Econ Polit Ind (2017) 44:429–447
DOI 10.1007/s40812-017-0079-4

Districts, multinationals and global/digital networks

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Received: 12 September 2017 / Revised: 18 September 2017 / Accepted: 21 September 2017 /
Published online: 4 October 2017

Abstract This paper reflects on what remains of Becattini's utopia in the new context of a globalized and digital economy. Can one still foresee a global world populated with local societies able to produce value by following their own inspirations and chorally participating in a world-wide division of cognitive labor? It is suggested that the interpretive value of Becattini's theorizing remains, to the extent that one moves away from the consideration of the classical district model, and adopts his more general way of thinking about the economy, which is only exemplified by the historical circumstance of industrial districts. His view may well apply to a variety of circumstances, not only to industrial districts, and it is flexible enough to encompass economic change under different environmental conditions.

Keywords Industrial districts · Innovation · MNEs · Digital economy · Globalisation

JEL Classification L5 · O4

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1 Beyond the Fordist dualism between market and hierarchy

In the seventies, the crisis of the mass production model named "Fordism" has forced scholars and practitioners to concentrate their attention on the role of "territories" where the generation of economic value occurs (Burrows et al. 1992; Jessop 1992). A greater emphasis has been placed on such expressions of the real world as: the industrial districts in Italy; just-in-time supply circuits orchestrated by the customer, in Japan; urban and regional innovation clusters, such as the Silicon Valley in California and the Glenn Valley in the UK.

Territorial ecologies are complex systems of complementary structures and resources inherited from the history of the site. They involve businesses and people who interact on the basis of a set of social, cultural and economic factors facilitating communication and transactions, including: trust, a tacit sharing of meanings and languages, networks of contractual links and of social relations among the different participants. The competitive success of these ecologies in reacting to the crisis of Fordism has persisted for a relatively long period of time (roughly from 1970 to 2000), revealing ways of generating value that can hardly be consistent with conventional theorizing in economics.

In Italy, Giacomo Becattini—along with several others (including Brusco, Fuà, Bagnasco and Messori)—has given a fundamental contribution to a first silent and then more and more visible revolution in industrial economics, by placing the role of industrial districts at centre stage in his analysis.

This Journal is proud to have hosted, since the early 1980s, several essays in which Becattini's different way of thinking about economics emerges with great lucidity (Becattini 1984, 1985, 1990; Becattini and Rullani 1993). In these seminal contributions, he has brought to the forefront the generative capacities of individuals and of their sets of relations in local society, as the driving forces of the new post-fordist production systems.

The key point is that this vision of production—where individuals and local societies have an active role that makes each ecology unique—goes beyond the conventional dualism of markets and hierarchies. That is the idea that industrial organization can be reduced to two basic forms: the competitive market, where equilibrium prices are set to select the optimal choices of many independent operators; and the hierarchy of large enterprises, which, with its own command, governs and finalizes the behavior of its employees. In the traditional view, prevalent until the seventies, *tertium non datur*: modern capitalism is expressed through a mix of market and hierarchy, giving a residual role to all other forms of production, considered ineffective and bound to be overcome.

Instead, other organizational patterns have proliferated and their competitive strength, well rooted in history, has become particularly apparent in the 1970s. In Italy, in particular, the demand for flexibility—in response to the turbulence of the markets and to the rigidity of the hierarchies—fueled the growth of polycentric systems of widespread entrepreneurship, localized in places which had long specialized in given sectors (industrial districts). To the most careful observers, this evolution—dominating the eighties and nineties—shows that market and hierarchy

do not exhaust the possible forms of modern production, but a third form is possible. In particular, in the case of Italian industrial districts, this third form relies on the cultural, historical, and solidarity based resources of local societies, which play a key role as productive forces, capable of using modern techniques, and at the same time managing complex situations. It is an organizational form that best expresses its competitive potential in all cases where it is necessary to elaborate flexible, intelligent and shared solutions to problems that are largely unforeseen and non codified (and often un-codifiable). In other words, problems that market prices and prescriptive programs have poor ability to handle.

A clear conceptualization of such phenomena emerges only gradually in the theoretical reflection of the 1970's. Initially, what captures the attention of scholars is the outsourcing process that reverses a previously observed trend of large corporations to internalize all functions and production phases, in the logic of maximum vertical integration. Outsourcing means that the big organization focuses on a particular core business on which it invests to maintain its competitive edge. Skills, services and investments are decentralized to external parties, building a stable collaboration network that allows the chain to generate value in an efficient and flexible way at the same time.

From this perspective, the third organizational form that accompanies the market and the hierarchy is contractual networking, based on agreements, alliances and trust-based linkages that are necessarily more heterogeneous and personalized than those characterizing "pure market" transactions. Network relations rely on a set of transactions whose nature needs to be adapted to the tasks to be handled. Fixing an equilibrium price (through market exchanges) or defining a program dictated by the organizational command (as in a hierarchy context) may not be effective when it comes to tackling problems that are not clearly defined ex ante, imply the combination of dissimilar but complementary resources (Richardson 1972) and require mutual trust between the parties involved. The network between interconnected operators implies transactions of a different nature.

The theory of transaction costs—which at the beginning focused on the market/hierarchy alternative (Williamson, 1975)—adopted an "institutional" interpretive key, which considered market, hierarchy and networking as different and complementary ways of organizing transactions (Williamson 1985). The enterprise can then be seen as a nexus of treaties (Aoki et al. 1990), i.e. as a system that utilizes various contractual forms to connect the parties involved in production both within the enterprise (business units and stakeholders), and in external relations (suppliers, distributors, partners and competitors). This organizational form—networking—is not entirely new: in order to define its characters, one can draw inspiration from the model, elaborated in particular by the Swedish school of industrial business, looking at the collaborative forms between suppliers and buyers in all cases where a relationship of mutual interdependence is established (Hakansson and Johanson 1993; Hakansson and Snehota 1989).

