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Creating an entrepreneurship ecosystem in higher education

Luísa Carvalho, Teresa Costa and Pedro Dominginhos
*Economics and Management Department
Business School (ESCE)
Setúbal Polytechnic Institute
Portugal*

1. Introductory Note

Entrepreneurship is a crucial element for each country that aims to be competitive and developed within knowledge-based world economy. In “Green Paper on Entrepreneurship in Europe” (2003) European Commission defines entrepreneurship as “the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation”.

Extant literature on entrepreneurship concludes by the thesis that entrepreneurs can be made (Gorman et al, 1997, Henry et al, 2005). Taking the words of Drucker (1985) “It’s not magic, it’s not mysterious, and it has nothing to do with the genes. It’s a discipline. And, like any discipline, it can be learned”. In this sense, entrepreneurs can be taught and schools have an important role in this process. Following Kuratko (2005), an “*entrepreneurial perspective*” can be developed in individuals.

Nowadays Higher Education Institutions have an important role in the improvement of entrepreneurship, being part of an entrepreneurial ecosystem with business and government. The market labor faced many changes in last year’s, the unemployment rates increased in Europe and the possibility of creation a firm comes as an important way to add value to economy and to create jobs. In this environment, universities and colleges must provide entrepreneurship education, develop and adapt competencies, skills, disseminate knowledge, technology and increase economic development as well as help students to create new firms and provide the adequate set of training to manage them across their life cycle.

Considering the question - How to improve entrepreneurship in higher education? - this chapter aims to present an entrepreneurship ecosystem developed in Setúbal Polytechnic Institute (SPI) Portugal, and discuss some results in an early stage of implementation as well as propose future directions and discuss some barriers faced in the implementation of the model.

The literature is particular intense in the analysis of the effectiveness of a particular course or initiative and less focused in an integrated approach of how can Higher Education Institutions promote entrepreneurship. We propose to study entrepreneurship education as

a whole, considering an entrepreneurship ecosystem whose consider three dimensions: curricular entrepreneurship courses; extra-curricular entrepreneurship programs and support infrastructures. The first dimension refers to entrepreneurship courses included in graduate and postgraduate programs, and pretend to present the methodologies and practices applied that supports the “learning by doing” methodology, a crucial method in the Bologna Process. The extra-curricular entrepreneurship programs concerns to a set of national, international and regional programs that aims to improve entrepreneurship in higher education, that involve voluntary students and teachers (e.g. European graduate program- Junior Achievement, National program of Polytechnic institutions - Poliemprende). Finally, the third dimension describes the support infrastructures created to progress entrepreneurship in higher schools and in region (e.g. Office for Knowledge Transfer and Information - OTIC).

Additionally this research intends to provide an integrated vision of these three dimensions and map the linkages with outside community and existent networks that stimulate social capital and facilitate the entrepreneurial process.

The methodology of this research will be a case study applied to SPI, which has five schools: the Business School; the Technology Schools of Setúbal, the Technology Schools of Barreiro, the Health School and the Education School. In scholar year 2007-2008 SPI had 6371 students and 505 teachers.

We believe that our approach represents a starting point to a better comprehension of entrepreneurship ecosystem in Higher Education Institutions that grants economic development. Furthermore, the results of these analyses supported in a case study provide a better understanding the role of institutions of higher education in promoting an integrated approach of entrepreneurship.

2. PART I – An Approach to Entrepreneurship in Higher Education

Nowadays, entrepreneurship becomes a buzzword present in all contexts, from politicians to media and from academia do business people. Despite fashionable trend, we cannot ignore the relevance of entrepreneurship for economic development, including economic growth job creation, innovation (Acs and Armigton, 2003; Autio et al, 2007; Carree and Thurik, 1998) as well as for social inclusion, allowing marginal groups to become active economic actors and promoting equal opportunities for women (Volkmann et al, 2009).

The relationship of entrepreneurship and economic development it is complex and implies strong and diverse connections and linkages across several institutional players (Bosma et al, 2009). In this vein, the promotion of entrepreneurship demands an entrepreneurial ecosystem where Higher Education Institutions (HEI) plays a crucial position in collaboration with other stakeholders, namely governments (central and local), business associations, entrepreneurs, NGO, service providers, financial institutions, incubators, and several others.

Entrepreneurship education only recently got some attention from scientific community, and is far from maturity, despite a large number of initiatives, experiences and curricular courses and programmes developed in last decades across the world (Charney and Libecap, 2000; Li and Matlay, 2005; Solomon et al, 2002; Solomon, 2005).

