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Regional Knowledge Management: Contrasting skills in science, technology and innovation along the Atlantic space

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ABSTRACT

This paper represents an effort to evaluate the current position and perspectives of science, technology and innovation in several Atlantic Regions. It is based on the results of a still running European research project (REGINA) that puts together *Andalusia*, *Algarve*, *Norte*, *Galicia*, *Basque region*, *Bretagne*, *West Midlands* and *Border, Midland and Western*.

Not discussing the large spectrum of the goals of that project, this is an exercise to consider the possibility of setting up a lasting partnership for regional knowledge management in the politically, so important, Atlantic space (AS). Comprehending Spain, Portugal, France, United Kingdom and Ireland, this part of Europe also integrates regions lagging in terms of tacit and codified knowledge environments and, consequently, missing innovative attitudes. Would they benefit of a better territorial development balance in case of a regional innovation common strategy? And if so, which sectors are those to show greater skills for technological transfer within already existent cooperative performances?

Highlighting an interactive model for which knowledge creation is understood in a broad perspective and innovation implicitly demands more than a simply gathering of discoveries and inventions this theoretical framing accepts the adaptation and combination of existing forms of knowledge.

An interactive and dynamic concept emphasises the external environment of the firms in addition to their internal knowledge creation capacity and refers a synthetic framework based on the concept of the learning process as a driver to redress stakeholders' attitudes and strategic choices. In such a context, the advantages that may result from institutional geographical proximity or similarity, specific knowledge diffusion and networking in coordination of common interests could build up advantages. In short, the specific construction of a territorial knowledge base and the consequent achievement of more sustainable regional development for a large part of the European Atlantic border are discussed in this practical case.

Based on secondary data from the European Innovation Scoreboard, an outline over the regional innovation performances of the considered regions will be supplied. Also, based on primary data obtained near the institutional bodies of each region, an analysis of the existent governance structures is possible. The conclusion allows considerations related to the present context for the development of an Atlantic spatial development strategy.

INTRODUCTION

As Europe adapts to social cohesion in an economic context of clear national asymmetry, European regions and respective stakeholders become more aware of their role in the dynamic process of sustainable growth. One of the challenges that the European structural change is facing is the development of new coordination forms, expressed in trans-national or trans-regional, formal or informal networks of science, technology and management. In spite of the fact that earlier studies have shared evidences on the need to converge at the macro, *meso* and micro levels (Noronha Vaz...), we are still in the beginning of our understanding about the accuracy of how to promote and drive coordination with clear advantages for growth and development. The constitution of ERA (European Research Area), which is a long term strategic plan for sustainable European growth, should be analysed in terms of regional participation in order to recognize synergies and proximities in the European regional path.

During decades, the theoretical context to support the Lisbon Agenda was settled and there are no further doubts that sustainable growth is mainly explained by an interactive model based on knowledge creation and innovation. The European Council confirmed, in March 2005, its determination to stress the potential of European economic growth and reinforce European competitiveness by investing in knowledge creation and diffusion.

Given the performance of R&D in Europe, weaknesses have been identified in the processes of knowledge creation and innovation: Insufficient funding, lack of environment to stimulate research and exploit results and a fragmented nature of activities with significant dispersal of resources. The main reason for such fragilities was identified (http://www.cordis.lu/era/concept.htm) as being the lack of coordination in the strategic direction and implementation of research effort in most countries and regions.

While accepting that R&D is an instrument to knowledge creation and a main factor for growth, the regional dimension or the cohesion concern may be in disfavour. The natural tendency of increasing investments in R&D may risk the escalating of asymmetric growth. However, ERA as a strategic choice compromises the commitment of decreasing regional asymmetries across Europe. Thus, the introduction of the regional sphere in European political arena demands a new level for consensus and dialogue and constitutes a highly challenging political exercise.

Much further then the American productive goal, Europe is using its support to science and technology as a means of income redistribution and human resources qualification for sustainable development. This is a very estimable goal with dual consequences: the costs of combining different political interests' threat their success, taking time and perspicacity, whereas the expected positive impacts can guarantee social stability inside a market that within the last 50 years has grown up to ..... Million people.

The Structural and Cohesion Funds are the European Union main instruments for supporting social and economic restructuring across its enlarged space. They account for over one third of the EU budget with a focus on regional disparities and intangibles targeting innovation, identified as a key priority for all regional programmes under European Regional Development Founds (ERDF) and European Social Founds (ESF).

