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Conference Paper

The AEIs Programme final evaluation 2007-2011: New insights on cluster and cluster policy contribution to competitiveness

52nd Congress of the European Regional Science Association: "Regions in Motion - Breaking the Path", 21-25 August 2012, Bratislava, Slovakia

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Paton, Jonatan; Castillo, Jaime Del; Barroeta, Belen (2012) : The AEIs Programme final evaluation 2007-2011: New insights on cluster and cluster policy contribution to competitiveness, 52nd Congress of the European Regional Science Association: "Regions in Motion - Breaking the Path", 21-25 August 2012, Bratislava, Slovakia, European Regional Science Association (ERSA), Louvain-la-Neuve

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The AEIs Programme final evaluation 2007-2011: New insights on cluster and cluster policy contribution to competitiveness

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Abstract: Clusters and cluster policy has become a widespread phenomena. The general thought shows that, somehow, clusters are directly related to business competitiveness and regional growth. In this context, The Ministry of Industry, Tourism and Commerce of the Spanish Government has been implementing a cluster policy since 2007 known as the AEIs Programme. On 2011, after a five years period, a final evaluation has been carried out. 165 clusters have been selected and become AEIs. These AEIs represent 3,934 firms and 529 institutions. These organizations account for a total of 750,000 job, making up 4.3% of the total Spanish employment figure. This total rises to 11.8% considering total knock-on effects (direct+indirect). The Ministry has financed these AEIs to the tune of € 32.8 million, a small amount considering the huge knock-on effect of these clusters achieved in term of private cofinancing (€39.1 million) and other support programmes (€1,177 million). A new evaluation methodology shows that in addition to this, AEIs and AEIs Programme can contribute to business competitiveness up to nearly 20-30% of total cost and sales. The aim of this paper is to present the main results of the Spanish cluster policy case as well as an innovative evaluation methodology for clusters and cluster policy.

Keywords: clusters, Spain, cluster policy, policy evaluation

JEL code: R12 - Size and Spatial Distributions of Regional Economic Activity

0. Introduction.

Clusters are a spreading phenomenon all around the world. The increasing importance gained as a theoretical explanation for economic development and the recurrent use as public policy instruments, make cluster organisations and cluster policies the focus of many debates about current competitiveness (Ketels 2006)¹.

Many cluster organizations have been promoted and launched by local, regional and national governments. In parallel, these authorities have also defined and implemented entire support schemes to ensure their consolidation in the short and medium term. One of these schemes was the AEIs Programme, the Spanish cluster policy.

The AEIs Programme was defined by the Spanish Ministry of Industry, Trade and Commerce (MITYC) in 2006 as a central pillar of the competitiveness strategic framework during the second half of the 2000 decade. The Programme aims at fostering small and medium businesses competitiveness through collaborative approaches and innovation, strengthening regional triple helixes throughout the Spanish territory.

After three years of performance, the MITYC decided to evaluate the scale, scope and results achieved by the AEIs (innovative business clusters) as well as the contribution of the Programme to them. Thus, in 2009, an intermediate evaluation was made under the title “*The AEIs Programme in the framework of international cluster policies –an assessment*” (MITYC 2010)². From this evaluation some tips and recommendations were found and used afterwards to improve the following calls.

Now, five years after the first call was launched, again the MITYC decided to evaluate the Programme and the cluster initiatives supported by it. The aim of this last evaluation is to close a period and start thinking about how to improve the cluster support scheme from a national perspective for the upcoming new programming period until 2020. This time **new evaluation methodologies and techniques have applied to the analysis and direct quantitative relationships between the Programme, the AEIs performance and their business competitiveness improvements have been found.**

The objective of this paper is to present the main results obtained from the evaluation of the Spanish cluster policy and cluster organization (AEIs), as well as to propose a methodology mentioned before. In the **first chapter** a brief introduction to clusters’ conceptual foundations will be made, highlighting its current roots from the economic geography theory as well as the apparent relationship between economic agglomeration and economic development.

The **second chapter** will make a descriptive analysis of the AEIs Programme itself including its background and political justification as well as the main elements of the annual call for proposals.

The **third section** outlines the methodological approach used during the analysis highlighting the improvements achieved from a quantitative point of view regarding not only the previous intermediate evaluation but also other evaluation exercises at national and European level.

The **fourth chapter** includes the main results found considering the scale and the scope of the Programme (direct impact of the programme within the AEIs and business

¹ Ketels, C. (2006) “*Michael Porter’s Competitiveness Framework: Recent learnings and New Research Priorities*”. Springer Science

² MITYC (2010) “*The AEIs Programme in the framework of international cluster policies –an assessment*”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy.

fabric) as well as the performance of the AEIs themselves and their contribution to business competitiveness (indirect impact or the so called cluster dynamics externalities).

Finally, in the **fifth section** the paper end with some conclusions and recommendation from the results observed at the end of the period, highlighting the necessity of promoting “*world-class innovation clusters*” and the role of these “*policy instruments*” for the upcoming “*smart specialization strategies*”.

1. The foundations behind: Clusters as a spreading phenomenon.

This work focused on the interest in analyzing the results and impact of

Before starting to analysis the performance the “*Business Innovative clusters*” Programme (hereinafter AEIs Programme) of the Spanish Ministry of Industry, Tourism and Commerce (MITYC), it must be taken into account some contextual remarks on current competitiveness model. The challenges linked to this new model, characterized by globalization from a local perspective (glocal phenomenon) (Roudometof 2005, Beck 1999³), knowledge intensity and open innovation processes, determine how companies compete and the way in which countries and regions get positioned globally in terms of economic growth and development.

In this new competitiveness context, we have witnessed an generalize “explosion” of cluster organisations, making it necessary to ask about the roots of economic clusters, and how these organisations can help companies in their regional and local environments to compete internationally, and even more importantly, ensure a sustainable welfare over time.

For some time, classic authors such as Marshall (1890)⁴, and more recently others such as Porter (1990)⁵ and Krugman (1992)⁶, attributed a higher performance of certain spatial economic concentrations to positive externalities that encourage innovation throughout the business tissue.

Clusters organisations have been, at least in those territories where a real commitment to them has been experienced, important initiatives generating many benefits and positive externalities for its members. Even it cannot be established a cause-consequence relationship between cluster consolidation and regional prosperity, it is not a mere coincidence that, in those countries and regions where the cluster phenomena is consolidated, regional innovation and competitiveness model has also reached the high levels.

A very simple function between the number of cluster organizations from one side and GDP per capital (an indirect indicator of regional prosperity) models the direct and positive relationship between economic agglomeration-specialisation an economic development.

³ Roudometof, V. (2005). “*Translationalism, Cosmopolitanism, and Glocalization*”. *Current Sociology* 53 (1): 113–135.

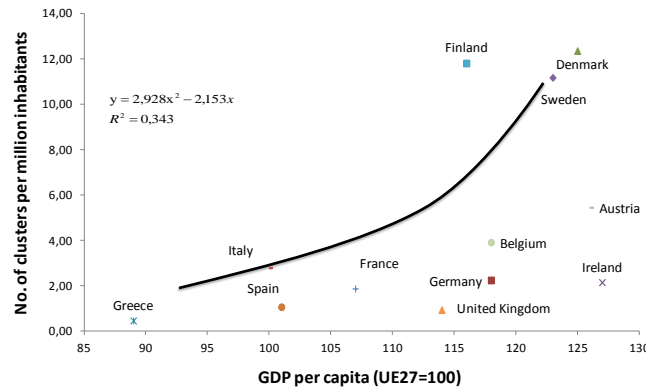
Beck, U (1999) *What Is Globalization?*. Cambridge: Polity Press

⁴ Marshall, A. (1890). “*Principles of Economics*” London MacMillan.

