

# **Clusters and internationalization: The role of lead firms' commitment and RIS proactivity in tackling the risk of internal fractures**

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## Abstract

In this paper we aim at discussing the growth potential of clusters in international markets. Over the past two decades, clusters and industrial districts have gone under increasing competitive pressure insofar as markets have progressively globalized. Lead companies, either foreign or home-grown multinationals, have globalized their operations while often reducing their commitment (e.g. investments) within clusters and districts. As a result, a number of second, third and fourth tier suppliers disconnect from global value chains coordinated by lead companies, leaving the cluster fractured and jeopardizing local development prospects. Only a small segment of firms in the cluster copes with globalization. This situation represents a challenge that clusters and districts need to take on. In this paper, we inquire about the importance of two factors that may represent crucial conditions for the upgrading of clusters within global markets. The long-term commitment of lead companies to the local economy, together with the dense interaction between the regional innovation system and the lead companies and their new global innovation network, are found to be crucial elements for the resilience of clusters/districts and their small and medium-sized firms. A few successful clusters are considered vis-à-vis others that face higher risks of internal fracture. In this work we analyse relevant cases in Spain, Italy, and Costa Rica.

**Keywords:** clusters and industrial districts, SMEs, lead firms, internationalization, regional innovation systems, global innovation networks.

## 1. Introduction

In this paper we aim at discussing the role of clusters and industrial districts (CIDs) in global markets and global value chains (GVCs) as part of a literature that acknowledge the value of this conceptual and empirical intersection with an explicit focus on the new opportunities offered for local development (Humphrey and Schmitz, 2002; Pietrobelli and Rabellotti, 2007; Hervas and Boix, 2013; Parrilli et al., 2013; De Marchi et al., 2017). In this work, we use Porter's definition (1998) of clusters as "interconnected firms and institutions localized in geographical proximity that compete and cooperate", and use industrial districts as a variant of clusters in which a local community actively participate and contribute to the development of a locally-bounded and industry-specific manufacturing production (Becattini, 1990; Markusen, 1996).

Over the past two decades, CIDs have gone under pressure insofar as markets have progressively globalized. Lead companies, either home-grown or foreign multinationals that brand the final product and that coordinate important supply chains within the CID (Hervas-Oliver and Albors-Garrigos, 2008; Belussi et al., 2017), have globalized their operations while reducing their activities within their home CIDs. As a result, significant numbers of second, third and fourth tier suppliers have increasingly disconnected from global markets, leaving the cluster "fractured" and with limited prospects of economic development. This situation represents a challenge that several CIDs currently face. In this paper, a detailed discussion is offered as a means to identify the critical conditions for the upgrading of CIDs within global markets and lead companies' GVCs, where the latter are intended as supply chains analyzed on the basis of the value adding process across all the different stages of resource extraction, manufacturing production, and commercialization including all pre- and post-production services, e.g. R&D, logistics, operation and maintenance, among others (Gereffi et al., 2005). In these stages different firms are involved, some as lead companies (usually large local or foreign firms) and others as first, second, third and fourth tier suppliers depending on the importance of the component supplied<sup>1</sup>.

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<sup>1</sup> This structure has been long analyzed in the context of the automotive industry, where brand manufacturers are the lead companies, while for instance engines and gearboxes are produced by first tier suppliers, steering wheels by second tier, windscreens and seats by third tier, and raw materials and generic components by fourth tier suppliers; see for instance Grabher, 1993)

In this work, we inquire about the importance of two structural issues that may help explain the success of some clusters vis-à-vis the struggle of others. In particular, we emphasize the role of lead firms and their commitment to the long-term development of the local economy, together with the effort of regional innovation systems (RIS) to support the innovation capacity of local suppliers, mostly small and medium-sized enterprises (SMEs) in a new context in which lead companies tend not to collaborate with them, and instead form their own global innovation networks (GINs). These are networks of innovators formed by a few lead multinationals that aim at collaborating with a handful of the most advanced world technological leaders in relevant segments of production as a means to strengthening their competitive advantage (Ernst, 2009; Parrilli, Nadvi and Yeung, 2013). In our argument, these two elements are likely to be synergic and critical in maintaining cohesive clusters that can compete in the market with good chances of success. In this work we show these dynamics through the study of relevant cases, primarily in Spain, Italy and Costa Rica. This work adds to the literature on regional resilience (Asheim et al., 2011; Boschma, 2015), and in particular purports interpretive keys that pave the way for specific policy actions that may in part be steered by local institutions and actors. Within this stream of the literature, our work addresses the literature on the leadership of “lead companies” in CIDs (indigenous or home-grown multinationals in Hervas-Oliver and Albors-Garrigos, 2008; Belussi, 2015). In this case the value added consists of considering the corporative commitment they take with the local economy in the context of increasing globalization pressures. Simultaneously, we contribute with the analysis of the interaction between RIS, lead companies and their GIN as a means to produce additional innovation capabilities across local SMEs.

