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Cluster boosting through Science and Technology Parks: The case of Tenerife

Roundtable 1

Cooperation among Innovation Support Structures

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Cluster boosting through Science and Technology Parks: The case of Tenerife

Executive Summary

In this paper, which main objective is presenting a case study of implementation of cluster policy supported by a STP as an innovation support structure, we stand out how Tenerife Science and Technology Park has contributed over the last years to cluster formation in diverse productive sectors of the local business network, mainly by boosting relations between the main actors of its innovation system, and facilitating repeated contact and mutual understanding of traditionally opposed institutions as University and Industry on one hand, and Industry and Government on the other. Empirical research shows that different goals, objectives, working rhythms and cultures seem to be mainly responsible for these opposed positions, and that they determine mentioned relations by interfering in their intensity, direction, content and frequency, all factors that the Triple Helix approach identifies as innovation explanatory.

Introduction

In this paper we present the results of four years policy practice on cluster boosting in the isle of Tenerife, one of the seven Canary Islands, a peripheral region of both Europe and the Spanish mainland. The role of Tenerife Science and Technology Park has been increasingly decisive for a major cooperation of the actors of the local innovation system, and is placed in the context of the Triple Helix approach. This approach explains innovation processes throughout the relations between three of the main actors (University, Government and Industry) of any innovation system - whether local, regional, national or sectorial –, and grants an important role to STPs whereas they occupy a central place in the intersection between these University, Government and Industry relations, emerging as *hybrid organizations* with new functions and responsibilities, and enabling an environment especially conducive to knowledge transfer and innovation.

The case of Tenerife´s cluster policy, with an important role of the isle´s STP as an innovation support structure, shows how an initially top-down mechanism (local innovation policy), after intensive working sessions with productive sectors and its subsectors, knowledge producers and local administration, results into new forms of cooperative organizations, the so-called clusters, conformed by actors proceeding from mentioned institutions, and finally turns into bottom-up mechanisms, that through their demands redefine local innovation policy and allow to consolidate the resulting innovation clusters. It also shows the importance of establishing new forms of organizations, that act as interfaces between different actors of the systems, and that are able to translate sectorial demands and problems into innovation opportunities, turning at the same time into meaningful interlocutors that enhance fluid communication between actors. The different resulting innovative clusters in Tenerife, in sectors as tourism, sustainable construction, transport and logistics, biotechnology, ICT and engineering have turned into important fundraisers for financing collaborative projects that improve sectors´ competitiveness, into value trainers that qualifies their members for global actions and internationalization, and finally, into indispensable prescribers that help to vertebrate a still weak and immature local innovation system that lacks of human capital, of capacity of knowledge absorption, and of the capacity of establishing collaborative relations with its environment.

The structure of the outcoming paper of this communication will be as follows. In the first part, we introduce the role of STPs within the Triple Helix approach accompanied by a brief review on innovation and cluster policy. The second part describes the context and the implementation of cluster policy in Tenerife. The third sections will resume main results achieved, with a mention to obstacles and experiences of key actors during the working process. Finally, we will conclude with some considerations regarding innovation culture and the possible effects on knowledge transfer and innovation processes and some conclusions about public policy.

1. The role of STPs within the Triple Helix approach

Explaining technical change and innovation is crucial for understanding the dynamics of knowledge-based economies. Differences in innovation performance and the institutional strategy of a specific country or region in innovation matters partly explain different economic results. In modern innovation theory, strategic behavior and alliances of firms as principal stakeholders in innovation generation processes, as well as interaction and knowledge exchange among firms, research and technology centers, public administration, policymakers and other public and private institutions, are the key factors of the innovation process.

Modern innovation theory is based on work of authors like Nelson and Winter (1982) and Freeman (1987), who locate and explain the phenomenon of innovation in the field of national innovation systems (NIS). These authors see technological innovation as the result of search processes to the best technology alternative offered in a specific environment

(market), which produces the selection of innovative technology. This search and selection process is based on trial and error processes, which are not accidental, that is, they have a sense or direction, and evolve in one or another direction. For this reason, they are called evolutionary approaches within innovation studies.