However, it is noteworthy that networking through which the division of labor occurs, tends to concentrate in specific places that are able—more than others—to attract and self-generate activities related to a certain sector or function. Thus, some

other local and non-ubiquitous drivers are in action—and help organise contractual networking on a territorial basis. In fact, empirical observation shows that, in the post-Fordist network, not all sites are the same: some involve more numerous relationships, they catalyze more capital flows, talents, and commodities. These more intense linkages reflect the amount and quality of knowledge embedded in those places, and their capacity to use specialized work and skills. Hence, the post-Fordist contractual networking nodes are not equally distributed in the geographic space of the national and global economy, whereas more complex and intense relationships can be observed in a number of localized clusters (Porter 1998). This is not just the effect of proximity relationships, which favor location and co-location decisions. There is a lot more here: attractiveness is indeed a function of the distinctive quality of the context in which each person or each enterprise lives and works. A territorial context rich in craftsmanship and of historical tradition, translated into a high entrepreneurial propensity, plays a completely different role from standard agglomeration economies. The latter are normally generated by the concentration of dynamic consumers on the demand side, of advanced research at the frontier in key technological fields (such as computing, mechatronics, biotechnology), or the availability of a market for specialized labour and production inputs on the supply side. On top of these important attractors, one should emphasise a more comprehensive and powerful division of labor between territories that relies on the distribution of skills, functions and processes in relation to the unique quality of the context where production and social life occurs.

In the case of Italian industrial districts, localized clusters are of a sectoral nature, because vendors and contractors in the same sector focus on a few square miles of space, thus communicating and interacting without difficulty to handle complex situations that are largely unforeseeable in advance. In Japan, geographical clusters reflect the connective role played by large system integrators mobilizing networks of small or medium-scale suppliers. In the field of information technology yesterday, and the web economy today, the places of excellence are dictated by the recent history of the most successful innovations and "champions", which generate knowledge externalities and a technological environment conducive to experimentation and innovation. Similar conditions apply in the case of logistics: airports, harbors, rail and road nodes with the highest traffic create territorial convergences between users, and generate network externalities. In many urban centers that have strong attractiveness in the field of creativity, fashion, and artistic expression, network consolidation reflects the need for many companies in the sectors concerned to maintain direct contact with embedded knowledge in the different territories of excellence (Florida 2005; Glaeser and Gottlieb 2009).

Clusters may also derive from the geographic distribution of R&D activities in particular fields and in specific regions or cities, based on cognitive pre-existence (embedded in place) or R&D investment programs in particularly attractive technologies. MNEs distribute their R&D investments according to the peculiarities of the countries where they are present, focusing on certain R&D activities in a specific local cluster, to take full advantage of the differences that characterize them. Thanks to their belonging to a transnational structure, R&D labs can

participate to a division of labor and are enabled to share useful knowledge flowing through cognitive pipelines managed by the multinational through its internal lines (Castellani and Zanfei 2006; Meyer et al. 2011; Cano-Kollmann et al. 2016).

The local nodes participating in this global division of labor tend to be characterized by a specific "atmosphere", in terms of both cultural values and "tacit" or contextual knowledge accumulated over time and made available to people and companies active in the area (Becattini 1989, 1991).

The local circulation of ideas among competent producers promoting creative solutions in technologies and products, which is a key dimension characterizing the Marshallian concept of "atmosphere",[1] is often referred to in more recent international literature by the term "buzz" proposed by Storper and Venables (2004). The 'local buzz' tends to lead to an ever-increasing geographical concentration of innovation activity in a few regions. However, it may be both unrealistic and undesirable to rely only on 'local buzz' for developing their knowledge base, and successful clusters need to combine knowledge internal and external to the cluster. To this end, 'global pipelines' need to be established in order to allow external knowledge to flow into the clusters (Owen-Smith and Powell 2004; Bathelt et al. 2004). Global pipelines refer to channels of communication used in the interaction between firms in different knowledge-producing centres located at a distance from one another. They can 'pump' information about markets and technologies into the cluster, making the 'buzz' more dynamic, by providing access to a more variegated set of knowledge pools from which to draw. What these authors emphasise is exactly the localized nature of innovations that are generated in a given place, and are transferred, applied and developed on a global scale through trans-territorial networks. The atmosphere characterizing each place may thus be a key asset for innovation and competitiveness, to the extent that it facilitates interactions and exchanges between local actors bearing unique competencies, and provided that it does not hinder cross-border transmission of knowledge.

2 Industrial districts as experiments of capitalism with a human face

Giacomo Becattini's theoretical work refers to the innovative experience of Italian industrial districts, linking it to the Marshallian model. He elaborated on the concept of "atmosphere" characterizing those places because of their history, culture and institutional background, which in turn affect the structure of incentives, behavior and learning capacities of actors. Geographic proximity is a key resource reducing relational costs (via the creation of trust), favouring knowledge sharing, creating a context of infrastructures, rules, and behaviors that are particularly suited to a given sector or type of activity.

In the pre-2000s district, the production chains are essentially located within a limited territory. Unlike what happens in clusters attracting multinationals—the

[1] The other key dimension of Marshalls' industrial atmosphere is the accumulation of specific competences, that in recent literature are referred to as "industrial commons" (Buciuni and Pisano 2015).

relationship with actors and institutions based outside the territorial boundaries of the district itself is circumscribed in terms of both activities and geography. External relationships are basically limited to upstream sourcing of some resources (raw materials, energy, basic knowledge) and to a few downstream activities (exports to distant markets). However, even with this characterisation, districts are already seen as nexuses of trans-territorial relations, highly conducive to innovation and in competition with other open networks. From this perspective, Becattini's reflection was quite aligned with, and even anticipated, the debate on open innovation in the post-Fordist era.

