30th IASP World Conference on Science and Technology Parks, 2013

Spanish STPs as key instruments for local and sustainable development in a global market

PARALLEL 5

Linking STPs to people and cities

SOLEDAD DÍAZ, sdiaz@apte.org

Association of Science and Technology Parks of Spain, Spain

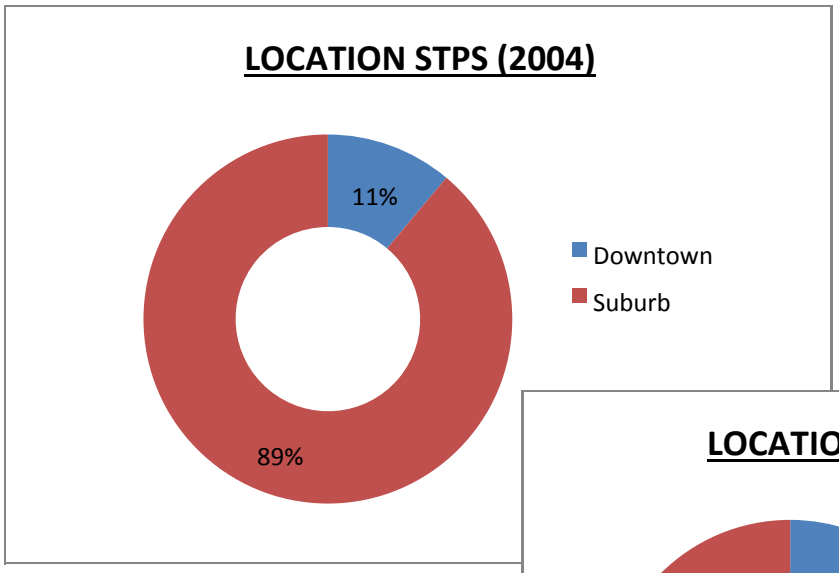
ASSOCIATON OF SCIENCE AND TECHNOLOGY PARKS OF SPAIN

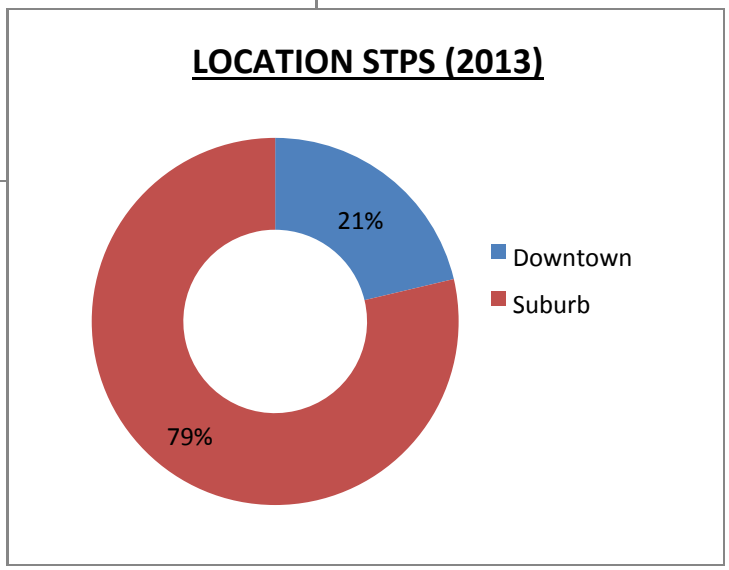
SPANISH STPS AS KEY INSTRUMENTS FOR LOCAL AND SUSTAINAIBLE DEVELOPMENT IN A GLOBAL MARKET

The first technology park was created in Spain in 1985 and since then the development of science and technology parks (STPs) has continued to the point of becoming one of the countries with the highest number of STPs and one of the most active promoting and developing them in a national and international level.

In the first stage, STPs´ development in Spain was not an urban phenomenon because most of the parks were located on the suburbs of cities. However, this tendency has been changing over the years and new parks´ projects are getting located in downtowns.

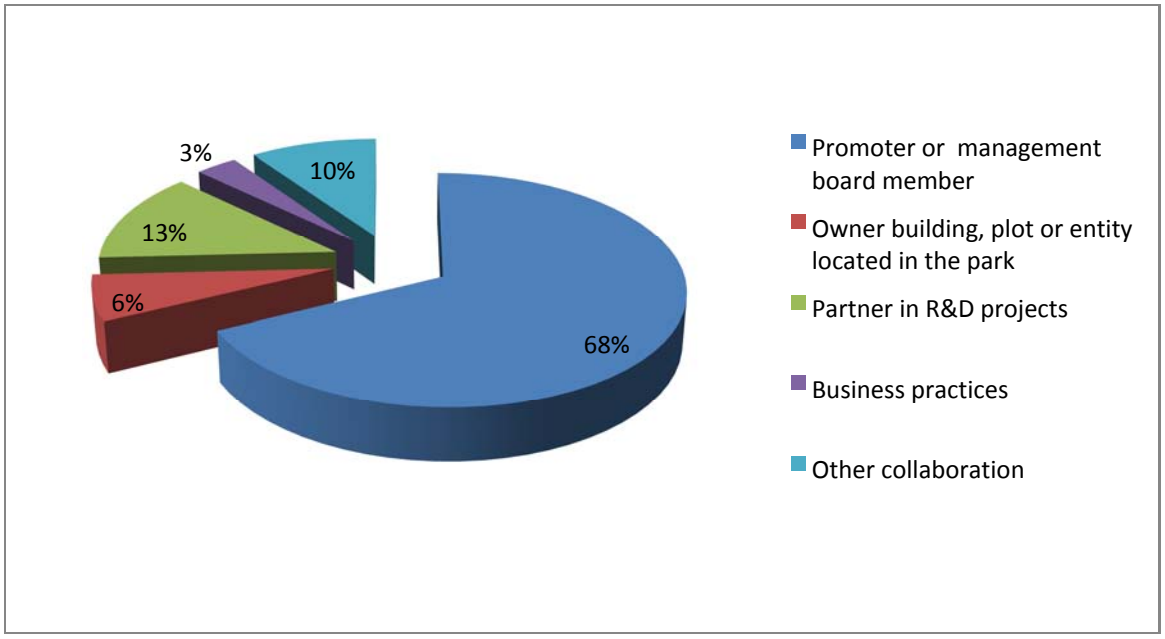
In the following graphics, we can see the different locations of the parks in 2004 and 2013:





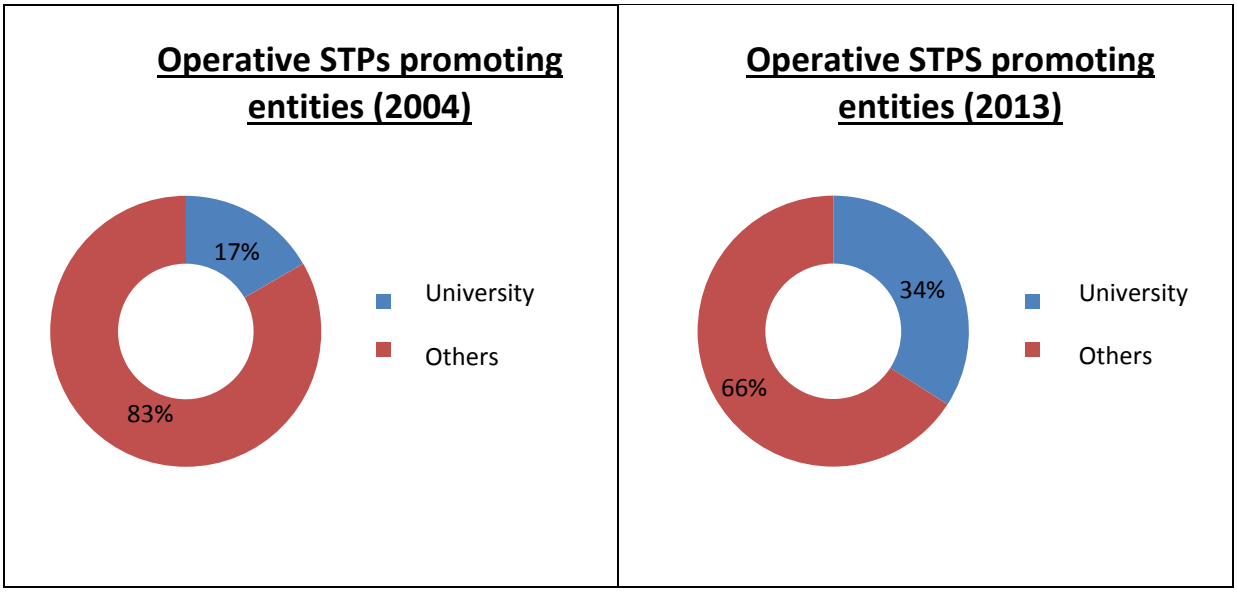
The relationship between parks and municipalities is not limited to geographical proximity. In addition, the municipalities are getting involved in the management of STPs as we can see in the following graphic:

Collaboration of the local governments in the management of the parks:



In line with the approach of the parks in the cities, at the end of 1995, University started to collaborate with them and even create their own parks called Science Parks.

In the following graphics we can notice the progressive interest of the Universities for STPs in Spain in the last decade:



Currently there are 42 Spanish universities that collaborate with parks and 35% of these spaces have their origin in the universities.

The parks promoted by the universities have the dual purpose of allowing students to be in contact with productive areas and promote the conditions for the creation of new companies (student as a future entrepreneur) and also to channel and enhance the transfer of knowledge from the classroom or the research group to the productive sector.

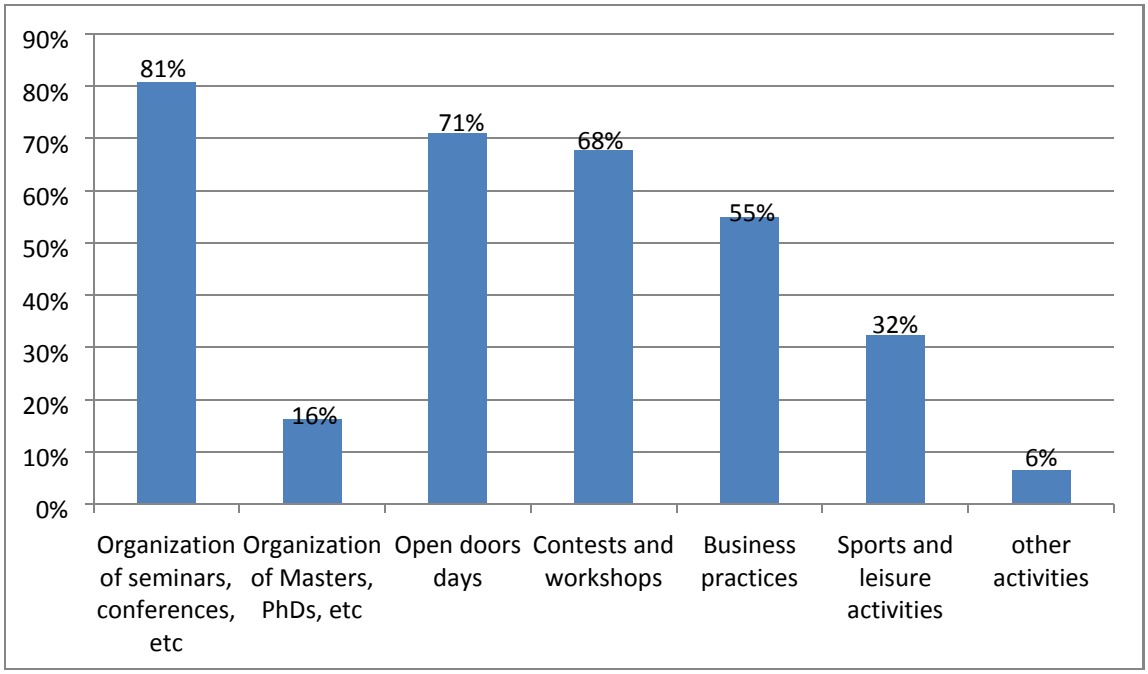
In addition, due to the collaboration with University, the STPs are places that attract talent from the high education system and a large number of leading companies, which stimulates the processes of knowledge and technology transfer and paves the way for the development of emerging technologies and cluster creation. This is one of the conclusions of the study made by Infyde for the European Commission, about the contribution of science and technology parks and technology centers to the objectives of the Lisbon Strategy in Spain.