In the next section, selected literature on CIDs is discussed, particularly in relation to their connection to global markets, and the importance of key features of their resilience and competitiveness. After section three on the methodological approach to this study, section four focuses on the empirical evidence provided by selected cases in Europe and Latin America, where CIDs tend to be common production systems. A section of conclusions and brief policy implications completes the paper.

## **2. Clusters and industrial districts within global markets**

### *2.1 International dynamics and risk of fracture*

The relatively recent challenge of globalization for CIDs has generated an important issue that a few years ago would have been found at the periphery of the invisible college of cluster research (Sedita et al., 2018). For a period of time, globalization mostly meant the possibility for clustered SMEs to export their production. This was from the 1970s onwards and up until the early 1990s. After this period, it also meant globalization of production (Gereffi et al., 2005; Henderson and Nadvi, 2011; Bailey and De Propriis, 2014). Several CID firms started to see Eastern Europe and the Far East as an opportunity to reduce production costs thanks to the possibility to work in contexts earlier used to mass production, e.g. Eastern Europe (Sass and Fifekova, 2011), or oriented to feed a growing urban population in the new poles of industrial production, e.g. China (Altenburg et al., 2008). The related risk of delocalization has been highly debated over the years (Dunford, 2006; Rabellotti et al., 2009; Belussi, 2015).

Simultaneously, another challenge for local development has arisen over the past fifteen years. It is the new competition that happens with new FDI from advanced and emerging economies within the boundaries of former CIDs (Dei Ottati, 2014; Pietrobelli et al., 2011; Hervas-Oliver and Parrilli, 2017). In the case of FDI from advanced economies, these investments may lead to dis-anchoring the strategies of lead companies from local development prospects; in the case of emerging countries' FDI (e.g. in European economies) the challenge often comes from new investors that become part of the local SME fabric, and even replace part of it through the adoption of disputed practices and strategies that sometimes rely on exploitation of own workforce (Dei Ottati, 2014; Dametto, 2016).

Both trends meant a new challenge for CIDs as their homogeneity and cohesion cannot be taken for granted anymore. The risk of an internal fracture has been rising as, on the one hand, new internal competitors manage comparative advantages in terms of labour costs, while, on the other, local producers in destination countries (e.g. in China, India and Brazil for the wind energy, Eastern Europe for automotive, footwear and furniture production) find it easier to supply CID's lead companies that enter their national market thanks to their physical proximity and the capacity to exploit economies of scale (Dunning, 1988; Elola et al., 2013).

Overall, we observe the risk of a fracture that can arise within the former CIDs as a consequence of these new globalization strategies of lead firms. Usually these companies are multinationals that focus on their overall profitability, thus may take little commitment towards specific local economies, unless it is convenient for them (Cowling and Sugden, 1997). When they realize that profitable business takes place elsewhere, they move their operations towards these other locations, and re-organize their value chain depending on monopoly power strategies (Ibid.), research, production and market opportunities (Henderson and Nadvi, 2011; Cooke, 2013) as well as the related ownership-location-internalization advantages (Dunning, 1988). As a matter of fact, several such companies move their operations around the world while maintaining their headquarters stable (Cowling and Sugden, 1997). Over the past two decades, this process has been seen often with the opening of new production plants in emerging economies. It is the case of Ford in the automotive industry in Mexico (Carrillo, 1995); Intel in electronics in Costa Rica (Alfaro, 2013), Vestas and Gamesa/Siemens in wind energy in China and India (Elola et al., 2013). This strategy has also been developed through the acquisition of important companies within CIDs (e.g. Luxottica purchasing US companies Rayban and Oakley in 1999 and 2007, Siemens purchasing Gamesa in 2016, the Chinese group Dalian Wanda buying out the British Sunseeker in 2013).

The effect of these processes is the formation of new value chains in new production sites and the simultaneous weakening of former value chains in their own countries and CIDs. This is visible in the wind energy industry in the north of Spain (Elola et al., 2013) and in the automotive industry from the US, Japan and the UK to Mexico, China and India (Carrillo, 1995; Baldwin, 2011; Bailey and De Propris, 2014). This situation and trend can lead to the fragmentation of CIDs, especially in countries that do not have a large internal market. Traditional local production systems can disappear in a few years (Markusen, 1996; Isaksen, 2018), wasting competences and skills accumulated over decades of hard work, and leave dwellers, workers and youth with an obscure future ahead.

Within this context, our main research question arises. This is the inquiry about the critical mechanisms that permit CIDs to face these challenges and to activate competitive responses that help them maintain their internal cohesion and international competitiveness. In particular, we hypothesize the relevance of two key elements that have been underlined with different purposes by fellow scholars. Currently, these aspects assume renewed value in relation to the behaviour of lead companies in CIDs. These are: 1) the commitment of lead

companies, often indigenous/home-grown multinationals, towards the local economy and society (e.g. Hervas-Oliver and Albors-Garrigos, 2008; Belussi et al, 2017; Hervas-Oliver and Parrilli, 2017, among others), and 2) the proactive interaction between the RIS, its CIDs (Cooke, 2001; Asheim and Gertler, 2005; Isaksen and Trippel, 2016), the lead firms and their GIN (Ernst, 2009; Cooke, 2013). We are going to discuss these aspects in depth in the next subsections.

