

## 1. DIAGNOSIS OF THE GALICIAN R&D SYSTEM

Galicia, in terms of **geographic location**, is on the Cantabrian coast and therefore in the NW of the Iberian peninsula, on the western most **periphery** if its position within the European Union is considered.

General data for Galicia

Total area	29,574.4 Km2
Currency	Euro
Time zone	GMT+1
Population	2,778,913 inhabitants
Official languages	Galician / Spanish
Population density	95 persons/Km2
Average age (2011)	45.1 years
Life expectancy from birth (2011)	82.4
Unemployment rate (2012)	20.13%
Active population rate (2012)	55.4%
Average monthly income per household (2011)	€1,908
% Micro-enterprises (fewer than 10 workers)	95.03%
GDP 2012	€56,313,345

Bordered to the South by Portugal, and to the east by the Autonomous Communities of Asturias and Castile and Leon, Galicia possesses great cultural wealth, where the existence of the Galician language and the **Galician and Spanish bilingualism** of its people are the best example of its culture, not forgetting its natural, scenic, architectural and gastronomic wealth. The location of this region on the crossroads between Portuguese and Spanish culture favours communication and also connects it to a Euroregion with a community of speakers numbering over 200 million.

With regards to population characteristics, it should be noted that the Galician population accounts for **6% of the total for Spain**, as there are **2,778,913 inhabitants**, according to the National Statistics Institute's January 2012 data. Thus, Galicia is the fifth most populated community in Spain, after Andalusia, Catalonia, Madrid and Valencia.

The **population is highly dispersed** over the territory, which can be deduced from the existence of 53 districts and 315 municipalities, leading to each having a population average that is comparatively below that for the rest of Spain because, while 30.7% of Spain's municipalities have fewer than 5,000 inhabitants, up to 63.17% of Galicia's municipalities have fewer than 5,000 inhabitants. This is also reflected by the **low population density**, which is lower than 95 persons per square kilometre; very close to the Spanish average but 11<sup>th</sup> on the list of regions with greater population density in Spain.

The highest density is concentrated on the coastal rim that connects Ferrol and A Coruña in the northwest and Vilagarcía and Vigo in the southwest. Therefore, 75.5% of **the population is concentrated in the provinces of Coruña and Pontevedra**, where we can find 5 of the 7 cities of the region (Vigo, A Coruña, Santiago de

Compostela, Pontevedra and Ferrol, in descending order of size). Only the capitals of the other two provinces are classed as cities: Ourense and Lugo, also in descending order.

Another feature is the stagnation of growth in recent years, with a slight decrease with the inertia from the general crisis from 2010. This situation has also become more pronounced due to the **increase in average age**, which rose from 42.3 years (in 2000) to 45.1 (in 2011) to exceed the Spanish average of 41.2 in 2011.

Insofar as the economy and the structure of the workforce is concerned, Galicia, compared to the rest of Spain, finds itself in an intermediate situation in terms of data for **Gross Domestic Product**, which has steadily grown, although stagnation was observed between 2009 and 2011 as a result of the crisis, from which **a certain recovery** is currently underway.

In terms of **employment and unemployment**, the following points should be noted:

- Unemployment: lower than the national average, although increasing (20.13% compared to the national average of 25.02%).
- The services sector is the largest, employing 69% of the population.
- Decrease in people with active employment, particularly in industry and construction.

On the other hand and with regard to the **main characteristics of Galician enterprises**, one feature is the **large-scale enterprise atomisation**, in which most enterprises are no bigger than micro-enterprises<sup>1</sup>. Specifically, 95.03% of all Galician enterprises have a workforce of fewer than 10 workers. The **small size of enterprises** means there are few that have the potential capacity for absorbing and exploiting knowledge, as can be seen in mechanisms for managing innovation, where most Galician enterprises – 70.7% – state that they promote internal innovation, but only 25.2% have innovation departments, and 8.6% maintain alliances to promote innovation.

