



**CREATIN**

**Leonardo Da Vinci**

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## **Regional Report**

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**EXECUTIVE SUMMARY**

The aim of this study is to highlight the degree of implementation of innovation and creativity techniques in the entrepreneurial network of Catalonia and to map the real needs for SME's and support organisations.

A brief desk research will be done in order to set a basic framework of the current situation in terms of innovation and creativity techniques in Catalonia. This previous analysis will be used to identify specific regional situations that need to be taken into consideration when elaborating further conclusions and recommendations. The information obtained from the documentation and bibliography research will later be contrasted with the results obtained through the questionnaires and interviews.

A representative sample of interviewees will be selected following the criteria established in the methodological framework, a selection that will include representative members of small and medium enterprises, intermediate organisations, Technology Parks of the region and innovation agents.

The information recollected from the interviews and questionnaires is designed to identify what is the issue-awareness level among the main actors of the region and what their dissemination needs are.

This regional report will also provide information on which are the mechanisms and techniques applied by small and medium enterprises and support organisations when implementing innovation and creativity practices in relation to products and services and the strategic stand they take in their execution in order to identify the most successful strategies.

The questionnaires and interviews are also designed to provide some feedback about the information, knowledge and training insufficiencies of innovation agents and managers, both within SME's and support organisations. To this, it will be added a concise analysis of the real needs and problems they face when implementing creativity and innovation techniques for products and services. All this information will later be used to develop the technical and content requirements of the Creatin self-learning system.

Finally the field work, with all the incidences and problems that might appear, will provide first-hand information about the methodology used in the Creatin project, leaving it open to further suggestions and recommendations.

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## 1 INTRODUCTION

### **Service Innovation in Small and Medium Enterprises**

#### **Catalonia**

##### **Catalonia in figures 2008**

- Population (million): 7.3
- Area: 32,106 km
- GDP (million) : € 208,627
- Individual GDP: € 29,092
- Inflation. 3,0%
- I+D investment (%GDP): around 1,44
- I+D investment small and medium enterprises (%GDP): 0,86
- Annual exports (millions): € 49,952
- Annual Imports (million): € 79,230

*Source: Catalan Institute of Statistics (Idescat)*

#### **1.1 Region's General Context**

##### **1.1.1 Entrepreneurial structure in Catalonia**

Implementing innovation and creative practices in small and medium enterprises entails and comprises the development of R+D activities –both internal and external-, the acquisition of new innovation materials and tools, the acquisition of knowledge intangible goods and the unfolding of complementary activities of training and lifelong learning.

Creativity represents a fundamental step in all this process since it provides the necessary ideas that innovation processes will successfully implement. Thus, creativity can change or update knowledge inputs and transform new technologies-based instruments into final consumer goods through innovative processes. In this sense, R+D activities within firms have to be understood as fundamental creative practices aimed at developing suitable ideas to be implemented in the business activity.

The development of all the afore-mentioned practices among SME's will be influenced by the entrepreneurial structures and culture of the region, and the subsequent analysis will also have to take them into account.

According to the latest data provided by the Catalan Institute of Statistics (Idescat) the Catalan entrepreneurial sector invested a 0.86% of the region's total GDP in innovation activities. Although this data reflects the leading role of the region in innovation activities within the whole of Spain (0.61% of the GDP) it still shows that Catalonia falls behind some of the most developed regions in Europe in this field.

The Catalan entrepreneurial network has always been dominated by small and medium enterprises, with a reduced presence of large global corporations. In this sense the figures provided by Eurostat for 2003 indicated that more than an 85% of the Catalan industrial network was made up of enterprises with less than 10 workers and another 12% of firms with less than 50 employees. However, the 2.3% of enterprises with more than 50 employees amounted, in the same year, to a 47% of the total active industrial population. Therefore, the important role played by small and medium enterprises in the economic network of the region turns them into key actors in the development of innovation processes.

Traditionally, however, the entrepreneurial culture of the region has shown important shortcomings on regard of innovation and creativity practices. According to a study realised by the University of Alcalá in 2008, the most important values recognised by entrepreneurs as keys to success were the firm's level of *differentiation* towards the competence and the "good performance" in the company activities; the notoriety of human capital, creativity values, capacity of technical innovation and provision of financial tools were not highlighted in a similar way by those entrepreneurs interviewed (*Innovative and Creative Entrepreneurship in Spain*, Cuadrado-Roura and García-Tabuenca, 2008, Publicaciones Universidad de Alcalá).

