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CLUSTER E CLUSTER POLICIES: THE CASE OF TORINO WIRELESS

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ABSTRACT

The article studies the policy making process of an ICT cluster located in an Italian metropolitan region. Adopting an institutional approach, the study aims at disentangling the impacts of cluster policies on individual firms and on the relations intertwined among cluster actors (firms and local and regional institutional and supportive organizations). In particular, it intends to verify the alignment of public interventions with respect to the needs' and the expectations of clustered firms. The multi-perspectives integrated approach herein embraced shows that policies affect simultaneously several cluster dimensions, generating expected and unexpected effects influenced by a number of factors, both intrinsic to the cluster, as firms' heterogeneity, and exogenous, as political interferences. As possible, policy makers should be aware of these dynamics in order to increase the effectiveness of their interventions.

1. Introduction

As a consequence of globalization, on the one hand, and of the IT revolution, on the other, advanced national and regional economies have begun to graduate into knowledge economies directly based on the production, distribution and application of knowledge (Brandt *et al.* 2009). Therefore, policy makers have started considering policies and interventions to improve the robustness of the knowledge base of the local economy and to foster processes of development truly inspired by a knowledge management framework. Coherently, many cities, facing the full transition towards a Knowledge-Based Economy (KBE, hereinafter), have started up initiatives and set strategies in order to improve their competitive position at a regional, national and also international scale from a knowledge-based perspective (Martinez, 2006).

In the KBE, what is also peculiar is that knowledge seems to be distributed across a large number of individual and collective actors, whose contacts and relations, when fruitful of knowledge creation, determine interactive models of innovation. Therefore, as the process of innovation comes out to be less and less organized hierarchically and more and more network-shaped, policies started sustaining linkages and relations among agents carriers of knowledge.

This phenomenon is verified and somehow also amplified in clusters. In economic theories, clusters are seen as important drivers of competitiveness and innovation. Innovation is not created by isolated organizations but mostly in dynamic environments where organizations and firms interact in a constructive and complementary way to assimilate existing knowledge and generate new ideas and products. Also for this reason, in recent years in Europe, a large number of policy initiatives have been launched and implemented aiming at fostering existing clusters or creating favorable conditions for the formation of new ones (European Commission, 2008).

Cluster policy with its many aspects has demonstrated success, but also revealed many pitfalls, with rather high opportunity costs, as it may be a burden to tax payers and its effectiveness may be doubtful. Besides, the understanding of how policy making works in clusters is then crucial, but often underestimated as there seem to be some gaps between the expectations of cluster actors and the actual activities and mechanisms offered by cluster policies.

In this frame, the research intends to explore the efforts put in place by local and regional policy makers in order to foster the competitiveness of a knowledge-intensive cluster based in an Italian metropolitan region. It investigates the alignment and the impacts of implemented policies with respect to firms' needs and expectations. In particular, the work considers policies affecting two cluster dimensions, the individual clustered firms and intra-cluster linkages.

The study examines the ICT (Information and Communication Technology) cluster based in Piedmont and labelled Torino Wireless. To be more precise, this work considers a peculiar niche within ICTs, namely Infomobilty, which is historically an important sector in the local economy with strong interactions with the local and regional economic base.

The case is chosen for its representativeness, both because of the sector (ICT is one of the most representative and relevant sectors of the contemporary knowledge economy – Cooke, 2001) and for the geographical area (Piedmont and Turin, its core metropolitan region, traditionally associated with a manufacturing past). As a consequence, Torino Wireless cluster not only has been recognized as a priority in the local agenda, but in the last years it has also received a strong financial support from public institutions. Furthermore, this case moves slightly away from the well-studied Italian district, defined as a set of vertically disintegrated networks of relatively small firms, historically embedded in the local social system, typical in the Third Italy. Piedmont ICT cluster does not show a path dependency as other Italian districts do, as it has been the outcome of a deliberate public policy. Besides, so far, the cluster has raised a lot of attention across scholars from other disciplines (Ramella and Trigilia, 2006), but no one has concentrated his/her attention yet on the appropriateness of policy making in fostering the development of the cluster.

The study is placed in a well established field of research. From Marshall onwards, some scholars have investigated mechanisms leading to agglomeration economies of economic activities from a meso-level perspective, i.e. digging the patterns of clustering and the interactions within agglomerations. Other contributions have assumed firms rather than agglomerations as crucial actors of innovation processes occurring in a territory, thus embodying a micro-oriented perspective. Others have focused on the role of institutions in setting policy frameworks and interventions nurturing knowledge flows and inter-firm linkages.

Some contributions flourished in mainstream economics (from neoclassical theories to New Economic Geography), others in Geography (from Institutional / Cultural to Evolutionary Economic Geography), and others in Sociology, mainly in network sociology.

The general tendency which can be traced among the different disciplines reveals that, so far, each of them has been used to adopt a rather uni-dimensional approach, missing the opportunities to merge complementary perspectives in interpreting the phenomena considered. The claim asserted by many is the development of an integrated and multi-dimensional approach (Capello, 2009) in order to scrutinize the interactive mechanisms, also related to process of innovation, among clustered firms. This research, then, takes up the challenge. It is originally an institutional study, which takes into account cluster policies implemented by governmental and institutional organizations and their impacts both on individual firms and on the pattern of interactions within the cluster. In so doing, the institutional approach is integrated by a firm-level and a network-based perspective.

The appropriateness of cluster policies is rather urgent for those metropolitan regions experiencing the transformation from industrial to knowledge economies and struggling for a leading position in the KBE paradigm also by massively investing in hi-tech clusters. Therefore, this study may be of interest also for policy makers in so far the research could help rationalizing cluster policies which may be a fairly imprecise and flexible label for differing combinations of measures (Martin and Sunley, 2003). The institutional approach together with the micro and relational perspectives should allow to disentangle the effects of policies in agglomerations, which in practice operate simultaneously at different levels, micro and meso/relational.

The remainder of the paper is organized as follows. The next section gives a description of the theoretical background in which the study is placed. In the third section, the conceptual framework is presented. Methodological choices are described in the subsequent chapter, followed by a section presenting the main features of the case studied in the work. Section five, then, discusses the results of the research. A brief conclusion includes the theoretical advancements and the policy implications derived by the study alongside with some issues left behind by the study but open to further discussion.

2. Cluster and cluster policies

Traditionally, economics, geography and combinations of both are the most relevant areas of studies concerned with spatial clustering of economic activities.

Among these bodies of literature, not necessarily clashing, as some attempts to make them complementary have been made (Caniëls and Romijn, 2003; Pinch *et al.* 2003; Boschma and Frenken, 2006), a plethora of approaches have been developed. According to Caniëls and Romijn (2003), one of the most decisive factors to look at them is the economic perspective they adopt for studying the process of innovation and knowledge creation in geographical agglomerations. In fact, some embody a meso-level perspective, focusing on the territory, its structural conditions (such as its institutional framework) and relational dimensions; others on the firm and its endowments (the micro-level perspective)[1].

Traditionally, scholars' interest has been caught by forces fostering agglomeration processes. From Marshall (1922) onwards (e.g. Becattini, 1979; Piore and Sabel, 1984; Porter,

[1] The meso-micro dichotomy developed is just one among the many possible approaches. Several alternatives have been identified: those focused on socio-cultural factors cementing agglomerations of economic activities (e.g. Becattini's industrial theory district); those stressing peculiar mechanisms fostering collective learning processes by means of relational proximity (e.g. the *milieu innovateur* theory); those stressing the importance of geographic proximity as a condition to the diffusion of local knowledge, interpreting space as a driver of knowledge creation and diffusion (e.g. the spatial spillover theory); others interested on the dynamic process of learning and knowledge creation via interactions among clustered firms.