## 1.1 CHARACTERISATION OF THE GALICIAN R&D SYSTEM

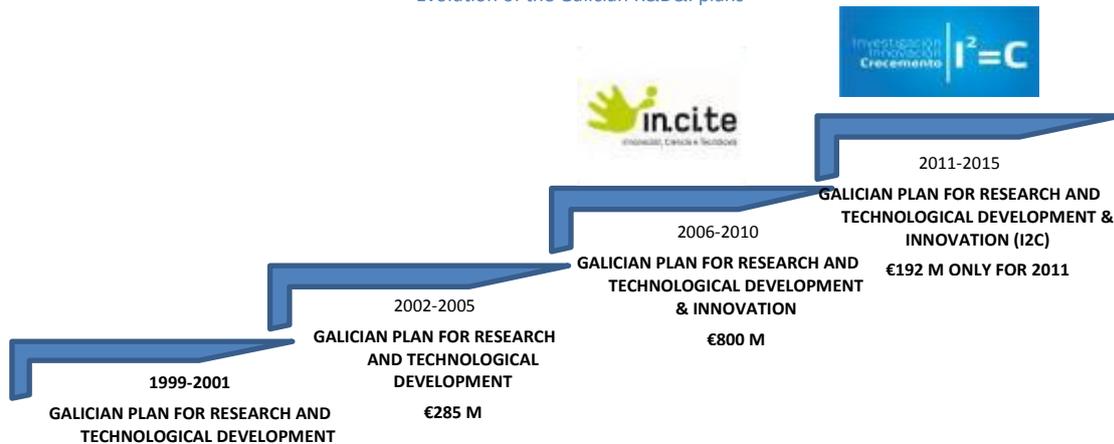
The Galician Innovation System includes a variety and wealth of constituents both at the knowledge generation and diffusion level and at the level of exploitation and regulation, forming an **open structure** in which all agents and resources needed for the system to function are integrated.

### 1.1.1 EVOLUTION OF INNOVATION POLICIES IN GALICIA

Socio-economic development is based to a great extent on technological capacity and on the development of a competitive Innovation system. That is why **awareness of the importance of research, innovation and internationalisation of productive activities in the development of a country** is vital. To this end, and since 1987, **4 long-term frameworks for innovation policies** have been developed through the **Galician Research and Technological Development Plans**, which contribute to the definition of a Galician Innovation System, and which followed on from each other in time and function as shown in the following chart:

<sup>1</sup> Source: The Commission's Recommendation of 6<sup>th</sup> May, 2003, on the definition of micro-enterprises, small and medium-sized enterprises.

Evolution of the Galician R&D&I plans



The path was started with the first step on this ladder in 1999 and in 2011 we reached the **Plan for Innovation and Growth 2011-2015 (Plan I2C)**, which called for an initial effort in the field of smart specialisation, and for the first time placed three central aspects at the centre of the Galician Innovation System. Such aspects demand observation and research into complementary aspects outside the regional System itself, as well as appraisal of knowledge beyond subsidies and public spending:

- Open innovation.
- International competitiveness.
- Complementariness and **multiplier** effect of public funding with **private funding sources**.

The new I2C Galician Plan (**Plan Galego I2C**) strongly backs **Open Innovation** and lays the groundwork for a strategy aimed at **Smart Specialisation** in such a way that government action in Galicia in the area of support policies for research and innovation will devote a large part of its efforts towards leading a process to define the areas of activity based on knowledge that are competitive internationally and in which the sectors forming Galicia's productive base can concentrate their innovative efforts.

Thus, the Plan I2C now thematically sets up **three singular areas of multi-sectoral convergence** that interrelate the spatial and economic features of the region, with proven capacity to generate knowledge by players in the regional System both nationally and internationally: **Sea, Life** and **Forest**.

In terms of operational dimension, the I2C Plan establishes a context for the creation of the **Galician Innovation Agency** to encourage coordination and inclusive, participative governance in the System, as well as the creation of other mechanisms to support the process both in diagnosis and governance tasks and in monitoring and evaluation tasks for measures such as: **the Innovation Observatory of Galicia; the Galician Innovation Platform; the Innovation Agents Registry; and the Law on Promotion of Research and Innovation in Galicia**.