Although connected with other theorizing of networks and of their territorial clustering, Becattini's in-depth study of some typical districts (first of all Prato) leads him well beyond the theory of clusters. In his view, local clustering of activities is nothing more than the most visible and measurable manifestation of a deeper and more powerful "engine" that brings local society to work and uses its anthropological and historical qualities in value creation. From this perspective, local society is a "choral" subject (Becattini 2015), and a very close relationship exists between "sense making"[2] and "value creation". In other words, industrial districts create the conditions not only for mutual trust, but also for the choice of specific ways of life and for the sharing of local knowledge. This is not merely an anthropological variant of clustered networking, but another way of thinking. Through the lens of industrial districts, he offers a comprehensive theorising—and proposes a utopia—of how the economy should work. Using the illustrative example of Prato and other districts, he highlights the makings of a capitalism with a human face, based on communities and not only on individuals (Becattini 1990, 2004).

3 Giacomo Becattini: another way of thinking about the economy

What are the elements that lead Becattini's reflection beyond the model of networks clustered in the territories?

His interpretive model gradually becomes sharper and neater with the emergence of clearer differences between the evolution of industrial districts and other expressions of capitalism (dominated by big businesses and by large multinationals). These differences are apparent especially in the post-2000s years, when industrial districts are no longer an emerging reality to be explored, but are rather established systems able to survive the competitive challenge of large companies. As stated by Alberto Magnaghi in the introduction to Becattini's last book (Becattini 2015): the inhabitants of a place—as observed in industrial districts—develop a shared identity based on a common anthropology and history. And this collective identity transforms them into a "choral" subject, capable of feeling and acting in

[2] A connection is made here with the literature on "sense-making communities" or "communities of shared meaning", made of interconnected individuals and organisations who pursue converging objectives, interests and passions, co-produce new goods and services that "have a meaning" to them (Weick et al. 2005; Bechky 2003).

forms of synergistic collaboration that the external market can recognize and reward in global competition.

By placing local society at center stage, the emphasis moves "from the theory of value of commodities to the theory of people's happiness". It is indeed another way of thinking about the economy. A way that proposes aims and means to pursue them, other than those assumed by mainstream economics.

As far as aims are concerned, people who "chorally" participate in the local society primarily pay attention to the extent to which the generation of value (and therefore of merchantable goods) makes sense in terms of their social life and of their individual sensibility. This sense making cannot be reduced to the maximum profit of the classical homo oeconomus. In fact, commodities and services, as well as the entire production process, need to be evaluated in relation to the "choral" happiness they are associated with. Moreover, a key role is played by the "shared intimacy" that arises from the common historical experience, the linkages created and accumulated over time with other actors, the moral obligations assumed and the empathy that makes social life satisfactory for individuals. People in flesh and bone are not abstract and one-dimensional economic agents. Their way of doing business is actually a project of life, not a program of mere capital accumulation. This applies to all the actors in the district, including local entrepreneurs.

As far as means are concerned, actors in the district are not only efficient users of resources the local context is endowed with. They also participate—with their own sensibility and values in a local ecology created over years, decades and (in some circumstances) centuries of evolutionary learning. This process has determined the accumulation of competencies and created occasions of convergence of interests, and facilitated the exploitation of complementarities, even beyond the awareness of individuals. Individuals active in the local context do not merely use the territorial cluster as a means for its own aims. They are part of a system that—in its history of evolutionary learning—has accumulated physical structures, cultural values, skills, viable specializations, social rules and codes of conduct that are suitable for life projects carried out by individual members of the local community. This is the way that makes the district a living system self-organized as a result of its own history, in much deeper and more complex forms than those that can be designed by its individual members.

In such an economy, every place (understood as a local society), pursues its own vocation, and develops distinctive qualities enhancing its competitivess, but also has the potential for the self-realization of meaning (happiness) for individuals involved, over and above the material well-being measured by GDP. If and when this accomplishment of individual aims in terms of sense-making and happiness does not take place, this is because—according to Becattini—this "natural" evolutionary process is hindered by deviant factors typical of classical capitalism: "the accumulation of wealth and of decision making" in a few hands (Becattini 2015).

4 Today: industrial districts in the ongoing digital and global revolution

After the crisis of 2008–2014, it is hard to say what remains of this utopia put forth by Becattini. Since 2000, as the so called fourth industrial revolution has been overtaking the scene, the industrial district has in fact ceased to be a reference model for the future of capitalism in general. In the world of digital and global relationships of the emerging paradigm, industrial districts are faced with a more difficult challenge than the ones faced by other production systems, dominated by large, highly internationalized companies. The big crisis combined with the effects of over a decade of wild globalization and of competition based on digital innovation has reduced the competitive edge of local systems centered on small firms, and has shifted the balance in favour of "technological poles" associated with the presence of large companies and large R&D investments. Multinational corporations and technology poles are present to some extent also in Italy, where Becattini's districts are rooted, but to a lesser extent than in other countries such as the United States, Germany, France or Great Britain.

Districts have always shown a significant propensity to set up export networks, but have invested little resources to reinforce their presence in foreign markets by means of direct investments. In the past, districts have relied heavily on foreign buyers (attracted by the flexible supply of Italian districts), international fairs and on trust-based relationships between large foreign buyers and Italian suppliers located in different districts. Today, these channels are no longer enough to be competitive in a market that has become more differentiated and widespread. The "closed" chains of classical industrial districts are no longer able to offer competitive products and services in global markets. Many districts have been experiencing the emergence of a few leading firms which have undertaken a new path based on foreign direct investment and on a greater involvement in global value chains. Local assets do not lose any importance in this process but their function changes: territorial specificity remains as a key to value creation insofar as it can be a source of competences, capacities and useful relationships that differ from those offered by producers located in other Places. In other words, 'local buzz' and, more generally, local industrial atmosphere need to be combined with 'global pipelines' that connect geographically dispersed sources of knowledge. This is confirmed by evidence showing that 'local buzz' is crucial for the development of knowledge in local economies, and it leads to persistence in innovative activities and in levels of concentration of innovation in a handful of places in the world. However, 'global pipelines' are also becoming a crucial element for the successful development of local knowledge, making the 'buzz' more dynamic, and providing access to a more variegated set of knowledge pools from which to draw. This is evidenced by the increased role of cross-border co-invention which, interestingly, seems to characterise both clusters in emerging economies, that may use such 'global pipelines' to catch-up, and by clusters in advanced economies, which may use them to revive their knowledge base and keep up with increased competition for innovation (Castellani 2017).

