

# Knowledge dynamics in localized communities: coworking spaces as microclusters

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## Abstract

The literature on knowledge creation in economic geography has often focused on the territorial or organizational level, without considering the multi-scalar aspect of innovation and knowledge dynamic. This article contributes to fill this gap by analyzing the knowledge dynamics that take place in localized emerging communities in Coworking Spaces (CWS) as well as their impact at the local and global levels. CWS are theorized as microclusters as they present similar knowledge dynamics as the ones identified in industrial clusters but at a lower scale. As an illustration, the article presents the case of the CWS in Barcelona. The implications for policy makers are analyzed in view of the potential contributions of these microclusters to the local dynamics of knowledge creation and transfer.

## Introduction

Research on the knowledge creation dynamics that take place in clusters has focused on the study of the effects of colocation of economic actors in the interactive learning processes (Maskell & Malmberg 1999a; Malmberg & Maskell 2006). This literature has acknowledged that both traded and untraded interdependencies contribute to a systemic effect in the processes of knowledge creation, where different and diversified types of economic actors interact and collaborate to share and co-create new knowledge. The “industrial atmosphere” (Marshall 1890; Marshall 1919) that characterizes and differentiates clusters is linked to the “local buzz” (Maskell et al. 2006; Bathelt et al. 2004; Storper & Venables 2004) that is fed by the daily interaction of the collocated agents that profit from the shared knowledge just by “being there” (Gertler 1995). However, current research has focused mainly studying the knowledge dynamics of clusters at the level of formal organizations and institutions, ignoring the effect of smaller entities like individuals -entrepreneurs, freelancers and other types of professionals- or small organizations -micro-firms, communities- in the knowledge creation processes within clusters. A recent research trend in economic geography has partially palliated this lack by underlining the importance of knowledge communities in the processes of (notably tacit) knowledge creation and transfer (Coe & Bunnell 2003; Saxenian 1994; Amin & Cohendet 2004; Henry & Pinch

2000), contributing to the literature on communities of practice (Brown & Duguid 2000; Wenger 1998) by contextualizing them geographically. But these analysis have usually referred to communities formed by peers with similar backgrounds, where the significance of strong ties exceed those of weak ties.

This paper is concerned by the dynamics of knowledge creation among localized communities that gather individuals from different professional and cognitive backgrounds. Specifically, I argue that the communities that emerge in Coworking Spaces (CWS from now on) create knowledge dynamics similar to the ones that have been referred in the literature about processes of knowledge creation in industrial clusters.

By adopting a more micro level of analysis, this paper contributes both to the literature on localized knowledge communities and to the literature on clusters. Identifying coworking spaces as microclusters, not only helps to understand the local embeddedness of knowledge creation processes and the local impact of communities, but also provides some clues to study how citizens and innovative individuals contribute to the localized knowledge dynamics in industrial clusters.

The structure of the article is as follows. First, the concept of coworking is introduced. Coworking is an increasing trend in the configuration of organization of independent professionals and small startups in urban environments. The main reason why we address this topic is because it represents a configuration that offers a micro-scale perspective on the knowledge dynamics through the interactions of co-located independent organizations. Second, the article follows with a literature review on the knowledge creation processes in clusters. Third, I argue that the knowledge dynamics in clusters can be assimilated to the ones taking place in coworking spaces and consequently, I propose that the term microcluster can be applied to such spaces. To illustrate these arguments, I present an empirical qualitative research about several CWS in Barcelona, describing the knowledge dynamics on the one hand within the community and, on the other hand, between the community and the local environment consisting on firms, public institutions and neighbours. Finally, before presenting the conclusions, I discuss the effects of the combination of clusters and microclusters in a same geographic location and the implications for policy makers.