The political effort to mix regional goals in the proceed of European research is clearly defined into two simple principles of regions' participation on ERA: to capture the research results into the entrepreneurial tissue, (particularly into small firms) and to increase private investments in R&D. Though, comprehensible hindrances to the adoption of a single European model at the regional dimension can be raised up. Namely, those that confirm that structures, problems and opportunities related to innovation are not necessarily the same across regions:

- Autonomy amongst the European regions in terms of research, technological development and innovation;
- Local leaderships tending to explore comparative product advantages and to play non-synergetic political influences;
- Huge variations between regions in economical terms and, mostly, human resource capacities.

To go beyond such hindrances the use of straight political attitudes able to catch the interest and the motivation of the great majority of stakeholders is required. Simultaneously, stakeholders' attitudes need to be redressed in a more efficient use of time and resources meaning the need to approach strategic decisions shaped into collective interests - we can conceive that institutional (organizational) or geographical proximity would constitute cost advantages or other positive externalities able to generate specific knowledge diffusion (mobile codified knowledge) and promote trust, one of the basic attributes for coordination. To

settle this conclusion we may argue on the efficiency of public policies to rectify agents' long term attitudes.

This paper is in the edge of a discussion linking public policy to organizational behaviour. It comprises a debate that considers institutional or geographic proximity as responsible for most of the agents' attitudes, drivers of their internal capacities to technologically learn and, therefore, participate in changes that may produce knowledge creation and innovation.

Inspired in the previous perception, the possible construction of a territorial knowledge base sustained on the common characteristics and specificities of the Atlantic border regions is analysed and discussed. The question is if, in spite of their asymmetric levels of growth and development or different historical and national contexts, the area could be understood as a particular context for knowledge diffusion. And, further, if this would improve the conditions for entrepreneurial efficiency. If so, it is expected that this paper could be considered an input to help drawing more adjusted public policies for this and other European regions (as in the case of the Mediterranean area), suggesting that the same type of exercise should be undertaken for other cases.

The work will be presented into two major sections: a theoretical framework that underlines the importance of knowledge creation and diffusion towards regional development and an empirical study using data related to of science, technology and innovation from some regions of the European Atlantic border to illustrate the complexity the different national and regional context in the area.

1- IS KNOWLEDGE THE PERMANENT LINK BETWEEN INNOVATION AND GROWTH?

Along the human history, innovation has been the main factor in adapting mankind to its settings. On a base of earlier practice, men's creativity allows a permanent finding of new ways to do things. Their applications encourage new spaces, new necessities and new lifestyles. Innovation has been an element of human capacities from its earlier stages although only recently it was recognized as a clear device of social and economical change.

Schumpeter, ---- and Freeman, ---- are those among the most important contributors to this view. After their works, diversified groups of academic studies appeared giving rise to different positions and concepts, some of them classified as "fuzzy" (Ann Krugger….) due to a lack of focus frequently characteristic of emerging scientific areas.

The long run economic change, defined by Shumpeter as *development*, was firstly explained in the Marx-Schumpter model as a result of a need for more competition in a capitalist economy. "New combinations" of resources and knowledge should permit a positive effect in business opportunities and define permanent change. Whether or not permanent change is always possible it is, however, a different theoretical issue. Frequently, the existence of specific organizational patterns obstructs institutions to undergo the required adjustments in spite of innovative performances and new opportunities. Such slowness in the process of growth may be classified as hindrances (Perez, 1983) to continuous process of change.

One of the forms to induce the process of change is to concentrate on continuous production of new products and processes adapting at the same time the society to absorb them. This represents a very accurate attempt to combine knowledge and consumption in an interactive model for innovation based on coordination capacity of organizations to manage the knowledge assets. This is way *the trade off among technology and organizations turn out to be an additional research subject with consequences on the analyses of the diffusion of new technologies* (Hall, 2004, in Oxford Handbook of Innovation) and on the proposals for public policies for development and innovation (Lundvall….).

In continuity, there is a long work done by Posner (1961), Krugmann (1979) and Fagerberg (1987, 1988) to prove that, at cross-country level analyses, the presence or lack of innovativeness may "affect differential growth rates". An imitative or innovative *modus operandi* may explain different levels of development among countries or regions, the so called "technology gap" or even the "north-south" asymmetry. Thus, Schumpeter's concern with the tendency of innovations to cluster, in spite of the closed link between innovation and economic growth, imposes that its use as an instrument for public policy in view of fast development may have to submit to more detailed attention.

