Abstract

The main conclusion of this text is that the development of systemic innovation in Metropolitan Bilbao is hampered by a fragmented effort. This conclusion is reached by a study of OTRI, Euskoiker, Cluster Conocimiento and BEAZ - four public-private initiatives that are set up to support innovative performance. The aims and efforts made by each initiative are positive, but they lack the necessary resources for making a real impact. Because of the complex context of government and administration in Metropolitan Bilbao, significant results from such initiatives are also hindered by lack of communication and co-ordination. The initiatives come from various directions and are small.

Public-private relations are seen as important in the process of achieving systemic innovation, and future policies in Metropolitan Bilbao will need to systemise and co-ordinate the various efforts. This is particularly important in relation to the innovative performance of the Small- to Medium Sized Enterprises (SMEs) in the area.

The first part of the paper sums up existing literature explaining the importance of systemic innovation in relation to economical development. How public-private relations can support innovative performance in SMEs will also be important in this part. Some particular problems that are important to be aware of in the context of Metropolitan Bilbao will also be presented.

Later, the activities of the four public-private initiatives will be described and discussed, in relation to theory and how they are performing.

Keywords: Innovation; Systemic; Public-Private; Infrastructures; SME

Table of Contents:

Chapter 1: Introduction

Within literature on innovation, the theme of making infrastructures- and networks where information can flow is important. The aim of this text is to have a look at some examples of such 'soft infrastructures' in Metropolitan Bilbao, and see how they work. The text will describe some symptoms in connection to the activities of four initiatives that are set up to stimulate innovation in this way in Metropolitan Bilbao.

Looking at four initiatives will of course only give a glimpse of the total picture, but at the same time the four initiatives will say something about the general picture of conditions for innovation in Metropolitan Bilbao.

The four initiatives are: OTRI (an office of the University of the Basque Country that are meant to set up research co-operation between the university and enterprises in the Basque Country), Euskoiker (is also presented as a part of the University of the Basque Country's department for relations between the university and business, and has the same aims as OTRI. The difference is that Euskoiker works as an independent foundation), Cluster Conocimiento (the associative structure of the Basque Knowledge Cluster which is a strategy for the development of management knowledge), and BEAZ (a business innovation centre that works with daily tutoring of innovative SMEs in Bizkaia).

The offices are all public-private relations in the respect that they are set up as mediators between various public institutions and private enterprises. Within literature on innovation, such relations are seen as possible vehicles for supporting innovative activities within Small- to Medium Sized Enterprises (SMEs). This text will particularly look at the relevance the initiatives have for the SMEs in the area.

Three of the initiatives – OTRI, Euskoiker and Cluster Conocimiento – work with the whole of the Basque Country. So, most of what is said here will have as much relevance to the Basque Country as to just Metropolitan Bilbao. BEAZ works within the limits of the province of Bizkaia. Regarding population and industry, Metropolitan Bilbao makes up the main part of Bizkaia[1].

1.1 Outline of the Chapters

Chapter 2

Chapter 2 sums up and discusses relevant literature. The first sections explains the importance of innovation to the economy, why innovation is a systemic phenomenon, and how public-private relations can be proper vehicles to support a systemic process of innovation. Authors like Freeman, Porter, Smith and Lundvall are important in these passages.

Later in Chapter 2, public-private relations are discussed more specifically in relation to support innovation within SMEs. The initiatives examined in this text will be referred to as soft infrastructures, or possible builders of such. Therefore, a section that explains the notions of 'soft infrastructures', 'internal networks', 'endogenous growth capacity' and 'innovative capacity' will follow. This is based on notions from Gómez Uranga and Etxebarria.

At the end of Chapter 2, there is included some descriptions of particular obstacles to systemic innovation, and in general to efficiency, in Metropolitan Bilbao. These points will be helpful to have in the background when discussing the performance of the public-private relations in connection with the literature. The points in this section

[1] The Basque Autonomous Community is made up of the three provinces Bizkaia, Gipuzkoa and Araba. The first has historically been the most important regarding industry.

are based on Font, and are concerned with the high number of layers of government and administration in Metropolitan Bilbao, the many judicial zones as a result of the high number of municipalities, and themes like the lack of quality in the management of the metropolitan administration.

Chapter 3

Chapter 3 will give a straightforward presentation of the initiatives that makes the examples of public-private relations and soft infrastructures in this text. The presentations are based on information obtained during interviews with the offices. This information varies from annual reports, through internal figures, to more informal information. The formal information is presented in Chapter 3. The discussion in Chapter 4 will introduce some of the more informal information. This is done, because some qualitative and empirical information is easier to introduce when the different initiatives are seen in relation to each other. As mentioned above, the initiatives that will be presented are OTRI, Euskoiker, Cluster Conocimiento and BEAZ.

Chapter 4

Chapter 4 discusses the performance of the initiatives that are presented in Chapter 3. This is done on the background on the literature discussed in Chapter 2, and also in relation to some additional information about the initiatives that will be introduced during the discussion.

The main theme of the discussion is that OTRI, Euskoiker, Cluster Conocimiento and BEAZ are hampered by small resources and a lack of communication and co-ordination. Public-private relations are proper vehicles for the development of systemic innovation, but they will not work if the effort gets too fragmented. The

initiatives looked at in this text are from the County Council of Bizkaia, the Basque Government and the Spanish Government. Communication between the various administrative and governmental levels seems difficult.

Chapter 5

Chapter 5 will sum up the conclusions from the discussion in Chapter 6.

Chapter 6

Contains some comments on the method of, and the results, of the study. What was problematic and how can the study be developed further.

Chapter 2: Literature Review

Public-Private Relations and Innovative Performance in Metropolitan Bilbao – a Theoretical Approach

2.1 Introduction

Public-private relations should be regarded as important to the economical development of Metropolitan Bilbao. One of the main arguments behind this statement is to be found in connection with the ability to innovate.

(1) On the macro level, innovation is essential to the development of the economy. In fact, innovation is said to account for 80% of productivity growth in advanced countries, and productivity growth accounts for some 80% of GDP growth overall (Freeman 1994 in REGIS-report). On the micro level,

> Companies achieve competitive advantage through acts of innovation. They approach innovation in its broadest sense, including both new technologies and new ways of doing things. (Porter, 1990[2])

(2) Innovation should be regarded as a systemic phenomenon. It does not happen by chance, but is a process that is in need of strategies and has to be nurtured (See, for example, Freeman 1987, Lundvall 1992 and Smith 1998).

(3) Thus, there are important aspects of a systemic innovative process that has to be taken care of by means of co-operation and communication. Relations between the

[2] The citation is taken from Tidd, Bessant & Pavitt 1997: 24.

public- and the private sector are proper vehicles for facilitating and implementing this process (See, for example, Lundvall & Johnson 1994).

To see the importance of public-private relations it will be useful with a brief look at the context. What kind of phenomenon is innovation, and why should it be regarded as systemic?