The NIS concept implies a vision of the innovation process that takes place at a system where the inputs proceed from the environment and are processed within the system travelling along certain routes or paths. At the same time, their parts (also called subsystems) maintain dynamic relations based on feedback and produce as an output technological change. The idea is that technological innovation shape different paths, which evolve in one or another direction depending on variables such as the environment, regulatory institutions and alternative technologies available.

For practical purposes, in empirical studies NIS concept is used because it implies the existence of different interrelated parts or components, that form a whole and whose dynamics produce effects and changes in different parts of the system. In this sense, NIS concept permits to study and analyze the state of scientific research, development and technological innovation in a region or country.

From out of the NIS concept new approaches have emerged, such as the co-evolution approach, which explains technological change and innovation processes as a co-evolution of different parts of the innovation system, which determines the direction of the technological innovation path. For example, the co-evolution between technology and markets is cited by Rosenberg (1982) or co-evolution between the institutional and technological development (Freeman and Perez (1987), quoted in Leydesdorff, 2000).

The most recent evolutionary approaches go a step further in co-evolutionary perspective developing a model that takes into account the relationships between not two but three parts, like the triple helix model of Etzkowitz and Leydesdorff (2000).This model outperforms the model of co-evolution, where the stability of the trajectory is reinforced by the interaction of relations between two types of agents (whether institutional, technological, or business), and generates a more complex scheme based on the three blades of the University, Industry and Government (UIG) helix and the relationships that take place between them. UIG relationships compone a much more complex and dynamic regime, and provides, according to Leydesdorff, bounding communication networks. The three main dimensions of this system (university, industry and government) interact and create trilateral communication networks, which decide the paths of technological innovation in the nation, region or sector, as reflected in the following figure:

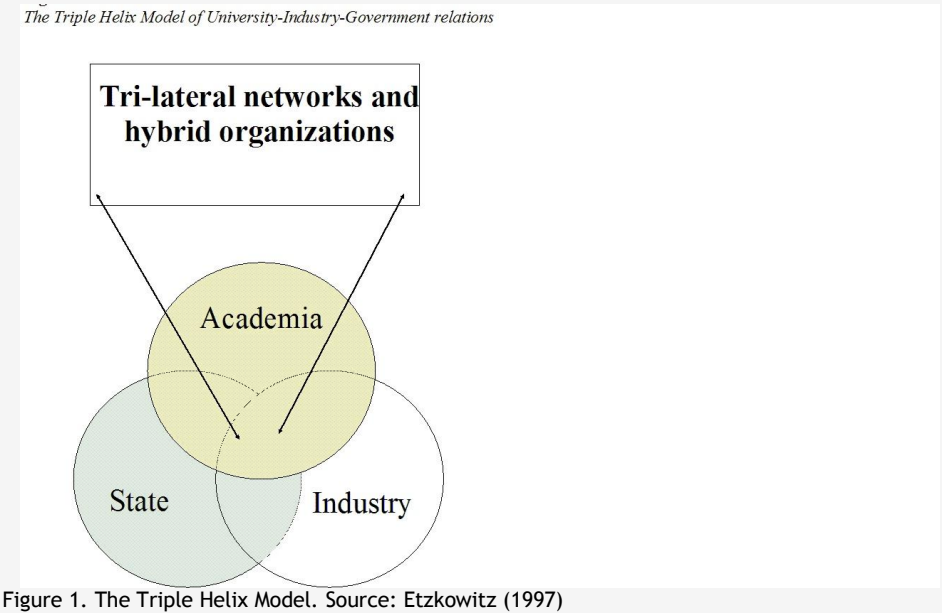

Figure 1. The Triple Helix Model. Source: Etzkowitz (1997)