Fagerberg, 2004, offers a complete revision on the scientific work done related to innovation and structural change and suggests promising needs for further research

related to the topic. Using his work, it may be helpful to undergo some of the epistemological limitations of this field and the most generally accepted findings.

i. Cross-disciplinarity: no single discipline deals with all aspects of innovation.
ii. Undetermined causality: A lot of what happens in innovation has to do with learning and learning is a cognitive science.
    1. "…to be able to turn an invention into an innovation, a firm normally needs to combine several different types of knowledge, capabilities, skills and resources;
    2. "…many inventions require complementary inventions and innovations to succeed at the innovation stage;
    3. "…a single innovation is often the result of a lengthy process involving many interrelated innovations.
iii. Path dependency: Due to uncertainty it may occur that chosen innovative paths may lead to cost disadvantages that would not have occurred in a different moment in time.
iv. Pluralistic-leadership: The need for flexibility to accept the application of different ideas and managerial solutions.
v. Systemic approach: innovation takes place in opened environments and affects simultaneously multiple and transversal relationships.

Starting off with the works of Penrose (1959) and Wernerfelt (1984), the drivers of innovation may be better perceived from the resource-based view of the firm and accepting their heterogeneous character. The approach takes the firm as unit of analysis and studies its resources and capabilities in order to understand the firm's strategic behaviour (Kaleka, 2002; Knudsen, 1995). In this context, knowledge is recognized as a key resource for firms and other economic agents and, both, codified knowledge and tacit knowledge are pertinent aspects for innovativeness.

Although, first studies on knowledge assets focused on the firm's own codified knowledge with particular emphases on its internal R&D capacities, nowadays, researchers accept the major role of external sources of knowledge in firms' capability to innovate (Albino et al., 1999; Nooteboom, 1999).

It is still in discussion whether the co-operation between research institutes and industrial firms enhances innovation as argued by Antonelli and Calderini (1999) or, contrarily, such links are of minor importance, as defended by Diederen et al. (2000). In any case, it seems to be of common agreement that the impact of the

co-operation with research institutes is sector-related. In general, high tech firms tend to co-operate more often with research institutes than firms producing in low technology areas[1].

Additionally, some authors have stressed the key role of 'good communication' between industry and research institutes for the successful transfer of technological knowledge (Baardseth et al., 1999; Diederen et al. 2000). This lack of acceptance may partly explain why low technology firms tend to be sceptical concerning partnerships with external researchers (Kvam, 1998).

Indeed, the strategic choice of low tech firms when regards innovation is highly influenced by vertical co-operation with suppliers and customers. In such cases, frequently the development of new products or processes (Maskell, 2001), considers above all the new demands as well as the marked structural changes[2].

Moreover, related to firms' attitudes towards the absorption of codified knowledge, it is important to underline that firms rely on the lessons from the success and failure of similar companies to improve their own strategic decisions, as signalled by Maskel, 2001. Particularly if due to small size they lack the means to carry out exhaustive cost benefit analyses and cannot pay for innovations with high-risk profiles (Senker and Faulker, 2001).

Following Nightingale, 1998 and Kaiser, 2002, tacit knowledge is a less mobile resource derived from lifetime experience, practice, perception and learning. After Nelson and Winter's, 1982, first discussions on the particularities of tacit knowledge, many other contributions have proved its importance as a component of the innovation process (Nonaka and Takeuchi, 1995; Johannessen et al., 1999). Also in the case of small or low-tech firms this has been confirmed by Le Bars et al., 1998 and Baardseth et al., 1999 or ……., more recently.

If knowledge has become the most important resource for firms and organizations and learning is its most important process (Lundvall and Johnson, 1994) European sustainable growth depends also on how knowledge creation is geographically

[1] The explanation can be found in the fact that R&D based innovations, which typify high tech firms, often result from co-operation with research institutes whereas innovations that are primarily experience-based, as is the case in small low technology firms, seldom require this type of co-operation.

[2] The case of innovation in the food industry is doubtless an important example of innovation in a context of small low tech firms deeply rooted in its environments as pointed out by Christensen et al, 1996, Galizzi and Venturini, 1996, Grunert et al., 1997 and Vaz, 2004

taking place, how its use is occurring and, finally, how efficient its impact is across the territories.

2- ARE KNOWLEDGE ASSETS OUTLINED BY PROXIMITY?

As earlier discussed, it has been argued and globally accepted that a firm doesn't innovated isolated from its external environment[3]. The amount of tacit knowledge included in the firm exposes its capability to expand links with external partners. In this context and in the resource-based view of the firm, beyond the national industrial specialisation patterns, also the role of geography becomes perceptible. When face-to-face interaction between partners with common traces like language, codes of communication, conventions, personal contacts, past history or succeeded informal interactions (Gertler, 2001, Maskell and Malmberg, 1999 or Nightingale, 1998) takes place trust and exchange is improved. Accordingly, a number of studies have accepted the major role that geographic proximity to external resources may play in innovativeness (Antonelli and Calderini, 1999; Maskell, 2001).