## *2.2 Local Commitment of lead companies*

The first critical aspect refers to the commitment of lead companies in the CID. This is extremely important because it represents the obligation of these companies not to leave the locality, but to find a way to harmonize their international growth aims with synergic ambitions to promote the growth of the local economy where they started their operations. This can be seen in competitive cases such as Luxottica in Belluno's glasses ID (De Marchi et al., 2017), Tecnica in Montebelluna' ski boots ID (Belussi, 2003); Marazzi and Ragno in Sassuolo's tile ID as well as Torrecid in Castellon ceramic ID (Hervas-Oliver and Parrilli, 2017), ST Microelectronics and Gemalto in the microelectronics cluster of Gemenos-Rousset (Longhi, 2016), among others. Here the growth of the CID went hand in hand with the growth of lead companies that continued to rely on their local suppliers in spite of the increasing scope of their international operations.

In the past, there have been cases in which the presence of lead companies was not accompanied by a strong commitment with the local economy. The case of Detroit with GM and Chrysler, and Turin with Fiat automotive seem to represent these situations (Sturgeon and Van Biesebrock, 2009; Balcet et al., 2013). In these big cities the main automotive industries downsized while developing an intense FDI campaign abroad in search for cheaper production chains and new markets (e.g. Korea and Europe for GM, Poland and the US for Fiat). As a result, they did not re-activated a florid supply chain in their home locations. In these cases, the size of these companies, their worldwide operations, and the need to respond to the interests of their stakeholders and shareholders, led them to disengage to a significant extent from home value chains. Some scholars may stress the "size" element in the disconnection from the local originating environment: the larger the lead firm, the higher the risk of delocalization of production activities (Cowling and Sugden, 1997). For others

commitment may be related to the difference between foreign multinationals vs. home-grown multinationals (Hervas-Oliver and Albors-Garrigos, 2008; Belussi et al., 2017) as the latter are more likely to maintain their original roots and keep investing in the local economy in the long-term. Other scholars may link commitment to the type of industry technology and market (Turkina and Van Assche, 2018). Finally, some may stress the importance of working within bounded markets (e.g. Europe). In this case assembled products and components could be exported once most part of the production process takes more easily place in the CID. This might be the case of traditional industries (e.g. furniture, footwear and tiles) and industries that target national markets (e.g. fashion, software, among others) as well as European car makers and their strong supply chain in Germany, Czech Republic and Hungary (Humphrey and Memedovic, 2003). It is more difficult in the case of more globalized industries such as aircraft, electronics including mobile phones, tablets and PCs, pharmaceuticals, weapons and energy. Here, the norms of national contents, and the weight and difficult transportation of key components create incentives for destination markets to set up their own tier suppliers, thus putting pressure on global lead companies to work with them instead of working with their home suppliers (Elola et al., 2013).

These aspects are likely to be relevant drivers of commitment. However, we stress the importance of critical assets of the local economy, particularly the skills and competences that this is offering to lead companies (Blazek, 2015; Turkina and Van Assche, 2018) as well as the proactivity of local economic and institutional actors to promote long-term local development actions (Rodriguez-Pose, 2013). These key aspects guarantee the lead firm's return on investment in the long term and justify their commitment with the local economy. This is a central issue because without the leadership of one or a few firms, the challenge of joining global markets as a competitive cluster becomes an illusion. As a consequence, crucial questions arise about the key requirements that these lead firms set, the support they deliver, and the performance indicators they adopt to keep these local suppliers integrated in their value chain. In fact, lead companies need to measure and assess the competitiveness of their supply chain, thus even in the case they decide to commit with the local economy, they need to be reassured by positive economic outcomes.

As a result of this discussion and arguments, we argue the following:

**Proposition 1:** *Only lead companies effectively committed with the local economy can avoid internal fractures in the CID and guarantee its long-term development as they do not plan to move their manufacturing and service activities (including R&D) abroad beyond a reasonable extent.*

As said, this commitment may be related to a number of factors, but in particular we stress the skills and competences managed by local suppliers as well as the proactivity of local economic and institutional actors to promote actions for the long-term development of the local economy (Rodriguez-Pose, 2013; Blazek, 2015). Overall, we argue that lead firms' commitment is a crucial element for the sustainable development of CIDs. This is a necessary but not sufficient condition. Another element matters, i.e. the capacity of the RIS to work with lead firms and their GIN as a means to help CID firms to meet the requirements of lead firms. It is what we are going to discuss next.