## The coworking phenomenon

The term coworking has started to be used as a buzzword and its meaning is far from clearly defined. Not all shared offices that use the term to define themselves can be considered as such. Defining CWS as “open-plan office environments in which they work alongside other unaffiliated professionals for a fee” (Spinuzzi, 2012, p.399) do not consider one of the most important features of CWS, and that differentiate them from mere shared offices: the focus on the community and its knowledge sharing dynamics. Coworking.com defines coworking as: “a global community of people dedicated to the values of Collaboration, Openness, Community, Accessibility, and Sustainability in their workplaces” (Coworking.com n.d.) and clarifies it:

“The idea is simple: independent professionals and those with workplace flexibility work better together than they do alone. Coworking spaces are about community-building and sustainability. Participants agree to uphold the values set forth by the movement’s founders, as well as interact and share with one another. We are about creating better places to work and as a result, a better way to work.” (Coworking.com n.d.).

Concerning this article, CWS are defined as localized spaces where independent professionals work sharing resources and are open to share their knowledge with the rest of the community. The first “official” coworking space was founded by Brad Neuberg in 2005 when he organized Spiral Muse in San Francisco as a reaction of the lack of social implication of business centers and the unproductivity of working at home (Deskmag.com 2013; Botsman & Rogers 2011; Hunt 2009). Since then, the coworking phenomenon has spread all over the world, converting the term a buzzword, with multiple definitions and uses. Currently, there are more than 100,000 people around the world that are members of one of the 3,000 coworking spaces running around the world (Deskmag.com 2013). In Barcelona, for instance, more than one hundred spaces define themselves using the term coworking. In Europe as in the United States, there are annual conferences dedicated to Coworking where CWS managers meet, share experiences and discuss about common issues. There are several networks of coworking spaces that operate CWS in several locations, such as The Hub, NextSpace or Urban Station. Nevertheless, the majority of coworking spaces are small local private startups that run independently with only one or two locations. Some of them are organized in associations to offer more services and create more values for their members. Being an emergent phenomenon, there are still few publications (Jones 2013; Jones et al. 2009; DeGuzman & Tang 2011; Nakaya et al. 2012; Davies & Tollervey 2013; Kwiatkowski & Buczynski 2011b; Kwiatkowski & Buczynski 2011a) and few academic research (Spinuzzi 2012) dedicated to coworking.

## Clusters and the dynamics of knowledge creation

The concept of cluster as a local industrial agglomeration and specialization is not new (Marshall 1890; Marshall 1919) but has gained a renewed interest not only for economic geographers, but also policy makers since Porter’s works (Porter 2000; Porter 1990). Even if the concept of cluster has been used with different connotations (Martin & Sunley 2003), clusters can be broadly defined as “geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example, universities, standards agencies, and trade associations) in particular fields that compete but also co-operate” (Porter, 1998, p.197)

Clusters have been conceptualized around the interconnection of major firms and institutions, linked by complementarities and commonalities. These bonds have an horizontal and a vertical dimension. The horizontal dimension consists of firms producing similar services and competing with each other. Competition among clustered firms forces innovation and product differentiation (Porter 1998; Porter 1990). The vertical dimension is based on the complementarities of the co-

located forms of the cluster, thus creating networks of suppliers and customers. Both dimensions, horizontal and vertical, are intimately related and reciprocally nourish themselves stimulating the growth of the cluster as Marshall already observed (Marshall 1919).

Clusters have been conceptualized as agglomerations of separate economic entities that even if they are in some sense related, they are not joined together by any common ownership or management (Maskell & Lorenzen 2004). Most of the links between firms involve social relationships and the building of networks that are beneficial for the insiders. Nevertheless, inter-firm networks represent different configurations than clusters. Each configuration is adapted to different market conditions and characteristics. Inter-firm networks are mainly based on strong ties, based on trust among the members, fruit of a high-cost investment. The entry barriers for newcomers are consequently high. Networks are mainly found in markets with a low or modest uncertainty and high stability (Maskell & Lorenzen 2004). In contrast, in industries with a high uncertainty or ambiguity, clusters rather than networks appear as a more convenient market organization. Clusters are arrangements based on weak ties, and are consequently more flexible because insiders have lower costs to construct links with other members. Instead of building dyadic bonds of trusts, clusters shareholders relationships are based on social trust and reputation (Maskell & Lorenzen 2004).

