XIII Congreso de Estudios Vascos Ciencia, tecnología y cambio social en Euskal Herria = Zientzia, teknologia eta gizarte aldaketa Euskal Herrian. (13. 1995. Zamudio)
ISBN: 84-89516-07-3 .- Donostia: Eusko Ikaskuntza, 1996, p. 31-37

THE NEW ENVIRONMENT FOR INNOVATION

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Drawing the insights of evolutionary economic theory this paper examines the new environment of the firm as an innovationg institution can be improved if the firm is primarily conceived as a sotcial institution for enhancing capabliles rather than reducing transaction costs. From an evolutionary perspective the key issye is how firms learm Because learning iS a sotlally-embedded, interactive process the innovation capacty of the firm is largely determined by the quality of ist internal and external networks. This theorical argument is ilustrated by lookmg at two dimensions of innovation the coparate milieu (where l examine intra-firm networks) and the spatial milieu (where l examine intra-firm and inter-firm networks) and the spatial milieu (where l argue that regioal factors are becoming more important m determining yhe innovatfon capacity of firms, especially SMEs). This paper concludes by examining what less favoured regions in Europe can do to promote innovation and regional renewal.

Teoria ekonomiko eboluzionistaren tesiari heldurik, oraingo artikulu honek enpresari-ingurune berriaren azterketa du helburu nagusia. Xede horretan, enpresa erakunde berritzaile gisa ikusten duen kontzeptuan hartzen du oinarri, hots, hobetu daitekeena baldin eta hasieratik enpresa hori here transakzioen kostua apaltzera baino gehiago, gaitasunak areagotzera jotzen duen gizarte erakunde gisa hartzen badugu. ikuspegi eboluzionista batetik, enpresak ikasten duen moduan datza gakoa; ikastea elkarreginezko prozesua izanik, elkarteak berezko duena, gehienbat bere barne zein kanpoko sistemen kalitateak ekarriko du enpresaren berrikuntzarako gaitasuna. Argudio teoriko hori argitzeko, berrikuntza alderdi bi aukeratu ditut, hala nola korporezio ingurunea (bertan enpresaren barne sistemak eta enpresen arteko edazioak aztertzen ditut) eta eremu ingurunea (bertan, lurralde -faktoreak gero eta garrantzi handiagokoak direlako ustea azaltzen dut, enpresen ahalmen berritzailea zehazterakoan, batez ere ETEEen kasuan). Ondorio moduan, berrikurrtza eta lurralde garapena sustatzeko ahalbideak aztertzen dira gutxien faboraturiko Europako lurraldeei dagokienez.

Recurriendo a la tesis de la teoría económica evolucionista, el presente artículo se centra en el estudio del nuevo entorno empresarial, partiendo del concepto de empresa como institución innovadora, que puede mejorarse si ésta se concibe originalmente como una institución social tendente a incrementar las capacidades más que a reducir el coste de las transacciones. Desde un punto de vista evolucionista, la clave reside en cómo aprende la empresa, al ser el aprendizaje un proceso interactivo e inherente a la sociedad, la capacidad de innovación de la empresa viene principalmente determinada por la calidad de sus sistemas internos y externos. Para ilustrar este argumento teórico, he escogido dos aspectos de innovación, como son el entorno corporativo *(en el que analizo los sistemas internos de la empresa y las relaciones interempresariales) y el entorno* espacial *(en el que sostengo que la Importancia de los factores regionales es creciente para determinar la capacidad Importancla de los factores regionales es creciente para determinar la capacidad innovadora de las empresas, especialmente de las PYMES) Como conclusión, se estudian las posibilidades de promoción de la innovación y el desarrollo regional en las regiones europeas menos favorecidas.*

1. INTRODUCTION

Our understanding of the firm as an innovating institution has been greatly enriched by the insights of evolutionary economic theory over the past decade or so (Nelson and Winter, 1982; Dosi et al 1988; Dosi et al, 1994). At a time when firms face a number of new threats and opportunities — not least from accelerating technological change, more globalised markets, high quality competition and ever more

stringent environmental regulations—it is hardly surprising that evolutionary economists should argue that knowlecfge is the most important resource and learning is the most important process. What these theorists also argue is that 'learning is predominantly an interactive and, therefore, a socially-embedded process which cannot be understood without taking into consideration its institutional and cultural context (Lundvall, 1992).