### *2.3 Regional innovation systems, lead companies and their GIN*

The second crucial aspect of the renewed involvement of the local supply chain is related to the innovation capacity and dynamics that occur in the CID. It is long known that innovation is a key asset for the competitiveness of local systems (Cooke, 2001). One condition to maintain a strategic position within the value chain is by preserving and developing skills and competences that promote innovation capacities. This ensures a high quality relation between lead companies and suppliers. Those that manage high competences are invited to join international projects, to establish their bases beside lead companies in new markets, and essentially become first and second tier -thus critical- suppliers for the lead companies. This opportunity implies endeavours that not all firms can undertake. It might be difficult and excessively costly, thus beyond their investment and risk-taking capacity (Chiarvesio et al., 2010; Elola et al., 2013).

In general, the question is where these firms absorb the advanced knowledge they need to produce innovative and competitive products and technologies. The question needs to find different responses depending on whether lead companies are based in CIDs. The presence of lead firms makes a critical difference. Usually, these firms are large, thus benefit from their dedicated R&D departments. For innovation, they suffice to themselves and do not need to

work with innovation systems, while they have recently created alliances with other lead companies worldwide in the form of GINs (Ernst, 2009; Cooke, 2013; Parrilli et al., 2013). In contrast SMEs lack resources and do not manage their own R&D departments, thus rely on research and innovation activities of public bodies, universities, private labs and technology centres (Cooke, 2001; Asheim and Gertler, 2005; Belussi et al., 2010).

Echoing Cooke (2001: 953), RISs are “proactive regional systems”, where a number of “networked actors” (i.e. firms and organizations) focus on the production of “new products and processes” by means of “interactive learning” of skills and capabilities that are embedded within specific “routines and conventions” applied by firms and interconnected organizations. Without entering the wider debate on the type of RIS best suited for each region (Cooke et al., 2004; Asheim and Gertler, 2005), or their peculiar development trajectories (Asheim et al., 2011b; Isaksen and Trippl, 2016; Capello and Lenzi, 2018), we stress that in CIDs those five requirements enhance the capacity of local companies that work within the first, second and third tier of supply, thus managing knowledge and competences that make them critical suppliers for lead companies. Due to their smaller size, especially second and third tier suppliers devote fewer resources to R&D and technological development, while need a reliable RIS to monitor and adopt new technologies developed by industry leaders and their GINs (Pietrobelli and Rabellotti, 2011; Parrilli et al., 2013).

As Morrison (2008) clarified, lead firms are crucial “gatekeepers of knowledge” in CIDs. They have the power to promote knowledge dissemination to local suppliers through their internal and external knowledge and innovation sources, activities and GINs. This opportunity makes a big difference in terms of local development prospects. Some scholars even tend to emphasize the “compensatory role of GINs in case of institutionally and organizationally non-thick RISs” (Chaminade and Plechero, 2015: 215). This is supported by the view that GINs work best in the context of thick local buzz and very small local clusters with little innovation capacity (Morrison et al., 2013).

However, engagement with GINs cannot be taken for granted as lead companies might not be interested in sharing knowledge with local suppliers beyond a certain extent. The commitment of these lead firms comes once again under scrutiny. Moreover, in our view compensation is never complete and tend to respond to whether lead companies work within the most advanced research and technology settings (e.g. aircraft and pharma industry), and want to disseminate their knowledge to their suppliers as part of their competitive value chains, or alternatively work in medium technology settings (e.g. renewable energies and

shipbuilding), and are not particularly interested in pursuing a strong engagement of the local supply chain that is often used for cost reduction purposes (Blazek et al., 2018). For these reasons, local lead companies may lose their original connection to their RIS, and replace it with their brand-new GIN. In this case, a gap may arise between technology developments promoted by these lead companies, and what the RIS and the local SMEs can develop autonomously. This situation may create a fracture that weakens the CID.

In response, the RIS and its CIDs need to work in synergy and proactively to develop the capacity to monitor and absorb the technological and market changes brought about by lead companies and their GINs. This requires long-term investments so as to maintain the capacity (in terms of human capital and physical infrastructure) to develop advanced R&D activities in pro of local production and innovation (Lundvall, 2007; Asheim et al., 2011a and 2011b; Parrilli et al., 2013). As a result of this discussion and arguments, we support the following:

**Proposition 2:** *Only CIDs that rely on both: i) the sharp and proactive contribution of their RIS, and ii) knowledge spillovers produced by lead companies and their GIN, are likely bolster their innovation capacity and remain important localized supply chains for lead companies, thus reducing the scope for internal fractures.*

In synthesis, when the RIS and lead companies (and their GIN) work together, the CID can benefit from the above-mentioned double flow of knowledge that enhances the capabilities of the local SMEs/suppliers: 1) knowledge produced by the RIS (Cooke, 2001; Asheim and Gertler, 2005; Hervas-Oliver and Parrilli, 2017); ii) knowledge produced by lead firms and their GIN (Morrison, 2008; Cantwell, 2009; Turkina and Van Assche, 2018).

