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1. Introduction: innovation and regional policy

One of the priorities for the new generation of regional development programmes in the European Union for the period 2000-2006 is the promotion of innovation. This is clearly stated in the official Commission Guidelines adopted in June 1999 as the basis for the negotiation of the new generation of regional programmes which should channel to the European regions, less favoured in particular², most of the 213 billion € of the Structural Funds for this period. These Guidelines³, entitled “Economic and social cohesion: growth and competitiveness for employment” are based on two broad principles:

i) identification of integrated strategies for development and conversion and ii) ...the creation of a decentralised, effective and broad partnership. They state that “*Structural assistance should therefore give an increasing priority to promoting RTD and innovation capacities in an integrated manner in all fields of intervention of the Funds*” though actions such as: i) Promoting innovation: new forms of financing (e.g. venture capital) to encourage start-ups, spin-outs/spin-offs, specialised business services, technology transfer, ii) interactions between firms and higher education/research institutes, iii) encourage small firms to carry out RTD for the first-time, iv) networking and industrial co-operation, v) developing human capabilities.

The reason for setting this priority within the 2000-2006 Guidelines might lie in the recent evolution of European regional policy due to a new understanding of regional competitiveness (Cooke, P, 1998)⁴ and the corresponding matching role of public policy, to which we now turn.

As stated in the Treaty of the Union, European regional policy is mainly about the reduction of disparities among regions in Europe.⁵ Thus, European regional policy aims at the creation of the right economic and institutional conditions in a given region for a sustained and a sustainable economic development process which creates economic opportunity and jobs that might increase regional income.

Over and above an appropriate level of physical infrastructures and workforce skills, which have been the traditional target of regional policies, these conditions also involve the existence of regional

strengths and opportunities to be further exploited such as the capacity of regional firms to innovate, the quality of management, a business culture which promotes entrepreneurship, an institutional framework which encourages inter-firm and public-private co-operation a dynamic tertiary sector providing business services and the transfer of technology, a minimum level of R&D capabilities, the availability of appropriate interfaces between the demand for and supply of innovation inputs, particularly by/for small firms, and the existence of adequate financial instruments conducive to innovation, etc. These conditions are closely related, at microeconomic level with “intangibles” and “real business services” concepts as opposed to traditional horizontal aid schemes and ‘automatic’ business subsidies.

At the ‘meso-economic level’ they are related to ‘institutional thickness’ and ‘social capital’ concepts. The latter has been defined (Henderson & Morgan, 1999) as a relational infrastructure for collective action which requires trust, voice, reciprocity and a disposition to collaborate for mutually beneficial ends. In short, the idea being not to simply to alleviate costs to an individual entrepreneur but to change corporate strategies and business culture as well improving the ‘productive environment’ or ‘milieu’ in which these firms work. This approach can be exemplified in Bellini’s words: *“the provision of real services transfers to user firms new knowledge and triggers processes within them, thereby modifying in a structural, non transitory way their organisation of production and their relation with the market”* (Bellini, 1998).

The legitimacy of public policy for the improvement of these conditions is critically dependent on the assumption that the competitiveness of firms relies not only on its own forces but, in no less extent, on the quality of its environment, sometimes referred to as ‘structural competitiveness’ (Chabbal 1994). The assumption here is that businesses, and SMEs in less favoured regions in particular (mainly because they are working in imperfect markets with limited information and ‘know-how’ access) may need assistance in tapping into the necessary resources (related to knowledge, in the form of technology or qualified human capital in particular), to face up to the new forms of competition developing in the global economy. In short they may need more than simply less taxes and lower 2 interest rates to fully exploit their competitive position and thus maximise their contribution to the regional economy in the form of more jobs and higher wealth, which ultimately justifies public financial support for a policy aimed at improving competitiveness. This assumption might particularly hold true in the case of small and medium sized firms, whose key economic difficulties are related not just to size but also to isolation. And this is ever more true in the case of SMEs working in less favoured regions which are often small size, family owned, working in traditional sectors for local markets and ill prepared for new competitive pressures induced by the globalisation process to which they are increasingly exposed to. Moreover, this assumption is particularly important for regional policy since small and medium sized firms constitute the basis of the productive fabric of the regions whose development is lagging behind.

Linked to the above, a generally accepted assumption is that the high road to competitiveness for these regions whose firms are progressively exposed to international competition runs through innovation, which enables them to adapt at the right time to increased competitive and the fast pace of technological change. Innovation must apply to all aspects of the activity of a small firm (new markets, new, different or better products, processes and services). In this sense, the concept of innovation embraces research and development, technology, training, marketing and commercial activity, design and quality policy, finance, logistics and the business management required for these various functions to mesh together efficiently.

Since small and medium sized firms, particularly in less favoured regions, do not usually have either the necessary strategic information or the skills and staff specialising in all the functions listed, some of the latter will have to be carried out by outside contractors. This means that the competitiveness of a small firm depends in part on the quality of the links with and the efficiency/availability of its geographical neighbours (research and technology transfer centres, training centres, business services companies and so on) and it is largely dependent on the quality of the institutional system providing support for innovation (regional authorities responsible for industrial/regional policy in particular). In this sense, innovation is more accessible to small and medium sized firms when they are working within rich and dynamic regional innovation systems. Regional innovation systems have been defined (Autio, 1998) as a distinct concept from national innovation systems (Lundvall, 1992), as “essentially social systems, composed of interacting sub-systems; the knowledge application and exploitation subsystem and the knowledge generation and diffusion sub-system. The interactions

within and between organisations and sub-systems generate the knowledge flows that drive the evolution of the regional innovation systems". Now, while the core regions of the world economy are well endowed with robust interactive networks, less favoured regions have underdeveloped, fragmented and much less efficient regional innovation systems, as we shall see in the next section.

In short, the creation of the right economic and institutional conditions in a given region for a sustained and a sustainable economic development process implies the triggering of learning processes in the regional economy which allows regional firms to become more innovative, anticipative and adaptable to rapidly evolving markets and techno-economic conditions. This is why European regional policy has set innovation promotion as one of the priorities for action in the period 2000-2006, starting from an exploration of new paths by bolstering intangibles, social capital and regional 'learning' capacities.

2. Regional Innovation Systems and Learning Regions⁸

2.1. Regional Innovation Systems in Less Favoured Regions

Today, in Europe, advanced regions spend more public money and in a more strategic way in the promotion of innovation for their firms than less favoured regions. In 1996, for example, while countries such as Denmark, Finland and France spent over 200€ of public aid to R&D per person employed in manufacturing, and Austria, Belgium, Germany and the Netherlands were around the 100€ rate, Greece and Portugal spent 10€ or less, and Spain did not reach 50€ (CEC, Seventh Survey on State Aid, 1999). This is increasing the inter-regional innovation-gap across Europe, which has a direct relation to the cohesion gap. If regional policy is to be effective in reducing the cohesion gap, it has to address this problem by increasing the innovation capacities in less favoured regions. This, in turn, is dependent on the establishment of an efficient regional innovation system in these regions, as a pre-condition for an increase of public and private investment in the field of innovation.

Otherwise, if policies are solely concerned with increasing the amount of public aid for innovation, 'absorption' problems will soon appear and the efficiency of these investments will be undermined, as has already happened in a number of regions with previous policy experiments (e.g. STRIDE). The reason for this lie in what we will call the 'regional innovation paradox'.

The regional innovation paradox refers to the apparent contradiction between the comparatively greater need to spend on innovation in less favoured regions and their relatively lower capacity to absorb public funds earmarked for the promotion of innovation, compared to more advanced regions. That is, the more innovation is needed in less favoured regions to maintain and increase the competitive position of their firms in a progressively global economy, the more difficult it is to invest effectively and therefore "absorb" public funds for the promotion of innovation in these regions. In other words, one might have expected that once the need is acknowledged/identified (the innovation gap) and the possibility exists, through public means, to respond to it, these regions would have a bigger capability to absorb the resources destined to meet this need, since they start from a very low level ('everything is still to be done'). Instead, these regions face considerable difficulties in absorbing this money. Such is the nature of the regional innovation paradox.

The main cause that explains this apparent paradox is not primarily the availability of public money in the less favoured regions. Its explanation lies elsewhere. It lies in the nature of the regional innovation system and institutional settings to be found in these regions. The regional innovation system in less favoured regions is characterised by its underdevelopment and fragmented nature. The institutional setting in less favoured regions is characterised by the absence of the right institutional framework and policy delivery systems, public sector inefficiency and lack of understanding by policy-makers of the regional innovation process in particular. The two combined explain the regional innovation paradox.