In this paper I want to argue that these theoretical insights can help us to understand the changing environment of innovation and, in particular, why it is that both corporate strategy and public policy are beginning to appreciate that *interactive learning* — between teams within the firm, between firms in the supply chain and between firms and their local milieu — is one of the most important features of an innovative environment. I shall argue that the innovative environment can be understood in two ways: in a corporate context (eg firms and inter-firm relations) and in a spatial context (eg national and regional systems of innovation). When we speak of innovative environments — or creative milieux as I refer to them in this paper — we should remember these twin contexts.

Although this paper is primarily addressed to the environment of innovation, it will also argue that the process of innovation should be understood to include a much broader spectrum of activities than is usually the case. Indeed, in this paper I shall use the term to cover product, process and organisational renovation on the one hand and institutional innovation at national and regional levels on the other. The main reason for defining the innovation process in this broad way is because the innovation bottleneck in Europe concerns not technology per se but the commercial exploitation and subsequent diffusion of technology, all of which requires a stronger networking capacity (which I define as the disposition to collaborate to achieve mutually beneficial ends) to transfer technology from lab to industry, from industry to industry and indeed from region to region,

Before we consider the corporate and spatial dimensions of innovation let us briefly remind ourselves why traditional economic theory (ie neo-classical economics) is of little use to us in this endeavour.

2. AN EVOLUTIONARY PERSPECTIVE ON INNOVATION

From an evolutionary perspective the key assumptions of neo-classical economic theory are not merely unhelpful, they are positively dangerous if used as a guide to the way in which firms behave in the real world. To assume, for example, that firms possess (near) perfect information, that they are objectively rational and that they optimise their utility means that neo-classical theory credits firms with a capacity for action which is as staggering as it is unrealistic. Taken together, these assumptions mean that neo-classical theory takes as resolved some of the largest and most important questions in the theory and practice of economic development, like how firms come to know what they know, ie how firms learn.

One of the great advantages of the evolutionary approach is that it begins with realistic assumptions about how firms actually behave in the real world, In other words it accepts the basic premise of bounded rationality, namely that the world is too complex for a firm to understand completely. It also holds that firms' optimizing behaviour can only be regarded as a calculated and risky gamble on what to do with imperfect information. Most important, the evolutionary approach puts the question of learning at the centre of its field of inquiry; it is thus a dynamic theory which recognises both the diversity of corporate behaviour and the fact that such behaviour is shaped by a wide variety of factors, economic and non-economic. Consequently, it avoids the neo-classical trap of assuming that prices and markets are the only social mechanisms that actively transmit information (Nelson and Winter, 1982).

Although the evolutionary approach recognises the privileged position of the firm as the main repository of knowledge in the innovation process, it also admits a role for a wide array of other institutional actors — like government, finance houses, education and training institutions, technology transfer agencies and trade associations for example. Because the role of these extra-economic actors varies from country to country we can speak of nalional systems of innovation, each of which affords different opportunities for learning and innovation, The evolutionary approach also appreciates the significance of intangible factors like social capital (ie the norms and networks of trust and reciprocity which facilitate cooperation between firms and between firms and other institutions).

One of the key points to emerge from this discussion is that innovation is an interactive learning process (Lundvall, 1992). This emphasis on the interactive nature of learning also finds an echo in recent theories of the 'knowledge-creating company' in Japan, where it is argued that an ethos of interactive learning is essential not just for the dissemination of existing knowledge but also for the creation of new knowledge, a key aspect of which is the sharing of tacit knowledge (Nonaka and Takeuchi, 1995). Learning by interacting is the theme I want to explore in the following sections because I believe that this is one of the most important factors in defining the innovatlve capacity of an organisation, be it a firm, a business association or a public agency.