Overall, propositions 1 and 2 help us study key elements of the resilience and sustainable development of CIDs in a context of increasing global competition and dynamic industry transformations.

### 3. Methodology

We work through a set of cases that are representative of the challenges that we envisage: the scope of the CID internal fracture between lead companies and first tier suppliers that

internationalize their operations on the one hand, and most other suppliers that focus on local production on the other. The latter face the risk of being driven out of global value chains and of their expanding market.

In particular, we have identified four CIDs on which a long-term meta-study and appraisal is built thanks to the work of a number of scholars and organizations. Some of these CIDs are undergoing an unstable growth path, while others are on a steady growth path -a situation that may change in the future-. These different cases help to analyze the role of lead firms' commitment, as well as the RIS engagement with CIDs on the one hand, and lead firms and their GIN on the other. As a result, we should be able to answer the question of whether these two elements represent crucial assets for a cohesive growth of CIDs.

The CIDs are selected on the basis of representative features (Yin, 2003). In Table 1 the key aspects of the selected CIDs are presented. In all cases it is a selection of CIDs that contain the following aspects: i) critical mass of firms and production volumes. They have all been active for at least two decades; therefore show an evolutionary process that includes periods of expansion and recession (Menzel and Fornahl, 2010), which help to get the wider picture of the competitive capacity of these CIDs. ii) Inclusion of one or more lead companies. This means that we are considering hub-and-spoke clusters where the current and future presence of lead firms is strategic (Markusen, 1996; Cantwell, 2009). iii) Selected CIDs and lead firms have a clear global orientation. In some cases, it is in terms of export and production markets, in other cases also in terms of knowledge generation processes. iv) Innovation is a key aspect of the success of these CIDs. This lends to the discussion of whether the innovation outcome is produced on the basis of local firms' efforts, the lead company's or the RIS'. v) Not all these CIDs are positioned in high technology industries; two clusters are in traditional industries (i.e. furniture/upholstery), one in intermediate technologies (i.e. wind energy), while the fourth is in high-tech industries (i.e. electronics and ICTs). In our analysis, this aspect should help us understand whether technology intensity matters for the growth of cohesive clusters (Turkina and Van Assche, 2018). vi) Geographically, these CIDs are selected from three countries, two in Europe (Italy and Spain) and one from Latin America (Costa Rica). The latter is rather homogeneous with the former group as Costa Rica represents a quite developed economy (63th position within the category of High Human Development, 2019). It is positioned before Turkey that is typically assimilated to European standards. Moreover, this Costa Rican cluster is representative of an economy that relies on SME competitiveness as most European economies.

## **INSERT TABLE 1**

These representative case studies are selected on the basis of key aspects that we plan to analyze (Yin, 2003). We refer to: 1) large firm commitment with the local economy; 2) whether CIDs interact more or less actively with RIS agents, or they also rely on exchanges with lead companies and their global knowledge community in their specific industry (GIN). For the first aspect and research proposition, we focus on lead companies' physical investments (variable 1), the interaction that they maintain with the local firms and institutions to promote human capital, e.g. in training courses, education prizes, investment decisions (variable 2), and the lead firms' interest in joining forums and actions with local partners around local development plans and strategies (variable 3). In relation to the second proposition, we focus on the existence of internal R&D within lead companies and SME suppliers (variable 1), whether small firms develop innovation collaborations with RIS organizations (e.g. investment in small firms, innovation projects with local universities – variable 2-), or RIS and SMEs are integrated in more open initiatives that include technology transfers from lead firms' GIN to the RIS and the local businesses (variable 3).

This approach helps us understand whether there is the effective risk of a fracture within the CIDs as the lead companies move towards international markets, and in doing so they are concerned about taking with them their local suppliers. For this study, we rely on own studies over a long period of time (mid-2000s up to now), and complete the relevant information with other studies developed by fellow scholars that have analysed these cases over time. Technical reports, consultancy and policy documents about recent development of these CIDs are also considered. All these form a bulk of specialized information that helps triangulate information, and study the way these CIDs cope with the challenges of internationalization.

## 4. The competitiveness of clusters within global markets

### *4.1 Local Commitment of Lead firms*

#### **INSERT TABLE 2**

As per Table 2, the four CIDs have a history in which some lead firm promoted the growth and internationalization of local industrial activities. In some of these CIDs, these firms show an orientation to maintain their competitiveness insofar as to promote the growth of a significant local supply chain; in others they exhibit a more ambiguous approach to the local supply chain. Table 3 shows the key traits of these CIDs and their firms in relation to their commitment to promote the growth of the local economy by means of engaging with a dense network of local suppliers and institutions.

