

THE IMPACT OF THE INCUBATORS' ROLE ON THE FIRM'S DEVELOPMENT IN THE BIOTECHNOLOGICAL SECTOR. AN EMPIRICAL ANALYSIS OF THE PIEDMONT REALITY

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Abstract

The development of the innovative activities in Italy is characterized by a limited presence of start up, if compared to what has been happening abroad. This fact, combined to the strong European request of reducing the entrepreneurial risk and the major attention to what is called "life science", has started off biotechnological clusters. Moreover, in these latest years, the tendency has been to promote the international relations to favor the territorial technological development.

The aim of our empirical research is to analyze the structure of the Turin (Piedmont Region) biotechnological cluster, in which the ideas' and firms' Incubators have a decisive role in terms of start up's promotion, raise, development and technological and knowledge transfer between the academic reality and the entrepreneurial one. Besides, we also want to analyze

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how the Incubators can be fundamental in order to attract capitals, both private funds and public ones.

Keywords: Biotechnological cluster; Incubators; Innovative activities; Start up

Topics: Industry and area specific studies; Technology and innovation management; Natural sciences and business

INTRODUCTION

"Biotechnology is the application of scientific and engineering principles to the processing of materials by biological agents to provide goods and services" (OECD, 2003).

Biotechnological companies arose in the '80s with the aim of capitalizing on their biotechnological discoveries in the pharmaceutical field. Fundamental forces shaping the biotechnology industry in the first decade of the 21st century include (Ahn, Meeks, 2008): 1) the gap between the low cost of creating a biotech company and the high costs for the pharmaceutical companies of converting novel technologies into approved drugs; 2) a steady evolution of the perception of value by investors in the biopharmaceutical industry value chain; 3) the irregular nature of the biotechnology financial markets resulting in increased operating risk and uncertainty; and 4) demand by multinational pharmaceutical companies for a product pipeline to insure against their own declining productivity and growing market penetration by generics.

The biotechnological companies are, on average, smaller than the pharmaceutical ones, and they have made the latter's position more fragile in the drug discovery phase (that is, in the first phase of research). Nevertheless, biotechnological companies are weak at the commercial distribution level.

THE STRUCTURE OF THE TURIN BIOTECHNOLOGICAL CLUSTER

In field of biotechnology, 75% of Italian firms born on solid scientific base like start up of researchers or academic spin off. However more than half of those firms, after some years is not able to earn more than one million euro gross.

Even in Italy it is possible to find out territory with a strong interest for biotechnological development. It is possible to notice the presence of biotech clusters characterized by the presence of a biopark, private firms, public laboratories, incubators and attracting a strong interest in biotech research of public institutions, in addition to the one of private firms. The biotechnological research is so composed: bioinfo 4%; environmental 9%; agrifood 14%; health 73%.

In Italy, as in other European countries, innovative activities in biotechnology have lagged significantly behind the U.S.A. and proceeded along different lines. Structural weaknesses in the industrial base, in the research system, and at the institutional level have hindered the development of biotechnology. The most important difference is the virtual absence of the phenomenon of the specialized biotechnology start-ups, even as compared to other European countries (Orsenigo, 2001).

The concept of cluster can be traced back since to 1920 with the work of Marshall in 1920 on the English industrial regions of the 19th century, observing which focused on the creation of industrial districts. Even Porter (1998) states that: "Clusters are geographic concentrations of

interconnected companies and institutions in a particular field"⁴. More specifically, cluster initiatives are a particular form of public-private partnerships and are organized collaborations between public and private sector actors, such as firms, government agencies, and academic institutions, with for the purpose of enhancing the growth and competitiveness of clusters (Teigland, Lindqvist, 2005).

In the future biotech clusters are expected to move away from geographical regions and become more virtually based around diseases, pathways, markets and unique industry segments.

The biotech cluster: the raise and the business model.

The Piedmont reality is characterized by the presence of the Turin biotechnological cluster. Its structure is organized in two principle areas: the University of Turin and the Bioindustry Park in Ivrea (in Turin province).

