NETWORK BUILDING AND THE INSTITUTIONAL ENVIRONMENT: A CASE STUDY OF INNOVATION STRATEGIES OF THE EUROPEAN COMMISSION

Shonie McKibbin

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For further information contact:
ORPAS - **Institute of Social Studies** - P.O. Box 29776
2502LT The Hague - The Netherlands - FAX: +31 70 4260799
E-mail: **workingpapers@iss.nl**

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1. INTRODUCTION

1.1 Background

The contours of the global economic landscape have changed rapidly over the last two decades. Globalisation of production and financial markets, and rapid technological progress have led to far-reaching changes in national and regional economies and in patterns of work and employment. There have been significant economic and political changes, but still the perpetual existence of unequal patterns of growth.

Technology has become central to regional economic development. It is now seen as the most obvious cause and effect of wealth of rich nations, and the means by which poor nations can overcome poverty. It is the idea of a new type of competitive advantage, one based not on price but on quality, that gives technology its reputation as the way ahead, the way to be competitive.

But technology alone cannot promise the delivery from low to high growth, and innovation is increasingly considered to be the most important factor in promoting technology, and hence (regional) economic growth. Innovation is increasingly being understood in the broad sense to include product, process, and organisational innovation in the firm, as well as social and institutional innovation at the level of the industry, region and nation. This has led to a change in ideas underlying both technology and regional policy, resulting in a gradual convergence of the two policy fields into regional innovation policy.

This trend can be witnessed within the European Union (EU). Innovation policy is increasingly considered to be most effective in making Europe more competitive and cohesive at the regional level. According to Corvers (1999) innovation and innovation policy in the European Union (although not limited to the EU) have the following five features:

- Innovation should not be confused with Research & Technology Development
- Innovation is an evolutionary process of multiple interactions among a variety of agents
- RTD policy and innovation policy are two different although complementary things
- In order for innovation policy to be successful, it should be guided by demand
- Innovation policy includes technological dissemination

There has been substantial documentation that shows effort in innovation (i.e. research and technological development) and the capacity of regions to adapt to

changes can be associated with positive effects on economic development. In the EU statistical analysis confirms that there is a 'technology gap' twice as great as the so called 'cohesion gap' between the developed and less developed regions. (Landabaso 1997) Given the correlation of technology and innovation in regional economic development we can see that to reduce the 'cohesion gap' there needs to be a focus on innovation in regional policy. Through this kind of promotion the Less Favoured Regions (LFRs) should be able to start building the conditions for self-sustaining economic development.

1.2 Objectives of the study

Landabaso (1997) points out that support for the promotion of innovation in the LFRs has been generally inadequate in quantity and quality to meet their economic development needs, and has not been adapted to the specific characteristics of the process of innovation in different regional contexts. He argues that the problem lies in the lack of understanding of the process of innovation in the regional context. This suggests the need for regions to develop innovation strategies that should promote private/public and inter-firm co-operation, create the institutional conditions for a more efficient use of resources, and promote demand led innovation, ultimately strengthening the position of LFRs within the European context.

The EU is made up of Directorates-General responsible for different areas. With the above in mind Directorate General XIII (DGXIII) and Directorate General XVI (DGXVI) have launched two complementary actions within the framework of Article 10 of the European Regional Development Fund (ERDF) and the Innovation Programme. The Regional Innovation Strategy (RIS) is part of the ERDF innovative action, aimed to help regions help themselves to mobilise local knowledge and improve capacity. "The RIS is about establishing a socio-economic dynamic based on bottom-up open discussion and consensus among key innovation actors in a region about policy options and new ideas/projects in the field of innovation." (Landabaso, Oughton & Morgan 1997: pg 9) The RIS is all about institutional co-ordination, being the linkages and networks among the different actors in the regional innovation system, the basic premise being to strengthen such systems in the LFRs of the EU.

The other policy is the Regional Innovation and Technology Transfer Strategy (RITTS) funded under the Innovation Programme of the EU. This is a complementary programme which if focused on building internal networks to increase capacity, but is

more focused on connections outside the region and the way in which knowledge (technology) can be distributed from outside the region into a strong regional innovation system.

The two programmes are jointly managed by the two Directorates-General and represent an opportunity for regional authorities, in partnership with the main actors concerned, to develop specific sets of actions based on a common understanding of the drivers and barriers to innovation. The following information is provided through the RIS/RITTS network (www.innovating-regions.org)

Potential outcomes of the exercises should be action oriented and include:

- strengthening of regional innovation networks
- new public and/or private programmes for the development and promotion of innovation
- identification of a stock of innovative projects in firms in the region
- strengthening internationalisation

In addition, the project may lead to some long-term 'dynamic' effects on the regional socio-economic structure. As an example, the methods applied for reaching a consensus may encourage an on-going and structured review by all those concerned of the opportunities and consequences which stem from the process of adjusting the economy of the region to technological change. Equally, the establishment of new (or the reinforcement of existing) networks of co-operation can help improve the efficiency with which firms and institutions can disseminate, adapt and adopt innovation on the basis of information and knowledge from as many sources as possible. Finally, a project should aim to secure competitive advantages for the regional economy through inducing a continuous adjustment to technical change.

The RIS and RITTS projects are encouraged to adopt a broad definition of innovation, embracing, managerial, commercial, technical, and financial factors. Innovation in such a context is not only about an increase in economic wealth, but also an improvement of social wellbeing (primarily through the creation or safeguarding of employment opportunities in the regions).

The objectives of the RIS and RITTS exercises are twofold:

Firstly, to improve the capacity of regional actors to develop policies which take into account the real needs of the business sector and the strengths and capabilities of the regional innovation system. And secondly, to provide a framework within which both

the European Union, the Member States and the regions can optimise policy decisions regarding future investments in RTD and innovation, and technology transfer initiatives at regional level. (Source:www.innovating-regions.org)

With these innovation strategies as the basis for the study, and the ideas of regional context and innovation promotion, it is possible to begin to take a closer look at structure and organisation through paralleling of the two. The idea of using a strategy that is based on promotion of actor linkages (such as the RIS/RITTS), is that the region, through the programmes phases and its underlying goals, is made to become aware of its structure. This is important as the methodology for collecting data is primarily through the project manager and their knowledge of the system.

The research paper will endeavour to research structure and organisation as the crucial factor in successful innovation promotion. The propositions developed in the next section are founded in the idea that there are certain typologies of regions with different contexts/environments and hence different approaches to employing an innovation strategy, in this case the RIS/RITTS. By taking a closer look at the structure and organisation of regions, and how and by whom the RIS/RITTS have been undertaken within the regions, the paper will begin to develop a set of typologies and characteristics to help answer the research questions presented in the following section.

The objective of this research paper is to examine differences in structure and problems and to determine if there are any patterns in the outcomes that can be linked to the context in the regions. Through this it is possible to establish if there are certain contexts that lead to an easier implementation of the RIS/RITTS programmes. Ultimately this should provide some insight to further develop such policies within more defined/classified regional contexts i.e. to determine if certain regions are better suited to this form of exercise and if those which are not need alternative programmes.

Although this paper is set within the boundaries of the European Union, innovation policy is not. The concepts developed in chapter two are reflective of the way in which the approach to economic development is changing at the world-wide scale. Globalisation is not a national or local phenomenon, its effects are felt in every country and the responses to development and indeed regional potential are increasingly being undertaken not as an inward looking exercise, but as a reaction to challenges and potentials posed from a wider environment. Competition and innovation are universally recognised as the way in which sustainable development can be achieved, this recognition is not limited to developed countries and regions, in actual fact is it more ada-

mantly prescribed for regions that are lagging behind – the way in which they can become sustainable. With this in mind this research paper is applicable not only to lagging regions within the European Union, but can be applied on a wider scale to the pursuit of successful innovation policy in all regions.

1.3 Research problem

With the aforementioned objectives this study aims to respond to the following questions/statements. Each question/statement is developed as the research takes its course.

Main Question

This question provides the theme of the overall research, it reflects the theoretical background in that context is the strength that innovation promotion can be developed upon. Through paralleling the networks produced through the implementation of a programme based specifically on building capacity for innovation and aimed specifically at the improvement of the regional networking system, (i.e. RIS/RITTS programmes), against context types in those same regions it is possible to answer the following question.

1. Does Regional Context Effect Network Building?

Sub-Questions

These questions have been developed in an attempt to answer the main question. They therefore begin by defining the socio-economic situation along with R&D indicators. This is the 'given' and should provide interesting information on its influence on structure. These 'context' type sub-questions are developed to highlight the context/innovation system in the regions, specifically by focusing on the socio-economic & research factors, and entrepreneurial & technology influences.

2. **Do the classified clusters present a pattern across socio-economic and research indicators?**
3. **Do levels of R&D and the role of SMEs in the regions show patterns across classifications, and add to the contexts presented through the analysis of indicators?**

The structure & organisation sub-questions are developed to determine the way in which networks were built through the RIS/RITTS programmes, and to determine if there are particular patterns within the clusters. Additionally, by defining the regional dynamics & regional environment (which have an important influence on the situation way networks are developed), the network outcome analysis can be strengthened. By classifying these networks we begin to answer questions about variation in the 'context' and type of outcome in terms of structure/networks.

4. **Are there patterns across clusters in the structure & organisation charts?**
5. **Are regional dynamics similar in cluster types and have they influenced the network outcomes under the RIS/RITTS programme?**
6. **Do environmental characteristics and entrepreneurial climate have simi larities within cluster type and have they influenced the networks within the regions under the RIS/RITTS?**

Concluding Question

This takes all the sub-questions for its answer. It in fact provides a response to the objectives of the paper, to determine if the contextual situation within a region – including, levels of technology, situation of SMEs (small to medium enterprises), and socio-economic and research indicators – do in fact influence the way in which a regions network is developed in response to a homogenous programme focused on the building of networks.

The contribution to the debate therefore is in highlighting the effect that a regional system has on network building. This is important as many policies jump straight into network building for innovation promotion while not making allowances for regional variation in context. This paper, through the answering of this final question, will determine what level of impact context has and if such homogenous policies are an appropriate starting point.

7. **Has regional context effected the way in which the policy is implemented, the types of networks that have been developed, and problems associated with the implementation of the policy?**

1.4 Methodology

This study is primarily a qualitative assessment of the structure and organisation of regions using the RIS/RITTS of the EU as the entry point. This will be done by using a structure and organisation chart that is filled in by each region involved in the study, and supplemented by a short questionnaire to the main actor for the RIS/RITTS in each region. In view of the diversity of regional systems and their institutional frameworks the focus of the paper is in identifying a typology of structure and problems in regions. The regions will be classified using a cluster system developed for Europe in a study by Clarysse and Mulder (1997) which is presented in the 'Second European Report on S&T Indicators 1997'. This cluster classification is introduced in section 1.4.2 and further developed in section 3.6.

The methodology follows six steps and culminates in the assessment of the collected data and a conclusion that establishes if there are any patterns by classification. The way in which the research is undertaken will provide answers to the above mentioned research questions.

1.4.1 Case Study Selection

The RIS approach was developed in 1994 with 8 RTPs (forerunner of RIS), 21 first generation RIS were developed from this initial idea and along with the 6 of the initial RTPs are now in their final stages. Three generations of strategies have now been launched since 1994, 69 RITTS and 32 RTP/RIS. This gives us a total of 101 projects. The study aimed to include all the 101 projects, and in turn information was requested from each region, primary data collection for this paper included a blank structure and organisation chart, and a questionnaire to be filled in by the project manager.

1.4.2 Classification

The classification used in the research paper is based on a study by Clarysse & Mulder (1997). This study is presented in the European commission's 'Second European Report on S&T Indicators 1997' and was selected for this paper because it reflects the systemic view of innovation that is developed within the theoretical background in chapter two. The study classifies the European regions into 4 clusters that are based on both economic and technological factors, and developed through a number of indicators

thought to appropriately establish a typology of 'innovation systems'. This classification is expanded in chapter three.

1.4.3 Collection of Socio-economic and R&D Data for the Regions

Socio-economic and R&D indicators are used in building an overview of the situation in the region. The indicators that were chosen are in actual fact being used to build a picture that will eventually be compared with different structures. For this reason the selection of indicators was based on whether they were seen as having a direct impact on innovation. Following is a list of indicators used in the socio-economic, and R&D profiles:

Socio-economic Indicators	**Research & Development Indicators**
Employment by sector	Patent applications
Unemployment	Expenditure on R&D
GDP	Employment in R&D
Value added	Growth in GDP
Migration	Education & training
Density of small and medium enterprises	

The data for these profiles is taken from a Commission Document from DG XVI - Sixth Periodic Report on the Social and Economic Situation and Development of the Regions of the European Union, further information was found in an article from M. Caniëls – Regional Growth Differentials, and additionally from the European Commission's Second European Report on S&T Indicators 1997.

1.4.4 Structure & Organisation Charts

The structure and organisation charts were used to build a picture of the way in which actors involved in the RIS/RITTS are spread among local, regional and national levels. Appendix 1 shows the blank structure and organisation chart. The actors that are present in the chart include; political-administrative, higher education, research institutes, chambers of commerce, financing agents, and others like business and innovation centres. This identifies how the innovation structure is organised, the level of decentralisation, percentage wise how the region is represented at each level, and where the concentration of actors lies. The process of typifying the various charts takes all these factors into account, and by highlighting the main actor and main intermediaries

in the RIS/RITTS process this chart begins to emphasise how the system is built. These charts are examined in light of the categories to see if any patterns emerge.

1.4.5 RIS/RITTS Plans from the Regions

The reports produced from the various projects have been requested from the regions along with the structure and organisation charts. These provide background material to study how the process has, or is, actually progressing – particularly, who is part of the project and which groups of actors make up the steering committee. The information found in these documents is not in a standardised format and is used primarily to build up knowledge of the region before the questionnaire was developed.

1.4.6 Questionnaire to the Main Actor

A questionnaire was undertaken in order to build a stronger picture of the regions both to support the structure and organisation chart and provide numerous links to the theoretical background. This questionnaire was developed and administered to help in the analysis of context of the region and the implementation of the RIS/RITTS. The questions developed provide information that is used extensively in chapters 4 & 5. The questions were divided into six basic areas: 1) actors 2) integration and network development 3) regional dynamics 4) R&D and the role of SMEs in the region 5) regional environment and 6)outcomes of the programme. A copy of the questionnaire, with aggregated results, can be found in appendix 2.

1.4.7 Establishing Patterns

With the aforementioned methodology, an analysis is undertaken for both context, and structure outcomes of the programme. Patterns are discerned in both areas, and following, an examination to determine the level of influence that context has exerted on the outcomes of the programme in terms of networks. This final examination is done in light of the research questions and leads to future recommendations, presented in chapter 7.

1.5 Scope and limitations of the study

The limitations in this study arise from the data source and the nature of the research methodology used. Firstly the case study selection depicted in section 1.4.1 – the limitations here do not rest on the regions that are used in the study, but the number

of regions that are not. Obviously the conclusions to be drawn are done so for a small number of regions, if it was possible to include all the regions that have undertaken either a RIS or a RITTS programme the conclusions would be stronger.

Secondly, the use of primary, qualitative data. The structure and organisation charts as well as the questionnaires were used to collect primary data, with the collection depending on the input from the project managers in the various regions. In this scenario, the structure and organisation charts (that diagrammatically depict the structure), depend on the way in which the project manager classifies each actor within the programme. In addition, the answers to the questionnaire are subjective in their nature, and for this reason the project manager was responsible for the completion – in that the project manager has a strong overall view of the region in relation to the project. The answers therefore reflect the view taken by the project manager, which may not be the same as other actors within the programme/region. Further, the way in which the project manager interpreted the request made in both the structure and organisation chart and questionnaire can influence the answers given.

These problems were recognised in the paper, and all efforts to complement this data were undertaken. In particular the use of regional profiles on the RIS/RITTS web pages and the web pages from the regions themselves. Additionally, a request was sent at the beginning of the research for documents relating to the programmes from each region – these were invaluable in substantiating the responses from the structure and organisation charts and questionnaires.

Another limitation encountered through the data source is the information that is not included. Such factors as political systems and cultural values are factors that can have important impacts on the way in which a region interacts, and the opportunities that are available for change and development. This type of information can only be collected with detailed study and location visits if it is to be truly representative of the situation, i.e. answers to questions in these matters are generally heavily biased, and for this reason it is not included in the study.

The second area where this study poses some limitations is in the nature of the research methodology used. By taking only a number of regions there is an inherent disadvantage with regard to the formulation of generalisations. In this study a number of regions were classified into cluster type, and although they can be described for their similarities, the certain level of heterogeneity within these regions can be a limiting factor in the formulation of generalisations for cluster types. For this reason the con-

clusions reached are provided as an insight into how context has effected network building, the recommendations made upon these conclusions are intended to give some thought to the problems that have been outlined throughout the analysis and concluding chapters.

1.6 Organisation of the Study

The paper is presented in six chapters. Chapter one provides the background and objectives as well as delineating the limitations present within the study. Chapter two provides the theoretical background, in which innovation policy and the effects of the environment are highlighted as the primary response to the 'new competition'. Chapter three introduces the RIS/RITTS programmes, and the classifications used within the study. Chapters four and five analyse context and structure outcomes respectively, with chapter six providing the correlation and conclusions that arise from the analysis. Finally in chapter 7, a synthesis of the relevant theory and the research is undertaken, providing a number of recommendations made in light of the findings of the study.

2. THEORETICAL/CONCEPTUAL FRAMEWORK

This chapter is mainly directed at identifying the role that regional structure plays in the dissemination of innovation strategy, a role that has been increasingly promoted as the way towards sustained economic growth. With the exhaustion of the classical paradigms of development, coupled with the failure of both the market and the state, and in particular the dualist stance taken by the classical ideology, an increasingly popular concept of development is growing. This new wave of thinking is a more holistic approach and is open to the inquiry of regional processes and intermediate institutions. In this paradigm, regional structure provides the challenges and opportunities for development.

This new paradigm reflects the Schumpeterian theory of innovation and echoes the institutionalist stream of thinking. It is with these concepts that this chapter begins. The changing paradigm in regional development policy introduces the way in which current ideology has been developed. Through the demise of the 'growth centre' policy and the rise in institutional economics we begin to see the path that the new ideology has followed. The idea of competitiveness that has been developed along with the new paradigm has fast become the new corner stone to development and this chapter will

continue with a focus on theories and concepts that apply to the 'new regional competitiveness'.

These ideas of regional competitiveness are found under a number of guises, and the following discussion provides an overview of them. The areas include a range of topics, the ones in which the concept of regional structure are deeply ingrained provide the content of the remainder of this chapter.

The areas, and their main focus, to be discussed include; Territory – specifically its effect on the way in which the concept of space is defined. The new competition - with technology being the primary input to sustainable endogenous development and competitiveness. Innovation – the way in which the new paradigm has impacted on the position of innovation in R&D policy. The environment – being the incubator for competitiveness, especially focussing on the ideas of milieu, networks and innovation. And social capital – being the interface between investment and absorption.

The chapter also introduces European policy in the area of innovation – specifically in the Less Favoured Regions (LFRs). The essence of the research to be undertaken in the following chapters is found within European policy, and although the theory has a wider audience, this paper will centre on innovation strategies of the European Commission and develop around the regions that are involved with current innovation strategies. The last section of this chapter will provide a link between current theoretical ideology and the practical outcomes within the European context. Additionally, it will introduce the research in light of what is theoretically fashionable, what has been undertaken, and what questions need to be addressed. The research questions presented in chapter one are a reflection of these outcomes.

2.1 Changing focus of regional development policy

Before we begin to look at the forces inducing current change in development policy it is important to understand what it is we are actually trying to achieve. Neil & Tykkylainen have provided a very simple explanation, "local development refers to the mobilisation and management of resources in order to create wealth in a community." (1998: pg8) Up until the 90s the way in which regional policy has gone about creating this wealth has been "…firm centred, standardised, incentive based and state-driven." (Amin 1999: pg365) Amin develops this further by placing two strands of economic thought behind some of the major influences that have taken place in development thinking. The first is the Keynesian approach developed in the late 60's believed in the

necessity of state intervention. This intervention was undertaken in the way of subsidies and other incentives to induce location of firms in certain areas, through increased government expenditure in designated areas usually in the form of infrastructure, and re-distribution of income to LFRs. The basic premise was that these types of strategies would produce growth in certain areas, hence then name 'growth centres'. This top down approach assumed that through the introduction of a set of factors/investments within a region there would be an automatic increase in economic activity that would trickle down to all sectors. These policies were not customised to the regional context under the premise that it took a universal set of factors to produce growth.

In this paper the focus is on the European Union and their aim of cohesion within the union. A problem of growth theory, particularly relevant to idea of cohesion, is that "although growth centre strategies may have the ability to dampen inter-regional disparities (through the closer integration of the regional and national urban systems), they may have the opposite effect on intra-regional disparities, inducing polarisation at a finer level of aggregation." (Coffey & Polése: 1984,88) Further, the idea of external investment, inherent in growth strategies, ignores the problems of linkage effects on regions, more precisely the low level of linkages that external investment creates. This echoes ideas of the dependency school, in that without local control there will be an exploitation of the region through a situation of unequal exchange. Basically, without local control and local initiative there can not be a retention or building of linkages to strengthen the position of the region.

The second strand outlined by Amin (1999) is the approach taken by the neo-liberalists. Theirs is an ideology based purely on market mechanisms, the top down approach is still evident, and once again the idea of economic growth is neatly encompassed in a set of common factors and applied to the 'functional region'. The belief here is that there should be an open and free competition between localities, and that structural adjustment of the socio-economic conditions of the LFRs (i.e. investment in roads, communication, education & technology) is the way to increase competitiveness. However, the deregulation of markets, reduction in welfare coupled with the weak position of the LFRs, and the growing climate of competition, has left certain regions in desperate circumstances and unable to sustain themselves in a national, as well as global sphere.

2.2 The Institutional perspective and the impact on development policy

The refocusing of development strategy has been in response to the failings of the growth theories. The failure of these policies in some areas, paralleled with strong growth in others, has led to a new way in approaching the questions of development. This approach begins to explore the contrasts of regional context and the potential that is embedded within it. This approach is therefore "region specific" (Amin 1999) and begins by exploring the production process and the way in which actors are involved and linked within the system. The approach is bottom up and tries to establish a local sustainable solution to the challenges of integration in national and global systems.

The approach is about more than just classical notions of price and factor inputs, it realises that the way in which systems are built has an impact on economic rationality. These ideas of institutional influences have led to a new perspective, that "economic life is both an instituted process and a socially embedded activity and therefore context-specific and path-dependent in its evolution." (Amin 1999: pg 366)

Weaver (1981) has argued that development has come full circle and that growing pressure for decentralisation and autonomy are challenging the functional perspective of space/territory that was the main belief of the growth theories. Weaver's ideas reiterate the institutional point, that space is not just functional but it is a "composition of collective influences which shape individual action, and a diversified and path-dependent entity moulded by inherent cultural and socio-institutional influences" (Amin 1999: pg 368)

This points to a situation where regional policy has to encompass more than just infrastructure investment and capital subsidies, there needs to be a consolidated effort to explore regional context and the structure contained within. With this perspective the territorial dynamic is brought to life, and once understood can point the direction towards a supportive regional policy that addresses the diverse challenges faced by a multitude of regional contexts.

Martinson and Shulman (1977) reflect these ideas and have suggested that by improving a communities infrastructure, in order to make it more attractive for economic relocation, has little effect upon the welfare of the indigenous population and upon it's long-term productivity. And that unless these strategies are accompanied by policies directed at the productive and entrepreneurial capacities of the local population there will be no locally sustainable outcomes. (Coffey & Polése: 1984) Weaver's approach (1981) reflects this thinking and is founded on the premise that the development

of a region lies within the common beliefs, values and abilities of it's people i.e. the social and institutional factors of growth of knowledge, innovation, management, and entrepreneurship.

