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Section ARTICLES

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The international resilience of Italian industrial districts/clusters (ID/C) between knowledge re-shoring and manufacturing off (near)-shoring

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ABSTRACT: The literature regarding ID/C is based on seminal writings of Marshall, followed by Giacomo Becattini's rediscovering of the concept of an «industrial district». But the concept of a «cluster» was also promoted during the 1980s by Porter, and highlighted the importance of geographically clustered and interconnected firms and institutions specialised in a particular field. Despite the model of ID/C has been often described as locally self-contained, various empirical researches and our analysis have pointed out its increasing involvement in the process of internationalization. The recent entry and exit of MNEs, and the phenomena of off-shoring did not question the model of ID/C per se, but it contributed to showing how interwoven the evolution of local economies and MNEs is.

JEL Classification: L60; 014; R30; R58.

Keywords: industrial districts; clusters; MNEs; off-shoring; re-shoring.

La resiliencia internacional de los distritos industriales/clusters (ID/C) italianos entre la relocalización del conocimiento y la deslocalización (en proximidad) de la manufactura

RESUMEN: La literatura sobre ID/C se basa en los escritos seminales de Marshall, seguida del redescubrimiento de Giacomo Becattini el concepto de un «distrito industrial». Pero el concepto de un «*cluster*» fue también promovido durante la década de 1980 por Porter, y destacó la importancia de las empresas e instituciones geográficamente agrupados e interconectados, especializados en un campo particular. A pesar de que el modelo de ID/C ha sido a menudo descrito como localmente auto-contenido, varias investigaciones empíricas y nuestro análisis han señalado su creciente participación en el proceso de internacionalización. La reciente entrada y salida de empresas multinacionales (MNEs) y el fenómeno de la deslocalización no cuestionaron el modelo de ID/C per se, pero contribuyeron a

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mostrar hasta qué punto está interrelacionada la evolución de las economías locales y las empresas multinacionales.

Clasificación JEL: L60; 014; R30; R58.

Palabras clave: distritos industriales; *clusters*; empresas multinacionales; *off-shoring, re-shoring.*

1. Introduction: The origins of ID/C concepts

The origins of the literature regarding ID/C are based on seminal writings of Marshall (1919, 1920) followed by Giacomo Becattini's (1987) rediscovering of the concept of an «industrial district» in Italy during the 1980s. In addition, the concept of a «cluster» was promoted during the 1980s in the U.S. by Porter (1998; 2000a and 2000b) and highlighted the importance of geographically clustered and interconnected firms and institutions that are linked by commonalities and complementarities and are specialised in a particular field. The literature on IDs/Cs has highlighted some of the most important characteristics regarding the geographical concentration of «specialised industries», both in peripheral regions or in central urban industrial areas (Grabher, 1993; Loasby, 1998; Amin and Cohendet, 2000; Maskell, 2001; Belussi and Pilotti, 2002; Lombardi, 2000; Sorenson, 2005). Following Marshall, in this paper we acknowledged that the great efficiency of the ID/C model was linked to the following: 1. to the high level of specialisation created by a large inter-firm division of labour, especially, but not exclusively among small firms; 2. to the access to a specialised local pool of skilled labour with better job match possibilities; 3. to the availability of local specialised suppliers of raw materials and components and by the co-location of competent subcontractors; and 4. to the privileged access to local knowledge and know-how, as Marshall himself stressed (knowledge resides «in the air» and in the «industrial atmosphere» of the district). This means that, once a specific form of industrialisation is rooted in a certain area, a process of socialisation and knowledge creation takes place, and the sharing of tacit and codified knowledge overcomes the factory walls, involving the new entrepreneurships, the local workforce, institutions, vocational training centres, universities, and research centres. Good ideas are promptly selected, and innovation quickly diffuses among the local firms, pushed by imitative behaviours. Moreover, IDs/Cs are characterised by the co-presence of cooperation and coordination among the local firms operating in the same phase of the production process. This has added another important characteristic to the complete representation of the «efficient working» of the local economic system (You and Wilkinson, 1994). Section 1 describes the origins of the ID/C concepts. Section 2 deals with the agglomeration phenomenon and Section 3 with the local learning features. Section 4 attempts to classify the variety of existing districts/clusters into a solid typology. Section 5 discusses the centripetal and centrifugal forces. Section 6 and 7 describe empirically the Italian case. Finally Section 8 drawn some conclusions.

2. Old wine in new bottles? Agglomeration, clusters, and industrial districts

More linked to the Marshallian tradition was the impetus during the 1980s provided by research underlining the «trusting district», which includes the institutional and social aspects blending together with the «pure» economic explanations. The argument here is that the social «embeddedness» of the local community is responsible for the «reproduction» of the local system, related mainly to the building of social networks endowed with trust, ethics, and commonly shared rules of conduct (Granovetter, 1985). This adds another important characteristic to the local system under analysis (Harrison, 1992), which bears an important economic consequence: a high propensity towards cost-saving rules throughout informal arrangements and cooperation (Dei Ottati, 1986a and 1986b; Lazerson, 1995; Brusco, 1982; Piore and Sabel, 1984), and the sharing of a collective identity (Porac *et al.*, 1989; Camuffo and Grandinetti, 2011). Clearly, the argument offered by the theorists of geographical proximity only, in part overlap with the ID/C theorisation, because organisational, institutional, and temporary forms of proximity matter, but they can be realised outside the borders of the local system under investigation (Rallet and Torre, 1999). The discovery of «external economies» opens up several unresolved issues. First of all, they can be linked to «urbanisation» (Jacobs, 1960) or to «localisation/specialisation» (Marshall, 1920). As discussed by Rosenthal and Strange (2004), diversity (urbanisation) encourages growth and also creation of new firms, particularly in the high-technology field, but if this is consistent with Jacobs, it is not inconsistent with Marshall.