Cluster configurations are characterized by the local circulation of information and knowledge that are shared by all the co-located actors and that has been referred as buzz (Storper & Venables 2004), local broadcasting (Owen-Smith & Powell 2004) or noise (Grabher 2002). Co-located actors profit of the shared informations, gossips and knowledge even without getting actively involved in the ongoing conversations, just by "being there" (Gertler 1995). Economic agents within a cluster profit from externalities at a low cost, thus reducing the cost of information seeking and knowledge transfer. This is why, in a economic environment of uncertainty, firms opt by integrating a cluster rather than creating inter-firm networks. Networks construction involve sunk costs by building strong ties with other firms that might become obsolete in a ever-changing environment. A cluster configuration, based on weak ties (Granovetter 1973) result in a more agile configuration: it can adapt to changes either in ambiguous situations or in markets that require a constant adaptation or customization of products and services to different customers and market circumstances, as it is the case in the knowledge intensive industries. As the construction of ties has a lower cost than in a network, firms can create ties with a higher number of firms. Collaborations to innovate also allow to redistribute the risk related to market uncertainty. Colocation also facilitate the circulation of best-practices, thus increasing the internal competition of the members of the cluster and at the same time increasing the overall competitiveness of the cluster.

Clusters' insiders are exposed to a large and diverse knowledge pool. Although each organization masters specific and limited capabilities, they can benefit of other members' capabilities by collaborating. In this way, clusters facilitate the integration of diversity and the combination of complementarities contributing to the cross-pollination of different bodies of knowledge and expertises that benefit a cluster's capacity of innovation and its differentiation

through the creation of “localized capabilities” (Maskell & Malmberg 1999b; Maskell & Malmberg 1999a).

Collaborations among organizations are often coordinated in the form of projects, that facilitate goal-focus temporary relationships where complementary bodies of knowledge are combined to reach a innovative endeavour. Project-based interaction also allow to change partners with agility and to adapt to constantly changing markets. *Ad hoc* collaborations allows the integration of different firms’ capabilities and specialities ensuring the competitiveness of the involved firms and consequently their survival.

The collaboration between members with different knowledge bases and cognitive frames of reference is promoted by a common institutional frame that reduces the cognitive distance and facilitates communication flows. However, the frequent interaction and interdependence between insiders can also derive in the long-term into the creation rigid structures of relationships leading the cluster to a lock-in effect (Visser & Boschma 2004; Maskell & Malmberg 2007). The creation of “global pipelines” (Bathelt et al. 2004) -knowledge interchange with distant actors- can counterbalance this effect, by providing the cluster with new knowledge from external sources. External knowledge, brought by boundary spanners into the cluster, is integrated into the local buzz, enriching the cluster’s shared knowledge pool and increasing its competitiveness. In a similar way, global pipelines also serve as vehicles for local-generated knowledge to reach distant clusters, contributing to the visibility of the cluster at a global level.

## Coworking spaces as microclusters

So far, the cluster literature has mainly focused on the regional (macro) and organizational (meso) level of analysis. Approaches at a micro level, as the study at the level of individual (i.e. entrepreneurs, freelancers, professionals), communities or micro-organizations have seldom been considered.

To fill this gap, I address the topic of the impact of the micro level of analysis on the macro level of clusters. I argue that coworking spaces and other localized spaces of collaboration have similar characteristics than industrial clusters at a micro level of analysis and can be assimilated to microclusters. Insiders of clusters are firms, organizations and institutions whereas in microclusters, insiders are entrepreneurs, consultants, freelancers, and alike.

Conceptualizing CWS as a microclusters contributes to the understanding of the emergent phenomenon of coworking by extrapolating the concepts of knowledge dynamics of the cluster literature to a more micro level of analysis.