1990; Krugman, 1991), classical explanations of the reasons why firms tend to cluster in specific areas were traced back to the cost advantages. Nowadays, a more relevant explanation is related to benefits from information spillovers that arise from proximity within an agglomeration. This is very true in the contemporary KBE, where the competitive advantage is represented by the effective utilization of intangible assets such as knowledge, skills and innovative potentials. As a consequence, the focus of the long debate on industrial districts and clustering has shifted from cost advantages to knowledge related issues (Maskell and Malmberg, 1999; Breschi and Malerba, 2001; Malmberg and Maskell, 2002; Boschma, 2005; Antonelli *et al.* 2008).

Consistently with the Marshallian 'industrial atmosphere' metaphor, a widely accepted view is that knowledge is diffused and created in clusters in a pervasive and collective way (Giuliani, 2005). On the one hand, economists stress the public nature of knowledge (Arrow, 1962) and argue that geography is conducive to innovation because of localized knowledge spillovers (e.g. Jaffe *et al.*, 1993) through which also tacit knowledge is exchanged (Kogut and Zander, 1996; Gertler, 2003). On the other hand, recent works done by economic geographers argue that it is not geography *per se* that matters for innovation, but it is a common institutional endowment and firms' relational proximity, which facilitate the diffusion of knowledge and enhance collective learning in clusters (e.g. Maskell and Malmberg, 1999; Capello and Faggian, 2005).

These views, embodying a meso-level or relational perspective to explain innovation processes, have actually received some criticisms (e.g. Breschi and Lissoni, 2001). In fact, some have pointed out the need to understand the nature and characteristics of the innovative process of a cluster by bringing in the analysis of firm-level learning (Bell and Albu, 1999; Maskell, 2001, Martin and Sunley, 2003), which may be structured and differentiated according to the heterogeneity of firms' characteristics (e.g. Giuliani and Bell, 2005). These strands of literature have successfully rehabilitated the role of firms as individual organizations in the process of knowledge creation and diffusion in economic agglomerations. Adopting this micro-level perspective, the process of knowledge creation results to be determined by the distinctive competencies of the firms and, consequently, the shape of the networks through which knowledge flows may be unevenly distributed among local firms.

This paper aims at contributing to this ongoing debate suggesting the integration of the meso-level / relational perspective and the micro-founded perspective with an institutional approach.

So far, the institutional dimensions affecting the process of knowledge creation and diffusion in economic agglomerations have been empirically neglected, even though prominent theoretical contributes have put considerable attention on the role of institutions in generating and maintaining effective innovation-related processes at cluster level (e.g. Porter, 1990; Cooke and Morgan, 1993; Saxenian, 1994). In the last few years mainstream

economists have increasingly come to the conclusion that the new 'kid on the block', institutions, matter as much, if not more, for economic development than long-established traditional factor-endowments (Rodríguez-Pose, 2009).

According to Narula and Santangelo (2008), firms exhibit a 'spatial stickiness' (Iammarino and McCann, 2006) resulting in firms becoming embedded in and perpetuating particular relationships with other collocated firms and organizations in their milieu. In this vein, Antonelli *et al.* (2008) suggest the idea that, in urban contexts, the density of institutional and scientific actors is the crucial factor shaping the progressive generation, dissemination, imitation and recombination of diverse know-how and competencies within narrow but thick geographical space.

The relevance of institutions in economic research is at least two-fold. Firstly, there is an interest in mapping and recognizing relevant territorial institutions in order to build networks between them, including governments, private actors (firms), public organizations (such as universities, research laboratories, …), as well as intermediates (trade associations, chambers of commerce, …) (Garmise and Rees, 1997). Secondly, the institutional perspective poses the policy issue of strengthening the 'institutional thickness' (Amin and Thrift, 1994). Efficient local and regional institutions are believed to play a central role in improving the conditions for the development of economic activity (North, 1990, 1995; Vázquez-Barquero, 2002) and in setting up incentives to smooth the process of knowledge and innovation transfer within and across territories, hence facilitating the learning process (North, 1995; Yeung, 2000).

Even though few dispute the role of institutions for economic development, there is little agreement on what institutions are (Markunsen, 1999) and on which institutions matter for development (Rodríguez-Pose, 2009). In line with the distinction between the 'institutional environment' and 'institutional arrangements' made by Martin (2000) and then picked up by geographers (Storper, 1997; Lundequist, 1998; Del Casino *et al.*, 2000; Jones, 2001; Dale, 2002; Grabher, 2002; Bathelt, 2003; Hall, 2003; Gertler, 2004; Rodríguez-Pose and Storper, 2006; Dawley, 2007), institutions need to be distinguished from organizations, even recognizing that the interaction between both is constant (North, 1990; Martin, 2000). The former denotes systems of informal conventions, customs, norms and social routines as well as formal rules and regulations, while the latter are particular organizational forms (such as firms, unions, city councils, business associations, trade organizations and chambers of commerce). In a motto, institutions are the 'rules', while organizations are the 'players' (Rodríguez-Pose, 2009).

This work uses the word institution in this second sense and focuses its attention on the role of organizations in cluster policy making.

To say the truth, there is a 'blind spot' in research on developing a consistent theory of cluster policies and strategies as a consequence of the fuzzy, polycentric and hybrid nature of

the definition of what a cluster is (Benneworth *et al*., 2003; Enright, 2003; Benneworth and Henry, 2004; Fromhold-Eisebith and Eisebith, 2005). Martin and Sunley (2003), in their seminal work, evocated cluster as "a policy panacea, a fashionable label attached to quite different sorts of policies".

According to Fromhold-Eisebith and Eisebith (2005: 1252), cluster promotion is defined as "any coordinated set of measures, in whatever constellation and style of implementation, which supports the development of a regional industrial agglomeration towards ideal features of a cluster in terms of a specialized, competitive, collaborative and collectively innovative set of sector related industries, research/education and other organizations".

Summarizing from a large body of literature (Boekholt and Thuriaux, 1999; Enright, 2003; EU Commission, 2002; Martin and Sunley, 2003; Raines, 2001, 2002; Sölvell *et al*., 2003), despite heterogeneities and difficulties of agreeing on a final and comprehensive version, a cluster policy encompasses some recurring features:

- Strategies designed to build upon existing potential in terms of some regional concentration of firms, other organizations and linkages in target sectors;
- A balanced combination of hardware, software and 'orgware' actions, mixing hard and traditional measures of concrete financial support for individual firms with soft activities developing the sense of belonging to a community and networking actions for enhancing inter-firm relations;
- Promotion of activities facilitating firms' access to previously insufficiently used public and private assets in the region that support competitiveness and innovativeness (e.g. fostering information exchanges and collaboration between regional firms and other organizations, such as regional universities and R&D centers which may serve as channels for technology transfer and innovation development);
- Marketing of specific cluster's strengths;
- Provision of specialized services (e.g. finance, marketing, …);
- Attraction of new industrial investors that may complete regional value chains and start-ups in order to strengthen the systemic potential of the cluster.

The nature of cluster as a multi-perspective concept (Benneworth and Henry, 2004) finds its expression also in the ways of actively promoting them, offering several similarly fruitful options. Therefore, it has to be pointed out that patterns of effects[2] are different and each type has its specific advantages. Consequently, the question is not which cluster support policy should in principle be preferred but which type fits better to a region's situation,

[2] It is worth mentioning that recurring issues of cluster evaluation involve understanding the additional impact generated by a cluster at the macro level (the regional or local economy), at the meso-level (the cluster and the sector in question) and on the micro level (on the individual business) (Asheim *et al.* 2006).

preconditions and preferred objectives. Once again it can be confirmed that there is no universal 'blueprint' of best practices in cluster promotion to be applied to a large set of regions (EU Commission, 2002; Martin and Sunley, 2003).