2.2 What is Innovation?

Innovation is to be understood as the development, diffusion and efficient use of products, services and processes. Innovations can consist of new or altered products, production processes, marketing methods, structural- and organisational forms etc. Further, a general distinction can be made between radical and incremental innovation. Radical innovation occurs with the development of entirely new products or production processes. More usually, innovation is carried out by small and incremental changes. The incremental innovation is carried out in connection with the daily activities and production processes of firms. When thinking about innovation it is easy to get too focused on entirely new products, but it is important to keep in mind that most innovations emerge within a "day-to-day" context, and that they are mostly related to organisation and processes. Therefore, dynamism and flexibility are keywords related to innovation. Thus, it is clear that research and inventions are necessary, but not sufficient. Successful innovation includes inter-linkage of various activities, such as marketing, company strategy, technological development and recruitment of personnel. Efficient communication with clients and suppliers are also important in this process, as well as continous education and training of the staff (Isaksen & Smith, 1997).

2.3 Innovation as a Systemic Phenomenon

There are several reasons for regarding innovation as a systemic phenomenon. In the present context, two aspects are particularly important. (1) The many institutions – tangible and intangible – that makes up the network where innovation occurs. (2) Technologies should be regarded as networks – or results of such (Hughes 1984 in Isaksen & Smith 1997).

(1) The actions of innovating firms are determined by the wider socio-economic context where they exist. This context is made up of both tangible and intangible entities, such as other firms and business regulations. A firm is surrounded by a network of customers, suppliers, sources of labour and skill, finance etc. The network is mainly made up of relations between firms, but they also include public sector, universities, research centres and so on. Further, the entities of the network operate within a framework of regulations and laws. Examples of such regulations and laws are technical standards, safety regulations, and laws relating to contracts, intellectual property and employment. The context of political- and social values must also be taken into account. All of these public- and private institutions, regulations and policies make up a set of relationships, which persist over time and may be thought of as systems. (Isaksen & Smith, 1997)

(2) Industrial development is systemic because much of modern technology has the form of systems. Technological artefacts do not exist individually but as components of larger integrated systems (Hughes 1984 in Isaksen & Smith 1997). Obvious examples would be the convergent fields of telecommunications and computer technology. When thinking about technologies, it is also important not to be limited to "hardware". "Software", such as forms of organisation, marketing methods and knowledge infrastructures should also be thought of as technologies. Such "software"

are technologies because, like “hardware”, they are tools based on various knowledge and enables the users to cope within the economy.

These two aspects of a “network-way-of-thinking” make up some of the context where the inter-linkage of the various activities necessary for efficient innovation occurs. To navigate in the networks, the development, preservation and communication of the necessary knowledge is crucial. It is said that knowledge, energy and materials are the basic resources in modern production, and the first may be regarded as the key resource (Lundvall & Johnson 1994). This means that the learning process becomes very important, and it will be central to try to identify and systemise knowledge- sources and dynamics. Knowledge development is in need of strategy and attention from systemic policies, as well as more specific and continuous follow-up from various initiatives.

2.4 The Role of Public-Private Relations in Innovation

Competition between firms is an important drive behind innovation but, at the same time, vital parts of the process are characterised by the need for co-ordination and co-operation. In research on innovative performance, the importance of co-ordinating and supportive activities is a widely acknowledged fact (See, for example, Smith 1998). The supportive activities should be designed to optimise the flow of knowledge that is necessary for efficient innovation. Thus, one important role of public government, in the so called learning economy, is to support learning processes (Lundvall & Johnson 1994). This means that public-private relations, set up in the right way, will be an efficient vehicle for optimising knowledge flux and learning processes.

In general, one could say that one role of public-private relations, in connection with innovation, is to provide and stimulate soft infrastructures[3]. These infrastructures should be designed as tools to support navigation in the economical- and technological networks such as mentioned above. Soft infrastructures will therefore comprise of everything from computer- and telecommunication systems, through research facilities, to education systems. However, what is important to highlight is that in every part of the network of soft infrastructures, the crucial points are the acquisition, development, administration and diffusion of knowledge.

According to Lundvall & Johnson (1994), government intervention in the learning economy should be concerned with (1) The means to learn, (2) The incentives to learn, (3) The capabilities to learn, and (4) The access to relevant knowledge.

Under each of the points, the public-private relation can be seen as a co-ordinating, co-operating and communicating unit – a possible vehicle for governmental policies.

(1) The means to learn are not just a question of the size of investment in training and education. The education and training must continuously be adapted to social and technological developments. For example, the systemic character of new technologies breaks down old barriers between technical- and scientific disciplines. This means that it is necessary to review where to find, and how to combine knowledge sources.

(2) Concerning the incentives to learn, the public sector's most important role is perhaps to be a professional user interacting with private firms and government programmes that supports co-operation. Networks between firms may help to establish more efficient communication between parties otherwise reluctant to co-operate.

[3] For a further definition of the use of the term 'soft infrastructures', see the section **Soft Infrastructures and Networks** below.

(3) The capability to learn is closely linked to the way firms are organised. The movement away from vertical hierarchies towards more dynamic and horizontal organisation, that enables flows of information, is a trait of successful firms in the learning economy. Government can promote organisational change by using "best practice" programmes. The content of such programmes is to make systematic studies of how firms advance in this area, diffuse information about experiences made by leading firms to those that lag behind, and give financial support to organisational innovations and experiments.

(4) One of the main problems with access to relevant knowledge is the communication between engineering SMEs and universities. These communication problems could be solved by setting up agents that work as links between knowledge-producers and users. Informal- and tacit knowledge, which is developed through learning inside firms, can be communicated by the establishment of various networks. Government can stimulate such networks by programmes that supports co-operation.

2.5 The Support of Public-Private Relations to SMEs

The communication problems that SMEs have, are not just in connection with universities, but may occur in connection with many types of institutions. The innovation support are particularly important to Small- and Medium Sized Enterprises (SMEs), because they do not have the sufficient resources to develop the necessary infrastructures and orientation tools by themselves. The larger firms will, in many instances, have available the necessary resources for innovation. This is not the case with SMEs, and a main problem, independent of region, is to get them to innovate.

Concerning innovative activity in SMEs, there are some recognised areas that are important to support. These are[4]:

(a) Marketing: Market start-up can be prohibitively costly.

(b) Management: SMEs often lack management specialists, such as business strategists, marketing managers, financial managers and so on.

(c) Qualified technical manpower: SMEs often lack suitable qualified technical specialists, and are often unable to support a formal Research and Development (R&D) effort on an appreciable scale.

(d) External communications: SMEs often lack the time or resources to identify and use important external sources of scientific and technological expertise.

(e) Finance: SMEs can experience great difficulty in attracting capital - especially risk capital. Innovation can represent a disproportionately large financial risk, and SMEs will not have ability to spread risk over a portfolio of projects.

(f) Economies of scale and the system approach: In some areas, economies of scale form substantial entry barriers to small firms. They will have difficulty with offering integrated product lines or systems.