In the theory of the ID/C perhaps one of the most important unanswered questions is the spatial definition of the geographical borders. Despite the numerous objective methodologies implemented (like the analysis of the local systems of labour), we cannot elude the subjective interpretation and intervention of the participant observer. IDs/Cs cannot be identified in their embryonic state, but only once they have developed a critical mass, thus, it is only the evolutionary dynamics of these systems that allow us to properly detect them.

However, considering the agglomeration of specific activities in given areas, statistical objective and subjective methods (case studies and surveys) can be applied once the local systems under examination have reached a critical mass (Belussi, 2006). But, agglomeration of different manufacturing units (Krugman, 1991), where external economies are achieved (alongside various off-setting diseconomies) is not clustering. Thus, we can identify the presence of a specific ID/C when significant relationships (Amin and Cohendet, 2000; Antonelli, 2000) and economic transactions can be detected (even indirectly, as in Sforzi, 1989 or Molina-Morales, 2002). These relationships must occur among the firms located in the area. Local institutions are expected to play an active role, being involved in the creation of training and research institutions, and in the promotion of sectoral associations (Brusco, 1992; Asheim, 1996; Belussi 1999a; Braczyk *et al.*, 1998; Morgan, 2007; Hervas-Oliver *et al.*, 2012).

As argued in Belussi (2006), there is a fundamental difference between the heterogeneous manufacturing agglomeration of individual firms (industrial or urban agglomerations) and a local specialised system, where firms are sharing specialised activities, a skilled workforce, subcontracting relationships, infrastructure, and institutions. This means that IDs/Cs must be analysed as a specific territorial unit, different from the provincial, regional, or country state level, and despite the definition of a cluster by Porter himself, for which the clarity of his argument often vanishes (see also Belussi, 2006; Martin and Sunley, 2003).

Therefore, the feature of agglomeration is only a precondition for the existence of an ID/C, and not at all a weak manifestation of this model. If we turn to the distinction between the concept of an industrial district and a cluster, as discussed in Belussi (2006), we are often describing exactly the same local system. Thus, in many cases, clusters and industrial districts can be considered synonymous, and in discovering the differences we encounter many semiotic antinomies (Martin and Sunley, 2003). However in other studies, the sociological interest of the researchers in the study of the influence of social variables such as trust, communitarian behaviour, propensity for cooperation, and so on, can make the difference. In this sense, it can be said that the subtle difference lies in the theoretical approach put in place, and not in the objective differences that are detachable in the various local systems. In contrast, Gordon and McCann (2000) and Iammarino and McCann (2006), following Markusen (1996), have argued that the industrial district (called «social network cluster») is the Italianate stereotype of a cluster, where only small firms are participating in the industrial structure, where cooperative behaviours and trust appear to be dominant among the local actors, and where spatial proximity incentivizes knowledge spillover and knowledge sharing. An alternative theoretical view could maintain that these phenomena can occur with different intensity both in clusters and/or in industrial districts, but they are typically studied by researchers interested in developing a socio-economic analysis (Becattini, 1990 and 2003), away from the neoclassical paradigm of perfect rationality.

However, IDs/Cs can, thus, transform themselves into mere indistinguishable spatial agglomerations, and vice versa.

More or less pure examples of «Marshallian industrial districts» may be found in the real world, but it must be said that the clustering of heterogeneous agglomeration is the norm, because indistinct agglomeration is more common than specialisation. Gordon and McCann (2000) have maintained that there are three basic forms of clustering. Two of these have developed from the (neo-) classical traditions of economics: the classic model of pure agglomeration and the industrial-complex model (industrial cluster). The third model, which is that of the network (or club) was developed initially outside mainstream economics and comes more from sociological perspectives (industrial district). However, can «pure clusters» avoid creating a kind of social relation or embeddedness in their life cycle? Is Silicon Valley a cluster or an industrial district? And what about the San Diego local biotech system which Kim (2015) calls a cluster, but that he describes with all the features of an industrial district? Should we follow what Saxenian herself clarified: an «Italianate» model of an industrial

district or the definition of Brian Arthur (1990) and Klepper (2010) which called Silicon Valley a cluster? I strongly believe that we have to accept a loose terminological definition (Paniccia, 2002).

In conclusion, we have to admit that we live in an academic world where there is great semantic ambiguity. What in Northern Europe was called a «cluster» (Maskel, 2001) or «learning region» (Asheim, 2006), is in fact a Marshallian theorisation of a «mature» industrial district, while, in Italy, the term industrial district was used to define different types of ID/C (Paniccia, 1998).

We have to recognise that the term cluster refers to a more general class of phenomena (where the industrial district belongs to a distinct specification), or to use the term ID/C without any juxtaposition.

3. Districts and clusters as local learning systems

When Marshall describes the advantages which arise from external economies and territorial proximity, with the resulting balance between localised increasing returns to scale and spatial distance transaction costs, he comes close to several concepts that in the history of economic thought were developed much later, such as increasing returns (Young, 1928), cumulative causation (Myrdal, 1957), path-dependency (Arthur, 1994) and evolutionary theory (Nelson and Winter, 1982; Witt, 1993). But, these advantages are not destined to last forever, as the history of British industrial districts during the two world war periods has shown.