The underdeveloped size of the regional innovation system in less favoured regions and lack of articulation/coherence of its different subsystems and innovation players is illustrated by some of the following characteristics in less favoured regions:

Money earmarked for innovation is sometimes utilised exclusively for the creation of R&D physical infrastructures and equipment for which no real demand has been expressed by the regional firms. Funding might fall in the hands of those responsible for research/science or technology policies which do not have an economic development perspective; innovation being primarily about economic competitiveness and the exploitation of new, better or different markets, products and services. Moreover, the regional government's departments responsible for research and education, industry and economic planning may seldom meet to discuss and agree an integrated policy for the promotion of innovation. That is, there is often no multidisciplinary approach in the planning of funding, which is critically important for a successful innovation policy.

Figure 1 A fragmented regional innovation system: less favored regions

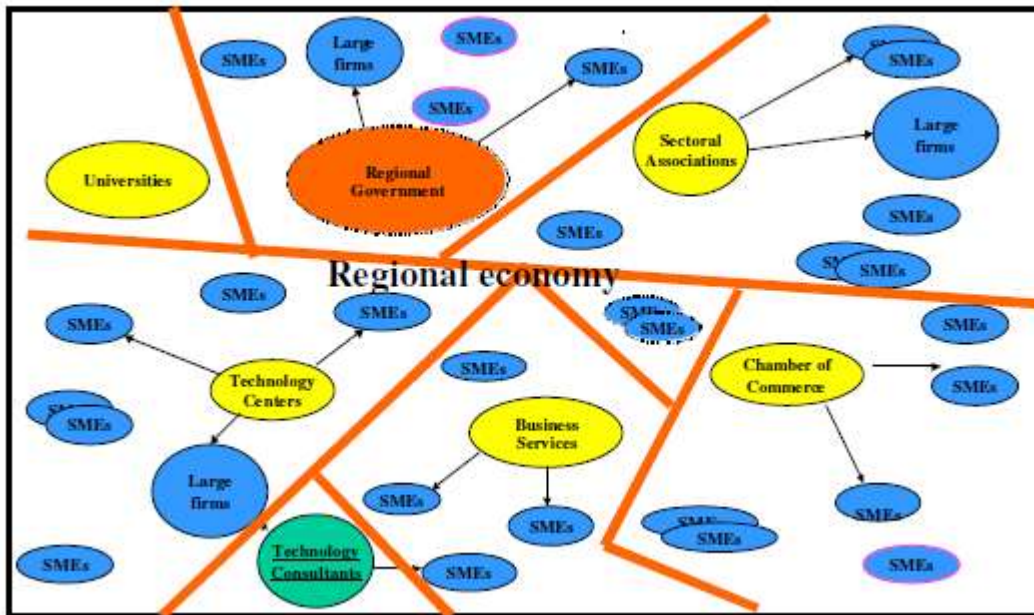


Table N° 1. Ten structural factors affecting the Regional Innovation Systems in LFRs

1. Shortcomings relating to the capacity of firms in the regions to identify their needs for innovation (and the technical knowledge required to assess them) and lack of structured expression of the latent demand for innovation together with lower quality and quantity of scientific and technological infrastructure.
2. Scarcity or lack of technological intermediaries capable of identifying and 'federating' local business demand for innovation (and R&TD) and channelling it towards regional/national/international sources of innovation (and R&DT) which may give response to these demands.
3. Poorly developed financial systems (traditional banking practices) with few funds available for risk or seed capital (and poorly adapted to the terms and risks of the process of innovation in firms) to finance innovation, defined as 'long-term intangible industrial investments with an associated high financial risk' (Muldur 1992).
4. Lack of a dynamic business services sector offering services to firms to promote the dissemination of technology in areas where firms have, as a rule, only weak internal resources for the independent development of technological innovation (Capellin 1989/ 9).
5. Weak co-operation links between the public and private sectors, and the lack of an entrepreneurial culture prone to inter-firm co-operation (absence of economies of scale and business critical masses which may make profitable certain local innovation efforts).
6. Sectoral specialisation in traditional industries with little inclination for innovation and predominance of small family firms with weak links to the international market.
7. Small and relatively closed markets with unsophisticated demand, which do not encourage innovation.
8. Little participation in international R&TDI networks, scarcely developed communications networks, difficulties in attracting skilled labour and accessing external know-how.
9. Few large (multinationals) firms undertaking R&D with poor links with the local economy.
10. Low levels of public assistance for innovation and aid schemes poorly adapted to local SMEs innovation needs

Source: Landabaso, 1997.

University departments from relatively new universities, for example, which do not have a long tradition of university-industry collaboration, use new funding to strengthen research activities which do not always reflect the needs of the regional firms.

On top of that, regional innovation systems in less favoured regions suffer from isolation from the R&TD networks of “excellence” internationally. Thus, SMEs find it hard to access the technology sources and partners, including informal personal contacts, which are necessary for the continuous feeding of the innovation system in order to keep abreast of technological change in the global economy.

The regional firms, often small, family-owned and competing among themselves in relatively closed markets, do not have a tradition of co-operation and trust either among themselves or with the regional R&TD infrastructure, particularly universities, as illustrated for example by the Spanish case in which “80% of firms in Spain with fewer than 200 workers undertook no R&D in 1994, whether internally or through outside contractors...” (COTEC, 1997). Co-operation for innovation which is particularly critical in their case due to their limited internal human resources and ‘know-how’ required for the innovation effort. Firms do not express an innovation demand and the regional R&TD infrastructures are not embedded in the regional economy, and therefore are unable to identify the innovation needs and capabilities existing in the regional economy. Thus, there is a lack of integration between regional supply and demand for innovation.

In short, the regional innovation system in these regions does not have either the necessary interfaces and co-operation mechanisms for the supply-demand matching to happen, or the appropriate conditions for the exploitation of synergies and co-operation among the scarce regional R&TD actors which could eventually fill gaps and avoid duplications. In this situation, investing more money in the creation of new technology centres, for example, without previously co-ordinating and adapting the work of existing ones, risks further distorting the system. At the same time it also risks imposing a new budgetary burden on public budgets through the running costs of these institutions, which are unlikely to reach a satisfactory level of self-financing in a reasonable time period due to the mismatch referred before. The same goes for a number of Technology parks initiatives in less favoured regions, which end up becoming property development operations dependent on external capital attraction, poorly linked to the regional industry and playing a very limited role in the economically strategic function of technology transfer regionally.

Moreover, advanced business services and networking agents/interfaces such as those existing in advanced regions are few and not necessarily specialised in the innovation domain. This hinders the innovation opportunities of firms through proper technology auditing and accessing strategically important services such as innovation management, technology forecasting and training, etc. These initiatives, particularly private ones, get trapped in the vicious circle of little demand and poor supply which is rarely spontaneously broken from within the system. When they do respond, due to firms’ defensive and adaptive reactions (rather than proactive ones) to market pressures, it is often as late technology followers and innovation opportunities are lost to local industry. Something similar can be said about financial instruments and institutions in less favoured regions, which on top of usually imposing higher than (European) average interest rates offer little attention to long term, higher risk and intangible investments which are characteristic of innovation projects.

Finally, the quality of the institutional setting in these regions is often the main obstacle for the creation of an efficient regional innovation system. Over and above the different degree of regional autonomy in the conduct of regional/industrial policy, several regional governance structures in less favoured regions suffer heavily from lack of credibility, political instability and absence of professional competence (and awareness) in the field of innovation. These three factors are characteristic of underdevelopment.

The lack of credibility of these governance structures, notably vis -à-vis the private sector, is reflected in their limited capacity for consensus building and partnership arrangements with private firms and other institutional actors, be it universities or national R&TD correspondents. Political instability and short-term political consideration (linked to the political cycle) undermine any serious effort in the implementation of an innovation policy which by its own nature is medium to long term. Moreover, it makes the necessary regional leadership for the development of a regional innovation system even more difficult and more prone to fall in the hands of consolidated lobbies and parochial interests which

hinder innovation. Lack of professional competence is reflected in the fact that these administrations tend to favour "traditional" and 'easy to manage' regional instruments rather than more sophisticated and complex policies such as innovation policy. In some instances even where the political commitment has been clearly expressed to support such a policy, governance structures are often inadequate and it may be difficult to find the necessary management resources to implement it efficiently.