3. CREATIVE MILIEUX: THE CORPORATE DIMENSION

Management theorists and corporate planners concur that the linear model of innovation — in which innovation was conceived as a series of sequential steps from R&D to manufacturing through to marketing and sales — has been superseded by the much more effective interactive model of innovation, in which cross-functional teams collaborate at each phase of a process which involves thick feedback loops, This new model of innovation presents a major challenge for firms organised along Fordist lines. Being very hierarchical the vertical information flow between managers and workers was akin to a one-way street, with the result that critical intelligence at the bottom of the firm rarely surfaced at the top. What made matters worse was the fact that the Fordist firm was also a departmentally segmented organisation, such that horizontal communication flows between R&D, manufacturing and marketing and sales left much to be desired, In short, the Fordist firm was ill-equipped to tap the knowledge of its internal workforce or its external suppliers, both of which are immensely important sources of know-how. As we know, the limited learning capacity of the Fordist firm was finally exposed by the superior enterprise strategies of the premier Japanese firms, strategies based on the interactive model of innovation (OECD, 1992; Nonaka and Takeuchi, 1995).

Learning by interacting is perhaps the key strength of the premier Japanese firms. We can see this principle at work at a number of different levels, both within the firm and between firms.

At the *intra-firm* level it is evident in the way that cross-functional teams interact intensively in the product development process, a method which is far more cost-effective in terms of both time and resources. It is also very apparent at the shopfloor level, where workers are encouraged to treat the factory as a laboratory — a key source of incremental innovation. In other words, thanks to a high degree of self-mamagement, workers are empowered to make continual changes in organisational routines and to communicate new problem-solving skills, through peer group interaction, so that new knowledge is broadly diffused throughout the firm. In contrast to individual learning, this constitutes the much more important phenomenon of *organisational* learning (Cole, 1994).

But the most pervasive form of learning by interacting takes place at the *inter-firm* level, between firms in the supply chain. Through a whole series of organisational innovations — like the placing of suppliers' engineers in the customers plant, from where they are ideally placed to feed back information; like the use of supplier associations, which disseminate best practice among their members; and jointly-agreed conventions, like open-book accounting, to share the profits of inter-firm collaboration — the leading Japanese firms have been able to reap the benefits of de facto vertical integration without bearing the costs. While the leading (customer) firms clearly gain most from these vertical supply chain networks, we should remember that *'both* purchasers and suppliers benefited from the synergistic effects that accrued from joint problem solving and continuous improvement in price, product quality, design, delivery and engineering (Nishiguchi, 1994).

The key point to establish IS that the integrated supply chain is first and foremost a highly effective system of interactive learning, indeed it has proved to be one of the most important mechanisms for generating and diffusing knowledge and problem-solving capacities throughout entire sectors, especially in the electronics and auto sectors. Within the supply chain the role of the supplier association (Kyoryoku Kai) has been hugely important. Formed to promote continuous improvement for customer and supplier alike, these supplier associations disseminate best practice through the various tiers of the supply chain, even down to small firms. A study in the Tokyo region, for example, found that even firms with less than 30 employees had mastered such techniques as Kaizen Groups, JIT and Poke Yoke, techniques which are only now becoming common in the best western multinational firms (Hines, 1994).

Companies throughout Europe and North America are now trying to emulate the intra-firm and inter-firm networking practices that have done so much to boost the innovative capacity of the premier Japanese firms — and, at bottom, this is what lies behind the epidemics of downsizing, delayering and re-engineering that have gripped western firms.