2.3 Territory as the development arena

There is now a change of focus, from the functional to a more territorial dimension of development. The functionalist paradigm saw space as simply the place where the process of development occurred. Space, structure, and ultimately economic hierarchy was developed due to the economic forces that were at play. The current thinking, as we have seen above, recognises that regional development and growth depend as much, if not more, upon the population and structure as upon locational, structural and resource characteristics. This new assessment sees space in a new perspective, it is now seen as possessing a territorial dimension which encapsulates population characteristics and structure.

The territorial dimension explores the environment within the territory, i.e. the interrelated historic, political, social and cultural factors that shape the way in which the development process is developed, or not. "There is thus a shift from the notion of territory as a medium of passive and static resources to that of a territory that creates strategic and specific resources."(Maillat 1998: 3) This territorial perspective changed the way in which development was approached and designed. Growth i.e. regional development, was now presumed to be greatly influenced by forces within the locality, forces that give rise to opportunities that stimulate development and those that deter it. These localised growth processes have been increasingly influenced by the spread of globalisation, and have been linked into specialised productive regions, in turn dependent on other regions. Hence a growing awareness of the need to place localities and/or regions in context with other regions and nations. Garafoli (1990: 89) sums this up:

> The final result of these varied reformulations of the problem of development has been above all a different concept of space held by economists. Space is not only the distance between different places, something that conditions the exchange of goods and a source of cost for economic agents, as in the traditional theories of industrial location, it is in these new interpretations the distinguishing feature of territory, of a strategic factor of development opportunities and of characteristics that could be assumed.

2.4 The new Competition

If the idea of territory is taken as a strategic factor, then it is essential to focus on the paradigm change that has taken place in regional development thinking in the arena of competition, as we will see, a strong strategically positioned region is assumed a certain level of competitiveness.

It has been the rapid globalisation of economic activity, the increasing mobility of capital and information, and changing technologies that have taken place over the last two decades that has resulted in a new type of international competitiveness. According to the OECD (Helmsing 1998: 4) the composition of world trade has been changing. There has been a declining share of resource intensive industries, stable shares of labour intensive industries, and rising shares of scale intensive, differentiated and science based industries. Competition is no longer about advantages in the price of the factors of production, it is about optimising the use of resources from the firm to the national level. This involves not only optimisation but also redefinition of resources, expanding to include human capital and the production of new resources within regions.

The survival of regions is therefore based on increasing competitiveness. The changing paradigm of development, as discussed in the previous sections, principally focused on the institutional base of the region for growth. Best (1990) has developed these ideas into a theory he calls “New Competition”, the underlying assumption of his concept is the way in which this institutional setting is able to maintain and increase competitiveness, his proposition is that this competition is reached through strategic advantage and not lower production costs. “The term ‘strategic’ referring to market-shaping activities in contrast with market-reacting responses.” (Best 1990: 11)

Best (1990) distinguishes the New Competition from the old using four dimensions within which strategic actions should be developed. Simply, they are a set of determinants of competition and/or advantage. These four dimensions and the way in which strategic actions (increased competitiveness) can be developed are:

Firstly, the firm. With the firm it is the pursuit of continuous improvement in methods, products and processes that is the strategic advantage, not low production costs as with the old competition. This reflects the ideas of Schumpeter, who sees the entrepreneurial firm as seeking strategic advantage on the basis of innovation in product, process or organisation. Accordingly, it is the competition from the new commodity, new technology, new source of supply, or new organisation that determines the

wealth of the region. It is not a question of price advantage but innovation. (Best 1990) With the firm in mind Best introduces his position on organisational culture, it is about organisation and interaction and can be paralleled with a regional context. The ideas are of organisational flexibility and adjustment, and of compiling a competitive strategy through SWOT analysis. His point is that competitiveness can be achieved, not only through specialism in new products and processes, but also through continuos inputs with a focus to detail in every activity area, be it within a firm or a region.

Secondly is the production chain. This is a particular important area of focus, as ultimately it is the collection of firms within a region that make up its economic production system. Competitiveness depends on all actors within the chain for sources of innovation and competition, and to establish trust and long term relationships. This paradox is sometimes called 'co-ompetition' although Best introduces the idea as 'consultative co-operation'. (Best 1990: 15) The idea of this co-operation is based on the idea of 'networked relations' that in turn produce norms which lead to the facilitation of long term investment. Additionally these networks, through increased problem solving capabilities, can produce competitive strategies for the region as a whole. This can be seen as more than a collection of autonomous bodies, it is about organisation, strategies and collective competitiveness. It involves enforcing individual responsibility to the common interest through institutions such as, trade associations, government programmes, joint marketing etc. It is all about identifying a common interest which is collectively pursued, not government imposed. In fact, government and development bodies fall under the collective banner and therefore make up part of the network themselves.

Thirdly is the sector: The focus here is on competitiveness of the institutions and inter-firm co-operation. This co-operation and complementarity can prove more positive to the regions as a whole, as is the case with firm competition. "Thus the implementation of a sector strategy is a partial means of realising the joint benefits of Schumpeterian non-price forms of competition. Strategically managed inter-firm associations can promote the long-term development and competitiveness of a sector." "What distinguishes the New Competition from the Old Competition is not an awareness of the paradox of competition, but the institutional capacity to turn the paradox to advantage." (Best 1990 : 19)

Lastly is the government. This is where ideas of welfare and market forces are replaced by the idea that government can actively promote competitiveness. The new

focus for government lies in a production rather than a distribution focus, and local government is now seen as a stimulator and facilitator, encouraging strategic alliance and building an enabling environment to promote networks and linkages for the success of regions.

This New Competition, in short, is a change in focus from one of allocation of scarce resources (the neo-classical definition) to one of the creation of new resources through innovation. This classification of New Competition can be summarised as having the same effects and potentials for regional economies. Regions need to aim for continuos improvement, making marginal adjustments to increase their position. The innovations need not be restricted to R&D specialists, with the ongoing social processes themselves pointing the way for solving and identifying problems and opportunities.

It can be said that competition has become the backbone of capitalism and this thinking has had an important impact on regional theories and a resulting influence on regional development policy. According to Maleki (1997: 8) "The neo-classical conventional theories and policies regarding regional development focused in one way or another on the capital-labour 'production function' and responses by the state via various policies." However there is a redirection and there are now broader theories that incorporate technology and competition in a more realistic way. With these theories we can begin to develop a picture of what the "New Region" should embody, and can begin to align concerns of neo-classical and Schumpeterian schools into a policy that is based on economic competitiveness as a priority for regions.

2.5 Porter's Diamond Model of Competitiveness - an approach to new Competition

Porter (1990) reflects this approach (i.e. combining both neo-classical and Schumpeterian thought) in his "Diamond Model of Competitiveness" which outlines the factors that influence national competitiveness. It is a new way of understanding national, as well as regional advantage. Porter proposes four premises from which this understanding can begin. Firstly, the need to isolate the influence of the nation/region on it's firms ability to compete in certain industries and industry segments. It is essential to allow for different sources of competitive advantage, not only cost differentials. Secondly is the task of explaining why the nation/region is a more or less desirable home base for competing in an industry. Porter points out that "The home base is

where strategy is set, core product and process development takes place, and the essential and propriety skills reside" (1990: 69). Thirdly is the role of the nation/region in stimulating competitive improvement and innovation. And finally, is the setting for firms and its impact on the way firms exploit changes.

The essence of the model is the four broad attributes of a nation that shape the environment and in turn determine the comparative advantage or competitiveness. Maleki has expanded Porter's basic model to include both Government and Chance, which are in fact proposed by Porter but do not form part of his model as such. Figure 2.1 shows this updated model.

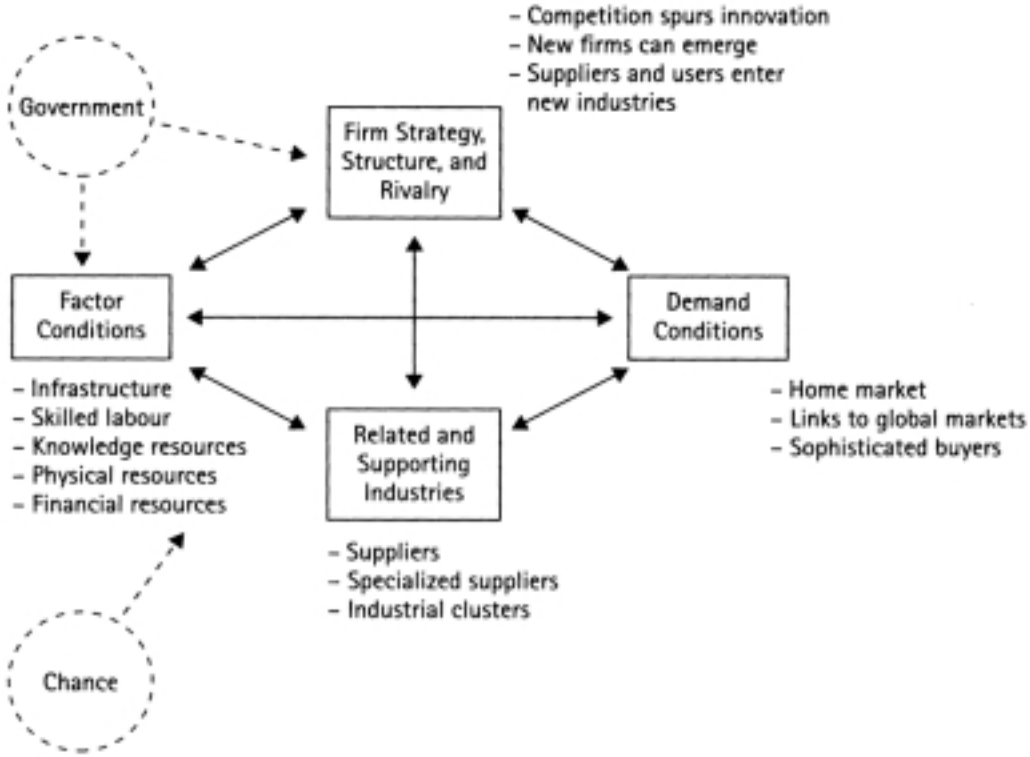

Figure 2.1 Porters Diamond Model of Competitiveness (Source: Maleki 1997: pg8)

Taking a closer look at the four factors we can begin to link the theoretical background to each. : Factor conditions reflect the neo-classical basic factors of production. Demand conditions look at regional/local market demand for products or services. It is his third category of supporting industries that is interesting as it points to quality and international competitiveness through networks of linkages. Finally is the Structure and Rivalry – this once again echoes the ideas of Schumpeter, it incorporates the legal, cultural and institutional framework which determines strategies, which

is why we can see an influence here of government, which could be the influences of policy and political structure on competitiveness.

Porter's model also helps us to determine what competitiveness is comprised of, in particular the elements which have major impacts on structural change in economies. Factor conditions point to the importance of human resources in the form of skilled labour and knowledge, these attributes are transformed by innovation to increase the competitive position and also provide the entrepreneurial base needed for furthering the development potential of the region. Demand conditions highlight the need to exploit both local and global markets to increase production possibilities. The Firm Strategy, Structure and Rivalry highlight the need for technological change through the enhancement of productivity, and the alteration of product mix, industries firms and jobs – this is the most important element for structural change. Finally, Related and Supporting Industries point to the need for strong local structures and networks that hold the local economy together and provide competitive advantage through collaboration.

The new competition is a particularly valid way to look at regional development or renewal because it addresses the region not just as space where production takes place, but as a strategic element that can be exploited to enhance development potential. This view recognises that social institutions and unique cultures, that make up firms and indeed all parts of a region's structure/network, play a role in promoting, sustaining, and undermining economic growth, and it is in fact through these elements that the new competitiveness will only be realised. By employing this institutional approach it is possible to get to the organisational root of the problems of lagging regions instead of defining regional situations in neo-classical terms of declining productivity and gross domestic product. Development policy, taking this as its backbone, can begin to focus on structural remedies as the root of success, as opposed to simply trying to increase productivity through continued welfare type policies.

In fact, we can make the assumption that the sources of competitive advantage are organisational, and if production and/or innovation strategies are organised to outdated principles (price factors) then there can be no capacity to respond to the New Competition. It is no longer the role of the individual firms, but the dynamic innovative milieu. It is time to turn from the pre-occupation with the growth of small firms to a focus on stabilising structure and communication flows. This points to a strategic industrial policy promoting Schumpeterian competition and collective entrepreneurial

firms. A policy based not only on labour productivity, but also on capital and organisation, based on analysis that is broader and more useful in understanding the competitive forces that are driving capitalist economies in the 90s and into the 21st century.

2.6 Innovation and the evolution of RTD policy

Over the last decade innovation has acquired a more central role in theories of economic development. It is the neo-Schumpeterian school which has pointed to the evolutionary process of capitalism through technical and organisational innovation, and to the pivotal role played by social institutions other than the market. (Morgan 1997) Above all it the innovativeness of regions that lead to the ultimate level of competitiveness. It is Porter's model that highlights what competitiveness is comprised of, but it is the Schumpeterian idea of innovation that points out what competitiveness is based on. Coupled with the ideas of evolutionary processes, this has produced major impacts on the way in which regional development has been defined and the path development policy has taken.

2.6.1 The Challenge to the Linear Process of Innovation

Two important propositions that have signified changes for development policy through this new paradigm have been put forward by Morgan (1997) as i) innovation as an interactive process and ii) innovation as shaped by a variety of institutional routines and social conventions.

The first proposition points to the change in the innovation process it self. The process was traditionally viewed as a 'linear process' where "innovation proceeded sequentially through relatively independent steps from research to marketing as a result of either technology-push or market-pull pressures." (Morgan 1997: pg493) Morgan points to two faults in the linear process: Firstly, the absence of recognition for feedback and loops throughout the process, which has led to the preference for a model of innovation that embodies the idea of interaction at the level of the firm, sector, region and wider environment. Another fault in the linear model is its lack of focus on knowledge other than pure science. Lundvall (1992) argues that inputs in connection with routine activities provide important inputs into the innovation process, and that this process should be conceived as a process of interactive learning within a wide institutional setting.

The second proposition, that innovation is shaped by a variety of institutional routines and social conventions, is an introduction to the social side of the development debate, in particular social institutions. The concept of institution proposed here is a pattern of behaviour – habits, conventions, and routines which help to regulate economic life by reducing uncertainty. "The significance of these types of institutions for innovation and economic development generally are summarised in the concept of social capital." (Morgan 1997: 493)

What this ultimately points to is a definition of the region as an innovation system, and not a set of individual pieces. It means that this system has the primary responsibility for the dissemination of innovation. Lundvall (1994) uses the concept of innovation, couples it with the pace in which innovation is currently evolving and arrives at the conclusion that without know-how firms, and indeed regions, cannot stay ahead of new developments. In other words, it needs to become a learning region, Lundvall sums this up as "know-how has become the key resource for firms to stay abreast of product and process innovation" and that "knowledge is the most strategic resource and learning the most important process" (Lundvall in Morgan 1997: 493)

2.6.2 Innovation Policy as More than Simply R&D

From the above discussion, which puts the emphasis on the innovation system of a region, we can see that more than the traditional regional policies are needed, policies that were based on physical infrastructure, business subsidies and training. The focus needs to be on maximising the impact of these traditional interventions through a focus on regional strength, which is embedded in capacity of firms, management, business culture, and most importantly a strong institutional framework that promotes interaction, learning, entrepreneurship and a dynamic environment. There needs to be an extension of traditional targets of policy to a more overall embracing perspective, ones that are deeply seeded in the development of the so called intangibles.

Innovation can no longer be viewed as a simple exercise in R&D, its definition must be stretched to include the structure and organisation of the region in which it is placed. This reflects the notion of the 'high road to development', where competitiveness is not won through low labour costs – which can be lost to the next best bidder, but is based on the principles of innovation, which are developed throughout the region. This type of development produces a sustainable base for future growth and development.

We have witnessed the process of economic and monetary integration progressively homogenising the costs of factors of production. But from a policy perspective, it is also reducing the margin of manoeuvre of public administration in their ability to influence and manage the economy. If the goal is to reduce the gaps among regions, as is the case within the European Union, there needs to be a focus on the generation of competitive advantages through the improvement of regional endogenous potential. Landabaso (1997) points to technological innovation as probably the single most important factor that may contribute to the 'creation' of regional competitive advantages. The above discussion underlines innovation as the way to build these competitive advantages. Further, it highlights the need for development of a region's structure to stimulate this innovation effort, and provide the rich 'seed bed' for technological investment coming into a region, not only providing high levels of absorption but producing linkages within the region in other sectors.

2.7 The environment as the incubator of competitiveness

We have now a scenario in which it is the system present in a region that carries the challenges and opportunities for sustainable development. Using the principles of new competition it is the system and its linkages that are the best promoters of innovation and improved competition, which in turn render the region a force in the new global environment. Current development thinking has attached an importance to regional policy, which reflects attempts to improve competitiveness, to produce a more flexible economic base, to increase economic integration and to respond to the changing forms of production organisation.

These developments have created significant ideas about the nature of local systems, and this argument can be linked to fashionable ideas of endogenous development. (Blakey 1989; Bingham & Mier 1993; Stohr & Taylor 1981) It is Garafoli (1991) however, who recognises the role of external interdependencies in the process. For him, endogenous development does not mean 'closed economy', it should incorporate the ability to react to external challenges. He further reduces his concept to the ability to innovate at a local level. Within this classification it is the focus placed on innovative capacity at firm and institutional level that ties in with the ideas put forward by the institutional schools. By taking this definition as a starting point we can follow some of the ideas presented by others in relation to the development of "the system".

2.7.1 Networks

One prominent concept developed around the ideas of local systems is that of networks. It is an extension of the idea of interaction and shared culture, and focuses on the direct co-operation between those involved. This co-operation takes placed within established relationships and links, these are what make up the network. Morgan (1997) sees networks as an alternative for mobilising resources and promoting regional innovation effort, which cannot be, and have not been, fully exploited through the traditional solutions of markets or government hierarchies.

2.7.2 Milieu

A concept often paralleled with networks is that of milieu. Outlined by Maillat (1995), the logic behind the milieu is that territory should become the starting point, as opposed to locational factors. Maillat's position is that the motors of development lie within the regions themselves, and therefore development does not only rely on the ability to attract external investment, but on ability to stimulate local initiatives and develop a territorial dynamic. And that if "territory is not given *a priori*, but built thanks to the dynamics of the milieus, one can consider that regional collectives have the possibility of promoting and initiating real territorial development." (Maillat 1995:157)[1] In this respect it is the construction of the environment that becomes the key element in instigating the process of change, and the strength of synergies, nature of relationships and the intensity of exchanges that define success. (Maillat)

It is in the highlighting of interactions, organisational strategies and collective learning within the overall configuration of economic, socio-cultural, political and institutional agents and elements, that the idea of milieu gains momentum. With this the definition illuminates the role of non-physical resources, proximity, and various forms of co-operation and learning to develop into the regional ability to steer its own development. It is no longer a question of locational factors but of an environment capable to develop and sustain growth.

[1] Maillat also offers an introduction to the concept of 'industrial district'. This is part of the discussion of territory and environment, but is limited to industrial production systems and therefore will not be expanded upon in this paper.

2.7.3 Innovative Milieu

Innovative Milieu is an extension of milieu, but in addition to organisation and interaction it focuses on the innovation process. The milieu, in this respect, becomes the territorial structure and organisation where the process of innovation is carried out. It has been defined as "a territorialised set in which interactions amongst economic agents develop as they learn about multilateral transactions that generate innovation specific externalities, and as the learning process converge towards increasingly efficient forms of joint management of resources" (Maillat 1995: 161) Taking this definition we can clearly see the development of the idea of innovation itself as more than just R&D, it becomes a process. A way in which components are combined, which in turn define and enhance the territorial dynamic, which underlines the way in which new product and processes are determined. As Perrin (1992) put it, "territorial organisation of productive activities has a determining effect on increasing their capabilities." (Maillat 1995:162) In these views the process of innovation begins with a social aspect that ultimately presupposes the technological underpinnings leading to development.

2.7.4 Innovative Milieu and Regional Policy

The innovative milieu approach has shown that by combining interaction and learning it is possible to increase the competitive position of a region. It therefore focuses on the development of the learning system and/or encouraging more co-operative organisational forms, depending on the situation in the region. Regional policy must make increasing use of the milieu so that regions can develop specific resources and externalities for development. Maillat (1995) proposes three dimensions which need to be considered when implementing such policy so as to produce a sustainable process. These are:

- Involvement of local players and development of specific non-physical territorial resources;
- Creation of synergies (interactions, networks) and of learning between the milieu's players so as to develop the advantages of proximity and specific territorial resources;
- The link with the technological and market environment (extra-territorial networks).

The term regional policy itself implies the changing essence of the way in which policy is approached, the focal point now on the region and not on individual firms and/or sectors. The regional is made up from a number of interacting influences

including institutional, economic and social. (Amin 1999) Therefore the local foundation can be improved through both supply policy such as innovation, education, skills etc, and institutional policy such as business organisation, political representation, development agencies etc. Amin (1999) offers a number of considerations towards actions that emerge from this regional perspective. These considerations are not provided as ultimate solutions but outline issues that should be taken into consideration when devising practical solutions to encourage regional endogenous growth. (Amin 1999) These considerations follow, and are coupled with the most prominent reasons for such policy action.

i) Building clusters and local economies of association – these would help regions to consolidate local ties and encourage continual upgrading and capacity-building across sectoral networks and of horizontal and vertical interdependency. However these alone cannot be the sole foundation for growth, there needs to be a certain uniqueness to the strategies that are built on the recognition of softer influences, these makes up Amin's remaining three considerations.

ii) Learning to learn and adapt – This follows the ideas presented earlier, that successful regions are 'learning regions'. It is the capacity to adapt to and anticipate opportunities that enable competitive advantages to be established and retained, this centres on providing a certain level of education within a region. It is also about circulation of informal information, innovation and knowledge – it is the networks of association that spread the information and therefore are an important aspect of the learning region. Behaviour, and the rationality behind actor decisions, also impose certain constraints on policy, it is important to recognise these as barriers or potential to information distribution.

iii) Broadening the local institutional base – This is about who makes decisions and how. It is not enough to assume that regional political autonomy is enough for a strong region. It is about "developing a pluralist and interactive public sphere", (Amin 1999: pg 373) and in realising that decision-making processes, deeply ingrained within a region, can constitute an obstacle to opening up the institutional environment. All in all it reflects the position of

Putnam (1993), that developed social capital is what secures a strong economic system.

iv) Mobilising the social economy – This is about including all people in all sectors of the region. It is not enough to provide growth in certain areas while leaving some untouched. If policies do not support the entire region, the emergence or preservation of inter-regional disparity will remain. This social economy also underlines the need for regions to be based on the decision of local actors, development needs to be shaped by the local perception and knowledge. The role of government is strong but must be facilitative.

2.8 Social capital and capacity building as the cornerstone of innovation promotion in less favoured regions (LFRs)

This above mentioned high road to development, or more simply innovation, is rooted in exploiting scenarios that focus on social capital, regional learning capacity and strong networks. It can be seen, although some differences exist, that all the above approaches (including that of Best and Porter) are centred on a regions innovation potential, and that any progress to be made in this potential can be conceived by focussing on the socio-cultural and institutional environment. Storper (in Amin1999) adds to the discussion with his suggestion of 'relational assets' and 'untraded interdependencies'. These types of untradeable assets draw on social networks on which the system is founded, the potential impact on competitiveness of these types of assets is that they form part of the learning environment.