⁵ Porter, M. E. (1990). “*The competitive advantage of nations*”. Free Press

⁶ Krugman, P. (1992) “*Geografía y comercio*” Antoni Bosch Editor. Barcelona

Figure 1 No. of clusters and GDP per capita in Europe 2010



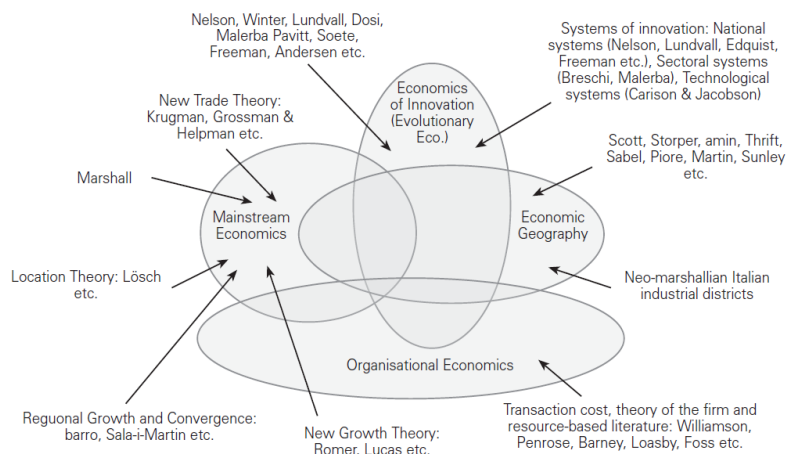
Source: own elaboration from data collected by ECO and Eurostat

So, as mentioned before, the economic geographic agglomeration has been studied for long since at the end of late nineteenth century authors such as Marshall, and more recently since the 90s other such as Sovell, Ketels & Linqvist⁷ used the term. With those authors the cluster and cluster organization terms became more and more popular. As Navarro states (2003)⁸, the complexity of cluster approach in economic theory is quite high due to the convergence of multiple research fields, but to a certain extent sharing a common denominator:

“A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”

Porter, M.E. (1998)⁹

Figure 2 Economic research fields that converge into cluster theory



Source: Navarro 2003 from Dahl 2001

⁷ Sövell, Linqvist y Ketels (2003) “The Cluster Initiative Greenbook”.

⁸ Navarro, M. (2003) “Análisis y políticas de cluster: teoría y realidad”. *Economiaz*. No 53 a partir de Dahl (2001) “What is the essence of geographic clustering”.

⁹ Porter, M.E. (1998) “On competition” Harvard University Press.

The easy going and simple cluster approach to understand how economies compete made it to reach a central role in any competitiveness policy at regional and international levels. Accordingly, even in some cases clusters have grown spontaneously, most times they appeared as an instrument of regional competitiveness policy defined and implemented by regional/national governments.

There are much more cases than those that can be identified but some efforts have been made recently to mapping clusters (European Cluster Observatory and/or Cluster Mapping Project). Thus, in the United States more than 40 types of clusters at regional level were identified¹⁰. In Europe, similar studies have identified more than 2,000 clusters across the 258 European regions¹¹.

Table 1 Detection of clusters in some European countries

<i>Country</i>	<i>Number of clusters identified</i>
Denmark	41 clusters
France	100 clusters
Finland	10 national clusters & high number of regional clusters
United Kingdom	154 clusters
Austria	45 clusters

Source: Final report of the expertise Group on Clusters and Networks. DG Enterprise. 2002. Brussels

As a result of this apparent “cluster fashion” Spanish Authorities, not outside this trend, stated to think about how to foster and coordinate a cluster policy at national level. In 2007 the Spanish Ministry of Industry, Tourism and Trade (MITYC) launched an entire funding scheme to support cluster initiatives through the so called AEIs Programme¹². Three years before, the Ministry decided to analyse the Programme to deepen the understanding of its scope and impact. The preliminary results show quite positive results both in terms of impact and scale though many of the cluster initiatives were young, and it helped to introduce some improvements and prioritizations in the following calls (Castillo y Paton 2011a)¹³.

But now, two years after this intermediate evaluation, the Spanish Government has carried out a second one to identify its real impact at the end of the first five years period of the Programme. The following sections of this paper present the main results of these five years of national cluster policy in Spain.

2. The Spanish Cluster Policy: the AEIs Programme

In Spain, clusters initiatives and cluster policy have their origins in the earliest experiences developed in some regions during the beginning of the 90's. The administrative decentralization that followed the adoption of the Spanish Constitution, directly led to significant regional governance autonomy. With this new legal framework where regional authorities acquired certain competences, the newly created

¹⁰ Council on Competitiveness (2001): “*The Cluster Mapping Project*”. A study jointly developed by Monitor Group and the Institute for Strategy and Competitiveness of Harvard Business School.

¹¹ European Commission (2007): “*Innovation Clusters in Europe: A Statistical analysis and overview of current policy support*”.

¹² Ibid. 2.

¹³ Castillo, J. & Paton, J. (2011a) “*Main findings and proposals of the Spanish cluster policy evaluation: the AEIs programme*” European Regional Science Association ERSA 2011.

regional governments began to take the initiative in promoting economic development in their respective territories.

In this context, the theories of innovation and economic geography acquired a central role in understanding regional development and supporting public policies definition and implementation. As clusters were gained increased importance in economic geography debate, they started to be seeing as main engines of the new economic development models.

Despite this importance, due to the relative youth of cluster policy and cluster initiatives approaches, no so many regions developed a formal cluster policy until the mid 2000's. In fact, some public initiatives in USA (NGA 2002¹⁴) and in EU (EC 2002¹⁵ and ECA 2007¹⁶) fostered the “cluster” fashion and established the starting point of a new period where cluster initiatives and cluster policies began to spread.

In Spain, as mentioned, although some pioneering regions started to define basic cluster policy approach, was during the first half of the 2000's (but formally during the second one) when the most regions decided to foster cluster approach formally. The policy debate on cluster at regional level started from some previous cluster analysis already carried out.

Table 2 Cluster policy initiatives and studies across Spanish geography during the 2000's

<i>Region</i>	<i>Author/ year</i>	<i>Studies and references</i>
Andalucía	Antúnez, A. y Sanjuán, J. - 2007	"Análisis de clusters en Andalucía". Investigaciones Regionales. Nº 12, primavera 2008
	Costa, M.T. - 1988	"Descentramiento productivo y difusión industrial. El modelo de especialización flexible". Papeles de economía española. Nº 35
Cataluña	Trullén, J. - 2002	"Barcelona como ciudad flexible. Economías de localización y economías de urbanización en una metrópolis polinuclear". En "Desarrollo local: Teorías y Estrategias". Civitas. Madrid
	Hernández, J.M., et al. - 2005	"Mapa de los sistemas productivos locales industriales en Cataluña". Generalitat de Catalunya. Departament de Treball i Indústria.
Castilla y León	ADE - 1997	"Identificación y análisis de clusters y microclusters en Castilla y León". Informe elaborado por Clúster Competitividad
	Juste, J.J - 2001	"Desarrollo local y mercado global: los sistemas productivos locales y la industria agroalimentaria en Castilla y León. Tesis Doctoral. Universidad de Valladolid
Comunidad Valenciana	Tomas Carpi, J.A. y Such, J. - 1997	"Internationalization of small and médium firms in four Valencia región industrial districts". Quaderns
	Soler, V. - 2000	"Verificación de las hipótesis del distrito industrial: una aplicación al caso valenciano". Economía Industrial nº 334
País Vasco	Monitor Company - 1991	Trabajo de identificación de los clusters vascos en el amrc del proyecto "Competitividad Internacional de Euskadi". Vitoria
	Aranguren, M.J. et al - 2008	Identificación de clústeres en la CAPV. Orkestra. Instituto Vasco de Competitividad
España	Costa, M.T. - 1992	"Cambios en la organización industrial. Cooperación local y competitividad internacional, Panorama general" Economía industrial. Nº 286
	Santamaría, M.J. et al - 2004	"Identification of the local productive systems in Spain: A new approach". En 44 th European congress of European Regional Science Association. Porto 25-29 August.
	Boix, R. Y Galletto, V. (2004)	"Identificación de Sistemas Locales de Trabajo y Distritos Industriales en España". Estudio de investigación financiado por la DG de Política de la Pequeña y Mediana Empresa.

