

The place-based nature of technological innovation: the case of Sophia Antipolis

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Published online: 23 December 2011
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Abstract The article looks at the case of the French technopole known as “Sophia Antipolis”. After a brief description of the history and main dimensions of Sophia Antipolis, we look at the everyday life of social relations in the technopole. We argue that the everyday life of social relations in Sophia Antipolis, such as community life and living choices of the workers, are poorly developed and this may affect negatively the economic life of the technopole. Finally, in the conclusion, we compare Silicon Valley’s model with Sophia Antipolis and we highlight similarities and differences.

Keywords Scientific parks · Technological innovation · Social capital · Community and economy

JEL Classification I2 · I3 · O31 · O32 · R1 · R5

1 Introduction

Social networks play a major role in the spread of knowledge, a key element of technological innovation (Powell and Groadal 2005; Lester and Piore 2004). Local development research showed that social networks depend on the spatial proximity among firms, institutions and people (Trigilia 2005). Since the Marshall’s founding work (1890), spatial proximity has been defined twofold: (1) as agglomeration economies among firms and (2) as interdependence between a community of individuals and a community of firms. First of all, in the classical model of industrial districts the spatial concentration of firms is decisive both for the genesis and the diffusion of knowledge. Marshall talked of an “industrial atmosphere” as a function of territorial agglomeration, which generates positive external economies as well as specialized know-how. In industrial districts research (Marshall

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1890; Becattini 1989; Capecchi 1990; Krugman 1991; Porter 1990), the competitive advantages of local social-economic systems have mainly been interpreted as a function of spatial proximity of economic agents. It is first and foremost the *territorial embeddedness* of firms which create particular forms of external economies, competitive advantage and endogenous dynamics (Hamdouch 2009).

Secondly, spatial proximity refers not only to economic agglomeration among firms, but also as interaction between “a community of people” and a “community of firms” (Becattini 1989). Hence industrial districts were considered “living places”: not simple productive environments with horizontally integrated small and medium size firms, but also as distinct *milieux* where a specific community of people *live* and establish the greater part of *daily* social relationships (Sforzi 2005, 8). Therefore industrial districts were framed as “complete” (although local) societies, with interdependence between economic structure, political institutions and civil society (Bagnasco 1999). In any particular territory we could recognize both living places and productive places, as the result of how families, firms and institutions coordinated themselves and were organized over time.

The relevance of spatial proximity has drastically changed with the crisis of the industrial districts and the emergence of new forms of local systems (Crouch et al. 2001). As shown by Bellanca and Lombardi (2011), the post-districts debate has widened the interpretative framework adding to the analysis of spatial proximity also *cognitive* proximity, whether or not firms shared the same knowledge base; *organizational* proximity if they shared common hierarchical control; *social* proximity, if they share interpersonal ties; *institutional* proximity if they worked within the same institutional boundaries (Boschma 2005). A shared feature of these four types is that the agents’ interaction (either individual or collective) can occur *independently* of their spatial closeness (Amin and Cohendet 2003).

The reduced importance of spatial proximity can—given the previous twofold definition given in industrial districts literature—be understood in two distinct ways. Firstly, it can be interpreted as physical closeness between firms is substituted with a *global* supply chain, i.e. an integrated management system of physical and informational flows of a group of firms which participate in a value chain. In this case, other forms of proximity (cognitive, organizational, social and institutional) can support local development differently to industrial districts and can generate innovation which transcends geographical boundaries. Secondly, less spatial proximity implies the weakening of relations between “community of people” and “community of firms”: e.g. between everyday life and technological innovation as well as between expressive and instrumental ties. The key idea of this paper is that innovation needs to be based upon “conversations”, as outlined by Lester and Piore (2004). Such “conversations” need an informal component as well as face-to-face interactions in specific “living places”. As for many industrial business owners: “it is the *very urbanity* of their location that makes business possible and successful” (Curran 2010, 871, emphasis added).

To illustrate this argument the article analyzes the case of the French technopole of Sophia Antipolis. The analysis is based on secondary data, archive documents, analysis of internet sites, repeated periods of participant observations in the field, and twenty interviews of young workers from Sophia Antipolis. The article is organized as follows: after a succinct analysis of the various definitions of a local system, the first part of the article describes the history and main dimensions of Sophia Antipolis. In the second part, we look at the everyday life of social relations in Sophia Antipolis, such as community life and living choices of the workers. These dimensions may be classified as “software” factors

among success factors in research parks¹ (Kang 2004). Finally, in the conclusion, we compare Silicon Valley's model with Sophia Antipolis and we highlight similarities and differences.

2 Local development and technology: key definitions and common elements

There is no just one specific concept to univocally define the different forms of local development and technology. Markusen's (1996) definition provide a useful starting point to distinguish between different types of local systems:

- *Classic industrial districts.* These are Marshallian type of industrial districts, made up of small, horizontally integrated firms. Investment decisions are taken at a local level, the labor market is flexible, there is high inter-firms career mobility, a high level of immigration, a large amount of cooperation between competing firms and large proportions of workers involved in research and development activity. Social and cultural proximity is very important for sharing knowledge and most districts are rooted in their local historical and cultural heritage. Local government supplies collective assets for local firms.
- *Hub-and-spokes:* these are dominated by one (or more) large firms vertically integrated and surrounded by sub-contractors. Long term contracts are stipulated by the dominant large company and its suppliers; there is a less flexible internal labor market and an high degree of labor mobility. There is a low level of cooperation between competing firms, associations are not very much diffused and public actors are keys in creating infrastructures. The dominant firm guides innovation and its influence can lead to "organizational inertia", which can cause adaptation problems during periods of economic crisis.
- *Satellite platforms:* A situation dominated by large foreign companies, with minimum exchange between contractors and suppliers. Key decisions are taken outside the area, there is no long term commitment to local suppliers, high degree of cooperation with outside companies (the "mother" company) and a low level of cooperation between competing firms. There is a high level of labour mobility and a low level of associational life, strong local government intervention which plays a fundamental role in the creation of collective infrastructures.
- *State-anchored:* This is dominated by government institutions, with relevant levels of state capital, large public Universities, low turnover and important relationships between institutions and firms. Key investment decisions are taken at various government levels, there is a low degree of cooperation, associations are weak and the public sector has a strong impact in creating infrastructures. Local public institutions thus guide growth and innovation.