3. Conceptual framework: firms, networks and institutions

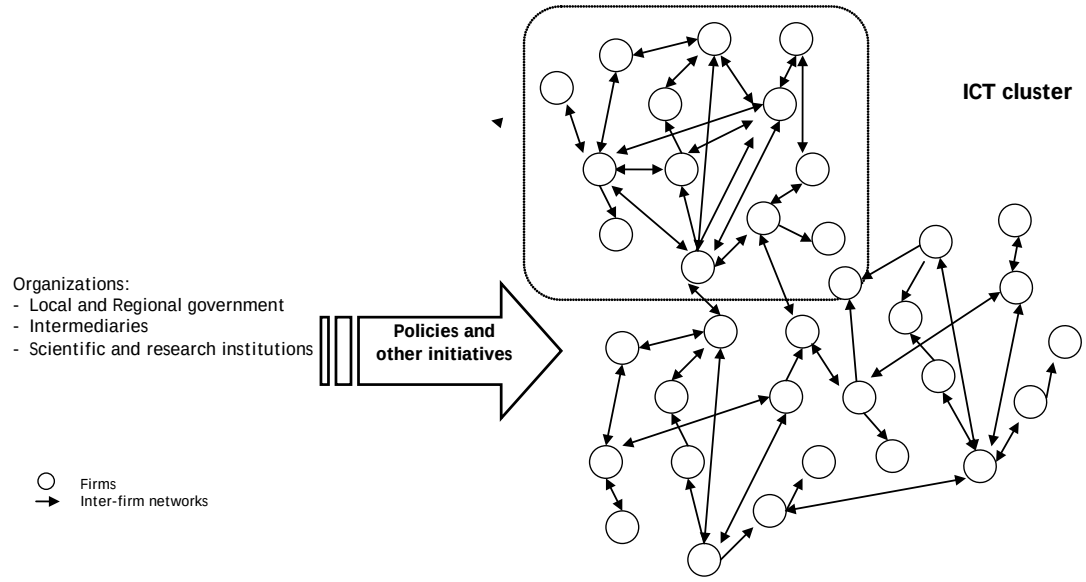
The conceptual framework of the research is structured in three conceptual building blocks: the micro-level (firm-based) perspective, the network perspective and the institutional perspective.

The study adopts an institutional perspective in looking at the policy efforts put in place by local and regional institutional and supportive organizations in order to enhance and promote the process of innovation in the cluster. This approach enables to explore cluster policies considering both the firms (micro-level perspective) and the interactions among firms and between firms and local and regional institutional and supportive organizations (network perspective). This 'integrated micro-meso level fashion' (Caniëls and Romijn, 2006) is justified, on the one hand, by the fact that firms have been recognized as carriers of unique resources embedded in the organizations and affecting their activities and innovative performances. On the other hand, cluster literature argues that cluster development is significantly embedded in networks of relational assets and geographical proximity particularly at the local and regional scales such that "territorialization is often tied to specific interdependencies in economic life" (Storper, 1997: 20). These "untraded interdependencies" refer to peculiar social processes, collective learning, localized capabilities, the everyday routines and practices of doing business which exist between firms and other institutions within regions. The rationale is that within regions, firms are the key loci of decision making in process of innovation and learning with the other parties in the innovation system (namely, universities, research labs, government agencies and so on) playing supporting and facilitating role (Caniëls and Romijn, 2006).

Therefore, the institutional approach applied to this micro-meso framework allows identifying from two different perspectives possible blockages or bottlenecks in policies targeting the development of the cluster. Accordingly, it shows the coherence and the appropriateness of policy interventions with respect both to firms' needs and to their real interactional environment.

Several are the units of analysis considered in the conceptual framework: the cluster and firms and organizations associated with it, the linkages within the cluster and the policies implemented in order to support the cluster.

***Figure 1* – Conceptual framework**



As the cluster-notion is multi-discursive, i.e. it means different things in different discourses – and even in the same discourse the term may has different connotations depending on the Author (Borrás and Tsagdis, 2008), it appears necessary to attempt some clarification of the notion of cluster herein adopted. In this work, a cluster is plainly defined as a geographical agglomeration of firms in a particular specialization. As pointed out in literature in different forms (for a review, Borrás and Tsagdis, 2008), a cluster also tends to have institutions – better, organizations, as discussed previously – associated with it. Thus, this work takes also them into account as supportive institutional actors for enhancing the performance of clustered firms.

Within an 'institutional pluralism' approach, two main categories of institutions are considered, governmental and non governmental. Among the first, the organizations considered are local and regional governmental institutions *tout court*, which usually embody the strategic vision of policies and initiatives and, in some cases, are in charge also of their implementation.

The category of non governmental actors includes:

- the scientific and research community, in the form of universities, research institutes, government research establishments and research-based companies (Mason, 2008), which as a whole represent the 'knowledge platform' of the cluster;
- intermediaries, a rather heterogeneous residual category. It takes in business associations, trade organizations and Chambers of commerce and all other business supporting organizations (Mason, 2008).

The figure includes also the item 'policies and other initiatives', referred to "any coordinated set of measures, in whatever constellation and style of implementation, that

affects the development of a regional industrial agglomeration towards ideal features of a cluster in terms of a specialized, competitive, collaborative and collectively innovative set of sector related industries, research/education and other organizations" (Fromhold-Eisebith and Eisebith, 2005: 1252). Policies can be targeted either to firms or to the networks between them, as a way to foster collective efficiency, externalities and territorial learning.

Supported by this framework, the research aspires to investigate the alignment and the impacts both at the firm level and at the network level of policies implemented by local and regional institutions in order to support the Infomobility niche of Torino Wireless cluster.

The policy dynamics is firstly investigated adopting a micro-level perspective, i.e. taking individual firms as focal points of analysis, in order to understand whether and how implemented policies satisfy their needs. It may be the case that policies are intended to support already strong firms, working in more traditional, long-established sectors, dominated by leading companies, with well-developed innovative capacities. Or, at the contrary, policies may be addressed only to start-ups and to new entrepreneurs in spearhead sectors. It is apparent that interventions as such may be misleading and turn the risk of missing some recipients. In line with this statement, the first hypothesis can be stated as follows

> **Hp:** policies designed and implemented by local and regional institutional and supportive organizations are biased towards strong, leading firms with well developed innovative capacities

Afterwards, the policy making process is analyzed from a network perspective, i.e. considering policy strategies and implementing measures adopted in order to foster inter-firm networking and intra-cluster knowledge sharing and cooperative efforts. Policies implemented by local and regional institutional and supportive organizations may foster long-established, strong interactions rather than influencing the building of new and adding value linkages among firms and other organizations. On the contrary, policies may be successful in connecting peripheral and low-critical mass firms and in linking weak and strong firms. Coherently, therefore, the second hypothesis can be stated as follows

> **Hp:** policies implemented by local and regional institutional and supportive organizations foster long-established, strong interactions

4. Research methodology

The research hypotheses previously stated are tested in a case study. More in detail, the research is designed as an embedded (Yin, 1994), as it involves more than one unit of analysis

(firms, cluster, networks, institutions), and as an explanatory case study, as it aims at studying the reflection of theories and hypotheses in the case.

The rationale for this choice is the representativeness of the case. First of all, the case is significant both because of the sector (ICT) and for the geographical area (Piedomont and its core, the metropolitan area of Turin) considered. As above mentioned, in the contemporary knowledge economy, ICT represents a relevant economic sector, able to lead the transformation of the regional economic base, traditionally associated with a manufacturing past (automotive-related essentially). As a consequence, Torino Wireless cluster not only has been recognized as a priority in the local agenda (the creation of the ICT cluster was one of the actions included in the first Strategic Plan of the city), but in the last years it has also received a strong financial support from public institutions.