(g) Growth: SMEs can experience difficulty in acquiring external capital necessary for rapid growth. Entrepreneurial managers will sometimes unable to cope with increasingly complex organisations.

(h) Legal: SMEs may lack ability in coping with the patent system, and it can be difficult to afford time and costs involved in patent litigation.

(i) Government regulation: SMEs often cannot cope with complex regulations. Unit cost of compliance for small firms is often high.

[4] The following points are taken from Dodgson & Rothwell (1989), cited in Isaksen & Smith (1997): 2.

2.6 ‘Soft Infrastructures’, ‘Internal Networks’ and Innovative Capacity

The term ‘soft infrastructures’ is already used above, and it will be useful with a clarification before going on to the specific cases in chapter 3.

Soft infrastructures are connected to the divide between internal- and external networks, which is described by Gómez Uranga & Etxebarria (1993). Relating to the innovative capacity of a certain space, ‘internal networks’ refers to the internal development capacity within a region, and ‘external networks’ to external networks of infrastructures. The latter are made up of the inter-regional, intra-national and inter-national links, such as infrastructures for transport and communication. The internal networks consist of all social, economic, technological and scientific institutions.

> These networks are the result of a long process of development in which all social, economic and scientific institutions are involved. The dynamic of development of these networks reflects the endogenous growth capacity of a certain space. (Gómez Uranga & Etxebarria 1993: 299)

The entities of this network will be firms, investigation centres, public institutions, financial institutions, user groups, as well as informal institutions – all mainly seen as channels where information flows. The quality of the internal network depends on the flow of information and the capacity for accumulation of knowledge over time.

> Linkages can be specified in terms of flows of knowledge and information, flows of investment funding, flows of authority and even more informal arrangements such as networks, clubs, fora and partnerships. (Cooke, Gómez Uranga & Etxebarria 1997: 478)

Such an internal network will, together with the external network, constitute the context where innovation occurs within a region. The more developed the internal network of a certain space, the better are the conditions for systemic innovation.

In this text, 'Soft infrastructures' will be used quite synonymously with 'internal networks', and the notion of a soft infrastructure, or an internal network, should be seen as a dynamic entity.

> A key policy issue arising from systems approaches is the need to identify and perhaps support nodal points in the creation and distribution system, keeping in mind that these are likely to be changing over time: the innovation system is not a structure, but a dynamic process. (Smith, 1998: 46)

Although it should be very clear that this text does not concern itself with a discussion of the possibility of an innovation system in Metropolitan Bilbao, but less ambitiously with some examples of systemic attempts at innovation, the same philosophy could be used. Namely, that the infrastructures and networks in question are dynamic. This will be clear in relation to the cases of BEAZ, OTRI, Cluster Conocimiento and Euskoiker, since they all are entities with the aim of continuously developing networks to advance innovation.

Concerning the initiatives, I will refer to them both as soft infrastructures and developers of such. This is because these entities themselves are developing as they are working with the making of infrastructures. To use a metaphor, they are part of the web that they are spinning.

2.7 Some Obstacles to Systemic Innovation in Metropolitan Bilbao

According to Font (1998), efficiency and performance improvement in the southern parts of Europe has apparently some particular obstacles. These obstacles also apply to Metropolitan Bilbao. Clearly, the efficiency and performance improvement in question can be closely linked with the conditions for systemic innovation.

In summary, the obstacles that are important to be aware of in connection with systemic innovation are (1) the great number of layers of government and public bodies, (2) the many and separate jurisdictions interfering within the metropolitan area, (3) the lack of policy evaluation and performance measurement, and (4) the lack of transfer of private sector management tools to metropolitan administration.[5]

(1) The great number of layers of government and public bodies in the metropolitan area of Bilbao

The great number of layers of government and public bodies makes it difficult to create a lasting environment for efficient innovation, because of the co-ordination problems and the many diverging interests which emerges from such a complex.

The different layers of government and administration in metropolitan Bilbao are as follows: (a) European (EU), (b) National (Spain), Regional (The Basque Country), Provincial (Bizkaia), Municipal (The approximately 30 different municipalities of the metropolitan area of Bilbao). When looking at other metropolitan areas in the world, this high number of layers of government are the exception rather than the norm (Font 1998).

Clearly, actors with colliding interests and conflicting policies will inhabit the different levels of government and administration. An example would be the

[5] The points in this section are taken from Font 1998.

conflicting interests between the Spanish Government and the Basque Government. According to Font (1998), these conflicts are amplified by the relatively greater strength of Southern European parties if compared to their Northern European or American counterparts.

(2) The many and separate jurisdictions interfering within the metropolitan area

The growth of Bilbao has led to the fact that the central city makes up less than half of the territory and population of the whole metropolitan area (Eurocities 1995 in Font 1998). Together with the preservation of old judicial zones, this implicates that the metropolis has many, and separate, jurisdictions.

Among the criticisms against fragmented metropolitan jurisdictions are that they lack strategy. Policies are made in a piecemeal fashion. Small jurisdictions may oppose projects that bother their inhabitants, but benefits the metropolis as a whole. This is a possible obstacle to the development of industry and infrastructure.

(3) The lack of policy evaluation and performance measurement

As in most Southern European local government, Bilbao has administrators with mainly legal rather than managerial background. The result of this is that formal and input-oriented controls dominates where there should have been output-oriented evaluation (Ballart 1992 in Font 1998).

Considering the fast changing and uncertain environment metropolitan governments face it is important that they are developing abilities to diagnose new problems, and to design and develop new solutions (Zapico & Mayne 1995 in Font 1998).

(4) The lack of transfer of private sector management tools to metropolitan administration

This last point is crucial, since it's a special case of a central theme when talking about the conditions for innovation: The transfer of knowledge.

In the USA 25 percent of all large cities have adopted total quality management (TQM) in at least one functional area. Firms, such as Motorola and 3M, have helped American metropolises, like Austin and Minneapolis, to apply TQM (Font, 1998).

The three main reasons behind the difficulties with achieving the same in Bilbao is (a) the late introduction of techniques, such as TQM, in local private businesses, (b) the weak relations between private and public bodies, and (c) the lack of public management professionals.

> [The] European Foundation for Quality Management (EFQM), set up in 1988 by 14 major European firms, has recently published the adaptation of its TQM model to Central and Local Government and established a specific quality award for public sector organisations (EFQM, 1995). These developments are likely to foster collaboration between private organizations and local authorities in the implementation of TQM in metropolitan government. (Font, 1998: 91)

The effect of this remains to be seen, and according to Font (1998) the introduction of various management tools will only increase efficiency if there also is a change in the distribution of power among the political bodies within the metropolis.

Chapter 3: Presentations of the Initiatives

3.1 OTRI[6]

OTRI (La Oficina de Transferencia de Innovación) is an office of the University of the Basque Country, and is set up to have responsibility for the transfer of results of research at the university to public and private enterprises in the region. For this reason it can be seen as a public-private relation.