Technology takes on further importance in Lazaric et al. (2004), who add two additional categories linked to globalization and the growth of the knowledge economy: *technological districts* and *technopoles*.

¹ The effect of technology transfer initiatives for attracting and retaining human resources has been defined as "the most elusive metrics" to evaluate the success of these initiatives (Jackson and Audretsch 2004). On the general lack of clear metrics for measuring the impacts and successes of Parks, see Link and Scott (2007).

- *Technological districts*, these share many characteristics of *industrial districts*, with large and small local innovative firms, which are horizontally integrated. Key investment decisions are taken locally, the internal labour market is very flexible, there are strong links with external markets, a high degree of labour mobility and a high level of cooperation between competing firms. Technological districts are characterized by continual innovation, strong association between firms and a very active local government. Silicon Valley can be considered the typical example of this type of local system.
- *Technopoles-Scientific Parks*, these are situations dominated by small *high-tech* firms and large *technology leading* companies, as well as by public and private research institutes and Universities. They have an internal labour market with workers employed in the *technopole* rather than in individual firms, high degree of labour mobility, high cooperation between competitors, strong external links with firms and research institutes, a highly qualified work force, mostly employed in R&D, strong ties between firms and a high degree of public involvement in supplying infrastructures.²

“Clusters” is another concept used to describe local systems. This, according to Porter, means: “geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition” (Porter 1998, 78). Clusters developed thanks to agglomeration economies and positive feed-back processes: firms had incentives to locate in a particular area, which in turn reinforced local advantages and sector homogeneity.

These various definitions share three common elements with regard to local development and high technology: technological infrastructure, high-tech industrial sectors and local collective competition goods. Technological infrastructure included various types of nodes which aim to transfer know-how, spread information’s and link public and private research centres to business environment and thus creating a culture of innovation, occasions to exchange knowledge and external economies useful for innovation (Rolfo 2006). High-tech industrial sectors is a result of relations between local development and technology. In this respect, Lazzeroni (2004, 8) proposed a four-way division of high-tech local systems: (a) high-tech manufacturers with high degrees of technological content; (b) high-tech manufacturers with a medium level of technological content; (c) high-tech service industry with high degrees of technological content; (d) high-tech service industry with medium degrees of technological content. Finally, all the definitions underline the importance of local collective competition goods which characterize local contexts (Crouch et al. 2001). Local systems meet the needs of firms by offering them links with scientific and University institutes, the availability of local partners who supply goods and services for enterprises, specialized finance, a good social environment and the creation of a professional community.

3 Genesis of Sophia Antipolis: institutional entrepreneur and field evolution

Silicon Valley is a key reference model for the relationship between territory, innovation and development (Saxenian 1996; Granovetter 2000). The features of this local system fully correspond to the definition of a technological district provided by Lazaric et al.

² Link and Link (2003) conclude that US science parks can be divided into three categories: (1) real estate parks, with no university affiliation; (2) university research parks with tenant criteria; (3) university research parks with no tenant criteria.

(2004). Even if the conditions of its development are closely linked to the historical context, its success has made it the model to imitate throughout the world. In this respect, an emblematic case is the French Technopole of Sophia Antipolis.

The initial events in the founding of Sophia Antipolis go back to 1969. The project's aim is illustrated in the name itself: Sophia is the name of wisdom in Greek,³ while Antipolis is the ancient name of Antibes. The chosen area was in the environs of Antibes, close to Valbonne: this is a wooded area, which had been saved from the urbanization of the Cotes d'Azzure. Sophia Antipolis was planned as a place which brought together economy, environment, research, science and art. The aim was essentially to give rise to a green area, in which "knowledge workers" of various cultures and profiles could meet and exchange their knowledge (Rasse 2003).

The first impulse for the creation of the technopole did not start from the public sector, but was rather a private initiative of Pierre Laffitte,⁴ a key figure for Sophia Antipolis. Indeed, not only did he conceived the project but he was able to involve other key actors in its making. It is well known that social structure can create benefits and strategic advantages which derive from bridging separate networks. Indeed, as Burt (1992) showed, "structural holes" positions in networks generate benefits and opportunities due to their structural characteristics: whoever belongs at the same time to separate networks gains an advantage, being a bridge over which information and resources flow, generating thus influence and arbitrating opportunities (Granovetter 2002). Pierre Laffitte's position gave him the opportunity to connect otherwise separated networks, allowing him to play the role of institutional entrepreneur. Even given his undoubtedly charisma, it was his being part of both the network of engineers of the "Ecole des Mines" and the network of the French political class which gave him his tremendous influence. These initially separated networks, were linked thanks to Pierre Laffitte's strategic position. In this way, his influence in the project was decisive not only for planning of Sophia but also for the second phase of implementation.