As discussed earlier innovation is a process and if regional policy is to be effective then it has to tackle the root of the process i.e. the ability of the region to absorb capital expenditure for innovation. The precondition then for this absorption has to be an "efficient regional innovation system." (Landabaso 1997)

2.8.1 Innovation Paradox

These absorption problems, and the undermining of investment, are defined by Landabaso (1997) as the 'regional innovation paradox'. Basically, this is a discrepancy between the greater need for spending on innovation in the LFRs and their low capacity to absorb the funds. Therefore the problem does not lie in the availability of funds but in the regional system itself. This system in LFRs is characterised as having an under-

developed and fragmented nature, shown in Landabaso's graphical description. (Figure 2.2)

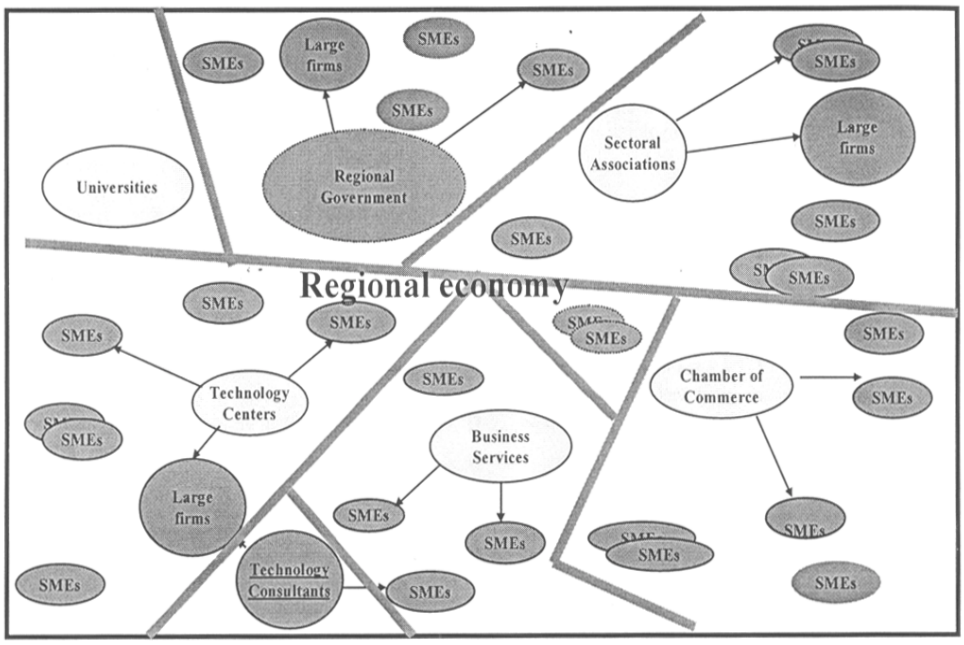

Figure 2.2 A fragmented regional innovation system: LFRs

The figure is a representation of a regional situation and shows the linkages between and within sectors – illustrated with arrows. The heavy lines represent the disjointed way in which the region operates in relation to innovation, by not promoting any connection. From an inspection of this it becomes obvious that there is an absence of a framework to identify demand for innovation. No connection is developed between actors, which is due to a lack, on behalf of regional development authorities, to understand the system and build links with all the agents in the system. This situation produces a weak delivery system of innovation funding, be it capital or knowledge, as the funding cannot take on a multi-functional working. Funding is directed to isolated areas, that are not working together, and in some cases producing technology/innovation that is of no use in other areas. All in all, the system does not have the interactive dynamics for a matching of the supply of innovation policy and the demand for innovation at all levels of all sectors. Furthermore, there are no synergies among major actors, which if present could multiply effects of policy and reduce the problems associated with technological type institutions that rarely become self-sufficient, the castles in the desert so to speak.

What also becomes apparent from the figure is the disconnection amongst the enterprises themselves. There is a lack of ability to join forces and strategically design

and implement innovation strategies such as management, technology sharing, information sharing and so forth. Additionally, the advantages of agglomeration are not realised, which in itself can help the above mentioned inputs but also increase competitiveness in the way in which the production process is run. These types of arguments are apparent in the case of the 3rd Italy, where it was precisely the increased interaction of the small firms that led to the growth and competitiveness of industry in the area.

2.8.2 Social Capital and Capacity

What we have established is that there is an innovation process that begins with structures and linkages, which in turn provide the conditions for absorption of innovation policy. What actually then determines the level of success of innovation policy is the degree of capacity inherent in the region. Putnam embodies this concept in people themselves, into the idea of social capital, which he defines as "..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 co-ordination and co-operation 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)

2.8.3 Innovation Capacity and Learning

We can now define a regions ability to innovate as innovative capacity. This is related to the 'learning ability of the region' which in turn is related to the density and quality of networking within the regional environment. The co-operation and the institutional setting within which these relationships take place are the sources of innovation, innovation as the result and the relationships the process. (Landabaso, Oughton and Morgan: 1999) Therefore, a region that is able to learn has the possibility to increase its demand for innovation and also develop the capacity to absorb it. The regional innovation system therefore becomes the process of producing, distributing and taking advantage of knowledge and in turn determines the effectiveness and efficiency of knowledge transfer/development among it's parts – "the system is in itself the process of learning".(Landabaso et al. 1999: pg 7).

An efficient system is shown in Figure 2.3. This system, as opposed to the non-innovative one of figure 2.2, does not have the barriers between different sectors and

actors, the regional government has contact with the major actors and can in turn produce strategies that benefit all sectors, multiplying the impact of funding. There is also no strong barrier around the region, this shows that it is outward looking, able to absorb external knowledge, and importantly is aware of economic forces that are influencing its innovative aspects.

The central positioning of the government highlights that the role of regional administration is to facilitate the articulation of the system through linking regional actors and matching innovation needs with knowledge supply. This should ultimately bring forth synergies and complementarities between the actors and the policies themselves. It is the links, synergies and complementarities that are the base for learning, and the way in which innovation capacity can be determined and strengthened. (Landabaso et al: 1999)

2.9 Implementation of theory in Europe

2.9.1 New Focus of European Policy on Innovation in LFRs

The focus of the research undertaken in this paper is about structure and organisation within certain regions within the European Union. The study uses the approach towards innovation taken through the RTP/RIS/RITTS programmes. These programmes will be outlined in the following chapter, but as an introduction to these

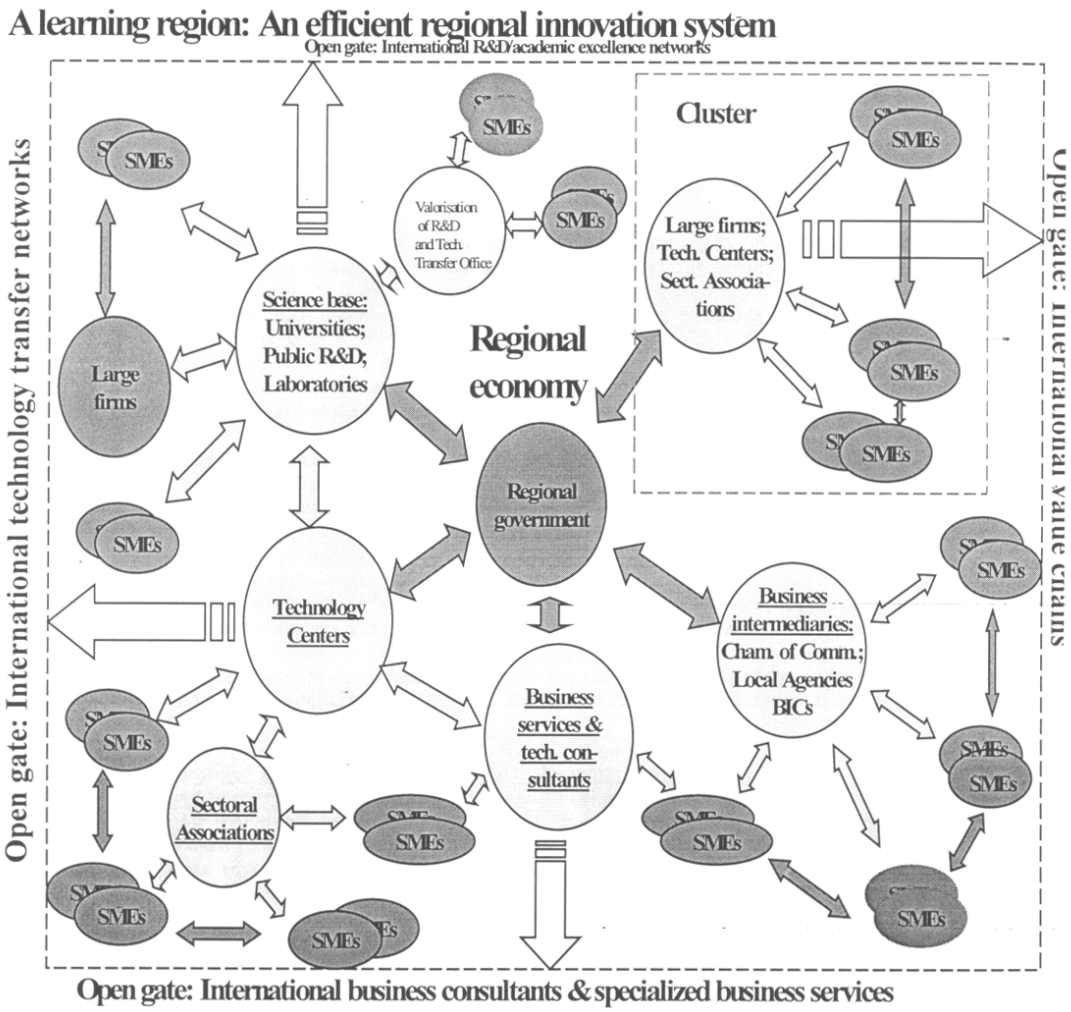

Figure 2.3 An efficient regional innovation system. (Source: Landabaso, Oughton & Morgan: 1999, pg 7)

we need to build a picture of the ideological environment towards innovation policy that is present within the European Commission today, and what factors are behind this current direction.

There are number of important reasons why there is re-direction in regional economic policy today in Europe. Most importantly are the large disparities in productivity and income that exist among the regions of the EU (see GDP per region in the 6th periodic report of the regions). The First report on economic and social cohesion of the EU explains that the goal of regional policy is not simply a convergence in growth and income, but is based on achieving development in the LFR's. The report outlines how it has become a question on the demand side with an implicit need to increase regional demand for innovation and technology. The report reflects the idea that without this

endogenous pull there is little hope of achieving self-sufficient growth and maximisation of external policy. (European Commission: 1999)

In the past, authorities responsible for regional economic development have drawn operational programmes that have not reflected the needs of their structural characteristics and technological profile. According to Landabaso (1997) the reasons for this are firstly, an absence of analysis of the specific features of supply of and demand for innovation in the region, with some using as a point of reference the 'linear' model i.e. assuming a trickle down of the economic effect into the region as a whole. They ignore the importance of small firms needs and the need for interaction between the science type innovation and the productive process where innovation needs to be implemented. An example is the STRIDE programme used by the EU (see Landabaso 1997 pg 11) where this mentality was employed. Apparent in the process was the problem of absorption of funds, which highlights a number of structural problems and institutional deficiencies in the LFRs.

A change in direction is however taking place, and the European Commission's ideas are developing. Strategy is now directed towards economic objectives more closely linked with raising the potential for innovation in the region. It is no longer simply aimed at an increase in the rate of R&D expenditure. DGXVI is responsible for regional policy and cohesion, and through statements such as the following we can begin to understand the undercurrents of the way in which policy is moving.

"It follows that from the regional development point of view, for these regions in particular, the scarce financial and human resources available for RTD have to be guided and directed towards innovation efforts whose goals are more related to economic development." (Landabaso 1997; 10) and

"It is important to note that the 'technology gap' in the LFRs can be seen not just in the differentials in financial and human inputs in the various regional science and technology systems but, most importantly, also in terms of their structural factors related to their productive structure, institutional framework and specific features of the regional demand for innovation. That is, in our view, the inter-regional technology gap and the innovation problem in LFRs is not only a quantitative problem measured in terms of availability of inputs in the system but first and foremost a qualitative problem that refers to the structural factors besetting the regional innovation systems of LFRs" (Landabaso 1997: 10)

Policy today is more focused on the regional innovation system itself, and the way it has to be changed to permit innovation policy and assistance to be absorbed and efficiently used. For the 'regional innovation paradox' to be dismissed, this policy direction towards a more holistic approach must be vigorously pursued. There needs to be a move in direction to the process per se, looking at linkages between actors as the determinant of capacity of the region to adapt to technological and economic forces, and to the new era of competition.

Through the RTP/RIS/RITTS approach the European Union is developing regional development policy to incorporate this ideology, with the premise that it is based on the capacity of the regional innovation system. The approach "aims to translate the innovative milieu theory into an operational concept. That is, it should establish the foundations of a regional innovation system by improving the structural competitiveness of indigenous firms, SMEs in particular." (Landabaso & Reid 1997: 5) By doing this the "RIS/RITTS approach acknowledges that the lack of social capital helps to explain one of the EU's key problems, namely its poor record of converting scientific and technological knowledge into commercially successful products and services." (Morgan 1996) More specifically the objective is to assist the regions in developing the conditions necessary for encouraging an innovative and learning culture, embedded in the productive and social environment of the region. In addition the RIS/RITTS are about stimulating a technology demand by developing innovation capacity.

2.9.2 Summary

The ideas developed in this chapter describe the movement in regional economic development thinking, from a process that focused primarily on external investment into a given location, to one that is based on locational factors. With pressures from increasing globalisation and integration into a world-wide system there has come a realisation that regions themselves must gain a competitive edge if they are to survive. The 'institutionalist' view that dominates regional policy today is in essence about regional dynamics, regional policy has begun to explore this regional context and the structure contained within.

In agreement with this view, the way in which innovation has been developed throughout the 90s has also become more sensitive to the way in which regions are able to absorb and disseminate new technology. As ideas of 'New Competition' have been developed the region has again assumed a major importance. The New Competition is

precisely about the way in which the region (as a complete and interactive system) can assume a set of technologies that produce an advantage, an advantage that is built on technological advancement and a set of competitive factors that go beyond price.

Innovation policy is no longer viewed as a simple exercise in research and development, its definition has been extended to include the structure and organisation of the region in which it is placed. The territorial dynamics within these structures have gained the attention of scholars and policy makers, and concepts such as milieu and networks have been developed and studied. These concepts shed light on what is one of the most important assets of a region, that is its human resource. Without social capital any attempt to introduce and disperse innovation will fall on fallow ground. Innovation policy has therefore recognised the need to begin with producing a system with a strong social capital and capacity, policy that can facilitate the articulation of the system through linking regional actors and matching innovation needs with knowledge/technology supply.

The European Union have learnt from their operationally focussed programmes and are moving into policy areas governed by this new ideology in innovation and competition. The RIS/RITTS initiatives reflect these changes and are aiming to transform the regional innovation system by improving the synergies between the actors, ultimately producing a dynamic system that is ready for the challenges of integration, and able to multiply the effects of innovation funding/policy.

In order for a policy such as the RIS/RITTS to exploit innovative competitiveness it is essential to understand better what the precise mechanisms on which the innovation process works, foremost the way in which knowledge is diffused across and within regions. The theoretical background provides a number of areas that can be taken for practical research, in this paper the RIS/RITTS programmes have been chosen as practical applications of the new ideology. This again provides a plethora of directions that a study could take. In this paper a first step is taken at trying to identify differences in regions, and the way in which this effects how such a process of regional development is implemented, i.e. what structures/networks have been developed.

This paper will argue that the differences in the way in which regions undertake such an exercise, and problems associated with the development of the RIS/RITTS, depend on the varying context/environment conditions. Further, through categorising regions we are able to discern some typologies of how certain categories of regions (based on innovative similarities) have similar contexts which influence the way in

which such programmes are implemented. And additionally problems in implementation can also be typified by the context/environment inherent in the region.

The following chapter details the RIS/RITTS programmes, this is an important area as it shows how exactly the Directorates General XVI and XIII believe a process should look. The research questions of this paper are built upon the context/environment within which these initiatives are placed. The homogenous nature of the programmes, set within different contexts (embedded in typologies produced through their socio-economic & research position) set the scene for answering the questions – in short, does context influence the way in which the RIS/RITTS are implemented (i.e. structure/networks) and the types of challenges that arise.

3 RIS/RITTS PROGRAMME AND AN INNOVATIONOVERVIEW OF SELECTED REGIONS

This chapter provides a short overview of the Regional Innovation Strategy (RIS) and the Regional Innovation & Technology Transfer Strategy (RITTS), and their place within the European Union (EU). It then introduces the classification system used for the analysis in the paper, and finally introduces the questionnaire that was used for data collection.

3.1 European policy framework for innovation and regional development

The approach to innovation underlying the development of the RIS/RITTS was fostered by the European Commission through a number of key documents. Firstly, the 1992 'White Paper on Growth, Competitiveness and Employment' which was specifically centred on the development of clusters of competitive activities and identified the need to define a global strategy bringing together the public authorities, innovation bodies and the various sectors of society concerned. The paper pointed out that it would require active involvement of all actors concerned, which could be facilitated by structural measures taken at community and national level. In 1995 the 'Green Paper on Innovation' more specifically noted the need to encourage innovation in enterprises and strengthen the regional dimension of innovation, with the importance of the regional level in the definition and implementation of such a strategy highlighted. Along with these are many communications from the European Commission supporting innovation and research and technology development, with a focus on institutional capacity of both firms and regions. In short, the issue of development of sufficient capacity in

the LFRs to successfully utilise the investments in infrastructure made by the Commission's Structural Funds, the bottom line being that of innovation promotion.

3.2 ERDF and the development of the RIS

The European Regional Development Fund (ERDF) is one of the EU's Structural Funds which co-finances actions to help reduce the gaps in socio-economic development between the various regions and Member States of the Union. The ERDF's resources are targeted at certain disadvantaged regions and are mainly used to finance improvements in infrastructure, productive investment, local development, human resources and the environment. The RIS projects of DG XVI are financed under the European Regional Development Funds Article 10, and are therefore confined to regions where a significant share of the population falls under the ERDF-assistance areas.

The development of the RIS started in 1991 when the Directorate General sixteen (DG VXI), responsible for Regional Policy and Cohesion, launched the idea of a pilot action to promote the development of regional strategies for research, technology and development policy. The initiative officially started with the launching, in 1993, of the pilot initiative called Regional Technology Plans (RTP) which are the forerunners of the current day RIS. Initially four regions (under the objective 2 - declining industrial areas classification of the ERDF, in which all regions in the European Union are classified by type and eligibility for structural funds) were invited to test the concept. In 1994 four objective 1 regions – classified as lagging - were also chosen to test the RTP approach. The pilot projects attracted much interest, and in 1995 the Commission put out calls for proposals of other interested regions for the newly named RIS, (The renaming was adopted to broaden the definition of innovation, not just with a focus on technology). From this 19 projects were selected and two of the previous RTP were restarted. These 21 first generation RIS, and 6 RTP are now in their final stages. Three generations of strategies have now been launched since 1994, 69 RITTS and 32 RTP/RIS.

(Source: www.innovating-regions.org - The Network)

3.3 The RITTS Programme

Parallel to the projects financed under article 10 of the ERDF, the Innovation Programme - which forms part of the 4th Framework Programme for Research and Development in the EU, is financing 21 RITTS (Regional Innovation Transfer and Trans-

fer Strategies). These are aimed at improving the efficiency of infrastructures and policies for the support of innovation.

Regional technology transfer is a response to the imperative of bridging the technology gap between regions and making the Union more competitive and self-sufficient. That implies that all the regions must learn to make better use of the technology available and increase their capacity for innovation. There is an urgent need in Europe for interregional co-operation on R&D and innovation. Businesses in disadvantaged areas find that most major technological resources and potential research and innovation partners are based in the central regions. Such firms, SMEs in particular, generally take a positive attitude towards new technology, and are capable of incorporating and adapting products and processes developed or improved abroad. Facilitating interregional exchange and co-operation in the field of technology transfer reaffirms the Community dimension and provides benefits both to the more and the less advanced regions, and indeed European competitiveness as a whole.

Regional technology transfer projects therefore involve the development of North/South co-operation systems to give the R&D sector in the disadvantaged regions better access to the high-performance European networks. The RITTS projects of the DG XIII are financed under the Innovation Programme and they can be located throughout the EU and the European Economic Area. (Source: www.innovating-regions.org – The Network)

3.4 RIS/RITTS Methodology

Both the RIS and RITTS are aimed at supporting regional governments and/or development organisations in undertaking a thorough assessment of the regional innovation system. The assessment should include managerial, financial, commercial, training and organisational issues as well as purely technological ones. The resulting strategy should provide a framework for optimising innovation policy and infrastructures at the regional level, especially with regard to their relevance to the needs of small and medium sized enterprises. It should be designed to promote co-operation between the private sector, SMEs in particular, the research, technology development, and public administration with a view to improve the regional innovation system.

The underlying methodological framework proposed aims to reflect the systemic model of innovation, which emphasises the contribution made by all actors within the entire production chain, from supplier to customer, and within the regional

innovation system, from universities and technology centres to individual SMEs. It also underlines the necessity of developing an endogenous development trajectory in the LFRs, which has long-term implications for sustained growth, rather than simply focussing on improving technological capacity. The objective is to improve existing capacities as well as to exploit the possibilities for new areas of development, rather than to limit the development of innovation systems to high-tech sectors. (Landabaso & Reid: 1997).

After being chosen for a RIS/RITTS, five steps are proposed by the Commission in undertaking such a programme. Figure 3.1 shows in detail what is required under each on the five steps of a RIS project – however the methodology guide for the programmes uses the same methodology for both programmes. For a detailed explanation of this methodology see Landabaso & Youds (1999).