All the above explains to a certain extent the conclusions reached recently by the R&TDI evaluation of Structural Funds for the period 1994-1999 in less favoured regions (Higgings *et al*, 1999, p. 9) in which the major policy issues identified were:

- Lack of co-ordination between the bodies in charge of public research and those in charge of private research
- Gap between Universities and enterprises
- In many regions there seems to be a lack of co-ordination of the science and technology policy between departments of industry and departments of education
- In some regions there is overlap and inadequate co-ordination between national and regional measures
- There is little involvement of the regional RTDI actors, private sector in particular, in policy Planning

2.2. Learning Regions

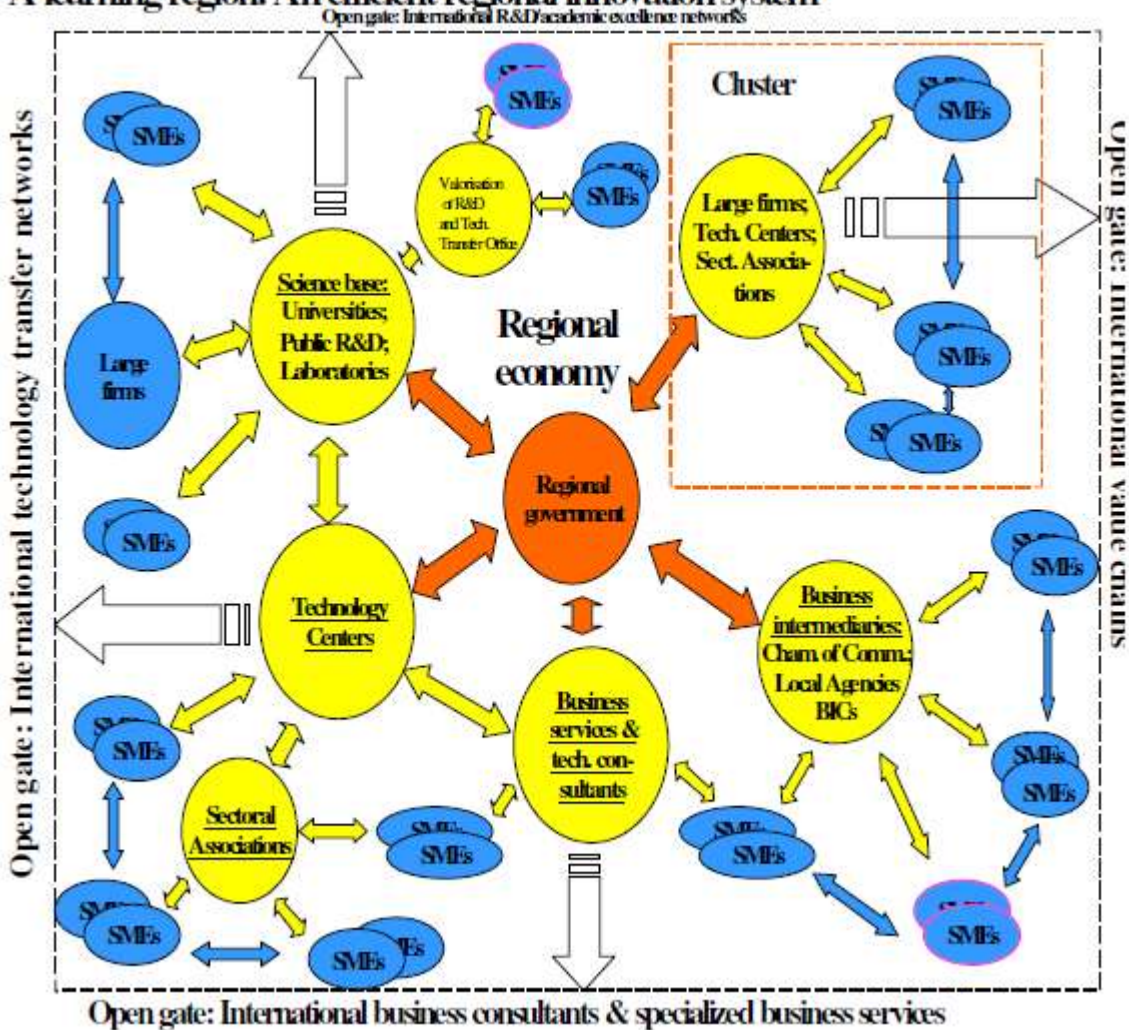
The innovative capacity of the regional firm is directly related to the 'learning' ability of a region. That is, innovative capacity and the regional 'learning' ability associated with it is directly related to the density and quality of networking within the regional productive environment. Inter-firm and public/private co-operation and the institutional framework within which these relationships take place are the key sources of regional innovation. Innovation being the end-product and the regional 'learning' dependent on the quality and density of the above relationships, being the process.

Asheim (1998, p. 3) defines a learning region as "representing the territorial and institutional embeddedness of learning organisations and interactive learning" and goes on to argue that in the promotion of such innovation supportive regions the inter-linking of co-operative partnerships ranging from work organisations inside firms to different sectors of society, understood as "regional development coalitions", will be of strategic importance.

A learning region is not a 'parochial' region, which ignores the importance of the national and international dimensions, particularly in the fields of 'science', 'research' and 'technology' over and above a narrowly defined concept of 'innovation' as such. The regional dimension is important but not exclusive. In this sense it is crucial to acknowledge the need for firms, to be close to 'open gates' to the national and international (see Glover, 1996) dimensions regionally, in particular for SMEs. Recently, some authors (Koschatzky, 1998, p. 403) have emphasised that even though "space clearly matters in innovation, this takes place more on a perceptible rather than on a politically defined territorial basis" because "it is not a specific region which matters in innovation but an environment fuelled by actors from different regions which, in its complex (inter-regional) structure, has to exceed a critical minimum to be regarded as supportive factor in each region. This environment originates only in part from each single region, but its impact is regionally specific, depending on the structural characteristics of the regional firms". This leads them to conclude that "cross-regional activities would increase the impact of regionally oriented measures, and therefore, provide stronger support for innovation management and the competitiveness of both local and regional firms" (Koschatzky, 1998).

Learning as an economic process, can be subject to virtuous circles and increasing returns to scale. The more a region (or a company) is in a position to learn (identify, understand and exploit knowledge, in the form of technological expertise for example, to their own economic benefit) the more capable, and possibly willing, it becomes to build on and increase its demand and capacity to use further new knowledge. But learning depends critically on two key factors; a certain degree of (business-economic) intelligence, which would trigger the demand for new knowledge, and access to/availability of knowledge.¹⁰

A learning region: An efficient regional innovation system



At the meso-economic level we also need an "intelligent cell" to trigger a learning process in a regional economy. The regional government (and its development-related agencies) can play a major role in articulating and dynamising a regional innovation system, understood as the process of generating, diffusing and exploiting knowledge in a given territory with the objective of fostering regional development. In this dynamic and systemic sense, the regional innovation system is in itself the process of learning which "learning regions" are aiming for. The regional innovation system is what determines the effectiveness and the efficiency of regional knowledge building/transfer among the different integrating parts of the system, including individual firms, sectoral/value-chain clusters, business consultants, technology centres, R&D centres, University Departments, laboratories, technology transfer and utilisation of R&D centres, development agencies, etc. The regional innovation system is what makes the whole bigger than the sum of the individual parts. Thus, the regional government can play the role of the "collective intelligence" necessary for a region to spark the process to become a "learning region". It is best placed in terms of political legitimacy and economic powers, including its ability to eventually use the carrot (with for example financial backing: not least as a key decision-maker in the process of Structural Funds allocation) and the stick (for example through its regulatory powers and public procurement policies among others), to facilitate the articulation of the regional innovation system regarding two key aspects in particular. Articulating means linking (regional actors: firms, technology centres, universities, business service providers, etc.) and matching (innovation needs with knowledge supply) in search of synergies and complementarities among the different actors, policies and sub-systems which integrate a regional innovation system. Links, synergies and complementarities which are precisely the "learning vehicles" which may allow a region to effectively learn and increase its innovative potential, due to the nature of the innovation process at regional level.¹¹

Firstly by matching innovation (the capacity to use knowledge) demand by firms with existing R&DTI regional supply (the availability of knowledge centres) and eventually finding open gates to external innovation sources and partners capable of addressing the innovation needs of the regional economy. This includes the initial important task of identifying and helping expressing innovation demand and needs, be it latent or not, from regional organisations, most notably SMEs. And secondly, by facilitating cooperation and coherence between the different agents and policies (science policy, research policy, industrial policy, regional policy, human resources policy, competition policy,...etc) which are integral parts of the regional innovation system.

In this sense, the regional government, as evidenced by the RIS experience explained in the next section, can and should play an important role as a catalyst, a facilitator and a broker in the articulation of the regional innovation system. This is particularly important for less favoured regions where the regional innovation system is more fragmented and its subsystems and integral parts are more underdeveloped or, at times, simply completely absent. It is above all a necessary "agent for change" which stimulates and develops networking among the different actors of the regional innovation system in the region. In this "enabling" capacity it can dynamise the regional endogenous potential in terms of entrepreneurship and technical expertise and know-how within the existing business culture and distinctive economic characteristics of the region. Notably by building its own distinctive path to an efficient regional innovation system, since there is not and can not be a unique model of a regional innovation system exportable to all regions. Regional diversity is precisely an asset for regional innovation to build upon.

For the regional government to be able to play the progressive role outlined above regarding the articulation of the regional innovation system, a major cultural and organisational change has to occur in regional governance structures in most regions, and particularly in less favoured regions. This change should go along the lines of more flexible, less bureaucratic structures capable of much tighter partnerships with the private sector (and a higher degree of professional competence in strategic planning capabilities in particular). This also means an increased disposition to consensus building and inclusiveness in the policy process, including the policy delivery system, away from stop and go policy decisions dictated by short-term political instability and parochial interests. It is only then that the necessary "social capital" and "institutional thickness" will be reached in order for the public sector, regional government in particular, to lead the process of articulation and dynamisation of the regional innovation system. That is, the process of learning conducive to the actual realisation of a "learning region" in practice.