In this section, I focus on the knowledge dynamics created within and around CWS to compare them to the ones created in localized industrial clusters.

CWS are strongly embedded to their local environment. Most CWS are startups with a single location founded by entrepreneurs that live in the same district. Local professional decide to join a CWS often looking for a “third place” (Oldenburg 2002), between home and work, away from the distractions of home and with a social atmosphere. CWS have been referred as preferable

than coffeeshops reporting that they experienced distractions, self-motivation problems, and feelings of isolation (Spinuzzi, 2012, p.421). CWS' members look for a workspace near home, to combine better work and family life. Location is one of the primary reasons when choosing a CWS. Other reasons are related to the reduction of fix costs in comparison to the rent of a whole office. However, once in a CWS, members tend to stay or to go depending on the community and the interaction created between members.

To join a CWS has low entry barriers. Entrepreneurs, freelancers and small enterprises can be members of a CWS by paying a (rather low) monthly fee. Even though there is generally no filter done by the CWS management in order to select members, each CWS tends to specialize in a certain market or field. CWS, contrarily to mere shared offices, focus on the dynamization of a community of members that supports common values around "collaboration, openness, community, accessibility, and sustainability" (Coworking.com n.d.). Initial cognitive proximity is reinforced by the daily interaction. New members with high cognitive distant with current members would tend either to isolate themselves not participating in the community interactions or leave the CWS.

The emergence of a knowledge community is not granted and not all CWS result in the construction of a dynamic knowledge community. CWS managers might improve the conditions to facilitate communication among members. For instance some CWS have community managers, that are members with special rights but also with the task of identifying synergies between members. Other elements might also contribute to members interaction like the physical distribution of the furniture and the space, as well as communication devices like "post-it walls" and shared blackboards. Nevertheless, community building responds more to a logic of organic emergence and autonomy rather than to an intentional design (Wenger 1998; Brown & Duguid 2000). Even though it can be nurtured and supported, the creation of a community in a CWS relies on the engagement of its members.

Physical proximity in combination with cognitive proximity, and intense face-to-face interaction facilitates the creation and nurturing of relationships based on trust (Boschma 2005). Trust is reflected in multiple dyadic bonds between members but also in the generation of a social trust and a reputation-based system at the level of the community. These trust-based relationships lowers the transaction costs related to the search, validation and transfer of information and new knowledge. Informal and frequent interaction between CWS insiders also feeds the creation of a local buzz, where information about the members and their projects are shared as well as information related to the local environment, like potential customers and suppliers. Knowing about the others' activities and capabilities, facilitates knowledge transfer and potential knowledge combinations through collaborations. Insiders profit the local buzz to identify useful knowledge and depending on their absorptive capabilities and strategy, they can opt to use the acquired knowledge by themselves or to engage in collaboration with other members.

Colocation and frequent interaction also creates common codes and the development of a common language as in the case of communities of practice (Lave & Wenger 1991; Wenger 1998). However the knowledge communities that emerge from CWS can not be considered communities of practice as CWS members do not forcely share the same practice or have

similar knowledge backgrounds. Knowledge dynamics in CWS are more close to the ones of observed in the collectivities of practice (Lindkvist 2005) where individuals with different knowledge bases and background collaborate to focus on reaching a common goal. These collaborative practices take often the configuration of inter-firm projects.

As in the case of knowledge-based clusters, projects are optimal organizational configurations to combine different knowledge pools and expertises within a temporal collaborative structure. In CWS, projects represent a common way of articulating synergetic collaborations between members, that increase the competitiveness of coworkers by allowing them to offer more complete services and integral solutions to their customers.

The collaborative environment of CWS, beyond creating traded interdependencies like formal agreements of collaboration, also contribute to the development of “untraded interdependencies” (Storper 1997) in a similar way as in clusters by the action of interactive processes of learning and knowledge transfer (McCann & Gordon 2000; Malmberg & Maskell 2006).