Furthermore, the report of the main statistics of science and technology parks in 2010, made by APTE, collected some data which confirm the suitability of the STPs to carry out processes of research and technology transfer. In that year a total of 1,070 R & D infrastructures were recordered, which accounts for 19% of all institutions that were located in parks. This infrastructure (technology centers, OTRRs, BICs, public and private R & D, etc.) generate almost one-fifth of the activity taking place in the parks. This is a positive development as it is an extremely beneficial concentration of talent for the local business. Also the Spanish STPS recorded in 2012, 313 patents and R & D and an investment over 1,000 million euros.

Also in the geographical approach, STPs have developed an approach to the activities of municipalities and cities. Since 2000, the Spanish STPs have been participating in a program of activities called "week of Science and Technology" to show to the citizens what they are doing.

In this way, people located close to the parks have been involved in their activities.

Also, Spanish STPs are collaborating with the local governments in activities connected with the society as we can see in the following graphic:



This approach to the local governments and University has been critical to the science, technology and economic development of the area as demonstrated by the following data obtained from the study on

the contribution of science and technology parks and technology centers to the objectives of the Lisbon Strategy in Spain (Infyde 2010):
"According to the analysis of the direct contribution and the indirect effects on the value generation by Spanish STPs of APTE, the total impact on the GDP reaches 2.2% on the regional GDP in the regions where STPs exist. This impact increases at provincial level, where the impact of the existing STP is 2.74% of the provincial GDP. With regard to employment, the total impact of the Spanish STPs corresponds to 2.67% of the regional employment in the CCAA where STPs exist, and to 3.42% of the provincial employment in Provinces with operating STPs."

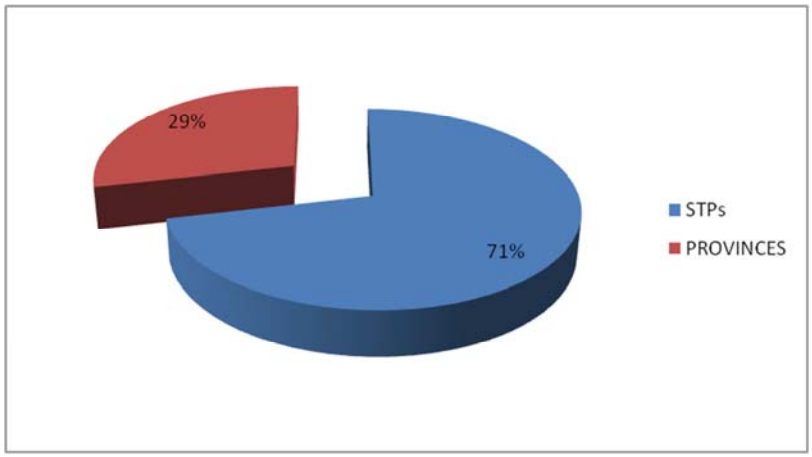
Also researcher at the University Carlos III of Madrid, Aurelia Modrego recently led a study called "*The Impact of Spanish science and technology parks on business innovation*", where data shows a very interesting contribution to economic and business development generated by these spaces. By this report "innovative SMEs located in parks outperform the rest in a proportion of 40% in sales of new products", i.e. SMEs located in these areas can increase their sales up to 40% compared to similar companies that are installed elsewhere, increasing the competitiveness of its businesses and economic development opportunities in locations where there are parks.

In accordance with the study by Professor Aurelia Modrego the percentage of turnover due to new product innovations to the market is significantly higher in the group of companies located in the STPs in relation to those outside of the parks. This statement is the result of the analysis of the Survey of Innovation in Companies offered every year by the National Statistics Institute.

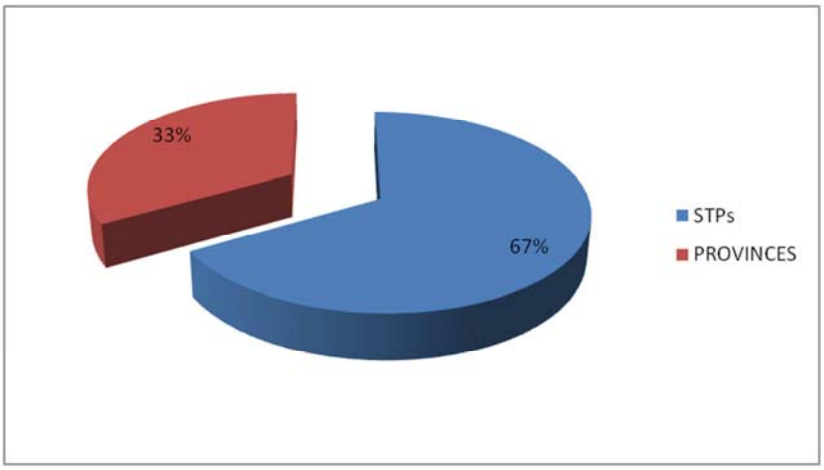
Other evidence of the importance of the activities of the Spanish STPs in order to the creation and development of the companies we can see in the following paragraph:

Percentage of STP whose business growth rate is higher than that of the province in which is located:

2008:

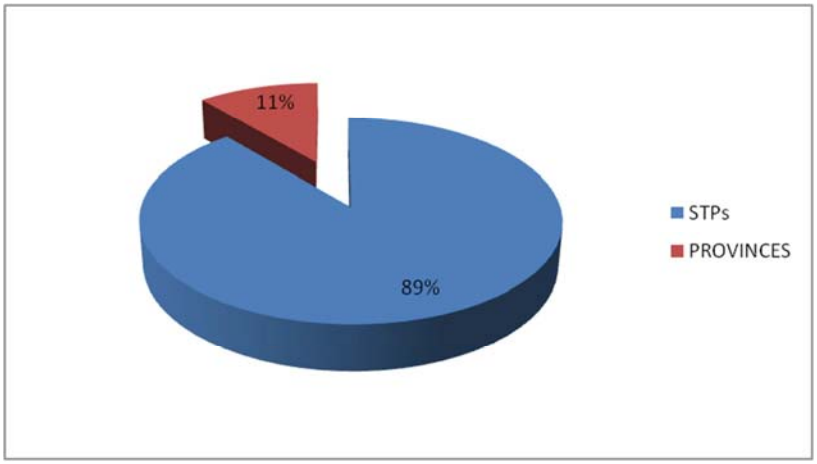


2012:

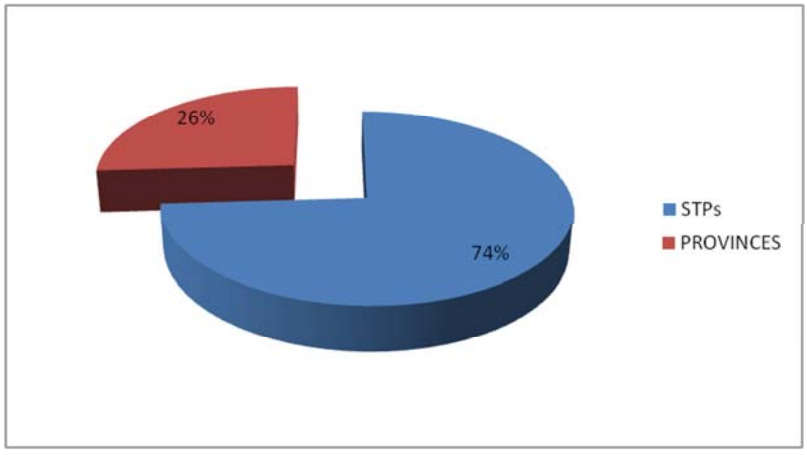


Percentage of STPs whose employment growth rate is higher than that of the province in which is located:

2009:



2012:



Recently, the Business Council for Competitiveness composed by the best Spanish companies, reflected in a report from Spain's competitive advantages is the network of science and technology parks it owns.

In addition, the collaboration between Parks and Universities, it is achieving a big goal. This goal is one of the challenges that COTEC identify in it new book: "*A Decalogue of innovation challenges for the competitiveness of Spain"*. This challenge is to achieve that University get fully involved in solving the problems of their environment.

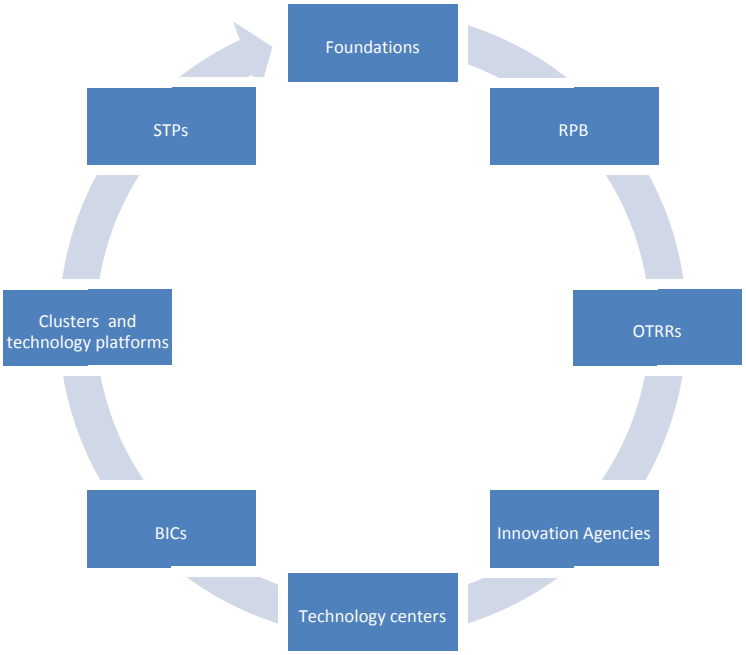
As Francisco Gonzalez, president of BBVA, said on his report "Science, Innovation and Society: moving the border far as possible", the results of science research and technology innovation have become increasingly present in every aspect of the activity and of human life, to the point where they are generating, as Peter Drucker noted, "much more than a social transformation, a change in the human condition "(Drucker 1994). This translates into an interpenetration and growing crossfertilization between scientific research, innovation, productive activities and ways of life of people and in a drastic reduction in the time between science discovery and commercial exploitation of results (Mowery 1989).
To sum up, the location of a STP in a municipality usually causes the following effects:

Increasing in number of jobs, most highly skilled.
Improving the quality of jobs.
Dynamising business sectors.
Capital attraction.
Creation of technology-based companies.
Increasing investment in R & D.
Job opportunities for students.
Opening the local market to the global markets.
Integration of the local society in the STPs´culture of innovation.

Why are STPs the best instrument to cause a socioeconomic impact in the places where they are located?

National innovation ecosystems are composed by agents that can develop a unique function within the system or be able to cover a larger number of them.

Among the different types of agents that our national innovation system has, we can find the following ones:



Source: APTE

If we analyze the various functions of each of these agents, we can integrate them into the following groups:

1. Entities that promote the generation of knowledge: RPBs, technology centers and science and technology parks.

2. Entities that promote the transfer of technology: Foundations, technology transfer offices, technology centers and science and technology parks.

3. Entities that promote business cooperation: Foundations, Innovation Agencies, technology centers, BICs, clusters and platforms and science and technology parks.
4. Entities that promote business development: Innovation Agencies, BICs and science and technology parks.

5. Entities that promote the internationalization of innovation: Innovation Agencies, clusters and platforms and science and technology parks.

6. Entities that provide access to financing innovation: Foundations, Innovation Agencies, BICs, clusters and platforms and science and technology parks.

	FUNCTIONS					
AGENTS	Generation of knowledge	Transfer of Technology	Business Cooperation	Business development	Internationalization	Provide access to financing innovation
Foundations						
RPBs						
OTRRs						
Innovation Agencies						
Technology Centers						
BICs						
Clusters and Platforms						
STPs						

Source: APTE

In the case of STPs, these functions are managed by the managing bodies of the parks, a team of professionals dedicated exclusively to this type of activities.

On the other hand, if we analyze characteristics such as the number of sectors in which they are working, the kind of target group and the relationship they have with them, we have the following classification:

	CHARACTERISTICS							
	SECTORS		CLIENT TYPES (CUADRUPLE HELIX)				CUSTOMER RELATIONSHIP	
AGENTS	Unisector	Multisector	Administration	Society	Academic institutions	Companies	Proximity	Virtual
Foundations								
RPBs								
OTRRs								
Innovation Agencies								
Technology Centers								
BICs								
Clusters and Platforms								
STPs								

Source: APTE

Currently there are in Spain 47 science and technology parks operating that are distributed throughout the territory.