Finally, it is important to note that regional 'collective learning' takes place in a context of co-operation and competition happening at the same time among the same actors). In this sense, some authors (SRI, 1997, p. 7) argue that "Competition in the future may be less between individual firms and more between the value networks (these will include suppliers to the business and other trading partners, even traditional competitors) in which they participate. There will still be competition, but increasingly the participants in the network will also coordinate, cooperate, and co-create new opportunities". Trust being at the heart of this horizontal integration process (Sweeney, 1999, p.19).

This is important from the policy making point of view since it adds a novel role to public action; that of a broker/mediator and facilitator among economic agents in order to create the right conditions for collective learning to happen. In the right context, entrepreneurs could then, through 'enlightened selfinterest', maximise their contribution to this collective learning task, thus providing further impetus to the broader regional development goals. This has been so far the experience of a number of RIS, as explained in the following section.

3. RIS: towards collective learning in less favoured regions

The main objective of innovative actions under the European Regional Development Fund (ERDF) is to influence and improve European regional policy in order to make it more efficient in terms of its content and policy action. These innovative actions rely on 'the principle of helping regions to help themselves through initiatives designed to mobilise local knowledge in a process of collective social learning' (Henderson & Morgan, 1999).

RISs (Regional Innovation Strategies) are part of these ERDF innovative actions. RISs cost on average half a million € co-financed at 50% between the EU Commission and the region, and last for two years. They are not studies or diagnosis of the R&TDI infrastructure of a region in the light of the identified needs of firms. Although they do 'use' these studies and diagnosis (see diagram below), they are fundamentally about establishing a socio-economic dynamic (social and institutional engineering) based on a bottom-up open discussion and consensus among the key innovation actors in a region about policy options and new ideas/projects in the field of innovation. In this sense, RIS are also about inter-institutional co-ordination and establishing linkages and collaboration networks among the different elements and players of the regional innovation system. A short definition of RISs might be 'an instrument to translate 'knowledge' into regional GDP'. RIS are a tool to strengthen Regional Innovation Systems (territorial systems that efficiently create, diffuse and exploit knowledge than enhances regional competitiveness) in less favoured regions.

Within the RIS operation, the Commission also provides regions undertaking a RIS with a network secretariat which facilitates inter-regional co-operation in the form of joint seminars, publications, etc. which promotes cross-fertilisation and the exchange of good practice among participating regions. Furthermore, the Commission also develops a number of 'accompanying' measures to enhance the 'learning' capacity of participating regions. One of these actions is RINNO. Rinno is intended as a tool for policy-makers to co-operate and learn from each other and avoid re-inventing the wheel.

Rinno (which will take the form of a Web Site, CD-Rom and Printed Publication of a Data-Base) has as a key objective the creation and maintenance of an "intelligent" directory of regional public support measures for the promotion of innovation and the identification and diffusion of good practice among regional policy makers. The areas covered by the data base are 1) Stimulation and detection of innovation needs in SMEs, 2) Support for the development and implementation of innovation projects in SMEs, 3) Stimulation and co-ordination of innovation and technology transfer-related business services, 4) Linkage mechanisms between the "knowledge base" and regional SMEs

3.1. RIS Methodology: a regional and demand-led, bottom-up approach

RISs have six key methodological principles:

- RIS should be based on public-private partnership and consensus (the private sector and the key regional R&TDI players should be closely associated in the development of the strategy and its implementation). Regional administrations should be fully involved, in partnership with the relevant key regional innovation actors, in the design, implementation, monitoring and follow-up of the exercise.
- RIS should be integrated and multidisciplinary: an effort should be made to link efforts and actions from the public sector (EU, national, regional, local) and the private sector towards a common goal. Innovation within RIS includes not only technology considerations but also issues regarding human capital, research and education, training, management, finance, marketing...as well as policy co-ordination among regional policy, technology policy, industrial policy, R&D and education policy and competition policy.
- RIS should be demand-led (focusing on firm's innovation needs, SMEs in particular) and bottom-up (with a broad involvement of R&TDI regional actors) in their elaboration.
- RIS should be action-oriented and it should include an action plan for implementation with clearly identified projects (at the end of the process new innovation projects in firms and/or new innovation policy schemes and inter-firm networks should appear);
- Regions participating in RIS should exploit the European dimension through inter-regional cooperation and benchmarking of policies and methods.
- RIS should be incremental and cyclical: the exercise is dynamic in the form of a strategy and plan for action that has to be reviewed in the light of previous experience and on-going evaluation.

These principles reflect an approach opposite to one that is top-down, 'dirigiste', based on existing institution/power structures and driven by a fiscal transfer/financial distribution rationale, which is characteristic of some of the traditional regional policy stands in a number of less favoured regions. This is in line with the argument that "innovation policy is rather (and increasingly) a matter of networking between heterogeneous (organised) actors instead of top-down decision making and implementation" and it follows that "successful" policymaking normally means compromising through alignment and 're-framing' of stakeholders' perspectives" (Kuhlmann et al., 1999, p. 12).

Moreover, the Commission does not try to promote one standard methodology to be applied religiously in all the regions partaking in RIS projects. In view of the sheer diversity of regional productive environments and their different institutional frameworks, and on the basis of the principle of subsidiarity, the Commission proposes broad guidelines and a flexible methodological approach to regions participating in RIS, which includes:

1. Raising awareness about innovation and building a regional consensus among key regional actors;
2. Analysis of the regional innovation system, including technology and market trends assessment, technology foresight and benchmarking with other regions ;
3. Analysis of the strengths and weaknesses of regional firms: assessment of regional demand for innovation services, including technology audits (in SMEs in particular) and surveys regarding firms needs and capacities, including management, finance, technology, training, marketing, etc.;
4. Assessment of the regional innovation support infrastructures and policy schemes;
5. Definition of a strategic framework – including a detailed action plan and the establishment of a monitoring and evaluation system. The action plan may involve pilot actions and feasibility studies as well as concrete projects that might be financed under existing structural funds operational programmes.

It is expected that a broad spectrum of local political, economic and academic actors will be involved in this process by actively participating in the Steering Committee responsible for RIS as well as through working groups, seminars, interviews, audits and surveys. In this sense, the suggested institutional setting for carrying forward the RIS is considered to be as important, if not more so than the proposed methodological stages outlined above. That is a Steering Group with broad and active participation of key regional actors and a management unit with the necessary skills (i.e.: economic planning capabilities, business understanding and R&TD competence) together with Working Groups (regional stakeholders which critically review RIS findings and act as a source of innovation projects and new policy approaches) and eventually a process consultant plus regional or international consultants. This institutional setting is essential in order to create the 'institutional' dynamism and social engineering that are at the heart of a successful RIS, as we will see in the next section.

Both the principles and the methodology suggested to the regions, which is supposed to be sufficiently compulsory and flexible at the same time so as to provide a clear reference framework while respecting regional diversity of needs and stages of development, are based on a 'systemic'¹² vision of the innovation process at regional level.

3.2. RIS Objectives: helping regions to help themselves

RISs have four key objectives:

1. Place the promotion of innovation as a key priority for the policy agenda of regional governments and develop an innovation culture within regions, particularly, less favoured regions.
2. Increase the number of innovation projects in firms, particularly SMEs.
3. Promote public/private and inter-firm co-operation and networks, which facilitate the connection of R&TDI supply with business needs, and the flow of knowledge needed for innovation.
4. Increase the amount and, more importantly the quality of public spending on innovation through innovation projects, structural funds assistance in particular, and thus promote a more efficient use of scarce public and private resources for the promotion of innovation.

