990). *Economics and sociology: redefining their boundaries. Conversations with economists and sociologists*. Princeton: Princeton University Press.

Waldheim, C. (Ed.) (2012). *The landscape urbanism reader*. New York: Princeton Architectural Press.