The case is of interest also because the ICT cluster has been the outcome of a deliberate public policy and it is managed by an autonomous entity, Torino Wireless Foundation, in charge of aggregating a metropolitan coalition sustaining the ICTs in Piedmont and designing policies and interventions for the promotion and development of the cluster.

In addition, this case moves slightly away from the well-studied Italian district, defined as a set of vertically disintegrated networks of relatively small firms historically embedded in the local social system, typical in the Third Italy. Piedmont ICT cluster does not show a path dependency as other Italian districts do, as it has been the outcome of a deliberate public policy.

Besides, Turin ICT cluster has raised a lot of attention across scholars from other disciplines (Ramella and Trigilia, 2006), but no one has concentrated his/her attention yet on the appropriateness of policy making in fostering the development of the cluster, also in the light of the fact that the institutional frame in which Torino Wireless initiative fits in is particular rich.

As the population of ICT companies in Piedmont Region is quite large (according to official statistics, it counts in more than seven thousands local units), a sample selection inspired by a sectoral criterion is fundamental.

From the population of ICT firms, firstly those firms active in the Infomobility niche[3], developing products and services at the crossing point of traditional ICTs and ITS technologies (Intelligent Transportation System), have been identified. The focus on

[3] The birth of this sector goes back to the period in which ICTs have gradually started to support also specific application for transports thanks to the improvement of mobile communication technologies and to the integration of Global Positioning Systems (GPSs).
According to the European Union (2008a), the ITS is the set of procedures, systems and devices which allow, through the collection, elaboration and distribution of information, the improvement of the access and mobility of people and freight, and the control of performances and results.
For Torino Wireless Foundation, the Infomobility domain includes "those technologies, products and services enabling the transmission, the exchange and use of data and information among and in favour of users on the go" (Torino Wireless representative).

Infomobility is motivated by different reasons. First of all, firms operating in this sector are highly distinguishable, as their core business is clear cut and narrowly focused on traffic and travel related systems (including logistics, fleet management, localizations services, ...). Their activities are rather less spurious and more homogeneous than those of ICTs firms in general. In fact, Torino Wireless Foundation, when carried out a clustering process, has been able to identify the companies active in the Infomobility domain. Moreover, the sector seems not to be dominated by a single firm (as it would have been in the case of other ICTs niches, as automotive, aerospace and e-finance, for example). To conclude, the choice of focusing on Infomobility has been due to the size of the niche, manageable under time and resources constraints affecting the research.

The selection of the sample group from the Infomobility niche is inspired by a convenience criterion aiming at selecting Infomobility companies active participants of Torino Wireless cluster. The process of identification of the sample has been directly managed by Torino Wireless Foundation, which made available only a final list of those firms (35) which the Foundation classifies as Infomobility companies. From this final list, four firms have been involved in the research.

In order to investigate the impacts of policies both at the firm and the network level, seven semi-standardized interviews have been conducted with key representatives of the cluster, among firms and organizations. The semi-standardized interview has been chosen as a model to allow some freedom for the interviewees while getting precise answers on some questions. Interviews have been carried out in Italian face-to-face or by telephone in July 2009 and lasted between 30 minutes and one and a half hours. Interview outlines have been sent to interviewees in advance in order to allow them to understand the issues at stake in the interview. The information that were extracted from the interviews has been cross-checked with complementary sources (institutional documents, Internet websites, press releases, databases of organizations).

Representatives of firms active in the Infomobility niche, intermediaries and the scientific and research community have been interviewed. Among firms, two small, a medium and a large leading companies active in the Infomobility sector have been involved.

***Table 1* – List of firms intervieweed**

FIRM	YEAR OF ESTABLISHMENT	N. OF EMPLOYEES	TURNOVER	SECTOR OF ACTIVITIES
[F1]	1986	300	20,5 mln €	ITs for remote monitoring and Localization
[F2]	2006	7	3 mln €	ITs applied to transport and logistics
[F3]	2005	10	1,5 mln €	IT applied to transport and logistics
[F4]	'30s	77.825	30.158 mln €	Telco Recent conversion to IT (on a broad spectrum)

Policy makers have been represented by the Chairman of the Torino Wireless Foundation and a representative of the Turin Chamber of Commerce, as organizations which translate the regional strategy in policies and interventions, according to their responsibilities and functions. Finally, within the category of research institutes, operating as supportive organizations of the cluster, the Mario Boella Institute has been consulted.

***Table 2* – List of institutions interviewed**

CATEGORY	SUBJECT
Intermediaries ***(policy design and implementation)***	- TW Foundation **[TWF]** - Turin Chamber of Commerce **[CC]**
Scientific and research community ***(policy design and implementation)***	- Mario Boella Institute **[ISMB]**

As anticipated, secondary data have been collected through institutional documents (for Torino Wireless Foundation and the Chamber of Commerce), Internet websites (for firms, Torino Wireless Foundation and the Chamber of Commerce), press releases (Torino Wireless Foundation and the Chamber of Commerce), databases of organizations involved (Torino Wireless Foundation and Mario Boella Higher Institute) in order to complement the information collected through the interviews. The rationale for using multiple sources of evidence is the fact that they allow a triangulation process.

5. The research context: the ICT sector in Piedmont

A regional context featured by a growing importance of the tertiary sector and a rather high innovative profile, both in terms of competencies available and fields of innovation explored (OECD, 2009) represents the breeding ground for the growth of the ICT sector in Piedmont. The importance of ICTs in Piedmont is at least twofold. On the one hand, there are some objective historical and contextual reasons leading to the development of a wide range of activities related to IT, communication and electronics, and their combinations. Thanks to some favorable conditions in the structure and the characteristics of the regional economy, together with a qualified research community and the presence of prestigious educational institutions, the ICT sector in Piedmont is consistent and well embedded in the regional economy. This confirms that, as cluster promotion policies are unlikely to succeed in creating clusters *ab initio*, there are more chances to be more successful if they attempt to build on the potentials already present in a particular economy.

On the other hand, in the last 10-15 years, public institutions, at every governmental layer, realized the urgency of recovery the economical base of the area and to transform it in a truly knowledge-based economy. They realized the crucial role of ICTs, also as complementary and synergic to the automotive sector (a sort of natural cluster for the

metropolitan area of Turin), and, therefore, decided to massively invest in it. Consequently, the birth of an ICT cluster in Piedmont, the first Technology District experience in Italy, benefitted also from a favorable *momentum* marked by the convergence of different policies and by the willingness and the interest of some local and regional stakeholders to trigger a knowledge-based process of territorial development led by ICTs.

***Table 3* – Policies related to the ICT sector in Piedmont and in the Municipality of Turin**

Level	Initiative	Promoter	Type of initiative	
			Policy	Regulation (laws, decrees,...)
NATIONAL LEVEL	**Industria2015**	Ministry of University and Research + Ministry of Public Administration and Innovation + Ministry of economic development		✓
	Technological districts	Ministry of University and Research (National research program 2005-2007)	✓	✓
REGIONAL LEVEL	**Regional Operational Program 2007-2013**	Piedmont Region	✓	
	Regional law 30 January 2006, n. 4 – Regional System for research and innovation **Regional law 22 November 2004, n.34, Interventions for economic development**	Piedmont Region		✓
LOCAL LEVEL	**Think up**	Turin Chamber of Commerce + Piedmont Region	✓	
	Innovation for business program	CSP + Piedmont Region	✓	
	Global access program	Turin Chamber of Commerce	✓	
	Turin Strategic Plan	Municipality of Turin	✓	

Concretely, Torino Wireless has been set up in December 2002 with the creation of the governance body of the cluster, Torino Wireless Foundation, which started to operate in September 2003. In itself, the Foundation represents a temporary institution as the time horizon of its activity has been limited to 10 years.