Asheim and Dunford, 1997, explained how territorial based complexes of innovation and production are increasingly the preferred means to re-create knowledge and in which creative socio-economic interactions are often performed in a regional context.

Isaksen, 2003, supplied a very enriching discussion on the boundaries of national and regional contexts for innovation, particularly the role of regional administrative level in what concern the design and execution of innovation policy tools in the regions. As detected, the autonomy and the capacity to reach financial founds is responsible for the level and the form to use policy instruments. So that it could be argued that the knowledge flows within a regional context is a result of a complementary effect of national innovation policies and regional governance structures for which hindrances may result from a lack of coordination between these two levels of decision.

In addition to the political attempts to support knowledge creation and reproduction a quite common form for agents to develop new tools to produce and compete

[3] There are even attempts to measure the intensity of the influence of the external environments in the innovative behaviours of firms (Vaz 2005).

based on networking in a system able to provide them with new informational flows.

In general, countries hold specific systems able to support (or not) innovation, growth and development. Such systems may be considered, similarly to energy or other traditional factors of production, major determinants of growth and defined as knowledge assets.

Malhotra, 2003, felt challenged to discuss the models available to measure the amount of national knowledge assets, discussing its restrictions and proposing new indicators and methodologies. Several have been the limitations perceived in his study, but the most relevant for this article are related to the cognitive nature of knowledge, more accentuated in the case of tacit knowledge.

Apart from the fact that *human-embodied* knowledge is non-physical, non-appropriable, not directly measurable and incompatible with financial accounting (OECD, 1996) knowledge assets can only be calculated if there is a clear understanding on their potential use in the economy. This means that a significant part of the actual value of knowledge may be depending on the success of future results.

This concept can be recognised when historical valuable background of poor communities disappears as time passes, narrowing the respective knowledge bases while others, prosperous, are able to integrate past value of knowledge in their present successful performances in a process that may even overestimate the value of their knowledge. In itself, the value of knowledge assets is relative to time and to growth.

As a result from the existent efforts to develop rigorous criteria to measure knowledge assets[4] and, in spite of the multiple measurement models developed[5], most of the available indicators related to knowledge are pertinent for analyses of national performance in terms of global development.

[4] As it is the case of World Bank's Knowledge Assessment Methodology and Scorecards in World Bank Institute, 2002, or the many specificities and conceptual contributions from OCDE to reconcile knowledge assets and human and social capital in OECD, 1996 and 2001

[5] Resumir todos os modelos da página 21 do texto de Malhorta

It has been accepted that for a better understanding and measurement, knowledge assets can undergo the following model:

Inputs - Processes – Outputs – Outcomes

In which Inputs represent structural or financial investments for development purposes, Processes are to track the use of specific financial, structural and human capital inputs, Outputs stand for the effective use of the inputs resulting in tangible and intangible outputs for the target users and Outcomes correspond to precise results.

This model recommends that the accounting of knowledge assets based on investments in inputs may not be a reliable *proxi* for the actual performance outcomes resulting from such investments[6]. Further restrictions could be considered: i) the first one is related to finding adequate desegregated data, which is a common problem related to many socio-economic indicators. Recent sampling and data mining techniques are helping to solve efficiently such problem; ii) the next concern that can be raised up is the lack of certainty that investments made on the location of knowledge inputs will result in nearby sited knowledge outcomes. Particularly, in the case of codified knowledge, due to its relative mobility, a gap could very easily occur; iii) Finally, the time lag between the investments made for inputs in knowledge and the accomplishment of outcomes is, certainly, unpredictable and may very well be very, very long.

Efficiency in knowledge management could be evaluated addressing the institutional capacity to favour near values between the Inputs and the Outcomes of the model. Institutional proximity and speed in the informational flows, among others, should help decreasing hindrances to separate such values.

This model shall be used in the empirical part of this study to analyse and evaluate the regional innovation performance across our set of Atlantic regions. The restrictions now pointed out are to be detected also in some illustrated cases.

[6] For example, there is increasing evidence to put in question the relation between ICTs and business performance.