Inside the University of Turin there are the 2i3T Incubator and the Ideas' Incubator of the Molecular Biotechnology Center (MBC).

Bioindustry Park in the Canavese area is a scientific Park specialized in Life sciences, is the second one in terms of size and importance in Italy. It has been established near Ivrea, Turin county, and is operating since 1998 (Eporgen, 2009).

It has been created in the context of structural funds for the regional development managed by Piedmont Region which gave a total amount of 32 million of Euros for the infrastructures. The Bioindustry Park has been thought as a tool to the economic requalification of the territory and the its management is always involved in the international development; for example the park is involved in an international project called Bio Alps, born five years ago. The aim of this initiative is to cooperate managing complementary assets coming from Italy (Piedmont and Lombardy), France (Grenoble) and Genève. The first goal is the events' organization, the second one concerns the matching between firms and research centers and the third one is about the students' exchange.

Within the social whole are presents the following public organizations and private firms (The corporate is BiPCA corporation, with more than 8 million euro of capital. This society coordinate directly the realization of investments): Finpiemonte S.p.A; Provincia di Torino; Istituto di Ricerca Cesare Serono S.p.A.; Merck Serono – RBM; Telecom Italia SpA; Bioline Diagnostici srl; Confindustria Canavese; Confindustria Piemonte; Bracco Imaging; Camera di Commercio di Torino.

As wrote before the infrastructures have been financed by the Public sector and every year the Region gives funding to the biotech pole for specific projects about specific researches and what is called technology transfer; if 100 are the costs of the Bioinsutry Park, 50 usually come from the Region and the rest from the self – financing (25% from the facilities rent, 25% from consultant activities). The total amount of the 2009 revenues was 6 million Euros; moreover the Park doesn't receive funding in the profit and loss account and when the

⁴ Three kinds of advantages are also identified by Porter (1998): productivity advantages (reduction of transaction costs), innovation advantages (biotech clusters that mostly mainly arose near research centers of excellence in biotechnology-based disciplines), and new business advantages (the role of environment in the creation of new biotech companies). Prevezer and Stout (1998) identify other advantages concerning the demand side: input-output multipliers (strong local demand), hostelling (spatial competition), search costs, and information externalities (transfer of tacit knowledge between people working within a cluster. On the supply side, major advantages are: technology spillovers, specialized labor and, infrastructures.

Region or the Public Administration finances the park, it concerns a co-financing that means that the amount of the fund given by the public is about the 60%; the Bioindustry invests the remaining 40% (self-financing).

In details the Park offers to the recently established firms operating in high tech sectors a complete kit of services which facilitate the start up and spin off in the pre-start up phase (feasibility studies and selection of projects) in the start up phase (assistance in business planning, legal assistance, support in fund raising activities and/or partner research like venture capital or business angels) for the development (support in the start up phase, orientation and financial, legal, fiscal, technological and marketing assistance, in the 3-5 years of stay in the bio-incubator) and finally Way-Out (verify of results, orientation for the realization of a business plan of development, research of partner able to support the competitive development of the firm on the market).

Talking about startups, we have to consider Eporgen Venture which is the first Italian company, entirely funded by private, non-institutional investors, dedicated to seed capital investments in the area of life sciences. It was established in June 2004 with the aim of establishing and supporting the development of new enterprises operating in the life sciences field and born of highly innovative projects of international scientific importance. To date, Eporgen - this venture raises just private funds - has no less than 11 investments on its financial balance sheet, 10 of which are start-up companies and 1 pre-funded project that is ready to become a start-up company during the course of 2009. From 2005 Eporgen has been gathering more than 6 million of Euros.

THE INCUBATORS' ROLE OF THE TURIN'S BIOTECHNOLOGICAL CLUSTER

The incubators arise to offer means for favoring growth and the success of firms through a network of resources and support services for business activities; they make available the sites, basic logistical services, and the networks of personal contacts that form as a result of carrying out business activities in a single structure. The most well-equipped incubators also provide managerial services and technical, legal and tax consulting.