At the intra-firm level few western firms have grappled with these issues as tenaciously as General Electric, where a sustained effort has been underway since 1982 to try to create a 'boundary less' organisation, which means operning the company up, both vertically and horizontally, to the free flow of ideas. A key part of this strategy has been a radical reorganisation of the relationship between GE's operating divisions and GE's corporate R&D centre in Schenectady, New York. In the past the operating divisions saw little or no connection between the annual tithe which they paid to the R&D centre and the work of the centre. A key organisational innovation in the mid-1980s completely changed the way in which the R&D centre was funded: the annual tithe was reduced and confined to high-risk exploratory research and anything beyond that had to be financed entirely by the operating divisions, a change which forced them to take a much more interactive approach to the R&D centre to ensure that 'their' projects were commercialised (Dickson, 1992). This is just one example of the efforts that are underway in western firms to try to overcome the departmental barriers to innovation, a prerequisite of the interactive model of innovation.

At the inter-firm level similar efforts are underway to try to create Integrated supply chains by developing long-term partnerships between buyer and supplier. This is easier said than done, not least because these supply chains are predicated on trust, an intangible asset which has immense value but no price! As a form of social capital trust cannot be bought, it has to be earned through sustained collaboration.

It is sometimes suggested that trust is peculiar to certain cultures, like Japan, with the implication that it cannot be built in the west. This culturalist interpretation ignores the fact that the trust-based supply chains in Japan were a postwar phenomenon, the product of corporate necessity and and legislation designed to protect SMES from unfair subcontracting practices. In this way inter-firm relations were transformed from 'classical exploitation to a new view of collaborative manufacturing, in the sense that both purchasers and subcontractors came to benefit, under newly established rules, from the synergistic effects of bilateral problem-solving' (Nishiguchi, 1994).

The implication of this argument is that integrated supply chains can be — and are being — created in Europe and North America and that this form of inter-firm network offers untold potential for disseminating best practice throughout entire sectors. But these supply chains do not exist on anything like the scale that IS required to effect significant corporate renewal. This perhaps indicates that the key barriers to innovation generally and to inter-firm networking in particular have more to do with the intangible factors of corporate culture than with technology per se. This reinforces the point that we should never think of innovation as just a technology-related issue, a point which the most innovative firms have always recognised.

4. CREATIVE MILIEUX: THE SPATIAL DIMENSION

The spatial dimension of innovation has received so little attention in the conventional economics literature that one could be forgiven for thinking that corporate activity is organised on the head of a pin. In this conventional scenario firms tend to be conceptualized in terms of sectors, technologies and markets, the Implication being that location is of little or no real significance in understanding their innovative capacity. Indeed, with the advent of digital communication technologies, which offer firms unprecedented opportunities to reduce the 'tyranny of distance', it might be thought that spatial considerations are less important than ever, with one location being much the same as another.

In this section I want to challenge this view by arguing that, for all the talk of a global economy, location may be much more important than is commonly thought. To make this argument I shall draw on three themes which highlight the continued salience of spatial factors — product cycle theory, national systems of innovation and regional clusters.

Physical Proximity and Product Development

The significance of spatial factors has always been recognised in one strand of conventional economic theory, namely, product cycle theory (Vernon, 1966; 1979). Among other things this theory argues that in the product development and prototype production phases, firms tend to favour central locations for these activities, locations where their key personnel can interact to resolve the problems associated with product innovation. The reason why space is so important is because physical proximity facilitates the interchange of inter-disciplinary skills if tacit knowledge, which is person-embodied, is to be fully exploited (Patel and Pavitt, 1991; Nonaka and Takeuchi, 1995). This raises the highly contentious issue of physical versus virtual proximity (ie interacting through the medium of digital communications) in the innovation process.

While there is no doubt that 'digital highways' have given multinational firms the capacity to exploit the talents of physically dispersed R&D teams, the fact remains that most firms continue to set a high premium on physical proximity at key stages of the product development process. Even Ford, the most globalised and IT conscious auto firm, argues that 'the quality of face-to-face interaction is higher than the electronic variety, even between people who know each other well' (Lorenz, 1995).