In the above figure is shown how trilateral networks emerge while the fields of University, Industry and Government gradually approach and lead to an increasing overlap, to finally create a central intersection where the three actors agree and where – at least conceptually – a special area for innovation arises. In this central part of the Triple Helix new organizations can flourish, which the authors describe as hybrids since they assume new roles and responsibilities that nourish the system especially by facilitating innovation. This central space of the intersection of UIG relationships is occupied, as is shown, by "hybrid organizations" of different orders, varying depending on the objects of study or conceptual frameworks. For example, these hybrid organizations of the Triple Helix (TH) model may be public-private partnerships also known as the so-called "P3" (B. Phillips, 2010), science and technology parks (Etzkowitz, 2010), clusters (Del-Palace Pique and J. Engel, 2010), technology transfer offices (TTOs) (Castro, 2009), or even technology entrepreneurs (Calleart et al, 2010) or institutional relations of power (Gran, 2010).

The figure also shows that the TH model has multiple directions, which are non-linear, and thus replaces the dominant linear model that explains the phenomenon of innovation exclusively as a result of the previous phases of Research and Development. The linear model assumes the existence of an order that allows the generation of innovation, starting by research, and which results can produce tangible results in the form of development that, once successfully introduced in the market, leads to innovation. The linear model can vary, in function of the driver of innovation being science by itself or the market mechanisms (science push or demand pull), but always suggests a beginning and an end of the innovation process set linearly.

The outstanding point of the Triple Helix model is that innovation ecosystems arise as a result of the interaction between the (not always visible) forces of university, industry and government relationships. These innovation ecosystems occupy a central space, which coincides with the intersection of the UIG areas, where clusters and business support institutions as business or technology incubators or science and technology parks can emerge as new hybrid organizations and occupy a significant role in the generation of innovation.

As Den Hertog (1999) states, the literature on innovation systems highlights two essential dimensions of innovation, whose assumptions leads to view clusters as reduced scale innovation systems, with the result that the dynamics, system characteristics and interdependencies evident are similar to those of national innovation systems. Importantly the cluster perspective provides a number of advantages over the traditional sectorial perspective in analyzing innovation and innovation networks. These dimensions are:

1. The interaction between different actors in the innovation process, particularly between users and producers of intermediate goods and between business and the wider research community, is crucial to successful innovation (interdependency).

2. Institutions matter, because innovation processes are institutionally embedded in the setting of systems of production (systemic character).

Linking clusters with STPs, both considered hybrid organizations in the TH model, and the role of STPs in innovation systems in particular, Etzowitz and Ranga (2010) find that in promoting localized learning processes, two basic approaches have been usually combined: an exogenous vision of attracting innovative high-tech firms to relocate in the region, as a variant of the traditional approach of attracting industrial branch plants, and an endogenous vision of creating an underlying science and arts base, as well as the mechanisms to support the formation of knowledge-based firms and creative industries. Exogenous regional development strategies based on firm relocation/attraction originate in the neoclassical view that firms' decisions are responsive to small differences in input prices. This old strategy is predicated upon a microeconomic theory that stipulates that firms prefer locations that offer lower factor prices (Feldman and Francis, 2004). Consequently, cost reducing

measures such as better locations, government programs, etc. became important factors in location choices. Endogenous regional development strategies, on the other hand, recognize that other factors, such as skilled labour services and proximity to sources of knowledge and expertise, are much more important than cost reductions, especially for high-tech firms. Innovative start-ups and smaller firms, lacking the resources of their larger counterparts, are more dependent on resources in their local environments. As Etzowitz and Ranga conclude, therefore, creating the infrastructure for knowledge-based firm formation and growth is the essence of an endogenous high-tech regional development strategy, which makes the success of the local innovative firms and the success of the region dependent on each other (Feldman and Francis, 2004).