Nevertheless, incubators represent a temporary solution, since usually the authorization to carry out business activities in an incubator is year-to-year, and in any event limited to a maximum of 3-5 years. After the start-up phase the business, if successful, is transferred outside the incubator into an independent structure, thereby completing a process for the creation of new businesses, employment, and regional and national economic stimulus.

Many incubators were formed in Europe when, in 1984, the European Commission decided to favor measures aimed at developing business enterprises in member countries. These incubators were all of the BIC (Business Innovation Centre) type, with public capital, and aimed at providing local enterprises a set of basic services: spaces in which to operate, logistical infrastructures, communication channels, and opportunities for outside financing. Subsequently, the private capital and for-profit incubators began to spread.

Often the incubators are in scientific and technological parks; that is, geographic poles that enhance the advantages from the joint localization of firms and institutions such as universities, venture capitalist associations, etc., operating in high-tech and knowledge-based sectors.

The growth of start-ups is the result of the entrepreneurial spirit of one or more individuals with innovative ideas. Both in the U.S. and the European Union the founders generally come

from the university or public research sectors, on the one hand, or the laboratories of large enterprises on the other. We can thus speak of academic or industrial spin-offs.

As concerns the academic spin-offs, after the university in question has obtained approval from the competent authorities and the patents, it can license (though it is not bound by this) its intellectual property to start-ups that include its own researchers or former doctoral students, thereby acquiring royalties on the revenues or sales, or participating in the equity.

While industrial spin-offs can occur for different reasons, in general they are closely linked to the transference of research from the pharmaceutical companies to the biotechnological ones, or as a result of rationalization processes or merger and acquisition operations.

The 2i3T Incubator of the University of Turin is a company where the University, Provincia di Torino, Comune di Torino and FinPiemonte each owns 25% of the company's stock. The company capital amounts to 50.000 euro and it is entirely given.

The innovation poles are synergic coordination tools among different players of the innovative process, with the aim to make available high value added infrastructures and services and to interpret the technological demands of the enterprises to address the regional actions that support research and innovation. Focused on specific sectors, the poles will be constituted by groupings of enterprises, organisms of research and from a corporate body manager.