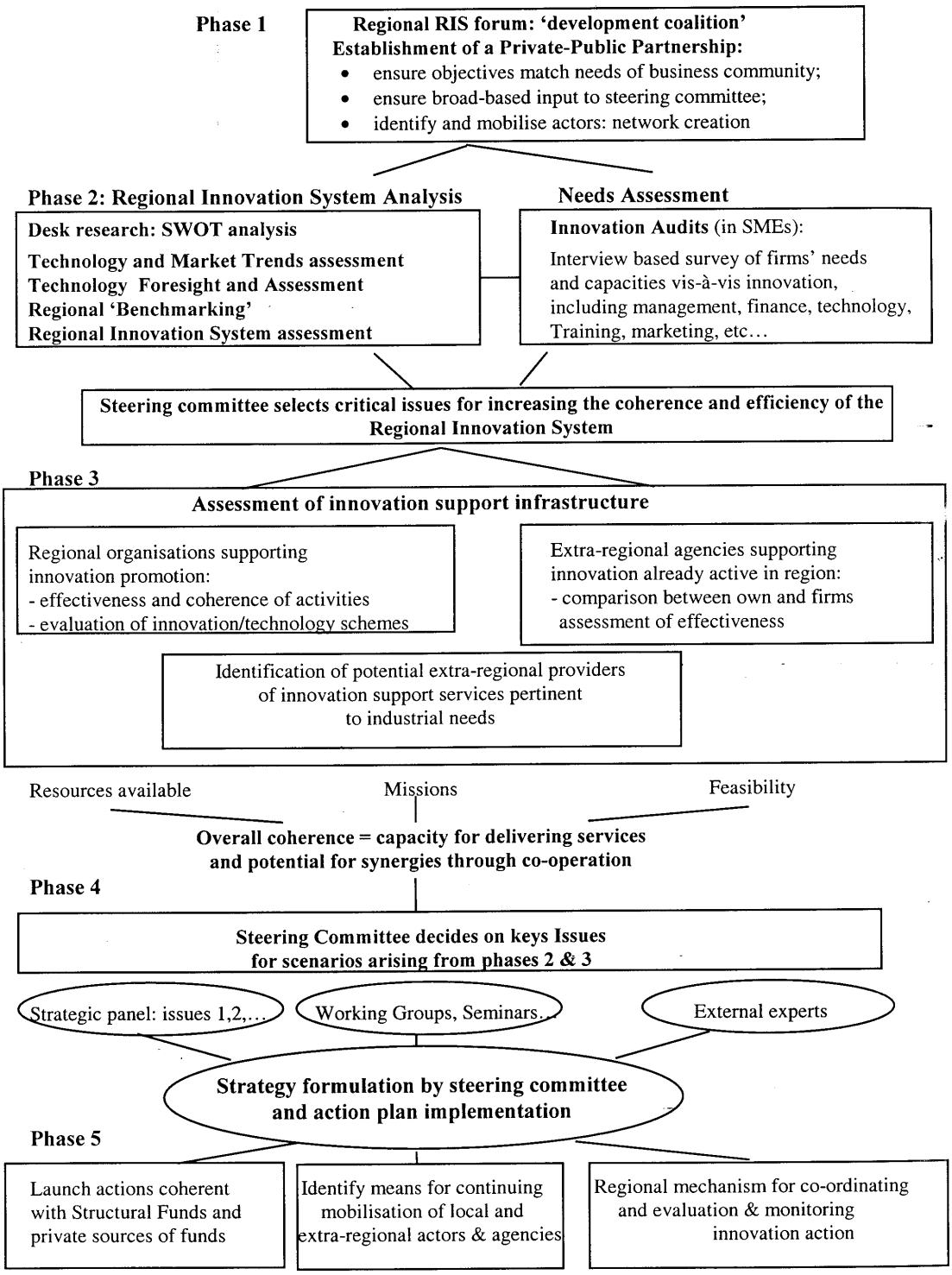

Figure 3.1 Methodology for RIS/RITTS programmes

(Source: Landabaso & Youds: 1999, pg 7)

3.5 Criteria for region inclusion in study

The research attempted to include all of the RTP/RIS & RITTS that have been undertaken. Each region was contacted by e-mail, fax or post and asked to provide information and complete a blank structure and organisation chart. The structure and

organisation chart was developed by the RITTS/RIS Subgroup "Best Practice in Inter-regional Innovation Policy" for their, Benchmarking on Innovation Promotion in the Regions – Structure and Organisation report, of December 1998. The report was aimed to provide criteria to help other regions evaluate their own innovation promotion structure in comparison to others, and to show that different structures exist between the various member states. The study was a systematic representation of structure and organisation and did not deal with explanations of mechanisms of how innovation in the regions is promoted and supported.

The results presented were gathered from the sub-group members, and included 12 regions from 8 member states. 9 of the regions fall into the first generation RIS/RTP, with 2 from the (Regional Innovation & Technology Transfer Strategies) RITTS programme and 1 from the 1998-2000 RIS pilot projects. For the current study a blank structure and organisation chart was sent to the remaining regions involved in the programmes. 8 were returned and the study therefore includes the following 20 regions:

Table 3.1 – Regions included in the study – by country

NETHERLANDS	**GREECE**	**GERMANY**
RTP Limburg	RIS Sterea Ellada	RIS RAHM
RITTS Overijssel	RIS Thesaly	RITTS Neubrandenburg
RITTS Utrecht	RITTS Crete	RIS Weser-Ems
	RITTS E.Macedonia & Thrace	
BELGIUM	**AUSTRIA**	**PORTUGAL**
RIS Limburg	RIS Lower Austria	RITTS Lisbon & Tagus
SWEDEN	**SPAIN**	**ITALY**
RITTS East Sweden	RIS Castilla La Mancha	RIS Calabria
	RITTS Asturias	RIS Puglia
IRELAND	**UNITED KNIGDOM**	
RIS Shannon	RIS Strathclyde	

3.6 Classification of regions

The methodology (section 1.4) specifies the way in which the research is tackled. It introduces the idea that there is diversity within the regions, which is what the paper aims to parallel with structure and organisation. The research questions are focused on the idea that there is indeed a strong correlation between a regions socio-economic position, innovation level and resulting structure and organisation.

The diversity within regions is quite pronounced within the EU and this paper uses a classification of the regions to bring into focus the main differences between them. With this established the paper researches typologies between the distinct categories of regions, their context and their structure and organisation.

3.6.1 ERDF Classifications

The regions within the European Union have been classified into objective areas according to the 'type' of regions they are. Throughout the 1994-1999 programming period, the European Regional Development Fund (ERDF) concentrates assistance on the objectives corresponding to these 4 kinds of regions, which are:

- Objective 1: promoting the development and structural adjustment of regions whose development is lagging behind.
- Objective 2: converting the region or parts of regions seriously affected by industrial decline.
- Objective 5: facilitating the development and structural adjustment of rural areas.
- Objective 6: development and structural adjustment of regions with an extremely low population density.

Although these objective areas provide a useful classification, they are reflective of a more economic approach. It classifies objective 1 and 2 areas by economic performance, objective 5 by geographical placement (though this does have economic implications) and objective 6 by number of inhabitants. For this paper the classification sought should be more reflective of innovation and the ideology presented in chapter two, and therefore the ERDF classification was dismissed. What was found was a classification that was more in line with the current study, this classification is presented in the following sections.

3.6.2 Theoretical Approach Towards Classification

The theoretical background presented in chapter two distinguished between two distinct schools of thought, namely the neo-classical and evolutionary. In relation to grouping regions, the two schools have a very different perspective, which are outlined in the Second European Report on S&T Indicators 1997.

The neo-classical school suggests that technological differences between groups of regions define regional economic growth processes, and that once control has been

made for the technology variable a type of catch-up should be found, which is reflected in the neo-classical growth model. In other words they believe that there is a strong correlation between technology intensity and economic growth. (European Commission 1997)

As identified in chapter two this linear causality between scientific progress and economic benefits has been vigorously questioned. Influenced by the evolutionary thought, an approach to link science, technology and innovation in a more systemic way was developed. The main argument is that the three form an interrelated set of activities that evolve with one another. And that by concentrating on only one aspect, and not making the link between the structure in the area, the science base, or technology policy, a situation of unevenness will occur. (European Commission 1997)

The S&T report proposes that regions can be grouped into clusters - which gain the classification by having a similar science, technology and innovation base, reflecting what has been developed in chapter two as the 'innovation system'. Taking this as the starting point the European Commission, in the report on S&T indicators 1997, presents a typology of classification in four clusters. This is presented in the following section and will be the classification employed in this research paper.

3.6.3 The 'Systems of Innovation' Approach

The S&T indicators report uses a study by Clarysse and Muldar (1997) which argues that clustering is the most appropriate technique to construct a typology. And that a "score card should be developed for each region which analyses different variables concerning the industry structure, the technology system, and the science base."(EC 1997: pg 359) The study realised that there are many highly correlating variables which were not deemed discriminating enough to serve as a basis for a cluster analysis. A principle component analysis was performed to reduce the initial set of data resulting in 5 variables which cover the two underlying factors: Economic and Technological. (European Commission 1997) The variables of which these two factors are composed of are:

Economic:
- growth in GDP per capita, 1989-1994
- average unemployment rate, 1989-1994
- percentage of employment in the agriculture sector

Technological - average no. of EPO patents per 1000 population[2]
- 3rd FP-participation (share in total)[3]

This produced 4 distinct clusters within the regions of the EU:

Cluster 1: Highly agricultural, low economic growth, very limited technological activity and acceptable unemployment rates. This cluster has been called the SLEEPING BIRDS of Europe.

Cluster 2: Somewhat rural, high economic growth, some technological activity, but facing the highest average unemployment rate. This group has been called the QUESTION MARKS or WILD CATS in Europe.

Cluster 3: Industrialised, very low economic growth, medium to high economic activity and a medium unemployment rate. The have been called the CASH COWS in Europe.

Cluster 4: Fast growing, extremely technology intensive group with a low unemployment rate. They have been called the STARS in Europe.

Appendix 4 shows the final typology that was derived from the cluster analysis. As you can see this study has a limited coverage of regions and for this reason there has been, in consultation with representatives from the EC, the need to additionally classify a few regions that are included in the research paper, but did not fall into the classification system boundary. This was done through a careful examination of employment figures, GDP, patents and industry type. The resulting classifications of the regions included in the study are presented in table 3.2

[2] EPO is the European patent system – and the amounts refer to applications not approvals

[3] 3rd FP is the 3rd Framework Programme of the European Commission – see chapter 9 of the S&T Indicators Report for definition of its content.

Table 3.1 Regions and Classifications for Current Research

CLUSTER ONE Sleeping Birds	CLUSTER TWO Question Marks	CLUSTER THREE Cash Cows
GREECE	**ITALY**	**NETHERLANDS**
Thessaly	Puglia	Limburg
Sterea Ellada	**SPAIN**	Overiissel
E.Macedonia & Thrace	Castilla La-Mancha	Utrecht
Crete	Asturias	**U.K.**
ITALY	**IRELAND**	Strathclyde
Calabria	Shannon	**SWEDEN**
	PORTUGAL	East Sweden
	Lisbon & Tagus Valley	**GERMANY**
		Weser-Ems
		Neubrandeburg
		RAHM
		BELGIUM
		Limburg
		AUSTRIA
		Lower Austria

3.7 Questionnaire

The questionnaire, as stated in the methodology, was a source of information for three different areas of the research paper. The six areas of questions included are used primarily for different aspects of the paper and their uses are described in the following paragraphs. The questionnaire, with aggregated results, can be found in appendix 3.

Questions on Actors, Integration and Network Development – 1-20, are used for the qualitative analysis in section 5.3. They were developed using factors included in Bennett & McCoshan's (1993)'Models of Networks', which is the base for the comparison of the structure and organisation charts and the network outcomes produced.

Questions on Regional Dynamics – 21-25, are applied in section 5.6, analysing the regional innovative environment, regional dynamics and outcomes of the RIS/RITTS programmes. These are used in conjunction with the structure and organisation charts to develop a description of the regional dynamic as either being pro-active or reactive in nature. This is used to determine if there are patterns between the structure and organisation of the programme and the dynamics within the region.

Questions on R&D and the role of SMEs – 26-32, were developed with the characteristics employed by Sweeney (1987) in his analysis of regional types in light of technology and entrepreneurship. This is used together with the socio-economic and research indicators in chapter 4, to build a strong picture of regional context present in each of the classifications in the paper.

The questions on environment – 33-35, are used again in section 5.6, where they are intended to help identify the promoting and inhibiting factors for regional innova-

tive development in the environment. They again tie in with chapters 4 in seeing if there are certain contexts that contain certain combinations of factors, and also if certain networks have developed and been influenced by these factors. Additionally they are used in conjunction with the last set of questions on the outcomes of the process to see if they have had a large influence.

The last set of questions on the outcomes of the programme - 34-37, are in essence looking at the types of projects the programme has developed, and also to see if there are certain aspects in the region that have either promoted or inhibited the process. These are discussed at the end of chapter 5.

4. CONTEXT ANALYSIS IN THE REGIONS

As stated earlier the reasoning behind the use of socio-economic indicators was to establish if in fact there are patterns between the context of the regions and their structure. Further, this reasoning helps us determine if there are specific regional contexts within each of the clusters. This section therefore provides an overview of the situation in the regions, and is divided into two main areas. The first is socio-economic indicators and the second focuses on research and development issues. This analysis is then extended by using a set of answers from the questionnaire – those on R&D and the role of SMEs – to see if the contexts reflect a particular type of environment based on Sweeney's (1987) classifications which are realised through focusing on technology and entrepreneurship. This analysis provides a strong definition on context within the three clusters and becomes the base for measuring against outcomes from the RIS/RITTS programmes in terms of structure and organisation, i.e. networks.

For socio-economic background a number of indicators are used to build a picture of the regions production system i.e. type of employment, value added, migration, density of SMEs. This type of information allows us to see within what context innovation strategies are being employed, which could lead to conclusions about production systems and innovation strategies. The research and development indicators include such items as, expenditure on R&D, type of expenditure on R&D i.e. product vs. process, and education in regions. Together these help us to examine how the region is contextually built, and provide some answers in paralleling context and innovation effort – in particular the building of networks for the promotion of a 'innovative system'.

4.1 Socio-economic indicators

The socio-economic indicators are firstly introduced for their input to the research paper and then the data is represented by cluster. This gives both the theoretical reasoning behind the indicator and provides us with a strong picture of similarities and differences between the clusters.

4.1.1 Employment by Sector

This is a very standard indicator which will show within which type of production system a region falls. This will show us if there is a persistent pattern between the cluster typology and type of production system (Figure 4.1).

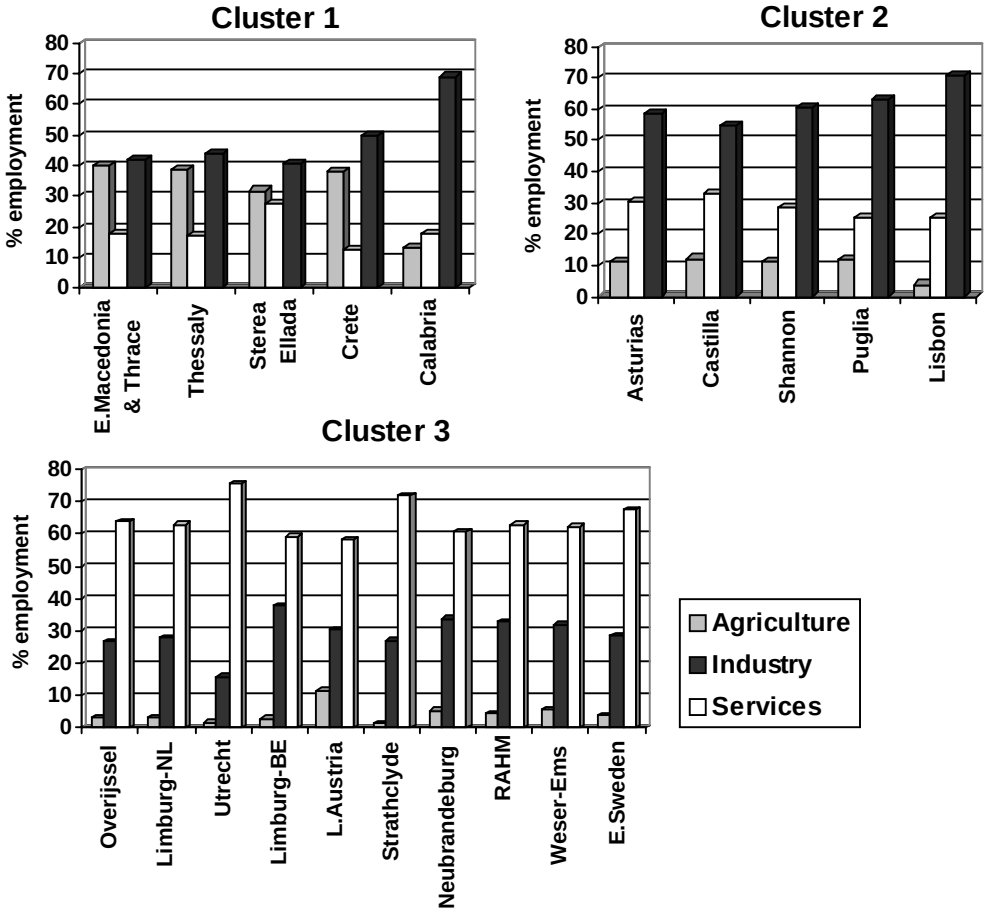

Figure 4.1 Employment by Sector 1997 (source: EC (1999) Sixth Periodic Report of the Regions)

Table 4.1 Change in unemployment 1987-1997 (source: EC (1999) Sixth Periodic Report)

		<-2.4%	-2.4%--0.6%	-0.6%-1.2%	1.2%- 3%	>3%
CLUSTER 1	E.Macedonia		x			
	Thessaly			x		
	Sterea Ellada		x			
	Crete			x		
	Calabria			x		
CLUSTER 2	Asturias				x	
	Castilla					x
	Shannon	x				
	Puglia					x
	Lisbon		x			
CLUSTER 3	Overijssel	x				
	Limburg – NL	x				
	Utrecht	x				
	Limburg – BL	x				
	Lower Austria			x		
	Strathclyde		x			
	Neubrandeburg					
	RAHM					
	Weser-Ems			x		
	East Sweden					x

4.1.2 Unemployment

Changes in unemployment rates (Table 4.1) are used in addition to unemployment (Figure 4.2), giving an indication if the region has been providing more jobs. This is a good reflection if economic growth is felt region wide, or is simply due to one sector.

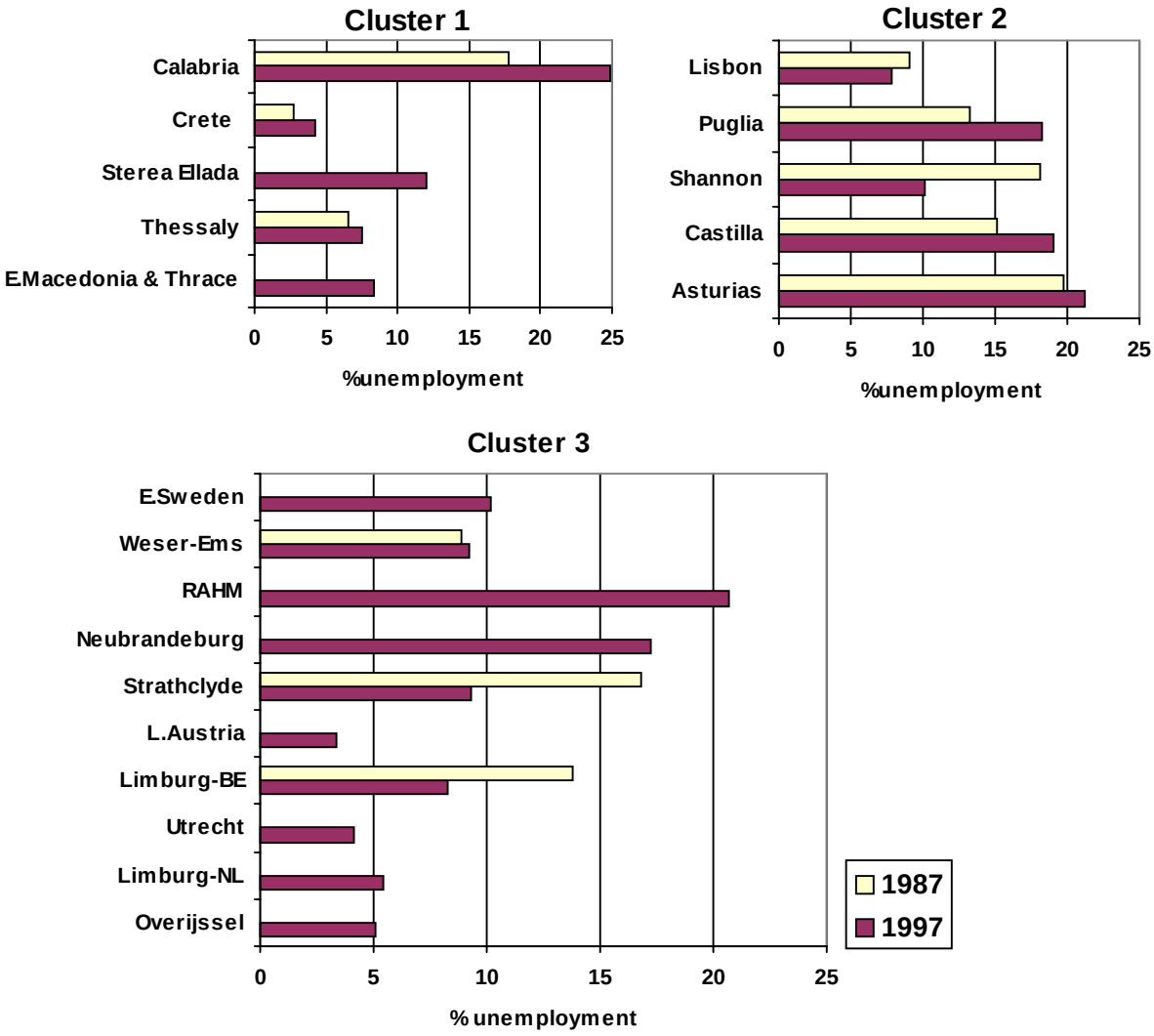

Figure 4.2 Unemployment rates 1987 & 1997 (source: EC (1999) Sixth Periodic Report of the Regions)

4.1.3 Migration

Migration goes hand in hand with unemployment, as it shows how well the region is able to provide employment for its population. If migration is high then the region is definitely not providing enough growth to accommodate for population increases. Table 4.2 shows the movement in both population growth and migration, (0) indicating no change, (+) being an increase in the region and (–) indicating movement out of the region.

Table 4.2 Population growth and migration

		Population Growth	Migration
CLUSTER 1	E.Macedonia & Thessaly	0	0
	Sterea Ellada	0	+
	Crete	+	+
	Calabria	+	-
CLUSTER 2	Asturias	-	0
	Castilla la-Mancha	0	+
	Shannon	+	0
	Puglia	+	0
	Lisbon	0	0
CLUSTER 3	Overijssel	+	0
	Limburg – NL	0	0
	Utrecht	+	0
	Limburg – BL	+	0
	Lower Austria	0	+
	Strathclyde	0	0
	Neubrandeburg	-	+
	RAHM	0	0
	Weser-Ems	0	+
	East Sweden	0	0

(source: EC (1999) Sixth Periodic Report of the Regions)

4.1.4 GDP

GDP (Figure 4.3) is a basic indicator that indicates the level of output per head that a region is producing. It is useful in its simplicity, but should be carefully interpreted. The data used in this paper is corrected to the purchasing power standard. (PPS)

4.1.5 Value added

Value added (Table 4.3) shows how much each region is converting products along the value chain within its boundaries. This obviously increases trade and income from trade. It is one of the better indicators to show just how much a region in being innovative, in the sense of developing its value added chain. Additionally, value added may be preferable to GDP as it avoids biases due to changes in the structure of the pro-

duction process. The data used here is corrected for population, which gives an even better picture of production in the regions. This data is however not widely available at regional level – particularly in cluster 1 regions. However a general indication can be found when we look at the available data for regions in cluster 2 and 3 classifications.