3- THE PRESENT SITUATION OF SCIENCE, TECNOLOGY AND INNOVATION IN THE ATLANTIC BORDER

3.1 Knowledge management concepts in national and regional innovation contexts of the Atlantic Space

The empirical part of this paper is based on a research developed for eight Atlantic border regions (Andalusia, Algarve, Norte, Galicia, Basque region, Bretagne, West Midlands and Border, Midland and Western) for which indicators related to socio-economic, knowledge flows and innovation performances have been obtained.

TABLE 1
SOCIO ECONOMIC DATA

COMMENTS:

The observed regions of the Atlantic space present diverse economic interests, partially explaining the asymmetric values[7] indicated in Table 1. A more attentive observation of data suggest three groups of countries: the clearly industry driven Basque region and Norte, the services based economies of Algarve, Andalusia and Brittany, all of them with a significant component of agricultural production and finally, the diversified West Midlands and Border, Midland, Western Region (BMW) with similar development paths but diverging because of the very important weight of agricultural production in the Irish region.

Later in this paper we shall see that these initial paths will reflect upon tendencies to create sectorial trends, eventually allowing a posterior definition of knowledge clusters.

Regarding other economic indicators as population, area and gross added value, their disparity among regions is sometimes quite significant[8]. A summary on such contrasts and respective immediate consequences for growth is supplied:

i) Size, originating very contrasting critical masses for productive processes and opposed possibilities in the application of policy measures[9].

[7] A note should be added related to the difficulties in obtaining disaggregated data to enlarge the variety of indicators. In certain cases, like in Spain, regions have created their own statistical institutes that were able to provide data banks including data related to R&D, publications and informations *on line*. On the other extreme, Algarve does not have but a delegation from the national institute of statistics which is loosing responsibilities. Gathering basic information related to technology, scientific production, and innovation projects is in some cases still based on the possibility to establish direct contacts with the organizations.

[8] It is not inconsequent to observe the two border regions of Andalusia and Algarve, one 19 times bigger then the other, with very similar production tendencies and quite different governance structures.

[9] In Portugal for example there is not a Regional Innovation Policy due to the lack of decentralized government. The small dimension of some regions has been the justification to keep a centralized administrative power.

ii) Also the unemployment rates reveal discrepancy. While the industrial Norte was presenting a rate of about 5% in 2003, Andalusia was reaching 17%, about 9% points above the Atlantic Area's average rate.

iii) Half of the regions being considered in this study belong to the classification of *Regions - objective 1*.

iv) Population density is another contrasting indicator. For example, Midland in the United Kingdom is ten times more populated then Border in Ireland.

v) Still, those two regions are able to generate the highest (excluding Brittany) added value per capita. One of the reasons is their regional pulling force, attracting a much higher number of big firms then the other regions. But also, country regulation or sectorial links could justify it.

vi) There is evidence of asymmetric growth between northern and southern parts.

TABLE 2
EVOLUTION IN REGIONAL PRODUCTION

COMMENTS:

Comprehending Spain, Portugal, France, United Kingdom and Ireland, this part of the Atlantic space integrates regions lagging in terms of effective regional production, as observed in Table 2. Their contrasts are in part resulting from their individual regional characteristics but also from the different national innovation cultures they are rooted in. *The national innovation systems approach is based on the view that learning and innovating are integrated in broader societal contexts, particularly in national frameworks of incentives and constrains that are deeply embedded in a set of institutions*. This argument from Isaksen, 2004, builded on Soskice, 1999, explains how national institutions and government may play a crucial role in stimulating, or not, cooperation among companies[10], creating consequent effects on the incentives for regions and institutions to create and use knowledge.

To give consistency to this view, the set of considered regions mix three different models of national innovation systems compromising the UK and Ireland, on one side, with liberal tendencies and France, on the other, with a mild coordination form among stakeholders and the government. The last group is added by Portugal (where liberal will does not match with heavy regulation and deep centralism) and Spain (with clear tendencies for a mild coordination between stakeholders reinforced by a fast decentralization process), countries for which the definition of the respective national innovation systems and corresponding national innovation policies are still in genesis.

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[10] For these authors there are two opposite National Innovation Cultures: those bound to the coordinated market economies and the liberal ones, for which the Anglo Saxon countries are examples.

Included in the previous discussion, there are some questions that could be raised up, namely, the possible interest of an Atlantic development common strategy. While, on one side, historical links and a common corporate governance culture at the firms' level would justify it, on the other, different regulative contexts and national historical identification unease such evolution.