The endogenous mechanism of building innovative capabilities within the ID/C follows a type of non-linear model of innovation, and it is based on a model of continuous incremental innovation, also defined as «innovation without R&D», constellated by radical Schumpeterian novelties. In other words, firms populating the ID/C have the advantages of an ample availability of knowledge reutilisation and routines replication (Antonelli, 1999 and 2000). Innovations may be created «by design», through a deliberate effort of firms or public agencies, or they may be created by chance, when people master the implementation of technologies or during the normal course of production activity. Changes are actively experimented with because entrepreneurs or technicians must always solve new problems or may encounter unexpected demands by their clients. So, the reuse of old blocks of knowledge or the recombination of dispersed pieces of knowledge may give rise to novelties. New knowledge and existing knowledge tend to circulate in the economic environment in a process that has no end. The advantage of an ID/C lies not only in the fact that: «when an industry has chosen a locality for itself it is likely to stay there long: so great are the advantages which people following the same skilled trade get from near neighbourhood to one another» (Marshall, 1920, p. 271). The long-term permanence of an activity in a locality tends to anchor and embed specialised knowledge (in firms, workers, and local institutions and organisations). The local accumulation of know-how and tacit knowledge is not an easily transferable or imitable resource. The notion of an «innovative milieu» (Aydalot and Keeble,

1988; Camagni, 1995), has attempted to relate questions of spatial clustering to the process of innovation.

In addition, learning activities related to interactions are of paramount importance. Within IDs/Cs, learning through client-supplier relationships, and by using innovative subcontracting are the norm. IDs/Cs are self-organized systems (Lombardi, 1999; 2000), characterized by a deliberately and historically formed ample inter-firm division of labour connected with firm specialization. Districts are not only an alternative model to large hierarchical organizations, but different systems, because they are founded on higher increasing returns, and on complex inter-related nets of organisations, which enjoy dynamic economies of scale. Therefore, the efficiency reached by these systems cannot be simply compared with that of one large firm. In these localized systems economies of scale reach a large scalar dimension related to the many complex networks of activities, overlapping filières, rival firms, co-operative subcontractors, specialized agents, and localized collective actors and institutions. This corresponds to the second order magnitude of input coordination and activity aggregation.

In many cases these systems also incorporate large size units, or large firms (Lipparini, 1995; Lipparini and Sobrero, 1994; Lazerson and Lorenzoni, 1999). Districts and clusters are, thus, hyper-networks and they take advantage of multiple synergies (Gertler, 2001). This is why IDs/Cs must be distinguished from networks (Biggero, 1999; Jacobs and de Man, 1996).

4. «Real» industrial districts/clusters: Unstable, interstitials, and epiphenomenal?

Yet, the attempt to classify the variety of existing districts/clusters into a solid typology is still challenging academic researchers.

A particularly influential article was written by Markusen in 1996, undertaking the effort of explaining «the puzzle of stickiness in a slippery world». The main thesis was the rejection of the «new industrial district», in either its Marshallian, or in the more recent Italianate form, as the dominant paradigmatic solution. The findings suggest that the study of industrial districts requires a broader institutional approach (it is not clear what was really meant). The research results suggest that a purely locally targeted development strategy will fail to achieve its goals. Unfortunately, in proposing an interesting categorisation of agglomeration forms, the phrase «industrial district», instead of cluster (avoiding to quote even Porter), was used, thereby engendering a terrible mess. In addition, with an immense intellectual haughtiness, Markusen killed the benefits of all possible «cluster policies» in favour of the various local economies.

Moreover, when Markusen introduces the category of an industrial district that is «state anchored» she rejects the idea that «cluster policies» do not have any impact on the dynamics of territorial agglomeration, which is clearly not true (UNCTAD, 1998; Oecde, 1999; Dohse, 2000; Trippl and Tödtling, 2007; Borrás and Tsagdis, 2008).

Markusen compares the models of modern clusters with the Marshall model, in which the cluster is rather homogeneous and created prevalently by small firms that collaborate with each other in a supplier-producer relation. In this model, none of the firms is large enough to appear dominant. In a hub-and-spoke cluster, there are a few dominant firms that represent the core of the «regional» cluster and are surrounded by numerous small firms that are linked directly to these such as suppliers of raw materials, externalized services or subcontractors specialized in particular phases. The small firms trade directly with the large firms and depend largely on their client strategy. Clear examples of hub-and-spoke clusters are found in the automotive industry, such as Detroit.

In a «hub-and-spoke cluster», there are few (or only one [sic.!]) dominant firms that represent the core of the cluster and are surrounded by numerous small firms that are linked directly to them, being suppliers of raw materials, externalized services or subcontractors specialized in various particular phases. The small firms trade directly with the large ones and depend on their client strategy

In the «satellite platform cluster», there are no localised MNE headquarters or large independent companies, but only branch facilities of externally based multi-plant firms. They are located in a particular geographic region in order to benefit from governmental facilities, low labour costs, or low profit taxes.

The last category, the «state anchored cluster», is defined around a public, governmental or non-profit organization that dominates the region and the economic relations between cluster members. This entity is exemplified in many U.S. scenarios, such as a large military base that is generally surrounded by numerous small firms that benefit from public-private contracts.

This analytical frame, unfortunately, is static and the analysis of firms» strategies is lacking. There are not valid universal instant snapshots. Hub-and-spoke clusters are not structurally different from many modern «Marshallian districts», as described in several empirical research studies (Lazerson and Lorenzoni, 1999; Belussi, 1999a and Belussi 1999b; Camuffo, 200; Belussi and Sammarra, 2010), and dependent local subcontractors in hub-and-spoke clusters may reach their global suppliers well beyond the cluster borders. In fact, Gereffi has studied «production» and «buyer dominated» international supply chains, showing two models that link global clients with local clusters of producers (Bair and Gereffi, 2001; Gereffi *et al.*, 2005). The Marshallian district, even in Italy, has been generally evolving throughout the consolidation of several leading firms, reducing the number of firms that compose the local industrial structure. In one sense, we can paradoxically argue that they are now less Marshallian. Interestingly, the same processes appear to be quite influential also in China (Wei *et al.*, 2007). The restructuring of the old Marshallian district in Wenzhou, in the period from 1980-2000 has passed from a model centred on small-scale family businesses in rural settings toward larger modern corporations and an extended delocalised external network. The work of Christerson and Lever-Tracy (1997), focused on the emergence of rural districts in China has, on the contrary, presented a new «mixed» model which is in the middle between the «canonical» industrial