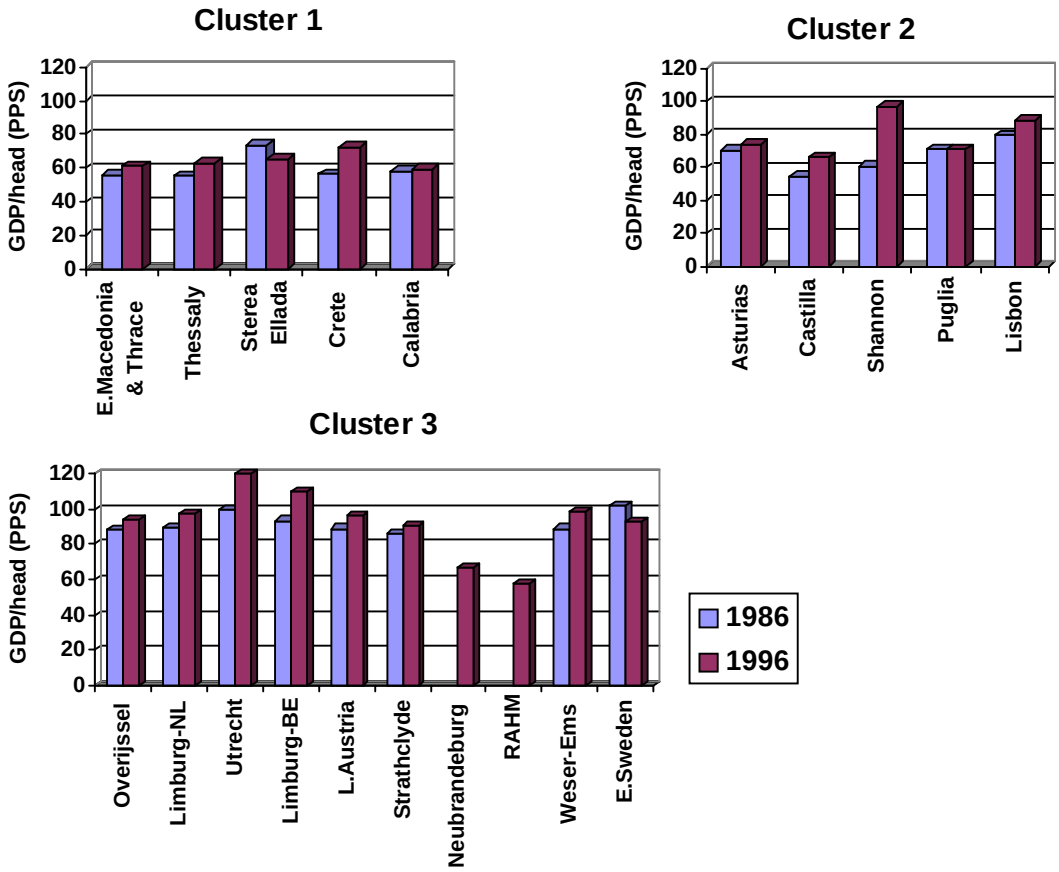

Figure 4.3 GDP 1986 & 1996

Table 4.2 Value added for cluster 2 and 3 (source: Caniëls 1999: pg 155)

		Value Added
CLUSTER 2	Asturias	<0.25%
	Castilla	<0.25%
	Shannon	<0.25%
	Puglia	<0.25%
CLUSTER 3	Overijssel	1-2%
	Limburg – NL	1-2%
	Utrecht	2%
	Limburg – BE	0.5-1%
	Strathclyde	0.25-1%

4.1.6 Density of small and medium enterprises

SMEs are increasingly being recognised as playing an important role in the fostering of economic progress at the regional level. They do not necessarily create technology in the traditional sense, but are among the leading adopters. They have a role in bringing R&D efforts of large enterprises to the market in a more flexible way, with the focus changing from technological development to innovation diffusion as a way to stimulate growth. SMEs are increasingly seen as the preferred agency to promote this (Table 4.4).

Table 4.3 Density of small & medium local units 1994 - All Clusters

	<25	**30-35**	**>=35**	**no data**
CLUSTER 1	E.Macedonia Thessaly Sterea Ellada Crete Calabria			
CLUSTER 2	Asturias Puglia		Castilla Lisbon	Shannon
CLUSTER 3	E. Sweden	Limburg-BE L. Austria Neubrandeburg RAHM Weser-Ems		Overijssel Limburg-NL Utrecht Strathclyde

4.2 Research & development indicators

There are a large number of indicators that can reflect levels of innovativeness. What is presented here is a short explanation of why the indicator is used, although in the explanation of other indicators it may well be rebuffed. What the selection has tried to achieve is a set of indicators that can provide the broadest picture available of innovation in a region, taking into consideration all the pro's and con's of each indicator.

4.2.1 Patents

Patents (Figure 4.4), which have been defined by Landabaso (1995) as the 'inventiveness co-efficient' indicate how enterprises perform technologically. Patent data is publicly available and covers a wide range of technologies. In being so closely linked to invention, data on patent applications are often considered as an extremely useful proxy for technological output. Patents can be used as an alternative to business expenditure in research and development (BERD) if sufficient data is not available. For

comparison between EU regions, the Sixth Periodic Report of DG XVI was used. This report makes use of Eurostat's database on regional patent applications.

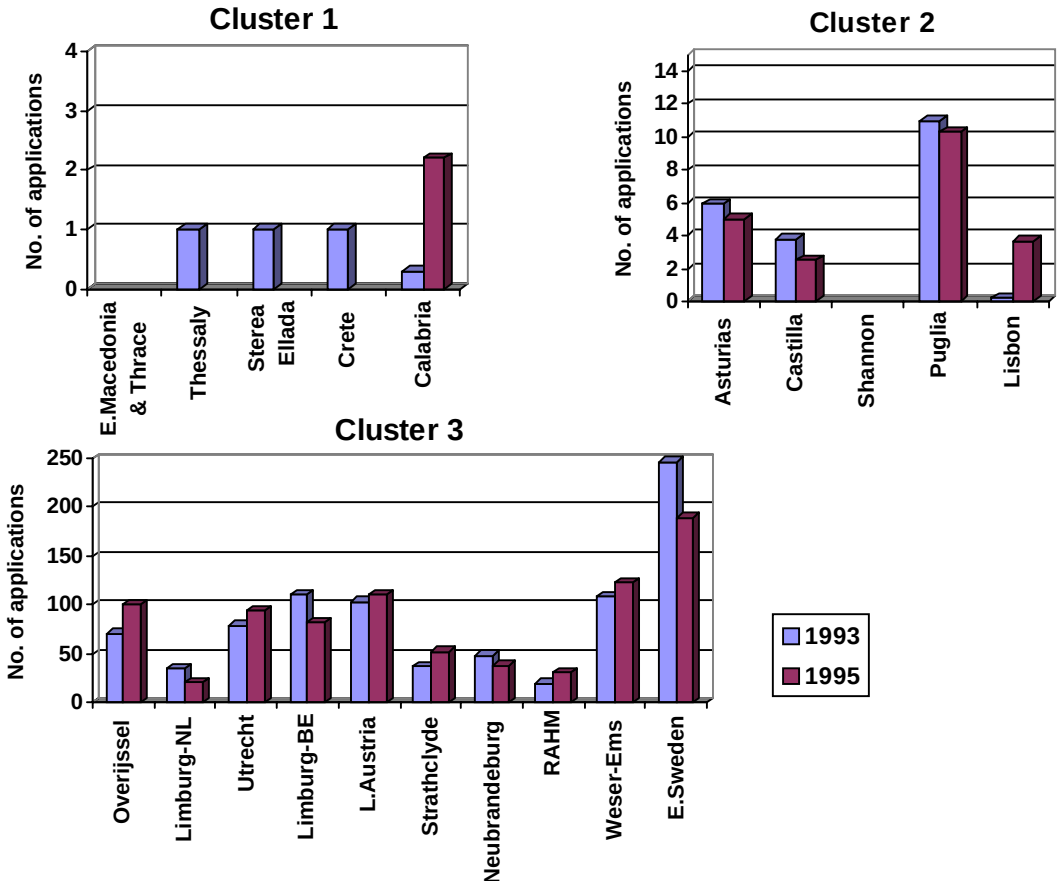

Figure 4.4 Number of European Patent Applications (source: EC (1999) Sixth Periodic Report of the Regions)

4.2.2 Expenditure on R&D

Although patents can show how 'innovative' an enterprise or let's say region is, it is by no means a presentation of the full picture. A region may well be innovative, while not actually being inventive. Other indicators are therefore useful in defining innovativeness, in particular expenditure on research and development.

The idea that Gross Expenditure as a percentage of GDP (GERD) is a good indicator of technological innovation is basically derived from the linear model of innovation. This model assumes that investment in basic research is strongly correlated with technological innovation in the market place. The policy conclusion is simply to spend more money on R&D. It is obvious that one of the major problems is not the

generation of new scientific knowledge, but in translating this science into commercially viable products. This is partly reflected in the percentage of Gross Expenditure on R&D which originates in the enterprise sector. This is know as Business Expenditure on R&D (BERD) of which we have information on the regions in Europe (Figure 4.5).

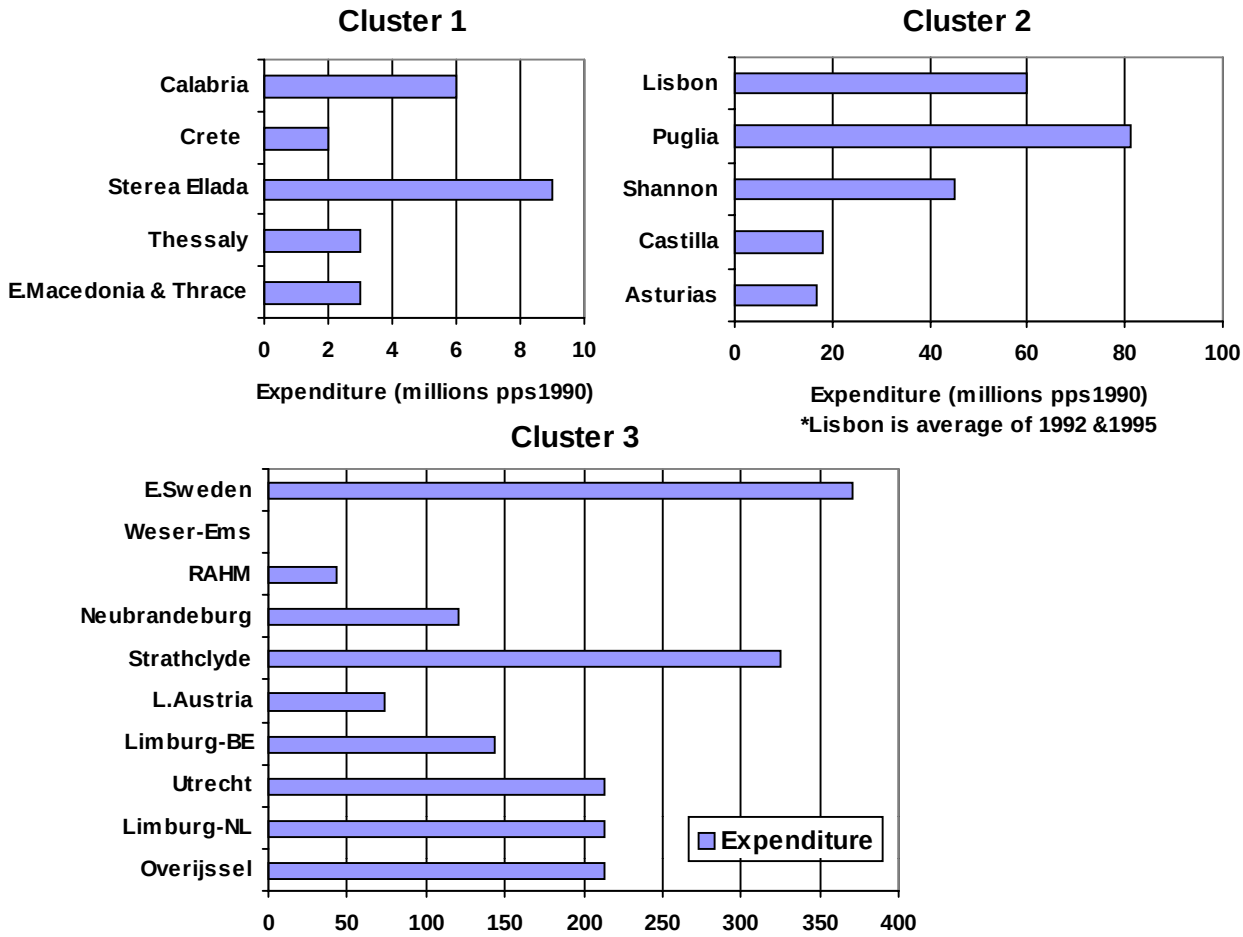

Figure 4.5 Business enterprise sector expenditure on R&D 1993
(source: EC (1999) Sixth Periodic Report of the Regions)

4.2.3 Employment in R&D

Employment in research and development (Figure 4.6) provides an idea of what percentage of the population is involved in innovative activity. It reflects the importance placed on R&D, as employment shows the intention of government and other actors to actively promote innovative activity. The data presented for R&D employment is further defined into private sector, public sector, and higher and further educa-

tion, which illustrates which regions have a stronger push from which sectors for the promotion of R&D.

4.2.4 Growth in GDP

It seems that the leading regions are able to exploit the technological benefits in terms of patents, while most regions can not. However, not all regions need to be technology 'leaders' in order to be economically profitable, some might profit from technology adoption and some might focus on innovation in a non-technological sense.

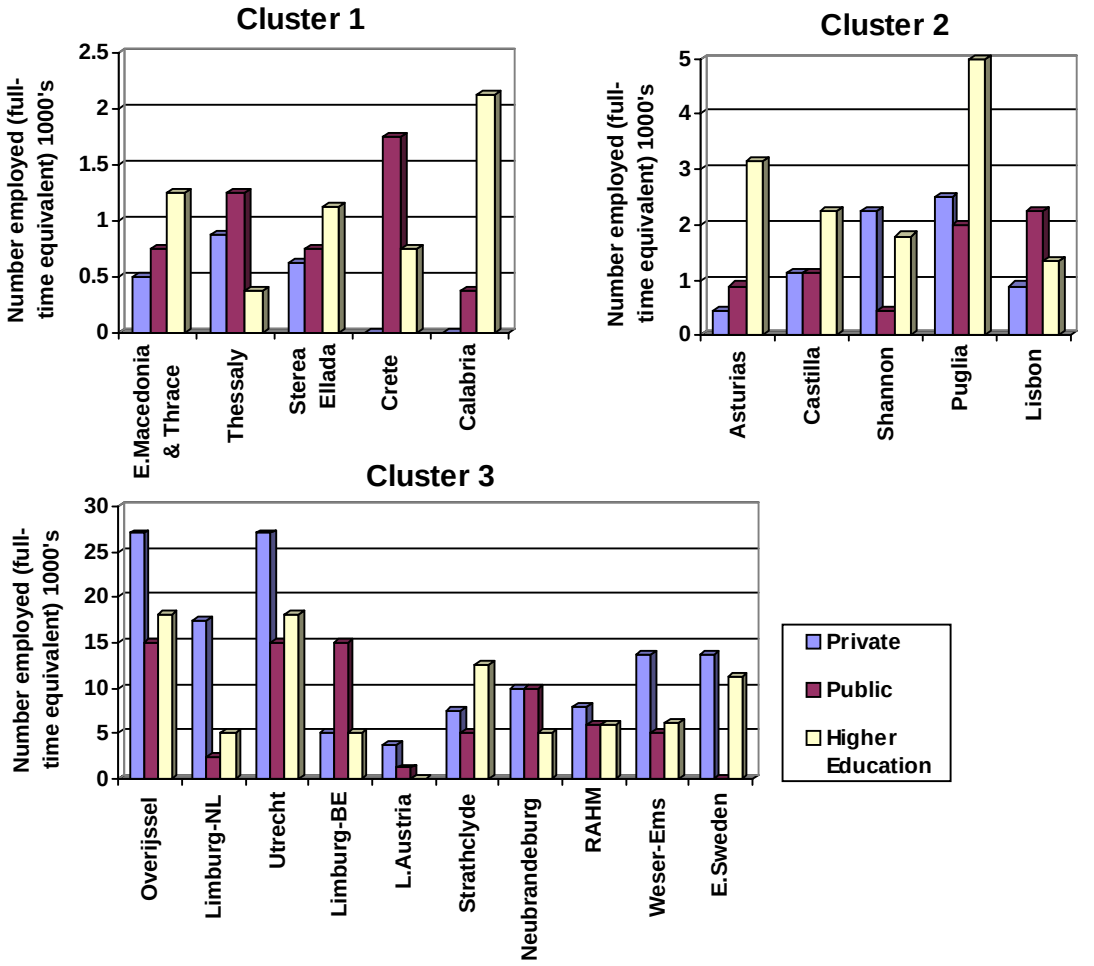

Figure 4.6 Employment in R&D 1995 (source: EC (1999) Sixth Periodic Report of the Regions)

Innovation therefore does not necessarily have to be R&D driven, regions may have a prosperous service sector, which is not covered by the traditional technology indicators. Therefore the inclusion of and indicator such as GDP can also show us something valuable. (See Figure 4.3 and Table 4.2)

4.2.5 Education & Training

The competitiveness of regions depends not only on physical infrastructure and spending on R&D but also on increasing the skills of the regional workforce. Effective educational and training systems are therefore important in strengthening comparative advantage. The data for educational indicators that was available at the regional level shows the attainment level of education (Figure 4.7).

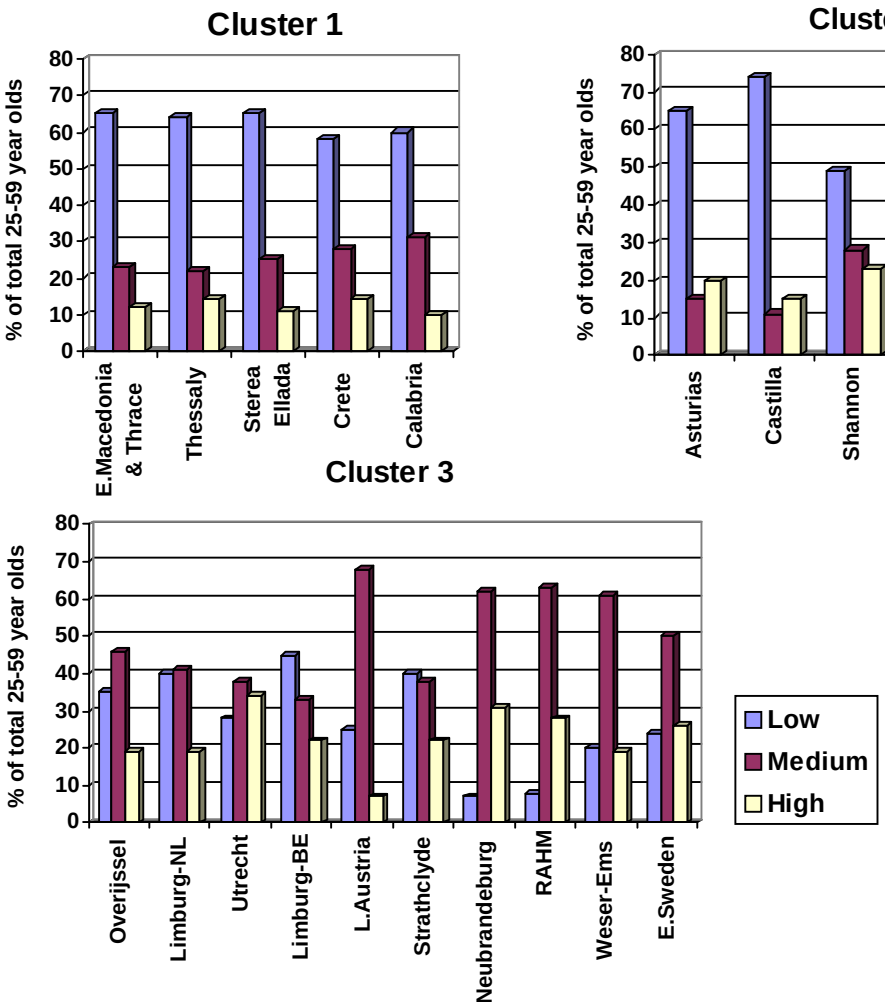

Figure 4.7 Educational attainment of 25-59 year olds
(source: EC (1999) Sixth Periodic Report of the Regions)

4.3 Observations of indicators

The indicators presented above are used to provide an overview of the regions and build a picture of the context present in each. They are not intended as a measure of innovation, as the focus of the paper is not about measurement of the situation

through indicators, but is primarily about the networks that have been developed through the implementation of the RIS/RITTS programmes. In chapter two the concept of the 'innovation system' was introduced. Leading from this the observation in this chapter is primarily about determining what sort of context, or lets say innovation system, is prevalent in each of the clusters of regions. Once this has been established we can begin to see what the effect of context (i.e. type of innovation system) has had on implementation of the RIS/RITTS programme, i.e. the structure and organisation that has resulted.

The research questions presented in chapter one however, do try to establish if there are indeed similarities in context between each of the clusters. As the clusters are based on innovation typologies, through analysis of these indicators we can begin to determine if there are any patterns across them, hence dealing directly with question 2. The research paper further aims to distinguish if these specific type of contexts have influenced how and by whom the RIS/RITTS programmes were implemented. Therefore, these contexts will, in the next chapter, be studied alongside the structure and organisation of the regions (by cluster) in regards to the RIS/RITTS programmes.

In addition to this straight-forward presentation of context patterns in the classifications, this section will also parallel these contexts with Sweeney's (1987) characteristics of regions. Sweeney has classified regions in light of their innovativeness by focussing on entrepreneurship and technology. This is an interesting theoretical perspective of innovation and can be useful when looking at regional context, particularly when paralleling them against the structure and organisation of an innovation programme such as the RIS/RITTS programmes.

4.4 Summary of context by classification type

The indicators presented here provide us with some interesting conclusions to the context within the three cluster types. At this point it is more relevant to describe each cluster type as a whole in comparison with the other types. By examining the outcomes of the indicators it is evident that there are indeed patterns within each cluster type.

4.4.1 Sleeping Birds – Cluster One

The sleeping birds have the highest percentage of agricultural employment of all classifications, an average unemployment rate of between 5-10% - much lower than

cluster two and a little lower than cluster three, although they have the smallest change in unemployment of all the clusters. If we take the addition of both population growth and migration we can see the overall effect on the region, in cluster one all but 1 region is experiencing a balance between the two, the others experiencing a negative flow. In terms of GDP, cluster one is producing the lowest amount, along with the smallest (positive) changes. Cluster one also has the lowest density of small enterprises, produces a very low number of patents, spends by far the least on R&D than the other clusters, and has the least people employed in R&D. Its R&D employment is found mainly in the 'higher education' or 'public' sectors, and it's educational attainment level shows that only approximately 40% are reaching either high or medium levels.

In summary, the sleeping birds - cluster one, seem to have very low growth prospects. The levels of R&D are considerably low, which could lead to the conclusion that they are still using old technologies and/or not investing in new ones. Technological demand will not be high due to low levels of education and the small number of SMEs, who additionally are not spending large amounts in R&D. Although the future does not seem that optimistic, the unemployment rate is not yet that high. What is needed is a new injection of technology into a more absorptive environment to retain the low level of unemployment and to create the multipliers that new technology can have into a regional economy such as these.

4.4.2 Question Marks – Cluster Two

The questions marks have their largest employment in the service industry, although show a marked increase in industrial sector employment compared to cluster one. However, they have the highest unemployment levels of all clusters and have some of the highest increases in unemployment levels between 1987 and 1997. They are more irregular in the outcome of population and migration effects, with two regions showing negative movement, two regions showing positive movement and only one with no change. The level of GDP is higher than that of cluster one, with slightly larger growth between 1986 and 1996. The level of value added is less than .25% in all regions, while the density of SMEs varies from the lowest to the highest amongst the regions in all clusters. Spending on R&D in the business sector is however much larger than cluster one, although still considerably lower than cluster three. The level of patents is distinguishable, although no where near levels achieved in cluster three. Employment in R&D is, as in cluster one, concentrated in the public and higher education

sectors, although there is a marked increase in the percentage that is being spent in the private sector. Educational attainment is still concentrated in the low level, but there is an increase of the population achieving a higher level.

In summary these question mark regions are the most heterogeneous of all the three classifications, although still having a distinct pattern in comparison to the other two. Their still moderately low GDP and alarmingly high levels of unemployment, along with low rates of patent applications pose serious problems to their economic growth. While their density of SMEs, expenditure and employment in R&D, and a certain level of highly educated population offer opportunities to try and reverse the situation.

4.4.3 Cash Cows – Cluster Three

The cash cows show a marked difference from the other two clusters. They have a low level of agriculture and in comparison a higher level of industrial employment. Unemployment is varied, with only two regions having alarmingly high levels, although the change has, in the majority, been increasing between 1987 and 1997. The flow from population growth and migration has on the whole been stagnant or positive, with only a few regions experiencing negative flows. GDP is also higher, although not exceptionally more than cluster two. The indicators that differentiate this cluster from the others are those that pertain more to innovation. Value added is higher, they have on average more SMEs, who apply for more patents and spend significantly more on R&D, additionally the private sector is in most cases the biggest employer in R&D. Lastly the population has a much higher level of educational attainment, particularly in the medium level – which is in general enhances the SME environment in terms of demand for new technology.