OTRI departments exist in several universities across Spain, but each will be formed according to the local environment and circumstances. At the University of the Basque Country, OTRI lies under the department for relations between university and business. OTRI is based on a Spanish law, relating to the National Plan of R+D, passed in 1989. The opening of the office at the University of the Basque Country took place in 1990. At the time being, the office has three employees.

The main activities of OTRI at the University of the Basque Country can be divided into the following three parts:

(1) Relations between university and firms.

(2) Protection of the research results of the university.

(3) Information on and co-ordination of European research- and development projects.

In this context, the relations between the university and the firms will be the most central, but the other points will also be connected to this.

The relations between the university and firms will be stimulated in various ways.

[6] This section is based on an interview with, and information provided by José Manuel Nicolau, director of university and enterprise relations at the University of the Basque Country 19/6-2000. See also references.

(a) It is central to identify the research results that could be important to the process of innovation. What kind of research could be transferable to the socio-economic context?

(b) Co-operation between the university, and private- and public firms will be stimulated by contractual work. This work can be of different natures – scientific, technical and artistic. In connection to this, it is also a strategy to promote co-operation between groups of researchers and the industry.

(c) Students will be given practice in firms. At the same time, contact between former students, now working in firms, and the university could be useful.

(d) An incubator for enterprises is set up. This university-business nursery is a co-operation between the University of the Basque Country, the Association for the Development of the Lower Ibaizabal (IBAE-ADEBI), Fundación BBK GAZTE LANBIDEAN FUNDAZIOA and BEAZ. In this co-operation, each of the four institutions brings something different into the nursery. The university provides technical assessment from teaching staff and the relevant departments, as well as access to research services. IBAE gives access to European financing through regional support programmes to SMEs, and collaboration with public authorities and their lines of support to business projects. BBK GAZTE LANBIDEAN FUNDAZIOA facilitates access to finance provided through company-creation aid. BEAZ provides experience from their network of SMEs, and their own incubator[7]. The OTRI incubator includes the following services:

- Internet-focused computer services
- Entrepreneur training service
- Preparation of business plans

[7] See description of BEAZ in section 3.1.

- Preparation of 3-year viability plan
- Training in issues related to company creation
- Internet training
- Theme seminars
- Individualised tutors
- Assessment from university specialists

• Establishment system

- When a company has been set up, it has rights to spaces at the incubator at reduced rates, access to BBK financing programmes, and further help from university specialists.

• Services to companies

- Physical infrastructure
- Individual and collective advice on company management
- Technological advice
- Individual and collective training
- Administrative-, tax-, labour-, accounts-, legal- and mercantile management
- Internet service
- General services (cleaning, security, supplies etc.)

Orientation towards the Basque Clusters

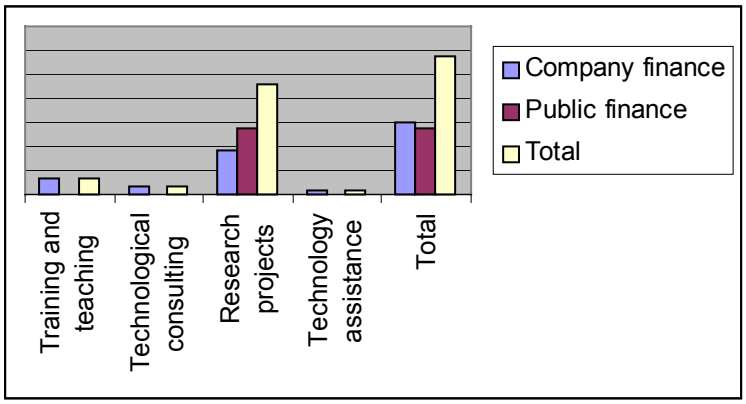
The research that have been done in relation to the Industrial Clusters of the Basque Country, have mostly been done by technological centres and not by the university. The reason for this is that the technological centres have been more flexible and able to produce results faster than the university. It is a strategy of OTRI to make the research more useful in relation to the clusters, and thereby also get access to more

sources of finance. This is done by creating interdisciplinary research groups, which will be attractive to the industries of the clusters.

Investments in Research Co-ordinated by OTRI

The last progress report from OTRI - that of 1998 – shows that activities with a value of 1.152.606.291 pesetas was channelled through the office. Of these, 598.016.204 come from company financing and 554.590.087 from public financing. The various activities are parted into Training and Teaching, Technological Consulting, Research Projects and Technical Assistance. Figure 1 illustrates the distribution of the investments.

Figure 1.



3.2 Euskoiker[8]

Euskoiker (Fundación Euskoiker Investigación Universidad-Empresa) is a foundation set up as a link between research at the University of the Basque Country (EHU/UPV) and the activities of enterprises in the Basque Country. Its main function is to promote, initiate and co-ordinate research projects and courses where firms and institutions co-operate with the university.

Euskoiker works as a non-profit private foundation, but can be seen as a public-private relation since its aim is to make links between public research and enterprises – public or private.

Euskoiker was set up in 1979, and its founding members are the Chambers of Commerce of Bilbao, Gipuzkoa and Araba, the County Councils of Bizkaia, Gipuzkoa and Araba, and the University of the Basque Country.

Euskoiker is a part of a network of foundations for research co-operation between universities and enterprises. In Spain, these foundations are called Fundación Investigación Universidad Empresa (FUE). As with the other FUEs, Euskoikers activities are quite similar to activities at the OTRI-office at the regional university. In general, the aims of Euskoiker and OTRI at the University of the Basque Country are the same. The difference is that the OTRI works within the university system, while Euskoiker functions as a private foundation, even if it originally was a public initiative.

The research projects channelled through Euskoiker are all company financed. This is in contrast to the projects channelled through OTRI, where approximately 50% are publicly financed and 50% company financed.

The research projects that go through Euskoiker are mainly those of large firms, because it is these that can afford to pay for the research in question. To overcome the financial barrier, one could maybe think that a possible solution for SMEs within an industry would be to do a joint project, but Euskoiker has never co-ordinated such a research project.

[8] This section is based on an interview with, and information provided by, Susana Perez at EUSKOIKER 7/9-2000. See also references.

Apart from the support from the founding members, Euskoiker, gets its financing mainly from fees obtained from firms and institutions that makes contractual agreements with researchers at the university.

Objectives

In a publication of promotion Euskoiker states its basic objectives:

- To act in a managerial spirit to ensure the efficiency of its activities as an intermediary.
- To be a meeting point for the encouragement of mutual understanding regarding different possibilities of co-operation.
- To guide all kind of businesses and institutions and help them set up links with university lecturers and researchers.
- To promote relations with other similar domestic and foreign institutions.
- To keep up to date regarding research possibilities and specialist training courses at different levels, and inform businesses about such possibilities.
- To make the Basque society in general aware of the many fields covered by the University of the Basque Country through the university's participation in trade fairs and congresses.
- To organise scientific and informal meetings to encourage mutual understanding between university researchers and people from specific areas of business or from public administration.
- On request, to provide complete "supporting management" for any project, covering administration, purchasing, accounting, financing and organisation and follow-up of results.