The combination and recombination of shared knowledge and the enrichment of the local buzz by external sources results in the development of “localized capabilities” in a similar view as described in the case of clusters (Maskell & Malmberg 1999b; Maskell & Malmberg 1999a). As in the notion of “industrial atmosphere” (Marshall 1919), CWS differentiate themselves by their particular capabilities and expertise, that are difficult to replicate by other CWS. CWS combine both the vertical and horizontal dimensions, from one side, to ensure that the diversity and complementarity of members allow fruitful synergic collaborations and, from the other, reinforce the CWS localized capabilities that would result on differentiation and competitiveness.

For coworkers, the added-value of being member of a CWS lies on the community and the potential learning possibilities. The knowledge share derived from the coworkers interaction is a crucial way to provide the diversification and collaboration required for innovation. However, communities focusing exclusively in their practices can derive to a lock-in effect: one of the main limitations of communities of practice in the knowledge creation (Roberts 2006; Amin & Roberts 2008). Permanent dynamics like the rotation of coworkers in a CWS or the presence of foreign coworkers bring new and diverse knowledge. Temporary configurations like events and projects facilitate inflow and outflow of knowledge between communities (Grandadam et al. 2012). CWS offer a platform to share knowledge not only among the insiders but also with outsiders.

## Empirical illustration: coworking spaces in Barcelona

Barcelona is currently the European city with a higher density of CWS (BBVA 2013). Among other reasons, this fact might be related to the Spanish economic crisis and the high quantity of offices and corporate buildings that have been emptied. Some promoters and real-estate agents have tried to monetize their spaces by proposing low-rent shared offices.

The first CWS in Barcelona was launched in 2007 and currently, more than a hundred spaces in the city define themselves using the term “coworking”. However, some of them use the term as a buzzword and do not adhere to the values related to community and knowledge-sharing that guide the coworking movement. Some are just shared offices with a “keep silent” policy that even refrains members from communicating.

The following research is based on an preliminary explorative study based on interviews to managers and coworkers of five different CWS located in Barcelona. In total, ten interviews were done with an average length of 45 min.

## **Come for the location, stay for the community**

Coworking being a relative new concept, many of the members of the visited CWS did not come initially looking for a community. The main factors to consider joining a CWS in the first place were mainly related to location: either the CWS was near home or it offered a central location. However, matching one’s interest with other CWS members appears as an important factor for staying. CWS managers do not normally filter members according to their interests and specialities. A natural selection is done by the flow of individuals that try different CWS before deciding to join the CWS that better fits their interests in terms of community, location and budget. Despite CWS managers might advocate for the free knowledge sharing and the willing to create a lively community, results are uneven. In some cases, members have a strong feeling of membership and identification with the CWS community, in others, the shared spaces responds more to a practical need of office away from home. Some CWS have an explicit interest and professional focus and others gradually specialize in specific fields depending on the community, some of them focusing more on design, others on social innovation, or on internet startups. The CWS with a more lively community are normally characterized by the organization of a high number of activities and by the sharing of values and principles related to knowledge sharing and community building. In some cases the community is dynamized by a “community manager” that might be the CWS manager or a involved coworker that is paid accordingly or gets special benefits.

Communities in CWS might emerge around common professional interests but the cognitive proximity (Nooteboom 2000) also responds to the agreement among the coworkers on the common values of knowledge sharing and collaboration. Even though communities are specialized, each CWS usually present a broad spectrum of professional fields. The complementarity among coworkers is more important than the competition. For instance, two designers sharing a same space, rather engage in knowledge sharing and collaboration than in competitive practices. The cognitive distance between coworkers is usually different enough and at the same time close enough to engage in a synergetic collaboration (Boschma 2005).

However, too much proximity can derive into a lock-in effect. To counterbalance this risk, several knowledge dynamics allow CWS communities to bring knowledge from external sources both at a local and at a global level, as it is discussed in the following section.