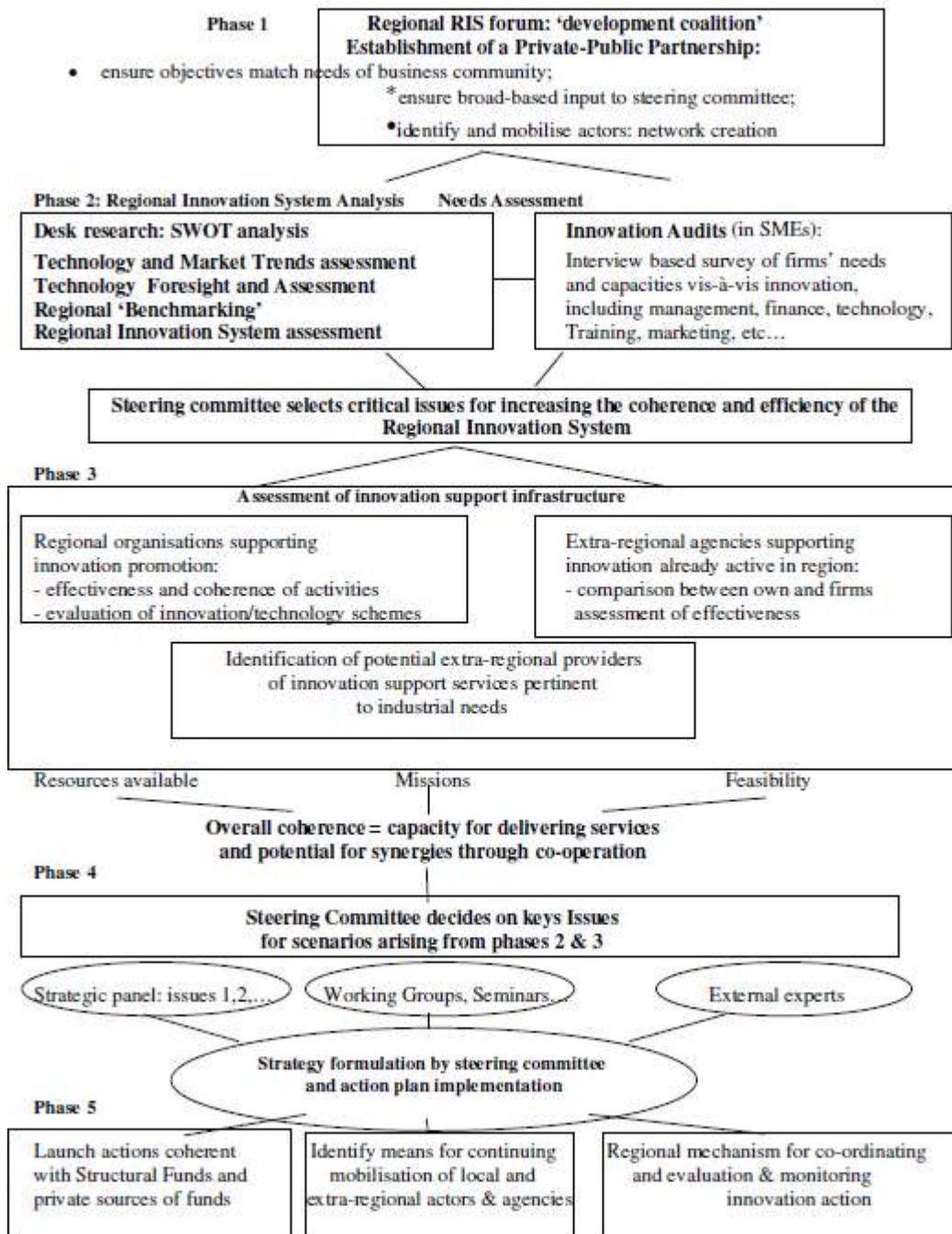
In short, the main objective is to set foundations of an efficient regional innovation system (a 'learning' regional economy) by improving existing regional innovation capacities as well as by exploiting the possibilities for new areas of development. RIS focuses on SMEs but is not limited to high-tech sectors and touches upon traditional sectors as well as the service sector (e.g.: tourism) which tend to be important in less favoured regions.

Table 3 Member States and their regions involved in the RIS action

Member State	Region and Objective region eligibility
Austria	Niederösterreich (2&5b)
Belgium	Limburg (2), Wallonie (1&2)
Spain	Aragon (2&5b), Castilla La Mancha (1), Extremadura (1), Galicia (1), Pais Vasco (2&5b), Cantabria (1), Castilla y Leon (1)
Finland & Sweden	Luleå & Oulu (2, 5b, 6)
Greece	Dytiki Makedonia (1), Sterea Ellada (1), Thessaly (1), Epirus (1), Central Makedonia (1)
Germany	Weser-Ems (2&5b), Leipzig-Halle-Dessau (1), Altmark-Harz-Magdeburg (1)
France	Auvergne (2&5b), Lorraine (2)
Ireland	Mid-West, Shannon (1)
Italy	Abruzzo (non-objective), Calabria (1), Puglia (1)
United Kingdom	Strathclyde (2), West Midlands (2&5b), Yorkshire & Humber (2&5b), Wales (2)
Netherlands	Limburg (2)
Portugal	Norte (1), Algarve-Huelva (1)

In short, RIS is a “social engineering” action at the regional level whose main aim is to stimulate and manage co-operation links among firms and between firms and the regional R&TDI actors, which may contribute to their competitive position through innovation, notably by facilitating access to “knowledge” sources and partners. In this sense, RIS ‘social engineering’ means creating the right environmental conditions, institutional in particular, for increasing the innovative capacity of the regional economy.

Figure 3 Schematic presentation of RIS workprogramme and methodology



4. The Impact of RIS Projects

In the last five years, more than 600 leading figures in the public and private sectors participated directly in the steering committees of the 32 RIS. The chairmen of most of these steering committees are leading businesspeople (e.g.: Director – Philips International in Limburg (B), Managing Director of Tellabs in Shannon (Ir), Chairman of Surgical Innovations in Yorkshire and the Humber, Managing Director of Wolff Steel Ltd. in Wales, Managing Director NTL CableTel in Strathclyde, etc.) or political figures (e.g.: the presidents of the region in Calabria, and Puglia, Weser-Ems, the regional ministers of industry in Niederosterreich, Castilla La Mancha, Castilla y León, Galicia, Magdeburg, etc., the Secretary General of the Region in Sterea, Thessaly, Central Macedonia, etc.).

More than 5,000 SMEs have been reviewed through technology audits and/or interviews (e.g. 350 firms audited in Wales, a regional innovation survey of 6,000 firms with a 10% response rate in West Midlands, 1,500 innovation questionnaires sent to regional firms in Thessaly, a survey of 760 companies in Castilla La Mancha with a 18% response rate and 50 technology audits, a questionnaire survey of 4000 firms with a 15% response rate in Niederösterreich followed by 30 in-depth firm interviews and 250 companies participating in 5 workshops, etc.).

Several hundred RDTI organisations consulted in the process of drawing up the strategies and in the implementation of action plans based on the RIS (e.g. over 150 businesspeople working in eleven innovation boards in Yorkshire and Humberside, over 200 businesspeople participating in 12 sectoral boards in Castilla y León, 39 experienced innovators from the private sector and 40 academics involved in 17 discussion groups in Shannon, 80 innovation support organisations have worked in RIS Strathclyde, over 150 key regional actors participated in thematic working groups in Calabria, etc.). What then has been the outcomes of RIS so far?

1) Identification of new innovation projects in firms:

“ In Limburg (Netherlands) 400 companies are taking part in almost 60 projects to date involving the preservation and/or creation of 1,500 to 2,000 jobs. Participation will be intensified from 1999 (aiming at 500 companies per year). Moreover 22 million Ecu from the Structural Funds have been earmarked for RTP projects from the ERDF Objective 2 resources for 1997-1999 and project volume is expected to come to approximately 30 Mecus per annum from 1998 until 2001”.

Most common RIS generated action:
1. Creation/strengthening/animation of sectoral business networks, clusters (supply chain or cross-sectoral) and business forums around innovation issues.
2. Establishment of new interfaces between business and the knowledge base, including technology centres, universities, public labs, specialised consultants, etc...
3. Integration and co-ordination of R&TDI services and agencies, including diffusion of their activities vis-a-vis the SME base through 'guides', inventories, 'one-stop shops', etc... and support to access national/international R&TDI schemes
4. Development of new financial instruments for the financing of innovation (seed corn fund for high tech. start-ups, risk capital, business angels, guarantee funds, etc...) including brokerage services between innovators and the banking sector.
5. Ensuring improvement of market intelligence for forecasting SME technology needs and future leading edge skills needs
6. Identification of innovation projects in firms, SMEs in particular, through the combined efforts of university trainees and R&D labs from Universities and/or other firms
7. Promotion and extension of technology audits in SMEs and innovation management training for businessmen
8. Facilitation of University/big firms spin outs and technology based start-ups

“The Welsh RIS Action Plan, launched by the Secretary of State for Wales in June 1996, includes 66 projects to be led by over 30 different organisations working together in partnership. Of these, over 60 are in progress...”.

2) Place the promotion of innovation as a priority for the regional policy agenda and increase the amount and, more importantly the quality of innovation public spending through innovation projects, structural funds assistance in particular.

“In Castilla La Mancha, following the RIS they have increased fivefold the regional budget for innovation promotion from 2.000 million pts for the period 1994-99 up to 15.000 million for the period 2000-2006”.

“RIS has clearly become the most important trans-regional co-operation project in central Germany and this impacts extremely positively on its practical implementation, firmly establishing the RIS as one of the main priorities in the regional development programmes...” (RTP Leipzig-Halle-Dessau).

“The Welsh RIS has been incorporated into the rationale and project scoring criteria of the Innovation priority of the Industrial South Wales Objective 2 Structural fund programme for 1997-1999, which offers the potential to draw down 18% of the total programme value of 630 million € to support RTP priorities in South Wales.”