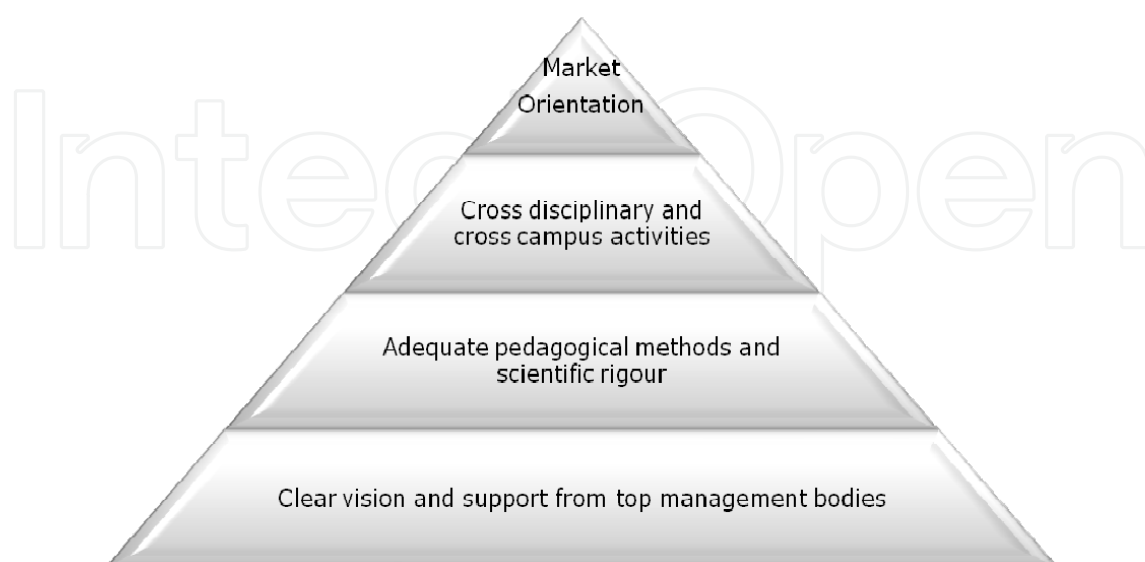
From HEI is expected the development of entrepreneurial capabilities as well as the creation of entrepreneurial mindset in their students, allow them to create and to explore

opportunities in private firms or in public or nongovernmental organizations (EC, 2008; Volkmann et al, 2009). Additionally, HEI can provide a set of competences, such as technical skills, business management skills and personal entrepreneurial skills (Hisrich and Peters, 1998). Moreover, in a knowledge economy, where innovation plays a central role, the R&D developed in HEI can create disruptive technologies and innovative ideas, contributing for more new firms, especially gazelle ventures acting in a global international basis.

Some studies appoint several perceptions of role of HEI to promote entrepreneurship. A study developed by Carter and Collison (1999) refers to retrospective perceptions of alumni towards the general provision of entrepreneurship education in Higher Education Institutions. The results of this study reveal an interest among alumni in entrepreneurial activities. However some constraints are pointed namely the lack of both finance and experience when setting up a business, conclusions shared by Linan (2008) that add the lack of self-confidence from students as an important barrier to not start a firm. The results also pointed to a need of a more practical grounding for graduates, specifically citing financial management and business communications skills as key elements missing from the undergraduate curriculum. There was an agreement that HEIs have an essential role to play in providing alumni with both formal post-qualification training and social support networks to promote entrepreneurial activity.

In a more strategic analysis, one can say that are some characteristics showed by entrepreneurial universities, anchored in a cross disciplinary and cross campus initiatives allow that all students can apply for them (Volkmann et al, 2009). Besides a widespread application, top management engagement in these issues, providing a clear vision and institutional support can contribute for the implementation of a entrepreneurship strategy, where the development of external linkages with entrepreneurs and other organizations should be present (Clark, 1998). The vision have also to, incorporate a market orientation, where scientific and technological capabilities developed by academics and students should be commercialized in the market through new firms, patents, licenses or other contractual arrangements (Bok, 2003).

Figure 1 resumes the characteristics of an entrepreneurial Higher education institution.



Source: Volkmann et al, 2009, adapted

Fig. 1. Characteristics of an Entrepreneurial Higher Education Institution

Despite these features, Schramm (2006) claims from more work in the field, recognising that further efforts should be developed.

Research recognises that courses or programmes in entrepreneurship can enhance participant intentions' to start a business as well as to develop entrepreneurial capabilities or to create more innovative or profitable ventures (Brown, 1990, Dominginhos and Carvalho, 2009; Henry et al, 2005; Reynolds, 1997), showing the significance of entrepreneurship education.

Entrepreneurship education has evolved in waves (Volkman et al, 2009). If in the beginning it was associated with management courses, gradually got his space, "to generate more quickly a greater variety of different ideas for how to exploit a business opportunity, and the ability to project a more extensive sequence of actions for entering business" (Vesper and McMullan, 1998:18). In pedagogical issues, several methodologies such as lectures were gradually replaced by application of active methodologies (Bell, 2008; Fayolle et al, 2006; Heinonen and Poikkijoki 2006; Peterman and Kennedy, 2003), such as problem base learning, project development, entrepreneur for a day, business drinks, simulations and other similar, allowing students to develop their potential by assuming more responsibilities in learning process.

We can argue that a more open policy towards community's involvement becomes crucial, bring entrepreneurs to the classroom to talk about their experiences, contact with local entrepreneurs, company visits, involve local business organizations in curricula's design, offer workshops and seminars, invite business angels and risk capitalists.

The successful of this strategy depends on teachers competences in the area as well as in their research work in the field of entrepreneurship (EC, 2003) allowing the development of an adequate curricula (Volkman et al., 2009).

3. PART II – Ecosystem in higher education

3.1 The Methodology

In this section it is our intention to characterize the methodological approach and tools used in this research, present the mains and specific goals and the propositions of the study.

This empirical research applies the case study methodology. According with Bell (1997), this methodology allows the researcher to focus in one case or specific situation and allows the identification of the interactive processes involved. Yin (1994) considers that the case study method is most appropriate for the investigation that search questions such as "how" and "why" about a contemporary phenomena about which the researcher has little or no control.

Regarding the main sources of evidence referred to by (Yin, 1994) - documents, interviews, archived data, direct observations, participant observations and physical artefacts, it has used, the analysis of documents, direct interviews and direct observations. This multiple sources of evidence are used in order to allow the triangulation.