The establishment of the Foundation proves the fact that the ICT theme in the metropolitan area of Turin succeeded in aggregating a coalition of relevant players, which became the funding members of the Foundation itself, including the national government, with the Ministry of University and Research (MiUR), local public bodies (the Piedmont Region, the Province of Turin, the Municipality of Turin), business associations (i.e. the Turin Chamber of Commerce and the Employers' Association of Turin), regional Universities and research centres, private companies (namely Alenia Aeronautica, Fiat Research Center, STMicroelectronics, Telecom Italia, Telespazio) and financial institutions (San Paolo IMI Bank and UniCredit Bank).

These actors do not only represent funding institutions (bringing about monetary contributions and offering infrastructures and competencies), but they are also organizations

concretely involved, to different extents and on different spheres, in the promotion and development of the cluster. In the words of a research institute's representative

> "*They are nodes in the networked organizational structure characterizing the district.*" [ISMB]

The remark shows that alongside with Torino Wireless Foundation, other actors are implicated in the governance system of the district, bringing about their specialized competencies, experiences and also, in some cases, material infrastructures. The rationale is to valorise territorial actors already rooted in the region, empowering each of them with a specific task and creating a cooperative institutional environment, in order not to transform the Foundation in an entity with all-embracing functions.

In the definition of its activities Torino Wireless Foundation adopts a threefold approach, based on technologies (such as base software, security, wireless, multimedia, microelectronics), sectors and applications (e.g. mobility, localization and related services, e-health, finance, agroindustry), processes.

Considering the processes carried out by Torino Wireless Foundation, it is possible to classify them in two main groups: the first includes tailor-made services for a specific company (in this sense, the Foundation provides consultancy services), the second relates to systemic activities involving both firms and other types organizations (as research centres, educational institutions, associational bodies, governmental layers). With its four main lines of intervention (namely, SME's acceleration, district venture capital activity, inter-firm networking and promotion of R&D activities also through large projects), the Foundation intends to influence the entire process of innovation, in some phases directly intervening, in others only coordinating the activities, in others unbundling processes and functions to organizations in charge of them [TWF].

The definition of the spatial footprint of Torino Wireless, as a cluster, is not straightforward: different criteria may be adopted in order to identify Piedmont ICT cluster, therefore, leading to different cluster maps. The spatial boundaries of the cluster can be defined administratively, meaning that the ICT cluster overlaps with the area of Piedmont. This criterion implies that all companies based in Piedmont and which, according to the ATECO code, operate in ICTs and related sectors are to be members of the cluster (roughly, 7.000 companies). This criterion may be satisfactory for pure statistical ambitions, but it is rather deceptive as it counts some activities in even though they cannot be considered as proper ICT activities (it is the case of cell phones or PCs shops, for example).

Therefore, a process for skimming statistical data is required in order to select only those companies carrying out truly innovative and technologically based activities. Under this criterion, real ICT companies are less than 2.000. Among this group, Torino Wireless Foundation is in touch with two thirds of them. Half of this subgroup of companies has been assessed with a rating model and about 500 benefit of continuative interventions by Torino

Wireless Foundation, as companies which have required and obtained the provision of specific services or as accelerated companies which have continuous and on going relations with the Foundation.

Therefore, in the widest sense, Piedmont ICT district is made up of about 7.000 companies, but for Torino Wireless Foundation they are just 500. It is worth underlining that these firms should not be considered as members of the cluster. In fact, there is not any formal membership policy for Torino Wireless. Rather, firms more willing to and interested in interacting with the Foundation are considered the very core of the cluster population.

6. Torino Wireless cluster: key findings

Embodying an institutional perspective, the study has intended to investigate how well policies and interventions implemented by local and regional organizations supporting Torino Wireless district are performing with respect both to the micro-level level (clustered firms) and to the network level, in terms of linkages and interactions intertwined among clustered firms and between firms and organizations.

The institutional approach embodied by the study intends to consider both firms' standpoint, as firms are the recipients of the policies, expressing a need, and the policy makers' standpoint, as policy promoters, whose role is to meet that need.

Accordingly, these two facets of the policy making have been maintained when analyzing the process. Moreover, in line with the conceptual framework previously discussed, policies affecting individual firms has been disentangled from policy measures adopted in order to foster inter-firm networking and intra-cluster knowledge sharing and cooperative efforts. Therefore, policies' impacts have been analyzed both at the micro-level and at the network-level.

6.1 Policies targeting firms

Firms active in Piedmont in the Infomobility field clearly perceive that the ICT sector, as a whole, is well supported by policy interventions. Also in comparison with other regional contexts, Piedmont with its institutional and supportive organizations is considered as a proactive region, strongly and coherently focused in the development of ICTs.

Interviews reveal also that firms active in the Infomobility field do not perceive themselves as different from other firms working in other ICTs niches. This is due to the fact that ICTs have a wide range of applications and as a sector is rather transversal, whose products and services may be easily adapted to different markets. This is clear for firms developing products and services for localization, or, even to a larger extent, for firms developing software and applications for mobile telecommunications, which may find

application both to the entertainment and to the Infomobility sectors. Therefore, firms perceive themselves firstly as ICT companies and only in a second step as Infomobility firms.

As maintained by firms, the very large offer of activities reflects the importance attributed by policy makers to the ICT sector in Piedmont, which is supported by useful and expected activities

> *"We work in the ICTs and we really appreciate that they give attention to ICTs … and the initiatives they are doing are those needed. Maybe firms in other fields think that they don't care of those sectors… but from our point of view, we're glad that they support us. "* [F3]

A second evidence emerging from firms interviewed is the fact that the importance attached to firms with respect to specific activities offered by the Foundation is affected by the size of the firms themselves. In particular for small companies, networking initiatives result to be vital in order to know other firms, business, commercial and technological partners, and seminars, training days, conventions and conferences, are occasions during which

> *"Small firms are informed and updated about new technologies and products, which may be interesting for their activities."* [F2]

Instead in the case of medium-size companies, the participation to R&D projects has become extremely important and effective thanks to the efforts of Torino Wireless Foundation in promoting calls for proposals, brokering competencies and experiences available in different firms and organizations (Universities and research centers) and aggregating them on specific projects. From the standpoint of a policy maker [ISMB], as ICT is an highly project-oriented sector, firms and regional institutions have to be supported in building project teams and coalitions.

For large companies, in general, as expressed by an interviewee, Torino Wireless has a clear strategic role, as a promoter of territorial initiatives in order to facilitate the matching of demand and offer in the ICT sector coherently with strategic objectives of the regional government.

Not only the perception of the importance of cluster activities, but also the real level of involvement in them may be affected by firms' characteristics and commitment. For the firms, the point may be, rather than the inconsistency of proposed initiatives, the lack of resources to be devoted to such activities, also in terms of opportunity costs of investing in them. In fact, even though all firms interviewed have demonstrated to be interested and also directly involved in a wide range of Torino Wireless activities throughout the last 5-6 years, some of them denounce that they have been found themselves compelled to accurately select and, in some cases also giving up, some activities.

Despite the fact that they sound to be rather satisfied about the initiatives proposed, to a closer look, firms denounce also some weaknesses. Activities implemented are recognized to be greatly focused on peculiar issues and addressed to specific niches. Concerning activities, criticisms are referred to the logics under the distribution of resources, and venture capital in particular. Some firms see a lack of selectivity in the distribution of financial resources (not really concentrated on firms working on specific themes, but rather scattered among firms and sectors) and a modest accountability of Torino Wireless with respect to the economic impact of financing resources on the territory [F1]. On different side, if generally, for R&D projects firms have already achieved concrete and positive results, with respect to the project for business internationalization, firms are quite suspicious: as the process is still in progress and it is rather long, they are not that confident to be able to keep on working on it [F1 and F2].