## Dynamics with external sources of knowledge at the global level

Contrarily to firms, individuals have a much more geographic mobility. Knowledgeable and talented individuals cross borders and move to other cities with relatively ease attracted by better job opportunities or a lively vibrant atmosphere, bringing their knowledge with them (Kogut & Almeida 1999; Florida 2002). Newcomers to a city, by having a reduced local social and professional network, have more difficulties to integrate into the local professional and social environment. Different cultural or institutional frames may increase the difficulty to create ties. Barcelona has experienced in the last twenty years an intense inflow of foreign professionals, seduced by the city's fame of world famous design, and architecture (Pareja-Eastaway, Turno, et al. 2008). Many foreign professionals have remained somehow unconnected to the city's dynamics and have kept working with their external customers using virtual communication platforms (Pareja-Eastaway, Garuz, et al. 2008). For others, CWS have offered the possibility to join a community intimately linked to the local environment, allowing them to integrate the local buzz, share knowledge, and socialize. In some CWS in Barcelona, the number of foreigners exceed the number of local coworkers. It is also not uncommon that CWS have been founded by foreigners, combining a way of earning an income and at the same time, creating their local network.

In some cases, foreign coworkers are only temporary in Barcelona. Coworkers mobility between CWS in different cities is facilitated by the fact that some spaces are part of a larger network (as it is the case for Betahaus, founded in Berlin) or have integrated the CoworkingVisa project (Coworking.com n.d.) that allow coworkers from affiliated CWS to work temporarily for free in a CWS in another city. The flow of temporary coworkers, together with the organization of other temporary platforms of interaction (like is the case of the annual conference Coworking Europe) contribute to the creation of knowledge "global pipelines" between distant CWS.

The mix of knowledge coming from local and external sources has been identified by managers and coworkers as an enrichment of the pool knowledge shared and a source of inspiration.

## Knowledge dynamics with the local surrounding community

CWS represent knowledge communities embedded in their local environment. A great amount of CWS are founded by entrepreneurs living in the same district where the CWS is located. CWS are open to the public and it is common that they organize events and projects with and for neighbors and local organizations. Some of them (like the CWS "Makers of Barcelona" and "Transforma BCN") have a coffee shop opened to the public at the street level, acting as a open agora where improbable encounters can take place between local citizens and coworkers and where information, ideas and knowledge can be shared.

CWS are also some cases, spaces where two or more communities meet. For instance, in the case of the CWS "Makers of Barcelona", the ground floor is dedicated to shared desks as in other coworking environments while the basement serves as a maker space, with tools and

machines to prototype. Each space attracts people with different interests but the daily interaction between the “coworker” community and the “maker” community is the source of inspiration and novelty for both.

Events play a major role in the everyday life of a CWS. Some managers even book all their facilities every evening after the working hours exclusively for the organization of events. In this way, the CWS community is dynamized by being exposed to a diversity of guest speakers, workshops, seminars, and presentations. These events are usually open to the general public and they offer opportunities to the coworkers to get in contact with external knowledge. The spaces also usually organize public presentations, exhibitions, showrooms, pitches, or competitions where the products and services developed by the members are presented and that represent a way of gaining external visibility to potential customers, partners or employers.

## Discussion

This paper focuses on the view of CWS as microclusters, making an analogy with the existing literature on localized industrial clusters. Knowledge dynamics on both configurations can be compared, showing similarities as it has been previously argued but also acknowledging differences mainly derived from the more micro level of analysis of microclusters. Table 1 summarizes what has been exposed so far.