Source: MITYC (2010) "The AEIs Programme in the framework of international cluster policies –an assessment". Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy.

¹⁴ NGA –National Governors Association (2002) "A Governors Guide to Cluster-based Economic Development" Washington DC.

¹⁵ EC – European Commission (2002) "Regional Clusters in Europe". Observatory of European SMEs. DG Enterprise publications

¹⁶ ECA – European Cluster Alliance (2007) "The European Cluster Memorandum: promoting European innovation through clusters". Prepared by High Level Advisory Group on Clusters

But to a certain extent, and mainly due to the differences encountered when considering the industrial and competitiveness policy heritage at regional level in Spain, the real roots of this new trend focused on clusters are directly linked to the general competitiveness policy that was being developed at national level. This new competitiveness framework has its basis on how to deal with productivity gaps through innovation and collaborative approaches (Cordero 2005¹⁷ and Trullén y Callejón¹⁸).

In the early 2000s, the MITYC began working on developing a strategic framework to coordinate and articulate at national level the cluster policy in Spain in order to face the problems related to productivity and competitiveness gaps. A first study (Boix y Galletto 2004)¹⁹ identified 237 industrial districts scattered throughout the whole Spanish geography and responsible for nearly 47% of Spanish industrial employment and around 30% in terms of turnover and GDP.

This initial mapping, based on traditional “*industrial districts*” and “*innovative milieus*” approaches, identified cluster cases in traditional sectors such as tourism, metal-mechanic industries and primary activities (agroindustries). These clusters were highly localized in a few specific geographical areas. Most of them were located across the eastern, central and northeastern regions of Spanish territory, with Catalonia and Valencia accounting the highest number.

In the light of these results and the potential opportunities under the Spanish cluster fabric, the MITYC developed a complete strategic framework to support these natural clusters and to enhance the appearance of cluster in those areas where this phenomenon has not been consolidated yet. The specific measure supporting this strategic framework is the AEIs Programme (“*Business Innovative Clusters Programme*”)

Thus, the AEIs Programme is an initiative launched between 2006 and 2007 by the DG SMEs Policy of MITYC aimed at fostering and promoting SMEs competitiveness through a number of funding actions supporting regional research-driven clusters. These research-driven clusters are thought to strengthen the triple helix in specific sectorial value chains at regional level.

An AEI is defined as "the combination, in a geographical area or specific industrial sector, of a number of companies, training centers and research units (public or private) involved in collaborative activities, seeking to obtain advantages and / or benefits from the implementation of joint innovative projects. This activity is organized around a target market and/ or sector as well as a branch of science and technology reference. The purpose of the AEI is to gain a sufficient critical mass, thus ensuring their competitiveness and international profile."

ITC/2691/2006 de 2 de agosto 2006²⁰

¹⁷ Gervasio, C. (2008) “*Growth Poles and Clusters Policy in Spain*”. DG de Política de Pymes. MITYC. Bruselas 7 Octubre 2008.

¹⁸ Trullén, J. y Callejón, M. (2008) “*Las Agrupaciones de Empresas Innovadoras*”. En “*Los distritos industriales*”. Colección de Estudios Socioeconómicos Mediterráneo Económico. Fundación Cajamar.

¹⁹ Boix, R. y Galletto, V. (2004) “*Identificación de Sistemas Locales de Trabajo y Distritos Industriales en España*”. Estudio de investigación financiado por la DG de Política de la Pequeña y Mediana Empresa.

²⁰ Orden ITC/2691/2006 de 2 de agosto 2006 (2007 call programme of AEIs programme) – MITYC – DG SMEs policy

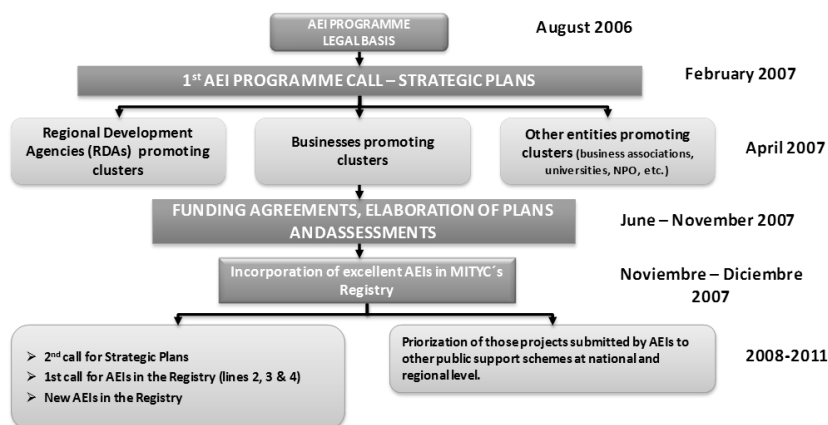
An “AEI” is a research-driven cluster including the whole triple helix (companies, research centers, universities, innovation and knowledge support infrastructures, regional authorities, etc.) geographically located and sharing a common interest in a certain economic activity and/or a particular general purpose technology domain (GPTs). This definition roots from the concept of cluster developed by Porter (1990)²¹ and further developed in some of his seminal works (Porter 1998²² and 2003²³).

The AEIs Programme has been operating since 2007. **In the first call (ICT ITC/2691/2006)²⁴ only the definition of strategic plans were financed by the Programme.** The aim was to establish the strategic guidelines from which each AEI would pursue the objectives of increasing the competitiveness and innovative nature of its businesses in the medium and long term. The finance of Strategic Plans was included under one of its four action lines: lines 1 – definition of cluster strategic plans.

In the following calls (2008, 2009, 2010 and 2011), the Programme included other four additional action lines (up to a total of four) aimed at strengthening the AEIs created in the framework of the Programme (under line 1). The other three priority lines were added: the financing of its structure and operation (line 2), specific R&D and innovation projects within the triple helix of the cluster (line 3), and collaborative projects with other clusters-AEIs at national and international level (line 4).

Regarding the whole process, during the first stage a number of clusters meeting the criteria established by the MITYC’s evaluators get funding for their strategic plans. Later, in a second phase, those strategic plans rated as excellent can access to the MITYC’s Registry of Excellence. Its membership allows access to the other lines under the Programme: lines 2, 3 and 4. It also prioritize them above applicants in other national and regional public support framework.

Figure 3. Main phases in the Spanish cluster Policy: AEIs Programme



Source: MITYC (2011) “AEIs programme final evaluation 2007-2011”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

²¹ Ibid 2

²² Porter, M.E (1998) “On Competition”. Harvard Business Press.

²³ Porter, M. E (2003) “The economic performance of regions”. Regional Studies 37: 549-578

²⁴ Other four calls were launched during the period, namely:

- Orden ITC/2691/2006 de 2 de agosto 2006
- Orden PRE/756/2008 de 14 de marzo 2008
- Orden ITC/1843/2009 de 3 de julio 2009
- Orden ITC/798/2010 de 22 de marzo 2010
- Orden ITC/687/2011 de 18 de marzo 2011

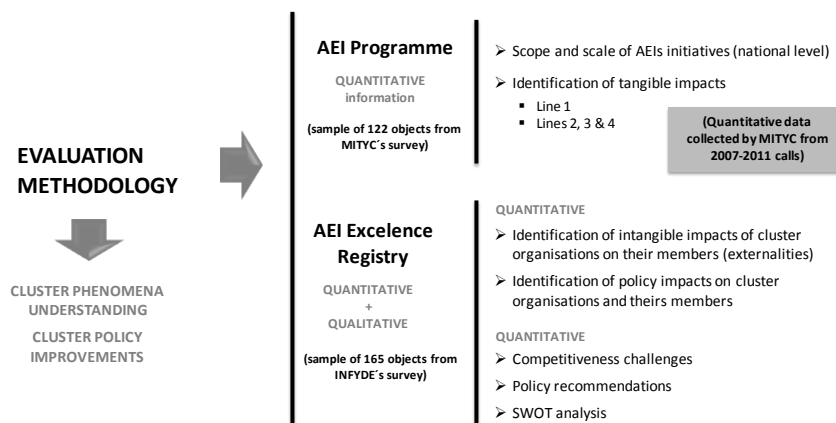
At the end of 2011, the number of AEIs included in the MITYC's Registry of Excellence accounts for 165 distributed throughout the entire Spanish geography. As it will be seen afterwards, it is quite a significant number of cluster initiatives regarding the impact of their members in terms of number of enterprises, GDP and employment but specially because of the knock-on effects of their externalities.