Looking at the niches to which interventions are addressed, firms perceive that policy interventions are biased at least by three flaws: Torino Wireless core competencies, political timing and contextual factors.

According to respondents, those niches which have traditionally represented core competencies of Torino Wireless Foundation and of other regional supportive organizations are really well garrisoned, while others lack of specialized interventions mainly because policy makers' expertise is less consolidated. As a consequence, using the words of a firm's representative

> *"Firms working on themes which are not in Torino Wireless Foundation's DNA are marginalized in the activities offered."* [F1]

Nonetheless, the role of Torino Wireless in monitoring, with its competencies and services, specific niches rather than others should not be overestimated. In fact, as a firm's representative analyses

> *"Policy making reflects priorities of politics. The point is that politics has long reaction times in translating emerging issues into real policies, and, therefore, there are some discrepancies between the realm of reality and the realm of political intentions."* [F4]

Under this light, ICT themes benefitting of policy interventions are those considered as main concerns among governmental institutions. The role of Torino Wireless, when deploying its competencies and designing its activities, only reflects a political prioritization. To exemplify, the e-health niche may be mentioned has a sector whose supportive activities have been strongly affected by political and institutional slowness. Nevertheless, many regional actors, such as the Boella Institute, the CSI and Torino Wireless itself, together with regional specialized bodies (as the Regional Agency of Health) have been started outlining their activities related to e-health (in fact, the number of activities in favor of the health sector is ample), even though firms representatives do not have the perception of the efforts put in

this domain [F1]. A possible reason for this distorted perception may be the fact that usually health projects involve a few large companies and several public research institutions. Therefore, for SMEs there is little room to manoeuvre to intervene.

On the contrary, ITs applied to tourism facilities and services have found a strong support among the regional government and the regional research system after the Olympics in 2006, when Turin and the neighboring territories have been re-discovered as tourism destinations [F4]. This perception is confirmed by the figures about the activities realized for the development of ITS and multimedia applications, which are at the base of tourism infotainment services.

A further theme so far amply ignored by policy interventions is the application of ITs for environmental monitoring [F4].

Besides this, also contextual factors as the industrial specialization, the presence of key players and the rise of a technological environment highly qualified may influence the policy making. This aspect is really central for the Infomobility sector. As stated by interviewees, research centers and regional institutions are demonstrating a great attention to localization, ITS and Infomobility fields in the area of Turin [F2]. The reason of this interest is twofold. On the one hand, the theme is on the public agenda because of the urgency of providing solutions to the mobility problem and all its consequences (congestion, pollution, inefficiencies in the transport systems,…). On the other,

> *"The theme is rather crucial for a territory in which the Italian leader company in the automotive sector, namely Fiat, and the Italian leader company in telecommunications, namely Telecom Italia, are co-located. And it is not by chance that a company of Fiat group, namely Magneti Marelli, and Telecom Italia, in 2007, established an equally co-financed new company, namely TeMa.Mobility, for the creation of innovative infomobility solutions."* [F4]

At a first level, the creation of this new company shows the interest of two leading companies in the theme: this may generate positive spillover in the regional economic and scientific milieu, contributing in the creation of further specialized competencies related to ITS in the area. But, at a second level, Fiat and Telecom Italia, individually, work as multipliers of the needs and demands of local related companies, also directly lobbying public institutions and influencing business associations for interventions on this issue. Consequently, it becomes clear that firms working in the Infomobility sector benefit of high support, not only explicitly and directly through policies, but also tacitly, as they have important channels to influence the strategic choices of policy making. Evidently, also for these reasons firms interviewed state absolutely positive opinions with respect to their experiences with Torino Wireless Foundation [F2, F3 and F4].

To conclude, for companies considered, policies are well aligned to their needs and expectations. But this conclusion may not be straightforwardly generalized to other groups of firms working in different niches. The point, in fact, is that it is objectively perceived that some ICT sub-sectors are more supported than others, as the level of political and public commitment to underpin them is different. But in the case of the Infomobility sector, the presence of an environment made up of leading companies in the automotive and in the communication industries, well supported also by the scientific community of the region, has revealed to be even more important as it has been able to influence political choices.

Having taken into consideration firms' viewpoint, it is possible to turn to the point of view of policy makers.

In mapping the offer of activities proposed to firms, it comes out that some are common to many sectors, as they reveal the same needs. The answer to these gaps takes usually the form of training courses and the communicative capabilities of the management. For example, to respect to the latter aspect, a policy maker noticed that

> *"These activities, however, are common to all the sectors, as generally speaking firms based in Piedmont shows the same gaps. They are very focused on the product, but they never communicate it… Here, the problem is not to make a very technologically advanced product, but to communicate that they are making a very technologically advanced product, as nobody knows it… it is a distinguishable attribute of the territory, it is a close character."* [CC]

***Table 4* – Interventions provided by Torino Wireless Foundation in the period 2003-2009**

ACTIVITY	N. OF SERVICES PROVIDED
Testing	**3**
Feasibility studies	**5**
Business plan	**7**
Large R&D projects and calls for proposals	**13**
Coaching	**15**
Technical evaluation	**22**
Support in project design and management	**32**
R&D Projects	**79**
Intellectual property	**85**
Training	**103**
Consultancy	**147**
Industry analysis	**159**
Networking	**254**

Source: Torino Wireless Foundation

Alongside these activities addressing a broad spectrum of economic sectors, there are some policies obviously designed and implemented exclusively for ICTs, such as district venture capital activities, R&D projects and the creation of the Pole of Innovation[4]. A problem related to the policy making supporting the ICT sector is the nature of the sector itself, rather heterogeneous, highly diversified and cross-sectoral *("The misfortune of this sector is that it is a sort of non-sector… So, it is necessary to consider the final market of destination of products and services, otherwise it is not possible to deal with it",* in the words of a policy maker). The heterogeneity in the specialization of firms complicates the policy making process, both in the design phase and in the implementation phase.

The policy design is actually placed in between two unworkable extremes, one-fit-all initiatives, lacking of prioritization and a specialist focus, and tailor-made services, which can't be provided because of lack of human and financial resources. Policies affecting Torino Wireless are therefore devised with a distinctive approach, including both systemic and individual interventions. The rationale is that some systemic actions will affect the ecosystem in which firms operate; individual and customized services will directly benefit the single firm, but may generate also positive spillovers to other firms in the area.

The implementation phase is usually concentrated on some specific niches, to which policies are deliberatively, even not declaredly, addressed:

> *"For political reasons, we have to help as many firms as we can, but in practice we never do that."* [CC]

In the case of the ICT cluster based in Piedmont, specialized policies have been designed and implemented by regional and local organizations in order to sustain and promote peculiar sub-niches and firms working within them. In the case of Torino Wireless, security, multimedia, Intelligent Transport Systems (ITS) and localization, are sub-niches benefitting from many initiatives. To a less extent, also finance, industrial automation, ERP (Enterprise Resource Planning) applications and e-health are also backed by policies.

The selection of the target domains is determined by market trends and prospects, as some sectors nowadays can offer products and services with a clear and direct impact on the market. Therefore, there is an obvious interest in investing on them as they generate direct and additional economic returns for individual firms, for the industry and for the territory as a whole, in terms of profitability, employment, tax revenues and national and international visibility. At the niche level, therefore, policies are informed by a convenience criterion and as a result, implicitly, policies become highly selective and naturally discriminatory.

[4] Regional innovation poles are a rather brand new initiative of the regional government. They are entities grouping, with a *filière* approach, SMEs, big companies, research organizations, start-ups which cooperate on specific common projects co-financed by Region itself with ERDF's resources.