These parks are located in 40 municipalities and the promotion of these 47 parks involves 25 municipalities and 21 of these parks have a BIC in their enclosures or have one nearby.

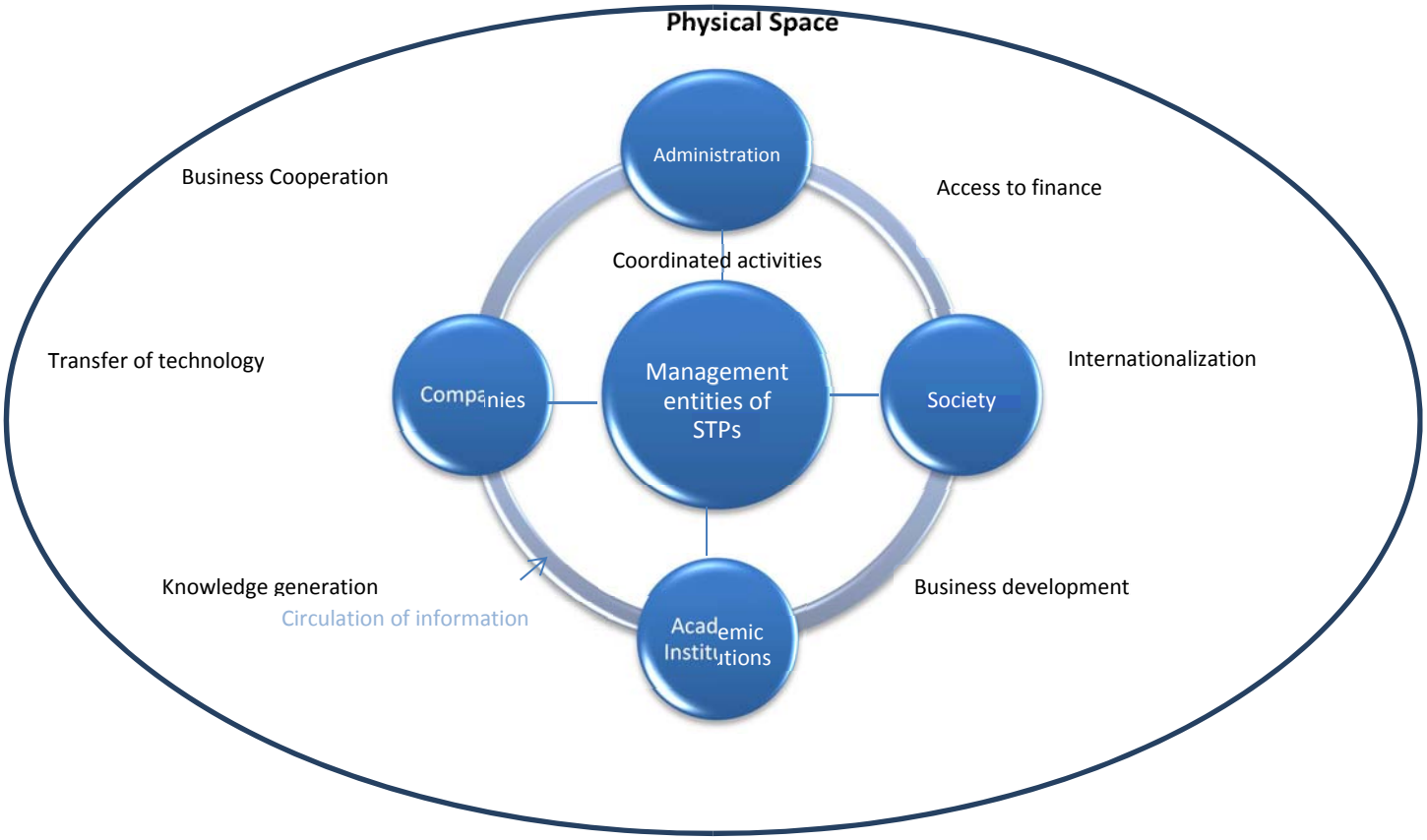
There are 6,206 companies located in these parks, where there are more than 1,000 R & D infrastructures (research groups, laboratories, OPIS, technology centers, etc...)

Also, STPs concentrate most of the private R & D in areas where they are located.

These 47 operative parks and other 25 parks that are developing are integrated into the Association of Science and Technology Parks of Spain (APTE), which coordinates all activities, promoting cooperation and networking. Also, APTE promotes the internationalization of these STPs through the International Association of Science Parks and Innovation Areas (IASP).

Based on the above, if we compare the science and technology parks with the other agents of the innovation system, we note the following:

Local ecosystem of Innovation



- The science and technology parks are the agents of the innovation system that more features develop with regard to the promotion and development of innovation.

- The science and technology parks are the only actors in the innovation system be able to concentrate the private R & D in the regions in which they are located.

- The science and technology parks are the only actors in the innovation system that included all the members of the quadruple helix (government, society, academia and industry) as a target group and also maintains a relationship with them as geographical proximity because in most cases they are physically hosting them.

One of the greatest challenges currently posed by the development of different regional smart specialization strategies required by the European Commission as ex ante condition for the regions to get access to the structural funds is precisely the effective governance mechanisms of the quadruple helix.

The main barriers to manage quadruple helix can be the following ones:

Geographical dispersion of members of the quadruple helix.
Lack of coordination between the members. Duplicity of their activities.

As we explain above, the STPs are spaces that perform more functions in the promotion and development of innovation in their enclosures. They are hosting all members of the quadruple helix maintaining physical proximity and a cooperative relationship through their management bodies. In this way, parks are creating local innovation ecosystems. Also, in coordination with the other parks of Spain trough APTE, they are forming a network that achieves efficient and coordinated management of the quadruple helix as we can see in the following diagram.

Picture: Quadruple helix management model develop by the Spanish science and technology parks and replicated across the country.

Source: APTE.

On the other hand, science and technology parks, even represent what some authors are calling quintuple helix which incorporates as new member all related to environmental topic, energy efficiency etc...

This environmental factor is intrinsic to the parks even since its origin. Not surprisingly, one of the main features of the parks has always been the care of green areas and avoid industry pollution activities of their tenants. Moreover, this has been an area of activity in which the parks have been working and improving and also at the same time fostering the creation of smarts cities, a phenomenon that parks also have contributed and will continue to contribute as future challenge.