Lakatos and Marconi (2001) describe interviews as conversations, whose purpose is to provide the necessary information to the researcher. With an interactive nature, this technique allows researchers to study complex subjects that could hardly be investigated in depth by means of questionnaires (Mazzotti and Gewandsznajder, 1993). Yin (1994) refers the importance of the use of interviews and according to this author it represents an important source of evidence for case studies.

Following this line, semi-structured interviews were carried out with Junior Achievement (one of the institutions responsible for extra-curricular entrepreneurship programs), and the responsible for OTIC. The interviews took place during March and April of 2008, and last for sixty to ninety minutes.

Also the student's involvement was quite important because it allowed significant contributions. Through focus groups it was possible to explore how points of view are constructed as well as how they are expressed (Kitzinger and Barbour, 1999).

3.2 How to improve entrepreneurship in higher education?

Considering the main question "How to improve entrepreneurship in higher education?", this section presents a case study applied Setúbal Polytechnic Institute - Portugal. We propose to study entrepreneurship education as a whole, considering an entrepreneurship ecosystem whose consider tree dimensions:

- Curricular entrepreneurship subjects;
- Extra-curricular entrepreneurship programs;
- Support infrastructures.

3.2.1 Curricular entrepreneurship subjects

The Polytechnic Institute of Setúbal (SPI) was created in 1979. Since the beginning these institutions intend to encourage both professional expertise and scientific knowledge. SPI comprises five Colleges covering such areas as Engineering, Technology, Education, Sports, Art, Communication, Business Administration and Health Care. Our college, BS (Business School) is one of the schools of Public Higher Education of the SPI, and today undergraduate, Masters, Post-Graduation, Courses and Technological Specialization in science business.

Created in 1994, with about 2000 students, BS has a significant size and is well recognized by businesses and other organizations. The school aims to train professionals in business areas, with a flexible and dynamic attitude. Strategically BS is focused on a differentiation based on:

- Satisfaction and employability of graduates - more than 90% of students in BS find employment in less than a year after they complete a degree;
- Linkages to business context - students engage in a compulsory internship for completion of the degree; teacher promote open classes and guest lectures by entrepreneurs and business people; , visits to companies and organization are common; case study methodology are often used in classes, business consultancy and training are offered to firms;
- Pragmatic education - in BS classes are dynamic, pragmatic and oriented towards real business and organizational situations;
- Accessibility of teachers - the relationship between teachers and students is characterized by an open door policy;
- Conditions for study - BS 's facilities are modern;
- Innovative practices - the use of simulation and technological resources, organization of business hours, language laboratories, workshops, personal development, among other practices are common in BS.

Entrepreneurship is one of the foundation stones of business education in BS. There are important reasons that justify this importance.

The first of all is that entrepreneurship is an important issue for world economy.

Another important reason is related with the change of the social contract between companies and their employees. In the past companies offered long-term security in return for loyalty, however from the 1980s, first in America and then in other advanced economies, the companies began downsizing their workforces. This made a huge difference to people's experience at the workplace. In the 1960s workers had had an average of four different employers by the time they reached 65. Today they have had eight by the time they are 30. Consequently people's attitudes to security and risk also changed. If a job in an organisation can so easily disappear, it seems less attractive and the creation of its own job can be an attractive option. In this context SPI tried to promote entrepreneurship education and in 2006 reformulate the curricula of Entrepreneurship, after 8 years course on New Business Creation. Besides the name, the methodology was radically changed, to fit Bologna process and to accommodate the recommendations of the scientific publications in the field of entrepreneurship education. In this vein, learning by doing approach was adopted, anchored in the development of a set competences connected to more entrepreneurial behaviours.

The new Entrepreneurship course starts, in 2006 at Technology School of Barreiro (TSB), in 2007 at BS and in 2008 at Education School (ES). The Entrepreneurship subject is elective for Accountancy and Financing, Human Resources Management, Information Systems Management, Engineering and Conservation and Rehabilitation, and is a compulsory course for Marketing, Logistics and Retailing Management, Construction Management, Cultural Animation, Social Communication and Sports and Recreation. In total, per year, there are about 500 students engaging Entrepreneurship classes.

Entrepreneurships subject is supported in the methodology "learning by doing", particularly at practical classes. The theoretical classes adopted the expositive method combine with the organization of open classes and conferences. The methodology "learning by doing", allow students to reach entrepreneurial competences through group dynamics and team experiences (table 1).