3. An evaluation methodology: further steps in cluster policy assessment

Even public policy evaluation has acquired a remarkable importance during the last two decades, probably due to the youth of cluster initiatives and cluster policies, the evaluation experiences in these fields are not very common (Aranguren y Navarro 2003²⁵). In fact, as Pezzi stated in Aragon et. al (2010²⁶), *“the results of cluster policies, especially those most important, are related to changes in attitudes, strategic changes and new business models that are long term processes”*. Nevertheless, the real impact of clusters, and so cluster policies, are difficult to observe since they contribute the most through indirect impacts coming from externalities that not always are measurable (Castillo and Paton 2011b)²⁷.

In this paper the evaluation methodology proposes a series of quantitative techniques to identify both, direct and indirect impact of cluster initiatives and then the contribution of the policy (in this case the AEIs Programme) to business competitiveness through these initiatives. These techniques have been also complemented with additional qualitative information gathered from the cluster managers. The evaluation exercise has been carried out through two main phases covering not only the analysis of the data provided by MITYC but also gathering additional information on cluster organization intangible impacts and externalities.

Figure 4. The evaluation methodological approach.



Source: Authors

²⁵ Aranguren, M.J. y Navarro, I. (2003) *“The cluster policy in the Basque Country: a first assessment”*. Ekonomiaz, 23. 2. Pp90-114

²⁶ Pezzi's prologue in Aragon et al. (2010) *“Cluster policies evaluation: the case of Basque Country”*. Orkestra.

²⁷ Castillo, J. and Paton, J. (2011b) *“Methodology for cluster Mapping and Impact Analysis. Identifying Critical Mass for Innovation”*. Journal of Business and Economics.

The first approach has been carried out using the data collected by the Ministry itself during the five years period the Programme has been running (2007-2011). The data set provided by the Ministry contains information about the performance of lines 1, 2, 3 and 4 of the AEIs Programme, as well as the business and other entities in the AEIs submitting project to the Programme during those years. 122 AEIs has been used that represent more than a significant sample of the total population. The overall methodological approach can be further analysed in MITYC (2010)²⁸ and Castillo y Paton (2011a²⁹ and 2011b³⁰)

However, since the first evaluation found the additional resources allocated for lines 2, 3 and 4 (management structure costs, R&D and innovation joint projects and collaborative and international promotion activities) were supposed to contribute significantly to business competitiveness through knock-on effects, in this second evaluation, further steps were established to overcome the first evaluation approach mentioned.

Therefore, in the second approach, the evaluation has been completed with a survey analysis done to cluster managers. The delivery of this second survey allowed collecting information about micro aspect where intangible impacts (as well as some externalities) can be indentified to a certain extent. The main objective here is to reflect the relationship between the performance of AEIs and their contribution to business competitiveness as well as linked these result to AEIs Programme contribution to AEIs. Besides, information about collaboration dynamics within each cluster and interclusters collaboration has also been collected. The overall methodological approach can be further analysed in Castillo y Paton (2011c³¹).

4. The AEIs Programme 2007-2011: main results

Main results from the data collected by MITYC

At the end of 2009, the AEIs Programme ended with quite good results. A relative high number of clusters become AEIs and the Programme not only started to generate collaborative dynamics in the framework of its action lines, but also facilitating the participation in other support schemes at European, national and regional levels (MITYC 2010)³².

Now, two years later, the MITYC elaborated the final evaluation of AEIs Programme for 2007-2011 period. In five years the projects submitted to MITYC reached 71.9 million Euros of which 32.8 million Euros were cofinanced by the Ministry. These amount show the great impact that the Programme achieved raising private funds to complement the public funding in each action line.

By action line within the Programme, projects submitted under line 1 (strategic plans definition) reached a number of 147. The MITYC allocated a total of 9.3 million Euros during this period to support the strategic approach of the cluster. Many of the cluster that presented strategic plans become AEIs of the Registry afterwards so the initial funding under **line 1** then was complemented with additional funds (by the MITYC or other

²⁸ Ibid. 2

²⁹ Ibid. 13

³⁰ Ibid. 27

³¹ Castillo, J. y Paton, J. (2011c) "Cluster identification and analysis: 4 regional cases in Spain".

European Regional Science Association ERSA 2011 Conference. Barcelona

³² Ibid. 2

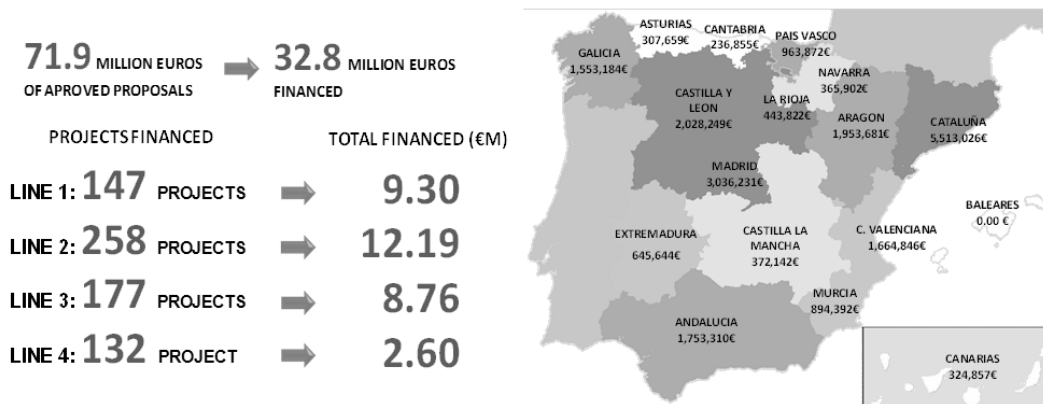
schemes of Spanish Government and regional governments). Thus, **line 2** financed specific action to strengthen and consolidate de AEIs structure and carry and carry out day-to-day work. A total amount of 12.19 million Euros for 258 projects were allocated to these kinds of actions. This figure reached quite a high amount since most of the initiatives did not existed before the launch of the Programme.

Line 3 supported specific projects focused on collaborative innovation and R&D projects between enterprises and science-technology based entities in each cluster. 177 projects were granted for a total amount of 8.76 million Euros.

Finally **line 4**, focused on intercluster collaboration at national and international level, only accounted for 2.6 million Euros and 132 projects. The smaller number of submissions here, and also the low unitary budget for each, reflects the scarce capacity of the initiatives for launching and managing complex collaborative project with other cluster from other regions and international ones.

Regarding the geographical distribution of AEIs Programme's funding, the critical mass of certain regions seems to have influenced the number of sum missions and therefore the budget granted. Thus, Cataluña and Madrid got most of the resources (5.5 and 3 million Euros respectively) between 2007 and 2011. Castilla y León, Andalucía, Comunidad Valenciana and Galicia obtained more than 1.5 million Euros each.

Figure 5. Main figures and results of AEIs Programme: lines 1, 2, 3 and 4.



Source: own elaboration from MITYC 2011 "The final evaluation of AEIs Programme 2007-2011". Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

The AEIs Programme includes the possibility of accessing a special group for those AEIs whose Strategic Plans (not necessarily financed by the first line of the Programme) have been assessed as excellent by the Ministry. This membership grants access to the funding available for the other three actions lines, as well as an easier access to other support programmes of the national and regional governments (Castillo and Paton 2011)³³.

At the end of 2011, the number of AEIs included in the Registry of the Ministry accounts for 165. The nature of these cluster initiatives remains quite heterogeneous as the intermediate evaluation showed, both at geographical and sectorial level. The

³³ Ibid 13.