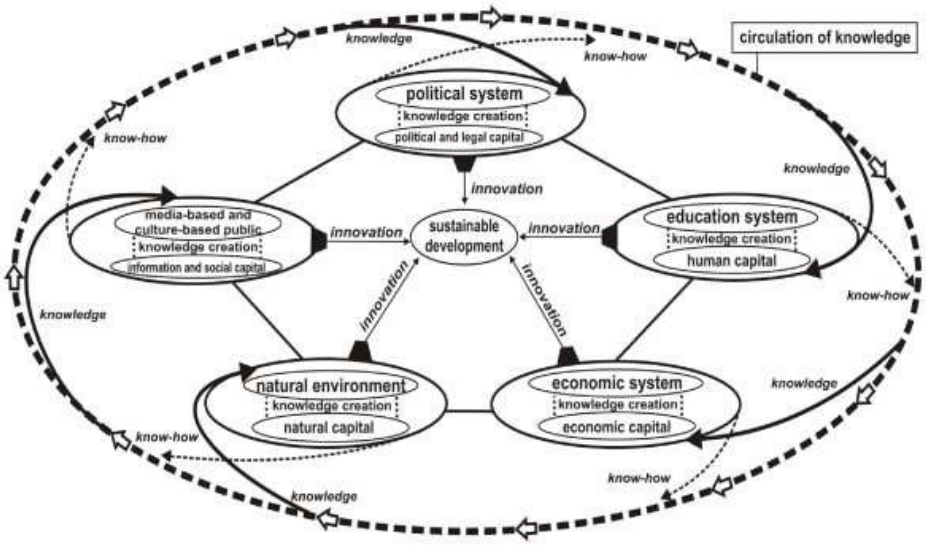
Furthermore, when STP is developed in a municipality or region, this STP connects the local business with the rest of companies of the Spanish parks cause APTE network and also with international business through IASP network.

APTE network has a group a professional that are dedicate to promote the collaboration of the companies located in all the Spanish STPs. We call them "APTE project managers´ network".

These professional are located in the operative parks but they are working together through the coordination of APTE to promote the collaboration of their companies.

The main instrument that they use to promote the business cooperation is a website: www.apte.org/rce (Business Collaboration Network). In this web page there are almost 5000 companies registered that publish every day offers and demands of collaboration and the project managers and their APTE coordinator make sure that these offers and demands successes.
Also, APTE network promotes the collaboration between foreign companies and collaborating with IASP to achieve this goal.

The STPs provide businesses with the difficulty and expensive task of contacting with potential international partners to develop their products and services. As a result of these activities, the Spanish STPs contribute to build and develop the global value chain.



The Quintuple Helix model and its function (functions). Modified from Etzkowitz and Leydesdorff ([2000]), on Carayannis and Campbell ([2006,2009,2010]), and on Barth ([2011a]).

As a result of the contribution of the Spanish STPs to the creation and development of the knowledge cities and smart cities, we have the following four examples:

1. **Collaboration of Parque Tecnológico de Andalucía with the local government in the development of Málaga as smart city:**

Málaga local government has developed the concept of MalagaValley and also has organized a club with the same name.

MalagaValley is a technological hub located in the metropolitan area of the city of Málaga in southern Spain, in the area of greatest technological excellence in Europe, a "European Silicon Valley." This area has become a center of ideas and innovation generation, able to attract companies from around the world, investments in R & D and talent. It specializes in the High-Speed Rail and Smart Cities industries, with special attention to energy efficiency and sustainability.

Since 1992, Málaga has advanced firmly toward becoming a destination that enjoys a high quality of life and respects the environment; as well as becoming the economic and technological capital of Andalusia, with an excellent university while at the same time remaining the tourist and leisure capital of Europe.
Club MalagaValley is an initiative supported by a distinguished group of presidents of the most important ICT companies based in Spain.

The Club´s goal is to design the policies and strategic guidelines to consolidate Malaga as the most important technological region in Europe.

The Club Málaga Valley project, in itself, is one of the most relevant technological "think thank" that exists in Europe, which is trying to identify new market opportunities for the ICT sector.

The Club meets twice a year in an open forum, where business leaders analyze the future of different industries.

In essence, the group is a focal point of knowledge with the purpose of making proposals, drafting directives and approving the final results suggested in the working sessions.

MalagaValley is working in several projects about energy, sustainability and smart technologies. One of them is the **Smart City Málaga Project**. This project works on "Smart Grids" searching for the optimal integration of different renewable energies into the power grid while bringing the generation closer to the consumers through the establishment of new energy resource management distribution for electrical microgeneration, or incorporating end user as an essential element of the intelligent management.

Storage systems managed in batteries help the incorporation of renewable energy.

The use of new smart measuring instruments in the context of remote management enables more sustainable electricity consumption.

Also, the installation of advanced telecommunications systems and remote controls permit automatic real-time operation on the distribution network, enabling a new energy management and increasing the quality of service. However, it is especially important that the customers feel involved in this project.

The ultimate goal of the project is to demonstrate that with the development of these technologies, it is possible to achieve a 20% energy saving and emission reductions of more than 6.000 tonnes of CO2 per year.

This team, led by ENDESA, is formed by the most important industry leaders: Enel, Acciona, IBM, Sadiel, Ormazábal, Neo Metrics, Isotrol, Telvent, Ingeteam y Greenpower. National and International Universities and Research Centers have supported this project as well.

Sustainable Buildings:

Designing and constructing buildings using the criteria of sustainability and energy efficiency, employing both active and passive measures, we can achieve energy savings around 40%.

Malaga has several which had been built this way:

Municipal Multiple Services Office

Urban Environmental Observatory

Business Incubator Excellence

Zem2All

The objective of the Zem2All (Zero Emissions Mobility to All) project is to create a real electric mobility scenario through new services such as recharging management, two-way charging (V2G) from the grid to the vehicle and vice versa, and strategically located rapid recharging points, all of which will be fully interconnected.

The vehicles will be charged via recharging points that will be installed at users' car parks and at strategic points in and around the city. Nine rapid recharging stations, with 23 recharging points, are also to be installed.

The fleet of some 200 electric vehicles will be fitted with IT and communication systems that enable users to track the performance of the vehicle at any given moment.

All these infrastructures will be connected to a control centre which will provide real-time information on the state of these points so as to manage and facilitate the users' recharging activities.