district and the «satellite platform». Chinese firms are typically indirectly linked to global markets through Hong Kong and Taiwanese trading companies and buying agents. This network embeddedness allows firms a greater degree of autonomy than being directly dependent on one or a few multinational firms. Although these areas of industrial production in China may not be «Marshallian industrial districts» in the sense of spatially concentrated agglomeration economies, the regional networks of Chinese factories and ethnic Chinese Hong Kong and Taiwanese investors, suppliers, and clients display the same tendencies toward cooperation, trust, and long-term relationships.

Again, let us discuss the case of the «state anchored cluster» of Sophia Antipolis discussed by Quéré (2003). This science park increasingly became, through a process of «distrectualisation», a more complex and mature «industrial district». In contrast, Wei *et al.* (2009) analysed the transformation of Suzhou Industrial Park, arguing that it resembles a satellite district.

5. The heterogeneous evolutionary paths between the centripetal building of local capability and the centrifugal loosing of low-value manufacturing activities

Can the history of the development of ID/Cs simply be accommodated under the label of their «geography of production» and the role played by «external economies»?

In understanding ID/C evolution, the analysis of the building of dynamic technological capabilities deserves a close look (Hervas Oliver, 2015), which returns to the issue of the accumulation of knowledge. Following this logic, John and Pouder (2006) have distinguished technology-based and industry-focused IDs/Cs.

Using a wide sample of local Italian systems, we have distinguished in Belussi and Pilotti (2000) different types of industrial districts/clusters. They are classed into three main categories: a) those with low levels of learning activities where tacit knowledge prevails, and learning takes place mainly through socialisation; b) those based on a balance between tacit knowledge and codified knowledge (here, learning appears to be a «pure» interactive process among localised agents with a rich absorption of external knowledge and recombination of innovative sources); and c) those where learning is based on more formal innovative activities (R&D type).

Traditional sectors in Italy (those with high fashion content), for instance, have evolved following a process of verticalisation, which has deeply transformed the historical IDs/Cs (Lazerson and Lorenzoni, 1999; Belussi *et al.*, 2003; Cainelli and De Liso, 2005; Mariotti *et al.*, 2006; Belussi and Sedita, 2009; Cainelli and De Liso, 2006). This has led to the international relocation of many activities previously carried out by local sub-contractors (Guerrieri and Iammarino, 2001; Zucchella, 2006; Sammarra and Belussi, 2006). Considering the evolution of IDs/Cs, we have to pinpoint the increasing connectivity with global supply chains (Arndt and Kierzkowsky,

2001), emerging from low-labour cost countries, and the transformation of distributive channels, including e-commerce, that advocate another kind of Chandlerian revolution in the economy.

In high-tech (science) or high-knowledge (engineering) sectors, including the high-tech/science districts located in the United States or in Great Britain (Cooke, 2004; Feldman and Audretsch, 1999; Saxenian, 1994), and in sectors specialised in biotechnologies, biomedical applications (Powell *et al.*, 1996; Zeller, 2001), electronics, and software production, where the knowledge possessed by the various actors is constantly and randomly recombined, local firms benefit from knowledge spill overs from local relationships with MNEs possessing highly specialised skills. MNEs are often attracted to clusters to gain access to the pool of localised knowledge (Cantwell and Mudambi, 2011). The entry of MNEs in IDs/Cs has given rise also to the processes of technological transfer between MNE subsidiaries and local firms, although this process is not present in every case (De Propris and Driffield, 2006). Clusters in high-tech are characterised by a dual mechanism of local knowledge absorption and sourcing knowledge from abroad (Gertler and Levitte, 2005; Waxell and Malmberg, 2007; Hervas-Oliver and Albors-Garrigos, 2008; Belussi *et al.*, 2010; Chen, 2009). They are now open systems, in stark contrast with the holistic categorisation of Markusen.

6. The Italian districts/clusters

While the expansion of the Italian districts/clusters historically dates back to the post-war period (Becattini, 1990; Brusco and Paba, 1997), the embryonic development of many of these clusters dates back to the end of the 19th century.

The «Italian district model» has enjoyed long-term slow growth without a sudden decline or dissolution, as in the UK, as discussed by Belussi and Caldari (2011).

Many Italian IDs/Cs that specialise in light or medium high-tech sectors are smaller than Prato, and less spatially concentrated, as is the case, for instance, of several IDs/Cs in Veneto, Emilia Romagna, and Tuscany (Cossentino *et al.*, 1996; Belussi and Sedita, 2009). Some IDs/Cs that show district-type features are diluted in conurbations, so they do not clearly and distinctly «emerge» from the statistical analyses, such as the packaging machinery cluster in Bologna (Belussi, 2003). More generally, behind the notion of a uniform «Marshallian industrial district phenomenon» there is a striking heterogeneity, including the recent entry of MNEs, and the creation of home-grown MNEs.

As reported by IPI (2002), considering the results of many classification grids and maps, Italy counts about 100—120 industrial districts typically characterized by the presence of «made in Italy» sectors. Local entrepreneurship characterises these local systems. Thus, the Italian case is quite opposed to the U.S. case, based on high-tech sectors formed around local leading universities, with foreign entrepreneurs and an immigrant skilled labour force (Saxenian, 1999). We are not in the presence of a

predetermined, or standard lifecycle, because we can observe a multiplicity of evolutionary paths (Belussi and Sedita, 2009).