#### **INSERT TABLE 3**

The unsteady growth cases of Forli-Italy and Bilbao-Spain represent CIDs that are striving to maintain their position in international markets. A few large lead firms work here and compete in international markets. These firms have developed successful strategies (e.g. Poltrone&Sofa through their large set of retail shops across Italy and France; Iberdrola through their world leadership in renewable energy distribution). In both cases, these large firms are also embedded in the local cluster. For instance, Iberdrola built its headquarters skyscraper in Bilbao in 2011-2013 giving a clear sign of its long-term commitment to this cluster. Notwithstanding these relevant elements, these CIDs and their lead firms also show some weak elements. For instance, Poltrone&Sofa is an outsider in Forli. They come from Parma (around 200 kilometres up north in Emilia-Romagna), although they decided to exploit the tradition of upholstery production of Forli, and set their main manufacturing bases here. This cluster hosts a number of migrant-led small firms that tend to operate as cost subcontractors for Poltrone&Sofa and for other local medium-sized companies (Dametto, 2016). This situation weakens the internal cohesion of the district as many other local SMEs struggle to achieve the cost competitiveness of these new subcontractors. Moreover, no

particular actions are undertaken by the lead company to stir joint investments in human capital or joint local development plans in collaboration with local government and business associations (Ibid.).

In the case of Bilbao, the cluster has grown over the past fifteen years thanks to the growth of two large lead companies, and the proactive regional cluster policy that supports joint projects among businesses and other regional organizations (Aranguren et al., 2014). In this wind energy cluster, Iberdrola is leader in the distribution of renewable energy, although it does not produce components. Instead, the leading manufacturing company is Gamesa. This company grew quickly in the early 2000s and became the fourth manufacturing wind energy company worldwide (Elola et al., 2013). However, the enlargement of its international operations led to the dismissal of around 3,000 employees in 2013 (Gamesa webpage 25/4/2019), but also made this company appealing to other multinationals. In fact, in 2016 it has been taken over by the giant Siemens. Since most local suppliers produce manufacturing inputs (e.g. nacelles, generators and transformers, pitch drives, among others), this decision may jeopardize the future of this cluster as the strategy of this MNC is decided from outside the cluster and may lead to substantial relocations depending on the future main markets of this company. Gamesa's decision to create a set of R&D centers in destination markets (e.g. China and India) as well as the closure or sale of some local companies in recent years exhibit this risk. Only recently there have been some preliminary efforts of the new Siemens-Gamesa to promote –with the regional government- a set of development programmes around the supply chain, the digitalization and innovation of this industry (Siemens-Gamesa webpage, 25/4/2019). However, these are just preliminary intentions that need to be corroborated by facts.

In contrast to these cases, we have also identified two CIDs that show a steadier growth path: the electronics and software cluster of San Jose/San Pedro in Costa Rica, and the furniture cluster of Azpeitia/Azkoitia in the North of Spain. In the first case the cluster has a clear leader; Intel in San Jose/San Pedro. This company accepted the financial and economic incentives provided by the Costa Rican government, and set up an important manufacturing plant in 1997. In the mid-2000s, Intel also set up the Latin American Electronic Study Centre (LAES) as a means to develop innovations in the country (Camtic, 2017). Simultaneously, Intel invested resources in the local/national universities to strengthen the supply of skilled electronic and software engineers for the local job market (Parrilli and Sacchetti, 2008). At first, they hired a significant number of local employees for the manufacturing plant (around

2,000), all in technical positions, thus leading to a technology transfer process that improved the local human capital. In recent years, the company decided to sell its manufacturing plant and to increase its investment in the research centre. As a result, the jobs in the manufacturing plant were progressively lost, while a large number of qualified jobs (i.e. engineering) were opened in the research centre that currently employs 1,900 people (Camtic, 2017). These decisions and investments represent long-term commitments of Intel that give stability to the local economy, promote new business opportunities for the local skilled workforce, and bolster a steady demand for qualified jobs in the company. In a few years, a significant number of local companies arose in the software industry (around 900), focusing on specific ICT and software niches, and on different international markets (Parrilli and Sacchetti, 2008; Alfaro, 2013; Camtic, 2017).

The CID of Azpeitia/Azkoitia is different to a certain extent as no very large firm is based there. However, two local companies (Fagor and Danona) reached a relevant size (small among the large-sized companies) and led the development process of this cluster for a long period. Being part of the large Mondragon Cooperative Group (MCG), these companies always showed a strong commitment to the local economy. They never planned to leave the cluster, although the group developed FDI in China. As a result, once the crisis arrived (in the late-2000s), this firm suffered the effects and merged with other companies of MCG while downsizing operations. With their local suppliers and the local development agency they set up a local forum to plan recovery actions. They lost the local leadership that was assumed by the new cluster organization Habic, which in collaboration with local firms developed a quite novel and complex cluster that reactivated production and development prospects in the mid-2010s (Parrilli and Zabala, 2014; Habic, 2018). Simultaneously, MCG cooperative group actively pursues actions related to the development of human capital, in particular through their own local university (Mondragon University) and local training institutions.