Considering the numerous definitions of STPs pointed out in a recent review of the different types of STPs (Science Parks, Science and Technology Parks, Technology Parks, Tecnopoles, Innovation Centres and High Quality Business Parks) and its role in Followers Regions Innovation Strategies, it seems obvious that there is no consensual definition on the concept of STPs (Almeida, 2008). The International Science Parks Association (IASP) (2002) defines a Science Park as an "organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spinoff processes; and provides other value-added services together with high quality space and facilities."

However, and focusing on the science park concept, some essential and common features are clear: it´s main objective is to foster technology transfer from universities or other research centers to firms and stimulate start-ups and spin-offs, achieving in an utter place reindustrialization towards knowledge intensive industries and boosting regional innovative performance. As referred to its characteristics, a science park must have formal links with relevant knowledge production infrastructures, providing a low construction density, a high quality infrastructure and a range of services that support innovation and boost New Technology Based Firms (NTBFs). Finally, science parks must restrict access to knowledge intensive activities. Nevertheless these objectives and characteristics, the closed science push perspective restricts the necessary articulation and interaction with other infrastructures, firms off park and relevant actors of the local innovation system. Therefore, the importance of combining demand pull aspects in an innovation policy framework that provides these firms the proximal demand is crucial (Almeida et al, 2008).

2. Implementation of cluster policy in Tenerife

Aware of the importance of innovation support structures, the Tenerife Isle Council adopts in 2008 an ambitious local innovation policy, called "Tenerife Innovates" based on the implementation of various actions aimed at developing an innovation strategy able to pull the isle´s business network to global markets and exploit knowledge reservoirs at local university and public research centers. Two of the main actions of this local policy revolve around infrastructures: providing physical space to technology based firms promoting a science and technology park, on one hand, and boosting clusters as sectorial platforms that enhance innovation and strengthen small firm´s capacities in the competitive global market, on the other.

Special importance was given to the STP as an innovation support structure, as it promotes an innovation ecosystem that fosters frequent and intensive relationships between the three parts of the Triple Helix model, industry, university and government. Tenerife Science and Technology Park assumed a leading role in local innovation policy, and has contributed over the last years to cluster formation in diverse productive sectors of the local business network, mainly by boosting relations between the main actors of its innovation system, and facilitating repeated contact and mutual understanding of traditionally opposed institutions

as University and Industry on one hand, and Industry and Government on the other. Empirical research shows that different goals, objectives, working rhythms and cultures seem to be mainly responsible for these opposed positions, and that they determine mentioned relations by interfering in their intensity, direction, content and frequency, all factors that the Triple Helix approach identifies as innovation explanatory.

Tenerife´s background

Tenerife is one of the seven Canary Islands. The Canary Islands archipelago is made up of seven major islands, all of which are of volcanic origin, located off the coast of West Africa and at a distance of some 1100 kilometers from the Spanish Mainland, what defines them as an outermost region with a special treatment within the European Union. The Canary Islands are divided into two Provinces, Las Palmas, comprising Gran Canaria, Lanzarote and Fuerteventura, and Santa Cruz de Tenerife, which includes Tenerife, La Palma, La Gomera and El Hierro. The region has as its twin capitals the cities of Las Palmas de Gran Canaria and Santa Cruz de Tenerife.

Because of its insularity, the Canary Islands have several distinctive features (González de la Fe et al., 2005):

- The small size of its territory (divided into seven ecologically fragile islands).

- The intense population pressure, aggravated by rapid unplanned growth in response to high tourism demand.

- The rate of economic growth: in two decades time, the Canary Islands have passed of being part of the group of regions that grow below the European average, to belong to the group of those regions that grow on top of it. And though for the moment they remain in the group of Objective 1 regions of the EU, this will not be without difficulty and only for a limited time. This circumstance will profoundly change the economic life of the islands, used to be subject of financial aid and public subsidies.