Research Areas

The research areas covered by Euskoiker are:

(1) Engineering and Technology

- Electrical- and mechanical engineering
- Telecommunication
- Chemistry- and energy engineering
- Environmental engineering
- Architecture
- Information technology

(2) Exact- and Natural Sciences

- Chemistry
- Theoretical- and applied physics
- Biology and geology
- Mathematics
- Ecology

(3) Social Science

- Organisation of enterprises
- Public- and private law
- Audio-visual- publicity and communication
- Economy
- Education

(4) Medical Science

- Medicine
- Health

- Nutrition
- Pharmacology

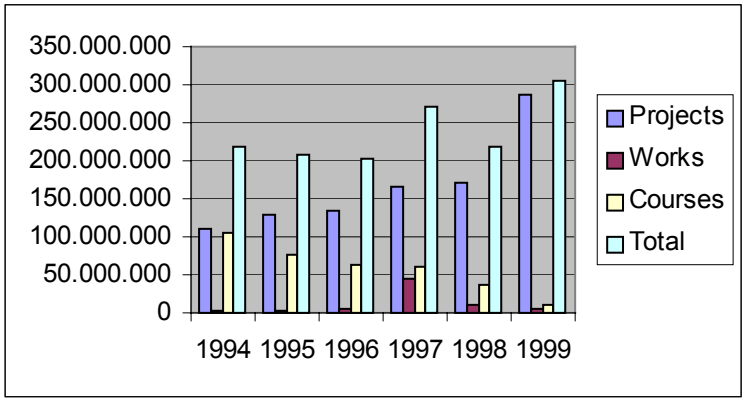
(5) Humanities

- Anthropology and philosophy
- Geography and history
- Philology
- Fine arts

Investments in Research Co-ordinated by Euskoiker

Figure 2 below shows investments in pesetas. The categories are research projects, smaller research works and courses.

Figure 2.



3.3 Cluster Conocimiento[9]

Cluster Conocimiento (Cluster Knowledge) is a foundation dedicated to the newest of the Basque Clusters. Namely, the Knowledge Cluster. In this context, the knowledge in question is the knowledge of management. The foundation's main function is to promote, acquire, develop and communicate management knowledge among Basque

firms and institutions, and especially among those who belong to the industrial priority cluster of the Basque Country.

Cluster Conocimiento is a public-private relation in two ways. Firstly, it was set up by the Basque Government to stimulate the industry and business in the area. Secondly, its members are from both the public and the private sphere, and it is meant to stimulate the flow of information between these.

Within the framework of the Basque Government Industrial Plan 1991 - 1995 a programme for competitiveness was set up. Michael Porter led a work that analysed the competitive abilities and advantages of the Basque Country. This work, based on industrial traditions and strategies for the future, led to the selection of certain industrial fields that should have priority - the industrial priority clusters of the Basque Country. At the time being, the defined clusters are ten: (1) Aeronautics, (2) Auto-motion, (3) Knowledge Cluster (4) Household appliances, (5) Energy, (6) Machine Tools, (7) Environment, (8) Paper, (9) Port, and (10) Telecommunications.

Each of the clusters has a corresponding associative structure. The structures are centres meant to stimulate improvement and competitiveness by setting up collaborative projects based on the strategic plans of each cluster.

The newest of the clusters, the Knowledge Cluster, is of course a bit special. Its subject matter is intangible, and more based on a wish and a strategy for the future than on industrial traditions. Cluster Conocimiento is the associative structure connected to the Knowledge Cluster.

Cluster Conocimiento is a foundation set up to stimulate acquisition, development and communication of knowledge in the field of management of enterprises and institutions. It was set up in 1996 as an initiative of the Basque Government and as a

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This section is based on an interview with, and information provided by, Monica Moso at Cluster Conocimiento 6/9-2000. See also references.

natural consequence of the definition of the Knowledge Cluster, but works as a private non-profit foundation. At the time being it receives its financing from three sources – approximately a third from each: The Basque Government, members and own activities. The goal is that within a few years the foundation shall be independent of the Basque Government, and the financing will come by a third from the members and two thirds from own activities.

The members comprise of approximately 155 private enterprises and public institutions, of varying size and nature. Among them are the three County Councils of Bizkaia, Gipuzkoa and Araba, SPRI (The vehicle for the Basque Government's science- and technology policies), educational- and research entities – such as The University of the Basque Country, The Private University of Deusto (Bilbao), Mondragon Polytechnical School (Coop) and The Technological Parks of Zamudio (Bilbao), Donosti and Araba, various foundations and associations – such as The Spanish Association for Manufacturers of Machine Tools and The Guggenheim Museum Foundation, large enterprises – such as IBM, Arthur Andersen and Metro Bilbao, and a variety of industrial SMEs.

Cluster Conocimiento tries to stimulate management knowledge through theories, models and by observing good practice. What are the problems in connection with management knowledge in the Basque Country, and how is it possible to learn? An interesting and important trait of the business life, and conditions for innovation, of the Basque Country is that - according to Cluster Conocimiento - it is characterised by having a large number of SMEs. As the samples of the activities below show, this is something the foundation works actively with. Something that also can be seen from the samples, is that Cluster Conocimiento mainly works towards the industry, even if it exists a working group directed towards improvement of management in the public

sector. The weight on industry is of course quite natural, since the foundation mainly is focused on management knowledge in the Basque industrial clusters.

The activities of Cluster Conocimiento consists of seminars, conferences, participation in fairs, projects linked to the strategic plan of the Knowledge Cluster and working groups. The most important activities are the two latter. Here follows some examples of these two types of activities in 1999:

Projects Linked to the Strategic Plan of the Knowledge Cluster:

Study of the Management Needs of the Various Clusters

Objective: To prioritise management needs in Basque Industry.

Working group: The associations of the Basque Clusters.

Results: (a) Implementation of detection of management needs in the clusters of Paper, Energy and Aeronautics. (b) A general report on the needs of the clusters.

Forum for Firms Advanced in Management

Objective: Creation of Basque company cases for use in the academic world.

Working group: Various relevant universities and schools in the region.

Results: Descriptions of nine cases of firms advanced in management (27 remains).

Clarification of What is Offered by Consulting Firms

Objective: Reduce the perception of risk of firms and organisations that is potential users of consulting- and other advanced services.

Working group: Cluster Conocimiento.

Results: Publication of the study.

Making SMEs Aware of the Management Needs

Objective: Meetings between businesspersons in order to share management knowledge.

Working group: Various development agencies, regional organisations and firms.

Results: Presentations and conferences among the members of the working group.

Management Models for Industrial SMEs

Objective: To study and disseminate key factors in the management of successful Basque SMEs.

Working group: Various firms and the University of the Basque Country.

Results: Report on the collected data.

Measurement of Intellectual Capital for SMEs

Objective: Publication and method of measuring intellectual capital, applied to SMEs.

Working group: Various firms and associations.

Results: Publication of "Creación de una Herramienta de Medición del Capital Intelectual para la PYME Industrial Vasca".