Fig. 1 - Turin start ups sample

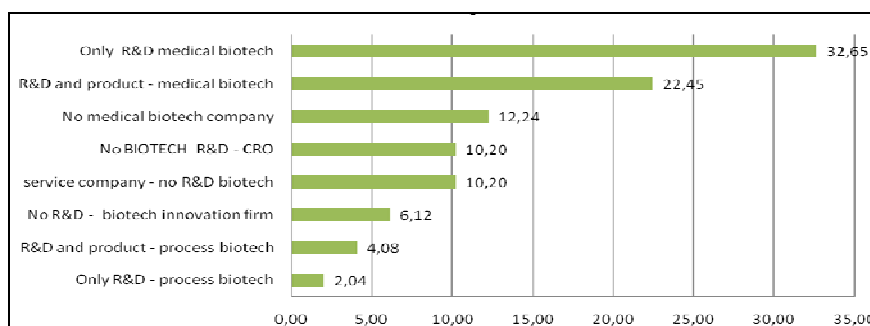


Fig. 2 - Medical research – specific area

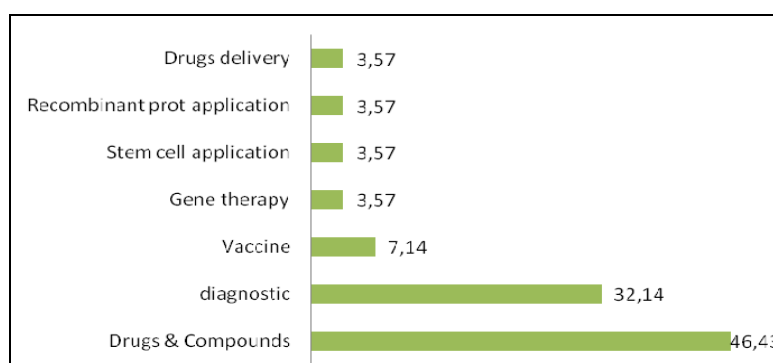
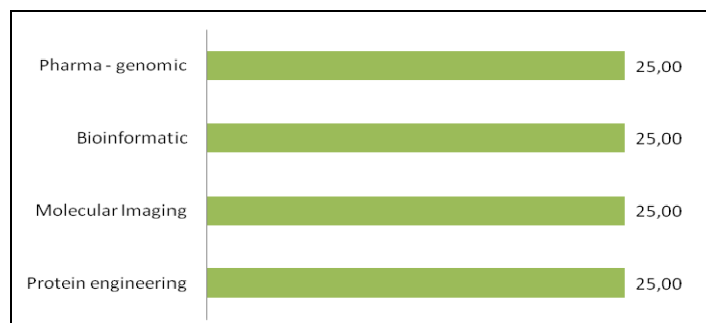


Fig. 3 - *Process technology – specific area*



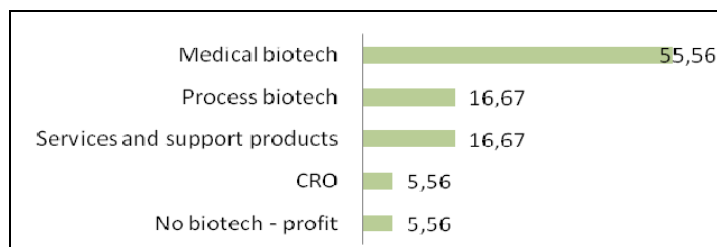
Sources: authors'elaboration

The incubator has shown its own interest into the poles of the *sustainable chemistry*, of the *biotechnology* and *biomedical*, of the *new materials* and of the *agrifood*, with the finality to propose itself as a subject bidder of technologies and know ledges, to promote the know how of the incubated enterprises and the university groups of research, particularly of those which pertain the available instrumentations into the incubator. The reality of the incubator doesn't have proper assets because these are of the university. In Turin there is also the ideas' incubator inside the Molecular Biotechnology Center of the University of Turin for specifically biotechnology research requested by external subjects or firms.

Unlike the Turin reality, in Ivrea we can find a facilities system called Discovery; this represents the second step of the biggest project realized into the Piedmont Region DOCUP 2000-2006 context and this is the incubator; this system of facilities offers 9 spaces equipped for the same number of startups operating in Life sciences, besides common equipping and areas.

The newly established startups companies can set themselves up within this incubator and thereby, during their first three years of life, enjoy the benefits of subsidized rentals, communal areas equipped with the most advanced instruments and privileged access to the technical and scientific skills of the Inter-disciplinary Advanced Methodology Laboratories (LIMA), in which the Bioindustry Park conducts its own proprietary projects and others on a contract basis, aimed at technology transfer. Furthermore, thanks to its network of international scientific and institutional contacts, the Bioindustry Park is able to provide the start-up companies with significant support in terms of sourcing and accessing public funding both within Italy and in Europe.

Fig. 4 - *Ivrea's start ups sample*



Sources: authors'elaboration

Fig. 5 - *Ivrea start ups*

Startups	activities
Apavadis Biotechnologies s.r.l.	Profit, just R&D of biotech process; proteomic anticancer
Bionucleon s.r.l.	Profit, just R&D biomedic product; drugs & compounds no specific therapeutic area
Biopaint s.r.l.	Altro per profit, no R&D biotech, environmental bioremediation
Creabilis Therapeutics s.p.a	Profit, R&D e commerce biomedic product, drugs & compounds, dermatologic
Dirivet Imaging	Altro per profit, no R&D biotech, services company
Ephoran Multi Imaging Solutions	Profit, just R&D biotech process; diagnostic no specific therapeutic area
Genovax s.r.l.	Profit, just R&D biomedic product; vaccine no specific therapeutic area
Natimab Therapeutics s.r.l.	Profit, R&D e commerce biomedic product, antibody no specific therapeutic area
NoToPharm s.r.l.	Profit, just R&D biomedic product; diagnostici autoimmune disease
Spider Biotech s.r.l.	Profit, R&D and commerce biomedic product, drugs & compounds, anti infective
Target Heart Biotech s.r.l.	Profit, just R&D biotech process; proteomics no specific therapeutic area
Vanadis	Profit, R&D e commerce di biomedic product, drugs & compounds, cardiovascular
Narvalus s.r.l.	no R&D biotech, services and support products
Rotalactis	Profit, R&D commerce biotech process, cells colture cell no specific therapeutic area
Noraybio	Profit, R&D commerce biomedic product, drugs & compounds, metabolic/foodstuff
ProCellTech	no R&D biotech, services and support products
Glyconova	no R&D biotech, CRO
	Profit, R&D commerce biomedic product, drugs & compounds, anticancer