***Table 5* – Activities and services provided for each ICTs niche**

ICT NICHES	TT PROJECTS (2003-2008) ∞	THINK UP PROJECT°		PROJECTS CO-FOUNDED BY ERDF (2000-2006) *^	TWF CALLS FOR PROPOSALS (2005) *	MIUR CALLS FOR PROPOSALS (2004) *	GAP (2004 - 2008) *	ICT POLE OF INNOVATION (2009) *	ISMB PROJECTS –	TOTAL
		2007-2008	2008-2009							
BI			3							3
Consulting			3							3
Document and work flow management		1	3				1			5
Educational learning system			1					1		2
E-gov			2							2
E-Health	5	6	6	1			1	2	3 (PR) 2 (NR) 2 (EU)	28
Environment			4				1	2		9
ERP		12	8				3			23
Finance		8	9					3		23
Home and building automation		1	1				2			4
HRM			3							3
HW-SW		6	3			1	4	4		22
ICTs for Manufacturing							12			12
Industrial automation		12	7				4			23
IT networks			8			1	1		4 (PR) 1 (NR) 1 (EU)	16
Localization				1	2				3 (PR) 5 (NR) 6 (EU)	17
ITS		14	8	1		1	1	1	2 (NR) 5 (EU)	33
Logistics			2							2
Mechatronics	2									2
Multimedia	11	16	7		1		3	2	4 (NR) 3 (PR)	47
Others	10									10
Remote management & control	7						2			9
RFID	2							2	1 (NR) 2 (PR)	7
Security	2	14	14		2		1		4 (PR)	37
Sensors	4						1		6 (PR) 1 (NR) 2 (EU)	14
Tax management			2							2
Telco		4	7					1		12
Territory			1							1
Training			1							1
Total	**45**	**68 (PR) 40 (PU)**	**65 (PR) 38 (PA)**	**3**	**5**	**3**	**12**	**18**	**57**	**374**

Sources:

- *∞ Torino Wireless Foundation, Internal report (2009)*
- *Torino Wireless Website, consulted on 24th July 2009*

- ^*Torino Wireless Foundation, Social report (2007)*
- ° *Turin Chamber of Commerce, Internal reports (2008-2009)* [PR = private company; PA = public administrations]
- ¯ *Mario Boella Higher Institute, Internal Report (2008)* [PR = contract with a private company; NR = national o regional co-financings; EU = European funds]

A policy maker adds that at the firm level, similarly, interventions are actually inspired by a sort of meritocratic approach, as realized for outstanding firms showing a clear proactive attitude towards innovation, good financial results, highly qualified internal competencies and open-minded management.

In directly supporting already strong, leading firms with well developed capacities, other firms apparently excluded by policy initiatives may be indirectly affect as well. In fact, when a strong firm succeeds on the market, it triggers some effects on the territory. The expectations underlying the choice of focusing on top leading firms is that, thus, their positive results may influence the sector, also affecting performance and opportunities for smaller and frailer firms which could never succeed alone[5]. From a different perspective, therefore, also interventions implemented on individual basis may generate some systemic impacts.

To conclude, according to policy makers the set of interventions realized in Torino Wireless district aims at creating opportunities indiscriminately for each company to make the system evolve in a process of development (in a motto, 'to make things happen' [TWF]). In reality, this approach reveals to be highly selective as not each company is able to catch all opportunities provided, therefore lagging behind. As a consequence, policies designed with a universalistic approach, in the end become highly discriminatory with respect to firms' characteristics and domains of activity, when implemented.

6.2 Policies targeting networks

Many efforts have been made by policy makers in order to strengthen inter-firm relations in Torino Wireless cluster, also in light of the features characterizing the sector, made up of SMEs which can provide just a single component of the offer (the software, the IT infrastructure, some components of the hardware,…) while the market asks integrated packages, completely assembled and ready to be used.

In order to accommodate this trend, there is a need of creating opportunities for firms to better network and combine their expertise. Accordingly, firms have been offered initiatives (such as the Pole of Innovation and, for some aspects, the project Think up, along with other pure networking occasions) whose rationale is the enhancement of cooperative relations and the development of business and technological networks among them.

[5] This is the case for internationalization programs, or for the participation in important international events, fairs and business meetings. A rather limited number of firms has benefitted of these interventions, but some positive spillovers have affected the ICT system as a whole.

Not only the Pole of innovation [F4], but also research projects, implicitly, may work as effective inter-firms networking devices [F1, F2 and F4]. As ICT is a highly project-oriented sector, firms are inclined to aggregate temporary and with flexible geometries their competencies, according to opportunities [ISMB]. It is worth mentioning that alongside Torino Wireless activities, also the Employers' Association of Turin and the Chamber of Commerce are used to organize meetings for ICT firms which represent events to introduce oneself and know each other [F1, F2, F3 and F4]. Large companies have a further channel to foster their linkages with other clustered firms, represented by their corporate research labs.

The role of Torino Wireless policy with respect to the creation and development of linkages with local and regional organizations is rather controversy. Concerning the networks between firms and the knowledge platform of the region, it is apparent that in some cases, the Foundation plays as a sort of mediator unquestionably in the first stage of the relations between firms and the cluster knowledge centers (Politecnico of Turin and Boella Institute, above all) [F1, F2, TWF, ISMB].

With its brokerage activities, in fact, the Foundation matches complementary expertise and capabilities when firms and R&D centers do not know each other. Once firms get used to share information and knowledge, and organizations, on their side, start to know firms and their activities, the role of the Foundation becomes less necessary [F1 and F2].

In other cases, firms do not show any links with the knowledge platform of the cluster. Two may be the reasons for this situation: the size and the age of the firms. Even though there may be the need of strengthening relations with Universities and research centers which have additional and complementary competencies, small and young firms suffer from lack of human resources devoted to this networking activity [F3]. On the opposite side, large companies are used to develop autonomously direct and strong interactions with Universities and research institutions through their internal R&D departments. Corporate research becomes a crucial channel for exchanging and intercepting knowledge with the local scientific community, as perceived both by firms [F4] and by policy makers [ISMB].

To conclude, policies aiming at increasing networking opportunities and at enhancing the cooperative attitudes of Torino Wireless firms result to be rather differentiated. Policies addressing inter-firm linkages are inspired either by niche logics (when networks are developed around a single domain) or by a *filière* approach (when networks are developed around a product or a service) or by integrating them (this is the case for rather complex research projects). In particular, R&D projects work rather effectively in aggregating firms in a flexible way and on a temporary basis, but the ties developed with project partners may be seen as a by-product of the project itself.

Interactions between firms and the scientific community follow different paths, in which the Foundation may exert a pivotal role as mediator. In other cases, the Foundation does not shape directly inter-cluster relations, rather it works as a promoter of a process of

cultural growth for increasing the habit, the attitude and the familiarity with practices of inter-institutional cooperation. Therefore, firms which have already established autonomously linkages with R&D institutions may succeed in perpetuating and thickening them as they find a breeding ground for open and trustworthy interactions.

Nevertheless, to a closer look, networking strategies in some cases seems to be rather ineffective, as firms keep on being disconnected from the cluster knowledge platform. But in this case, a mismatch may occur between the efforts required to companies for fostering their relations with cluster supportive organizations and efforts that companies, mainly when young and small, can actually make.

To conclude, therefore, it is clear that both at the micro and at the network level, the phase of policy design follows logics different than the phase of implementation. In fact, at the micro-level, policies are designed to clearly target the entire population of ICTs firms based in Piedmont. But, when policies are realized, they target only specific niches, which perform better than others and with outstanding market prospects. Therefore, policy making is surely biased towards a few domains which receive higher support than others.