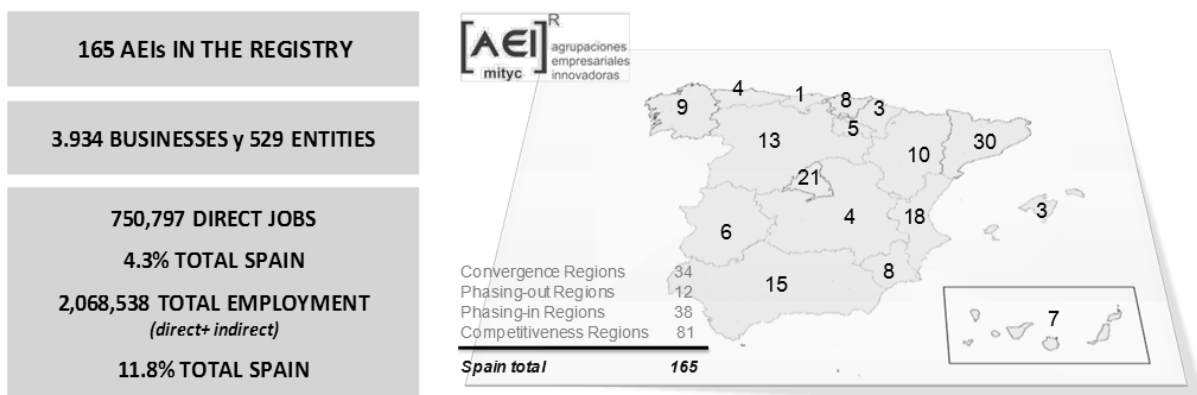
invariability of the sectorial distribution is a sign for considering the Registry as a good representation of Spanish economic specialization pattern.

Analysing geographical distribution The Region of Catalonia accounts for the highest number of registered AEIs with a total of 30. Madrid is the second with 21 AEIs. Other regions with significant number of AEIs approved are Valencia and Andalusia (18 and 15 respectively) and Castilla y Leon (13). Therefore, as it can be seen from the figures from the MITYC, Catalonia along with Madrid, Valencia and Andalusia got a significant share of total financing. These are the regions with highest number of AEIs, entities and impact on employment. It seems then that the existence of a critical economic mass has determined to a certain extent the AEIs constitution and its level of excellence.

Regarding these figures, it seems that the level of regional development is somehow positively correlated to the number of AEIs in the Registry. Thus, Competitiveness regions account for 81 AEIs compared to 34 of the Convergence regions and 50 of Phasing regions. In fact, Convergence, Phasing-out and Phasing-in regions altogether account for nearly the same number of AEIs than Competitive regions.

The AEIs in the Registry are thought to be powerful instrument to reach businesses, specially SMEs and microSMEs. Analysing the “big numbers”, the Registry involves **3.934 enterprises and 529 entities** (mainly regional development agencies, universities and technological centres). These are directly responsible for more than **750,000 jobs in Spain** (4.3% of total Spanish employment in 2010).

Figure 6. The AEIs´ Excellence Registry and its main figures.



Source: MITYC 2011 “The final evaluation of AEIs Programme 2007-2011”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

According to the estimates carried out during the evaluation of the Programme, the financing by the MITYC reached indirectly a significant share of the Spanish industrial fabric. If indirect knock-on effects are taken into account (Castillo et al. 2008, and Castillo and Paton 2011b)³⁴, these figures reach more than 2.1 million of jobs and 11.8% of total Spanish employment. So, the AEIs Program can be considered as a “cheap” policy in terms of its impact in Spanish economy.

³⁴ For a complete description of impact assessment methodology see:

- Castillo, J., Paton, J and Sauto, R. (2008) “*The Socioeconomic Impact of Spanish Science and Technology Parks*” XXV IASP World Conference Proceedings
- Castillo, J. and Paton, J. (2011b) “*Methodology for cluster Mapping and Impact Analysis. Identifying Critical Mass for Innovation*”. Journal of Business and Economics.

Regarding current figures with those from the intermediate evaluation two years before, the total employment considered directly and indirectly nearly doubled (+71.33% between 2009-2012). It seems also that the number of business in the Registry has grown more than the number of jobs (73% versus 66%) so a higher rate of SMEs are supposed to be added to the Registry as potential beneficiaries of the Programme's funding. By the other side, as the number of AEIs initiatives also is lower than the number of enterprises and jobs, cluster initiatives become bigger.

Table 3 Main figures of the AEIs Registry

	Total budget 2008-2011	2011				
		AEIs	Businesses	Total entities	Employment	Total Employment (direct+indirect)
Transport and logistics	4,655,759	29	765	101	242,004	740,508
Biotechnology	974,949	5	109	15	4,659	9,027
Energy and environment	2,477,553	17	449	45	154,282	468,015
ICT and media	4,251,049	25	744	76	133,340	310,651
Metal-machinery	1,523,263	9	201	27	16,485	49,519
Tourism	-	31	456	131	65,992	142,002
Agroindustry	2,460,541	14	324	44	25,816	78,616
Optics	199,943	1	11	1	334	936
Wood and furniture	1,727,842	13	311	13	22,224	60,647
Wealth	308,367	3	87	31	23,537	43,457
Other	4,968,411	18	477	45	62,124	165,161
TOTAL 2011	23,547,677	165	3,934	529	750,797	2,068,538
TOTAL 2009	8,359,015	101	2,268	493	450,734	1,207,941

Source: own elaboration from MITYC 2011 "The final evaluation of AEIs Programme 2007-2011". Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

The figures gathered by MITYC also show powerful clusters around specific economic activities such as transport and logistics, ICT and media sector, energy and environmental activities, agroindustries, and wood and furniture industries. These groups of AEIs accounts for nearly two thirds of total budget, AEIs, business and organisations and employment.

But the knock-on effects and the externalities related to cluster dynamics imply that the benefits of a cluster policy are not limited to direct and indirect impact on employment but to a better performance in those activities carried out under a cluster scheme. Thus, the Programme also encourages, through its financing, the participation in other R&D and innovation support frameworks, not only at regional and national level but especially at European level. The Programme (through line 3 and 4) seems to contribute in the return of Spanish businesses in framework programmes.

The MITYC has also gather information about projects submitted to these other framework under the title "*horizontal activities*" (R&D+I projects with no sectorial approach), "*collaborative research and technology development*", and the organization of "*seminars, workshops and meetings*". Besides, the AEIs also carried put a significant number of "*joint actions*" as well as "*viability studies*" as a prior phase to launch more formal collaborative projects.

As it can be seen in the table bellow, the data available about those other projects not under the AEIs Programme accounts for 27.3 million Euros granted for a total of 64.8 million Euros in the case of Horizontal Projects. For the whole period 2008-2011, the

total amount of budget granted reaches 44.7 million Euros of a total of 95.77 million Euros submitted.

On the other side, R&D and innovation projects register higher amounts up to a total of 801.7 million Euros granted of a total of 1,178.2 million Euros submitted in 2010. The funding for the whole period reached in this case 1,132.3 million Euros granted.

Table 4 The AEIs knock-on effects through other projects not included in the AEIs Programme

	YEAR	TOTAL		FUNDING (€)	
		Submitted	Granted	Submitted	Granted
HORIZONTAL PROJECTS	2010	350	235	64,874,770	27,313,470
	2009	220	167	19,843,720	11,017,060
	2008	107	90	11,173,860	6,426,350
R&D AND INNOVATION COLABORATIVE PROJECTS	2010	2,028	1,261	1,178,198,330	801,766,520
	2009	1,910	1,170	610,775,020	214,776,480
	2008	1,467	853	224,574,860	115,960,110

Source: own elaboration from MITYC 2011 “The final evaluation of AEIs Programme 2007-2011”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

So these figures show the real impact of AEIs that is not only in the economic agglomeration they represent but in the activities they facilitate among their members and other clusters and entities.

Although not in the table, the AEIs also organize other activities such as 429 viability studies and 759 joint actions.