7. The genesis of the Italian industrial districts

7.1. Methodology

In this section an ample survey that applied a qualitative meta-analysis (Paterson *et al.*, 2001) on the existing Italian industrial districts will be discussed. Instead of using statistical data, textual reports developed in previous studies have been analysed, creating new interpretations from secondary sources. The rationale that informed the case study selection strategy was twofold. On the one hand, we searched for IDs/Cs with different characteristics (e.g., recent vs. ancient, high-tech vs. low-tech, small-sized vs. large-sized) in order to include extreme situations and polar types in which the process under investigation could be «transparently observable» (Eisenhardt, 1989). On the other hand, we selected IDs/Cs for which at least one published case study was available, containing information and a description of the processes under investigation (e.g., historical roots, changes over time, process of internationalisation, technological dynamisms, etc.). This critical survey examines 22 Italian cases, using scientific publications that appeared in academic journals and books[1] (see Table 1). The list is not meant to be a comprehensive survey. However, the aggregate picture that emerges allows us to appreciate the presence of different types of evolutionary paths. Thus, Factors 1-8 were deducted from the existing publications —an ample bibliography collected and mainly written in the Italian language, cited in Belussi and Sedita (2009)— while Factors 9-12, involving the analysis of the more recent trends referring to the issue of internationalisation (external knowledge sourcing, presence/absence of MNEs, and creation of home-grown multinationals), were elaborated, extracting the information provided by telephonic interviews with district/cluster representatives or leaders of the local entrepreneurial association. In order to validate the information collected, we ran a double check by searching on the firms» websites (June 2015). The analysis of Factors 1-8, enlarged to a larger sample of districts (55), was first published in Belussi (2009).

7.2. The initial take-off

In the 1950s, the growth of Italian IDs/Cs was driven by the expansion of the «small firm model»: a growing number of local small- and medium-sized firms populated the Italian industrial districts/clusters. They were «phase» or «component» producers for the already existing firms, or for new firms entering the market with novelties, or slightly improved products. During that period there was a correlating increase in local employment.

[1] The main sources are reported in Belussi and Sammarra (2005), Belussi and Pilotti (2002), Belussi, Sammarra, and Sedita, 2008; Belussi and Sedita, 2009, and Club dei distretti industriali (2003).

Table 1. The Genesis of Italian IDs/Cs

Nature of the triggering factor	*Key triggering factor*		*Sector and locality*
Endogenous	• Ancient craft traditions (with ubiquitous spin-offs)	Veneto	1. Sportsystem (Montebelluna) 2. Artistic ceramics (Bassano, Vicenza) 3. Artistic glass (Murano, Venice)
		Emilia Romagna	4. Ceramic tiles (Sassuolo) 5. Agriculture machinery (Reggio Emilia)
		Lombardy	6. Footwear, now footwear machinery (Vigevano) 7. Nylon stockings and socks machinery (Castel Goffredo, Mantua and Brescia)
		Tuscany	8. Textiles (Prato) 9. Tanning (Santa Croce sull»Arno, Pisa)
		Other regions and Mezzogiorno	10. Sofa district (Matera-Altamura-Santeramo)
	• Natural resources endowment (with ubiquitous spin-offs)	Veneto	11. Leather (Arzignano) (water and tannin)
	• Anchor firm (with employee's learning and subsequent spinoffs)	Veneto	12. Footwear (Riviera del Brenta -Voltan firm 1898) 13. Eyewear (Agordo, Belluno - Luxottica firm in 1950)
		Emilia Romagna	14. Biomedical (Mirandola - Dideco of Veronesi firm 1960) 15. Packaging (Bologna - Ima and GD firms in 1920s) 16. Motor-valley (Bologna - Ducati)
		Others regions and Mezzogiorno	17. Ornamental horticulture (Pistoia - Bartolini firm 1849) 18. Jewellery (Arezzo - Uno A Erre 1926) 19. Ceramics (Sesto Fiorentino- Richard - Ginori, 1737) 20. Furniture (Pesaro - Scavolini firm) 21. Footwear district (Civitanova -Tod's - Della Valle firm)
Exogenous	• Entry of MNCs	Sicily	22. Microelectronics (Etna Valley in Catania - STMicroelectronics)

Source: Our elaborations are based on Belussi and Sedita (2009), Belussi and Pilotti (2002), Dei Ottati (1996), and Club dei distretti industriali (2003).

Four main triggering factors can explain the ID/C genesis (see Table 1), either endogenous or exogenous. The endogenous factors include: *a)* the availability of skilled craftsmen b) the pre-existence of certain natural endowments, such as tannin in the forest for supplementing the process of treating leather products (see the case of Arzignano); or c) the presence of an important local dynamic firm (the anchor firm[2]), which at the time had developed unique technological capabilities leading to a process of spinoffs[3]. The main exogenous factor seems to be related to: d) the entry of an external dynamic firm (a multi-national firm). The exogenous triggering factor, so important in explaining the take-off of IDs/Cs in developing countries (Markusen, 1996; Ernst, 2001; Guerrieri *et al.*, 2001; Giuliani *et al.*, 2005), is marginal in Italy. The only case found is the electronic ID/C in Catania in the Etna Valley, born around the French-Italian multinational, STMicroelectronics (Mudambi and Santangelo, 2014).

By the end of 1980s, most of the IDs/Cs had approached a phase of maturity. The most important triggering factor appears to be the pre-existence of an «ancient craft tradition» (Bellandi, 1992). The anchor firm hypothesis can be applied to a few Italian industrial districts/clusters; for example the Voltan firm, founded in 1989, which was the founding firm of the footwear district/cluster of the Riviera del Brenta near Venice (Belussi and Gottardi, 2000); Luxottica, founded in 1950, the founding firm of the Belluno-Padova eyewear ID/C (Camuffo, 2003); or for the Ima and GD firms, established in the 1920s in Bologna, which can be considered the founding firms of the Bologna packaging ID/C (Belussi, 2003).