But how (and how much) knowledge is transferred in these global pipelines? How can the obstacles of 'not being there' be overcome? (Gertler 2003, 2008). At the most basic level, pipelines can be created by firms and organisation, or through personal networks. Lorenzen and Mudambi (2012) examine the role of migrant diasporas in facilitating the creation of such pipelines, with reference to the cases of the movie and IT clusters of Bollywood and Bangalore in India. Maskell et al. (2006) point out the role of temporary clusters, emerging from the participation in trade fairs, exhibition, conventions congresses, and conferences. Gertler (2008) discusses how communities of practices, which are defined as groups of workers informally bound together by shared experience, expertise, and commitment to a joint enterprise, can be vehicles for supporting learning at a distance. These communities mediate in the joint production and diffusion/transmission of knowledge within and between organizations. Furthermore, they allow some degree of relational proximity, which facilitates knowledge flows across regional and national boundaries. As Gertler (2008) notes, the formation of communities of practice, can be encouraged in large MNEs with 'distributed' knowledge bases and multiple sites of innovation, and supported by advanced means of electronically mediated communication, to overcome the friction of geographical separation. Indeed, the view of the MNEs as global orchestrators of geographically dispersed knowledge has long been established in the literature. By tapping into diverse knowledge clusters, and thanks to their ability to de-contextualise tacit knowledge and transfer it within the MNE and across space (Meyer et al. 2011; Castellani and Zanfei 2006; Cantwell and Santangelo 1999), they create institutional proximity that allows connections between knowledge sources and to share tacit knowledge across locations despite of geographical distance (Almeida et al. 2002; Cano-Kollmann et al. 2016; Hannigan et al. 2016). In other words, MNEs are privileged actors to connect clusters (Iammarino and McCann 2013) and build global pipelines between them. But, in order to act as conduits of knowledge between clusters, MNEs need to locate R&D in dispersed locations. Despite the fact that the world is increasingly inter-connected, national borders and distance still matter (Ghemawat 2016). This begs the question of 'How far are MNEs willing to go with their R&D in order to be close to knowledge cluster?' Castellani et al. (2013) address this question, and argue that concentration of knowledge in few geographically concentrated clusters reduces the set of possible available locations where specific bits of knowledge can be sourced. This may leave the MNE no choice but to locate R&D in a relatively remote location. Moreover, low transport costs in the case of knowledge inputs and outputs, combined with the fact that MNEs have developed routines and organizational structures that enable them to codify, process and transfer (codified and tacit) knowledge across national boundaries and within their internal networks (Gupta and Govindarajan 1991; Cantwell and Santangelo 1999; Zanfei 2000; Ambos and Ambos 2009), further increase the likelyhood that MNEs set-up R&D labs in relatively remote locations. Castellani (2017) shows that the distance between the home and host place (the city in his analysis) of foreign investment is the largest when MNEs locate R&D activities abroad: 22.4% higher than the average distance for all type of offshored activities, and 36% higher than in the case of production related investments. More robust evidence along these lines is

provided in Castellani et al. (2013) who find that geographic distance has a lower negative impact on the probability of setting up R&D than manufacturing plants. Furthermore, once accounted for measures of institutional proximity (such as, belonging to the same trade area or sharing similar religious attitudes and language), MNEs are equally likely to set-up R&D labs in nearby or in more remote locations.

A similar process of internationalisation is discernible also in industrial districts, which in many cases experienced a significant entry of foreign multinationals investing to take advantage of local assets and networking abilities. A partially alternative pattern of transnational evolution of districts relies on local medium sized firms, capable of investing in foreign markets and of involving local and international suppliers. Whichever the path followed in this evolution, it appears to be a slow and non-linear process that is turning industrial districts into nodes of global networks, wherein each place contributes according to its distinctive character, and according to its capacity to satisfy specific demand segments.

The competitive advantage of multinationals relative to district firms that had reached its apex over the past decade, has thus been slowly shrinking, as districts are becoming themselves involved in global value chains. However, Italian industrial districts have been even more affected by the second driver of the ongoing revolution: digitization. In fact, the organization of knowledge and relationships has increasingly become digital, deeply changing the cognitive environment in which companies work and where people live. On the one hand, new ways of producing and using knowledge have become feasible; on the other hand, previous organizational modes have become obsolete. The districts are at the center of this spiral of creative destruction that has affected the organizational forms of modern production. At first glance, the pervasive diffusion of digital technology has a detrimental effect on industrial districts because it changes the function and importance of geographic proximity, the axis of the classical district organization. With the advent of digital technologies, in fact, in many aspects of production and of R&D in particular, the role of distance is undermined (Castellani et al. 2013). In fact:

a. Codified knowledge becomes reproducible and transferable (over time and space) at virtually no cost;
b. Tacit knowledge whose transfer is much costlier, can indeed be produced through more effective communication and interaction between persons active in distant locations. This makes it possible to distribute intelligence on a truly global scale, both across different stages of Global Value Chains in the case of production networks, and across different phases of innovative activities in the case of R&D networks (Saliola and Zanfei 2009).