3.2 The Atlantic space (AS) as an economic integrated zone

Development strategists have certainly raised up a question related to the opportunity to consider the AS as an economic integrated zone. In order to be able to reflect on this question some facts should be well thought-out: i) An Unbalanced distribution of employment within the AS is permitting the emergence of some subspaces[11]; ii) High technology employments in industry are concentrated in United Kingdom, East of Ireland, Norwest of France regions, Basque country and Lisbon; iii) A tertiary productive specialization in the northern regions and a secondary and primary productive specialization in the central and south regions is generating territorial unbalances preparing a north versus centre-south dichotomy which is influencing the ability of the regions to participate equitably in the globalisation process; iv) The irregular connectivity links are expressed in multiple forms[12].

Recent advances in regional innovation policies have restored the active participation of local authorities in the decision making process in the hope that *bottom-up* strategies would improve the participation of local actors in the development process, thus speeding it. Accordingly, a general process of decision transference from national to regional sphere is taking place in most of the considered regions. UK and Portuguese regions are exceptions. An additional remark should identify the barriers that a regional innovation system could hide in presence of particular cases such as: regions that have low organizational density, a frequent situation in peripheral areas; regions with fragmented regional systems, typical low cooperative behaviours; closeness inside the regional system leading to *in-breading* and other *lock-in* situations occurring frequently in traditional manufactural or rural areas. Such

[11] We are considering the center-littoral area of Portugal, the area of Bilbao and the eastern cost of England

[12] Low accessibility of the hinterland Iberian and French regions and also in the northern of UK regions and west of Ireland (in Bock, E., BuguellousJ.B., Coquio, J., Guimas, L., Mathis, P., (2004), University of Tours – EPU CESA, Base Géographique:GISCO) are producing empty spaces; v) The road connectivity within the AS shows some territorial discontinuities, but also some important relationship spaces as the Iberian costal regions, Basque country, Norwest of France and the central regions of UK (www.viamichelin.fr); vi) connectivity is irregular too. Although there are numerous ports along the cost, logistic and administrative constrains hinder an efficient modal system facilitating maritime transport. Air transport is also suffering from articulation deficiencies since most of the medium size cities are linked to national capitals even though low cost companies have brought some recent improvements to the air accessibilities (IAAT, 2004).

barriers refereed to by Isaksen, 2003, are also present in some of the institutional contexts of Andalusia, Algarve, Norte, Galicia.

Still and in spite of clear evidenced for asymmetrical growth, the AS assumes a geographic identity that has sectorial tendencies and motivations as well as a maritime responsibility. Nevertheless, given a global context of clear heterogeneity a common integrated zone seems to be far from being a realistic project. The results of this analysis do not indicate, however, that this discussion is nearing an end. Quite the contrary, the dynamic and complex process of knowledge flows, such as we have been describing it, could very well be considered the great instrument to better shape the already existent tendencies allowing new opportunities and external advantages for those gapping regions.

Stimulated by the previous theoretical model for knowledge flows, some data has been selected in order to supply a list of indicators able to help judging the level of inputs and outcomes of innovation for such regions (European Innovation Scoreboard 2003). In spite of the reduced recent disaggregated data, consequent innovative performances have been compared.

TABLE 3
REGIONAL INNOVATION PERFORMANCES

COMMENTS:

Table 3 presents a first demonstration of the unbalanced distribution of knowledge assets. For most of the indicators, the Portuguese regions hang behind strongly. In spite of the fact that Spanish regions are still lagging in terms of gross domestic production, there is a clear attempt to increase rates of tertiary education, long life learning, R&D in business and patent applications in general. The northern Atlantic border constituted by Brittany, West Midlands, BMW (Border, Midland and Western Region) and Basque Region are by far those that show best innovative performances. They also employ more medium and high tech labour in the manufacturing industry. Production in services is higher in Algarve, Brittany and West Midlands. These last two regions are sustained by a correspondent significant value of high tech employment in services. However, Algarve (just like Norte) has the lowest value for these indicators.

The ratio patent by tertiary education confirms that both regions located in the Portuguese-Spanish frontier Algarve/Andalusia and Norte/Galicia are not yet able to reproduce significantly those investments made in tertiary education. To note also that Basque Region has low number of patent applications in spite of its highest value of tertiary education and significant high employment in manufacturing.

Further conclusions are related to public or private R&D investments: The public attempt to induce research is not as discrepant as in case of other indicators. An exception for Algarve and Basque Region, being this last case compensated by the higher effort of private initiative in the area of R&D. A relationship between geographical periphery and firms' investment interest in R&D seems to occur. Andalusia, Algarve, Norte and Galicia are those regions with the less business expenditures on R&D and, consequently, patent applications.

To further advance in this issue the project partners tried to identify the characteristics of the productive (in terms of total of small and large firms), scientific and technological environments. Table 4 reproduces the results.