Main results from the data collected by INFYDE

Along with the quantitative data analysis of the results presented before, it has been carried out an additional survey to cluster managers. Although near to what was done in the intermediate evaluation in 2009, current survey sifts from considering only qualitative issues regarding the opinions and points of view of those involved in implementing the Programme (AEIs managers and cluster policymakers) to a more quantitative approach considering indirect relationship between the contribution of the policy, the actions carried out by the AEIs and the competitiveness performance of their businesses.

Following a similar structure to that in the intermediate evaluation (MITYC 2010³⁵ and Castillo et al. 2011a³⁶) the questionnaire has been divided into four main blocks that refer to (1) the nature of the “*natural cluster*” the AEI is representing, (2) the contextual framework in which different AEIs operate, (3) the performance of the AEI and its contribution to business competitiveness and (4) the overall assessment of the Programme by its beneficiaries.

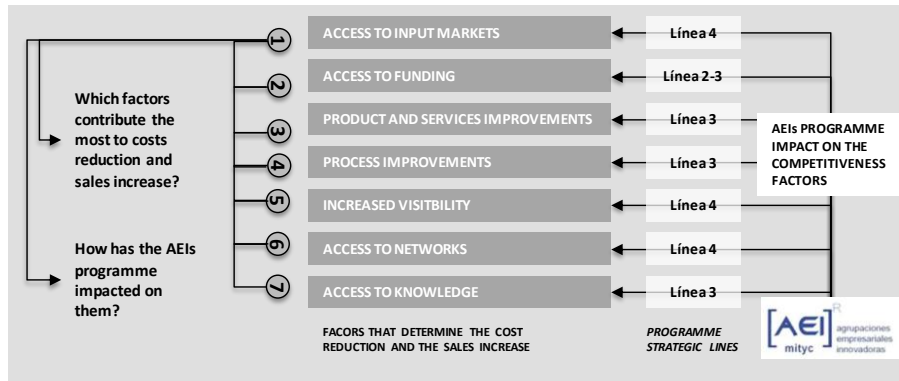
As shown in the graphic, during a **first stage**, the AEIs managers have been asked for those **competitiveness factors** linked to somehow to cluster’s competence field that contribute most to business cost reduction and sales increase. In a **second stage**, they were asked for approximately **quantify the contribution of these factors** to business costs and sales. Finally, in a **third stage** they were also asked about the **contribution of the AEIs Programme** through all of its lines (2, 3 and 4) to the improvements on those

³⁵ Ibid. 2

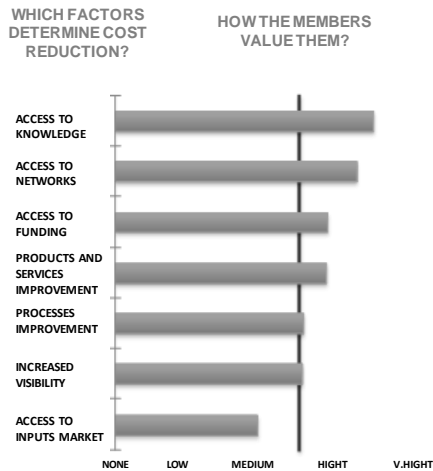
³⁶ Ibid. 13

competitiveness factors. This methodological scheme does not aim to be comprehensive in a sense of detailed competitiveness impact of AEIs and/or AEIs Programme but to infer shared thoughts of experts in the sector³⁷.

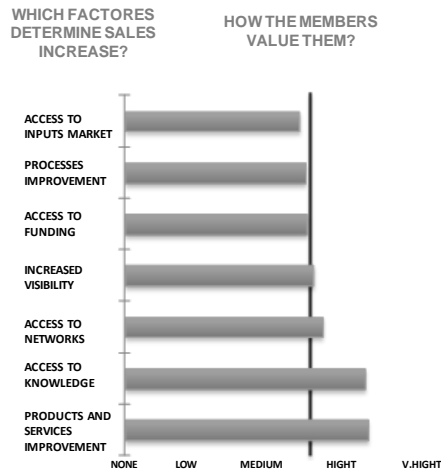
Figure 7. The AEIs Programme contribution to business competitiveness



HOW THE COMPETITIVENESS FACTORS ADDRESSED BY AEIs DETERMINE COST REDUCTION?



HOW THE COMPETITIVENESS FACTORS ADDRESSED BY AEIs DETERMINE SALES INCREASE?



Source: own elaboration from MITYC (2011) "The final evaluation of AEIs Programme 2007-2011". Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

The results from the first round questions (competitiveness factors in the field of clusters' competences) show that according to the surveyed, among the fields under clusters' competences, **access to knowledge** and **access to network** seem to contribute the most to costs reduction. **Access to funding** and **improvements in products and**

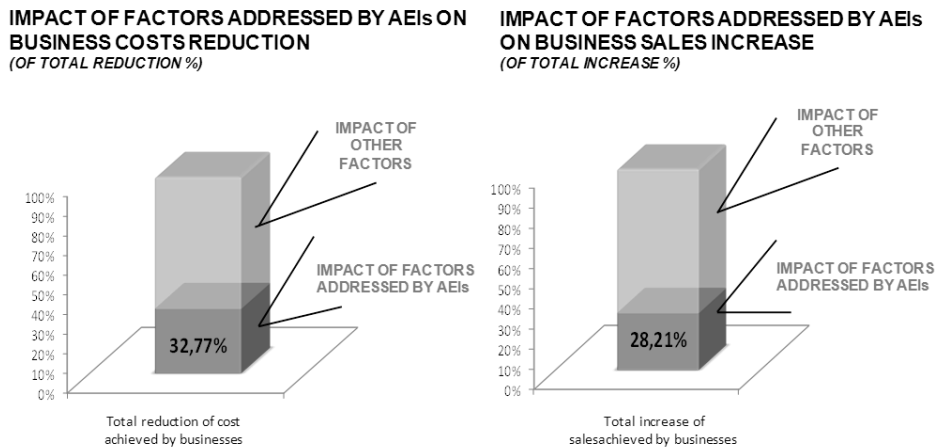
³⁷ This methodological approach presents some barriers related to certain degree of subjectivity (cluster managers own experience) direct information gathering techniques (cluster managers value the contribution of policy and factors but not carry out 2nd level surveys to contrast their though in the field). Nevertheless, as this study only aims at outlining an overall idea of the contribution between policy, clusters and business competitiveness, the degree of "subjectivity and gathering techniques inconsistencies can be afforded. In any case, the aim of this paper is to propose a further analysis in which considering facing this barriers with a more complex evaluation technique.

services also were rated quite high. The reader must notice that considering the higher innovative nature of the businesses in the AEIs, it is not strange that intangible elements (knowledge, networking etc.) account for the most of their costs and/or contribute to reduce them.³⁸

Regarding the contribution to sales increase, the **improvement of products and services** as well as **access to knowledge** appears to be the most important ones. Access to network was also rated as high but less than the other two mentioned.

The results from the second round questions shed light on some interesting insights. Thus, **those factors** mentioned of being direct competence of AEIs (or more generally a typical cluster association) **can represent up to 32.77% of total cost reduction of a company annually**. On the other side, **the same factors can contribute up to 28.21% of the total sales increases of a company annually**.

Figure 8. Quantitative contributions of those factors addressed by AEIs on cost and sales.