Whichever type of knowledge is considered, a more extensive division of cognitive labor is possible on a digital basis, involving different specialists depending on the specific problem to be solved, and on the modularity of products and technologies. In addition, it becomes necessary for firms and workers active within districts to master new technologies in order to codify all the knowledge that is codifiable, to facilitate interaction in global networks. This is of course a non-

trivial process requiring skills and a deep understanding of practical and contextual knowledge and a costly effort to generalise valuable knowledge in more abstract forms.

Digitization and globalization are therefore destabilizing forces that have exerted their competitive pressure on industrial districts, especially in Italy, marking the end of a long cycle of development that can be roughly dated from the early 1970s though the early 2000s.

However, this is only part of the story: to understand the strength of this change in the competitive environment after 2000, we must consider the intrinsic synergy between digitization and globalization. In fact, as the distances to be managed increase, it becomes more and more convenient for globalizing firms to codify the knowledge to be used and therefore it is more and more advantageous for them to digitize their cognitive processes. By the same token, if an enterprise becomes digital, its strategic and operational horizon will soon broaden, to take advantage of the zero-cost replication and transfer of the codified knowledge available. Thus, digital and global transformations tend to overlap and to reinforce one another, significantly changing the geography of innovation compared to the past (Castellani et al. 2013; Castellani 2017; Plechero 2012).

Hence, industrial districts are forced to accelerate and intensify their efforts to integrate their local assets into global networks, thus becoming "glo-cal" systems open to international knowledge sources and to global production and commercialization networks. Of course they have to undertake this transformation without losing the cultural, social and technical characteristics that make their contribution to global networks valuable and unique.

Moreover, industrial districts need to reconcile the use of computer codes and formal languages needed to move around in the digital world, with the role historically played by informal relationships and knowledge exchanges based on physical proximity.

It is no wonder that the transition to the new digital/global paradigm has been more difficult and slower in Italy, where industrial districts have always been a widespread reality, than in other countries, characterized by larger, more structured firms. In particular, countries with a wider presence of multinationals, capable of moving on a global scale and endowed with more educated human capital, appear to be in a better position to manage the formal languages of computer science, management, and communication that are needed to face the Fourth Industrial Revolution.

5 Three great transformations underway

Despite their weakness in the changing global environment, industrial districts have turned out to be reactive systems, capable of evolving and of tackling environmental change. Looking at the empirical data, the districts have in fact suffered the crisis with significant revenue losses and profit margins, but 20 years after the end of their golden age, they are not "dead" nor out of the way, as many observers had imagined. This is demonstrated by the annual survey on Italian industrial districts

conducted by Intesa San Paolo (2016). This survey, which compares the sales and profit dynamics of Italian district and non-district businesses, shows that the former outperform the latter, both in their capacity to react to the crisis, and in their ability to recover pre-crisis productivity and production levels. It thus appears that it is not size in itself that makes a difference. It is rather the ability to be resilient and responsive to the transformations to be undertaken. In fact, districts are still alive and vital because—as happens to all living systems—have changed in response to environmental change.

Three were the basic directions of transformation undertaken:

a. In each local system, medium-sized enterprises grew up to occupy a key role as system integrators of complex supply chains, and got increasingly engaged in export and foreign direct investment to serve foreign markets. Most of the production phases, as well as raw materials, are decentralized to external suppliers, sometimes local and sometimes located elsewhere (in emerging or technologically advanced regions). External purchases increasingly involve suppliers in the regional, national and international circuits (Rullani 2014, 2015). To illustrate, Mediobanca and Unioncamere data from balance sheets reveal that, on average, medium-sized district firms directly produce only one-fifth of their sales value (Unioncamere 2015). Medium-sized district firms are increasingly able to play a role that is typical of the leading companies in supply chain relationships;
b. The "social capital" that allowed all actors in the local system to gain easy and free access to the knowledge, capabilities and relationships present in the proximity circuit is no longer sufficient to compete in the fourth industrial revolution era. Cognitive and relational skills previously available free of charge in the district are not enough. They need to be reinforced by means of costly investments to integrate knowledge, networking abilities and skills deriving from past experience and traditions with new assets, competencies and relational abilities. Sometimes, it will be necessary for firms to set-up alliances with new partners (inside or outside the district, and often international). Ideas, logistic networks, suppliers and customers will hybridize the typical business model of the district. The supply-chain internal to the district increasingly needs to be integrated with external supply-chains, thus entering into a previously neglected world of partners, competitors, institutions, workers, distributors and consumers in the global market. This evolution requires companies to significantly enhance their financial, organizational and strategic abilities. Firms, workers and local institutions may significantly differ within and across industrial districts, in terms of their ability to undertake these efforts Rullani (2015);
c. While in pre-2000 years "sense creation" was the result of living and producing in the local context, today it relies on innovative ideas and competences that are accumulated in different places. It is through the connection between and among these places that such ideas can be fully developed and exploited, and new reasons of satisfaction are generated. Industrial districts are subject to important tensions to change, with the most

innovative firms within them increasingly involved in extensive interactions with external suppliers and consumers to whom the innovative ideas often make sense. This is for instance the case of producers of wood furniture in the Trentino region, who apply innovative ideas to the area of domotics and environmental sustainable housing. These firms are able to satisfy niches of consumers sensitive to such issues in many other regions and countries, and to find producers interested in using the same protocols, or Universities and research centers carrying out R&D elsewhere in the world. In addition, the driving ideas are propagated—by imitation or collaboration—throughout the supply chain. They are assimilated by suppliers, distributors, and even competitors (that are seeking distinctive products and services), and are translated into the expectations and desires of potential consumers who share their meaning. The connective system that holds together all these parties is not a shared local system, with the corresponding buzz. The shared driving idea, that generates meaning, creates links, enhances the derivative products and services, in a sort of extended, multi-local district where producers, distributors and consumers learn to use the same codes and to establish trust based relationships. Therefore, this kind of district firm has a dual rooting: each firm uses the supply chain of the district of origin for the distinctive abilities that cannot be found elsewhere, but also distributes other functions, workmanships, experiences in the extended district (the immaterial chain, centered on the same shared sense), giving rise to a new, complex, division of labour. A similar path of transformation took place in the case of ski boot manufacturers in the Montebelluna area, who have introduced new materials in the production of sport appliances; and in the several districts that are specialized in textiles and garment, whose new business model required to invent new fibers with applications in clothing as well as in other fields. See Barzotto et al. (2016) for illustrative evidence on these evolutionary patterns.