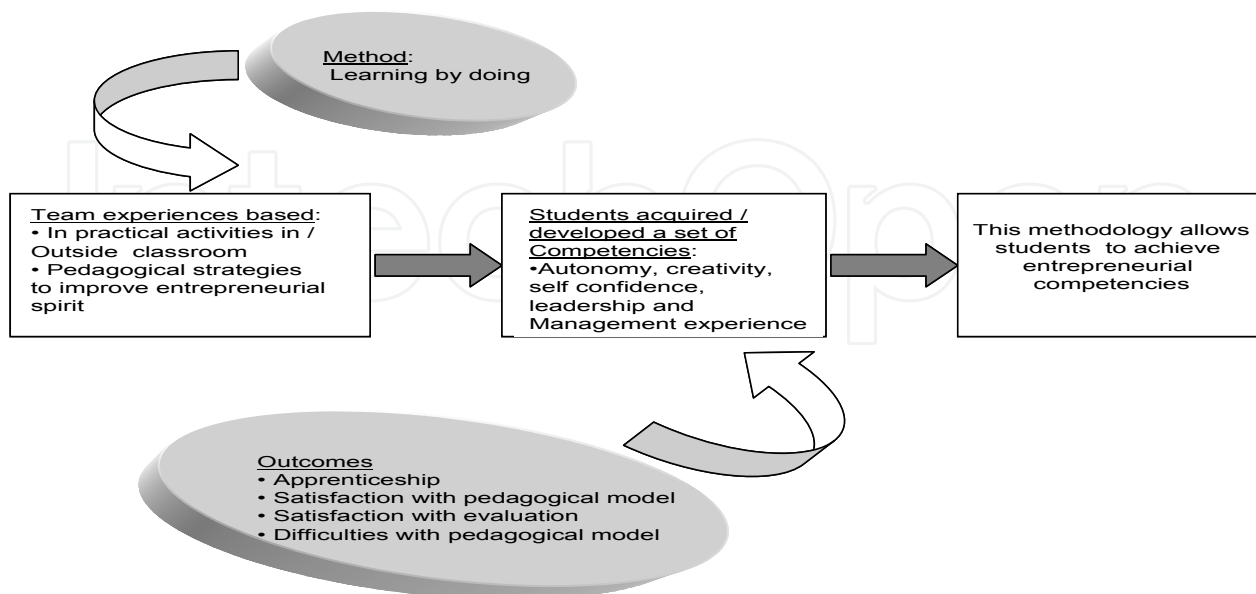
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Competencies	Activities developed
Criativity	Techniques of presentation that exposes students to different situations and promote behaviors "out of square".
	Bainstorming applied to creation of ideas
	Selection and test of ideas
	Find answers to unexpected questions
	Strategy games that involve creative thinking
	Apply theoretical knowledge through drawings, diagrams and symbols and their descriptive memory
Team work, leadership and autonomy	Group dynamics and studies that aims the development and application of theoretical concepts are made in group
Communication skills and self confidence	Activities in the classroom presentations and exhibitions are made in public.
Theoretical knowledge	Acquire theoretical knowledge of economy, management and specifically entrepreneurship and apply to case studies, business plans and strategy games

Source: designed by the authors

Table 1. Competencies and activities developed

This conceptual pedagogical model was evaluated according with a set of outcomes (see figure 2).



Source: Dominguihos at al, 2008

Fig. 2. Conceptual Model

According with Dominginhos et al (2008: 9), the results of the evaluation of the methodological model applied at Entrepreneurship classes justify the importance of this kind of learning, which allows a more efficient apprenticeship when compared with others traditional teaching methods. These results revealed that:

- 1) *“The activities in classroom, based on active pedagogical methodologies, contribute to satisfactory results concerning entrepreneurship learning and student’s satisfaction.*
- 2) *Other similar extra class activities also contribute to entrepreneurship learning and student’s satisfaction.*
- 3) *The methodology used – learning by doing – is, in students’ perspective, easy and friendly.*
- 4) *The activities developed and resources available were considered by students adequate to the methodology applied.*
- 5) *Students express satisfaction with evaluation system, confirming that the curricula unit evaluation was well accepted by the students, except concerning with satisfaction and difficulties involved with guest events invitation and activities planning. This exception proves that students need to improve their competencies related with communication, autonomy and self-confidence in their relations with external environment, including stakeholders“.*

3.2.2 Extra-curricular entrepreneurship programs

In addition to curriculum entrepreneurship subjects, SPI propose entrepreneurship extracurricular programs whose students could participate voluntarily. In this section we present two entrepreneurship voluntary programs:

- a. Junior Achievement, European Graduate Program
- b. Poliempreende, Polytechnics Institutes National Program

JA Worldwide is the world’s largest organization dedicated to educating students about workforce readiness, entrepreneurship and financial literacy through experiential, hands-on programs. Junior Achievement programs help prepares young people for the real world by showing them how to generate wealth and effectively manage it, how to create jobs which make their communities more robust, and how to apply entrepreneurial thinking to the workplace. Students put these lessons into action and learn the value of contributing to their communities. JA’s allows volunteers from the community to deliver our curriculum while sharing their experiences with students. Embodying the heart of JA, the about 384,925 classroom volunteers transform the key concepts of the lessons into a message that inspires and empowers students to believe in themselves, showing them they can make a difference in the world.

JA has different entrepreneurship programs according the age and degree of education: elementary school programs, middle grades programs, high school programs and other particular events and specific programs.

With a range of different programs, Junior Achievement teaches about concepts relating to entrepreneurship, financial literacy, and work readiness. The volunteers bring real-life business experience and guidance into the classroom at a time that represents an essential crossroads for young people. In this chapter we will focus in Junior Achievement's high school programs help students make informed, intelligent decisions about their future, and foster skills that will be highly useful in the business world. JA Graduate Program analyzes and explores personal opportunities and responsibilities within a student-led company and is accompanied by a tutor. In Portuguese case the tutors are a senior manager from a Portuguese private Bank (Millenium BCP). The group develop a set of concepts in the

program (Business, Choices, Competition, Division of labor, Entrepreneurship, Expenses, Fixed Costs, Goods, Incentive, Income, Liquidation, Management, Marketing, Parliamentary procedure, Price, Productivity, Profit, Production, Research and development, Services, Stock, Variable costs) and develop several skills (Assembling products, Consensus-building, Critical thinking, Estimating, Filling out forms, Interpreting data, Math computation, Negotiating, Presenting reports, Problem-solving, Public speaking, Research, Selling, Teamwork). SPI participate in JA Post-Graduate Program with two students groups from ESCE and TS (Technology School) whose propose to create a company and participate in national competition.