- The characteristics of the business network are as follows: predominance of SMEs, and within this group, a high number of microenterprises (up to 95% of SMEs), and with an especially big weight of the service sector, overall tourism establishments and service providers of the touristic sector.

- Its isolation from the rest of the Spanish mainland and regions and, indeed, the rest of the European Union, as all outermost regions, makes them feel discriminated and sort of “forgotten” in general by the State Government, and reinforces their needs to create an autonomous and separate region. This circumstance is signaled by Koschatzky and Sternberg (2000) as negative, since the closer existing relationships between actors of the local environment with those of the external environment, the more likely an efficient development is achieved.

Canary Islands, as well as other south Spanish regions, can be considered as a catch-up innovation system because of the lack of industrial agglomeration and innovative firms. Its indicators are far away from other European regions. Investment in R&D is still very low by international standards (0,6% of GDP in 2009). Only 20% of R&D expenditure of the region is incurred by business (INE, 2009). Sharing with other Spanish regions, a feature of the business community in the region is that family-owned SMEs account for a large proportion of the manufacturing and service sectors. As above described features show, the Canary science and technology system is characterized by a great weakness, especially in the private and institutional sectors. Therefore, it is particularly important to identify key issues that can change culture and improve the less efficient public policies.

Tenerife´s innovation policy

In 2008, within the framework of the local innovation policy (Tenerife Innovates) as mentioned before, the Tenerife Science and Technology Park, commissioned by the Isle´s

Council and within its social purpose as a local innovation agency, starts to contact lead player of several sectorial business networks, in order to identify possible prescribers for boosting sectorial clusters. The intention is to promote and create together with these business leaders, local government and local university initiatives that help to create the necessary climate of trust for boosting clustering. It is important to mention that the scope of action of Tenerife´s STP only extends to the isle´s firms and other stakeholders of Tenerife, but that logically the action and integration of actors also include the other islands of the Canary Islands, turning Tenerife´s clusters at the same time into regional clusters.

An import decision in Tenerife´s innovation policy during the mentioned period (2008-2011) - which coincided with the beginning and deepening of the world´s economic crisis - is worthwhile to be mentioned here. Whilst significant cuts in government expenditure affected all local policy, Tenerife´s Isle Council decided to prioritize and maintain expenditure on cluster policy, considering that at the medium and long term a positive impact on communication between industry, academia and government would be established, and therewith, a major basis for developing local innovation culture.

During 2008 and 2009 numerous sectorial workshops, seminars and public events were celebrated in order to identify common goals and construct together the bases of sectorial clusters. Both traditionally important and ingrained sectors for the isle´s and region´s economy such as tourism, transport and logistics or agriculture (or subsectors as winemaking) and knowledge intensive sectors as IT, engineering, sustainable construction or biotech were encouraged, and throughout 2010 and 2011 between 8 and 12 sectorial clusters were established. The support they received from the Isle Government through the STP consisted both in financial support for carrying out a feasibility and strategic plan in the first place, and subsidies for supporting the cluster structure and co-financing recruitment cluster management, in the second, as advice and consultancy by technical staff of the STP. Besides this intensive support from Tenerife´s local government, many clusters also received public subsidies from cluster programs fostered by both the regional and the state government, which in a certain way produced the collateral effect of stimulating many initiatives, some of them not viable or sustainable on the long term. However, a prominent feature of Tenerife´s cluster policy, which was not provided by other public institutions, consisted in an intensive accompaniment and frequent (monthly) contact through meetings and work sessions between the private sector and the local policymaker, which has contributed definitely to strenghten cluster´s projects. In this sense, the local government has assumed towards third parties (regional o state government) defense and lobby labor in favor of local cluster projects, which have been benefited by the public promotion and visibility, and have been able to grow and achieve critical mass. In the case of Tenerife, local government has had - through its STP - a decisive role in cluster formation, leading the promotion and creation process, and encouraging industry during the consolidation phase to take over as leader and main actor of resulting clusters. Meanwhile, the third important part of TH model, the university, has had an unequal weight by sector. In this sense, whilst university took a leading role in the case of agrofood and tourism clusters, in other sector its presence and role has been less prominent. The intensive support given to local clusters through Tenerife´s STP has encouraged at the same time inter-cluster projects and actions.