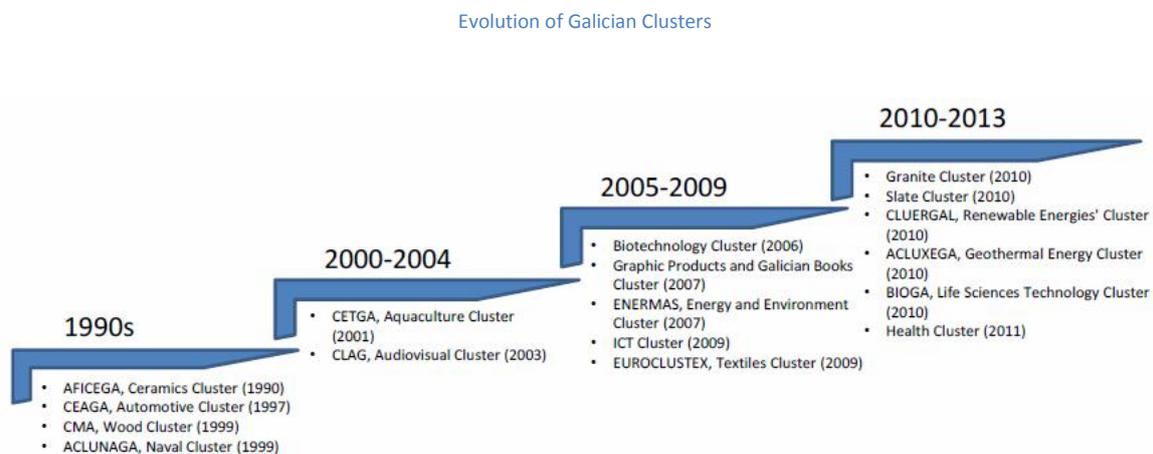
Despite the success of previous plans in the creation of a path towards progressive cohesion for the Galician Innovation System, a reform in the direction being taken is needed in Galicia in order to maintain convergence at an international level, which will be tackled with the definition of the present strategy.

To complete this evolutionary analysis of innovation policies in Galicia, we consider that there should be a review of the evolution of the clustering process in Galicia, in order to make the most of what has been learnt

from this process according to the recommendations from Aranguren and Wilson (2013)<sup>2</sup>, who state that the experience in the region with regard to clustering policies can serve as a lesson and precedent by providing highly useful information for implementing the S3 policies process.

Policies for creating and developing industrial Clusters in Galicia have their origins in the 1990s, with enterprise groups that were begun in the re-industrialisation processes and proved to be an effective instrument for encouraging enterprise cooperation initiatives in the face of innovation and internationalisation and, therefore there is a long standing tradition in the community.

According to IGAPE7<sup>3</sup>, there were 9 clusters operating in Galicia in 2010 and 2 in the process of consolidation, representing 450 enterprises, 52,000 jobs and 40% of the regional GDP. The following chart shows the evolution over time of the creation of the Galician clusters, those already included within the aforementioned report and others subsequently formed, all recognised and are currently operating:



According to IGAPE7<sup>4</sup> data, if we take into consideration the number of enterprises linked to the Clusters in 2010, it can be concluded that the most relevant are the **Automotive** (1997), **Shipbuilding** (1999) and **Wood** (1999) clusters, which were those that were set up in the first place and so it is therefore understandable that they are the ones responding most directly to the nature of Galicia's industrial sector.

According to the aforementioned *Aranguren and Wilson* report (2013), the Clusters were generally adopted very rapidly, both in the governmental sphere and in the structures for enterprise and innovation. They needed to be developed from "theory into practice" from an operations point of view and provided a highly valuable empirical basis for the definition of competitiveness policies.

In Galicia, institutional support for clusters mainly took the form of horizontal schemes for internationalisation but there are also specific agreements with each cluster in order to provide institutional support to specific projects that are more related to innovation. In this sense, according to the aforementioned IGAPE report, Galicia can contribute great experience in the management of some Clusters linked to major sectors and, in

<sup>2</sup> Mari José Aranguren and James R. Wilson. "What can experience with clusters teach us about fostering regional smart specialisation?", 2013, *Orchestra-Basque Institute of Competitiveness and Deusto Business School*.

<sup>3</sup> "Analysis and Benchmarking of Cluster Policy", 2010, Instituto Galego de Promoción Económica (IGAPE) within the framework of the AT Clusters Project (Atlantic Area Operational Programme, EU).

<sup>4</sup> "Analysis and Benchmarking of Cluster Policy", 2010, Instituto Galego de Promoción Económica (IGAPE) within the framework of the AT Clusters Project (Atlantic Area Operational Programme, EU).

turn, meet the needs and interests of their sub-sectors on the basis of integration as a key factor. The Automotive Cluster is a clear example of success in this.