TABLE 4
PRODUCTIVE, SCIENTIFIC AND TECHNOLOGICAL ENVIRONMENTS

COMMENTS:

3.3 Detecting knowledge Clusters for advanced technology within the Atlantic Space

Apart from the reported discrepancies, common cultural values, a maritime identity and some similarities in industrial specialization could be accepted as mutual bases for growth. Whether or not the extended AS would benefit from a better territorial development balance in case of a consequent regional innovation system common strategy is the next concern of this discussion.

An evaluation to the trajectories in the development of the different innovation systems revealed some common elements:

1. The goals are of two different but complementary natures: to increase SMEs competitiveness and adding value to the industrial structure.
2. The process has evolved recently: all the considered regions started their regional innovation strategies in the 90's with "technology-related plans or policies", a focus on R&D infrastructures as support means and public regional institutions are in charge to financial supply support.
3. The sustainability of the innovation process is being guaranteed by involving stakeholders in formal or informal networking: technological transfer structures and other interface/intermediate bodies, business units in high education

establishments, technical delivery or laboratory test bodies, science and technology parks, incubators. Specific agencies for business intelligence and foresight.

4. Significant impact of European Structural Funds: BMW region is the one to present higher benefits
5. Knowledge management strategies are not frequently pointed out in the new regional plans.

On the other side, all regions show different degrees of maturity in their development strategy for which not always the innovation issues play the same significant role. Accordingly, the presence of satisfactory regional innovation system governance[13] is not frequently found.

The REGINA project tried to demonstrate the central role of knowledge in driving regional development and in the search for the responsibility of regional actors in the effective participation of their future. Possible trans-regional basis for learning in interaction across AS were identified in common preliminary knowledge clusters. Due to their emergent phase they were called "common interest niches", the main question being which sectors are those to show greater skills for technological transfer within the already existent cooperative attitudes. Desk research and stakeholder consultation concluded the existence of the following niche areas for knowledge clustering:

i) Agri-food and biotechnology – integrated by Brittany, Basque region, Galicia, Andalusia, Algarve;
ii) Renewable Energies – Basque region, Norte;
iii) Nanotechnologies and Medical devices – West Midlands and BMW
iv) ICTs and Automotive – Galicia, Norte, Brittany, Andalusia;

Further, a "regional niche analyses" has been undertaken with two major observation vectors: the involved regional policies and the interactions among keyplayers (REGINA report sub-action 2.1).

[13] Complementary to this study a review on the regional innovation system governance structures of the eight regions is being developed. Data is available after an extended questionnaire applied to most of the driver regional stakeholders. The project proposed method is based on a SWOT analyses as an analytical tool.

Synthetic conclusions[14] from the results suggest, first of all, different dynamics in the involvement of institutions to speed up knowledge flows in the four niche thematic areas. Secondly, there are main gaps shared by most of the regions in what concerns the governance of their regional innovation systems. Finally interesting strengths could be detected.

To be further developed with data from the project…

The weakness concern different levels of the knowledge flow: At the knowledge creation phase very little involvement from the universities and graduated schools in the regional innovation policy was reported. In general there is few and explicit focus on knowledge management neither in the innovation support strategies nor in its elaboration process for most of the regions. This may be a reflex of a more extensive problem related with the lack of cross-sector networking all together, which was also detected and has direct impact on the efficiency of new processes.

The knowledge dissemination phase is probably the one to present more hindrances, many directly or indirectly related to the persistent difficulties to accept new concepts and methods in the organizations. Such attitudes obstruct transversal knowledge flows and hinder the development and implementation of a coherent R&D policy at regional level leading the happening of innovation, frequently to isolated action of individual stakeholders.

The last group of apprehensions is based on the fact that existent regional innovation systems and correspondent strategies are hardly monitored and evaluated at regular bases, thus benchmarking stands for a well common sense notion but a rarely used exercise.

[14] A remainder to the fact that because of their respective intrinsic nature biotechnology is more research oriented while renewable energies and automotive are more product oriented.

CONCLUSIONS

Highlighting an interactive model for which knowledge creation is understood in a broad perspective and innovation implicitly demands more than a simply gathering of discoveries and inventions this theoretical framing accepts the adaptation and combination of existing forms of knowledge.

An interactive and dynamic concept emphasises the external environment of the firms in addition to their internal knowledge creation capacity and refers a synthetic framework based on the concept of the learning process as a driver to redress stakeholders' attitudes and strategic choices. In such a context, the advantages that may result from institutional geographical proximity or similarity, specific knowledge diffusion and networking in coordination of common interests could build up advantages. The case of the Atlantic space has serve as an example to provide field for discussion.