So logically, not all of the cluster initiatives achieved to consolidate or survive till nowadays as the next table reflects. As shown, the audiovisual cluster has not achieved to consolidate and has crucial survival problems in this moment, and the winemaking and tobacco clusters did not survive after intensive attempts for its creation and consolidation in 2009 and 2010. Internal sectorial as well as contextual reasons explain these failures. Nevertheless, important efforts have been made for stretching intersectorial relationships between firms in the first place, between industry-university links in the second, and industry-government links, in the last place. A major consciousness about the benefits of collaborating and the possibilities of reaching external (global) markets has contributed to the implementation of a still weak innovation culture among Tenerife´s entrepreneurs and business leaders, so far strongly characterized as individualistic and low levels of associationism (Canary Island Government Report, 2010).

Table 1. Overview of sectorial clusters in Tenerife / Canary Islands.

CLUSTERS AFTER 4 YEARS CLUSTER POLICY	Number of members	Total revenue by sales of members	Number of jobs generated by members	Weight of the sector / GDP
ENGINEERING	44	133,3 M €	941	n.a.
TOURISM	25	n.a.	1410	10,30%
SUSTAINABLE CONSTRUCCTION	28	21 M €	277	9,20%
ICT	19	n.a.	n.a.	3,30%
RENEWABLE ENERGIES, WATER RESOURCES AND ENVIRONMENT	218	290 M €	1410	n.a.
TRANSPORT & LOGISTICS	31	1.714 M €	10921	4,11%
AGROFOOD	36	95,52 M €	1065	n.a.
AUDIOVISUAL	10	n.a.	n.a.	n.a.
BIOTECH (BIOTECHNOLOGY AND PHARMA INDUSTRY)				
COMMUNICATION AND MARKETING				
WINEMAKING				
TOBACCO				
	n.a.= not available			
		endangered clusters		
		no response		
		failed initiatives		

3. Main findings of cluster experience in Tenerife

In order to deepen in cluster experience and to contrast the main results achieved after four years of cluster policy in Tenerife between 2008 and 2011, a questionnaire among the 10 existing clusters was sent during the first months of 2012, to which 9 cluster managers finally responded. Here we present the main findings:

1. As figure 2 reflects, the interviewed cluster have an average age con 2,75 years, and therefore can be considered between growth and consolidation phase. As was mentioned before, during the first years of cluster policy in Tenerife, a boom of initiatives for cluster creation emerged, probably incentived by public policy. Nevertheless, throughout the years, only part of them survived during the years, and achieved to gain critical mass y sufficient representativeness in the corresponding sectors. Nowadays, the youngest cluster has been functioning already for at least two years, as figure 2 shows, which permits to trust in their survivability.

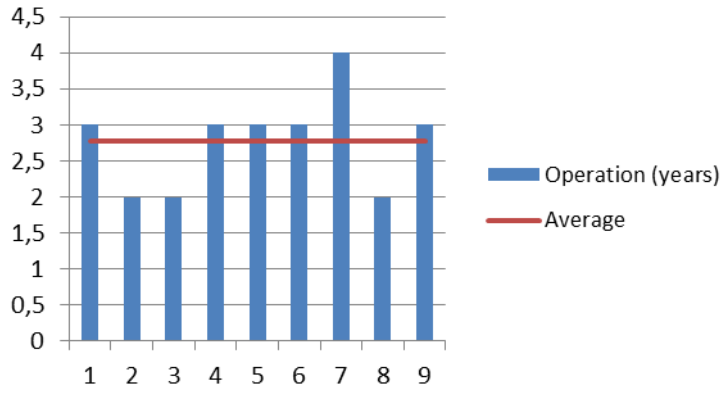

Figure 2. Age of cluster

1. Asked for best practices of cluster management, more than the half of interviewed managers (62,5%) consider a scalable implantation of membership quotes as the first option, while the rest (37,5%) call for training specific cluster personnel. It draws the