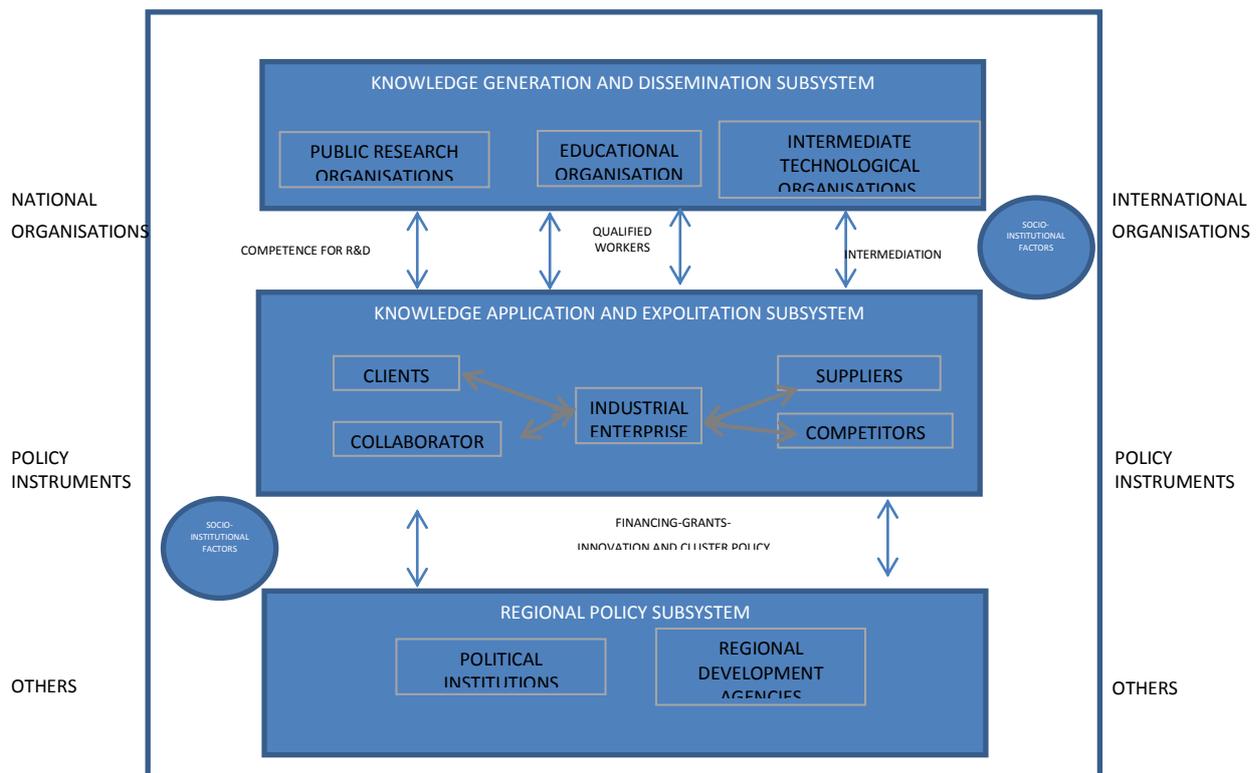
To be more precise, a major part of what was learnt from the clustering policies that already existed in Galicia for the setting up of a Smart Specialisation Strategy provide four main conclusions that can be considered in the planning process for the S3 Strategy:

- a) The predominant approach in Galicia for the creation and development of Clusters was the “top-down” one, with a character and support that were heavily institutional during the emergence and consolidation stage, which indicates a natural scenario for increased convergence and a need for public leadership in innovation policies rather than private sector representation that is hegemonic, consolidated and in itself capable of generating driving and overarching dynamics in the creation of regional innovation strategies.
- b) The existing Clusters provide a clear orientation for the already consolidated paths towards specialisation, and their participation and contribution to strategic planning should be considered as a regional asset in the process for prioritising and generating a vision for the future for Galicia. Thus, the Clusters have had an active and relevant participation in the working groups for the second phase of the process to draw up a Smart Specialisation Strategy for Galicia, as described in section 3 on Methodology of this document.
- c) The existing interaction dynamics between the Clusters and the KETs provision agents mean there is a relevant angle of vision on the existence of entrepreneurial discovery processes and the establishment of priorities in the S3 process, and, therefore, active participation in the drawing up of the strategy.
- d) The critical mass associated with each Cluster means they appear to be adequate vehicles for channelling a common vision to ease interaction that is, at the same time, Top-down and Bottom-up, with the enterprises themselves forming part of the S3 governance structure within the working groups.

In short, the cluster policies in Galicia share basic features with the S3 processes, which can provide potential for learning from previous experience and existing processes, for the analysis of the regional context, using the available diagnosis processes from the Clusters themselves and sector analyses. This is particularly important in the entrepreneurial discovery process, which is a crucial part of the S3’s conceptual basis and constitutes a solid reference for the region’s productive specialisation.