	<b>CLUSTERS</b>	<b>COWORKING SPACES (CWS)</b>
Type of members	Organizations	Micro-firms, entrepreneurs, freelancers
Level of geographic impact	Region, city	City, district
Interaction with local citizens	Limited	Medium / High
Public policy intervention	High / medium	Low
Shared resources	Infrastructures (public and private) and shared services	Office facilities and services (printers, internet connection, etc.)
Type of relationships between insiders	Collaboration and competition	Mainly collaboration
<b>Knowledge dynamics</b>		
Interaction modes between members	Formal and informal, face-to-face and virtual	Informal face-to-face
Type of knowledge shared	Tacit and codified	Mainly tacit
Local buzz	Knowledge shared within the cluster	Knowledge shared within the CWS
Global pipelines	Interaction with distant similar clusters	Interaction with other local and distant CWS

Table 1. Characteristics comparison between clusters and CWS

In this section, I argue that both types of configurations, clusters and microclusters, present complementarities that can create synergetic relationships to nourish the territorial innovation capabilities.

Microclusters represent intermediary-configurations between firms and clusters. While microclusters are constituted by entrepreneurs and micro-firms, clusters are typically characterised by a combination of small, medium and large firms.

Much research studying the locus of innovation in clusters has been concerned on the size of the organizations involved in innovation. With the end of the Fordist era, a renewed interest was put on the potential of small firms to innovate (Best 2001; Piore & Sabel 1984). Research on the dynamics of small companies showed that they allow a high degree of innovation to regions like the Third Italy (Trau 1997; Amin 1989), or Silicon Valley (Saxenian 1994). Small firms have been acknowledged of being more innovative than large ones because they provided more flexibility and variability, thus improving their ability to build alliances and collaborate through projects (Acs & Audretsch 1990; Birch 1987). Networks of small firms might concentrate in clusters creating networks (Perry 1999) that interact with larger firms as just-in-time production systems. The role of small and young firms has been acknowledged as being a crucial actors in generating economic dynamization of cluster and fostering the emergence of new businesses (Henderson 2003; Rosenthal & Strange 2004; Glaeser et al. 2010). However, the literature has also identified strong clusters with the presence of larger firms that act as “anchor” firms that promote the emergence of spin-offs and attract new businesses to the cluster (Scott 1992; Enright 2000; Agrawal & Cockburn 2003; Klepper 2007). Regions with strong clusters provide the needed diversity and reduced costs to start new businesses, and are associated to stronger rates of new firms and start-up employment (Delgado et al. 2010). Clusters where large and SME have succeeded to establish decentralized innovative networks (Langlois & Robertson 1995) may be able to develop competitive advantages in front of radical structural changes in the industry. In this line, the creation of “learning networks” -transversal structures where individuals of different organizations participate- facilitate learning and thus increase the overall localized innovation capability and pace (Bessant et al. 2012; Bessant & Tsekouras 2001).

Microclusters in interaction with local clusters facilitate the creation of such “learning networks” in different ways.

First, microclusters represent a source of talent for large firms. The autonomous and self-managed communities that might emerge in microclusters are autoregulated by a system based social trust and reputation. Members with reputation and recognition will gain visibility to external local firms through the action of the local buzz. In this way, microclusters facilitate the detection and selection of talented individuals and high-potential startups to local large firms. The costs of searching for new talent are reduced by the action of the microcluster community. Talented individuals might be not visible to formal organizations in a given territory. Communities in microclusters might take the role of actors of the “middleground” (Cohendet et al. 2010), connecting creative individuals (the “underground”) that are outside the economic and managerial logic of the large formal firms (the “upperground”).

Microclusters are spaces of interaction between insiders and outsiders. For instance, the majority of CWS organize events opened to the public to present their members and their projects. This offers excellent opportunities to microcluster insiders to gain external visibility and to outsiders to detect potential collaborators or get interest in joining the microcluster. Microclusters result in shared spaces of knowledge sharing and knowledge creation -related to the concept of 'ba' (Nonaka & Konno 1998)- as well as places of social interaction. CWS can also gain external visibility for their members by forming alliances with other local CWS. For instance, the 23 CWS localized in the Barcelona's district of Gràcia have put in place a collaborative project called "Silicon Gracia" to facilitate collaboration among the different spaces in order to gain visibility and to join efforts to attract projects from other European hubs, notably London.