Sources: authors'elaboration

If we want to compare the Turin incubator 2i3T and the Ivrea one, we can say that the first one is a legal subject, the second one is an concept; this is a concept and not a project because the project usually has one begin and one end, the concept has one begin but has not end. Finally, the Ivrea incubator is a way to do, a behavior in which we can count the 11 Eporgen startups plus 4 or 5 others companies.

Talking about the Eporgen reality, it has been started as a Bioindustry Park initiative to help the startups' incubation; before the raise of Eporgen, there was a lack of private capital to invest in startups and the Park Board took the decision of creating an independent venture; a company which have the total amount of the corporation stock as private. Eporgen Venture is though as a tool to help startups raising and growing but only if they are driven by winning ideas. This approach has the main goal of avoiding what the Park Board calls "initiative's parasitism".

The Eporgen business model is a smart one; even if in the Piedmont Region territory we cannot find business angels specialized in biotechnology, we can find business angels in other sectors able to invest money in winning initiatives; so the Eporgen goal is to get them around a table for guarantee the biotech sector knowledge. The approach is not the business angels typical one because the investment which is proposed by Eporgen is the portfolio one; business angels will not invest in just one startup but in a startups' portfolio.

The choice of the portfolio startups was managed with an extreme selection through a two years national public job advertisement; the planning ideas was been garnered and selected thought a two step process (internal and external the Park) and this process has involved three venture capitalists and three industrial specialists coming from the Serono reality. A third step was based on another internal analysis and, after that, Eporgen was able to define the startups to incubate.

During the latest 10 years the Bioindustry Park has helped more than 30 companies to raise and to grow, gathering more or less 30 million Euros of equity and this is a great result if compared to the youth of the Ivrea biotech reality. Moreover, it is important to analyze that we are talking about funds given directly to the startups, not to the biotech park by which

today the Piedmont Region has seen the birth of a new sector (to remind: at the begin of the 21th century, there weren't biotech firms in this Region).

Incubators' promotion and the technology transfer.

These incubators have a fundamental role on the firm's development in the biotechnological sector. In particular they promote the born and the development of the biotechnology start up in the Piedmont territory. Every incubator has own distinctive features that can be summarized as the following.

The incubator of the University of Turin 2i3T is place of aggregation of entrepreneurial activities that, thanks to its facility of contact and interchange consequential from the concentration in one unique center, it should offer an articulated and complementary set of services able to accelerate its development⁵. The 2i3T revenues refer to the charges for services provided for enterprises incubated in example for the use of scientific equipments and of laboratories. It can therefore result useful to plan a process of incubation of the enterprises articulated in the following phases: promotion, tutorial ex-ante the constitution, tutorial ex-ante the constitution, scouting, idea definition, business plan formation and development, the constitution of the enterprise, tutorial ex-post constitution, incubation in 2i3T and acceleration process.

The ideas' incubator inside the Molecular Biotechnology Center of the University of Turin has not a formal procedure for the incubation process. The subjects or firms that request the incubation pay a rent for the infrastructure, instrumentation and machinery.

As told before, the incubator Discovery is a concept and every promotion and technology transfer action is something the Bioindustry Park management has to think about; the international initiatives, the events and the students exchange programs are some examples.