3) Creation of new regional partnerships for economic development and promotion of inter-firm and public-private co-operation:

“In Central Macedonia RIS lasted for two years (April 1995-March 1997) and about 200 scientists, public officials and businessmen participated directly in the working groups for the preparation of 39 reports necessary for the Action Plan. Furthermore, 2000 businesses and 277 laboratories for applied ...participated indirectly during the process of audits, technology demand and supply analyses, and consultation for the selection of projects”.

“In the RIS Yorkshire and Humberside 11 Sector Innovation Boards have been established. Each Sector Innovation Board comprises representatives from both large and small sector businesses plus representatives from the main Business Support agencies in the region, TEC & Business Links, Universities and Further Education Colleges, Local Authorities and Trade Associations”.

“With 41 funding partners involved in the project to date, over 100 organisations from the support network and more than 150 private companies have participated in the project” (RIS Strathclyde).

“In Castilla y León nearly 800 companies were involved in the RIS process through a dozen sectoral strategic discussion meetings. A total of 447 million ECU has been pledged for the first four years of implementation (1997-2000), with the objective of increasing the regional “technological effort” (R&D expenditure over GDP at factor costs) to reach 1% in the year 2000, from a current 0,8%”.

In 1997 an external evaluation was carried out by Technopolis (Netherlands/UK) and the University of Athens (Greece). The overall conclusion reached by the evaluation team was that “the Regional Technology Plans have had an important impact on the policy formation process, i.e. they created a policy planning culture where innovation and RTD are well embedded in the overall regional development strategies”. More specifically the evaluation team pointed to a number of positive results and formulated recommendations for future policy actions in the field of innovation: the strategic nature of the policy approach, which entailed the involvement and co-operation of a broad spectrum of actors in the regional political economy in a detailed planning process, facilitated the development of an endogenous learning environment. It also resulted in a growing awareness of the innovative needs of the regions’ firms and therefore instigated a reappraisal of the Structural Fund priorities and spending. Another interesting point to make concerns the flexibility of the RTP and RIS approach. The RTP evaluation demonstrated that despite being applied in many different ways in many different contexts RTPs still had a considerable effect on the regional innovation systems; the model is applicable in dissimilar environments.

5. RIS West Midlands Case Study

In this section of the paper we explore how the theoretical concepts of social capital,¹³ the learning region¹⁴ and external economies of scale¹⁵ have been both utilised and enriched by the development and implementation of a regional innovation strategy in the West Midlands, England. The methodology and process of the West Midlands Regional Innovation Strategy project followed the broad structure outlined in Figure 3. However, there are important features of the West Midlands experience that offer valuable insights into the ways in which this overall framework can be adapted in different regions to maximise the use and development of social capital, learning and external economies of scale.

The West Midlands Regional Innovation Strategy project commenced in September 1996. Phase 1 was completed by December 1996 and phases 2 to 5 of the project (see Figure 3) were completed by early 1999, but the process side of the project continues through the perpetuation of the Steering and Operational Groups. The strategy has been adopted and endorsed by the newly established Regional Development Agency (RDA) and is being implemented by the RDA in partnership with all the key players in the region.

Three fundamental and inter-related concepts underpinned the approach adopted in the West Midlands region: social capital, learning and external economies of scale, particularly collective external economies (Oughton and Whittam, 1997). The combination of these three elements is crucial in any regional innovation system, particularly from the perspective of small and medium sized enterprises. Yet paradoxically, SMEs are usually less likely to exploit these factors. This implies there is a need not only to raise awareness but also to find ways of making these concepts operational for SMEs. In the discussion that follows we illustrate how these concepts relate to the standard RIS approach and outline the contribution of the West Midlands RIS to: (i) providing new insight into what these terms actually mean and (ii) illustrating how these concepts can be operationalised within a regional economy.

5.1 Social Capital

Phase 1 of the West Midlands RIS saw the formation of two fora that brought together key players within the region: the Operational and Steering groups. The creation of these two distinct, yet related groups (see Figure 4) is an important feature of the West Midlands RIS and one that serves to build social capital.¹⁶ Both groups are of similar size with members from the *same* organisations represented at both senior (Operational Group) and executive (Steering Group) levels. The Operational Group consists of over 20 senior representatives from a range of public and private organisations including the business sector, the science base, local government, regional government and policy intermediaries, such as innovation centres, training and economic development agencies. The Operational Group met on a monthly basis and were involved in a hands-on way in the development of the strategy. Representatives on the Steering Group were drawn from roughly the same set of organisations but at executive level. The research team that conducted the research that informed phases 2-5 was also represented on these two groups and worked in an interactive way with the membership.

Figure 4 The Operational and Steering Groups – West Midlands RIS



The advantages of this dual structure are threefold. Firstly, each organisation had committed its senior personnel to participate in the Operational Group, to help with the development of the strategy and to provide constant feedback on the research. As a result of this involvement, each organisation had ownership over the strategy. Secondly, the existence of a dual structure whereby the Steering Group is a (higher level) mirror image of the Operational Group meant that members of the Steering Group (which met 3-4 times a year) were kept informed of the progress of the project through their own staff as well as through the project manager. At the same time members of the Operational Group knew that they and their fellow members had backing at executive level to design and implement the strategy. This feature of the dual structure, therefore, increased the level of credibility and commitment within the Operational and Steering Groups. Finally, the existence of participation at both executive and senior level facilitated trust and cooperation – the temptation of any individual member to follow a non-cooperative strategy in, say the Operational Group was reduced by the knowledge that cooperation was likely to occur at a higher level. Moreover, the strategy was agreed at both Operational and Steering Group levels thus minimising the chances of it falling down either due to lack of executive commitment or because of difficulties in implementation. In short, the dual structure enhanced the formation of social capital in the region by encouraging participation, trust and civic cooperation.

In terms of Colman's (1988) three forms of social capital: (i) the level of trust; (ii) information channels; and (iii) norms and sanctions that encourage or constrain actors to work for the common good, it can be seen that the dual structure adopted in the West Midlands embodied and promoted each of these three forms. The level of trust was enhanced by cooperation at both senior practitioner and

executive levels. Information channels were opened up both horizontally between organisations and vertically within organisations. And finally, norms were established at two levels with the possibility of sanctions for non-cooperative behaviour at any one level.

The institutional structure of the West Midlands RIS also consisted of 5 sub-regional groups to develop sub-regional strategies reflecting the particular sectoral mix and priorities of the sub-regions. Each sub-regional group had at least one (often more) representative on the Operational and Steering Groups and involved local economic actors and agencies. This approach helped foster institutional thickening and embeddedness based on a bottom-up approach.

Finally, it is important to consider the functional membership of the Operational and Steering Groups which was based on bringing together representatives from industry, SMEs, the science base, technology transfer centres and research centres, training organisations, the finance sector and policy intermediaries. This multi-functional membership enabled networking and trust to be developed across a range of organisations to build multi-disciplinary networks and was an important prerequisite to both the design and implementation of policy actions (discussed below) that require cooperation across organisations.

The organisational or process side of the West Midlands RIS described above was crucial to all of the subsequent phases. Phases 2 and 3 of the West Midlands RIS were conducted by the research team in conjunction with members of the Operational and Steering Groups. The establishment of an effective institutional process laid the foundation for the successful completion of subsequent phases of the West Midlands RIS.

5.2 The Learning Region

Learning is widely regarded as a necessary prerequisite for innovation. Few people would disagree with the suggestion that individuals learn¹⁷ but the idea that organisations or regions 'learn' is less well understood or accepted. What is it that regions and organisations learn and how? In many ways phases 2 -5 of the RIS methodology are about learning. Any region has an innovation system, learning about that system is a necessary prerequisite to improving it, and given that competitiveness depends, at least in part on innovation, improving the innovation system is a necessary prerequisite to improving competitiveness and attaining real convergence. Phases 2 and 3 of the RIS provide concrete examples of how a region (or rather the regional actors represented on the Operational and Steering Groups) may learn, apply and implement knowledge in a strategic way to promote innovation. Phases 4 and 5 of the RIS programme are very much about stimulating learning, between firms, between firms and other actors, such as scientists, financiers and policy intermediaries so that learning becomes an integral and ongoing feature of the system.

Phases 2 and 3 of the West Midlands RIS

Phases 2 and 3 of the West Midlands RIS consisted of:

1. an extensive review of regional economic performance (including firm and sector performance) and the regional innovation system which was later summarised into a SWOT table;
2. a large scale survey of firms' needs (with over 450 usable responses) and the piloting of an innovation audit;
3. an assessment of the regional innovation support infrastructure based on comparative analysis of key regional data (on productivity, investment in R&D, education and training and fixed capital) and a series of semi-structured interviews with supply side agencies and policy intermediaries.