In general this cluster is made up of relatively prosperous regions. Overall this cluster shows signs of being more technological minded, and are by far the most technological intensive of the three classifications, although they have not reached a level where they are economically viable due to both levels of unemployment and/or GDP.

4.5 Setting context within an entrepreneurial perspective

The previous sections have built a picture of the general context present in each of the clusters. To give some body to the analysis, and a strong definition to our 'innovation systems' it is worthwhile to give some kind of terminology to each. A num-

ber of regional analysis' have been done that do exactly this, one which is particularly interesting is that of Sweeney (1987). Sweeney characterises regions by their level of technology and entrepreneurship, which for this paper, and in conjunction with the classification of clusters used, provides the perfect opportunity to embellish our contexts for parallel with the structure and organisation charts. By examining the above outcomes of regional analysis in light of technology and innovation we can come to some level of realisation of these regional contexts in terms of promoting the implementation of innovation policy. As this paper aims to see what effect context has on implementation of the RIS/RITTS programmes, delineating these contexts using Sweeney's analysis can highlight the innovative aspects of context, which have a strong bearing on implementation of innovation programmes.

4.5.1 Characterising Regions by Technology and Entrepreneurship

Sweeney sees entrepreneurial vitality as the key characteristic of a region in generating prosperity within itself. His ideas reflect the premise that 'social capital' needs to be developed to increase levels of absorption for technology and create the momentum for sustainable regional development. He identifies a number of factors which he believes give a region this possibility for self-generating growth (1987: pg205) and from these has constructed a classification of regions which fall under the four groups of:

- Innovative and entrepreneurial
- Progressive and entrepreneurial
- Technology cyclic
- Technically isolated (Sweeney 1987: pp 206-211)

By comparing the factors within each of the above groups with the outcomes of the patterns produced in the socio-economic and innovation indicators analysis it is clear that the three clusters have a context that fits to one of the Sweeney's groups. In addition the answers of the questionnaire – in particular the set pertaining to R&D and the role of SMEs – strengthen this correlation. See appendix 3 for aggregated answers to the questionnaire.

4.5.1.1 Cluster One – Technologically Isolated

Cluster one – sleeping birds, reflect Sweeney's group of technological isolated. With a large agricultural sector, influenced by low technology and efficiency, there is little best technical practice in the region. The low level of medium educational attainment reduces technology pull into the region, although there is generally a strong entrepreneurial potential in that most of the population is self-employed. As seen above it is the isolation, specifically in terms of technical knowledge flows, that keep these types of regions isolated and unable to explore their full potential.

If we begin to explore the answers to the questions on R&D and the role of SMEs in the region, the correlation of this cluster with the technologically isolated group becomes even stronger. There is indeed a low level of linkages between large firms and SMEs, which in turn produces a low level of knowledge in these enterprises and low levels of adoption and adaption of technology. Further the SMEs in this cluster supply only locally, this greatly reduces the information flows, in turn reducing awareness of opportunities and indeed the demand pull for technology in the region. The networks at the SME level are established but because of their isolation and low levels of linkage within the region are unable to link to sources of information both inside and outside the region. As stated earlier the potential is there but the information flows impede progress.

4.5.1.2 Cluster Two – A Mixture of Typologies

Again, the heterogeneity of this cluster is reflected in the outcomes of the indicator analysis, which is reflected in the answers to the questions on SMEs and R&D from the questionnaire. With these differences in mind there is not one of Sweeney's technological types that this cluster can be defined as. This makes for an interesting comparison, as in the classification system these regions were seen to have an aggregated outcome that put them into the same innovative level category. What is apparent from the context analysis is that these regions have a number of factors from three of Sweeney's typologies. They have some elements of a Technically Progressive region, but also with factors evident that are part of a technically cyclic and/or technically isolated regions causing them to not fully reach the technically progressive level. In a number of regions there was either external control of firms or a large number of branch plants adding little to entrepreneurial potential or opportunities, in addition the linkages between small firms and larger firms was weak, again declining innovation

potential in SMEs. In most of the regions there was a number of factors reflecting the technologically isolated type of region, low levels of expenditure in R&D – particularly in the private sector, low levels of educational attainment – reducing technology demand, and an isolated SME sector in terms of information flows. What becomes apparent for this cluster of regions is that the aggregation of their positive and negative points brings them to an equal level of innovation output. In chapter 5 this will be explored to see what kind of networks are produced by this heterogeneous group.

4.5.1.3 Cluster Three – Technically Progressive and Entrepreneurial

Cluster three – Cash Cows, are reflective of Sweeney's Technically Progressive and Entrepreneurial group. They have a large percentage of employment in business, manufacturing (industrial) and administration (services). Value added is relatively high, leading to a demand for new technology, additionally this demand is supported by an educated population, particularly in the medium category. Expenditure of business enterprises on R&D is substantial, with the private sector employing the largest percentage in R&D. The density of small and medium firms are well connected to the large firms and suppliers, creating opportunities for SMEs to lock into the information flows, resulting in increased opportunities and a cycle of technology pull at this level. There are also strong linkages outside the region, resulting from the supply to external markets, creating awareness of new technology developments and best practice, resulting in higher levels of adoption and adaption of technology & innovation in SMEs.

5. INNOVATION NETWORKS IN THE REGIONS

The analysis of innovative performance through indicators such as R&D expenditure, patents etc are a valuable way to outline context and give some idea of the situation of a regions competitive situation. However, they do have limitations due to the fact that they do not allow a deeper insight into the particular micro characteristics that exist within regions. These micro characteristics consist of the strategies followed by the organisations/institutions within the regions and importantly how these organisations interact.

As discussed in chapter two, innovation activity is often measured by the level of R&D, however, as also recognised, it encompasses a lot more than R&D related measures and therefore there has been an increasing emphasis on innovation as opposed to technology. Technology itself represents just one of a series of factors that influence

innovation. However, the main focus on measuring innovation has been limited to this dimension, and although it covers innovation in both product and process there is a definite lack of emphasis on non-technological innovation.

This research paper has shown how the EC, through policies such as the RIS/RITTS programme, has put emphasis on promoting the non-technological aspects of innovation within the Union. The EC recognises that it plays an important conditioning role in supporting cohesion within the regions of the European Union. It also realises that its policy can only be effective if it is complemented by favourable environmental conditions. In this respect the RIS/RITTS programme is aimed at producing a more open environment where all actors at the regional level can build together, a strategy for innovation in the region.

The objectives of this paper, presented in chapter 1, centre on the regional environment. The idea is that structure and organisation within the environment is the crucial factor in successful innovation promotion, in other words, networks are a major element in achieving local integration as well as enhancing innovation. The contrasts of networks between areas create very different possibilities for development, the paper aims at showing that certain clusters of regions have similar innovation systems (contexts) and hence specific ways in which networks are developed for the implementation of innovation programmes i.e. RIS/RITTS.

The research paper researches structure and organisation by taking a closer look at the structure and organisation of regions, and how and by whom the RIS/RITTS have been undertaken within the regions. This analysis is then strengthened through an analysis of the environment and regional dynamics, which are seen as the basic foundation for such structure to be built upon.

5.1 Introduction to the structure and organisation charts

The structure and organisation charts used in the research paper are intended to build a picture of the way in which actors involved in the RIS/RITTS are spread among local, regional and national levels. The actors that are present in the chart include; political-administrative, higher education, research institutes, chambers of commerce, financing agents, and others like business and innovation centres. A blank chart was sent to all project managers in the regions participating in the RIS/RITTS programme, as their intimate knowledge of the region was required to fill in the chart.

The structure and organisation chart itself was developed by the RITTS/RIS Subgroup "Best Practice in Inter-regional Innovation Policy" for their, Benchmarking on Innovation Promotion in the Regions – Structure and Organisation report, of December 1998. The report was aimed to provide criteria to help other regions evaluate their own innovation promotion structure. Appendix 1 – shows the blank organisation and structure chart and appendix 2 the completed Structure & Organisation charts of the 20 regions included in the report.

5.2 Observations of structure charts

The objective of this research paper is to examine differences in context and then compare how it has effected the implementation of the RIS/RITTS strategy, ultimately determining if there are any patterns in the outcomes that can be linked to the context found in the three clusters of regions. Through this it is possible to establish if there are certain contexts that lead to certain implementation structures for such innovation programmes as the RIS/RITTS. For this purpose the structure and organisation charts will be allocated to their determined cluster, (which are presented in chapter two), and then an analysis will be done in both a descriptive, qualitative manner, and also in a more quantitative fashion.

5.3 Analysis of the structure and organisation charts - A qualitative approach

As has been stated, networks are necessary in enhancing innovation, and in light of the RIS/RITTS programme, to enhancing the environment for producing innovative projects. The aim of this research paper is to try and analyse networks within the context of this homogeneous RIS/RITTS programme, and come to a descriptive conclusion of what type of network has been developed through the programme. Further, using the context analysis of chapter 4, to try and establish if there is a correlation between type of network produced within given contexts. This idea is further developed through analysis of the regional environment and dynamic – i.e. have the attitudes inherent in these environments had an impact on the way in which the networks have been developed.

5.3.1 A Typology of Network Types in the Regions

Therefore, to begin the qualitative part of the analysis it is necessary to try and place each of the regions into a 'network typology'. For this research paper the models

presented by Bennet & McCoshan (1993) are used. The models/structures they outline are:

- Individual - fragmented action, possibility of conflict, with overlapping or gaps.
- Role – single leader, hierarchical structure, that is internally & externally top down.
- Club – Single leader, network structure, that is also internally & externally top down.
- Task – Teams and partnership networks for tasks, defined into fields of action.
- Responsive – Flexible task networks between agents and tasks.

(Bennet & McCoshan 1993: pg. 208)

Each of the structure and organisation charts are examined for factors that belong into one of the above structures. Using the answers from the questionnaire pertaining to the actors, integration and network development, the allocation of regions/clusters into Bennet and McCoshans structures is identified.

The answers from the cluster 1 regions show, that for the majority, the core actors in the programme are administrative bodies and universities. Integration in the programme is achieved through a single leader, with small actors being integrated using top-down approaches – through connections with higher levels such as the regional authority, chambers and larger firms – producing little to few private sector partnerships. Further there is little use of entire organisations – a single person is usually the active representative. Interaction at the three levels has been judged low to medium, with national actors showing a low level of influence in network building, regional actors a medium level, and local also a medium level, this has produced a feeling that long term structures will be only moderately well produced. Interestingly the actors that are more involved are the universities and chambers, and the actors with most commitment are the universities and SMEs. Inclusion into the programme has been predominantly through formal inclusion into the process, reflecting that the leaders – who are regional authorities & universities – have a lot of power over the inclusion of participants – private sector, SMEs & research institutes. Further the level of learning for network building is high, with large changes needed to produce a successful strategy.

This description is reflective of Bennet & McCoshan's traditional hierarchical - role network structure. There is a strong vertical division, which has led to a frag-

mented interaction of actors. The top-down planning experienced in this cluster also is distinctive of the hierarchical network structure, with interactions of actors being defined by role producing a static response to opportunities

Looking now to cluster 2, there is an obvious difference in outcomes to the questions. The core actors for these regions are all regional bodies, for example development agencies, associations, commissions etc, with the highest levels of interaction taking place within this level. Further, the smaller actors are integrated into the programme through these regional bodies, and although a lot of interaction takes place with intermediary bodies at the regional level there is still a high level of a top down approach reflected in the process. This is represented in the way that integration has been achieved - predominantly using a single leader to establish networks, reflective again of the higher level of influence from regional actors in network building. However, there is integration through activity type, this seems to takes place within the established networks through the core actors, proposing a certain level of cross-linkages, adding to the influence of local actors. All in all this has led to little to few private partnerships, but there is the feeling that flexible structures have been developed, with a moderate level of long term structures produced.

The overall picture in this cluster is that the core actors are regional bodies, with responsibilities being made to participants, such as research institutes, innovation centres etc, through a formal inclusion into the process. There is a medium level of bureaucratic influence from actor organisations that are seen to be quite involved in the process, although once again key personalities are seen to be very important. The high level of learning required by the actors for this type of process, along with moderate levels of change needed, could be the reason behind the under developed interactions of non-administrative actors.

This description is representative of Bennet and McCoshan's Single Leader - club network structure. There seems to be in each region a strong single central point secured by a strong central leadership. From this point there are links going outwards to the regional bodies that make up the list of core actors. The linkages within actors under these regional bodies and the links between the bodies themselves display a rather complex set of interactions. The level of influence from within organisations, and the seemingly top-down approach of this type of network, has seemed to hinder the local initiative to networking in this cluster.

Cluster 3 shows show, that for the majority, the core actors in the programme are spread across the categories. Integration in the programme is achieved by action type, i.e. actors connected through activity, with small actors being integrated into these activities through the working group, through inclusion into projects, and importantly giving them an equal participation in the process. These horizontal and vertical connections producing many private sector partnerships. Organisations are generally well represented, although key personalities play an important role. It seems that the regional and local level actors are most predominant in their influence on network building, producing a feeling that a high level of long-term structures will be sustained.

Interestingly the active actors come from all categories in the regions, with all seen as having a strong commitment to the programme, reflected in the fact that inclusion into the programme has been both through formal inclusion and at the other end of the spectrum through informal agreements. This seems to cater to the set up of a process in cluster 3 regions, where there is more flexibility and integration, particularly as the main actors include representatives from companies, development agencies and government. Additionally the participants are the universities and chambers – reflecting a bottom-up approach where the 'clients – i.e. SMEs and companies – are an integral part of the process. Perhaps this is explained by the fact that the level of learning for network building was seen to be medium, with some changes needed to produce a successful strategy, obviously this makes it easier for all actors to be involved at all levels.

The above description of the cluster three regions points towards Bennet and McCoshan's Teams and partnership - task network model. Networking is more flexible, and encourages broader networking and initiative. The bottom-up approach and inclusion of actors from all categories in the process has produced an environment where the structure is able to be tailored to all actors, i.e. allowing for integration at appropriate levels, and drawing on appropriate background and skills. The actors have a distinct input into the process while at the same time being linked to the network through the strong intermediary infrastructure.

5.3.2 Position of Main Actor/Manager in the RIS/RITTS Programmes

From the above section we can see that there are certain network structures present in the clusters. What is interesting to identify is where the actor responsible for the management of the programme is situated within the network. This will illustrate from

which level the programme is undertaken, reflecting the type of approach to innovation (bottom up or top down). Further it identifies within which category this main actor falls – which examines from what area/category a regions innovation focus is, i.e. political, education, development etc. Appendix 1 shows the structure and organisation charts, the horizontal axis showing these categories.

Table 5.1 Main actor position and category -Cluster 1 – Sleeping Birds

REGION	LEVEL	CATEGORY	ORGANISATION
Thessaly	Regional	Higher Education	University of Thessaly
Sterea Ellada	Regional	Political-Administrative	Region of Sterea Ellada
E. Macedonia	Regional	Higher Education	Democritus University
Crete	Regional	Technology Transfer	Science & Technology Park
Calabria	Regional	Other – Business Innov. Cntres	CALPARK

Source: innovating regions web site – www.innovating-regions.org

Table 5.2 Main actor position and category - Cluster 2 – Question Marks

REGION	LEVEL	CATEGORY	ORGANISATION
Puglia	Regional	Technology Transfer	Technopolis
Castilla	Local	Political-Administrative	Gvt. Castilla
Asturius	Regional	Other – Business Innov. Cntres	FICYT
Shannon	Regional	Other – Business Innov. Cntres	Shannon Development
Lisbon	Regional	Political-Administrative	Commission of co-ordination of Lisbon & Tagus Valley

Source: innovating regions web site – www.innovating-regions.org

Table 5.3 Main actor position and category - Cluster 3 – Cash Cows

REGION	LEVEL	CATEGORY	ORGANISATION
Overijssel	Regional	Political –Administrative	Province of Overijssel
Limburg –NL	Regional	Political –Administrative	Province of Limburg
Utrecht	Regional	Political –Administrative	Province of Utrecht
Limburg –BE	Regional	Development Agencies	Strategic Planning Limburg
Lower Austria	Regional	Political –Administrative	Regional Gvt Lower Austria
Strathclyde	National	Political –Administrative	Strathclyde European P/ship
Weser-Ems	Regional	Political –Administrative	Landkries Emsland
RAHM	Local	Other – Business Innov. Cntres	TTI – Magdeburg GmbH
Neubrandeburg	Local	Other – Business Innov. Cntres	Titan E.V.
East Sweden	Regional	Development Agencies	ALMI Business Partners

Source: innovating regions web site – www.innovating-regions.org

This exercise identifies some patterns of position of main actor across the clusters. While the clusters show a definite predominance of main actors being at the regional level, which is expected as they are regional strategies, it also highlights that in some regions local level management is predominant, suggesting the more bottom up approach.

What is interesting however is the pattern of categories within which these actors are present across the clusters. Cluster one is the only classification that includes representation in the higher education category, and has only minimum political management. Cluster two on the other hand is predominantly technology transfer and business & innovation centres, while in cluster three we see the majority of influence lies in the political-administrative category, with a number of development agencies – which moreover have strong political ties.

5.4 Analysis of charts using quantitative methods

Quantitative analysis of data develops a way in which we can view the structure and organisation charts in a simplistic manner. It provides an ideal for comparison by measuring the structure in the regions in view to their institutional thickness and also their vertical integration.

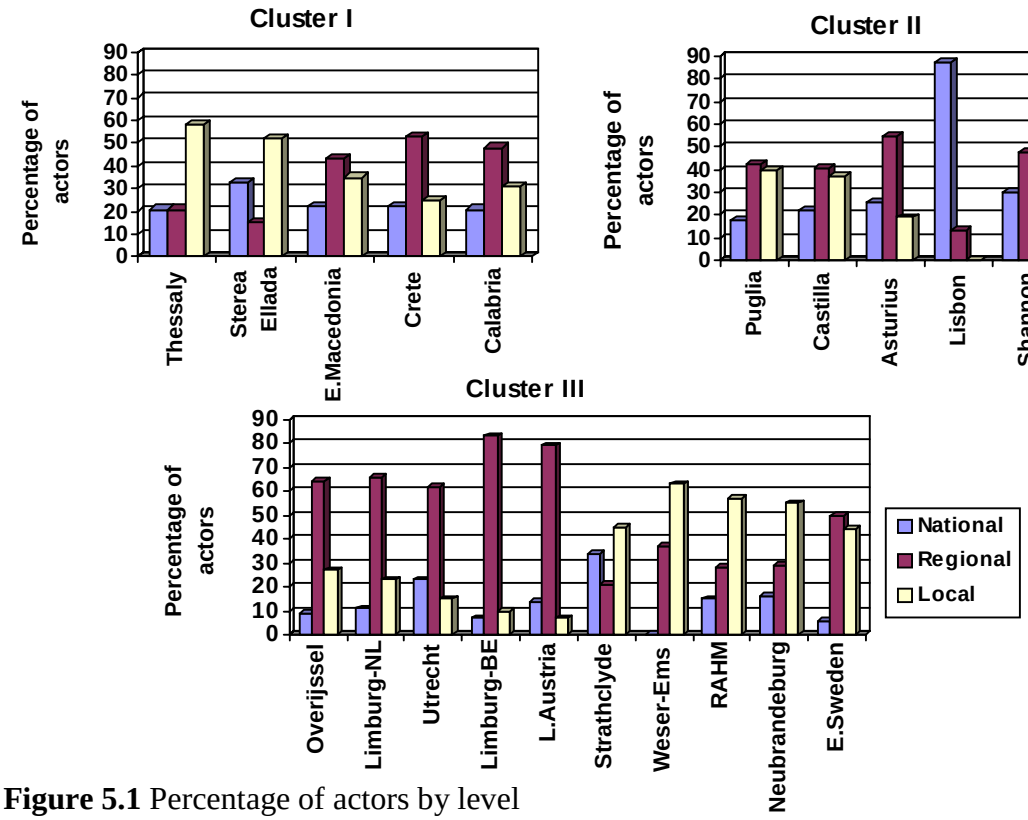

Figure 5.1 Percentage of actors by level

5.4.1 Institutional Thickness

Institutional thickness here refers simply to the density of actors within each of the region's structure and organisation networks. This is done using the number of actors at each level and number within each category. This will highlight at which level and which category the concentration of actors is. See appendix 5 for data table.

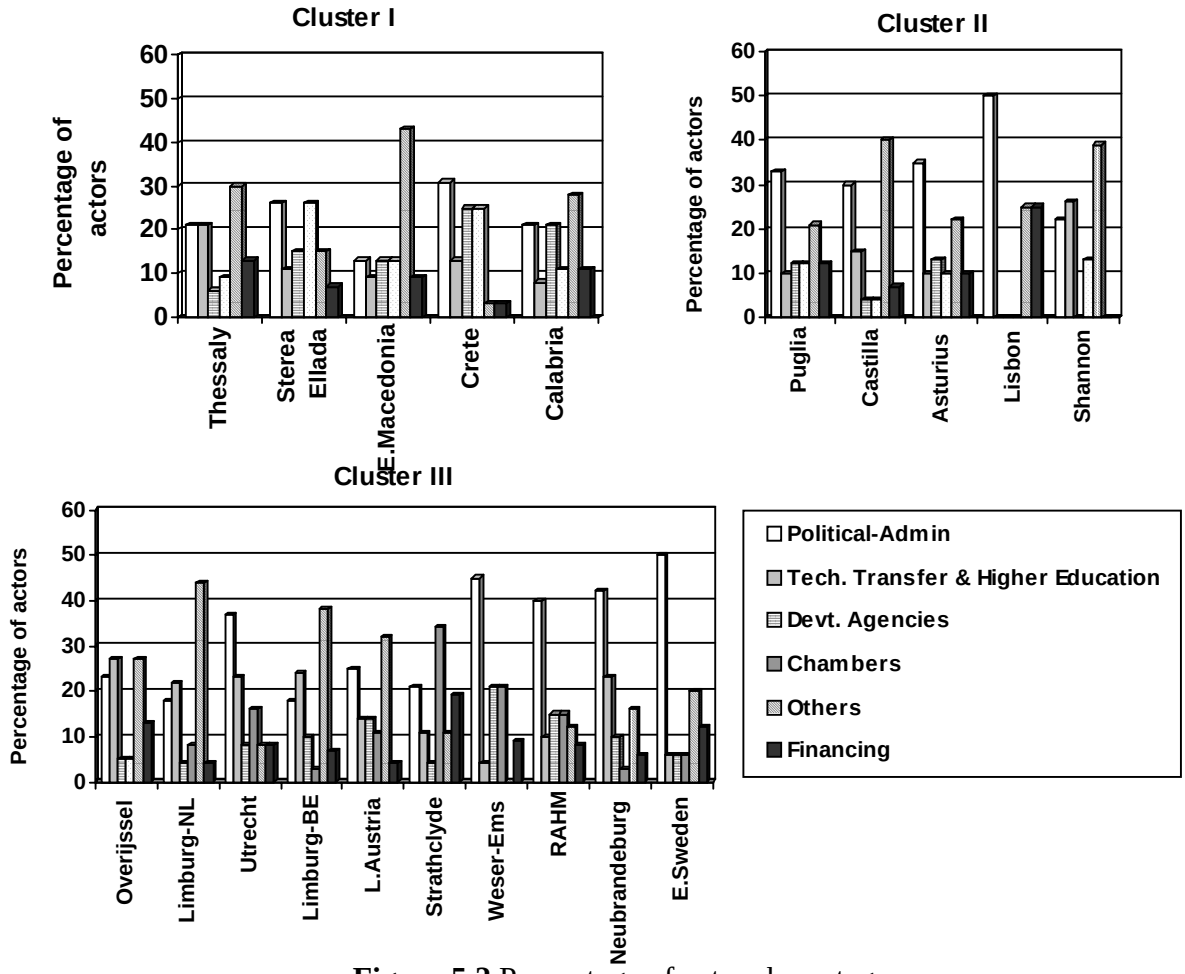

Figure 5.2 Percentage of actors by category

From the first set of graphs (Figure 5.1 – actors by level) we can see that there are no specific patterns arising across the clusters, Although there is a definite predominance of both regional and local concentration of actors. Similarly in the second set of graphs (Figure 5.2 – actors by category) there are no distinct patterns. These graphs however, in conjunction with looking at the spread within each category over local, regional and national levels, have some interesting aspects.