Second, microclusters contribute to increase the resilience of territories. Research has shown that clusters with a core/periphery configuration (Borgatti & Everett 2000) with an heterogeneity of domains of exploration configure a more optimal network to ensure regional resilience (Suire & Vicente 2011; Simmie & Martin 2010). In other words, regions that combine large firms that act as anchors firms with a high exploitation-related inertia, combined with a large periphery formed by a pleiade of small firms with a high explorative capacity would offer the best configuration to confront radical changes in markets. CWS, as communities of entrepreneurs, are involved in agile exploration dynamics that are often independent from the ones of big firms. Thus CWS represent hubs of innovation that contribute to the local development and that can potentially feed the innovation processes in local large organizations. The contribution of the ensemble of local CWS also represent a knowledge repository of local knowledge and a contributor to the local buzz and to absorb external knowledge. The innovation developed by communities within microclusters might represent an important contribution to the local innovation that might ensure regional resilience. The presence of innovative microclusters can represent a way of externalizing the innovation processes from the large organizations thus reducing the high costs that an equivalent exploration efforts would represent if they would take place within large firms or research centers. In the same vein, the risks associated to the high explorative practices are also absorbed by the microclusters.

## Implications for policy makers

Most CWS are private for-profit startups run by entrepreneurs that work in the shared office, in the same conditions as all the other coworkers. CWS are generally low-profit small businesses and it is not uncommon that founders combine the development their own business simultaneously to the management of the CWS. In fact, the origin of the CWS is often the need of the founders to reduce their office rent costs.

Despite the low investment normally dedicated to the launch and management of CWS compared to similar publicly funded projects (like public business incubators), the outcomes of CWS do not only benefit the coworkers but also represent returns to the local environment. As argued previously, CWS contribute to the local dynamics of knowledge creation and sharing and can contribute actively in the local processes of innovation, linking talented individuals to

innovative communities and to firms. In this view, policies that facilitate the creation of CWS and foster the relationships between them and the other local actors could lead to the local social and economic dynamization. Policies aiming to create a favorable soil for CWS communities to emerge like, for instance, fiscal incentives or facilitating the access to low-rent spaces, could represent an improvement of the local knowledge dynamics. However, considering the autonomous and self-managed character of bottom-up communities, a too interventionist and directed policy could have counter effects and refrain the organic development of the community.

## Conclusion

The cross-scales nature of innovation (Bunnell & Coe 2001) shows that localized knowledge processes have to be considered at different levels. The literature on knowledge creation and diffusion in economic geography has traditionally focused on the territory level (nation, region, city) or organizational level (cluster, network, firm) without considering that “knowledge is still intrinsically an individually centred phenomenon” (Howells & Roberts 2000, p.20). Few research has focused at the level of communities or individuals.

This article contributes to fill this gap underlining the importance of individuals, particularly entrepreneurs, in the localized knowledge dynamics. Beyond the Schumpeterian view of the entrepreneur as a hero on its own, individuals are conceptualized as “sites for creation, storage and dissemination of knowledge for broader innovative processes” (Bunnell & Coe 2001). To understand knowledge creation processes, individuals do not have to be considered as atomized actors but as part of knowledge networks, communities and organizations. Cross-scale analysis contribute to fill the a void in the current literature, that often ignores the constant shift of levels in localized innovation processes. This aspect is especially evident in the case of CWS, where coworkers often act simultaneously as individuals and as the firms they represent. The relationships between coworkers and other community insiders and outsiders, it is often difficult to delimitate the private sphere from the professional, and the formal from the informal.

Finally, clusters have to be considered more than simple economies of agglomeration or interdependencies among firms and take into consideration the importance of the complexity of social networks where dynamics of flows of knowledge, resources and trust are vital. In this view, the concept of microclusters brings a closer focus on the level of individuals and their close social and professional environment where the knowledge dynamics take place.

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