To this, it must be added that the majority of Sme's of the region must face a shortage of financial tools when trying to implement innovative and research activities; and, although the private financial system plays an important role for

the region's development, its activity has proved to be insufficient in helping Sme's face their capital needs for innovation. Thus, lacking the capital and human resources of large companies a different approach has to be taken when analysing the application of innovation and creativity processes in small and medium enterprises.

Moreover, the region has traditionally been devoid of an entrepreneurial culture encouraging live-long learning practices. According to the figures provided by the Catalan Statistics Agency only a 7.8% of men and a 10.0% of women aged between 25 and 64 were currently engaged in regular plans of lifelong learning in their workplace; these are poor figures when compared with similar practices in other regions of the Euro zone.

Neglecting training processes in small and medium enterprises deprives the employees of the tools and information necessary to actively participate in creativity and innovation processes along the whole productive chain; and might also hamper their motivation and involvement within the company (being the former two driving forces in creativity processes).

Some reasons might be used to explain the picture described above: historically the Catalan industrial sector has relied heavily on traditional manufacturing activities, such as the textile production and housing activities; these are areas in which the development of innovation tools and creativity practices has traditionally been neglected and undervalued. This has been so, because the implementation of these practices was not seen as imperative in providing a higher value-added for the final product.

Despite this preliminary gloomy picture, the Catalan entrepreneurial network has experienced, during the last years, an important transformation that has lead to a major attention towards the corporate values of innovation and creativity.

This transformation has been propelled by the upsurge and development of new sectors of the economy that have taken a different stand towards innovation. These sectors are mainly oriented towards high or medium-high technology services and productive activities; just to mention a few: the chemical, pharmaceutical, life sciences, and automotive and industrial design sectors.

More and more small and medium enterprises are currently developing their activity in one (or more) of these sectors and have understood the need to develop innovation and creativity practices in order to add high value to their products and services in an extremely competitive environment. In this sense,

the typology of these sectors, and its sme's, shows great similarities with that of the rest of the European countries and a similar process of spill-over might be expected in the development of innovation activities among other economic areas of the region.

Alongside the proliferation of these new sectors of activity it has to be highlighted the development and creation of a wider network of technology parks, research centres and S+T intermediate organisations that have to be seen as a good opportunity to strengthen the collaboration between the entrepreneurial and the research sectors. This cooperation is deemed to be necessary in order to foster innovative and creative activities in the region.

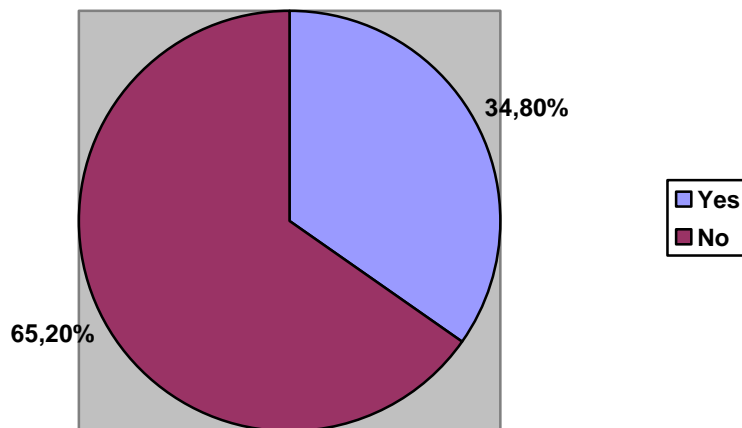
Catalonia has created a vast conglomerate of S+T intermediaries aimed at facilitating knowledge transfer and fostering innovation. Since 1997 their importance for the economic performance of the region's firms has grown steadily and is rather likely to keep on doing so.

Also, the creation of a wider network of technological parks has to be seen as a good opportunity to strengthen the relation and cooperation between the entrepreneurial and the research sector, a relation that will result in a better perspective for innovation processes. Currently, Catalonia has more than 30 Technological Parks and a wide network of small research centres that work in close collaboration with the business sector.