In cluster 1 there is a definite predominance of 'other' and 'political' categories –and within these high percentages within the local levels. The 'technology transfer & higher education' category is moderately represented, with the concentration being at the regional level, while the 'development agencies', also moderately represented, have a concentration lying at the local level.

In cluster 2 the 'political' and 'other' categories once again show the main concentration, but in this cluster we see a spread over level concentration – some being very highly local, others national and then others regional. Again showing the heterogeneity of this group with a mix of category concentrations within the regions.

In cluster 3 we see again a large proportion of actors in the 'political' and 'other' categories, with the majority of regions showing a higher proportion of 'political' actors at the local level, and the 'other' category mostly at the regional level. The 'technology transfer & higher education' category also has a considerable representation in cluster 3, with 7 from the 10 regions having concentration in this category, interestingly with most at the regional level.

Overall, the measurement of density of actors by level and category does not produce any distinct patterns across clusters. From this we can begin to make some preliminary conclusions. That there is negligible influence of the different context types across the clusters on the structure and organisation of the programme in terms of this quantitative representation of the networks.

5.4.2 Vertical Integration in the Structures

Vertical integration is basically the number of actors in certain levels as a proportion of actors at other levels. In the following analysis these proportions are measured for three scenarios, local to non-local actors, local to regional actors, and finally regional to national actors. Basically this gives an indication as to whether the programmes have achieved integration/spread over the levels, and to what extent. The objective here is not to provide a benchmark of an 'optimal' spread to measure against, but simply to see if there is certain behaviour within the clusters. The proportions are represented in Figure 5.3 a) the proportion of non-local for every1 local b) the proportion of regional for every 1 local, and c) the proportion of national for every 1 regional. Appendix 6 contains the data tables for the graph.

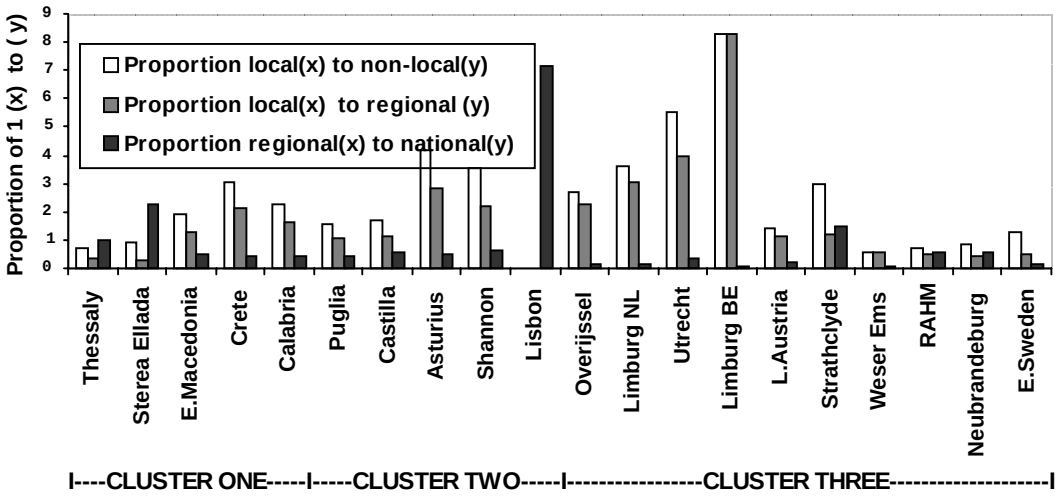

Figure 5.3 Proportions of actors within the levels

Again the quantitative measurement (proportions of vertical spread) of structure and organisation for the implementation of the programme does not show us any patterns that are specific to each of the three clusters, although there are patterns for the proportions that carry through for all of the clusters. This is an interesting reflection of how, in general, innovation strategies of this type are being vertically spread between different levels. In cluster one 3 from the 5 regions, in cluster two 4 from the 5, and in cluster three 7 from the 10, show a proportion of greater than one of local to non-local – this illustrates that there is more non-local actors as compared to local actors. Likewise, the proportion of local to regional is predominantly greater than 1, representing a greater amount of regional as compared to local. Lastly the proportion of regional to national shows in most regions a level of less then 1, with more than half showing less than 0.5 – illustrating that there is considerably more regional actors as compared to local.

The outcomes of the quantitative analysis do not raise any distinct patterns across the clusters. This result does however provide us with some consequences for policy makers in the promotion of innovative systems. That there are no typical contexts that produce specific arrangements of actors between levels and categories, furthermore, that the contexts deemed to be more innovative do not produce any magic network compared to the less innovative contexts. The conclusion being that the number and placement of actors within a structure have little influence on the level of innovation within a region.

5.5 Use of questionnaire in analysing the regional innovative environment, regional dynamics and outcomes of the RIS/RITTS programmes

From the above quantitative analysis we can see that there are indeed no patterns across the different contexts as to the way in which the RIS/RITTS programmes have been implemented. Perhaps there is a need to go beyond this analysis and gain some insight into the process. That is, the way in which the programme has been perceived by the actors, and the resulting way they inter-relate. Correspondingly, the process is also about the learning ability of the region – which is embedded in the density and quality of structures in the region. For this reason the following two sections will analyse the process in light of environment and regional dynamics, to determine if these influence the way in which implementation has taken place.

5.5.1 Environment Analysis

Recent literature on innovation, as outline in section 2.7, has centred on the capability of people, both their accumulated knowledge and networks on which they draw. The environment in which this takes place is a complex system and the promotion of innovation within it is built upon many factors. Maleki (1990) sees the entrepreneurial climate as the single most important variable influencing innovation, a climate that rests almost entirely on well-connected networks. This climate is based on the 'cultural milieu' i.e. the perception of actors, and the way they inter-relate. This will have a serious impact on the way in which structure and organisation within the region will be developed.

The following analysis rests on the answers to the environment questions in the questionnaire. It will provide some insight into the way in which the attitudes and interaction within the regions have influenced how the RIS/RITTS programme was implemented i.e. how the structures were developed. The answers to these questions cannot be compared across the clusters, as they are subjective. The analyses will therefore look at the ratings within the clusters to determine if there are certain aspects that are rated low or high.

The average results for cluster 1 in rating the environmental characteristics were on average between 6.4 out of ten to 3.2 out of 10. The averages reflect also the concentration of lowest and highest scoring characteristics with the lowest scores found in; mix of enterprises & sectors, awareness of best practice and level of supplier infrastructure, and the highest being; level of skill and knowledge, and openness of the re-

gion. Interesting, as this has a strong correlation with the type of innovative context outlined in chapter 4.

By then looking at the results given for ranking the entrepreneurial climate in cluster 1 there is a marked increase in rating. The averages being between 5.8 and 7 out of 10. Interesting is that telecommunications and quality of labour have the concentration of lowest rankings, while quality of local government had the concentration of highest rating. Again we see a link with the entrepreneurial environment for the programme and regional context, there is a strong sense of entrepreneurship, but due to quality of labour and telecommunications the effect on the innovation strategy has been dampened.

Cluster 2 regions show less variance in results for environmental characteristics, from between 5.2 – for mix of enterprises and sectors - and 6.8 – level of technology - out of ten. These averages hide the fact that again there is a level of hetrogenity within the regions, with some regions showing high scores for some characteristics and others low and vice versa. However, there is a persistence for mix of sectors and enterprises gaining low scores from all regions.

The entrepreneurial climate had higher scores in general than environmental characteristics, quality of life having the highest, with quality of labour, education resources and telecommunications having the lowest. These low scores are reflective of the context analysis in that low levels of R&D expenditure and education have aparrently effected the way in which these elements have impacted the implementation of the RIS/RITTS programme.

The results for cluster 3 in environmental characteristics, show again a concentration in the lowest ranking in mix of enterprise size and mix of sectors. However the lowest score was for the level of flows from outside the region, which is interesting because as far as the context analysis showed it was not these problems that were identified. The highest ranking, did however, reflect what was shown in the context analysis – with high concentration in the level of technology, skill and infrastructure in the regions.

The entrepreneurial climate ranking for cluster three showed again higher average scores than for environmental characteristics. The highest being quality of life and telecommunications, and the lowest being quality of local government and education resources. This reflects that in this cluster the problems are not in the regional ‘fabric’ but more in the way the region is organised.

5.5.2 Regional Dynamic Analysis

The importance of a strong 'learning system' has been outlined numerous times within this paper, particularly in section 2.8 of the theoretical background. Innovation capacity has been directly linked to the learning ability of the region, which in turn is related to the density and quality of networking within the regional environment.

Bennett & McCoshan have captured the learning process as the "need to shift from reactive to proactive behaviour". (1993: pg. 215) They capture perception and response to change, as well as the scope in the region to develop a bottom up capacity. The questions on regional dynamics presented in the questionnaire were developed on the criteria presented in distinguishing a region from being either reactive or proactive in its implementation of the RIS/RITTS programme. This, along with the environmental aspect, has repercussions on how well a region is able to develop networks. This therefore becomes another dimension on which to compare the structure and organisation, representing yet another important influence on the way in which the networks were developed for the implementation of the RIS/RITTS programmes.

The questions pertaining to regional dynamic were set into four different areas; the region itself, the private sector, higher education, and finally regional government. Under each area were two choices – the criteria on the left being reflective of a reactive dynamic, while those on the right showing a proactive dynamic.

Cluster one regions show, in the majority, that the region itself and the private sector are seen as being reactive. Higher education institutes are seen as being predominantly proactive, while the regional government is for the first 4 characteristics (which are mostly based on the policy and approaches) reactive, and for the last 3 characteristics (based on flexibility & responsiveness) proactive. This analysis can provide some strong ideas on how the network is influenced by the mentality and level of ability of different actors. If being proactive is equal to a higher level of innovation, then a positive outcome for these regions rests on those proactive actors. This is indeed reflected in the structure charts, in that higher education plays a great role in cluster 1 RIS/RITTS networks. And although there is a positive government influence there are still problems in relation to the way in which the network tends to be leader dominated and too top-down, reflected in the policy & approach outcomes and evident in the network typology.

Cluster two once again shows its heterogeneous nature. Not one of the 4 areas, the region, private sector, higher education, or regional government, show a collective

proactive or reactive nature. Instead each area has a number of proactive and reactive characteristics within the RIS/RITTS programme. What becomes obvious in the analysis is that the reactive characteristic, in all areas, lie in the fact that the regions are dependent in nature, dominated by outside influences, and non interactive in their programme. For the proactive element in the regions the flexibility was obvious in all areas. This seems typical of the context analysis, and the club network model. Looking closer, the regional government is seen to be rapid in response to opportunities, and the region itself is seen as being local influence asserted. It is these regional strengths that provide the innovative potential, while the lack of networking at the broader level leaves a private sector static in its response to opportunity.

Cluster three regions shown a very different story. The region, as well as the regional government, are clearly seen as having a pro-active character. The private sector is proactive in its internal dynamics, but is still seen as being reactive to large companies and outside influences. This is reflected in the higher education area, where again there is a reactive response to outside influences, with little integration into the region and response to regional demands. This poses a question of the level of openness and how reactive it is deemed to be for innovation. Bennet & McCoshan have said that this is a reactive characteristic, while it has been argued by Sweeney that this external interaction is what is needed to promote flows of information and ideas into a region. In response to this problem, the type of interaction needs to be further scrutinised. If the perspective is from internal network building, a high external connection could reduce the internal interaction – hence reducing regional network strength, but without information flows the region, and its networks, are in danger of becoming isolated and hence non-competitive in the global economic environment. The conclusion for cluster three is that it has the characteristics of being pro-active. The external influences have not had major impacts on the strength of the networks, in actual fact they seem to support the higher levels of adoption and adaption of technology of the private sector, and increase the level of best practice in industry, as show in context analysis.

5.5.3 Regional Impact on Programme Outcome

The process to build strong networks within regions can be broadly seen as a general mechanism. (Bennett & McCoshan) offer a number of stages that summarise the network building process:

- Establishment of leadership team of key agents in the region, with strong external expertise to fill the gaps
- Taking stock of problems through a SWOT type analysis, and thinking strategically
- Forming and selling a long term vision of the region to the wider network of agents
- Building a firm foundation through partnerships and collective action
- Getting change underway, use of flagship projects
- Build on success and spread vision, keep everyone involved
- Ensure quality and that outcomes are an improvement of situation, make sure it is a long term goal
- Spread motivation, build capacity

This reflects the process that the RIS/RITTS have taken, the question is, have these steps been realised? The structure charts can provide us with basic information, but through a set of questions to the main actor we are able to see if in fact certain characteristics inherent in the regions have influenced the way in which these goals were achieved or hindered.

The problems inherent in cluster 1 regions effecting the RIS/RITTS process of network building came under 5 general headings.

a) Actors and actor interaction - some main points were seen to be a lack of strong key actors, low links between SMEs and research institutes and university, and finally, an overall sense of low internal communication.

b) Location, geography, and infrastructure deficiencies

c) The innovation environment itself - main points being, little vision to exploit opportunities, weak systems of innovation, lack of finance, and a low level of expenditure by SMEs on R&D.

d) Fragmentation - main points being highly fragmented economic & political powers, differences in market access & communications for SMEs, and a large amount of family owned SMEs alongside modern and large companies

The factors seen to have had a positive influence on the programme inherent in the region are a technological capability, a number of innovative opportunities, good research institutes, a strong commitment from administrative bodies and a positive attitude to changing to a more bottom-up attitude. Along side these factors are a number

of positive influences from the actors themselves, in that there is commitment from local actors, and a changing approach to analyse needs to increase competitiveness from both large and small business.

The conclusion to be drawn from these headings is that it seems a lot of the problems in cluster 1 regions seem to be embedded in the persistence of historic production patterns, where there are a number of leading firms a long way ahead of a multitude of small family owned enterprises. However, there is a feeling of change within the regions if we look to the positive influences – the question for policy makers is how to reduce the problems and nurture the growing opportunities embedded in the actors themselves.

In cluster 2 the problems inherent in the region that have effected the RIS/RITTS programmes have centred largely on a few areas, being:

a) Infrastructure – low levels in both human resources and communication,
b) Dependence – on both foreign firms – particularly the dual effect it has on the process, and European funding - deepened by the size and character of enterprises.
c) Networks – low level of networks, non-integration of branch plants
d) Technology – low levels of technology in industrial activity, technical support intermediaries being young and without a market, low capability of local groups to use the technical infrastructure, and low levels of spending in R&D by enterprises.

This cluster poses distinct differences from the other two clusters – it is not so much the 'lack of' which plagues cluster one – or the interaction problems of cluster three, within this cluster the problems seem to be the nature of the region itself. There are structures present for innovation, but there seems to be a problem aligning it with the current situation in the region. The SME sector is still developing, but its knowledge and ability to grasp the opportunities are not being realised, reflective in the persistence of outdated technology. The support infrastructure for innovation are also in place, but the way in which the networks have developed in a top-down approach has resulted in SMEs not being able to utilise these services – i.e. lack of demand pull. This echo's again the club network model. Where there is leadership, but the way in which interaction takes place within the network is dominated by a number of core ac-

tors, acting in line with the top-down menatlaity, and not working to produce the bottom-up approach that is needed to fulfill the needs of all actors.

However, there are a number of factors in cluster two regions that hold the opportunity for increased innovation development. The fact that there is good support structures, an approach to education that is integrated into the region - with more courses reflecting business needs, a generally good supply of resources, and a SME sector that has its own dynamic. What the region needs is a more interactive, bottom-up process that links the SME sector to the innovation network, increasing knowledge and the demand pull for innovation and technology. This idea is currently in vogue under the heading of 'clusters' – where SMEs are encouraged to join together to become more competitive, and with the help of a strong innovative structure/culture, to multiply these agglomeration effects.

The problems in the region seen to effect the implementation of the RIS/RITTS programme in Cluster 3 fall under the headings of

a) Actors – for cluster three the problems under this heading are based in accepting new leadership for un-recognised regional leaders, problems in co-operation between actors, a lack of common strategies across the categories of actors, and a lack of long-term strategies in SMEs. Here, it is not the links that are the problems – as in cluster 1 – but it is the relationships between the actors.
b) Regional Dynamics – in that there is a lack of definition for the regions and a distance between companies. Again the problems rest on internal dynamics, it is not the physical infrastructure and not the attitude to change, but the internal cohesion within the regions.

The factors in cluster three regions that are seen as having a positive influence are strong government – in its bottom-up approach and its strong interest in European projects, which is seen as having a strong political backing. This reflects the pro-active dynamics and the outward looking aspect of this cluster. The location of these regions, along with their strong infrastructure also adds to the implementation of the RIS/RITTS programme. Finally, the co-operation in the process and a strong integration of actors is seen as producing a solid platform on which the programmes have been built, additionally the ardent intermediary element in the regions ties the actors together and provides a arena where interaction can be co-ordinated and nurtured.

The conclusions for this cluster reflect the analysis presented so far. These regions are, as defined by Sweeney (1987), progressive in their approach to innovation,

and have a high level of autonomy in decision making. The structure and organisation of the programme allows the actors to be combined into certain tasks where their inclusion and input are most needed, catering to the need to be forward-looking and open to opportunities to become increasingly competitive – through both technological advancement and innovation.

6. COMPARISONS AND CONCLUSIONS

In this chapter the purpose is to align the analysis undertaken in chapter four and five. The analysis in these chapters was undertaken in a systematic manner, firstly in chapter four to outline the differences in context of each of the 3 clusters of regions (identified in chapter three). Following in chapter five, a qualitative and qualitative analysis of the structure and organisation within these contexts, being a direct outcome of the implementation of the RIS/RITTS strategies of the European Commission. Further, an analysis of the environment and regional dynamics in each of the clusters was undertaken, in that these aspects have a direct bearing on the structure and organisation/ networks developed under the RIS/RITTS in the regions.

This analysis provides a base on which the objectives of the paper can be realised, i.e. to examine the differences in structure and organisation of regions (including the effects of regional dynamics and environment) and determine if there are patterns that can be linked to the context of the regions. Ultimately determining if there are certain contexts, producing certain networks, that can lead to a more fruitful implementation of the RIS/RITTS programmes. These objectives are re-stated in the research problem/questions and this chapter ties the analysis together to begin to answer them.

6.1 Patterns across clusters

The propositions that underlie the research questions are founded in the idea that there are certain typologies of regions with different contexts. Hence, there will be different outcomes of implementation of an innovation programme such as the RIS/RITTS in terms of structure and organisation i.e. network development. It is reflected in the main research question – Does regional context effect network building?

To begin to tackle these propositions, and attempt to answer the research question, a classification system was used to delineate the regions into a set of clusters. Due to the pronounced diversity of regions within the European Union this classification

was necessary to highlight the main differences between them. In this paper a system was used that is reflective of the systems approach to innovation and development. Once established, these clusters were analysed to see if indeed there were patterns of context evident within them, and subsequently if there was a pattern in the way the regional network (structure & organisation) was developed in light of the RIS/RITTS programme.

6.1.1 Patterns in Context

The analysis of context was undertaken in chapter 4, using both indicators – socio-economic and research and development, and answers to a set of questions on research & development and the role of SMEs in the regions. This undertaking shows if there are specific contexts (innovation systems) in the three clusters of regions.

The outcomes of the analysis did show that each of the three clusters has a typical context, with the indicators reflective of Sweeney's technology and entrepreneurship classifications. This outcome of the analysis is then a description of the innovation system prevalent in each of the clusters.

Cluster one – Sleeping Birds, are seen to be technologically isolated. Their system is technology isolated, has low levels of efficiency, little best technical practice, low demand pull for technology, and is not part of large information flow networks. This is compounded by a low level of linkages between large and small firms, the primarily local market of SMEs output, low levels of spending on R&D – especially by the private sector, and low education levels of the population. However, there is latent potential in the predominantly self-employed population and the established networks between the SMEs.

Cluster two – Question Marks, are the most heterogeneous cluster, although their aggregated results put them, innovation wise, above that of cluster one. Overall they have higher levels of, industrial employment, GDP, spending on R&D – also in the private sector, and a distinguishable level of patent applications. In terms of the innovation system this cluster overall, has a dependence on external linkages through the number of branch plants - with little linkages between the SMEs and these firms leading to the non-realisation of opportunities and potential. These regions have not yet developed a strong innovation system, although density of SMEs, expenditure and employment in R&D, and a certain level of human resources, put their systems, as the name implies, in a position of certain possibilities.

Cluster three – Cash Cows – are seen to be technically progressive and entrepreneurial, showing an increased level of innovativeness as compared to clusters one and two. This innovation system has a large percentage of employment in industry and services, decent levels of value adding – increasing technology demand, and good resources of infrastructure – including a well educated population. The SME sector is well connected to large firm and suppliers – locking them into the information flow, and there are substantial levels of spending and employment in R&D in the private sector. This innovation system has strong links outside the region, while not being dependent on them, creating awareness of new technology and best practice – leading ultimately to higher levels of adoption and adaption of technology and innovation.

6.1.2 Patterns of Regional Dynamics and Environment Characteristics

With this contextual outline established we need to examine the regional dynamics and environment and also the structure and organisation charts to determine if there are patterns in the clusters. Regional dynamics and environmental characteristics are dealt with first as they have an important influence on the way in which the network is developed, and ultimately provide a way in which to explore correlation between context and network outcome.

The analysis of regional dynamics was undertaken in a manner in which each region was classified as proactive or reactive to a number of factors under the four headings of the region, the private sector, higher education, and regional government. The analysis of these dynamics has produced certain patterns across the clusters.

Cluster one has an overall reactive system, although higher education institutes were predominantly proactive, and the regional government under flexibility and responsiveness was also proactive in nature. Cluster two, on the other hand, did not have one area in which it was predominantly pro or reactive. However the areas in which it was reactive were a reflection of a dependent nature, domination from outside influences and non-interactive in term of the programme, while the pro-active factors were reflective of flexibility in all the four areas. Cluster three, again shows a different pattern, with a more proactive nature, both in the region and within the regional government. The private sector is seen as having a proactive internal dynamic, but as with higher education, is reactive to large companies and outside influences. These outcomes are interesting and can clearly be linked with the type of network outcome, which will be discussed in the next section, which focuses on the networks.

The environment analysis is centred on the cultural milieu, i.e. the perception of actors and the way in which they inter-relate, again having a large influence on the way in which a network is developed. In cluster one, a low mix of enterprises, the low level of awareness of best practice, and a low level of supplier infrastructure, coupled with low levels of telecommunications and expert labour were seen as the characteristics impeding the process. While level of skill, openness of the region and quality of local government were seen as positive characteristics in the region. For cluster two it is the mix of sector and enterprises, quality of labour, education resources and telecommunications that are seen as a negative influence, while the level of technology is seen to have a positive effect on the process. Cluster three shows that the level of flows from outside the system, quality of local government, and education resources have negatively effected the process. It is the high concentration of technology, skill and infrastructure along side good telecommunications that are seen as the positive influences. These characteristics, reflect the context in each cluster and have once again, effected the outcome of the programme in terms of structure.

6.1.3 Patterns in Networks/ S&O Charts

The objective of the paper is to examine differences in context and then compare how it has effected the implementation of the RIS/RITTS programme. The structure and organisation charts were analysed both qualitatively and quantitatively, the qualitative analysis showing definite patterns for each cluster, which in turn were strengthened by the environment and regional dynamic analysis. Chapter 5 shows the analysis, but in summary we can see that quantitatively there was little emergence of patterns, this is reflective of the theoretical background – in which the importance of dynamics is time and again stressed, including the environment, learning systems, capacity, and social capital.