The attracting capitals capability.

A central role is taken by co-financing program of the public sector, contributing for more than 50% in favor of the smallest firms with national and regional programs.

About Venture Capital, it is confirmed their scarce presence on national market. Finally, result almost absents even the so called Business angels.

Financing for biotechnological research can take the form of public financing, for-profit private financing, and non-profit private financing. Public financing can be direct or else take the form of company incubators.

Public financing for companies in the biotech field is distributed through various formulas based on the country in question.

Finally, as regards private financing, bank financing for unlisted companies is generally possible in the biotech sector only for those companies that can offer immaterial fixed assets as a guarantee. Other sources of private financing for unlisted firms are seed money in the form of business angels, venture capital, private equity funds, and corporate venturing.

The 2i3T incubator and the startups receive regional and European funds for the development of their own activities.

⁵ Serrao G. in G. Büchi, C.A. Di Fazio, M. Pellicelli (a cura di), 2008, *Economia aziendale. Temi e metodi per le Facoltà scientifiche*, FrancoAngeli, Milano.

Also the future startups can participate to the "Start Cup Torino Piemonte"⁶ competition that chooses the more innovative ideas and reward the best ones. Moreover this is a fundamentals moment for connecting the new ideas and the investors (business angels, seed capitalist, etc).

From the Ivrea pole side, the Eporgen system is a great one in raising times and this system is suffering the crisis situation; the Eporgen planning needed about 10 million of Euros but this funding not happened so in 2010 maybe some startups could be closed. Meanwhile Piemontech⁷ has been involved in this system and has invested in two incubated startups.

Nevertheless there is a systemic problem which regards the venture capital; in Italy is difficult to find investors in life sciences sector and this is true not just for Italian investor, but also for foreign investors and this happens because the biotech in Italy is perceived as too risky unlike what has been happening abroad since years.

If we look at the France reality, for example, we can see that the Grenoble biotech cluster can count on three risk funding levels; a "pre-seed" level (50.000-100.000 Euros), a 10 million Euros fund, a 25 million Euros venture capitalists level. So Grenoble can count on more than 35 million Euros against the 6 million of the Bioindustry Park; there is the difference.

CONCLUSIONS

The limit of our research has been represented by the difficulty in analyzing start ups' data – in particular the economics ones because the neo-entrepreneurs (often scientists at the first years of activity) have not developed the entrepreneurial mentality and they have many difficulties when they have to outline their own firms' economic trends. Despite this limit, we could understand as follows.

The Bioindustry Park and its incubator and 2i3T are so closed, that it's easy to think about synergies between the Ivrea pole and the University of Study of Turin. Actually some University Departments 'activities are placed on the Bioindustry Park ground, as some MBC research's groups and the focus is on the molecular imaging; what must be said is that those synergies are there because off some University full professors interests, so we are not talking about systematic behaviors.

However thanks to the bridge built between Ivrea and Turin, in the latest years a first molecular imaging center has been built in Ivrea. Through it the Ivrea reality makes the entrepreneurial competencies available and the University of Turin (with its Departments and the MBC) does the same with the academic ones.

This is, at the moment, the visible synergy; moreover the Bioindustry Park and 2i3T incubator are starting working together in some international initiatives and European projects, as the ESOF 2010, which is the biennial pan-European meeting dedicated to scientific research and innovation (planned for July 2010 in Turin).

Certainly the collaboration should be huger. The two realities don't work together on initiatives as the startups 'catching, neither on the ideas' selection, nor on the support services. Why? It seems due to the different cultures, different DNAs; in Ivrea we can smell

⁶ Start Cup is a an entrepreneurial project competition addressed to all those who have an innovative business ideas. the focus is on the innovations which can bring new features to products, processes and businesses.