Existing studies concerning Italian IDs/Cs reveal that spinoffs are generally sustained by the desire of senior engineers to become entrepreneurs (self-employed workers) and there is no evidence that many conflicts have occurred between the parent firms and the new initiative that was created (Lipparini and Lorenzoni, 2000; Belussi, 2003).

The «natural resource endowment» driver concerns only a few IDs/Cs in our data set and seems a quite marginal explanatory factor. Italian IDs/Cs particularly emerged in the regions of the «Third Italy» (Veneto, Emilia Romagna, Tuscany, and Marche), after a long incubation period, starting with the proto-industrialisation derived from the Renaissance (Bagnasco and Trigilia, 1984; Garofoli, 1989). In the Mezzogiorno region of Italy the most interesting case appears to be the sofa ID/C of Matera-Altamura-Santeramo (Belussi, 1999a).

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[2] Tested in the American high-tech districts by Dyck (1997), Klepper (2001), and Braunerhhjelm and Feldman (2006). This was certainly the case of Fairchild Semiconductor in Silicon Valley (Klepper, 2001) whose most famous offspring have been Intel, and Xerox in Palo Alto, and whose technology was then developed by Apple and others (Chesbourg, 2000). Particularly innovative firms allow their workers to capitalize on the firm's existing specific knowledge, starting their own firms.

[3] As described by Viesti (2000), Lazerson and Lorenzoni (1999), and in the case of foreign high-tech districts by Klepper (2001), and Feldman (2004; 2005).

7.3. Growth in industrial districts/clusters: Strategic behaviours and knowledge dynamics

In this section, we will present a composite explanation regarding the combinations of growth factors identified by the literature that describes 22 Italian cases[4] (see Table 2).

From a critical scrutiny of the literature on such cases (see Footnote 6), and from website exploration, twelve important factors have been selected and classified under four broad headings: a) the role played by local institutions and demand growth (Factors 1 and 2); b) the innovation capabilities and access to knowledge (Factor 3-diffusion, Factor 4-indigenous innovation, Factor 5-cost-saving innovations, Factor 6-product-design innovation); c) the firm's strategy towards product differentiation/diversification (Factor 7-diversification); and d) the strategy towards internationalisation and access to global knowledge (Factor 8-reaction to global competition, Factor 9-access to global knowledge, Factor 10-offshoring, Factor 11-entry of MNEs, Factor 12- development of home-grown MNEs).

In Table 2 what emerges is not one direction of change, but multiple path-dependent mechanisms, influenced by the combinatorial variety of different evolutionary growth factors.

In most of the cases, the proactive roles of local institutions (Factor 1) and demand growth (Factor 2) have been found to be particularly important, as expected. The provision of real services to local firms and the role of local policies that pushed toward technological upgrading, influenced the take-off of the industrial districts/clusters[5]. This has often implied the creation ex-novo of specialised vocational training schools[6].

Factor 3 corresponds to the role of imitative behaviours. As the literature has extensively discussed, the replication of knowledge and diffused decentralised creativity appear to be the basic traits (Belussi and Gottardi, 2000).

Factor 4 is related to the so-called Schumpeterian innovations, specifically, radical innovations. Radical innovations conceptualised by local firms were more frequently cited than expected (13 cases out of 22), considering what is hypothesised by the «industrial district literature». Once an innovative firm in the ID/C was able to introduce a radical novelty this novelty was quickly spreading among all other producers. Thus, some IDs/Cs became very innovative in their technological core (1. Montebelluna, 14. Mirandola, 11. Arzignano, 4. Sassuolo, 7. Castel Goffredo and Brescia, 5. Reggio Emilia, 15. Bologna, 13. Belluno-Padova, 10. Matera-Altamura-Santeramo and 22. Catania). In most cases, radical innovations did not just involve the final product internationally commercialised by the local firms, but also the tech-

[4] For a reference on the methodology see Belussi and Sedita (2009) and Belussi (2009).

[5] For an ample discussion of the Italian case see also Belussi (1999b).

[6] For instance, in the case of the packaging machinery industrial district/cluster in Bologna (Istituto Valeriani) and in the shoe industrial district/cluster in Riviera del Brenta (Politecnico calzaturiero).

Table 2. Growth factors in development for selected Italian IDs/Cs

Nature of the growth factor	*Most important factors in development stage (ordered by relative importance)*	*Most important factors at maturity stage (ordered by relative importance)*	*Presence of knowledge re-shoring and manufacturing off-sourcing*	*ID/C*
MARKETS AND LOCAL INSTITUTIONS 1. Local institutions 2. Demand growth INCREASING INNOVATION CAPABILITIES 3. Imitation and diffused learning processes 4. Creation of new radical knowledge embedded in technical innovations, in product and processes (indigenous innovations) 5. Cost leadership (only process innovations derived from external to the district sources) 6. Original non-technical product innovation (new design) and differentiation FIRMS STRATEGY 7. Diversification GLOBALISATION 8. Passive reaction to global competition (strategy involving only internal restructuring) 9. Presence of knowledge exploration and knowledge re-shoring	4-3-2-1 2-6-3-1 2-3-6	4-6-1 1	9. Recombination and improvement of Lange US patent 10. Diffused also among small firms 11 (Nike) acquisition of Bauer 12. (Geox, Tecnica, Stonefly, etc.) 10. Absence 11. Absence 12. Absence	1. Sportsystem in Montebelluna (Treviso) 2. Artistic ceramics in Bassano (Vicenza) 3. Artistic glass in Murano (Venice)
	2-1-3-4-5-6-7 2-1-3-4-5-6-7	1-3-4-5-6-7 1-3-4-5-6-7	9. Absorption of knowledge from Castellon district; absorption of knowledge in self-cleaning tech (Toto Japan) 11. Mohawk US has acquired Marazzi (the biggest firm of the district) 12. Mapei, Rak, Iris Ceramica 10. No off-shoring 11. Bucher industries (Swiss) with acquisition of Hidroirma 12. Landini Gruppo Argo	4. Ceramic tiles in Sassuolo 5. Agriculture machinery in Reggio Emilia
	2-1-3-6 2-1-3-4-5-6-7	6-8 4-6	10. Absence 11. Absence 12. Atom (acquisition of Main Group) 9. Acquisition of foreign firms with special capability for Circular Knitting machine (Vignoni) and the Garment Length circular knitting machine (Mecmor). 10. offshoring in East Europe 12. Calzedonia, Golden Lady Company, Pompea, CSP International Fashion Group; Lonati group	6. Footwear, footwear machinery (Vigevano) 7. Nylon stockings and socks machinery in Castel Goffredo (Mantua and Brescia)