Poliemprende, Polytechnics Institutes National Program is another extracurricular program to promote entrepreneurship. This program is a national contest applied only to polytechnic institutions and aims improve an entrepreneurial culture and develop student's entrepreneurial skills and promote the creation of innovative firms in each region with positive impacts in local development. This project favors the participation of students with ideas supported in knowledge from different scientific areas and schools in order to mobilize different skills work in multidisciplinary teams and facilitate technology transfer. Poliemprende considers two training cycles: Workshops E1 and E2. These workshops occur during academic year and include: an ideas competition and a business plan competition. The workshop E1 highlights hands on methodology and try to develop new attitudes, initiative, decision making, uncertainly management capability, negotiation techniques and communication skills. The workshop E2 aims the development of several personal competencies (leadership, communication, and valorization of team work, ethics and organizational culture) and the development of an entrepreneurial project supported in a Business Plan.

The Business Plan evaluation is made in two steps. Firstly the competitors are evaluated by a regional jury in each Polytechnic Institute. The three best business plans won a prize and the best team jump to a national competition. The second step consists in national competition whose includes national prizes and special support to set up a new firm.

3.2.3 Support infrastructures

Finally the third dimension describes the support infrastructures created to foster entrepreneurship in higher schools and in region (e.g. Office of Knowledge transfer and information –OTIC; and ACTIVLAB).

OTIC stimulates and promotes the transfer of ideas and innovative concepts from research developed in colleges to firms. Additionally, acts as a forum to match business needs with solutions provided in the SPI. In this sense, the establishment of strong ties with business organizations becomes the main strategic goal of OTIC.

OTIC aims to promote the enrichment of scientific portfolio SPI in conjunction with the real needs of businesses in the region, based on a rigorous exploration of the market and building an environment of cooperation and trust through transfer of technology and knowledge in joint projects. The main objectives of the OTIC are:

- Identify results that transfer, generated by groups of research or product of research alone;
- Detection of unmet needs in the business environment and its transformation into innovative projects;

- Promote the establishment of multidisciplinary teams Polytechnic Enterprise, for the resolution of specific problems of companies;
- Providing an environment of cooperation between the Polytechnic Institute, businesses and other organizations in the region;
- Promoting entrepreneurship and supporting the processes of business creation.

OTIC promotes:

- 1) Scientific and technical support to small and medium sized companies based in the region of Setúbal;
- 2) Development of R&D projects and activities of technology transfer in partnership with business;
- 3) Training activities for companies in the region;
- 4) Cycle of events devoted to technology transfer and international cooperation (workshops, conferences and meetings) as well as those dedicated to promote an entrepreneurial culture.

In 2008 was created a laboratory for entrepreneurship - ACTIVLAB. The main purpose of the infrastructure is to allow entrepreneurs to test their ideas and give some logistical support in first six months of new ventures.

It is an open space, for 8 different firms that offer, totally free, a personal computer, fax, and telephone, access to internet and to library and data bases. Additionally, teachers offer consultancy to young entrepreneurs in management and technical areas.

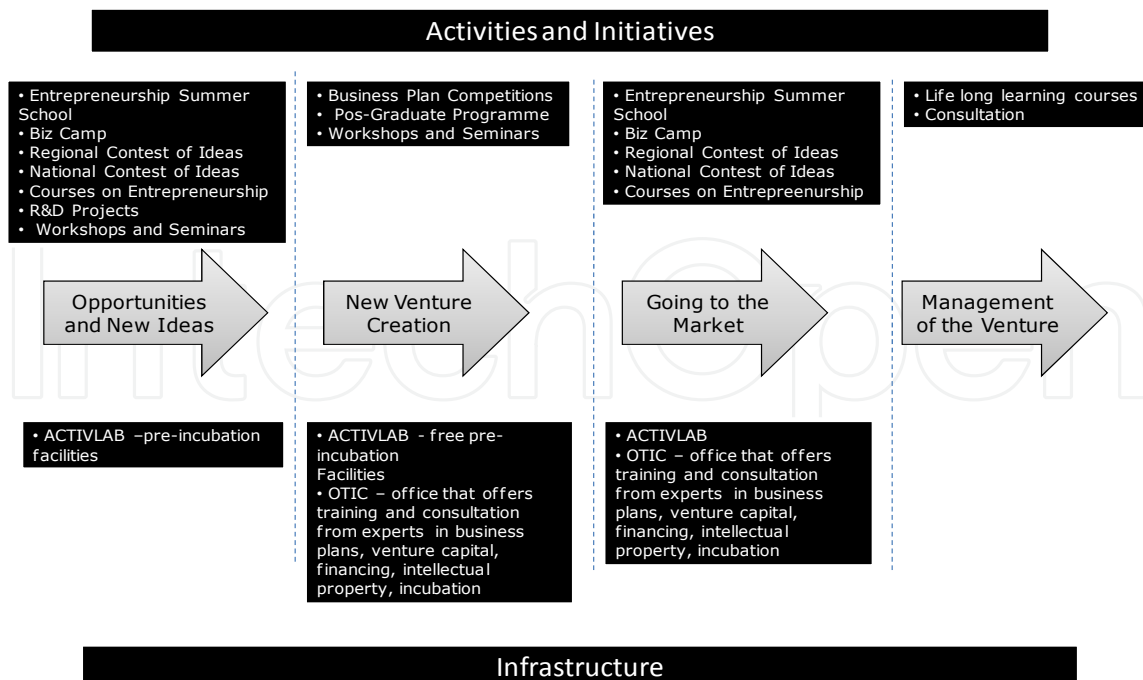
ACTIVLAB works in close cooperation with OTIC, and entrepreneurs can benefit from their formal and informal contacts.