No company seems more committed to exploiting the Innovative potential of physical proximity than BMW. Utilising the idea that R&D engineers are more creative when co-located at a single point BMW has constructed one of the largest concentrations of engineering expertise in Europe at its Forschungs und Ingenieurzentrum (FIZ), which is close to the heart of Munich, BMW plans to house some 6000 technical staff in the FIZ and this represents an unprecedented intermingling of research, design, development, manufacturing and purchasing skills. A key principle in the design of this extraordinary 1.2 million sq. foot complex is that no person has to walk more than 50 metres to talk face-to-face with another, the aim being to push simultaneous engineering to its limits so as to reduce the cycle time of designing and producing vehicle prototypes, which BMW sees as the area where firms lose or gain time (Griffiths, 1990).

While Ford and BMW testify to the continuing salience of physical proximity in the product innovation process, the traditional product cycle theory has been criticised for underestimating the extent to which firms are necessarily tied to their domestic base when they undertake this highly sensitive activity. Nowadays, for example, the leading-edge multinationals are tapping into local fields of technical expertise in different countries as part of their product development strategies, which means that the traditional product cycle model needs to be revised (Cantwell, 1995).

However, this critique does not invalidate the key argument that physical proximity continues to be seen as a major source of creativity 'in the product development process. This underlines the simple — but fundamental — point that innovation is a socially-embedded and spatially-rooted process of interactive learning (Lundvall, 1992; Henry et al, 1995).

National Systems of Innovation

The continued significance of national systems of innovation (NSI) is another reason why we need to consider the spatial dimensions of innovation (Lundvall, 1992; Nelson, 1993; Freeman, 1995). While there is no commonly agreed definition of these national systems we can think of them in terms of two inter-related levels: firstly, the formal institutions and regulations through which innovation resources are mobilised and deployed and secondly, the informal norms and conventions which regulate the ways in which institutions interact with one another (ie social capital). This is consistent with, though broader than, the definition proposed by Freeman, namely 'the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies' (Freeman, 1987).

With respect to the *formal* level the key elements would include the internal organisation of firms, inter-firm relations, the role of the public sector (including education and training institutions), the operations and structure of the financial sector, the scale and organisation of R&D resources, technology transfer organisations and professional associations of various kinds (Lundvall, 1992). We know enough about the formal national systems in the OECD to know that the Japanese system, for example, is much more oriented to building innovative capacity than the UK system: the availability of 'patient money', the commitment to education and training, the premium attached to R&D etc are all higher in Japan (Freeman, 1987).

Furthermore countries like Japan and Germany have robust professional associations of engineers which help to disseminate information and knowledge, and I mention these because they are invariably neglected in most studies of national systems of innovation. Bearing in mind the significance of the supply chain as a mechanism for inducing and diffusing innovation in its broadest sense it is worth noting that the debate about how best to promote innovation in the UK all too often ignores the potential of these professional associations. Yet it is quite possible that the Chartered institute of Purchasing and Supply (CIPS), for example, has more potential to promote innovation in the UK economy than the Department of Trade and Industry.

When one considers that the corporate membership of CIPS annually spends some £750 billion, a sum which dwarfs the government's innovation budget, this potential leverage becomes clear. Yet a recent CIPS membership survey revealed an alarming picture of untapped potential because 'most companies are still in the stone age as far as managing the purchase and supply chain is concerned' (Cassell, 1994). What compounds the problem is that purchasing managers labour under a Cinderella status in the corporate hierarchy and that, unlike finance or marketing, the purchasing function is rarely a route to the top in the UK.