Table 2. *(cont.).*

Nature of the growth factor	*Most important factors in development stage (ordered by relative importance)*	*Most important factors at maturity stage (ordered by relative importance)*	*Presence of knowledge re-shoring and manufacturing off-sourcing*	*ID/C*
10. Off-shoring or near-shoring 11. Entry of MNEs 12. Development of home-grown MNEs	2-1-3-5-6	6-8	11. Entry Chinese firms 10. Absence 11. Absence 12. Absence	8. Textiles in Prato
	2-5-7		10. Absence 11. Absence 12. Thimeco; CMC concerie	9. Tanning in Santa Croce sull'Arno (Pisa)
	2-1-3-4-5-6-7	4	9. Natuzzi transfer and adaptation of the moving chain of Mercedes, industrializing the production of the sofa 10. Offshoring in China and Romania; 2015 partial back-shoring 11. Entry Chinese firms 12. Natuzzi	10. Sofa in Matera-Altamura-Santeramo
	2-1-3-4-5-6	1-4-6	9. Development of local technical capabilities with global brand (watch strap Apple) 10. Limited off-shoring involving the largest firms, reverse delocalization (inflows of immigrants) 11. No entry 12. Dani, Rino Mastrotto Group, Mastrotto	1. Tanning and leather production in Arzignano

Table 2. *(cont.).*

Nature of the growth factor	*Most important factors in development stage (ordered by relative importance)*	*Most important factors at maturity stage (ordered by relative importance)*	*Presence of knowledge re-shoring and manufacturing off-sourcing*	*ID/C*
	2-1-3	6-1	9. Development of local technical capabilities with global fashion brand 10. Limited off-shoring involving the upper production, 11. a. Reverse delocalization (inflows of immigrants), b. entry of small Chinese firms as subcontractors, c. entry of large MNEs through acquisitions	12. Footwear of Riviera del Brenta
	2-1-3-4-5-6	6-7	LVMH (Calzaturificio Rossi); Ppr, now Kering, of Francois Pinault (Gucci Logictica spa) 9. Development of local technical capabilities through acquisitions of advanced foreign technologies through firms acquisition (Persol, Ray-Ban, and glasses.com belonging to WellPoint Inc.) and alliance with Google and Intel (Google glass) 10. Limited off-shoring 11. No entry 12. Luxottica, Saffilo Group, De Rigo, Marcolin	13. Eyewear of Belluno-Padua

Table 2. *(cont.).*

Nature of the growth factor	*Most important factors in development stage (ordered by relative importance)*	*Most important factors at maturity stage (ordered by relative importance)*	*Presence of knowledge re-shoring and manufacturing off-sourcing*	*ID/C*
	2-1-3-4-5-6	7-6	9. Development of local technical capabilities via international alliances (or being acquired) 10. Limited off-shoring involving the largest firms (Malta and Easter Europe) 11. Entry of Gambro, Baxter, Mallinkrodt, Braun Carex, Biofil, and Hospital Dasco which have acquired local firms	14. Biomedical in Mirandola
	2-1-3-4-5-6	4-6	9. Development of local technical capabilities during the 1980s, links with Silicon valley firms for the introduction of microelectronics in machinery 10. Delocalisation: Titan and Mondi Silicart, IMA; backshoring, Danfoss-Turolla (from Slovakia), 11. Tetra Pack Modena; Philip Morris Italia- and Interba in Predosa have opened new plant in Crespellano (Bo)	15. Packaging district in Bologna
	2-1-3-4-5-6	4-6	12. IMA large acquisition strategy (Indian Precision Gears; German Kilian of Koln, Swill Ilpack, Chinese Tianyan Pharmaceutical Machinery; Acma-GD-Sasib aree now Coesia group; Sacmi Imola 9. Development of local technical capabilities with R&D alliances (a Ferrari, b Maserati, c Ducati, d Lamborghini) 10. No off-shoring 11. All-important firms were acquired by MNE (Fiat- a and b and Audi Volkswagen c and d)	46. Motor valley in Bologna