3.3 The Entrepreneurial Ecosystem

Wikipedia defines natural ecosystem as a completely independent unit of interdependence organisms which share the same habitats. Applying this concept to social sciences, an entrepreneurial ecosystem includes a set of tangible and intangible resources and actors characterized by an interdependence relationship that creates important synergies.

3.3.1 Results and Barriers

This section highlights the main results and barriers found in the implementation and development of the entrepreneurial ecosystem. The figure bellow resumes activities and infrastructures existing in SPI to promote entrepreneurship.



Source: Designed by the authors

Fig. 3. Activities and Infrastructure to Promote Entrepreneurship in SPI

These activities are performed internally but also with the establishment of linkages to external organizations across entrepreneurial process. In the figure above, activities and initiatives delivered by SPI are considered as well as the infrastructure to support those activities across entrepreneurial process. First stage concerns opportunities and new ideas. A set of activities are developed in entrepreneurship regular courses and in others short training courses and in R&D projects, where new technologies are created. ACTIVLAB becomes the natural place for those ideas grow up and become more mature, after studying the market.

The second stage is where entrepreneurs test the business idea or technological concept before set up the new venture. In this phase, entrepreneurial team prepare the business plan to get money from investors. Our experience shows that the vast majority of students' stops here and few start a new venture.

In third stage, namely going to the market, entrepreneurs got the support of ACTIVLAB, particularly logistical facilities, and from OTIC, in soft skills.

Finally, in fourth stage, SPI provide some consultancy and training courses, as well as the development of joint R&D projects.

Concerning the results OTIC achieved some important indicators that are presented in table 3.

Indicator	Number
Number of R&D projects driven by OTIC	4
Number of products / services created / supported by OTIC	6
Number of partnerships established with OTIC	20
Number of business created with OTIC support	4
Number of business in development of business plan	3
Number. of business in idea maturity and development	4
Total number of participants in training programs	166
Average number of participants in training programs	28
Total number of participants in events	388
Average number of participants in events	65

Source: Designed by the authors

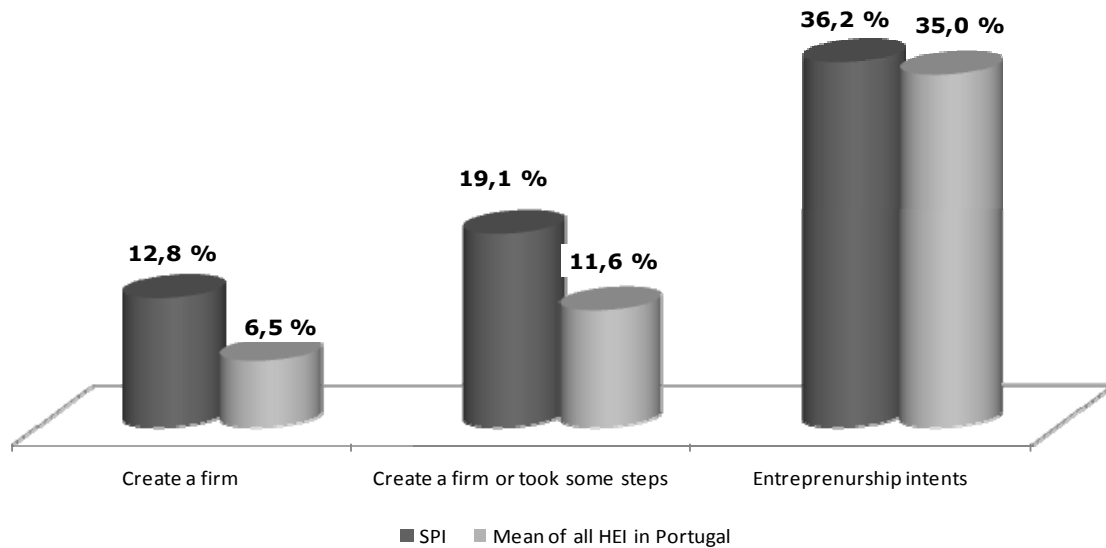
Table 3. Result Indicators from OTIC

Concerning ACTIVLAB, three projects were installed in its facilities. One entrepreneur, that won the first place in the regional completion of ideas, is testing a project in the area of alternative energies. Another, a firm created with strong support from OTIC, runs a business in information technologies. The third one, from the competition promoted by Junior Achievement, is trying to set up a consultancy firm.

The set of programmes and infrastructures described allows SPI to create a more entrepreneurial culture in last three years.

These statement is supported by some results from a national survey aplyed to students from Higher Education Institutions, public and private, as wells from universitiy and polytechnics. Three main indicators were measured: % of students who created a firm; % of students who created a firm or are doing some steps to do it; and % of student who said that will create a firm in the future. The data is shown in Figure 4

Globally, students from private and polytechcs reveal a higher propension to create firms. In the case of SPI, the percentage of students that create a firm is almost twice the average. If we consider those who taken some steps toward this goal, in SPI the percentage is 19,1% against 11,6% in national terms. But when we consider entrepreneurial intentions, the resuks are quite the same in SPI as in national average.