In the transition to the digital and global world, the most dynamic medium-sized companies, and the most innovative small companies, have a very different perception of what makes the sense of living and producing as opposed to less dynamic firms. The latter can be expected to adopt an inertial approach and perceive change as a source of anxiety and uncertainty. By contrast, the former, more innovative firms are likely to tackle the new competitive conditions more easily and to find them challenging and stimulating.

Globalization and digitization should not, however, be considered only as penalizing processes for small businesses in industrial districts in the new competitive post-2000 context. In fact, the development of efficient global networks involving dynamic medium-sized and small firms erodes, year after year, the quasi-monopoly condition of big multinationals in many markets. These were initially the only companies in the industrialized world able to operate on far-off markets, especially emerging countries. In the long run, global networks can have positive effects on the evolution of district based small or medium-sized enterprises, with two fundamental effects:

- The "empowerment effect" determined by the possibility of gaining access to digital networks. In other words, small businesses and even individuals are enabled to develop richer and more effective communication and interaction with distant counterparts, different from the usual ones based on proximity. On the one hand, digital networks facilitate the expansion of sales markets for those who have achieved some successful innovation. On the other hand, they allow to gain access to the knowledge available globally, making it easy to deploy use innovations, which are the key capacity of district firms. While big R&D investments remain largely associated to public investment in strategic research or to the commitment of large-scale enterprises, globalization and digitization are increasing the importance of use innovations that enhance the extraction of economic value from such investments. It is on this part of value creation processes that industrial districts can recover a propulsive role.
- The "worldmaking effect" of digital/global networks. We here refer to capacity of such networks to exponentially expand the range of meanings, desires, stimuli and values that firms and people connected can get in touch with, enriching their own world made of consolidated habits and ways of life. Nowadays there are many cases where digital/global marketing proposes to potential users new styles of living and working. New global commercialization practices are aimed at creating, first in the collective imagination and then in everyday practice, new living and working environments other than those inherited from the past. Creating new or personalized life and work environments (in response to individual user needs) is one of the most important sources of value added in digital and global networks. From this point of view, industrial districts have long developed valuable skills, brands and customized solutions in many emotionally engaging areas (fashion, nutrition, lifestyles, fun, smart tourism, reliable machine supply, as well as complex services). They now have the opportunity to exploit their quality and reputation by offering their "world" ideas in the digital and global environment involving millions of potential enthusiasts, propagators and buyers in the world market.

6 Becattini's utopia in the new world of digital and global revolution

Districts are alive and vital nowadays, albeit facing serious difficulties in their adjustment to the changing environment. However, there is quite a gap between today's districts and the classical model inherited from history and theorised by Becattini. This is not only a matter of diminishing distance barriers, implying that local systems have lost a significant part of the proximity-based differential benefits and are less protected from competitors' external incursions. More importantly, their evolution brings out a kind of "new district" that dramatically differs from the classic model, exhibiting a degree of involvement in global networks and of functional specialization that are not too far away from the ones characterizing multinational corporations. One may thus wonder what remains of Becattini's utopia in the new context. Can one still foresee a global world populated with local

societies able to produce value by following their own inspirations and chorally participating in a virtuous division of labor, without the distortions introduced by the the monopoly power of large multinationals? The answer is that the interpretive value of Giacomo Becattini's theorizing remains to the extent that one moves away from the consideration of the classical district model and adopts his more general way of thinking about the economy, which is exemplified by, but not limited to, the historical circumstance of Italian industrial districts in the second half of the XX century. His view may well apply to a variety of circumstances, not only to industrial districts, and it is flexible enough to encompass economic change under different environmental conditions.

Indeed, industrial districts are changing in a way that is by and large converging with the evolution of knowledge intensive, geographically spread and extensively networked transnational corporations. Much like multinationals, the most dynamic industrial districts are undertaking three different levels of action (Rullani 2015):

1. The creation of a multi-localized system of creative clusters, located in open innovation environments, capable to attract talent and to experience emerging innovation ideas. These clusters tend to be close to where R&D centers are, but also to the most attractive urban centers, where different operators converge to get in touch with, and get involved in, circuits of excellence. Due to their local concentration of expertise and experience in given sectors, industrial districts can favour the formation of, and feed the development of, such clusters enhancing the accumulation and exploitation of valuable knowledge and skills. As argued earlier, however, the making of creative clusters (and of effective connections with other clusters) requires strong investments and strong risks. This forces district firms to develop alliances both within and outside the district well beyond the set of supply relationships inherited from the past;
2. The connection to a global cognitive network that manages codified knowledge relevant to the chosen innovation field. Such a network can give access to what is useful and interesting in the world of science and technology and provides the means to diffuse relevant information on product characteristics and usage conditions towards customers, distributors, end-consumers in world markets. The global cognitive network is very active in multinationals and within large metropolitan centers, where the level of education of entrepreneurs and workers is high, and contacts that facilitate exchange or cognitive sharing are frequent. In the case of industrial districts, this network is still embryonic, both because of their decentralized localization (far from major R&D centers and metropolitan knowledge), and due to the relatively low level of formal education of local workers and entrepreneurs who largely derive their competences from practical experience. Even in this respect, the situation is evolving and weaknesses can be overcome, but it might be important to speed up this process, by setting up alliances among large national or international companies, research centers, universities, in order to gain access to relevant expertise;