The network prospective, in the same way, shows that policies aiming at strengthening inter-cluster linkages and promoting the culture of cooperation among cluster's actors are used to be addressed to the entire population of firms. In this case, policies are neither conceived nor realized for targeting particular already existing linkages. Rather, policy makers are investing in thickening and extending inter-cluster ties, as connections between business community, academia and governmental bodies may generate interactive learning and innovative processes affecting the cluster ecosystem, fostering technological cross-fertilization and mutual business exchanges. But in the implementation phase, the policy frame turns to be less important than the capability and the attitude expressed by firms in investing in interactions with other firms and with other territorial supportive organizations. In fact, some firms show to be rather proactive and organizationally equipped to develop relations with other companies and cluster's organizations. Others, instead, do not show either the interest or the capacity (mainly because of their size) to take part concretely in networking initiatives and to foster their network of ties with other cluster's actors.

7. Concluding remarks

Torino Wireless represents an original experiment in the Italian districts' landscape at least for two reasons.

First, it may be considered as an 'artificial cluster', rather different from traditional manufacturing districts characterizing the Italian economic geography, as it has been created by political will when it has been recognized that ICTs represent the second most important

sector of Piedmont's economy [TWF, CC, F4], rooted in a favorable local environment (in terms of education and research systems).

Second, the governance system of the cluster itself is another element of interest. The cluster is managed by a Foundation which works as a pivot among coalitions of metropolitan actors defined with variable geometries around different policies. From this point of view, alongside the results so far reached, the main strength of the initiative is determined by the fact of having started a cultural process among institutions, in the sense of organizations players of the game, active in the cluster for the promotion of an environment open to collaborative and fertile interactions.

In this institutional frame, the adoption of organizations as key elements of the study has revealed to be rather helpful, as it is clear that institutions and their policies strongly affect cluster development and shape intra-cluster dynamics. Accordingly, the research has intended to investigate the impact of policies and interventions implemented by local and regional organizations both at the micro-level, represented by individual clustered firms, and at the network level, represented by linkages and interactions intertwined among clustered firms and between firms and organizations.

To this aim, the policy making process has been analyzed taking simultaneously into account both policy makers, the promoters of interventions, and firms, the beneficiaries of designed interventions. Methodologically, this analysis has been carried out through direct semi-standardized interviews, also integrated by secondary data and information.

With respect to the research objective, at the micro-level, it has emerged that policy making follows a clear selective logic: even though the policy design is featured by a rather "universalistic approach", as it is intended to equally offer opportunities to each clustered firms, in the phase of policy implementation, interventions become highly selective as they are addressed to particular domains with promising market prospects and to excellent firms. The policy frame adopted in the case of Torino Wireless solves the fundamental tension between the public policy's desire to include as many firms as possible and the notion that policy interventions can be more cost effective if they are targeted in some way (Martin and Sunley, 2003), adopting this latter alternative.

At the network level, policy making is much less elitist in its approach. Policies implemented by local and regional institutional and supportive organizations foster indiscriminately the development of interactions among clustered firms and between firms and cluster supportive organizations. Rather, what affects the density and the layout of interactions is the capability and the attitude expressed by firms in investing in interactions with other firms and with other territorial supportive organizations. Within this frame, it may be possible to answer to the question arisen by Martin and Sunley (2003): "is it really wise to exclude certain firms from institutional dialogues, particularly when the future course of local industrial and technological change is so hard to predict and previously marginal firms can

become key nodes in the local economy?" In the case of Torino Wireless, policy makers are selecting with a rather rational criterion those firms to be supported and, what is also interesting, are not excluding any firms in cluster's networks, aware of the fact that linkages in wider and more diverse networks may well be weaker, but they may provide greater long-run local adaptability (Grabher, 1993).

Thus, referring to Menzel and Fornahl (2009), the different impacts of the policy making both at the firm and at the network level may be explained by the variety of organizational forms (in terms of size, essentially), the diversity, measured by the different knowledge and innovativeness existing among companies, and the heterogeneity, described by the technological distances of clustered firms. This variety implies wide thematic boundaries within which the cluster operates, and, without exceeding, this avoids the risk of lock-in. Moreover, if may facilitate adjustments, whenever they become necessary, because of an intrinsic flexibility of the cluster itself.

The study has, then, clearly shown that cluster policies do have different impacts, intended and unintended, simultaneously, on different cluster dimensions (individual firms and intra-cluster networks, considered in this work, but also in specific niches and in the sector as a whole). Policy makers not only should become aware of this, but they should recognize also the factors influencing the impacts of their interventions, when possible, to tackle them and to better fine tune their interventions.

This study confirms that cluster promotion substantially varies across sectors, necessarily taking account of path-dependent (in Torino Wireless, characterized by the presence of leading automotive and telecommunications companies which foster the development of specific technologies and applications) and industry-specific conditions (featured by hi-tech SMEs and a few top companies: *"We lack of the usual Google"* [ISMB]). It is also verified that cluster's activities are modified according to cluster life cycle phases: in Torino Wireless some areas of intervention have been abandoned, while others have been started (e.g. first level venture capital interventions, financing seed investments, has been reduced in favor of seminal funds for angel investments; Intellectual Property Management has been spun off to a regional body).

In addition, policy makers, if aware of the characteristics of the clustered firms, in terms of their variety, diversity and heterogeneity (Menzel and Fornahl, 2009), may be able of anticipating, supporting and re-addressing the evolution and the development of the cluster itself.

Alongside these empirical findings, the research may offer a theoretical advancement in cluster policy theory. In embodying an institutional approach together with the micro-oriented and the network-level perspectives, an illustrative integrated and multi-dimensional approach for studying cluster dynamics and assessing cluster policies has been experimented.

It is apparent that, as designed, the study suffers from some limitations. The first is related to the sampling technique adopted which implies that the results of the study may not be directly generalized to other ICTs domains. Among policy makers, in Piedmont, the Infomobility niche shows an high potential of development and benefits from a supportive environment and from a virtuous configuration of converging interests, expressed both by leading companies active in the automotive and in the telecommunications sectors and by the scientific and research community which is well aligned to these interests in terms of competencies and technological domains. For these reasons, Infomobility is one of the ICTs niches which has received so far priority and consideration of policy making.

A further limitation is methodological. The study has intended to shed some light on the intra-cluster dynamics making use of qualitative analysis, very helpful in providing insights into the motivation of people in various key positions and into the nature of the linkages among firms and between firms and institutions. But the drawbacks of a qualitative technique concern the fact that they may offer only a partial representation of reality. In fact, with qualitative information it is not possible to map and describe the subjects' positions in the networks. For this reason, qualitative methods should be integrated by other quantitative methods, as Social Network Analysis (SNA). Using a variety of methods is more likely to result in a better understanding of the geography of clusters and in designing specific measures to mobilize and improve inter-organizational links and knowledge flows among the regional actors (Brand *et al.* 2009). Moreover, the use of quantitative methods for analyzing data would allow also to include time as a conceptual dimension, showing possible changes in the structural positions of cluster firms and organizations in networks in separate time frames.

Alongside this possible methodological integration, this study contributes to open new lines of research. A theme of interest in the future, in fact, may be the relation of ICTs with other sectors of the regional economy towards "platform" based cluster policies. On a different front, it may be worth studying the links between the industrial tradition of the Region and the development of ICTs. Exemplarily, the relations between Infomobility firms in Piedmont and FIAT group's companies should be investigated. The agglomeration mechanisms under the process of co-location of these companies and the automotive sector, their geographies of innovation, their relationships both in the innovation processes and in daily activities may be issues of interest.

Cluster policies are topics suitable for comparative studies. Then, there may be a need of studying the process of policy making in a comparative fashion, investigating sectors other than ICTs (for example, the aerospace) and other regional contexts different than Piedmont. In the Italian context, regional comparisons may consider. for example, Tuscany, in which both Pisa and Florence have a good tradition in the ICT sector, Marche, as indicated by Ramella and Trigilia (2006), and Sicily, with the so called Etna Valley.

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