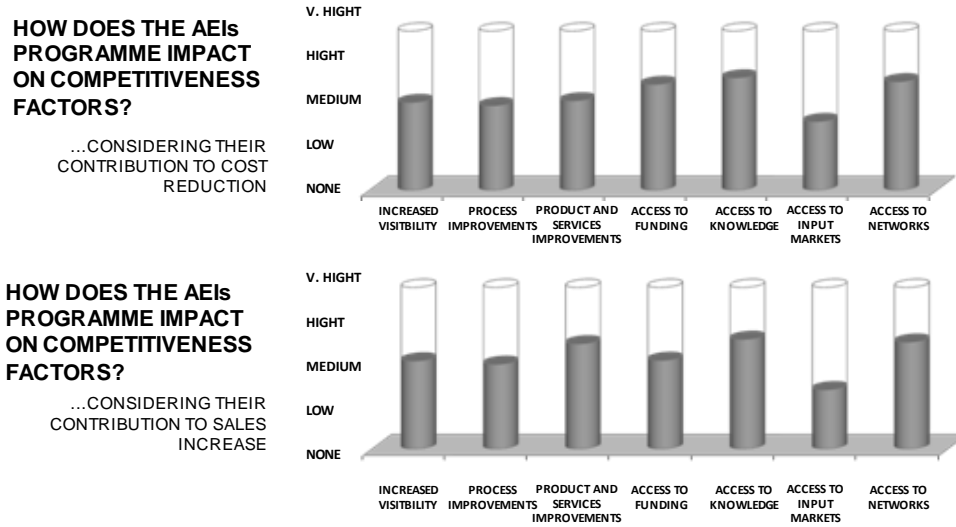
Source: MITYC (2011) “The final evaluation of AEIs Programme 2007-2011”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

Therefore, a direct conclusion from these figures is that considering the competence fields of clusters focused on those competitiveness factors, and parallel considering also the quantitative contribution of those factors to cost and sales, supporting clusters’ day-to-day activities can contribute significantly to business competitiveness.

In order to further advance in this issue, the third round questions directly addressed the relationship between AEIs Programme and its contribution (impact) on the competitiveness factors included in the analysis. Here, **access to knowledge** and **access to networks** seems to be field where the programme has contributed the most within the AEIs’ activities in terms of cost reduction. These fields seem to register the same impact from the AEIs Programme regarding sales increase.

³⁸ A very clear example are those businesses in very high tech sector (bio, ICT, advanced services etc.) where the intangible goods (e.g. acquisition of knowledge via licensing) can represent the most of their cost. This reasoning is also extensible to other businesses in more traditional activities but with highly innovative profile in it.

Figure 9. Quantitative contributions of AEIs programme on competitive factors addressed by AEIs.



Source: MITYC (2011) “The final evaluation of AEIs Programme 2007-2011”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

Therefore, considering the interrelationship between the three rounds of questions, we can infer a positive impact in business competitiveness (measured by cost reduction and sales increase) from the AEIs’ performance and the support to them by the AEIs Programme. In fact, it seems that **the AEIs Programme is especially effective on those competitiveness factors that AEIs contribute the most.**

Apart from these results, the survey also gathers information about the relationships established by the AEIs in the Registry since line 3 and 4 specifically addressed this issue.

According to the survey, in Spain the **relationships within the cluster are predominant**³⁹ and they can be classified as **medium intensity**. The strongest relationships are those between enterprises themselves and less important with Public Administration and research institutions⁴⁰. However, although not very common, it seems that interclusters collaboration begin to flourish in the most consolidated AEIs. Information obtained from the survey on this issue is summarized in the maps bellow.

The arrows indicate the existence of some kind of relationship between AEIs from different regions. The map on the left shows the relationships under the same economic activity, and the percentages are a relative measure of them in terms of the total relationships identified in the survey⁴¹. On the contrary, the map on the right shows the relationships between clusters of different economic activities.

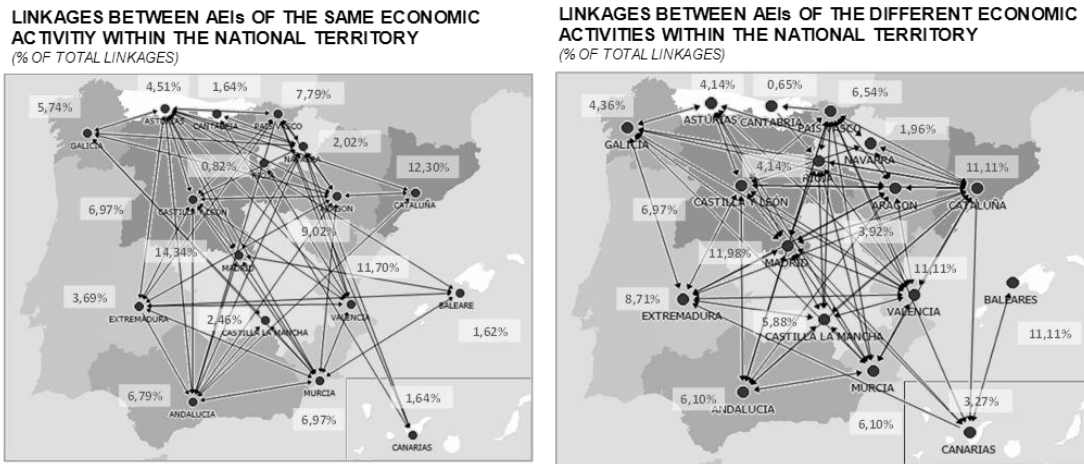
³⁹ This result has been found also in the intermediate evaluation and unfortunately it seems that the programme were not totally successful in changing this trend through lines 3 and 4.

⁴⁰ For further details see the intermediate evaluation MITYC (2010) and the final evaluation MITYC (2011)

⁴¹ We must be cautious in the analysis because this difference has not collected by the nature of the relationship (that is, if it is based on specific projects or more informal) a question which can nevertheless be important in order to realize a deeper support from actions such as those listed in line 4 of the AEI Program.

The relationships identified both within the same and different economic activities show that **although some interclusters collaboration dynamics can be found across Spanish regions, the regional focus is still highly predominant**. One of the reasons of scarce interclusters experiences can be found in the fact that most of the AEIs do not existed before the launching of the AEIs Programme. Further analyzing the relationships mapped, in general they correspond to cluster organizations with previous experience and able to define and manage complex collaborative project with complex partnerships.

Figure 10 Main figures of the AEIs Registry



Source: MITYC (2011) “The final evaluation of AEIs Programme 2007-2011”. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

So, intercluster collaboration must be a priority for Spanish cluster policy in order to build up critical mass around certain activities as the only way to compete internationally. Line 4 must be promoted among AEIs combining these efforts with line 2 also since critical mass and consolidated cluster infrastructures are also keys to start collaboration with other clusters in other regions or internationally.

On the other side, intercluster collaboration between different economic activities will progressively focus the business and policy interest as it represents the most direct way to exploit regional related variety. In fact, related variety is in the core of the newly concept of smart specialization fueled by the European Commission (MacCann and Ortega Argiles 2011⁴², European Commission 2011a⁴³/2011b⁴⁴). Behind the concept of related variety (Frenken et al. 2007)⁴⁵ there is a process where radical innovations arise from technological convergence of general purpose technology domains (GPTs) different from each other but related to a certain extent. The relationships mapped regarding different AEIs from different economic sectors already reflect this trend.

⁴² McCan, P. and Ortega-Argilés, R. (2011) “*Smart Specialisation, regional growth and applications to EU Cohesion policy*”. Economic Geography working paper 2011. Faculty of Spatial Sciences, University of Goningen

⁴³ Regulation of the European Parliament and on Specific provisions concerning the ERDF and the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006

⁴⁴ European Commission (2011) “*Regional Policy for Smart Growth in Europe 2020*”. Directorate General for Regional Policy

⁴⁵ Frenken, K, Van Oort, F. And Verburg, T (2007) “*Related variety, unrelated variety and regional economic growth*” *Regional Studies*, Vol 41.5

4. Conclusions

Clusters and cluster policy has become a widespread phenomena. The general thought shows that, somehow, clusters are directly related to business competitiveness and regional growth. In this context, the Spanish competitiveness strategy of the second half of the 2000's focused on how to develop a coordinated cluster policy at national level. This took in 2006 the shape of a specific measure by MITYC: the "Innovative Business Clusters Programme" – AEIs Programme.

The AEIs Programme has been designed two stages measure. The first one has been the financing of the elaboration of strategic plans for cluster proposals selected by the Ministry in a competitive process. The second one has been the financing of the of cluster initiatives to cover their structural costs and their collaborative R&D and innovation projects.

One of the main characteristics of the Programme has been that, although nationally focused, the cluster prioritization has remained at regional level: it has been businessmen, academia, regional and local authorities who have taken the initiative to submit cluster proposals to the Ministry. This national-regional implicit coordination is in the heart of the subsequent success.