The *infomnal* dimension of national systems of innovation is less developed, yet it is no less important. To illustrate this point let us use the example of social capital, which has been defined in the following way:

> 'By analogy with notions of physical capital and human capital — tools and training that enhance individual productivity — social capital refers to features of social organisation, such as networks, norms and trust, that facilitate coordination and cooperation for mutual benefit. Social capital enhances the benefits of investment in physical and human capital ... and is coming to be seen as a vital ingredient in economic development around the world' (Putnam, 1993)

Building trust, as I have said, is difficult but not impossible. High trust networks are today more important than

ever because they help partners to deal with growing uncertainty on the one hand and with the mobilisation of complementary assets on the other, both of which are key problems in innovation and in economic development more generally (Sahel, 1982). Because innovation requires ever more demanding forms of collaboration, the national systems which are able to develop high trust networks are in a better position to mobilise and exploit their resources, a point underlined by the research on the role of 'invisible factors' in economic development (OECD, 1993).

While national systems of innovation remain important they are being modified by two distinctive processes — globalisation and regionalisation.

Driven by multinationals the globalisation process means that national differences are becoming less stark as these firms try to reproduce their domestic routines abroad: some of the best examples of this process are the ways in which German firms try to build strong training cultures in the UK or the way that Japanese firms in the UK seek to build robust supply chains.

The regionalisation process introduces further modifications because the formal and informal aspects of a national system are not uniformly distributed throughout a national economy. This process of regionalisation, which is highly uneven across the EU, raises some extremely important questions about how firms innovate and about which spatial scale is most appropriate for the design and delivery of innovation policy,

Regional Clusters

The notion of regional clusters — a term I use to cover a wide array of territorial agglomerations of economic activity — has done more than anything to elevate the spatial dimension of innovation in the minds of theorists and policymakers alike, Because the notion of cluster has become so pervasive, largely due to Porter's evangelical work, it is now used so freely as to be a shorthand for almost any concentration of firms, however weak their transactions. Even so, it is a useful term to signal the growing significance of the region as a basis of innovation and economic development. The key point I want to establish here is that the 'regional renaissance' does not apply to all regions: many regions simply do not have the resources — economic assets, institutional capacity, social capital and political disposition for example — to become 'actors' in the new global economy. In this section I want to examine the the key features of successful agglomerations in advanced regions and raise the question of what, if anything, less favoured regions can do to enhance their own innovative capacity.

Regional clusters assumed international prominence largely because so much innovative activity was thought to be taking place in key agglomerations around the world. Among the most famous of these agglomerations are the semiconductor and computer industries of Silicon Valley, the automotive and machine tool clusters of Baden-Wurttemberg, the knitwear and ceramics districts of Emilia-Romagna and the financial services sector of the City of London to name but a few. To understand these agglomerations in theoretical terms we can say that the greater the complexity, irregularity, uncertainty and tacitness of transactions, the more sensitive they are to spatial distance, ie there tends to be a high premium on physical proximity attached to these transactions. In other words, there is a strong association between the triad of spatial agglomeration, tacit knowledge and learning in the production of complex products and services (Storper and Scott, 1995).

If this triad helps to explain the existence of advanced technology-based regional clusters, how do we explain the erosion of these clusters? Part of the answer lies in the concept of lock-in, which highlights the weakness of strong ties. That is to say, the networks which bind the cluster can actually undermine the vitality of the cluster if they become too complacent and impervious to innovative trends elsewhere in the world, which is what happened to the coal and steel cluster in the Ruhrgebeit, the minicomputer industry in Route 128 around Boston, the mechanical watch industry in the Swiss Jura and, more recently, this problem began to afflict the auto cluster in Baden-Wurttemberg (Grabher, 1992; Morgan, 1994),

Although these leading edge clusters developed organically, in the sense that they were not the product of a public planning exercise, concerted efforts are now underway to keep these clusters on an innovative footing, Even in Silicon Valley, where the ideology (if not the practice) extolled competition over collaboration, the formation of Joint-Venture: Silicon Valley, a consortium of private and public sector organisations, was a sure sign that even this cluster feels the need for a conscious and collective effort to promote better social capital in the region (Saxenian, 1994).