3. The set up of a multilocalized supply chain that deploys the manufacturing and marketing phases in multiple locations around the world, depending on the specific costs and capabilities of the different locations. Logistics flows of goods and information also need to be organized to speed up production operations throughout the supply chain. From this point of view, districts are still weak as compared to transnational chains organized by large multinationals that have been operating in several countries around the world for decades. Indeed, small size district based firms can hardly afford to establish production plants as well as commercialization facilities abroad. This is another field where alliances, within the district or with external subjects, are needed to help set up such supply chains and to speed learning processes. There are also many cases of district companies that actively participate—as specialized suppliers—in multilocalized value chains that are run by large multinational corporations or local medium-sized businesses. In these cases, it is very important that the supplier brings in distinctive quality and competencies, as competitive assets to be spent in the network.

What are the elements of Becattini's utopia that are still present and active in the new digitalized global context? The key concepts emphasized by Becattini—sense sharing, search of happiness, territorial ecologies based on collective learning processes—still play an important role in a competitive scenario characterized by creative clusters, cognitive networks and global supply chains.

The role of sense sharing that districts inherited from their own history needs to be reconsidered however. On the one hand, efforts must be made to govern conflicts originating from the fragmentation of the previous district ecology. On the other hand, new forms of sense sharing must be constructed. The chorality and intimacy that, as Becattini suggested, characterized local communities, can hardly be replicated as such in the global context, while global sense making communities emerge. Trans-territorial social relationships co-exist with local communities. To make a well-known example, Slow Food[3] is illustrative of a sense community that crosses the territories and connects all those who adhere to a certain nutrition idea (Slow instead of Fast, sensitive to local supply, preference for non-standardized food). However, communities of this kind are emerging in all fields, by putting together—through the digital network—people and businesses that assign a shared sense to certain lifestyles, fun, learning or work.

The other crucial element of Becattini's model is collaborative learning, as a key driver of the evolution of local economies. Today's digital and global supply chains (creative clusters, cognitive network, operational chain) rely on such collaborative learning, but this is not a mere replication of traditional collaborative patterns that were inherited from local history. In fact, the number and variety of actual and potential partners dramatically increases as compared to the traditional district model. This implies also a dramatic increase in the number and variety of

[3] Slow Food is a global, grassroots organization which aims to prevent the disappearance of local food cultures and traditions and to sustain consumers' interest in the food they eat, where it comes from and how our food choices affect the world (www.slowfood.com).

interactions, relationships, and experimental connections through which evolutionary processes occur. Such learning processes must be governed through the convergence and cross-fertilisation between different cultural, technological and organizational languages, practices, and routines. This is the way through which elements of chorality and intimacy of the old districts are introduced in the new district model. From this perspective, the digital and global revolution appears to be, especially in the case of industrial districts, a cultural revolution because they have to internalize diversity in a pre-existing shared sense framework. Local people can be the pivot of this creation of sense if they bring into collaborative networks their own distinctive identity and competences. This is a possible evolutionary pattern, quite consistent with Becattini's idea of local contexts as a powerful engine of growth, potentially leading industrial districts to increase their value creation capacities.

References

Almeida, P., Song, J., and Grant, R. M. (2002). Are firms superior to alliances and markets? An empirical test of cross-border knowledge building. *Organization Science, 13*, 147–161.

Ambos, T. C., & Ambos, B. (2009). The impact of distance on knowledge transfer effectiveness in multinational corporations. *Journal of International Management, 15*(1), 1–14.

Aoki, M., Gustafsson, B., & Williamson, O. E. (1990). *The firm as a nexus of treaties*. Londra: Sage Publications.

Barzotto, M., Corò, G., & Volpe, M. (2016). Territorial capital as a company intangible: Exploratory evidence from ten Italian multinational corporations. *Journal of Intellectual Capital, 17*(1), 148–167.

Bathelt, H., Malmberg, A., & Maskell, P. (2004). Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography, 28*(1), 31–56.

Becattini, G. (1984). "L'ambiente": Ospite scomodo della politica industriale. *Economia e Politica Industriale, 43*, 3–8.

Becattini, G. (1985). L'interpretazione sraffiana di Marshall. *Economia e Politica Industriale, 47*, 5–26.

Becattini, G. (1989). Il distretto industriale marshalliano come concetto socio-economico. *Stato e Mercato, 25*, 111–128.

Becattini, G. (1990). Dall'impresa alla quasi-comunità: dubbi e domande. *Economia e Politica Industriale, 68*, 7–12.

Becattini, G. (1991). Il distretto industriale marshalliano come concetto socio-economico. In F. Pyke, G. Becattini, & W. Sengenberger (Eds.), *Industrial districts and inter-firm cooperation in Italy*. Ginevra: International Institute for Labour Studies.

Becattini, G. (2004). *Per un capitalismo dal volto umano. Critica dell'economia apolitica*. Torino: Bollati Boringhieri.

Becattini, G. (2015). *La coscienza dei luoghi. Il territorio come soggetto corale*. Roma: Donzelli Editore.

Becattini, G., & Rullani, E. (1993). Sistema locale e mercato globale. *Economia e Politica Industriale, 80,* 25–48.

Bechky, B. (2003). Sharing meaning across occupational communities. *Organisation Science, 14*(3), 312–330.

Buciuni, G., & Pisano, G. (2015) *Can Marshall's clusters survive globalization*? HBS Working Paper 15-088.

Burrows, R., Gilbert, N., & Pollert, A. (1992). *Fordism and flexibility: Divisions and change*. New York: St. Martin's Press.

Cano-Kollmann, M., Cantwell, J., Hannigan, T. J., Mudambi, R., & Song, J. (2016). Knowledge connectivity: An agenda for innovation research in international business. *Journal of International Business Studies, 47*(3), 255–262.