attention that none of the interviewed considers as a best practice the incorporation of research centers in the management team of the cluster, neither awareness actions. Obviously, to be able to fulfill cluster´s strategy and lead members to global market, throughout innovative of expansion projects, a minimum of stable income must be assured. As before was mentioned, the high dependence of Canary Islands of subsidies (in all parts of economic life), has its reflection also in this area. Turning a subsidy culture into an innovation and investment culture is one of the major challenges of the local and regional innovation system.

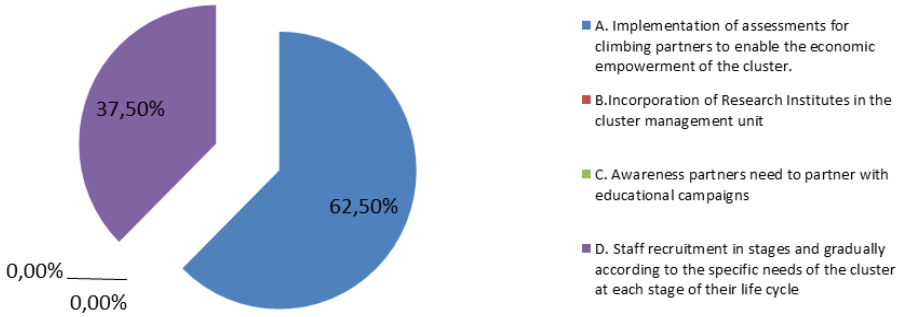

Figure 3. Best practice in cluster management.

2. When asked for the role of STPS in clustering, a wide range of answers was registered, which difficult a clear and single lecture of this matter. As the next figure reflects, an almost equal distribution of the distinctive possible answers was registered, with only a slight advance for those who consider the STPs an important tool for technology and knowledge transfer. Cluster managers´ opinion on STPs role could be interpreted as a lack of understanding of STPs´role, which is quite understandable since Tenerife´s STP is still in development, being the first one operative in Canary Island since 2006, and thus with few years of presence and visibility. Another possible interpretation of this result could be the high expectation cluster managers have from la isle´s STP role, assuming a wide range of possible roles and function of this new infrastructure.

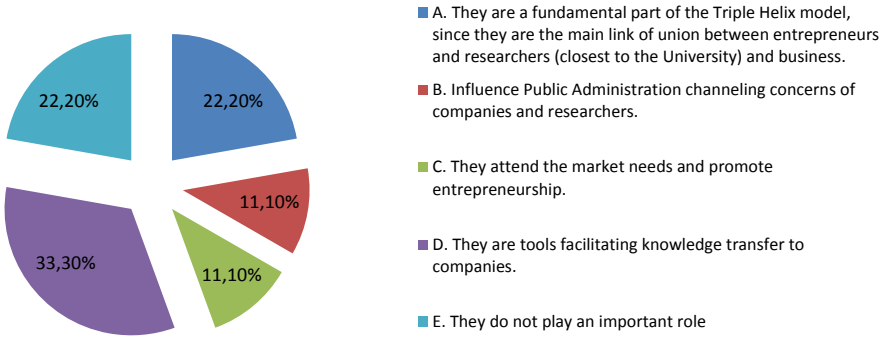

Figure 4. The role of STPs in clustering.

3. When asked for the importance of Industry in cluster formation (following the TH model), 77% consider Industry as the most important promoter and prescripter of the cluster, leaving the Government and the University with the less important role.