In 2009 an intermediate evaluation of the Programme found some interesting insight on how the cluster phenomenon was developing across the different regional realities throughout Spain. At this initial stage the main conclusion was that in general terms, except in the case of the pioneer regions, the vast majority of cluster policy frameworks at regional level have been set up to after 2005-2007, when the AEIs Programme was launched by the Ministry.

Besides, regarding the data gathered and the survey results, it seems clear that the launch of many regional cluster initiatives as well as regional cluster policy frameworks has been closely linked to the Ministry AEIS Programme support. Therefore, one of the main achievements of the Programme was its nature as an incentive that has allowed many regions (where there were no previous initiatives or policies in the field), starting working on a framework for integrating regional value chains and improve competitiveness.

Two years after the intermediate evaluation, a final one was carried out considering the whole five years period 2007-2011. Regarding the previous evaluation, since a significant number of AEIs had acquired experience during those five years, the evaluation methodology incorporated not only the data gathered by the Ministry and qualitative aspects from clusters managers, but also a further quantitative approach to deeper understand the impacts of AEIs and AEIs Programme to business competitiveness. This is a quite innovative approach since the traditional cluster and cluster policy evaluation exercises remained in the qualitative field. And the results founded are quite positive.

After five years, **165 clusters have become AEIs** and part of the MITYC's Excellence Registry. These AEIs represent **3,934 firms and 529 institutions** (universities, R&D centres, public bodies etc.). These organizations account for a total of **750,797 jobs**, making up **4.3% of the total Spanish employment**. This total raises to **11.8%** (2.1 million jobs) considering the knock-on effect over their value chains (direct and indirect employment).

The Programme itself has financed the AEIs with more than 23.5 million Euros distributed across four different action lines focused on strategic plans definition, cluster

operational structure, R&D and innovation collaborative projects and interclusters collaboration at national and international level. The knock-on effect of the Programme in increasing the return from other public support schemes (e.g. other national, regional and European framework programmes) raises to **44.7 million Euros for horizontal projects** and **1,132 million Euros for R&D and innovation collaborative projects**.

But one of the innovative features in this final evaluation was, as mentioned, the exercise on the identification of clusters and cluster policy impacts on business competitiveness. The survey shows that apparently, **the competitiveness factors addressed by clusters-AEIs and AEIs Programme can represent up to 32.77% of total cost reduction of a company annually**. On the other side, **the same factors can contribute up to 28.21% of the total sales increases of a company annually**.

Additionally, the evaluation concludes that it can infer a positive impact in business competitiveness (measured by cost reduction and sales increase) from the AEIs' performance and the support to them by the AEIs Programme. It seems that **the AEIs Programme is especially effective on those competitiveness factors that AEIs contribute the most**.

Table 5 AEIs Programme evaluation main results

1	Clusters are phenomena of regional/national economic systems that generate positive externalities that impact on business competitiveness
2	The number of AEIs in the MITYC's Excellence Registry has grown considerably since 2009 accounting for 165 at the end of 2011. They clearly represent the economic structure and the specialization pattern of the Spanish economy
3	All actions lines of the AEIs Programme have increase their funding and number of projects. The projects submitted rose 40 million Euros, 23 of with were financed by the MYTIC.
5	The AEIs have registered a significantly knock-on effect. Additional resources have been raised from other public support schemes at national and regional level up: <ul style="list-style-type: none"> • 44.8 million Euros in horizontal projects • 1,132.0 million Euros in R&D and innovation projects
4	The AEIs phenomena accounts for 750,797 direct jobs (4.3% of total Spanish employment) and 2,068,538 in total (direct + indirect) (11.8% of total Spanish employment).
6	The competitiveness factors addressed by the AEIs and the AEIs Pogramme contribute up to 32% of total business cost reduction and 28% of total sales increase.
7	AEIs are a powerful instrument to facilitate the establishment of an integrated national cluster system to gain critical mass in key GPTs at international level
8	AEIs and AEIs Programme can contribute to develop smart specialization in each territory considering the importance of (1) regional specialization patterns, (2) the globalization imperatives for current competitiveness and (3) the opportunities under the exploitation of regional related variety.

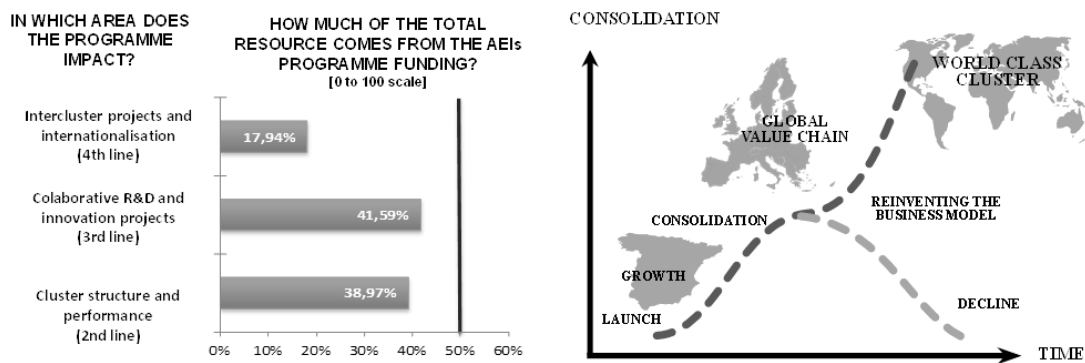
Source: Authors

Therefore, considering those all results and specially the figures on knock-on effects, the AEIs Programme can be considered as a **“cheap” policy**. The MITYC has financed until 2011 to the tune of € 32.8 million Euros, a small amount considering the huge knock-on effect of these clusters achieved over the whole period. As mentioned previously, this knock-on effect includes the additional private cofinancing for the Programme (39.1 million Euros) as well as the additional resources from other regional, national and European programmes of more than 1,177 million Euros (1,132.3 million dedicated to collaborative R&D and innovation projects).

The survey asked AEIs managers about their general thoughts about the Programme and answered that it has been contribute significantly to AEIs initial launch and subsequent consolidation: 87% of surveyed managers states that the AEIs Programme has a very high-high impact on cluster consolidation versus 8% stating that the impact was low.

This can be translated into the opportunity that the Programme has supposed to AEIs performance during this five years period. As it can be seen in the graphic bellow, the three lines under the Programme account for a high percentage of total resources the clusters association have to develop their business competitiveness support activities.

Figure 11. AEIs Programme contribution to AEIs' competence fields and the future of tomorrow for cluster initiatives



Source: MITYC (2011) *“The final evaluation of AEIs Programme 2007-2011”*. Report elaborated by Castillo, J., Barroeta, B. and Paton, J. for DG SME Policy

But above all previous arguments about the optimality of the AEIs Programme, there are still come weaknesses that must be addressed. The interrelations between clusters are still in their first stage. This can be a consequence of the relative youth of many AEIs initiatives but also because of the traditional difficulties of the Spanish business fabric to go internationally. Globalization is an imperative that Spanish economy must face and considering the scope and the scale of global competition this must necessarily rest on coordinated and systematic actions where clusters can play a central role.

The challenge for the Spanish cluster policy will be base on how to support cluster consolidation; on how to reinvent the activities exploiting local and regional related variety; on how to manage it into a Global Value Chain through interclusters collaboration; and finally on how to evolve into knowledge and innovation intensive specialization patterns fueled by Spanish World-Class Clusters.

Although it can seem quite ambitious, regarding 2020 period, the Smart Specialization Framework enhanced by the Commission can be an opportunity to rethinking the Spanish cluster model into these terms. Spanish cluster must acquire (1) a sufficient critical mass at national level and (2) a road map to better identify global value chains and integrate them. Whatever the next step in cluster and cluster policy will be, what it seems clear is that the concept will get a dominant role in the configuration of new regional and national competitive strategies as stated in the new Europe 2020 context⁴⁶.

⁴⁶ EU Commission (2010) *“EUROPE 2020. A strategy for smart, sustainable and inclusive growth”*. COM(2010) 2020 final