While the advanced regional clusters have enormous assets which they can mobilise on the innovation front, this is clearly not the case in the less favoured regions (LFRs) of the European Union. However, some of these LFRs have made a concerted effort to develop regional renovation strategies which depart in siginficant ways from the traditional approach to regional development, which in most cases inrevolved little more than attracting mobile international capital.

Wales provides an interesting case in point. Having diversified from coal and steel, Wales has done as much as any LFR to design a regional innovation strategy, the key elements of which include supply chains to forge better links between foreign-owned branch plants and indigenous SMES, centres of technical expertise, technology clubs in key sectors which are run by and for local enterprises, training consortia for SMES and cluster-building. The main animating force behind these initiatives is the Welsh Development Agency (WDA), which is in the process of transforming itself from a glorified property development agency to a regional animatuer of innovation, a role which requires the 'soft' skills of animatuership and brokerage rather than the 'hard' skills of a property developer. At the heart of the WDA'S regional innovation strategy lies the philosophy of helping firms to help themselves, which is radically different to the traditional philosophy of just subsidizing firms to create jobs (Morgan, 1994).

These efforts were rewarded when Wales was chosen by the European Commission as one of the four regions to pilot a new generation of regional policy in the EU, the Regional Technology Plan (RTP). The RTP is the most significant step in the process of creating regional innovation strategies in LFRs in Europe. In essence the RTP aims to enhance the networking capacity of all the key organisations at regional level so that they can engage in a process of interactive learning, which is the first step in raising innovative capacity (Morgan, 1995).

Regional development agencies throughout Europe are beginning to grapple with this new model of regional development, a model which assumes a degree of institutional capacity, social capital as well as a political disposition to create a new and more innovative trajectory of development at the regional level.

On the face of it the Basque Country would seem to have enough institutional capacity to develop a robust innovation strategy. In governmental terms it might even be argued that it has too much institutional capacity because a population of 2.1 million sustains three separate levels of government. From a policy standpoint this creates as many problems as it solves because the lack of inter-governmental coordination is perhaps the key barrier to the formation of a more effective regional innovation strategy (del Castillo et al, 1989; Serrano et al, 1993).

This problem of (untapped) institutional capacity is all the more serious because the Basque Country is forced to rely on its own indigenous resources. Unlike Wales, which has been a major recipient of foreign direct investment, the Basque share of foreign investment in Spain was just 2,5% in 1993, which is pitifully small compared to the 43% secured by Madrid and the 29% secured by Catalonia (Ferreiro et al, 1995).

On the positive side the Basque Country has made some promising steps to create a more innovative infrastructure and three elements deserve to be mentioned:

First, the *Technology Centres* are now well established and these could become very important technology transfer mechanisms for SMEs. The evidence suggests, however, that these centres are too academic, hence not sufficiently geared to the more mundane needs of the SME sector in the regional economy (Cooke and Morgan, 1992; Prospektiker, 1994).

Second, a significant effort has been made to Identify and nurture nine Regional Clusters, as in the high value added steel, machine tools and domestic appliance sectors, the aim being to enhance innovative capacity by fostering an interactive learning culture in each cluster (Bilbao, 1995).

Third, SPRI could be a highly innovative development agency if it is allowed the relative autonomy to fulfil its potential. Once regarded as the most innovative agency in Spain, it seems to have lost this status in recent years to the likes of IMPIVA in Valencia. Given the problems of governmental capacity, and the critical need to engage the energies of the corporate sector in self-help initiatives, SPRI is perhaps the most appropriate body to coordinate a regional Innovation strategy, If the two key problems of regional development agencies can be solved — namely lack of business skills on the one hand and being used as propaganda machines for politicians on the other — these bodies have much more to offer in the way of promoting innovation in LFRs (Velasco, 1991).

To conclude we can say that the regional level has assumed a new significance because it is the most effective level at which to design and deliver innovation support services, especially to SMEs. This is the level at which regular interactions can be sustained and, as I have suggested, regular interactions offer great potential for creating and sustaining the high trust relationships which lie at the heart of innovation today.

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