As is customary in a RIS project the analysis of firms' needs (in terms of innovation inputs) is matched against the supply side picture of innovation support infrastructure to identify areas where there are gaps in the regional innovation system and areas where there may be duplication of service provision. However, it is important to note that both the analysis of firms' needs and the assessment of the region's innovation infrastructure were conducted in relation to an external standard, or best practice. In the case of firms' needs the objective is to discover their *latent* needs for innovation inputs, and one way of doing this is to look at the extent to which firms in the region were underinvesting in knowledge, training and fixed capital equipment relative to the to leading firms in the region, leading firms in the UK and leading international firms. In the case of the supply side, the West Midlands innovation system was compared with best practice regions, such as Emilia Romagna and Baden Württemberg. The comparison of firms' actual demand for innovation inputs with their latent (or best

practice demand) was used to identify targets for improvements in innovation performance. The comparison of firms' needs with the supply of innovation inputs, and the further comparison of the West Midlands regional innovation infrastructure with that of best practice regions was used to develop the framework for the regional innovation strategy. Hence, phases 2 and 3 were very much based on inter-firm, interorganisational and inter-regional learning. In the West Midlands region the main findings under phases 2 and 3 were as follows:

1. Productivity in the West Midlands region was only 90 per cent of the UK average and only approximately two thirds that of leading European regions, such as Emilia Romagna and Baden Württemberg.

2. The aggregate productivity gap of West Midlands manufacturing firms vis -à-vis their UK counterparts reflected both a long tail of underperforming firms and lower productivity amongst the region's leading firms. This finding was significant because it meant that closing the productivity gap would mean that typically both lagging and leading West Midlands firms were underperforming and would benefit from adopting international, or even UK best practice i.e. there is a need for inter-regional learning as well as intra-regional between firms.

3. West Midlands firms underinvest in broad capital – fixed capital, R&D and training – vis -à-vis their UK and international counterparts. Compared to the UK average the West Midlands R&D figures are skewed by the fact that region has a very small pharmaceutical sector and this is a sector that has very high R&D spending. Analysis of sectoral data revealed that West Midlands investment in R&D in the transport and engineering sectors was high by UK standards but still low compared to leading engineering regions, such as Baden Württemberg.

4. Public investment in R&D is more or less in line with the UK average but low by international standards. The Defence Evaluation Research Agency at Gt. Malvern in the West Midlands accounts for a significant part of this investment but DERA is not closely embedded in the region and its resource is under-utilised in the West Midlands.

5. There is a lack of appropriate technology transfer institutions to link industry and the science base. The West Midlands (and UK) innovation system has an 'institutional gap' between basic/applied research in the science base and commercial research.

6. Firms stated that they found the innovation support system complex and confusing, there are too many agencies and too many schemes with areas of overlap and gaps. Moreover, in order to innovate firms need packages (e.g. technology, marketing advice, finance, training) of support but there is a lack of coordination between agencies providing different services. There is a need for greater networking between supply side organisations as service provision is predominately on a bi-lateral basis i.e. there is a need for inter-organisation learning and coordination. Moreover, there is a conflict incentive mechanism operating as a result of the dual objectives of *Business Link* to sign-post firms to other service agencies and to generate fee income.

7. The West Midlands (and UK) system of business and innovation support is generic rather than sector specific and there is a need to create more sector specific support infrastructure mechanisms that provide packages of support rather than individual services. 8. There is a lack of innovation culture amongst firms: our survey revealed that almost 40 per cent of firms had not introduced a new product between 1994-96, and 30 per cent of firms had not introduced a new, or improved product. Thirty-three per cent of firms had no plans to innovate over the coming year and nearly 80 per cent of respondents spent less than 5 per cent of turnover on R&D.

9. The finance system suffers from short-termism – most firms finance innovation activity by bank overdraft. There is little use of long term funds and the venture capital market is underdeveloped. The survey of firms' needs also revealed that the finance problem is multi-dimensional and includes problems in validating technology, market forecasting, inadequate collateral and weaknesses in management's capability to present good business plans.

10. There are some examples of networking that realises external economies of scale e.g. the Rubber

and Plastics Research Association and networking in the automotive sector but unlike highly successful regions, such as Baden Württemberg and Emilia Romagna the system of networks is patchy across sectors and multi-dimensional service provision is not fully integrated into networks.

The analysis carried out in phases 2 and 3 of the West Midlands RIS provided the basis for the development of the strategy in phases 4 and 5. The strategy was based on increasing opportunities for

learning and realising collective external economies of scale through the catalysation of sector based inter-firm and inter-organisational networks.

5.3 Networking, Collective External Economies and Learning

Successful innovation requires the correct combination (or package) of a innovation inputs – knowledge, technical expertise, design, finance, managerial expertise, marketing expertise, trained labour and capital equipment. Unlike large multi-divisional firms, small firms often lack the scale and resources to conduct research, development, design and training in-house. As a result they are unable to reap the internal economies that large firms enjoy, instead SMEs are forced to use the market. This is problematic when the market for specialised business services is fragmented and incomplete i.e. when there are missing markets. Cooperation within networks offers SMEs the possibility to reap collective external economies and enables them to compete on equal terms with larger firms. Examples, of such networks are commonplace e.g. CITER and Centro Ceramico in Emilia Romagna. Collective external economies of scale have four distinguishing features. Firstly, they are realised within a network of participating firms; hence they are external to the firm but internal to the network. Secondly, they require the active, rather than passive involvement of participating firms (i.e. firms need to make joint investments either in financial terms or in terms of human resources) in this regard collective external economies are different from agglomeration economies realised in clusters where the source of the economy is purely locational, that is, firms benefit simply from locating next to each other. Thirdly, they depend crucially on the maintenance of effective cooperation between firms. And finally, while they depend on cooperation they are pro-competitive in that, provided entry to the network is not restricted they reduce barriers to entry (Oughton and Whittam, 1997 p 9).

Results from the West Midlands Survey of firms showed that firms that engaged in joint innovation activity were up to 6 times more likely to innovate than firms that acted in isolation. Moreover, the stronger the degree of cooperation in terms of resources (for example, joint investment as opposed to cooperation in kind/time) the greater the impact on innovation.

Phases 2 and 3 of the RIS identified numerous inter-firm and inter-organisational networks in the West Midlands and showed that they had an appreciable effect on innovation performance both because they provide scope for inter-firm and inter-organisational learning and because they offer firms the possibility to reap collective external economies scale. Social capital or trust is crucial to the success of networks but it should also be noted that cooperation can evolve even among selfish firms provided there is a sufficiently long time horizon and a small proportion of firms who are willing to initiate a cooperative network. It can be seen that the approach in the West Midlands RIS was to jointly promote social capital building, learning and collective external economies of scale. The following subsection outlines how these were to be promoted through policy actions.

5.4 The Strategy and Action Plan

The findings from phases 2 and 3 of the West Midlands RIS fed into a strategic framework that formed the basis of a consultation document launched in July 1998 at a regional conference. The document was widely circulated to over 2000 parties. Twelve working parties (led mainly by members of the Operational Group) were set-up to develop different policy actions, from productivity to training.¹⁹ The action plan was developed by the Operational and Steering Groups in the light of the research findings from phases 2 and 3, the feedback from consultation and the reports of the twelve working parties.

The first step in strategy design was to engage firms and regional actors by adopting a definition of innovation that had operational meaning and to set targets that were ambitious, realistic and measurable. Hence, innovation was defined under the heading of 'profitable change' and results from the survey of firms were used to show that the average rates of growth of profits and sales for innovating firms were double those of non-innovators.²⁰ Four targets were set out:

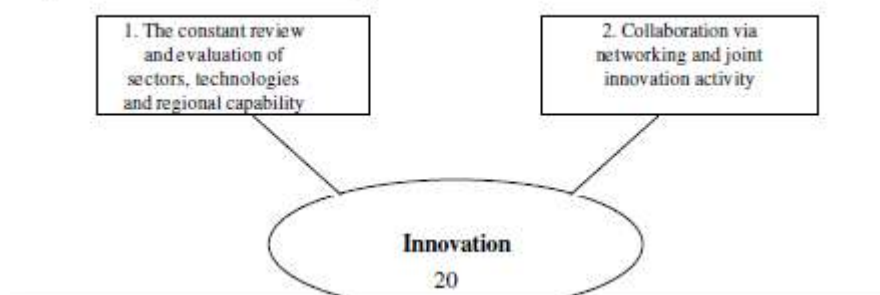
- To increase the proportion of innovating firms from 60 per cent to 90 per cent by 2004
- To increase investment in R&D, fixed capital equipment and training to, at least, the UK average by 2004
- To increase the proportion of firms who engage in joint innovation activity from 50 to 90 per cent and the proportion who make joint investments from 22 to 50 per cent by 2004
- To spread best practice and close the productivity gap so that productivity in the West Midlands is in line with the UK average by 2004

The strategy is based on four inter-related cornerstones illustrated in Figure 5. Policy actions sit within this framework and are being implemented by the RDA in conjunction with all partners. While there is not the space here to outline all of the policy actions (see West Midlands RIS Report 25) several key actions deserve consideration.