Similarly, Smartphone applications will be developed that will enable the user to manage and receive information about the car and recharging status.

The project is financed by NEDO (New Energy and Industrial Technology Developvement OrganizatioSaven of Japan) with support from CDTI of Spain and the participation of Spanish city halls. The project is being implemented by Endesa, Mitsubishi Heavy Industries, Mitsubishi Corporation, Hitachi, Telefónica and Sadiel.

Renewable Energies

In the last few years, the exponential growth of renewable energies in the Malaga province has seen the installation of 680.71 MW.

Currently Malaga has:

20 wind farms, together with 14.35 kW power stand-alone small windmills, generate a total of 481.7 MW wind energy.

Grid-connected photovoltaic systems on roofs of buildings and small photovoltaic plants from 2 MW to 10 MW that generate a total power output of 48.01 MW.

156,621 m2 of solar thermal power installations which generate hot water for 265,000 homes.

11 hydroelectric power plants in operation with a total power output of 126.66 MW.

Also, Málaga provides smart service to the society:

Public Transportation

Malaga´s urban public transportation company (EMT) provides the following innovative services:

- Real-time bus schedule information
- Talking Informative Panels
- Virtual reality apps
- I want to go to...
- Free Wi-Fi internet access
- Mobile payment methods
- Solar panels

Momo Pocket

"Momo Pocket" is a new payment system designed for smartphones that allows purchases in shops of all types. It's independent of mobile phone type, carrier or bank entity and it has been developed in APP format.

It's based in a pay-pal system with validation through QR codes or barcodes with pre-charge of money so that the payment process will be faster.

Implementation of this application will start with pilot testing in 130 shops strategically located in the downtown, the University Campus, technological parks and large shopping canters.

MalagaValley map:

Technology Park + society + University + Companies= MalagaValley

2. Collaboration of Parque Científico Tecnológico de Gijón with the local government in the development of Gijón as smart city:

Gijón smartcity
red española de ciudades inteligentes

The main initiatives of the local government of Gijón, in the field of Smart City are framed on sustainability, efficiency, relationship with citizens and promotion.

1) Low environmental impact:

Mayors´ Pact: In September 2011 Gijón joined the Mayors Pact, environmental initiative that requires a commitment to reduce emissions of CO2 at least 20%. This covenant is the mainstream European movement involving local and regional authorities who have taken voluntary commitment to improve energy efficiency and use renewable energy sources in their territories. To achieve this goal requires:

Developing a Baseline Emission Inventory (REI): completed draft to publication Definition of an Action Plan for Sustainable Energy (SEAP) under development.

SOLUTION EXIOM, S.A. in collaboration with Gijón Municipal Business Center, has become the cover of the Main Building Technology Park of Gijón in a "solar farm" incorporating to its roof, facing the University of Gijón, a PV of 50 kW pouring all the energy produced directly to the network. The photovoltaic plant installed in the business area of Cabueñes is totally innovative, because it is directly connected to the first network that dumps all its production to the grid.

In order to achieve the EU target of reducing CO2 emissions by 20%, Municipal Business Center of Gijón hired a company located in the Science and Technology Park of Gijón to study about energy efficiency of municipal business Residences to. The company is Efficiency Program, S. A., which has an innovative business model that is based on the development of a technology tool to measure the electronics comsuptiom, detailed power consumption groups of their individual centers or isolated, diagnosing the overall electrical installation and its optimum design, identifying savings opportunities, proposing corrective measures without investment, and allows it to track the actions taken and contrast the results over time. Work is currently under study.

In terms of mobility, there are two projects mainly:

Ecomile Project is proposed to hold a series of actions for analyze on the decrease of the impact of mobility in the area of Gijon Knowledge Mile. Entities, public and private, involved in the project, suggested the creation of a living laboratory for the study (individual and collective) of habits of local people in terms of its route to jobs or study. For this study they used the latest advances in the field of Information Technology and Communication (ICT) for monitoring vehicles.

There were about 5,000 trips between the 150 participants, with an average exceed 30 trips per person on average. About 26,600 km were recorded throughout the study, in which the number of miles a day monitored has ranged between 1,400 km and 2,500 km with an average of 1,860 km. More information: http://www.ecomilla.com/

Gijón Knowledge Mile of, is an environment that included, as key instrument, the Science and Technology Park of Gijón, with companies and knowledge-based institutions and college campuses

Viesques and La Labor, with different qualifications and research groups with engineering and social sciences. It is also Cabuenes hospital also conducts research.

According with the recent report of COTEC about this place, Gijón Knowledge Mile is a project that is being created gradually and is a local innovation system.

LabCityCar is a complete study of mobility and driving efficiency that will bring as a benefit the identification of global indicators to improve the lives of citizens in driving or mobility. Somehow, it is the continuity of the aforementioned project.

The project uses Catedbox technology, a technology that allows knowing two important types of information for research, the first related to vehicle data and driving and the second, the positioning data and vehicle mobility within the city.

LabCityCar Gijón will identify areas with more traffic, areas that need special attention by, among others, high flow, fuel consumption figures, and the carbon footprint of the city...

LabCityCar is useful information for local government and citizens in the improvement and conservation of the environment and the pace of city life. For more detail: http://www.labcitycar.info/

2) Integrated Management Administration citizen - citizen relative efficiency - administration:

Open Data Lab Gijón is the name that summarizes the new proposal emerged in Gijón to build an innovative city, closer to citizens. This is a CTIC Technological Center project, with the support and funding from the City of Gijón, through its Municipal Business Center, which is exploring new ways to work with public data that the City provides to citizens and businesses from the website.

It is an opportunity to add talent and creativity to generate new business opportunities and selfemployment in the city. Opening is defined as the action data and result of making public accessible, and usable form for any individual or company, and for any purpose, commercial or not, that were previously hidden data, or to which access was restricted to persons of managing the organization, such as the case of a local authority.