The first document which talks about the development of the Valbonne area was an article by Pierre Laffitte published on the 20th August 1960 in the daily newspaper "Le Monde". The article clearly shows his vision: the initiative was inspired by the Latin Quarter in Paris, which had always been a meeting point where encounters and discussions occurred in a privileged environment for innovative ideas. Laffitte believed that in a modern metropolis, traffic and stress were obstacles for creativity and hence a Latin Quarter like "micro-climate" would have aided creativity and innovation. This article did not have any significant result, although the project was appreciated by the Senator of the *Alpes Maritimes* and president of the association "Expansam" (*Société d'Etudes pour l'Équipement et l'Expansion économique des Alpes-Maritimes*), Emile Hugues. Supporting Pierre Laffitte's idea, in 1962, Hugues therefore started a plan for the creation of a "cité scientifique qui regrouperait certains laboratoires autour d'un laboratoire parapublic avec des disciplines voisines" (Bourdin 2003, 29).

³ Sophia was also the name of Pierre Laffitte's ex-wife: a personal point which underlined that it played as father of the project.

⁴ Born in Saint-Paul de Vence he graduated in engineering at the "Ecole nationale supérieure des mines", becoming director of the Geological, Geophysical and mining office of France. He was elected vice-director in the two subsequent mandates (1959–1962 e 1963). In 1963 he was nominated director of the "Ecole nationale supérieure des mines" of Paris and was re-elected until 1984. In the 60's, which were the basis for the construction of Sophia Antipolis, also thanks to the aid of Emile Hugues, his son-in-law and major of Vence. In 1985 he was elected senator of the French Republic and remained in office until September 2008.

The entrepreneurial action of Pierre Laffitte was accompanied with parallel legitimization by key collective actors. The institutional entrepreneur is successful not only thanks to his ability to link otherwise separate resources, but also due to the support and legitimization of specific collective actors (Granovetter 2002, 2005). As we can see in Table 1, the organisational field of Sophia Antipolis became ever wider, varied and made up of authoritative political and economically active influential players who contributed to legitimize Pierre Laffitte's project (AA.VV. 2000; Grondeau 2006).

The strategy of IBM and Texas Instruments, two of the largest hi-tech American corporations, had a fundamental role in consolidating the project. In the same year (1962), they both opened up offices in Sophia Antipolis, giving credibility to the idea of a new model of industrialization for the region, at that time totally dependent on tourism. In 1963 the regional authority for local planning and development, the *Délégation à l'Aménagement du Territoire et à l'Action Régionale (DATAR)* was created. This organisation drew the general outlines of the project and made planning possible by local authorities. In 1969, Claude Daunesse, the director of the *Ecole des Mines de Paris* agreed to support his old school mate Pierre Laffitte. *L'Ecole des Mines* thus developed an intellectual pole near Antibes. Another agreement, laid out by Pierre Laffitte and Jérôme Monod of DATAR, planned the creation of a scientific pole north of Antibes.

Afterwards promoting agencies were created, such as the Organization for the Study and Development of the Maritime Alps (ODEAM), G.I.E. Savalor (Sophia Antipolis Valorisation) and the scientific and cultural association "Sophia Antipolis". These wanted to contribute installing institutes, laboratories and research centres in the region. One ODEAM study concerning the creation of service industries stated that the Valbonne area was suitable to group together scientific plant. Furthermore, the project benefited from the investment inputs from France Télécom for avant-garde technology projects, as well as from the National decentralization policy. Furthermore, both national and local authorities participated in the project: after 1970, the management was made public, while the Sophia-Antipolis association was trusted with promoting the park.

In 1972 SYMIVAL, a mixed association for the Valbonne plan, was founded. It included the Chamber of Commerce, the Department and the five municipalities which managed the Zac (United Planning Zone). Sophia Antipolis then took the name "*Parc International d'Activités de Valbonne Sophia Antipolis*". In 1974, the Inter-Ministerial Committee for territorial development (CIAT), which had already approved the Valbonne scientific park, declared the park an issue of *national interest*. In 1973 Symival commissioned a feasibility study whose results approved the project, proposing "*parti d'aménagement*", which defined the aims of the park precisely and fixed its framework (dimension, organization of activity, urbanization regulations, environmental development) The approval of this document by Symival and CIAT was the real start of the project.

Between 1974 and 1990, important external actors were attracted (Moreau and Bernasconi 2002). Firms such as FRANLAB, agency of the French Petrol Institute and the French Geophysics Company sited there. Subsequently, the Zurich ROHN & HASS laboratories were decentralized in the area, as well as laboratories of the CNRS (National Centre for Scientific Research) and the prestigious *Ecole des Mines*. In the following years there followed other educational and research sites, including the National Institute of Computer Research (INRIA), the International Centre of Dermatological Research (CIRD), IUT (University Institutes of Technology) and IUP (University Professional Institutes), ESINSA (The Nice Sophia Antipolis Advanced School of Engineering), ESSI (The Advanced School of Computer Sciences), INRA (the National Institutes of