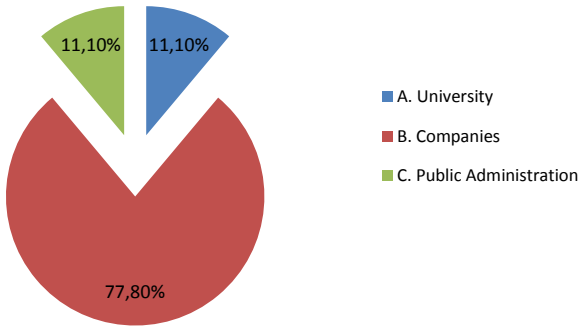

Figure 5. The importance of Industry-Government-University.

4. On the question if the university is considered important in the grow and consolidation phase of clusters, more than the half of the interviewed (62,5%) consider it does have an important role in this process. This finding leads to think of the university of an essential part of clusters, which in the isle´s context is a positive circumstance, which permits to assume major understanding and fluidity between firms and university.

5. When asked for the main obstacles and difficulties, the interviewed cluster managers again answered throughout the wide range of possible options. As the next figure shows, more or less all possible obstacles that were identifies were quoted, hindering a clear interpretation and conclusion in this matter. As happened before, a possible explication could be the still numerous obstacles to be overcome by active agents of the local innovation system, among which remains an insufficient communication between key players.

Figure 6. The importance of Industry-Government-University.

4. Considerations on innovation culture in Tenerife and the relationships between agents: conclusions and some policy recommendations on innovation processes and knowledge transfer.

The case of Tenerife´s cluster policy, with an important role of the isle´s STP as an innovation support structure, shows how an initially top-down mechanism (local innovation policy), after intensive working sessions with productive sectors and its subsectors, knowledge producers and local administration, results into new forms of cooperative organizations, the so-called clusters, conformed by actors proceeding from mentioned institutions, and finally

turns into bottom-up mechanisms, that through their demands redefine local innovation policy and allow to consolidate the resulting innovation clusters.

It also shows the importance of establishing new forms of organizations, that act as interfaces between different actors of the systems, and that are able to translate sectorial demands and problems into innovation opportunities, turning at the same time into meaningful interlocutors that enhance fluid communication between actors. The different resulting innovative clusters in Tenerife, in sectors as tourism, sustainable construction, transport and logistics, biotechnology, ICT and engineering have turned into important fundraisers for financing collaborative projects that improve sectors´ competitiveness, into value trainers that qualifies their members for global actions and internationalization, and finally, into indispensable prescribers that help to vertebrate a still weak and immature local innovation system that lacks of human capital, of capacity of knowledge absorption, and of the capacity of establishing collaborative relations with its environment.

Based on the results obtained so far during the period 2008-2011, especially attending to the survival rate of the clusters and the type of projects they promote, some conclusions can be drawn. First of all, the outstanding fact that the local insular government, through Tenerife´s STP has made a successful intervention with the strategy of business clustering on the isle. Among the key factors that have enabled to reorganize relevant economic sectors on the island, promoting a culture of innovation, are:

1) The decision to concentrate scarce public resources and invest in the promotion and creation of clusters, not only with subsidies for their strategic plan and supporting a minimum infrastructure and personnel, but overall assisting them and guiding them through the whole process with intensive work sessions throughout the years as well intrasectorial as intersectorial.

2) The implementation of a direct and continuous communication channel between the clusters and local government. Tenerife´s STP has held monthly sessions with all clusters supported financially between 2008 and 2011, establishing a bidirectional communication between private and public sector, enabling the identification of challenges, opportunities and problems, leading to mutual understanding and support in different actions

3) The visibility and promotion that local clusters obtained through these communication channels has permitted to raise funds for cluster projects, and even joint project between different clusters, and between them and government.

However, as well was illustrated throughout earlier discussed results and findings, the island government still needs to establish special measures aimed at improve communication between industry and university, promoting major importance for university in clusters and encouraging industry-university links.

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