Cantwell, J., & Santangelo, G. D. (1999). The frontier of international technology networks: sourcing abroad the most highly tacit capabilities. *Information Economics and Policy, 11*(1), 101–123.

Castellani, D. (2017). The changing geography of innovation and the multinational enterprise. In G. Cook, J. Johns, F. McDonald, J. Beaverstock, & N. Pandit (Eds.), *The Routledge companion to international business and economic geography,* Abingdon-London: Routledge **(forthcoming)**

Castellani, D., Jimenez, A., & Zanfei, A. (2013). How remote are R&D labs. Distance factors and international innovative activities. *Journal of International Business Studies, 44*(7), 649–675. doi:10.1057/palgrave.jibs.8400312.

Castellani, & Zanfei, (2006). *Multinational firms, innovation and productivity*. Cheltenham: Edward Elgar.

Florida, R. (2005). *Cities and the creative class*. Abingdon-London: Routledge.

Gertler, M. (2003). Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). *Journal of Economic Geography, 3*(1), 75–99.

Gertler, M. (2008). Buzz without being there? Communities of practice in context. In A. Amin & J. Roberts (Eds.), *Community, economic creativity, and organization*. Oxford: Oxford University Press.

Ghemawat, P. (2016). *The laws of globalization and business applications.* Cambridge: Cambridge University Press.

Glaeser, E. L., & Gottlieb, J. D. (2009). The wealth of cities: Agglomeration economies and spatial equilibrium in the United States. *Journal of Economic Literature, 47*(4), 983–1028.

Gupta, A. K., & Govindarajan, V. (1991). Knowledge flows and the structure of control within multinational corporations. *Academy of Management Review, 16*(4), 768–792.

Hakansson, H., & Johanson, J. (1993). Network as a governance structure. In G. Grabher (Ed.), *The embedded firm. The socio-economics of industrial networks*. Londra: Routledge.

Hakansson, H., & Snehota, I. (1989). No business is an island: the network concept of business strategy. *Scandinavian Journal of Management, 4*(3), 187–200.

Hannigan, T. J., Perri, A., & Scalera, V. G. (2016). *The dispersed multinational: Does connectedness across spatial dimensions lead to broader technological search?* (No. 11). Venice: Department of Management, Università Ca'Foscari Venezia.

Iammarino, S., & McCann, P. (2013). *Multinationals and economic geography: Location, technology and innovation*. Cheltenham: Edward Elgar Publishing.

Intesa San Paolo—Direzione Studi e Ricerche (2016). *Economia e finanza dei di-stretti industriali. Rapporto annuale* n. 9, coordinato da Foresti G., Guelpa F. e Trenti S., dicembre, www.group.intesasanpaolo.com/scriptIsir0/si09/contentData/view/EconomiaFinanzaDistretti.pdf?id=CNT-04-000000001F6D4.

Jessop, B. (1992). Fordism and post-Fordism: A critical reformulation. In M. Storper & A. J. Scott (Eds.), *Pathways to industrialization and regional development* (pp. 42–62). London: Routledge.

Lorenzen, M., & Mudambi, R. (2012). Clusters, connectivity and catch-up: Bollywood and Bangalore in the global economy. *Journal of Economic Geography, 13*(3), 501–534.

Maskell, P., Bathelt, H., & Malmberg, A. (2006). Building global knowledge pipelines: The role of temporary clusters. *European Planning Studies, 14*(8), 997–1013.

Meyer, K. E., Mudambi, R., & Narula, R. (2011). Multinational enterprises and local contexts: The opportunities and challenges of multiple embeddedness. *Journal of Management Studies, 48*(2), 235–252.

Owen-Smith, J., & Powell, W. W. (2004). Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. *Organization Science, 15*(1), 5–21.

Plechero, M. (2012). *The changing geography of innovation. Chinese and Indian regions and the global flows of innovation*. Lund University—Centre for Innovation, Research and Competence in the Learning Economy, Lund: Lund University Press.

Porter, M. E. (1998). *Clusters and the new economics of competition* (Vol. 76, No. 6, pp. 77–90). Boston: Harvard Business Review

Richardson, G. B. (1972). The organisation of industry. *Economic Journal, 82*(327), 883–896.

Rullani E. (2014). Filiere, reti e clusters: strategie e politiche per i sistemi di relazio-ne emergenti. In *Osservatorio nazionale distretti italiani. Idee, esperienze e progetti per rafforzare o ricostruire la competitività dei territori* (pp. 139–161). Unionfi-liere, Unioncamere e Distretti Italiani.

Rullani, E. (2015). Distretti e filiere in evoluzione. In *Rapporto 2015 dell'Osservatorio Nazionale Distretti Italiani* (pp. 76–103). Roma: Unioncamere. http://www.osservatoriodistretti.org/sites/default/files/rapporto-2015.pdf

Saliola, F., & Zanfei, A. (2009). Multinational firms, global value chains and the organisation of knowledge transfer. *Research Policy, 38*(2009), 369–381.

Storper, M., & Venables, A. J. (2004). Buzz: Face-to-face contact and the urban economy. *Journal of Economic Geography, 4*(4), 351–370.

Unioncamere (2015) *Rapporto 2015 dell'Osservatorio Nazionale Distretti Italiani.* Roma: Unioncamere. http://www.osservatoriodistretti.org/sites/default/files/rapporto-2015.pdf

Weick, K., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science, 16*(4), 409–421.

Williamson, O. E. (1975). *Market and hierarchies: Analysis of antitrust implications*. New York: The Free Press.

Williamson, O. E. (1985). *The economic institutions of capitalism. Firms, markets, relational contracting*. New York: The Free Press.

Zanfei, A. (2000). Transnational firms and the changing organisation of innovative activities. *Cambridge Journal of Economics, 24*, 515–542.