Table 1 The development of Sophia-Antipolis organisational field

Period	Years	Events: Planning, involvement of political and private actors and institutions
1960–1974	1960	Pierre Laffitte 's article in "Le Monde"
	1962	A start of a construction project of a "cité scientifique" IBM, Texas Instruments open to project
	1963	Creation of DATAR, a regional authority for the regional planning of local development
	1965	The University of Nice founded
	1969	L'Ecole des Mines di Parigi agrees to the opening of a decentralized office close to Antibes The creation of promoting entities (ODEAM, G.I.E. Savalor) and the association "Sophia Antipolis"
	1970	L'INRA (the institute of agronomic research) is situated in Sophia Antipolis
	1972	SYMIVAL (The mixed union for the application of the Valbonne plan) is founded Creation of the "Parc International d'Activités de Valbonne Sophia Antipolis"
1974–1990	1974	Franlab and the French Company of Geophysics are the first firms to establish themselves at the site
	1975	The Zurich Rohm and Hass laboratory is opened
	1976	Certain CNRS labs are opened as well as a decentralized site of the <i>Ecole des Mines</i> , Parigi
	1977	L' "Air France's world reservation centre" si sposta da Parigi a Sophia Antipolis
	1983	A sit of INRIA (<i>Institut National de Recherche en Informatique et en Automatique</i>) is opened at Sophia Antipolis
	1984	The creation of the Sophia Antipolis Fondation, given the task of promoting the Park. Strong growth of the park tank to attracting external funding until 1990
	1988	The founding and locating at Sophia Antipolis of ETSI (European Telecommunications Standards Institute)
	1989	Viene aperta, tra le altre, la sede di Amadeus a Sophia Antipolis (oggi una delle aziende con più dipendenti a Sophia Antipolis) Nice University becomes the Nice-Sophia Antipolis university Founding of "Club des Dirigeants", a professional association

Table 1 continued

Period	Years	Events: Boom of small-medium enterprises, local spread of know-how: competitiveness begins to be linked with endogenous resources and Sophia Antipolis is transformed from a <i>satellite platform</i> to a <i>technopole</i> . At the same time, new professional associations are created specialized in particular sectors
1990–1994	1990	CICA (<i>Centre International de Communicatin Avancée</i>) is inaugurated
	1991	Downsizing of multinationals at the site Telecom Valley Association founded l'Eurecom sited at Sophia Antipolis
	1992	Creation of the “ <i>Maison de l'entreprise</i> ” Creation of the Club Hi Tech
	1993	The <i>pôle santé, pôle spatial</i> and <i>pôle multimédia</i> are created; creation of the Persan Association
	1994	MITSA club founded The Data Base Forum Club and IMET Club are founded
Period	Years	Events: Both endogenous and exogenous development. Exploitation of existing resources of the area also by means of initiatives which aid innovative projects
1994-today	1997	Creation of the Eurosud I55 Club and the ATM platform of 155 megabyte
	1997–2005	International Venture Capital Summit, to attract venture capital
	2001	Creation of the Incubateur Paca Est, to aid innovative projects
	2004	SAME (Sophia Antipolis MicroElectronics), to promote and develop the regional micro-electric sector
	2009	The start of work for the Campus STIC

Source: A.A.V., “Sophia Antipolis, de l'idée de 1960 aux miracles de l'an 2000”; <http://www.insme.org/documents/sophiaAntipolisStruct.pdf> e <http://unice.fr/universite/historique>

Agronomic Research), the *Institut* EURECOM (School of Engineering and research centre for communications systems created in 1991 at Sophia Antipolis thanks to the contribution of Télécom Paris and EPFL-*École Polytechnique Fédérale de Lausanne*), the *Institut Théseus*, CERMICS, other educational institutes were CNAM, CPA Méditerranée, GRETA Antipolis.

The evolution of organizational field went hand in glove with profound changes in the economic structure of Sophia Antipolis, which ceased to be a *satellite platform* to become a *technopole* to all effects.

4 From satellite platform to technopolis

In 2008,⁵ Sophia Antipolis had in 5,750 acres (corresponding to about 23 km²), 414 firms, 40% of which operated in the R&D sector, 30,000 workers of whom 54% employees, 5,000 students and 4,000 public sector workers. There are about 140 foreign capital firms or 11% of all firms in the *technopole* and 25% of jobs. Those working in the computer technology are about 13,100: 45% of jobs and 20% of firms in the park.⁶ In 2008, even given the recession and general reduction of International investment, there were 225 new investment projects against 178 in 2007.

The economic backbone of Sophia Antipolis highlights three *clusters*. The first, the main one, involves computer science, electronics and telecommunications, and was to be the engine for area development and growth. The second, life sciences and health, developed more gradually and reached a relatively significant level, even if not quite as important as the first. The third cluster, natural sciences and the environment, was the first to develop in Sophia Antipolis but never went beyond its initial stage and presently involves only a small part of the area.

The development of Sophia Antipolis displays two principal phases. Until 1990, Sophia Antipolis could not be defined a *technopole*, but rather a “satellite platform”, according to Markusen’s definition (1996). In this context, proximity was reduced to simply physical closeness, and there was no “*fertilisation croisée*” yet. From 1991 to 1994 some important changes which were to revolutionize Sophia Antipolis occurred. The exogenous event was the first cyclical crisis in information technology, with subsequent restructuring of the sector’s industrial activity. The principal change was the transformation from an exogenous development model, based on the attraction of external firms, to an endogenous one based on internal resources and the development of local relationships between firms and research institutions. After the crisis, thanks to the emergence of professional networks and new collaborations among firms, the *satellite platform* was therefore transformed into a *technopole* (Longhi 1999; Lazaric et al. 2004).

Before the 90’s, in Sophia, *spin-offs* were restricted to research institutions, but the crisis extended the phenomena to large companies. At the beginning of the 90’s—just at a time when growth in jobs was collapsing and multinationals were beginning to downsize their personnel and sub-contract to external companies—there was a boom in the creation of small-medium size enterprises. There was a good number of spin-offs: small-medium size enterprises created by engineers who had previously been employed by large firms and who were reluctant to leave Sophia Antipolis after personnel down-sizing. From that point on, the new growth regime was no longer based on the capacity to attract external

⁵ From <http://www.sophia-antipolis.org>, the official web-site of the Sophia Antipolis foundation.

⁶ From the 2008 report on the attraction of investment to the Alpes Marittime region in 2008.

resources or state incentives, but was thanks to the human capital and social cooperation which had occurred over time (Quéré 2005). These changes therefore shifted from an exogenous development model to an endogenous one, where relations between organizations (firms, research centres) were fundamental (Longhi 1999; Quéré and Coutures 2002). Even given this, as we will now see, Pierre Lafitte's *fertilisation croisée*, the principal aim of the project, still remains on the drawing board.