Internationalisation

Objective: Connection between the Basque Knowledge Cluster and "world class" centres at international level. Transfer of knowledge.

Working group: Various.

Results: Participation on various international conferences, and visits to the Basque Country by international associations for knowledge clusters.

Improvement of Management in the Public Sector

Objective: Research, modelling, diffusion and application of knowledge management within public administration.

Working group: Various from public administration and consulting enterprises, and the University of the Basque Country.

Results: Forming of the working group and initialising of the activity.

Workers' Participation in the Firm

Objective: To promote the active participation of the workers in the management of the firm.

Working group: Various firms, consulting enterprises, associations and educational units.

Results: Forming of the working group and initialising of the activity.

The Technology- and Innovation Plan

Objective: To promote research projects according to the Technology- and Innovation Plan of the Basque Autonomous Community.

Working group: Various medium- to large research enterprises.

Results: Presentation of projects integrated in the Knowledge Cluster in the Technology- and Innovation Plan 1997-2000, and elaboration of the Technology- and Innovation Plan of the Knowledge Cluster 2000 – 2004.

3.4 BEAZ[10]

BEAZ (Bizkaiko Enpresa Aurrerapen Zentrua) is a foundation dedicated to the development of innovative SMEs in the province of Bizkaia. It works as a tutoring centre, and provides day-to-day support in the many fields that are necessary to master for the activities in such firms. The foundation states that it works with firms within a variety of industrial fields, and names telecommunications, environmental technology, electronics and mechanics as examples.

BEAZ is a public-private relation in two ways. Firstly, the founders are a mix of public institutions and private enterprises. Secondly, much of the work that BEAZ does has to do with setting up links, and stimulating the flow of information, among public institutions and private SMEs in the province of Bizkaia.

BEAZ was set up in 1987 as a part of a programme of the European Commission, and with the aim of promoting new and innovating activities by enterprises in Bizkaia. At the time being, the County Council of Bizkaia and the rest holds 70% percent of the shares by some of the major firms and institutions in the area. These firms and institutions are Acería Compacta de Bizkaia SA (earlier named Altos Hornos de Bizkaia, and historically regarded the strongest steel company of Bizkaia), Bilbao Bizkaia Kutxa (BBK), Iberdrola SA, SENER – Técninca Industrial y Naval SA. Petronor SA, Caja Laboral, Banco Central Hispano, IDOM SA, Euskal Herriko Unibertsitatea (University of the Basque Country), Banco Bilbao Vizcaya (BBV), Instituto de Fomento Empresarial and Asociación Vasca de Empresas de Ingeniería y Consultoría.

[10] This section is based on an interview with, and information provided by, Javier Barcina at BEAZ 22/6 2000.

BEAZ is a Business Innovation Centre (BIC). It is a member of both the Spanish- and European network of BICs, European Business and Innovation Centre Network (EBN) and Asociación Nacional de CEEI Españoles (ANCES).

Aims and Activities

The main general aim and activity of BEAZ is to offer mentoring to firms that enter an innovative process. This may be established firms with new projects, or firms in creation. The general activities of BEAZ are defined as follows:

(1) Detect, evaluate, select and promote innovative projects of modernisation and diversification, within functioning firms, and facilitate their consolidation.

(2) Detect, evaluate, select and promote projects of new innovative firms and facilitate their definitive establishment.

(3) Suggest, create and promote technological innovation in the SMEs of Bizkaia, facilitate the firms with innovative- ideas and projects, and supply technical information for stimulating and managing innovation.

(4) Provide the firms of Bizkaia with European contacts, so that they can take part in the interchange of, and access to, "know-how", experiences, relations, and financial sources.

To perform the four points above BEAZ provides the following services:

- Detection, recruitment, analysis, evaluation and promotion of projects.
- Training programmes designed according to the actual needs of each project.
- Technological assistance.
- Support in the management and planning of firms and projects.
- Support in the elaboration of business plans.

- Facilitate access to finance.
- Offer localities and services.
- Promotion and diffusion of the activities of the enterprises.
- Other specialised services.

Programmes

The services are expressed through three different educational programmes and the provision of business localities: (1) Training programme, (2) Programme for development of projects (3) Programme for creation of enterprises, and (4) Business localities that are available to projects and firms that are part of the BEAZ network.

(1) The Educational Programme

The programme is divided into three complementary parts. It is designed to give an integrated training in the management of promoting projects within new, or already existing, enterprises.

(a) Idea of the firm – This is meant to give the participants assistance, methodology, criterions and instruments for analysing the feasibility of the business idea. 100% financed by BEAZ.

(b) Management of the firm – Here, the firms will get training and tutoring in the management of specific situations, and assistance in the making of business plans. 100% financed by BEAZ. In, addition there is a possibility of getting 1.500.000 ptas to initiate the entrepreneurial activity.

(c) Creation of the firm – Various tax-, finance-, labour- and commercial aspects are important to business projects. Professional training, information and counselling is given to rise the level of knowledge in these fields, and to solve frequent problems in the management of new firms. Partly financed by BEAZ.

(2) The Development of Projects Programme

This programme consists of continuous counselling and tailored tutoring in the process of making strategies and initial business plans, and in the implementation of these.

The support that is provided in this part is connected to market studies, economic- and financial plans, prototypes, launching campaigns, travel expenses and consulting. 90% financed by BEAZ – maximum 6.000.000 ptas. Further, a maximum bonus of 1.500.000 ptas is given after the constitution of the firm is a fact. Possible recipients are innovative promoters in the process of forming a firm, or SMEs that promote new business ideas.

(3) The Creation of Firms Programme

The programme gives assistance, monitoring and financial support to new firms. The support of the resources of the initial situation of a firm will improve the chances of success, and facilitate the creation of new jobs.

Point of departure for the financial part of the programme is when the firm has achieved:

- The creation of 3 jobs
- Share capital of a value higher than 7.000.000 ptas.
- Investment of 10.000.000 ptas.

Additional support: 3.000.000 ptas.

Following phases:

- Investment of 20.000.000 ptas. – Additional bonus: up to 2.000.000 ptas.
- Investment of 10.000.000 ptas. – Additional bonus: up to 2.000.000 ptas.

The maximum support is set to 7.000.000 ptas. And will not, in any case, supersede 50% of the share capital of the enterprise. Possible recipients are registered

enterprises whose principal activity is within industry, or services connected to industry.

(4) The Business Centre

In order to stimulate the implementation of the activities of the enterprises connected to BEAZ, a business centre was set up in 1991. The business centre comprises of a total of 10.896 square metres of office facilities and technology infrastructure available to the enterprises. Not only registered enterprises have access to the business centre, but also firms in the making. Thus, the business centre - at its best - will function as an incubator, where different firms and projects can share infrastructures, experiences and "know-how".

Survival Rate of Firms in the BEAZ Network

Looking at the amount of surviving enterprises in the BEAZ network, since the start in 1991, BEAZ has worked with 410 firms, of which 360 still exist. See Figure 3 below.