Table 2. *(cont.).*

Nature of the growth factor	*Most important factors in development stage (ordered by relative importance)*	*Most important factors at maturity stage (ordered by relative importance)*	*Presence of knowledge re-shoring and manufacturing off-sourcing*	*ID/C*
	2-3	1-3-5-9	9. Acquisition in Holland of new technical capabilities 10. No off-shoring 11. No entry 12. No home-grown MNEs	17. Ornamental horticulture in Pistoia
	2-3-6	7-3-9	10. No off-shoring 11. No entry 12. No home-grown MNEs	18. Jewellery (Arezzo – Uno A Erre, 1849)
	2-3-6	9	10. No off-shoring 11. Gucci (Ppr, now Kering, of Francois Pinault) has acquired Richard Ginori) 12. No home-grown MNEs	19. Ceramic (Sesto Fiorentino- Richard - Ginori)
	2-1-3-6	3-6	10. No off-shoring 11. No entry of MNEs 12. Scavolini cucine; Biesse wood machinery	20. Furniture district in Pesaro
	2-3-6	3-7-8	10. Off-shoring and near shoring 11. No entry of MNEs 12. Tod's (Della Valle family)	21. Footwear district in Civitanova
	2-1-3-4-6	4-7-9	9. Access to global knowledge through R&D centres in California, U.S. and Bangalore, India 10. Off-shoring in India 11. Entry of other MNEs: Omnitel, IBM, many exits 12. No home-grown MNEs except STMicroelectronics	22. Microelectronics of Etna Valley in Catania STMicroelectronics)

Source: Our elaborations are based on Belussi and Sedita (2009), Belussi and Pilotti (2002), Dei Ottati (1996), and Club dei distretti industriali (2003).

nologies related to machinery. During the time, local suppliers of machinery became international leaders, selling their technologies also to competitors outside the ID/C. However, local firms had the advantage of having been the first in experimenting and adopting the new machinery. New radical technological innovations were conceptualised during the «development stage» or in the «maturity stage».

Product differentiation and new designs (Factor 6) are also a frequently cited item, which particularly characterises the phase of maturity. As we know, numerous low-cost sources have been utilised by local firms to be creative, such as being located near design offices, having internal engineering departments, and above all, having good interactions with their clients and suppliers. Useful ideas received from these sources could be combined with their existing internal knowledge, stimulating a low-cost activity of problem-solving. Creativity, diffused engineering skills, and the understanding of customers needs are the major sources of incremental innovations and product customisation (Gottardi, 1996).

Another feature (Factor 5) was captured by the implementation of cost cutting innovations, introduced mainly through the adoption of new machinery and new organizational methods (innovations originated externally to the ID/C). The cost leadership characteristic appears typical of the initial stage of the lifecycle of the majority of the investigated industrial districts/clusters.

Strategies of diversification (Factor 7) were important particularly for the IDs/Cs specialized in traditional sectors (Carabelli *et al.*, 2006). For instance, Vigevano shifted its production from the production of shoes to the production of shoe machinery. Luxottica, a leading producer of frame glasses (sales in 2014 reached the stratospheric value of nearly 8 billion Euros), entered into the business of commercialisation by buying large retail chains (actually Luxottica covers about 20% of the U.S. consumer market of sunglasses).

Only in three cases out of twenty-two was the reaction to global competition by district/cluster firms definable as passive (adoption of hypercompetitive strategies such as cut-throat prices, accompanied by severe restructuring, plant closure, etc.). These strategies characterised the ID/C of Prato (textile), Civitanova Marche (footwear), and Vigevano (footwear machinery).

About half of our ID/C sample adopted off-shoring strategies with success, developing international subcontracting chains (Factor 10). Relocating strategies have involved less strategic (labour intensive) sections of the value chain in low cost countries. This has been a diffused strategy adopted by nearly all districts specialized in the «made in Italy» sectors, such as footwear, furniture, and clothing (Belussi and Sammarra, 2010). In IDs/Cs where the product cycle was less decomposable (ceramic tiles, and tanning and leather production), the relocation activity was marginal. Relocation was marginal also in IDs/Cs that rapidly declined, like Prato and Vigevano. High- and medium-tech mechanical IDs/Cs (Mirandola biomedical, Bologna packaging, Bologna motor valley, Reggio Emilia agricultural machinery) did not turn often to off-shoring. In the Bologna packaging and Reggio Emilia agricultural machinery districts, local leaders were created (home-grown

MNEs), such as Ima, Sacmi, and the Landini-Argo group. In contrast, the most important firms in the Mirandola biomedical district were acquired by Gambro and Baxter and in the Bologna motor district (by Fiat and Audi Volkswagen). Also, in traditional sector districts international inflows and outflows were intense, as shown in Table 2. Entry and acquisition by MNEs involved ten cases out of twenty-two, including the massive entry of Chinese clothing firms into Prato. The formation of home-grown MNEs was significant and involved twelve IDs/Cs. Considering the process of knowledge re-shoring (Factor 9) we found that they were significant for twelve IDs/Cs.

8. Some conclusions

This paper has tried to address the following questions: Where do IDs/Cs in Italy come from? Are they innovative? And how so? How can we describe their genesis and subsequent growth? Clearly, the meta-analysis adopted represents a methodology in which the goodness of the results is very much dependent from the interpretative capabilities of the researcher, and it is not automatically embedded in standard statistical procedures, which benefit from the availability of large data sets. But in many cases there are no available data for interesting research questions. In the last 20 years, Italian IDs/Cs were witness to a recursive sequence of cumulative growth with the emergence of variation and significant ID/C heterogeneity. IDs/Cs started with a small group of firms endowed with some artisan skills, or with access to specific natural resources, or being created by a founding firm. The building of endogenous technological capability was an important triggering mechanism. Since the 1990s, the forces of globalisation have presented new and ruthless competitive challenges, testing the ability of IDs/Cs to sustain their market advantage and pushing some of them over the edge. Despite the model of ID/C has been often described as locally self-contained, various empirical researches and our analysis have pointed out its increasing involvement in the process of internationalization. The recent entry and exit of MNEs, and the phenomena of offshoring did not question the model of ID/C per se (with the notable exception of a few cases), but it contributed to showing how interwoven the evolution of local economies and MNEs is (De Propris and Driffield, 2006; Iammarino and McCann, 2010; Mudambi and Swift, 2010).

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