5 Organizational networks and individual networks in Sophia Antipolis

5.1 Organizational networks

In Sophia Antipolis the creation of start-up benefits from vibrant organizational networks. Let us take the example of “Gridpocket”, a start-up just created by the Eurecom incubator, specialized in ecological solutions to save energy by mobile phones, digital TVs and internet applications. An interview with Filip Gluszak, the founder of GridPocket,⁷ asked what were the benefits of being situated in such a rich environment. He replied:

Sophia Antipolis is a real mine of hi-tech skills, especially in the IT and telecommunications sector. But that's not all. It was surprising to find that all the firms have avant-garde capacities in energy management. We have already started some projects with research organizations at Sophia Antipolis and have had the opportunity to work together with some of the small-medium enterprises, large groups and local authorities in the region.

Another specification of the local networks are the “network forms of organization” (Podolny and Page 1998) as the case of SAME (Sophia Antipolis MicroElectronics). This is an association which aims to promote and develop the microelectronic sector in the region. Founded in July 2004, it now has 30 members specialized in the sector. Its main task is the organization of an annual event, the SAME Forum, which aids meeting and exchanges between firms and specialized organisations in micro-electronics, helping to sponsor projects between firms and local organizations and promoting the study of science by students at University. The Forum attracts about 1,000 participants every year and is a key occasion for firms, start-ups and the academic world to meet.

Many professional associations at Sophia Antipolis are directed towards the creation of international networks. An example is “Sophia Business Angels” (SBA). The members of this club are entrepreneurs or managers from all over the world who meet once a month in Sophia Antipolis and are interested in investing in *start-ups*. The SBA collaborates with both locals and non-French firms and organizations. The location of the organization in the *technopole* allows investors there to see the large amount of firms which are strongly innovative and who are incubator of new start-ups looking for financing. Another example is ETSI (European Telecommunications Standards Institute). Also in this case, members are not only local players. ETSI was created in 1988, was sited in Sophia Antipolis from the beginning and is responsible for standardizing ICT technologies for the whole of Europe. Presently, there are 740 members from 62 countries from all over the world.

Public intervention also aims to create organizational networks. In the beginning, with the *satellite platform*, public intervention aimed above all at attracting big firms.

⁷ From the website <http://investincotedazur.com/en/newsletter/index.php?txt=act9242> (consulted June 2010).

Subsequently, with the transition to a *technopole*, public action was concentrated more on the creation of networks among local actors. An example of this is the activity of the Foundation Sophia Antipolis, which organizes monthly scientific thematic meetings open to whoever wants to participate.

The presence of institutes which work in research and development, education and training in Sophia Antipolis is also important. They support the development of specialized knowledge used by local firms as well as the exchange of knowledge between different organizations. The campus STIC (*Sciences et Technologies de l'Information et de la Communication*) is being built in the area, which springs from a project in 1999 of Eurécom, INRIA, UNSA and Telecom Valley, strongly aided by local authorities. This campus brings together advanced teaching and research institutions, to aid collaboration and synergy both on a pedagogical and a scientific level by means of common research projects and the creation of an incubator for firms.

Eurecom should also be mentioned, an engineering school and research centre which operates in telecommunications, created in 1991 at Sophia Antipolis by TELECOM ParisTech (*Ecole Nationale Supérieure di telecomunicazioni*) and EPFL (*Ecole Polytechnique Fédérale di Lausanne*). In 2009, 160 scientific speciality students and 77 postgraduates attended the centre; the teaching staff is made up of 21 professors and 26 assistants. Eurecom is part of prestigious academic networks and collaborates with the following faculties: TELECOM ParisTech, EPFL (Lausanne), Politecnico di Torino, Aalto University Helsinki, Technische Universität München e Norwegian University of Science and Technology (NTNU). Its networks are not simply academic however for Eurecom also collaborates with firms situated in the *technopole*. All its courses are in English and 70% of its professors and 60% of the students are not French.

L'INRIA (*Institut National de Recherche en Informatique et en Automatique*) is a research institute specialized in information and communications technology. The Sophia Antipolis office was created in 1983 and has about 30 research teams which collaborate with other institutes and Universities (CNRS, CIRAD, INRA, *Université Nice Sophia Antipolis*, *Université Montpellier 1*, *Université Montpellier 2*, *Université de Provence*, *Université de Bologne*, ENS.). Patronage is considered one of the principal instruments to reach objectives and exchanges with both other institutes and firms, and is strongly encouraged.

L'INRA (The National Institute of Agronomic Research) has been in Sophia since 1970. L'INRA was the first European agronomic research institute and the second in the world. It is a public organisation under the auspices of the Ministry of Education and Research and the Ministry of Agriculture and Fisheries. It carries out food research, both for agriculture and the environment. With a staff of about 250 people, it is one of the largest research centre into protecting flora and sustainable development.

The foundation of the subsidiary offices of the *Ecole Nationale Supérieure des Mines de Paris a Sophia Antipolis* dates back to the mid '70. This is a specialized education institute for engineering. Presently, the Sophia site covers 10,000 m² and includes four research centres with a large degree of autonomy for education, research and collaboration with industry. At the same time the CNRS (National Centre for Scientific Research) was also sited at Sophia Antipolis. This is again a public scientific and technological research institute, under the control of the Ministry of Education and Research and which is one of the major research institutes on The Cotes d'Azur. It is involved with all the main scientific disciplines and its strategy is to actively give patronage to all the regional agents involved in research as well as to the local and regional political institutes. The common objective is to aim for scientific excellence in the area.