Another area in which the region has recently shown considerable improvements is in the implementation of regular joint innovation and creativity initiatives among small and medium enterprises. The traditional lack of active collaboration among the main actors of the entrepreneurial network resulted in a significant shortage of regional and trans-regional networks of excellence and its subsequent activities. New projects on open innovation are conceived to provide feasible solutions to this situation.

On this regard, and according to Cuadrado-Roura and García Tabuenca, those entrepreneurs that participate in joint-innovation activities hire more graduates and researchers, are more prone to negotiate merger agreements and are more likely to be affected by private financial investments (*Creative Entrepreneurship in Spain; Cuadrado-Roura and García-Tabuenca; Publicaciones Universidad de Alcalá, 2008*).

***Small and Medium enterprises collaborating in joint-innovation activities***



Source: *Universitat Pompeu Fabra, 2009*

## **2 THE ROLE OF PUBLIC ADMINISTRATION**

The Catalan Government in order to give an answer to the afore mentioned problems implemented for the period 2005-2008 the so-called Research and Innovation Plan aimed at providing the necessary tools and mechanisms to fuel research and innovation activities among the region's firms. This plan has recently been renewed for the period 2009-2012.

Among many others, the main objective of this plan is to develop the necessary infrastructures required to support and ease the process of product and service innovation necessary for the region. As mentioned before, an insufficient amount of private investment for infrastructures and innovation and creativity initiatives has forced the region to rely heavily on the public sector in order to achieve this goal.

Together with these initiatives promoted by the regional government, both the Central Government and the European Union have also played an important role in targeting Catalonia and its entrepreneurial fabric as a main recipient of financial support for innovation and creativity actions.

### ***2.1 History of success***

All the efforts made by the private and public sector have proved to be successful in turning Catalonia into one of the European leading regions in high added-value products and services.

Catalonia and its capital city, Barcelona, are currently recognised as one of the most active and thriving economies in the design and industrial production innovation services, a fact that poses both an excellent opportunity of growth and an improvement challenge for the region.

The exports volume of industrial products in the region shows a growing importance of high and mid-high technology-oriented products. Thus, in 2008 the exports of high technology products amounted to 6,606.9 million euros whereas those of mid-high technology reached the 23,241.2 million euros (Idescat).

The region's success in these areas is quite interesting for the present study. It has to be taken into account that most of the fields in which Catalonia has shown excellent performance results require of a high involvement of creativity

practices. This is an excellent prove that creativity practices have settled down among the entrepreneurial fabric of the region.

In bringing forward this success it has also helped the growing awareness shown by the entrepreneurial network of the role of new communication and information technologies for their economic performance. Thus, according to the data provided by the Catalan Institute of Statistics (Idescat), in 2006 more than 95% of Catalan firms had access to internet and more than a 53% of them had their own corporate web site. This might be seen as a potential factor in developing innovation and creativity practices within the region, since the use of these technologies is fundamental in developing creative activities.

### **3 GENERAL PROFILE OF S+T INTERMEDIARIES IN CATALONIA**

#### **3.1 *The role of S+T intermediaries***

Catalonia has a very complex system of actors and networks implementing in the field of support to innovation and intermediation. This network is highly involved in the general objective established by the “Research and Innovation Plan for Catalonia 2009-2012” in supporting a solid research, development and innovation system capable of fostering forward-looking initiatives and in positioning Catalonia in the scientific and technological European vanguard.

These institutions are formed by the regional development-oriented organisations, universities, research centres, innovation agencies and prestigious technology transfer centres with recognised experience and knowledge of their territories. In this sense in 1997 the Catalan government created the Innovation and Relay Centres network of Catalonia in order to allow this centres to collaborate and to work in joint activities, turning them into points of reference in innovation and technology transfer processes.

These institutions have proved to be very valuable for all those sme’s interested in processes of technology acquisition and transference, providing them with a higher competitive stand in a highly globalised environment and establishing regular contacts with the entrepreneurial actors of the region.

The development of S+T centres has been the answer provided to the growing needs faced by the business sector and research centres in establishing a collaborative interaction, and has resulted in an increased competitiveness of the region’s entrepreneurial network and in higher returns from the implementation of R+D projects.