In short, the specific construction of a territorial knowledge base and the consequent achievement of more sustainable regional development for a large part of the European Atlantic border are discussed in this practical case.

Based on secondary data from the European Innovation Scoreboard, an outline over the regional innovation performances of the considered regions was supplied. Also, based on primary data obtained near the institutional bodies of each region, an analysis of the existent governance structures is possible.

INNOVATION SYSTEMS REDIFINED: the interest of proximity

The conclusion allows considerations related to the present context for the development of an Atlantic spatial development strategy indicating the interest that regional innovation strategy should be redefined in view of spatial networking based on oriented knowledge flows. Theoretical framing indicates that this is possible and advantageous although empirical observations proved that the considered AS is far from having an institutional context sufficiently flexible and co-operative necessary to implement spatial networking on knowledge basis. Policy makers and other stakeholders are those to call first in the exercise of cooperation, since the major missing points are due to a lack of institutional concerted strategy. In order to achieve goals of symmetric development for Europe new efforts are required in the redefinition of regional innovation system considering spatial the advantage of the proximity, both geographic and institutional, in the knowledge flow.

TABLE 1

SOCIO ECONOMIC DATA

	West midlands	Algarve	Andalusia	BMW	Brittany	Galicia	Basque Region	Norte
Area (km2)	13.004	4995	87597	32481	27208	29574	7235	21278
Population density [15]	405	80	87	32	107	93	288	173
Unemployment rate	5,5	5,3	17,2	5,2	8,1	14,6	8,6	4,9
% Population in primary sector	0,9	9,7	11,3	10,0	8,0	11,4	2,0	11,4
% Population in industry	19,3	7,7	10,8	30,0	18,0	19,0	26,8	30,5
% Population in services	75,4	69,0	63,5	60,0	68,0	57,8	62,4	45,4
% Production in primary sector	4,2	8,2	5,8	14,3	4,7	4,8	1,1	3,1
% Production in industry	24,9	7,0	14,6	25,7	18,1	20,8	30,4	28,5
% Production in services	68,5	82,7	66,2	60,0	70,0	61,3	60,8	59,8
% Number of big companies	0,7	0,03	0,07	2,36	0,26	0,09	0,14	0,03
% Number of SMEs[16]	99,0	99,97	99,93	97,64	99,74	99,91	99,86	99,97

[15] Stands for people by km2

[16] In the Algarve SMEs correspond to less than 200 employees, not to less 250 employees as in the other cases

TABLE 2

EVOLUTION IN REGIONAL PRODUCTION

	West midlands	Algarve	Andalusia	BMW	Brittany	Galicia	Basque Region	Norte
GDP per capita	23 919	10 908	11 353	19 711	19 933	12 011	18 836	9 260
GAV per capita	19 525	8 848	13 620	20 407	21 402	14 789	21 356	9 470

TABLE 3

REGIONAL INNOVATION PERFORMANCES

	West midlands	Algarve	Andalusia	BMW	Brittany	Galicia	Basque Region	Norte
Tertiary education[17]	25,45	6,85	19,77	19,64	23,25	21,53	34,18	7,1
Life long learning[18]	21,41	2,01	4,76	6,14	3,02	5,96	7,33	2,04
High/med tech manufacturing employment [19]	10,49	0,46	2,14	7,08	6,36	5,71	9,42	3,15
High tech employment in services	4,28	0,68	1,65	2,61	3,36	1,48	1,83	0,93
Public R&D[20]	0,46	0,31	0,44	NA	0,53	0,50	0,31	0,43
Business R&D	0,78	0,02	0,17	NA	0,99	0,19	1,04	0,16
Patent applications[21]	97,3	2,6	7,1	65,6	108,1	4,1	35,0	5,9

TABLE 4

PRODUCTIVE, SCIENTIFIC AND TECHNOLOGICAL ENVIRONMENTS

	West midlands	Algarve	Andalusia	BMW	Brittany	Galicia	Basque Region	Norte
Universities	11	3	10	1	4	3	4	8
Technology centres	6	2	22	1	12	10	9	9
Research centres	6	16	22	5	0	11	12	5
Laboratories	0	4	16	0	0	9	5	5

[17] Population with tertiary education (% of 25-64 years age class)
[18] Participation in life long learning (of 25-64 years age class)
[19] Percentage of total work force
[20] Percentage of GDP
[21] Per milion population

BIBLIOGRAPHY

(TO BE DONE)