Overall, these four CIDs do not seem to justify the idea that the home-grown origin of the lead companies matters much for the growth opportunities of the local supply chain. The size also seems not to matter as this latter case does not entail the current leadership of a large lead firm. However, the long-term commitment of the lead company/organization matters, particularly for the investment they make in critical local assets that ensure progress and good prospects in the future. This is the case of Intel's investment in human capital and education infrastructure/universities in Costa Rica (Parrilli and Sacchetti, 2008; Alfaro, 2013; Camtic, 2017), and the proactive and coordinating role taken by the new cluster organization in the

furniture CID of Azpeitia-Azkoitia which stirs the effort of local firms to develop a number of innovation-led initiatives, e.g. turnkey solutions for hotels and restaurants, schools and health clinics (Parrilli and Zabala, 2014). In contrast, the former intermediate cases show mixed features that include: i) positive aspects such as the location of lead firms in the cluster, but also ii) lower investment scope as no specific programmes are designed to stir new skills and capabilities there, and iii) risks connected to the takeover of some of these local lead firms that may promote a footloose approach of these businesses to the cluster, thus weakening local strategic plans and jeopardizing future growth prospects.

#### *4.2 Clusters, innovation systems and global innovation networks*

The second key aspect in our analysis is the relation between the RIS, the clustered SMEs and the lead companies and their GIN. In advanced economies, innovation is an essential ingredient for competitiveness. For small firms that do not invest in R&D, external sources of innovation are essential, either in the form of supply chain-based interactions, or through the support of science and technology-based organizations including universities (Jensen et al., 2007). In the case of lead firms that have their own R&D facilities and skilled human capital, the RIS is not a critical asset. They tend to work through their GINs with other selected lead companies and organizations worldwide (Ernst, 2009; Cooke, 2013; Parrilli et al., 2013; Chaminade and Plechero, 2015). However, this autonomy of large firms may lead to a fracture with smaller suppliers, as lead firms invest resources wherever they find it convenient, thus may skip the RIS (unless it is leading in science). As a consequence the RIS organizations need to make additional efforts to monitor and test new technologies and supply local SMEs with relevant knowledge so as to make them appealing to lead firms in their production and innovation activities. This effort and its outcome are not to be taken for granted. A relevant appraisal is required to understand whether the RIS works effectively or not, and how to improve its capacity to supply firms with appropriate knowledge and innovation opportunities (Asheim et al., 2011b).

**INSERT TABLE 4**

The CIDs with risky prospects present special features. In Forli ID, the RIS is not self-evident. Emilia-Romagna RIS is focused on a medium-high technology sectors (e.g. motor industry, biotech and machinery and equipment, among others), while a large part of the CIDs focus on traditional productions (clothing, footwear, furniture). Here CIDs benefit from the formation (in the 1980s) of specific cluster organizations (e.g. CITER in the clothing CID of Carpi). In Forli there are no such catalysts of industry innovation apart from the major regional organizations (ASTER for technological development), which are located away from actual production, thus leading to poor interaction with SMEs (Parrilli, 2009; Dametto, 2016). For this reason, the firms in these industries depend on their incremental innovation activities (i.e. design). Neither information is found about the existence of a GIN linked to the lead company here, nor evidence is discovered about a significant interaction for innovation between CID firms and the lead firm (Poltrone&Sofa). This overall picture leaves the CID in a quite weak position vis-à-vis future challenges from global competitors that join this market with cost effective solutions.

In the wind energy industry in Bilbao, the lead company Iberdrola has formed its own GIN with lead international companies from the US, Holland and Singapore. Simultaneously, Iberdrola has maintained relationships with RIS agents (e.g. technology centres Tecnalia and IK4), which is a key step to help the latter monitor the current scientific and technological advances. However, in the manufacturing area the lead company Gamesa has progressively disconnected from the RIS, while focusing on creating its R&D centres in India, China, and the US (Elola et al., 2013). This trend may even increase with the recent takeover by Siemens in 2016. Overall, fear exists that the involvement of the (generally strong) RIS with the SMEs of the wind energy industry cluster in Bilbao may deteriorate, opening a gap between the knowledge managed by lead companies, and that available to second, third and fourth tier local suppliers.

These cases exhibit clear dissimilarities vis-à-vis the following CIDs where the RIS exists and operates more effectively. In the steadier growth case of Azpeitia/Azkoitia furniture cluster, the RIS proves to be active as the new cluster organization Habic has been able to reactivate the interest of the local technology centre Cidemco and the local training institute Urola-LH so as to produce new projects (e.g. EU-Interreg “Woodtech”) in search for better technologies and a more advanced combination of components and products for new markets abroad, e.g. restaurant and hotel chains, health and education facilities (Parrilli and Zabala, 2014; Habic, 2018). For the peculiarity of this region (i.e. homogeneous population and

culture), lead companies work directly with the RIS. Simultaneously, members of the cluster and of MCG have built up international innovation networks in relation to EU Interreg projects and other international knowledge sources (e.g. German engineers invited to discuss design innovation for the cluster since 2013-2014). As a result, a collective effort is organized by agents of this cluster (led by the cluster organization) that promotes an innovation and technology transfer between GIN and RIS that cross-fertilizes all firms in this CID.