The first priority action was to ensure mechanisms are established to implement the strategy and action plan and champion RIS for the future, that is there is a clear commitment to continue to build social capital. This is being done through the RDA endorsing the strategy and the perpetuation of the Operational and Steering Groups. Second, a team of network brokers is being established to build on existing sector-based inter-firm and inter-organisational networks and catalyse new ones. These networks are designed to encourage inter-firm, inter-organisational and inter-regional learning and promote joint innovation activity and the realisation of collective external economies of scale. Third, three technology centres will be developed to serve 3-4 sectorally based networks to act as a focal point of technological expertise and a bridge between the science base and industry. Fourth, a sector-network based system of designing and vetting business plans and loan applications will be established that closes the information gap regarding validation of technology and market assessment and increases the chances of attaining finance. In addition a seed corn fund is being set up for high-tech firm start-ups and a regional brokering scheme is being developed to match venture capitalists (business angels) with innovators and entrepreneurs.

The above list is not exhaustive but it is indicative of a set of policy actions designed to stimulate: social capital; learning (inter-firm, inter-organisational and inter-regional); and collective external economies in order to promote innovation. The West Midlands case study shows not only how these terms may be operationalised but also adds greater theoretical precision and meaning to these concepts and the mechanisms by which they impact on regional economic performance.

Figure 5 The Cornerstones of the Strategy: West Midlands RIS



6. Conclusions

A new kind of regional policy is emerging in the European Union in which the accent is on collective learning and institutional innovation rather than upon basic infrastructure provision. Thus emphasis is being put on 'social capital' (i.e. a relational infrastructure for collective action based on trust, reciprocity and the disposition to collaborate to achieve mutually beneficial ends) rather than into 'physical capital' building.

In our opinion, in these small regional experiments we can begin to discern a new and more innovative form of economic governance, the hallmarks of which are interactive, strongly based on public-private partnership and network based, rather than hierarchical of solely market-driven, the respective governance modes of dirigisme and neo-liberalism. In this sense these actions are concerned not with the scale of state intervention but its mode, not the boundary between state and market but the framework of effective interaction (Henderson & Morgan, 1999). In RIS governance is based on public-private partnership and consensus, with the public sector playing a role mainly as an animator, a catalyst and a dynamic force for networking among all the relevant regional agents. Thus making scarce regional efforts and energies converge towards innovation promotion with a regional development objective.

Although regional experiments like RIS have triggered some encouraging institutional innovations, the key question is how to evaluate success in this context. It is clear that this new regional policies, which aim to raise regional innovation capacity, and the establishment of an efficient regional innovation system, can not be judged by the standards of the old regional policies (short-term job creation). In order to overcome this problem, we need a new set of indicators that allow us to assess longer-term changes in regional innovation capacity, away from "linear" indicators such as standard R&D input and output indicators. That is, we need interactive indicators which aim to measure "soft" processes like institutional linkages and network formation in order to capture the important changes in a region's institutional architecture which are beyond the grasp of more conventional linear indicators (Nauwelaers and Raid, 1995).

Notwithstanding this lack of appropriate indicators, the external evaluation of the first 7 RIS experiences, as well as the on-going evaluation carried out for the new generation of 20 RIS, clearly point out that RIS have been a novel approach in each of the regions involved. An approach that has significantly contributed to establishing a strategic planning culture based on consensus and partnership by which innovation promotion has been put high in the regional development agenda. Moreover, most regions which have undertaken a RIS have managed to increase considerably the quantity of public funds targeted on innovation, which is expected to trigger a parallel increase from private funds.

In conclusion, we believe that RISs may help prepare the ground so that those responsible for innovation promotion at regional level can better respond to the need of increasing the regional innovation potential and addressing the problem of 'absorption' related to the 'regional innovation paradox' mentioned before. This can be done specifically through work on basic strategic planning involving key regional actors which will result in new innovation projects consistent with regional policy objectives. Social capital, learning (inter-firm, inter-organisational and inter-regional) and networking to promote collective external economies of scale are crucial to this process. Thus, RIS seems to be a fertile ground for further experimentation and learning in the quest for efficient regional innovation systems that can consolidate sustained and sustainable economic development processes in those regions where these are most needed.

Notes

¹ The opinions expressed in this paper are the authors' alone and not necessarily those of the European Commission.

² Over two thirds of this amount is earmarked for regions whose income per capita is less than 75% of the European average. Nearly 20% of people in the EU still live in regions with output per head 25% or more below the EU average. By comparison, just 2% of the people in the U.S. are in a similar position, and average disparities between States are less than half those between equivalent regions in the EU (CEC, 1998).

³ CEC, 1999; CEC, 1998 p.12.

⁴ Cooke, P. 1998, pp. 15-27. This paper summarises the findings of research conducted in the "Regional Innovation Systems: Designing for the future" (REGIS). This research was funded by the European Commission DG 12 under the Fourth Framework – Targeted Socio-Economic Research Programme.

⁵ The Treaty of the European Union has "economic and social cohesion" as one of its main pillars, as established in the following articles: Article 130a: In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. In particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions, including rural areas. Article 130c: The European Regional Development Fund is intended to help to redress the main regional imbalances in the Community through participation in the development and structural adjustment of regions whose development is lagging behind and in the conversion of declining industrial regions.

⁶ We will use Von Hippel's definition of know-how as "the accumulated practical skill or expertise that allows one to do something smoothly and efficiently (e.g. the know-how of engineers who develop a firm's products and develop and operate its processes). Firms often consider a large part of this knowhow proprietary and protect it as a trade secret".

⁷ This perspective is in line with the 'institutional' perspective which insists that these intangible resources merit as much attention as tangible resources (Cooke and Morgan, 1998). The so called 'institutional perspective' "eschews the bloodless categories of 'state' and 'market' in favour of a more historically-attuned theoretical approach in which the key issues are the quality of the institutional networks which mediate information exchange and knowledge-creation, the capacity for collective action, the potential for interactive learning and the efficacy of voice mechanisms" (Sabel, 1994; Amin and Thrift, 1995; Storper, 1997; Morgan, 1997; Cooke and Morgan, 1998; Maskell et al, 1998; Amin, 1999).

⁸ A more detailed explanation of this section can be found in Landabaso, M, 1998.

⁹ An excellent insight on this 'learning' ability can be found in Lundvall, B.A. & Borras, S., 1997. Chapter

7 in particular, regarding the creation of networks and stimulating interactive learning is most enlightening.

¹⁰ Similarly, someone that starts reading for the first time, once he/she enjoys a book, looks for more while increasing his -her capacity to understand it better, read faster and combine the new knowledge with previously recorded knowledge from other books, thus extending its learning capabilities in a sort of virtuous circle.

¹¹ For a further tentative explanation of the characteristics and nature of the innovation process at regional level see M. Landabaso 1997.

¹² The limitations of the 'linear model' of the innovation process have been clearly exposed in the work of Soete and Arundel (1993) by contrasting this model with their 'systemic model' of the innovation process. These limitations relate, in particular, to the lack of inter-relation between the different stages and retroactive nature of the innovation process within the 'linear model', which is fundamentally a science and technology-push model. It is only by focusing on the demand of firms and the economic nature of the innovation process that policy approaches can deal successfully with the promotion of innovation. Thus, recognizing the importance of the economic-pull factors (demand by firms) in the innovation process is critically important in the design of policy.

¹³ Coleman, 1988, Putnam, 1996, Knack and Keefer (1997), Temple and Johnson, 1998 and Schuller and Field, 1998.

¹⁴ Glover, 1996, Cook, 1997, Cook, Uranga and Etxebarria, 1997, Morgan, 1997, Hassink, 1997, Glasmeier, 1999 and Hudson, 1999.

¹⁵ Oughton and Whittam, 1996 and 1997.

¹⁶ Putnam (1996) has defined social capital as 'the features of social life – networks, norms and trust – that enable participants to act together more effectively to pursue shared objectives' Putnam, D (1996) *Who Killed Civic America*, *Prospect*, March, 66-72, p 6.

¹⁷ Although, of course, there is strong debate about how and what people learn, the relative worth of applied and abstract knowledge and the ways in which knowledge is utilised. ¹⁸ Business Links were set up by the government as local one-stop shops to provide SMEs with business services. They are briefed to sign-post firms to appropriate service providers but they also have to generate fee income themselves, hence they face a contractual incentive to keep customers rather than to signpost.

¹⁹ See page 30 of *West Midlands Regional Innovation Strategy and Action Plan: Shaping Our Future*, May 1999, Report Number 25.

²⁰ See Table 1.1, page 3 of *West Midlands Regional Innovation Strategy and Action Plan: Shaping Our Future*, May 1999, Report Number 25.