The University of Nice-Sophia Antipolis and CNRS created a *Unité Mixte de Recherche* in the form of the laboratory I3S. This laboratory includes 71 teachers-researchers from the University, 18 researchers from CNRS and 11 researchers from INRIA, about one hundred PhD students as well as technicians and administrative personnel. The laboratory is part of various national and international programmes and is active in various research sectors (computer sciences, biomedical etc.). There are also some open schools and private Universities at Sophia Antipolis. For example there is SKEMA (*School of Knowledge Economy and Management*), which is a private University with sites at Lille, Paris and Sophia Antipolis. It offers courses in management and economics and its location in the *technopole* has supported contacts between the academic and business environments.

The organizational networks are therefore an important element of Sophia Antipolis model. However, as we outlined previously, Pierre Laffitte's original project included also making a favourable environment for *fertilisation croisée*, above all in informal exchanges in everyday life, on the kind of a "Country Latin Quarter" or a "European Silicon Valley". This target fits with the idea that local systems are both "communities of people" and "communities of firms" and innovation also depends on the informal relationships in everyday life.

5.2 Sophia Antipolis population: housing choices, participation and local identity

The study of Sophia Antipolis's population is difficult due to the dispersion of the workers' housing and the lack of a census. However, it is a fundamental element to understand everyday life in the *technopole*. Here, we will refer to the results of a sample questionnaire made by the Chamber of Commerce in the years 2003, 2005 and 2008 called "*Sophia à la loupe*"⁸ as well as to data from a poll made in 2004, by Symisa (*Syndicat Mixte Sophia Antipolis*). In the first case, the study was made by an online questionnaire given to workers in Sophia Antipolis, asking 77 questions about housing, mobility, social life, schooling and daily life. The study was advertised on buses, in large companies and shops, posters on streets in the *technopole*, serviettes in restaurants, leaflets, press releases, e-mail and the distribution of some questionnaires in key restaurants. About 1,300 questionnaires were collected in 2008 and about 1,000 in 2005.

For housing, only one worker in ten lives in Sophia as the results of the study "*Sophia à la loupe*" 2008 showed. In the initial project, the housing of workers at Sophia Antipolis were to be spread among the towns and village nearby and meeting centres within the park were to be created. For this reason, cafes, restaurants, banks, travel agents and book shops were to be built in the centre along with amusement and cultural centres (such as playing grounds, exhibition halls) and public buildings (social services, post offices, town hall.) so as to foster *fertilisation croisée*. Subsequently, this idea was abandoned and the construction of housing within the park was allowed. However, most workers choose to live outside Sophia Antipolis. They live in the surrounding municipalities, Antibes, Nizza, Grasse, Cannes and Mougins: the park is considered a prestigious work place, but it does not attract residence as it hasn't the services which can be found in a city.

The research "*Sophia à la loupe*" also analysed the social life of the *technopole*'s population. The interviewees were asked which services they felt were lacking: public

⁸ The 2005 data are shown at <http://www.jceasa-asso.com/sophiaalaloupe/> (consulted in May 2010), those of 2003 can be downloaded at http://www.jceasa-asso.com/IMG/pdf/CP3_HS_21Fev04.pdf (consulted in May 2010), while those 2008 have not yet been published online. We have used data which were kindly offered by the person in charge of the poll.

transport was the main thing that was missing and was the main request for improvement. Indeed, in the *technopole*, whoever did not have their own car was isolated because outside working hours there were no links either between the various parts of the *technopole*, or between Sophia Antipolis and the surrounding towns. The other services which the inhabitants of Sophia Antipolis felt lacking were: a cinema, a swimming pool (the construction of one is planned for 2012, shopping centres (only in 2009 was a supermarket opened within Sophia Antipolis), a cultural centre and restaurants. And so it emerged that the lack of services effectively hindered the creation of informal interpersonal relationships and therefore *fertilisation croisée*, which was conceived in the initial project. Most workers choose to live close to built-up centres where social life is richer: within the *technopole* there are few informal places to meet and cultivate relationships outside work environments. There are few bars and pubs, there is no cinema, theatre, discotheque and very few shops. Without a place to meet, the inhabitants of the *technopole* found they had to go miles to be able to meet in a more lively centre. This constituted a hindrance to the creation of informal networks and professional communities.

Both the 2005 and 2008 investigations confirmed the low participation of social life organized in the *technopole*: for example, one worker in three did not participate in any extra-professional activity in the area. Who did, preferred sports activity to professional initiatives or anything which had to do with community life. The “*Jeux de Sophia*”, an annual sporting event, was most popular event, while concerts and conferences involved a very low percentage of workers (respectively 10 and 15% in 2005). Another symptom of the insufficiency of the place to create informal interactions was the fact that 20% of those interviewed in 2005 said they never went out in the evening, while more than 60% went out only once or twice a week (including the weekend).

Finally, Sophia Antipolis’s workers have a rather vague idea of the history and institutional characters of the *technopole*. Most interviewees said they had little information about the history of Sophia Antipolis, but were interested in knowing more. Only 57% of interviewees recognised the logo of the *technopole* and 62% did not know the date of the creation of the site even if the celebrations for the 40th anniversary of the *technopole* were in 2009. However, 60% said they were proud to work in Sophia. This percentage increased with the length of time worked in the *technopole* and for those who intended to stay there. In any case, most felt the work experience was very positive and that it improved their curriculum vitae.