Source: Teixeira and Davey, 2008

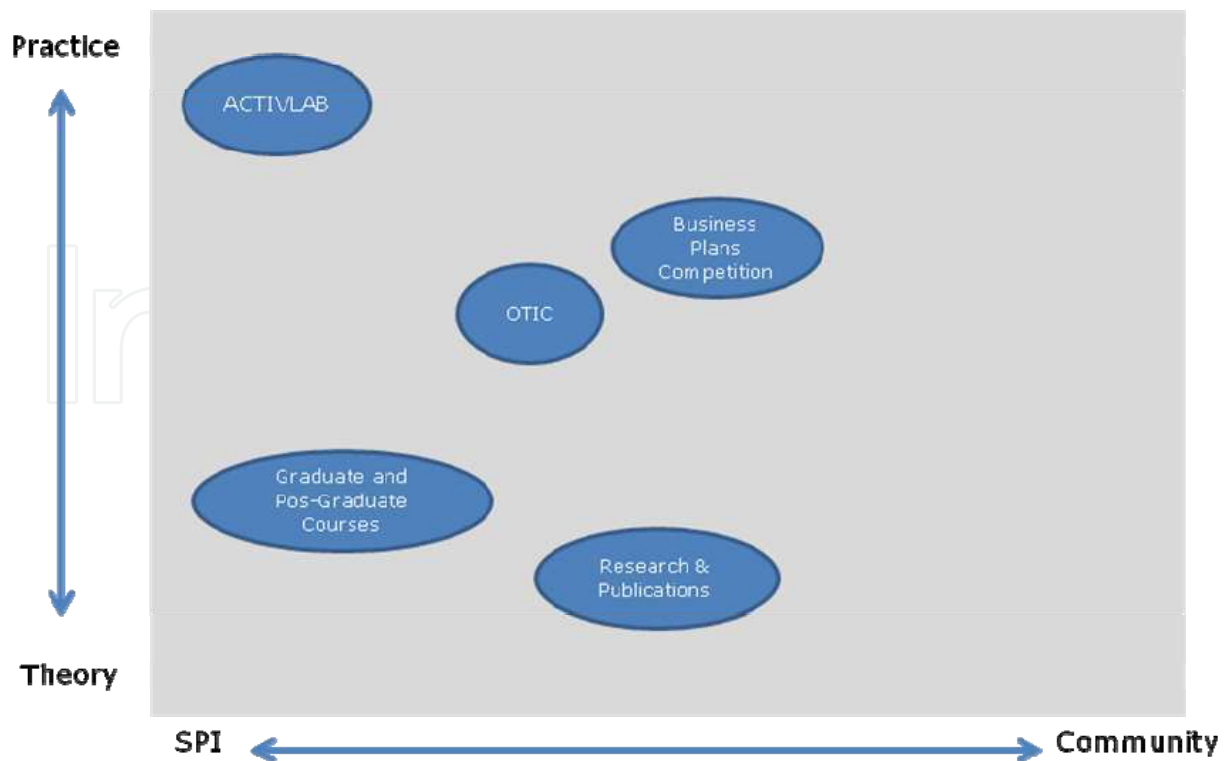
Fig. 4. Entrepreneurship indicators among portuguese higher education students

One can say that the entrepreneurial ecosystem is still in its infancy in Portugal (Redford, 2009), and SPI is not an exception. One can speculate that having the support infrastructure allows SPI to transform more ideas in firms.

In SPI, two different types of events have contributed for the development of entrepreneurial ecosystem. In one hand, scientifically and pedagogically, entrepreneurship has been boosted by some local champions, above all teachers, based in their PhD programmes. They were able to change the goals and methodologies of the courses to create a more student oriented approach, based in the results of scientific research. This focussed approach, based in Business School and in a small group of teachers, was complemented by a transversal project (OTIC), with strong support from top management, applied to all schools. At the time, in engineering, education and health schools entrepreneurship was seen as an unfamiliar subject, and now more and more degrees have, at least, an course on entrepreneurship.

In last two years the investment was carried out to create a more entrepreneurial culture across schools, specially Deans and Scientific Boards, teachers and students. And, despite all initiatives taken in classes and by OTIC, to interact with outside community, activities are specially executed by SPI, internally, with a mix of theoretical and practical classes, supported in infrastructures to promote business creation and connections to external support organizations.

In next figure, we summarize activities taken by SPI, based in a framework proposed by Engles *et al* (2008).