Some APPS developed by the Open Data Lab, using open data portal of Gijón city Hall and by companies located in the Municipal Business Center of Gijón, S. A.:

	eKancha AG - eKancha Gijón is eKancha program version that offers the services of various facilities of the City of Gijón. Disponible en el App Store
	Gijón in your pocket - Collect more than a hundred points of interest and indicates how to reach each one of them, incorporating audio guides for urban routes. + Info
	FICXixón App - With this application you can stay informed of everything related to the International Film Festival of Gijón. + Info
	Gijón Bus - Locating the attractions of urban public transport in the city. + Info
	Blood Alcohol Calculator - This "BAC Calculator" allows you to calculate the blood alcohol level and how it evolves over hours. + Info

3. Collaboration of Parque Tecnológico de Álava with the local government in the development of Gijón as smart city:

In 2012 the city of Vitoria was declared European Green Capital.

For this reason, the city of Vitoria Gasteiz launched a plan to promote and manage projects about environmental activities such as organizing different events within the context of the celebration of this recognition by the European Union Commission. Among the activities that were implemented are included the following ones:

Green Deal:

Parque Tecnológico de Álava, as well as other entities joined Vitoria municipal initiative "Green Deal".

The City proposes a large Green Deal for companies, businesses and institutions to adhere with clear commitments and reviewable annually to reflect its commitment to improving the environment. The

common goal is to move towards a low carbon economy. A deal that activated forums for dialogue and exchanged of best ways that recognized good business practices.

Under the "Green Deal Program" activities related to energy conservation and environmental improvement on sustainable mobility linked to electric vehicles energy rehabilitation of buildings in the park and investments in energy efficiency installations drinking water, supply and purification were launched.

Science Program

Under the "Scientific Program" of Vitoria Gasteiz European Green Capital APTE and Parque Tecnológico de Álava organized the 10th International Conference of the Association of Science and Technology Parks of Spain and also a workshop of the International Association of Science Parks and Areas of Innovation (IASP) during the week from 15 to October 19, 2012. The main topic of both events was renewable energy.

Green Factories

Under the "Green Factories Program" guided tours of the Technological Park were organized.

4. Collaboration of espaitec, Parque Científico y Empresarial de la Universidad Jaume I de Castellón with the local government in the development of Castellón as smart city:

The park has set up a LivingLab Campus of the University Jaume I of Castellón and they want to become in a "showroom" to export the results to the big cities of the province.

Espaitec, in 2010 launched the e'LivingLab around Campus of the Universitat Jaume I in Castellón which will involve the transfer of the campus to a known current SmartCampus in which products, technologically advanced, made available to university community to improve the quality of life in the environment and involving them in the development of innovative products through participation and feedback as end users (democratization of innovation). It is what might be called "Crowd-sourcing" symbiotic since all participants will benefit from the results.

From Espaitec was considered very interesting figure would generate synergistic hybridization processes between companies and knowledge centers incorporating end users as agents of innovation assets, which is referred to the European environment: PPPP: Public-Private-People Partnership.

In the Phase I e'LivingLab SmartCampus involve 16 companies linked to Science Park, and research groups of the University and funded by the Ministry of Science and Innovation and the Ministry of Economy and Competitiveness through INNPLANTA 2010 program.

The projects involved in Phase I of SmartCampus develop around different technologies and sectors:

Espaitec (e'LivingLab) projects:

1. - Designing a kit for detection of Legionella pneumophila by automatic procedure to be installed in the water storage areas and air conditioning at the Universitat Jaume I.

2. - Designing a kit for detection of Legionella pneumophila by manual procedure to be installed in the water storage areas and air conditioning at the Universitat Jaume I.

3. - Designing a book management system using smart tags and bows Radiofrequency (RF) to be located in the Library of the Universitat Jaume I in Castellón.

4. - Designing two telepresence robots: one for the reception ESPAITEC1 and the second for videoconferencing room ESPAITEC2 (KNOWLEDGE EXCHANGE CENTRE AND INNOVATION).

5. - Designing of a temperature control system (TERMOCONT) to control server cooling systems at the University Institute of Pesticides and Water (IUPA) located on the campus of the Universitat Jaume I.

6. - Designing a Solar and Wind Tree (Flower Power) installed fully autonomous in UJI Campus, as a social gathering and also includes comfortable seating and lighting led night, a charging system for mobile and portable to ensure user comfort.

7 - Designing an irrigation control system, conductivity and moisture in the garden areas of the Campus of the Universitat Jaume I read through the real-time values through a set of sensors scattered in different plantations.

8. - Designing a POS payment system to process student enrollment at the Universitat Jaume I using multitouch screens and mobile devices.

9. - Designing a system for generating 3D virtual sets for the production of multimedia by students and researchers at the Universitat Jaume I in Castellón.

10. - Designing innovative mailbox for correspondence of the companies located in the Science Park, Technology of the Universitat Jaume I.

11. - Designing a control system driveways to the Campus of the Universitat Jaume I through realtime reading of their tuition that will analyze the influx of vehicles to the site and assess its impact on environment pollution

12. - Designing a lighting management system of street lamps Campus of the Universitat Jaume I with an intelligent M2M (machine-to-machine) that will reduce the energy costs of the University.

13. - Designing an Information Point system for students at the Universitat Jaume I Multitouch screen based on technology that will provide students with academic content.

14. - Designing a system of continuous monitoring of energy consumption and other representative to calculate the ecological footprint of the campus and whose information is shared with the entire academic community.

15. - Designing of RFID system to track athletes on their tour of the campus where each athlete will have a chip and through posts with the antenna system monitor distances and times and then calculate efforts, accessible through a web platform 2.0
16. - Designing an access control system of students to classrooms those Bologna Treaty requirements, through QR Code and RFID technologies.

SOURCES OF INFORMATION AND REFERENCES:

APTE´s survey to their members about their relationship with the local system of innovation. Special thanks to all of them.

Spain, a country of opportunities. Madrid, Consejo Empresarial para la Competitividad, 2013.

Analysis Gijón Knowledge Mile as local innovation system. Madrid, Fundación Cotec para la innovación Tecnológica, 2012.

A Decalogue of innovation challenges for the competitiveness of Spain. Madrid, Fundación Cotec para la innovación Tecnológica, 2013.

GONZALEZ, Francisco. *Science, Innovation and Society: moving the border far as possible*. Madrid, BBVA. 2013

MODREGO, Aurelia. *Estimated impact of the Spanish science and technology parks on business innovation*. Madrid, 2011

Study on the contribution of Science and Technology Parks and Technology Centres to the goals of the Lisbon Strategy in Spain. Bilbao, Información y Desarrollo, S.L. (INFYDE), 2011.

www.malagavalley.com