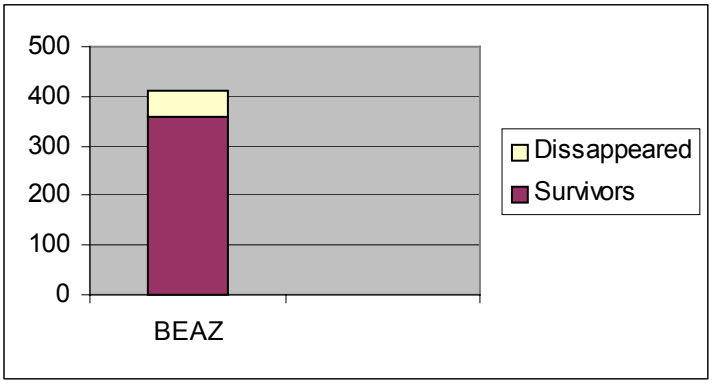

Figure 3.

That makes a net survival rate of nearly 88 percent. Much of the reason for this rate is the close monitoring that is provided within the BEAZ network. The enterprises that belong to the network are “shielded” against some of “the natural selection” of the economy, because they have been through a quality test and selection process at the time of entering the network.

Chapter 4: Discussion

4.1 The Complexity and Fragmentation of Initiatives in the Basque Country

As stated in section 2.7 (Some Obstacles to Systemic Innovation in Metropolitan Bilbao) the governmental and administrative context of Metropolitan Bilbao is very complex. The European Union, the Spanish Government, the Basque Government, the County Council of Bizkaia and the approximately 30 municipalities of Metropolitan Bilbao are all actors in the area. The different layers of administration and government means that initiatives to stimulate innovation come from many directions. OTRI is an initiative of the Spanish State expressed through the university, Euskoiker and Cluster Conocimiento are initiatives of the Basque Government, and BEAZ is an initiative of the County Council of Bizkaia.

Apparently, many initiatives of this kind may look good regarding the possibilities for stimulating innovation in the area. The problem is that the result of many initiatives from many directions results in a fragmented effort.

This fragmented effort has various consequences for the efficiency of the initiatives. (1) The initiatives are small and have limited possibilities for making an impact. (2) The initiatives do not communicate much, even if they share aims.

4.2 The Limited Size and Resources of the Initiatives

The limited size of the initiatives has the consequence that much of the work will be administration. This is most significant when looking at the very similar initiatives OTRI and Euskoiker. The offices only have three employees each, which mean that the work that is done is mostly administration of the office and the research contracts

that are set up. The role as proactive infrastructures for research co-operation is difficult to fulfil. Promoting activities are limited to fairs, research awards and the OTRI- incubator.

Another effect of the small size of the initiatives is that they are not, at the time being, involved in the initiating of the majority of connections between research personnel and firms, even if they may take care of the invoicing and so on. Euskoiker states that they do not initiate most of the research contracts that they are co-ordinating. What is most normal is that university researchers take direct contact with enterprises that have potential interest of their work. It is not a goal that all contacts between university and business should be channelled through offices, such as OTRI and Euskoiker, but it says something about the random nature of the contacts and that the offices do not have sufficient resources to promote themselves in the direction of enterprises. Since there is a need, according to the actual contracts of Euskoiker, among firms for university research, why do they not contact the university?

Concerning the activities to initiate co-operation between the university and business, the OTRI office states that it still is at a planning stage, even if it has been working since 1989. The planning stage is in an internal phase. This means that they are trying to set up the necessary links and communication within the university before setting this potential network in connection with the outside world. This is not only due to limited resources, but also to changing and unpredictable climate within the departments of the University of the Basque Country.

4.3 The Significance of the Initiatives in Figures

The significance of the initiatives is small in economical respects. The research channelled through OTRI in 1998 was 1.155 millions pesetas. For Euskoiker, the

respective figures was 218 millions pesetas. In comparison, the total Research- and Development effort in the Basque Autonomous Community in 1998 was 63.413 millions pesetas[11]. This means that the OTRI-research was 0.02%, and the Euskoiker-research 0.003%, of the total of the Basque Autonomous Community.

The results of BEAZ, which says that 360 of the 410 SMEs that they have worked with since the start in 1987 have survived, are good. But clearly, this is not a significant result for the geographical area that BEAZ works with - Bizkaia. In comparison 2.528 firms was created in Bizkaia in 1998[12].

The Activities of Cluster Conocimiento is a bit more difficult to measure since their activities are of an intangible kind. The office has only three employees, but looking at the activities described in Chapter 3 they have a lot of interesting projects going on, and it seems like they are using the network of members well.

4.4 Communication between the Initiatives

OTRI and Euskoiker are working in the very same field, namely setting up connections between research at the University of the Basque Country and research needs in Basque firms and institutions. The first works within the university and the second as a private foundation. They are both presented as a part of the University of the Basque Country's programme for university-business. The only difference is that the research channelled through Euskoiker is 100% financed by companies, and research channelled through OTRI is financed both by companies and by public sector. Although they both have the same aims the daily co-operation seems to be minimal.

[11] Source: Sistema de Indicadores de Revitalización Bilbao Metropolitano, Bilbao Metropoli-30.
[12] Source: Sistema de Indicadores de Revitalización Bilbao Metropolitano, Bilbao Metropoli-30.

E.g. in the cases where private enterprises or public institutions request contact with research resources through Euskoiker, the foundation goes directly to possible researchers and not through OTRI. It seems like the two offices are creating two very similar contact networks without communicating.

> It is important to highlight the structural deficiencies of the Basque University. In the past, these deficiencies have prevented the university from exercising its interface role in the Basque innovation and production system and this will continue to occur in future unless drastic measures are taken. (Gómez Uranga & Etxebarria 2000: 6)

To make university research more attractive to Basque firms and institutions OTRI has oriented itself towards the Basque priority clusters – among others represented by Cluster Conocimiento. OTRI and Cluster Conocimiento have knowledge of each other's existence, but the co-operation is evidently not of a too developed kind. Both Cluster Conocimiento and OTRI states that the contacts between such initiatives, in general, too a huge extent depends on persons in the relevant positions. It was not stated anything about this particular relation, but the general perception at OTRI is that communication between the university and private research centres, and between university and firms, is difficult. The willingness to co-operate does not seem to be very present. At Cluster Conocimiento it was stated that it is possible to see a positive change as the Basque SMEs develops away from an engineering- and towards a management based culture.

Even if Euskoiker is very much in the same business as OTRI, the office was not known to Cluster Conocimiento and vice versa.

What is most surprising is maybe the lack of contact between Cluster Conocimiento and BEAZ. Even if the first initially was an initiative of the Basque Government and

the second of the County Council of Bizkaia, Cluster Conocimiento works on a strategic level with the same subject matter as BEAZ works with on a day-to-day basis. The SMEs in the BEAZ network would probably find a lot of interesting knowledge sources in connection to Cluster Conocimiento (see, the presentation of the activities of Cluster Conocimiento in Chapter 3.).