5.3 Associations in Sophia Antipolis

In Sophia Antipolis, the transition from exogenous to endogenous development went hand in hand with the growth of relationships between firms and research institutes. The professional associations which were created in the *technopole* helped this process. The first generation of associations in Sophia Antipolis were lobbies which aimed at creating an environment favourable to economic activity in the park. Subsequently, they aimed at creating a technological environment, of building networks and relations, all of which aimed at *fertilisation croisée* (Lazaric et al. 2004). There are 86 professional, cultural, sports and social associations in Sophia Antipolis. There are 29 professional ones and some of these are specifically aimed at creating *fertilisation croisée*. In particular, the Sophia Antipolis association, which then became the “*Club des dirigeants*” foundation and the Persan association were the first local associations of this type, which aimed to increase internal coordination between local professionals. Subsequently, they were followed with the creation of other thematic associations.

Many of the associations in Sophia Antipolis aimed to create local networks. In particular, we have seen those which had the explicit objective of *fertilisation croisée* and creating informal ties. However, unlike the organizational networks we looked at previously, these collaborations had great difficulty in taking off. For example the Club Sophia Start-up, indicated on the technopole's web-site does not refer to the association anymore.⁹ This is an association which brought together private individuals with projects (scientists, students, researchers, engineers, teachers etc.), *start-ups*, firms, financial organizations, consultants and representatives of local institutions. The Club should had collect and distribute information's, aided collaborations on common projects, encouraged contacts between firms and organized monthly meetings and thematic dinners.

Another example is the Hi Tech Club, which is also indicated on the *technopole* web-site. Thanks to an agreement, "*Chambre de Commerce et d'Industrie Nice Côte d'Azur*", l' "*Université de Nice Sophia Antipolis*" e l'INRIA (*Institut National de Recherche en Informatique et en Automatique*), this association aimed to link research, innovation, industry and the University. Its objective was to create meetings with projects where specialized high tech professionals in various sectors could meet. However, the site was up-dated only to 2004 and there was no news on the web after this date nor links to possible club projects. We can conclude that the club has closed.

A third example of the difficult of this type of association is shown by INTECH'SOPHIA group, created from an INRIA initiative with the support of the General Council for the Maritime Alps and the *Région PACA*. This group organized seminars to create synergy between research and industry and to reinforce the socio-economic structure and create a meeting place for firms in Sophia Antipolis and INRIA. Even if it is still active, the site promotes few initiatives and there is generally fewer conference being organized since the beginning (2002) to today.

We can say that there are initiative in Sophia Antipolis to promote *fertilisation croisée* in everyday life but, in reality these have encountered great difficulty in reaching this objective. The initiatives taken did not create a context which aided useful outside work social links and so to create the Marshallian "industrial atmosphere" of widespread and spontaneous spread of specialized know-how.

5.4 Daily life in Sophia Antipolis

In this final part, we will look at daily life in Sophia Antipolis by reporting the results of a participant observation and twenty interviews carried out by the "*Foyer des Jeunes Travailleurs*". The *Foyer de Jeunes Travailleurs* (FJT) was inaugurated in September 1998 to meet the housing needs of young workers in Sophia Antipolis. The FJT of Sophia Antipolis is situated in the heart of the *technopole* and has two room flats of 16 m² and 18 bedsits. Any young person between 16 and 30 who works or studies in the *technopole* and who are looking for temporary board can stay there. It is a starting point for whoever has just arrived and helps socialization in an environment which has few other meeting points. Access to the *Foyer* has been fundamental for this research over an observation period which lasted on and off between 2006 and 2010 and which has allowed us to closely interview some of its guests and see everyday life in Sophia Antipolis close up. The questions were about working life, knowledge of the *technopole*, social relations in the *technopole* and future projects.

⁹ <http://www.sophia-startup.com/>.

The interviewees were for the most part men between the ages of 24 and 38, who worked or studied in organizations of firms in the *technopole's* high-tech sector. They all worked in the IT sector and no one was originally from the Cotes d'Azzure. For most it was their first job after University. Their University had been a strong influence in attracting them to Sophia Antipolis: the collaboration between local research institutes and the academic world had been for nearly all of them the factor which had made them decide to come to Sophia Antipolis. It is also important to underline the collaborations between Universities throughout the world. This confirmed the role of weak ties created by work place collaboration as a resource for mobility (Granovetter 1983): many personal experiences confirmed that the present job at Sophia Antipolis was created thanks to previous colleagues.

A second factor was the international collaborations of the institute/firm for which they had worked. There was a clear difference between collaboration of those working in research institutes and those in business. In the former case, all interviewees talked about a very open collaboration environment, while the latter did not know of any initiatives which involved other actors. All those who worked in firms were much more isolated. They all worked on projects which were unlinked in any way. Unlike what we would expect in a context which aids the creation of networks, their experience underlined the fact that competing firms did not want to make any contact with each other. Their offices were very close to other offices but everything was done so that the employees did not meet. In the experience of the interviewees, the only organization with which their own company collaborated with was work agencies which recruited personnel. They all confirmed the scarce (or non-existent) involvement of organizational events to aid exchange in the *technopole*. The only interviewee who had participated in such an event was in a Forum SAME one. His situation was however special in that he was the only one to have more responsibility as head of some projects in his company.

The analysis of life outside work gave a relatively homogeneous picture, confirming the quantitative data of the "*Sophia à la loupe*" study. All the interviewees underlined the difficulty of creating informal knowledge networks outside the work place. No one had ever taken part in associations or cultural groups or knew of their existence. The distance between housing within the *technopole*, the lack of meeting points and the related problem of rare public transport (limited to work days) meant the environment was very dispersive. People who choose to work in Sophia Antipolis for long enough moved outside the *technopole*, which was considered a work place and nothing more. There was very modest knowledge of and participating in events organized in Sophia Antipolis, even with people who had worked there for more than 4 or 5 years. However, as we have seen, there are many initiatives which have attempted to give life to "*fertilisation croisée*" by means of associations. However, these attempts tend to pilot the processes top down rather than aid the botto-up emergence of associations. The *Foyer* was the exception as it was a local association which concretely helped young people to meet who had just arrived in the region, giving thus an indispensable service.