The services offered by these organisations are mainly oriented towards small and medium enterprises, mostly performing high and medium-high technology activities, although their services are also available for large corporation, universities and other research centres.

These Catalan S+T network has signed in the European IRC Network that comprises more than 71 IRC’s from more than 30 different countries and that works in close collaboration with more than 65,000 firms.

**3.2 Sectors and research areas covered by S&T intermediaries**

Table: Coverage of selected intermediaries by sectors

|                          |         |                        |         |                       |                                       |
|--------------------------|---------|------------------------|---------|-----------------------|---------------------------------------|
| <i>no specialisation</i> | 1, 2    | electronics            | 3, 4, 5 | textiles              | 5                                     |
| chemistry                | 3, 4, 5 | mechanical engineering | 3, 4, 5 | optics                | 5                                     |
| biotechnology            | 3, 4,5  | informatics            | 3, 5    | logistics             | 5                                     |
| medicine                 | 3, 4, 5 | robotics               | 3, 5    | ICT                   | 3, 5                                  |
| food processing          | 4, 5    | metrology              | 5       | construction          | 5                                     |
| advanced materials       | 3, 4, 5 | industrial design      | 3, 5    | transport equipment   | 5                                     |
| mechanics                | 4, 5    | wood processing        |         | energy                | 3, 4, 5                               |
| nanotechnology           | 3, 4, 5 | agriculture            | 3       | other, please specify | 4<br>(pharmacy, economics, languages) |

These institutions do not have show any particular specialisation by sectors. In general terms, they cover a wide range of industrial fields such as chemistry, biotechnology, medicine, electronics and mechanical engineering, all of them key sectors for the Catalan economy.

In relation to what have been mentioned before, some traditional sectors such as textile production and housing activities have not been seen as potential targets by these S+T organisations. However, this situation is very likely to change in the foreseeable future since the Catalan economy has tended to diversify in the last few years: thus, the textile sector (together with other traditional sectors of the economy) has had to undergo a deep reorganisation in order to face the challenges posed by emerging economies. For this reason, is very important to develop and foster innovation and creativity initiatives oriented, not only to strong and currently consolidated fields, but also towards the sectors of the economy that might face major problems posed by the globalisation trends in the economy.

**3.3 Service areas covered by S+T intermediaries**

Support for new product and service development is a quite relevant area for most of the intermediaries, although it still shows important differences in its degree of development. The most common service applied is "Technical

assistance for preparing a feasibility study of the product-service”, while the intermediate steps are less and less important.

Support to innovative start-ups and spin-offs are also important and they have greatly contributed to the successful development of spin-offs and start-up companies in the region.

Licensing is one of the areas where S+T intermediaries show a lower degree of performance and it is not yet considered a priority among their activities.

Networking and Clustering: The S+T active on the region present important differences in their scope of action in relation to networking and clustering activities, although most of them do implement practices geared at its development.

Among the less developed areas of activity of S+T in which further efforts are still to be expected are the IPR commercialisation and personnel mobility. On regards of the former only a small percentage of S+T's operating in the area show good performance levels and a big majority do not consider it an integral part of its operational activities. Worse results are shown in human mobility actions where only one of the S+T of the region develops regular programmes.

#### **4 THE ROLE OF TECHNOLOGY PARKS IN THE INNOVATION AND CREATIVITY INITIATIVES**

The role of technological parks in the development of innovation and creativity processes has also to be highlighted. In Catalonia there are more than 30 technology parks working in close collaboration with the entrepreneurial network of the region.

80% of these technology parks is composed of small and medium enterprises, a fact that gives a clear idea of the important role that they play in providing added value for the actors involved in their activity.

The creation and development of these technological parks and research centres is designed also to increase the presence of investigators and technical advisors in small and medium enterprises of the region, allowing a more fluent and proactive knowledge flow.

Within this conjecture both the central and the regional government have recently developed programmes and initiatives geared at encouraging the employment of in-house and external researchers within the firms.

#### **5. ENTREPRENEURIAL TYPOLOGY OF SURVEYED FIRMS**

In order to gather coherent and complete information for the project Funditec has contacted representative institution active in the whole process of innovation and creativity. A representative range of firms with less than 50 workers has been contacted in order to receive down-to-earth information on the impact that innovation and creativity practices have in their performance.