In San Jose/San Pedro, the linkage between the cluster and the RIS is guaranteed by the important efforts of Intel. In 2013, this company removed its manufacturing plant from Costa Rica, but simultaneously strengthened its research and development centre (LAES) that currently employs 1,900 workers (Camtic, 2017). In addition, Intel maintains its collaboration with the University of Costa Rica (UCR) and the Technological Institute of Cartago for the formation of engineers and technicians in electronics. This helps to transfer knowledge from the lead company and its GIN to the local economy. Several local ICT and software firms benefit from these activities and from a range of public and private labs dedicated to experimentations and trials in electronics and ICT (Alfaro, 2013; Camtic, 2017). The government keeps developing financial lines that benefit the autochthonous ICT industry so as to promote the continuous growth of this diverse and competitive industry. Overall, the connection between clustered firms and the RIS is sound.

Overall, these cases show that where the lead firms have built their own GINs and do not ensure a similar collaboration with the RIS, the risk of a disconnection between lead firms and local SME suppliers grows. Instead, when the RIS actively engages with the lead firm and its GIN in the process of innovation, the local suppliers are more likely to benefit from voluntary knowledge transfer and technology spillovers that put them in the best position to follow the lead companies in their internationalization strategies. This is shown by table 5.

**INSERT TABLE 5**

## **5. Conclusions**

In this paper, we provide evidence on two drivers that are very likely to affect the capacity of CIDs to develop cohesively in spite of the new globalization challenges. The risk of internal

fractures is visible in cases of growing separation between lead firms and their local suppliers due to the low resources the latter invest in innovation. This risk increases with the globalization of lead companies that might find convenient to replace their local suppliers with scale economies-led suppliers in the countries where they develop FDI and internationalization strategies (Elola et al., 2013; Bailey & De Propris, 2014; Belussi, 2015).

Based on previous scholarly work on the role of home-grown/indigenous multinationals in CIDs (Hervas-Oliver and Albors, 2008; Belussi et al., 2010; Sedita et al., 2013), here we identified the “commitment” of these lead companies with their CIDs as a key for local resilience and sustainable success (Asheim et al., 2011b; Boschma, 2015). This commitment can be seen in renewed investments in physical (e.g. R&D labs, production plants) and intangible assets (e.g. training courses, university programmes) as well as in participation to local development plans with local stakeholders. Moreover, their commitment is essential to promote knowledge transfer from their GIN to the pre-existent RIS in a way that allows the RIS and in particular local SMEs to be nourished with advanced knowledge, thus maintaining an appeal for the lead companies. These are the key aspects and approach of this paper that represent an original contribution to the strand of research on the importance of RISs for SME innovation in CIDs (Cooke, 2001; Asheim and Gertler, 2005; Belussi et al., 2010; Isaksen and Trippel, 2016) and home-grown multinationals for local development more in general (Hervas-Oliver and Albors-Garrigos, 2008; Morrison, 2008; Sedita et al., 2013; Belussi, 2015).

The evidence that we have provided shows a range of CIDs, some of which are competitive though also present risks of internal fractures due to the lower commitment of lead firms to the strengthening of the local supply chain. We also identified a couple of success cases in which their steady growth path is linked to the effort of lead companies to continuously invest in the development of a significant local supply chain, also by means of promoting significant investments in the RIS while simultaneously investing in the formation of their own effective GIN (Parrilli et al., 2013).

These findings offer relevant indications for both practice and policy-making as the commitment of lead companies can be assessed and promoted through policy actions and incentives (e.g. joint effort by Intel and the Costa Rican government for the promotion of specialized human capital; Parrilli and Sacchetti, 2008; Camtic, 2017). In addition, the synergies between GINs and RISs (mediated by the lead company) can also be assessed and bolstered, provided they are inserted within well-planned development strategies that include

technological developments as well as public investments in innovation infrastructures such as universities, labs, science and technology parks, business incubators, among others (Morrison, 2008; Asheim et al., 2011a, 2011b; Parrilli et al., 2013).

This work presents limitations that can be addressed through further studies. The set of cases is limited, thus a larger number of applications would be useful as a means to verify the importance of those critical drivers (commitment and GIN-RIS interaction) across a wider set of cases. The study of CID failures could also help to achieve consistency. Moreover, it would be interesting to study more cases in which leadership and commitment are not in the hands of a lead company as in hub-and-spoke clusters, but also shared across larger sets of SMEs (Marshallian industrial districts). In effect, commitment is essential, and yet does not need to be concentrated in one or few companies only.

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