### 1.1.2 AGENTS IN THE GALICIAN INNOVATION SYSTEM

Innovation systems are made up of two elements: the system components; and the relationships between these components; both elements, together, determine the system, which will have as a feature the existence of limits to make it easier to differentiate it from other Systems. Therefore, in addition to understanding **the set of public and private agents present in a specific space** that make up the system, and their essential features, it is particularly important to understand the **relationships that exist between these agents** and the way in which these relationships can produce a multiplying effect.



Source: Self-produced from Todling, F and Trippi, M (2005) <sup>5</sup>

This Figure shows the composition of a Regional Innovation System, made up of three sub-systems of players involved in interactive learning:

- **Sub-system for generation and spread of knowledge**, made up of Universities, Public Research Organisations (PROs and Research Groups linked to Hospital Centres) and Intermediate Technology Organisations, such as Technology Centres, Technology Parks, Enterprise Incubators and Associations, including the Platforms and the Clusters.
- **Sub-system for knowledge exploitation** or regional production structure, made up mainly of companies, particularly those showing systemic features.
- **Sub-system or infrastructure for regional support**, in which government organisations and regional development agencies act.

A unique example is the Galician Health Service (SERGAS), as it cuts across all three of these sub-systems.

The **GALICIAN SUB-SYSTEM FOR GENERATION AND DISSEMINATION OF KNOWLEDGE** is what acts as a driving force for activity based on knowledge with an international competitive capacity. Below is a brief description of its components:

- 1) **University.** The university is traditionally the main agent for knowledge production, contributing simultaneously to the generation, training and attraction of researchers. Galicia has **three universities, all of which are state run**, and within them are the OTRI, interface structures that have the mission to stimulate the relations between the scientific world of the university and enterprises in order to make the most of R&D capacities and the results from university research activity. At the same time, Galicia has a

<sup>5</sup> Mikel Navarro Arancegui: "Los sistemas regionales de innovación. Una revisión crítica" ("Regional innovation systems. A critical review"). Ekonomiaz No. 70, 1<sup>st</sup> quarter, 2009.

wide range of training cycles on offer for Vocational Training, both at the medium level and the higher level, with 109 different qualifications on offer, belonging to 22 professional families; of which 47 belong to the new LOE (Basic Law on Education) qualifications.

- 2) **Public Research Organisations (PROs)**. These are research institutions that are public in nature and national in scope. Together with the universities, they form the basic core of the Spanish public system for scientific research and technological development, as they carry out most of the programmed activities for the National Plan for Scientific Research, Development and Technological Innovation. There are **2 PROs** in Galicia with **7 associated operations centres**: the Galician branch of the State Agency of the Higher Council for Scientific Research (CSIC), which is the largest public institution devoted to research in Spain with 5 centres in the region, and the Spanish Institute of Oceanography, which has 2 centres in Galicia.
- 3) **Hospital Centres**. The Galician Health Service (SERGAS) has support structures for research in health matters which are of great relevance. There are **4 university hospital complexes**, **9 health research foundations** and **3 research institutes** that have great potential as structures both for the generation of knowledge and its transfer.
- 4) **Technology Centres**. There are **24 Technology Centres** in Galicia, which act as strategic partners for enterprises and are a rapid and efficient link for support for R&D&I aimed directly at the productive sector, particularly at SMEs, although they also collaborate with Public Administrations to carry out activities related to technological innovation.

In the case of the **SUB-SYSTEM FOR KNOWLEDGE EXPLOITATION**, the main enterprises in the region in terms of volume of operations **do not have the same leading position as shown by employment and business in the field of knowledge transformation** in new products or internationally competitive services, and this could not apparently be otherwise given the features of the dominant fields of economic activity, characterised by medium or low technological intensity, in the Galician economy, where the outstanding fields are the following: the fishing sector, the food processing industry, the car industry, textiles and timber, among others.

Another feature that explains the reduced tendency for innovation recorded in Galicia's business sector can be found in the **small size of enterprises**, which is a critical conditioning factor when referring to the capacity to carry out innovation activities, as the small scale makes it difficult to have specific budgets or specialised resources, which leaves only a small number of enterprises with the potential capacity for absorbing and exploiting knowledge.

Insofar as the **SUB-SYSTEM FOR REGIONAL INNOVATION POLICY** is concerned, the recent creation of the Galician Agency for Innovation and the accompanying instruments for support for enterprises appear to complete the needs of the system in terms of coordination and collaborative governance, as the S3 creation process will try to make clear.