In the same way, these contacts have been profitable in disseminating the important role that creativity practices might have for them and to highlight which are the problems and difficulties that are more likely to appear during their implementation.

Some of the companies interviewed also provided information about the aims and objectives pursued and expected by them when implementing creativity and innovation practices. As it will be discussed in the following chapter this information was mainly gathered through open discussion with their representatives since the questionnaires did not show special attention in highlighting the firms' real ambitions.

A sample of Technological parks and research centres were also interviewed for the project. Their paramount role in developing innovation practices and fostering technology transfer processes turns them into key actors of the process. The important role played in them by SME's was also an interesting point to be analysed in the study. It was important to identify the services that Technological Parks and research centres provide to SME's and intermediary organisations in order to understand the characteristics of their relationship with SME's and the most common problems this cooperation might face.

Finally, a range of intermediary organisations has also been approached. Their active role in technology transfer activities between research centres and the business sector gives them a wider perspective of the whole process and important tools of analysis.

## **6. INCIDENCES FOUND DURING THE FIELD WORK**

Through the development of the field work we could observe that the final questionnaire presented some shortcomings. Once the firms had provided their answers there were no grounds upon which to identify which were the real needs and wants of the companies interviewed. The questionnaire was strictly designed to provide a description and an analysis of current practices on innovation and creativity initiatives within companies and the level of issue-awareness among them. However, the questionnaire lacked the necessary tools (questions and statements) suitable to gather information in terms of what the companies' real needs are and which are the most important problems that they have to face when implementing innovation and creativity practices. This information is extremely important when designing far-reaching strategies in innovation and creativity and should not be undervalued.

We could also observe that the questionnaires did not make a clear difference between the concepts of creativity and innovation. Even though both are fundamental in order to identify needs and develop performance strategies, it might have been interesting to segregate the two concepts beforehand and to show the particular and individual role that they play when implementing new productive processes. Sometimes the conceptual border between the two ideas was rather blurry and so it was shown by the interviewees' answers. With this information available, the study could have focused more directly on the analysis of the interrelation of creativity and innovation practices within the firms' strategies.

Another relevant fact that we could observe was the different approach the interviewees took towards the questions depending on which was their typology and field of action. In this sense, the representatives of the technological parks took a more academic-like approach to the questions; their answers were more

rigid and implied a more in depth analysis of what they were asked about. On the other hand, small and medium enterprises representatives gave a more practical and down-to earth answers to the questions. However, whereas it was easy to identify what was their level of awareness in relation to innovation and creativity actions it was more difficult to understand what where their expectations and desired goals.

In some cases, sme's representatives had problems in identifying what they were asked about and they had not a clear understanding of what the values of innovation and creativity referred to and which are their benefits.

Also, some of their answers referred only to one department of the company and could not be taken as a general conclusion used to frame the whole productive system of the firm.

Finally, and as it has already been mentioned by other participants in the project we could observe certain differences between the answers provided by the representatives at the management level and those in more technical positions. Whereas the first ones took a more normative approach of what the company performance in innovation and creativity activities is, or rather should be, the second ones did not provide so positive and laudatory answers to the questions.

## **7. CONCLUSIONS**

### **7.1 Further suggestions**

Although the field work realised has provided us with reliable information on the degree of awareness about innovation and creativity practices of small and medium enterprises, it might be also highlighted that a wider extent of firms interviewed would have provided a more complete picture of what the actual needs of these actors are.

Another shortcoming that we could observe in the questionnaires was that it was not successful in providing a wide perspective of which ones are the real needs of small and medium enterprises. Although, the questionnaires allow us to identify where sme's stand in terms of creativity and innovation practices, they do not provide sufficient information in terms of what their aspirations and ambitions are.

At the same time it would have been beneficial for the study to differentiate clearly the concepts of creativity and innovation and their separate/aggregate importance for smes' performance. Delimiting both ideas while stating their intrinsic interaction would have provided the interviewees with a wider and more

defined picture of the whole process, and therefore, allowing a more coherent and comprehensive understanding of which are the firms' needs and strategies.

## 8. REFERENCES

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