⁷ The holding company promoted by the Torino Wireless Foundation, invests with risk capital in the most promising Piedmont-based companies in the following sectors: Information and Communications Technologies (ICT), Biotechnologies, Biomedics, Advanced Mechanics, Energy, innovative Services. Source: www.piemontech.it.

an entrepreneurial culture, while in Turin the culture is mastered by the university mentality. The only result is that they perceive each other as competitors in terms of funds and, more in general, money and this is the biggest systemic error which can represent an obstacle to the Piedmont international competitiveness.

Another difference we have to underline is the composition of the equity; when we talk about the Bioindustry Park we look at a model in which the Region and the Public Administration have the 70% of the share against the 30% owned by Merck Serono, Bracco and the other private firms.

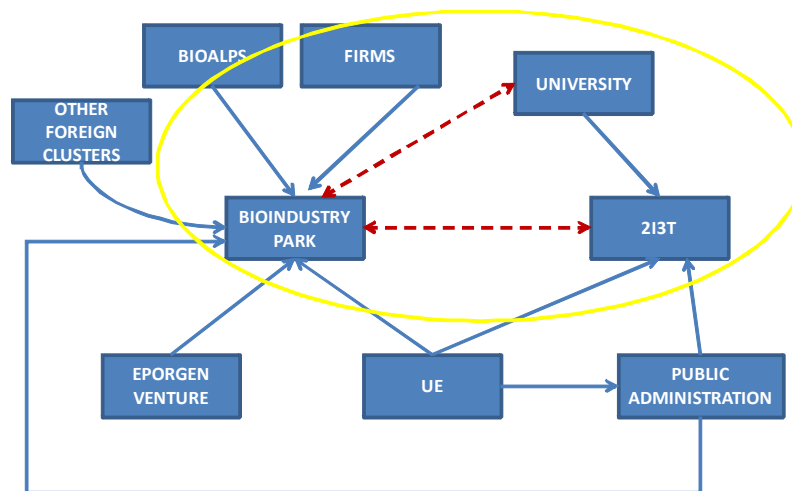
Although we have to consider that the Piedmont reality is one of the more fast growing; the Bioindustry Park is getting a benchmark for the other rising biotech Italian clusters (as the ones in other Italian Regions as Sicilia and in Puglia).

Finally we should consider some elements in order to improve the success of Piedmonts Incubators and biotech clusters.

Concerning our research, today the Bioindustry Park (in which we can find the Ivrea incubator) is the player with the major number of international relationships (as the Bio Alps can show); moreover is managed through a business model like what we can find abroad (for example in the Genopole bio cluster, France)⁸.

According to the model below, a huger collaboration between the BioindustryPark and 2i3t incubator (red dotted line in the model) should take international advantages, because the Ivrea pole's relationships would mean a huger international visibility for the Turin start ups which, at the moment, have few possibilities to be known by foreign investors and backers.

Fig.6 - *Synergies and relationships among the biotech sector's players*



Sources: authors' elaboration

We have to underline that in Italy there is a broad limitation for the development of the biotech young realities: investors don't pay attention to the innovative sector because they perceive it as too risky. A major synergy between Ivrea and Turin would create active networks for business angels or informal investors for an increase of very early stage high risk investment capital; this would mean profit not just for the single start ups, but for the

⁸ To decide about the new start up, the bio park board evaluate the single cases using the BCG matrix; in this way it is possible to understand the research areas the territory mostly needs.

whole territory as well. Moreover, public and private financing mechanisms and other financial incentives are needed to attract private investors to invest in client firms in the incubation process and in the cluster's territory.

Eventually, thanks to a huger collaboration between the two realities, it would be easier the alignment between the entrepreneurship in one hand and the university research in the other hand. This alignment can be generated by building the tools for an everlasting communication among researchers (the University of Turin is one of the shareholders of the 2i3t) and the two analyzed poles' firms. This could be a very useful link because another huge limitation is represented by the lack of managers who have proper biotech skills, in one hand, and can manage corporate and business problems, in the other hand; a collaboration among university's researcher and entrepreneurs is fundamental because the incubators need to develop a multidisciplinary culture of staff to guarantee a support on the competences needed such as coaching, marketing, accounting and (if applicable) supervision, available for client firms.

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