4.5 Adequacy in Relation to SMEs

As stated in section 2.4 (The Role of Public-Private Relations in Innovation), Lundvall & Johnson (1994) emphasise the problems with communication between universities and SMEs. According to the objectives of Euskoiker and OTRI they could be potential vehicles for facilitating communication of this kind. The problem is that the initiatives do not reach SMEs. Euskoiker states that the enterprises and institutions that contract research are big. The research co-ordinated by Euskoiker is financed by the firms, and it is big firms that can afford this. OTRI also states that they have problems with reaching the SMEs, even if this office is in a slightly different position regarding financing. Approximately 50 percent of the research co-ordinated by OTRI is financed by public sources, and the initiative is directing itself consciously towards activity that will be useful within the Basque clusters. In addition, the office has set up the university-business incubator in co-operation with BEAZ – among others. Whether this will have any effect in the process of reaching SMEs remains to be seen. A recognised problem with business incubators is that due to the lack of firms with experience - within such incubators - it is difficult to make an environment for growth.

BEAZ and Cluster Conocimiento relates to SMEs in a different way than the other two initiatives. Their activities are more directly designed towards the stimulation of

SMEs. Many of the points from Lundvall & Johnson (1994) and Dodgson & Rothwell (1989), stated in section 2.4 (The Role of Public-Private Relations in Innovation) and 2.5 (The Support of Public-Private Relations to SMEs), are taken care of by the two initiatives.

BEAZ believes in the value of providing a network of different services to the SMEs they are tutoring. This network will help the firms to find and make use of the relevant knowledge, give management support, facilitate possible sources to finance, help to cope with regulations, and so on. According to the results, it seems that BEAZ works well, but as stated above, their network is small in comparison with the total number of SMEs in Bizkaia.

Cluster Conocimiento works in a more intangible manner and it is difficult to measure the value of their activities, but the initiative acknowledges the importance of a systemic approach to knowledge diffusion. Looking at their activities, it is possible to find examples on "best practice" programmes, stimulation of management knowledge within SMEs, and transfer of management tools to public administration - such as mentioned by Lundvall & Johnson (1994), Dodgson & Rothwell (1989) and Font 1998 (see sections 2.4, 2.5 and 2.7). Another positive initiative is that one of their projects is to promote research projects in connection with the Technology- and Innovation Plan of the Basque Autonomous Community. SPRI (The Basque Governments vehicle for science- and technology plans) has had problems with reaching the SMEs. To let Cluster Conocimiento, which is very conscious of the SMEs, work with the plan may be a possible way to start to reach the SMEs.

Chapter 5: Conclusions

In this text it was first argued for the important role innovation has in connection to the development of the economy, and that innovation must be taken care of as a systemic phenomenon. Further, SMEs need special attention in the process of innovation because they often do not have the necessary resources. Initiatives, such as public-private relations can be fruitful in the process of supporting SMEs.

In Chapter 4 it was shown that there are problems connected to the performance of OTRI, Euskoiker, Cluster Conocimiento and BEAZ – the examples of public-private relations in this study. The initiatives that is examined is only four, but they say something about the typical conditions for offices of this kind in Metropolitan Bilbao.

When considering policies for the future, three points are important to sum up in connection with the present situation.

1) The initiatives are small and have limited resources. Thus, their impact on the overall conditions for innovation in Metropolitan Bilbao is very limited.
2) As a result of the complex governmental and administrative context of Metropolitan Bilbao, the initiatives come from various levels and are not co-ordinated in a rational manner.
3) The economically most significant initiatives in this study, OTRI and Euskoiker, have problems with reaching the firms that need support mostly – SMEs.

Chapter 6: Comments on Method and the Results

Further Development

· This text has presented just a few cases. To present a more complete study, more interviews with initiatives and firms will have to be done. Anyway, the symptoms found are characteristic problems for the conditions of systemic innovation in Metropolitan Bilbao. It confirms the opinions expressed through literature, interviews and more informal talks with personnel at the University of the Basque Country: Structural problems and many small and uncoordinated initiatives hinders progress.
The intangibility of some of the subject matter will also be easier to cope with if balanced with more interviews.

Difficulties with the Provided Information

· A problem with some of the information obtained from the offices that has been interviewed, is that much remains to be seen. E.g. how will the OTRI-incubator work?
· The information provided in interviews tends to be superficial. Much of the information have the characteristics of, and is the same as, what can be found in promotional publications. Figures can also be difficult to obtain. Clearly, this is due to the fact that the various initiatives want to present themselves as successful. Although this is not to say that they also have made critical points about their own work, and especially their conditions for working - financial resources, climate for communication etc.
· When doing interviews, personal opinions occur, and sometimes it is difficult to know whether this should be included in the study - and if it is scientific to take them

into account. In this case, the personal opinions that have occurred during the interviews, have been related to the general climate for communication between various institutions in Metropolitan Bilbao, and the Basque Country in general. All of the opinions voiced tend to say more or less the same and are interesting for the context. The perception of the climate for communication, and links that are vital for innovation, is not of the best. This opinion has also been clear in more informal conversations with various personnel at the University of the Basque University.

References

Cooke, Philip, Gómez Uranga, Mikel & Etxebarria, Goio: *Regional Innovation Systems: Institutional and Organisational Dimensions*, Research Policy 26 (1997).

Font, Javier: *Efficiency and Effectiveness of Partnership in Southern European Metropolitan Administration* from *Inter and Intra Government Arrangements for Productivity*, Kluwer, Netherlands, 1998.

Isaksen, Arne & Smith, Keith: *Innovation Policies for SMEs in Norway: Analytical Framework and Policy Options*, STEP-report R-02/1997, Oslo.

Lundvall, Bengt-Åke (ed.): *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*, Pinter, UK, 1992.

Lundvall, Bengt Åke & Johnson, Bjørn: *The Learning Economy*, Journal of Industry Studies, Volume 1, Number 2, December 1994

REGIS Project: *Regional Innovation Systems: Designing for the Future – REGIS*, Targeted Socio-Economic Research – European Commission, European Communities 1998.

Smith, Keith: *Innovation as a Systemic Phenomenon: Rethinking the Role of Policy*, STEP Group, Oslo, 1998.

Tidd, Joe, Bessant, John & Pavitt, Keith: *Managing Innovation – Integrating Technological, Market and Organizational Change*, Wiley, England 1997.

Gómez Uranga, Mikel & Etxebarria, Goio: *Panorama of the Basque Country and its Competence for Self-Government*, European Planning Studies, Vol. 8, No. 4, 2000.

Gómez Uranga, Mikel & Etxebarria, Goio: *Networks & Spatial Dynamics: The Case of the Basque Country*, European Planning Studies, Vol. 1, No. 3, 1993.

Cluster Conocimiento: *Memoria de Actividades 1999*.

Cluster Conocimiento*: Necesidades de gestión de los clusters del País Vasco*.

Euskoiker: ***Informe de progreso 1994-1998***.

University of the Basque Country: *University and enterprise relations annual report 1998*.