The interviews showed not only a lack of identity with the place but also any sense of belonging to a professional community. Most relations at the work place not only do not generate spontaneous initiatives between colleagues, but struggle to grow outside the work place. This is also due to the dispersal of housing and the state of free time we have just seen. The distance of residence, lack of meeting places, mobility of people who work in the *technopole* are all factors which hinder the creation of a local community and make young people who live in Sophia Antipolis consider moving to other areas. Most interviewees, considered their life in the area to be satisfactory mainly for work reasons. The positive

aspect of Sophia Antipolis is the economic security of a stable job, but distance permitting, workers would return to their native town in their free time.

Some plan to stay in Sophia Antipolis for the near future for work related reasons and would like to move out of the *technopole* as they consider inappropriate to live there. All interviewees said they would be willing to move elsewhere and gave the same reasons linked to the difficulty of living in such a dispersive context. These results correspond to those shown in the book “*L’héritage d’une utopie*” by Araszkievich (2003). In this case, 360 people who worked in Sophia Antipolis were interviewed between June and September 2003, outside their offices, in car parks and on public pavements. It is worth to underline that in 8 years, nearly nothing has changed from the point of view of everyday life in the *technopole*.

6 Conclusions

The development of the *technopole* aims at concentrating knowledge in a local *milieu* in which firms, institutions and people interact cooperatively to create a specific competitive advantage. As we have seen, one of the targets of the creation of Sophia Antipolis was to try to create “fertilisation croisée”. According to Pierre Laffitte’s project, the key leader of the process,¹⁰ this aim would aid technological innovation and scientific progress and would be the base of the success of Sophia Antipolis. The project has only partially fulfilled these objectives (Rasse 2003). The *technopole*, is not a particularly rich environment for collaboration and exchange in daily life (Ter Wal 2008; Rasse 2003).¹¹

Silicon Valley (SV) has been the recent reference point for advanced projects of local development to which Sophia Antipolis (SA) has been compared (Isaak 2009). Our research has confirmed Isaak’s results, showing further differences in terms of the supply of collective assets for SA’s competitiveness. The factors which lead to SV success can be reduced to three different types of local collective competition goods (Trigilia 2007):

- Collaborations between scientific and University structures;
- The availability of local partners able to supply goods and services for enterprises;
- The quality of the context.

In SA, there were many ticks for the first two points, while the most relevant differences between the French *technopole* and the Californian technological district is the quality of the general context. The availability of suitably furnished areas both in terms of social-cultural and environmental factors has proved to be scarce. The differences between the two local systems are mainly linked to the presence (or absence) of these assets.

Isaak’s analysis focuses in particular on the importance of creating a local professional culture able to produce technological and entrepreneurial innovation. This element is seen to be one of the principal factors of the success of SV (as stressed also by Saxenian 1996;

¹⁰ Leadership played a crucial role in other cases as well (Alshumaimri et al. 2010). For instance Link (1995, 2002) attributes both the formation of the Research Triangle Park in North Carolina, as well as the growth of the entire Research Triangle region, linking Chapel Hill to Raleigh and Durham, to committed and enlightened leadership (cfr. also Alshumaimri et al. 2010). For the institutional history of Parks, see Vaidyanathan (2008). On the role of private sector more into the management of science parks, see Sofouli and Vonortas (2007).

¹¹ Since firms located on science parks have a significantly greater rate of survival, a deeper analysis should test the effect of “Parks daily life” on firm’s survival: see Ferguson and Olofsson (2004), Squicciarini (2008).

Patton and Kenney 2003), while SA has had difficulty in reaching the same objective. Unlike SV, there is no shared local culture in the French case and little sense of belonging to a professional community. SA is simply a work context, with no local subculture and most of the workers live outside the *technopole* as they do not feel to be part of a community.

SA was created by the work of an institutional entrepreneur with extended contacts which created institutional mobilization and then involved local institutions. Subsequently, the creation of new local actors and the localization of firms, research and educational institutes in the area allowed these actors to cooperate effectively. The social capital in the area mainly entailed formal collaboration between research organizations, Universities and institutions aiming to manage the development of the *technopole*, while a true professional community struggled to consolidate itself. Widespread and spontaneous *fertilisation croisée*, which was one of the principal aims of Pierre Laffitte's project, has still to be achieved. The elements which block bottom-up development participation and the difficulty of informal collaborations are: dispersed housing, lack of services, insufficient transports, low participation in the *technopole's* organized events, the lack of a sense of belonging to the place and to a professional community, the isolation of company employees who see mainly their own work mates and who are not involved in any collaborative projects with other firms and few social projects.

SA could exploit its potential better if it were able to create more favourable conditions for a strong social capital in the everyday life of the *technopole*. As we said in the introduction, a local system is also a "living' space" (Sforzi 2005) and not only a productive environment for firms. The SA area risks being cut off from the local society and creating almost exclusively work interactions. This is a weak point for a *technopole* as it creates discontent and a "brain-drain" towards richer social contexts. The social life in Sophia Antipolis lacks meeting places and many workers, even if they are satisfied with their professional condition, want to move to other areas and cannot conceive of their future life in the *technopole*. All this means external mobility which would lead to dispersal of the *know-how* accumulated locally. It therefore can be considered an obstacle to the creation of a professional community, innovative life-styles, long term projects and territorial innovation (Florida 2005).

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