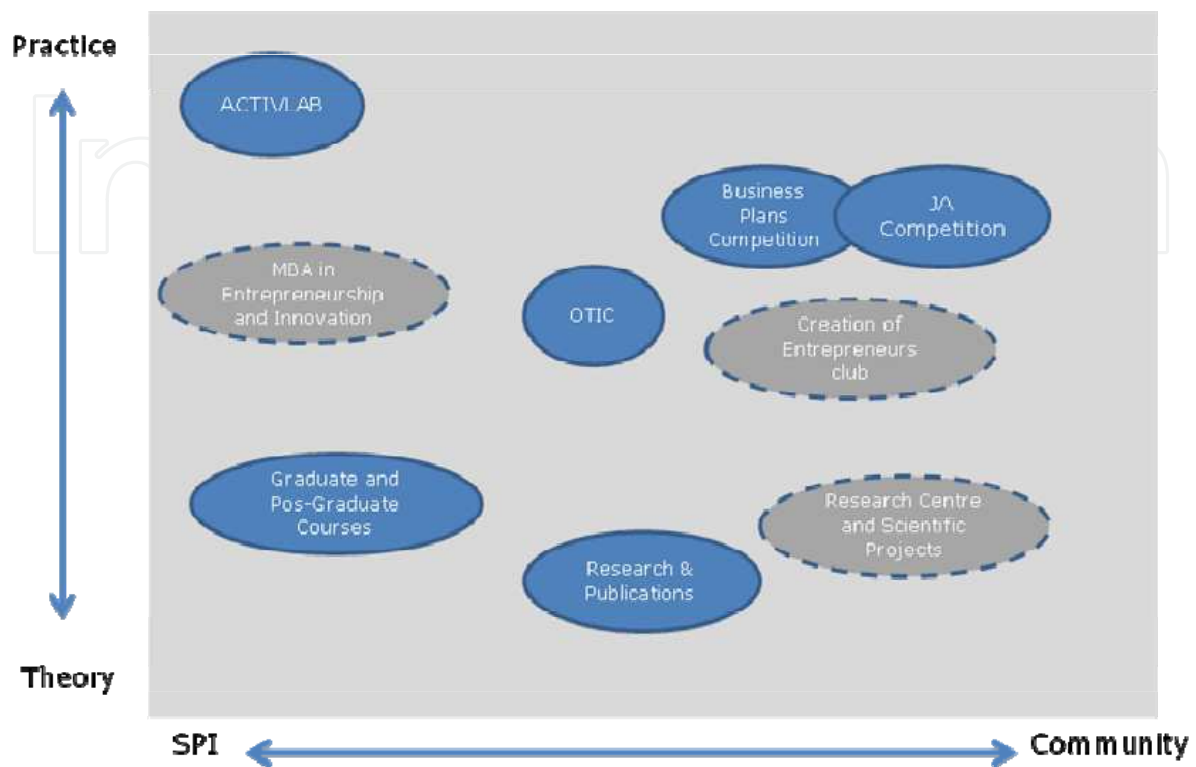
Source: Engles *et al* (2008), adapted

Fig. 5. Current activities in SPI to promote entrepreneurship

Despite this investment, there are some barriers faced when trying to implement an overall strategy to promote entrepreneurship in SPI. First of all, students, teachers and executive boards reveal a cultural resistance. Studies show that in Portugal, people show lower entrepreneurial intentions and cultural attitudes that not favor entrepreneurship (GEM, 2004, 2008; Eurobarometer, 2003). In this sense, it is not easy to convince students to apply to entrepreneurship courses, especially when they are pushed, by family and society, to get a job after the degree. For teachers, there are no real incentives to become an entrepreneur. For a full time professor, it is forbidden to accumulate a private activity, and patents and business activities are not very worth in academic careers. For scientific boards, because only a limited number of teachers are working in the area, it is difficult to accept transversal courses in all degree. First of all, because a question of power. Secondly, entrepreneurship only recently got its scientific legitimacy and most part of teachers is not familiar with the subject. Finally, for executive boards, until recently, there were no real incentives to promote entrepreneurship, because all external evaluations do not take into consideration the number of firms created by students or teachers, or the number of patents registered, but concentrate in professional inclusion of young graduates in labor market.

3.3.2 Recommendations and Concluding Remarks

Three main dimensions deserve a closer attention to reinforce entrepreneurial ecosystem in SPI, anticipated in the next figure.



Source: Engles *et al* (2008), adapted

Fig. 6. Projected activities in SPI to promote entrepreneurship

First of all, in a more internal perspective, the dissemination of entrepreneurship courses for all five colleges and for all degrees. Less than fifty percent of first cycle degrees offer, at least, an elective course on entrepreneurship. This is a cultural change and demands a strong commitment from Scientific Boards as well as from Executive Boards. We believe that this change can occur for two set of reasons. Firstly, in Portugal, a national movement pro entrepreneurship start in last year's. There is several programs devoted to new firms creation and to commercialization of R&D. Secondly, internally, the new legal framework and structure, with an Academic Council, facilitates the implementation of transversal courses in all schools. This movement should be complemented by a Master in Entrepreneurship and Innovation, allowing scientific research between teachers and students as well as a strong focus in business creation during two years' degree, reducing the percentage of mortality from those who start a business, according with international results (Henry et al, 2005). This Master will allow us to work together with management students and those come from sciences and technology, where more innovative ideas can e developed.

A second area is refers to the creation a research centre devoted to entrepreneurship. This research centre should act in different areas. First, to reinforce academic research and field work, promoting academic legitimacy. At the same time, it is a laboratory for joint projects

with external organizations, an area that deserves closer attention and need to be emphasizing in SPI.

Thirdly, there is a need for more involvement of students and outside organizations as well as entrepreneurs and business organizations. The creation of a Club of Entrepreneurs could overcome this weakness. Such infrastructure can promote workshops and seminars, counseling and support novice entrepreneurs, provide financial support, such as seed capital or money from some business angels, social capital initiatives opening SPI to the community.

Promoting entrepreneurship in SPI shows how complex and difficult it becomes, particularly in a society where entrepreneurship education is still in its infancy (Redford, 2009). If in early stages the role of local champions becomes essential to generate examples and to show that it is possible, advanced stages claims for more ground support, especially from Executive and Scientific Boards, to spread out all the activities as well as to put some money in the development of all kind of activities.

Additionally, to promote new ventures, Higher Education Institutions need to invest in support infrastructures, such as logistical facilities and specialized consultancy or establish strong partnerships with organizations that offer these services.

Last but not the least it becomes essential a strong focus in scientific research that push HEI to create innovative products and technologies with market orientation.

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No.65, Yan An Road (West), Shanghai, 200040, China
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821

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