From the qualitative analysis the three clusters were seen to have definite typologies of networks. Cluster one has a traditional hierarchical structure, whose characteristics are echoed in the regional dynamic and environmental analysis. A top down approach to policy is identified, with problems of internal communication and a lack of strong key actors, leading to domination of the programme by a limited few in a hierarchical manner.

Cluster two is reflective of a single leader (role) network structure, with a strong central point and strong central leadership. The core actors are all regional bodies, with

responsibility from core actors going to other regional bodies, who in turn need to develop the interactions. These horizontal interactions are difficult to achieve through this kind of structure. This is echoed in the regional dynamic analysis, in that regional bodies are seen to be flexible and rapid in response to opportunities, while the lack of networking – inherent in the role model- has led to a rather reactive private sector in terms of response to opportunities and interactions.

Cluster three proves to be demonstrative of a more teams and partnership model, in that networking is more flexible and encourages broader networking. There is a bottom-up approach in these regions and an inclusion of all actors, meaning that integration takes place at appropriate levels with appropriate actors, giving strong input at all level from all areas, and a linkage to the broader network and information flows through the strong intermediary structure. Again there is a strong connection with the regional dynamic analysis, where the process is integrated and where interactions are defined by task, producing an environment where the actors are flexible and rapid in response to opportunities.

6.2 Correlation of context with types of networks - (including regional dynamics & environment)

This exercise provides the response to the main objective of the paper, to see how far context has influenced the outcome of network building under the RIS/RITTS programme. It brings the analysis together, by paralleling the patterns found in context and networks with the resulting structure of the RIS/RITTS programme. In tackling this, the clusters are dealt with separately, and the connections between context and outcomes are established. What can be seen from this correlation is that context actually does seem to influence the way in which networks are developed, with structures being influenced by the existing climate (innovation system) prevalent in each of the clusters.

In cluster one we have a technologically isolated innovation system. This system is reflected in its environmental characteristics and regional dynamics that have been at play within the programme, in the end producing a network structure that is hierarchical, top-down, and with a fragmentation of actors. This has led to a static response by the private sector to opportunities – due primarily to the lack of interaction with the information channels, crucial for innovation and technology dissemination.

Cluster two's innovation systems have a mixture of typologies, somewhere between technically isolated and technically progressive. Overall these systems are seen to be dependent on external linkages, with little linkages between the SMEs. The environmental and dynamics analysis illustrate the links between the system and the way in which the networks have been developed i.e. through the single leader, role type structure. With this top-down networking approach, implemented through regional actors, few linkages at the private sector level have been produced, leaving a region that is static in responses to opportunities.

Cluster three's innovation system is seen to be technically progressive and entrepreneurial. This is reflective of the environmental characteristics and dynamics effecting the programme in that there is a high level of technology, skill and infrastructure available, with strong internal dynamics in the private sector. The bottom-up approach of regional administration to policy, and interactions defined through tasks leading to a Teams and Partnership – task model of network. This has seen a regional network that has broad flexible networks producing an environment where initiative is developed and opportunities realised.

6.3 Context/network influence on implementation of the RIS/RITTS

As the last comment towards the conclusion in this paper, it is necessary to determine to what level these networks, as a result of context, have benefited or impeded the reaching of goals under the RIS/RITTS programmes.

In cluster one, the hierarchical network model has proven to be a barrier in producing a decent amount of strong leaders, and linkages between the actors at different levels – particularly between SMEs and regional institutes. This structure has not improved the innovative environment in the fact that SMEs still do not have the vision to exploit opportunities, and have not gained the confidence, or in fact knowledge to produce greater spending in R&D. The fragmentation resulting from this type of structure is also seen as a barrier to implementation, with SMEs working isolated from the large firms, and still being kept out of the markets where they could gain valuable knowledge for innovation.

Cluster two's single leader, role type structure has also presented a number of barriers to the implementation of the programme. The low level of networking between the smaller actors (SMEs for instance) and the non-integration of branch plants is causing a duality within the region that is not inducing innovative potential. Further,

the top-down interaction is not encouraging the number of SMEs to fully utilise the support structures, which in most cases are in place. Basically there seems to be a lack of thoroughness in determining the needs of the SMEs – or that is perhaps the problem, their needs are being defined for them – resulting in a mis-match of support provision and needs. This club type single leader approach is hindering the process of innovation dissemination, which ultimately needs to take place within the productive sector, because in the end businesses are the place where innovation and technology can have the biggest impacts on the competitiveness of the region.

Finally the teams and partnership model of cluster three. Although this cluster is seen to be the most innovative of the three it certainly poses distinct challenges in reaching the goals of the program. Here the problems rest on the attitudes of the actors to new and unrecognised leadership, getting the actors to co-operate at the horizontal level, and in getting actors to unite in a common, long term strategy that has the regions competitiveness as its main focus. However, with the strong regional government in these regions -who have taken a bottom-up approach to innovation policy. An outward looking stance of the private sector - who have a willingness of co-operation. And set within an environment that has a strong infrastructure and resource base, there is a solid platform to overcome the problems that are being faced.

7. SYNTHESIS

In this synthesising chapter, the influence of context on network building is combined with the theoretical background to propose some future directions for innovation policy. These recommendations are based in the analysis performed in chapter 4 and 5, that took context in certain regions under the RIS/RITTS programmes and paralleled it against outcomes in structure. This study has focused on structure within regions as the main influencing factor on successful innovation promotion. Further, it gives a view that greater consideration to the impact and importance of contextual factors need to be taken into account when designing policy for innovation – particularly in developing networks for innovation dissemination.

7.1 Theoretical influence on regional policy

With the exhaustion of the classical paradigm, a popular concept of development has been growing. This new approach has seen a renewed interest in regional structure, in particular its role in innovation promotion – it has the opened inquiry of

regional processes as the corner stone to the realisation of development opportunity. Along with this, the idea of the 'new competition' has been growing. Where price no longer takes centre stage, with non-price factors seen as the path to the 'high road of development'.

This theoretical change has had profound implications for the regions. The region has become a proactive space in which all of its assets must be mobilised to try and secure regional economic competitiveness. Competitiveness as a regional attribute has become a product of systemic interaction between diverse players who must be 'associative', 'networked' and 'consensus minded'. The process of innovation is now seen as "a systemic phenomenon based on the accumulation of learning processes through networks of co-operation which encourage interaction between those engaged in the economic and technological life of the region". (Soete & Arundel in Landabaso 1992:120)

The policy implications of this for regions are numerous, primarily they have to play a role in strengthening regional networks of enterprise, research institutions, and government agencies. Innovation policy therefore frequently rests on the changes to the underlying system in the region – the whole complex of knowledge, skills, routines and competence. Central to these changes are the concepts of learning individuals, learning organisations and the learning economy, in the long-term, policy should be focused on the determined investment in intangible assets – collaboration, networks and communication.

The aim is the building of a smart infra-structure that includes know-how, capital, technology and talent, embedded in; the environment, the push/pull factors at play, the R&D performers, technology institutions, private capital institutions, businesses, technical infrastructure, and inputs on the nature of technological innovation. This infrastructure, although in itself important, is not the final outcome, it is a question of networking – the crucial element in success of this innovation strategy. The process of preparing regional strategy for innovation means that co-operation must be integrated into a stable institutional framework that; encourages contacts and the search for partners, clarifies the objectives for public policy in the field, and perhaps, makes available to firms public resources to encourage their participation in joint projects.

7.2 The European Union responce

These theoretical concepts, and in particular that of the learning region have become a buzz word among academics and policy makers, and the RIS/RITTS approach has provided a practical tool for tackling the underlying problems faced by regions suffering from economic decline or under-development. The main problem in these areas is the under development of social capital to complement the massive investments in infrastructure over the last few years by the structural funds. The RIS/RITTS programmes are aimed at developing a certain level of competence in this area, and from accounts from the regions it can be said that the RIS/RITTS programmes have had a positive influence on innovative activity in the regions involved.

7.3 Institutional setting & context considerations

What can be seen from the analysis is that the institutional setting has been an influential obstacle for the creation of an efficient regional innovation system. For instance, the profile of the less innovative clusters are characterised by a system that is less developed than the more innovative clusters. There is over-representation of the public sector compared to the private sector, isolation from information channels, little links between sector and between large firms and SMEs, low educational attainment, and a lack of intermediary structures linked to lower levels etc. This context has produced innovation networks that are top-down in approach and have not led to a full maximisation of regional innovation potential.

Regional disparities in context are primarily due to differences in the productivity and competitiveness of the various regional structures of production, which influence how the interactions take place within the regions and more importantly the way in which innovation is introduced and dispersed. The differences in the intensity of innovation effort therefore depends on the varying socio-economic conditions that have a definite territorial dimension. It is therefore a qualitative problem referring to the structural factors besetting the regional innovation systems – the regional innovation system itself must be changed to permit stronger innovative networks and allow more assistance to be absorbed and better utilised.

Promoting innovation, as time and again stressed in theory, involves focussing on the demand-side initiatives. If the region has to be able to define it's own needs for technology and innovation then it is crucial that regional context be taken into consideration, as context is the setting in which factors of demand are developed. Without

orientating this demand realisation through context, the approach will only produce networks that are beset by the problems found in their context/innovation systems.

7.4 Conclusions in light of analysis

The creation of policy measures in favour of innovation and the creation of R&D infrastructure in a region will have only marginal effects if the wider constituency of business and social partners fail to unite. They need to build networks to create a common vision of the needs of the region and support across those networks in the realisation of projects identified by the region. (Landabaso 1997)

Through the analysis the striking feature is the diversity of regional circumstances, but whatever the competitive position of the business sector, proximity to R&D infrastructure, or the level of availability of financial resources, most regions reflect that the real challenge is the capacity to innovate.

The three clusters presented in this paper have, in their own way, challenges to improve the synergy within the structures/networks that have evolved during the RIS/RITTS programme. In cluster one the problems associated with the technological isolation that exists has led to a network where main barriers are a lack of strong actors and low links & communication at the horizontal level. This hierarchical, yet non-linked network structure has reinforced the isolation felt with the SME sector. For cluster two the level of influence from external organisations and the seemingly top-down approach of the network has seemed to hinder the local initiative to networking. While cluster three, although having a strong innovative system, still has problems with actor co-operation and unity.

The outcomes of analysis in the quantitative sector, in that there was no clear combination of actors at respective levels, highlight the theoretical considerations. Reflecting that no model of network (based on an optimal number and position of actors) in the theoretical undertakings, has been produced and prescribed. Instead, the theory concentrates on regional dynamics and environmental characteristics. It is system oriented, with the focus on linkages, the milieu, and intermediary infrastructure, overall on questions of a more qualitative nature.

7.5 Recommendation for future innovation policy

The RIS/RITTS programme is foremost about stimulating a collective learning process in less favoured regions. Basically trying to include all actors in regional re-

newal that must take place within the system, in practical terms resting on the regions networking capability.

For the potential benefits of closer economic and monetary cohesion within the Union to be realised there are basic pre-conditions to be met in terms of infrastructure endowment and human capabilities. Further, a region must have an entrepreneurial culture and a political and social organisation which is sympathetic to that culture, and at the same time inspires a level and type of networking that can multiply the effects of innovative policy and programmes. For this to be realised the contextual situation needs to be carefully analysed, and improvements made that are deemed necessary for an increased responsiveness and ability to produce innovative networking structures within that context. It is all about the creation and consolidation of regional capabilities at all levels – both to recognise their opportunities, and importantly to consider their weaknesses, that are impinging the process of increasing competitiveness.

But there is a heterogeneity within regions, and this needs to be recognised when setting the goals for such programmes. The debate then turns to the institutional preconditions that precede the development of this learning region. Obviously not all regions have the capability to renew themselves, and they cannot be condemned to their current status, but can these regions develop such capabilities to become truly involved in the race for increased competitiveness? The focus is obviously on territory, once defined and analysed for strengths and weaknesses, there is possibility for these regions to develop a network scenario that is best able to promote innovation.

Ideally Bennett & McCoshan's teams and partnership - task model (evident in Cluster 3) allows each task to draw on the agents, talents and resources it requires, each task can be approached differently, and is well suited to looking forward, and to problem solving. It allows considerable opportunities for achieving local integration, innovation in methods of linking agents together, and the demonstrable improvement in overall quality that can be achieved through linking programmes. Hence it is an important model to pursue in stimulating action and animating partnership at local level. (Bennett & McCoshan 1993:210)

The task model is best suited to strategic development in local economies where key actors are highly competent and consensus on roles can be achieved. Perhaps this is a starting point for a regional policy focus – i.e. taking the pre-conditions for this type of network model and trying to develop them within the less innovative systems/

territory, making the possibility for these regions to also develop this task type of network model.

The fundamental aim is to put regions on the viable path to growth. This implies, in addition to promoting productive activity, (and when appropriate) a reform of the institutional framework within which policy is implemented, in addition supported by a full provision and free circulation of information of all kinds.

The need for action within the context of the regions is all about intensifying the transfer of information and know-how, promoting co-operation and links, supporting a process of achieving regional concept and process development, improving the administrative condition – inducing/ allowing for a more bottom-up approach, and supporting improvement in the intermediary structure. There needs to be a clear regional image and at the same time a flexible framework for diverse horizontal and vertical links, as well as exploiting the potential for synergy.

Animation of the local environment is therefore a crucial first step towards LED though innovation. Once established, it can increase the distribution of knowledge, in turn allowing for an environment that is ready to take full advantage of inputs by increasing the levels of absorption. Regional policy must make increasing use of this local environment, either creating or transforming it, so that the regions create the specific resources and externalities necessary for development – and therefore the territory becomes a specific resource, who's construction is essential for the process of innovation.

7.6 Considerations on the recommendations

In many regions the institutional framework is not strong, and it is difficult to create new momentum. Attempting to replicate successful networks elsewhere is dependent upon strong institutional structures, which may not be available in certain regions. The shifting from top-down to bottom-up may put too much responsibility to local institutions who are inadequately equipped for the task. A major task is again the building of regional context. With the above as a consideration, the task begins with a level of devolution as the first goal. What is needed is a strong regional administration that can promote and guide the process - from contextual analysis and considerations to building a network that will allow for high levels of innovation capacity and promote the learning region.

In conclusion, success in an uncertain and fast changing world economic environment is determined by a high level of information, widely shared, a high level of skill attainment, a prevailing entrepreneurial culture, and a well organised institutional framework. These are the qualities that development policies should seek to promote, going beyond basic requirements of infrastructure and education, and focussing on contextual barriers and possibilities as the most important influences in producing strong innovation networks.

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Internet addresses

Innovating Regions in Europe the RIS/RITTS Network

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LIST OF ABBREVIATIONS

DGXIII	Directorate General 13
DGXVI	DIRECTORATE GENERAL 16
EC	European Commission
ERDF	European Regional Development Fund
EU	European Union
LFRs	Less Favoured Regions
RIS	Regional Innovation Strategy
RITTS	Regional Innovation & Technology Transfer Strategy
RTD	Research & Technology Development
SME	Small & Medium Enterprises
S&O CHARTS	Structure & Organisation Charts

APPENDIX 3: QUESTIONS ON ACTORS, INTEGRATION AND NETWORK DEVELOPMENT

1. What is the level of interaction between actors in general within the RIS/RITTS?

Low	1		1
Medium	3	4	3
High	1	1	4
Cluster	1	2	3

2. What is the level of interaction between actors at the local level within the RIS/RITTS?

Low	1	1	1
Medium	4	4	6
High			1
Cluster	1	2	3

3. What is the level of interaction between actors at the regional level within the RIS/RITTS?

Low	3		1
Medium	2	2	3
High		3	4
Cluster	1	2	3

4. What is the level of interaction between actors at the national level within the RIS/RITTS?

Low	1	1	4
Medium	4	3	4
High		1	
Cluster	1	2	3

5. Who are the core actors in the RIS/RITTS?

SME Associations x 4	Regional Devt. Agency x 2	Universities x 4
Innovation centres x 1	Universities x 2	Regional Government x 4
Regional & Local Admin x 5	Innovation/Research Centres x 2	Companies x 4
Universities & Technical Ins x 5	Business Associations	Intermediate organisations x 2
National ministries x 1	Regional Authority	Technology centres x 3
Regional chambers x 3	Regional Commission	Regional Devt agencies x 3
Research Institutes		Regional Financing agency
		Local Administration x 2
		Industry
		SMEs
Cluster 1	Cluster 2	Cluster 3

6. How has integration been achieved in the RIS/RITTS process?

With a single leader – hierarchical, leader deciding who is involved with whom			
Single leader – establishing networks between actors to achieve integration	3	3	2
By action type – i.e. actors integrated through activity	1	2	7
Little leadership, actors joined through a flexible network	1		2
Cluster	1	2	3

7. Has the programme led to/or will lead to flexible network structures for the implementation of the resulting projects for the region. i.e. do actors have their own momentum to implement projects or is there still a strong need for main actor leadership?

Yes	**4**	**5**	**8**
No	**1**		
Cluster	1	2	3

8. Has the RIS/RITTS process induced private sector partnerships?

Little	2	3	2
Few	2	2	
Many	1		6
Cluster	1	2	3

9. How have the smaller actors been integrated into the RIS/RITTS process?

Working Groups/ Steering committee x 4	Working Group	Working Group x 5
Capillary difussion & Promotion campaigns – interviews/mailingx2	Through business associations	Members of expert groups for the programme
Lists of regional authority	Active participation in workshops	Through final outcome projects x 3
Chambers of Commerce	Seminars & task forces	Making sure they have an equal say
Partnerships with larger firms		Chambers of commerce
Cluster 1	Cluster 2	Cluster 3

10. What level are the organisations of the actors involved in the RIS/RITTS process? i.e. have the organisations taken the role or is it more a single persons input?

Low	1		
Medium	4	4	6
High		1	2
Cluster	1	2	3

11. To what level has bureaucracy within the actors organisations effected the RIS/RITTS process of integration into the programme?

Low	3	2	2
Medium	1	3	6
High	1		
Cluster	1	2	3

12. What is the level of influence of actors in network building in the process at the three levels? i.e. have actors at these three levels been active in network building?

National

Low	3	3	4
Medium	2	2	4
High			
Cluster	1	2	3

Regional

Low	1		1
Medium	4		1
High		5	6
Cluster	1	2	3

Local

Low		2	1
Medium	4	2	3
High	1	1	4
Cluster	1	2	3

13. How well do you think the process will be in producing long-term structures?

Low well			
Moderately well	4	1	4
Very well	1	4	4
Cluster	1	2	3

14. Which actors are more involved in the RIS/RITTS process?

SMEs	1	1	6
Local Government Bodies	1	3	6
Regional Development Bodies	2	5	7
Chambers of Commerce	4	2	5
Universities	4	2	7
Other	3	2	3
Cluster	1	2	3

15. Which actors seem more likely to have an active commitment to the future projects outlined in the RIS/RITTS? (you can choose more than one sector if applicable)

SMEs	4	1	4
Local Government Bodies	1	2	5
Regional Development Bodies	4	5	5
Chambers of Commerce	2	2	4
Universities	4	1	5
Other	4	1	2
Cluster	1	2	3

16. How are responsibilities of actors to the RIS/RITTS made?

Formal contracts	1		2
Informal agreements	1	2	5
Formal inclusion into process	4	3	5
Other – please specify			1 – strategy meetings 1 – participa-tion in pilot actions
Cluster	1	2	3

17. Who are the animators/leaders in the RIS/RITTS

Research centres	Regional Devt. Agency x 4	Regional Technology Transfer agency
Universities x 3	Higher education institutes	Regional Govt. X 3
Regional Authorities x 3	Enterprise associations	Funding agents
	Regional Authority	Steering Committee members
	Regional Commission	Regional Devt. Agency
		Local Authorities
		Companies
Cluster 1	Cluster 2	Cluster 3

Participants/followers in the RIS/RITTS

Public authorities	University	University x 2
Private sector x 2	Bussiness Associations	Chamber of commerce x 2
SMEs	Labour Union	Technology centres x 2
Industrial Associations	Research Institutes	Companies x 2
	Chambers	Local Enterprise Trusts
Research Institutes x 2	Innovation Agencies	SMEs
Cluster 1	Cluster 2	Cluster 3

18. What level of learning has been required for the actors in terms of building contacts/ developing networks within the RIS/RITTS process?

Low			
Medium	1	1	6
High	4	4	2
Cluster	1	2	3

19. What level of change has been required by the actors to make this a successful process?

Low			
Medium	2	5	6
High	3		2
Cluster	1	2	3

20. How important have key personalities been in the RIS/RITTS process?

Not important			1
Moderately important	1	1	
Very important	4	4	7
Cluster	1	2	3

QUESTIONS ON REGIONAL DYNAMICS

21. Describe your region (in light of the RIS/RITTS) as either (choose one from each row)

Dependent	4	4	3	Leader	1	1	5
Top Down in policy approaches	4	4		Bottom up in policy approaches	1	1	8
Dominated by outside influences	2		3	Local influence asserted	3	5	5
Actors defined by role	2	2	6	Actors defined by task	3	3	3
Static response to opportunities	3	4	2	Rapid response to opportunities	2	1	6
Inflexible	3		2	Flexible	2	5	6
Individual programme dominated	3	4	2	Integrated programme dominated	2	1	6
Clusters	1	2	3		1	2	3

22. What has been the level of change in these characteristics with the introduction of the programme?

Low			2
Medium	4	4	2
High	1		4
Cluster	1	2	3

23. Does the private sector (particularly SMEs), in light of the RIS/RITTS, have the characteristic of being either (choose one from each row)

Dependent on large companies	5	5	7	A leader in best practice & tech.			1
Dominated by outside influences	3	4	5	Local influence asserted	2	1	3
Interactions defined by role	3	2	1	Interactions defined by task	2	3	7
Static response to opportunities	5	4	3	Rapid response to opportunities		1	5
Inflexible	3		1	Flexible	2	5	7
Clusters	1	2	3		1	2	3

24. Are higher education institutes (in light of the RIS/RITTS) characterised by being either (choose one from each row)

Adapters of technology	2	4	2	Leaders in new technology	3	1	6
Dominated by outside influences to new development	4	2	6	Influenced by local needs of new technology	1	3	2
Courses based on classic ap-proaches to technology	3	3	5	Responsive to SME employment demand in courses offered	2	2	3
Inflexible			2	Flexible	5	5	6
Not particularly integrated into region	1	1	4	Integrated into region	4	4	4
Clusters	1	2	3		1	2	3

25.Is regional government administration (in light of the RIS/RITTS) in the region characterised by either (choose one from each row)

Dependent	3	4	2	Leader	2	1	6
Top Down in policy approaches	4	3	1	Bottom up in policy approaches	1	2	7
Dominated by national policies	4	5	3	Largely autonomous	1	0	5
Defined by the role it should play	3	3	5	Defined by the way in which it operates	2	2	3
Static in response to opportunities	1		2	Rapid to respond to opportunities	4	5	6
Inflexible	2		1	Flexible	3	5	7
Individual programme dominated	2	4	2	Integrated programme dominated	3	1	6
Cluster	1	2	3		1	2	3

QUESTIONS ON R&D AND THE ROLE OF SMEs IN THE REGION

26. Is the region dominated by

A few large firms			
Mix of Large & small firms	3	2	3
Mainly small firms	2	3	5
Cluster	1	2	3

27. Is Research and Development within the region mainly

Short term – i.e. technology and design based	3	5	8	Long term – i.e. science based	2		
Cluster	1	2	3		1	2	3

28. Is control of the majority of SMEs

Internal	4	4	8
External	1	1	
Clusters	1	2	3

29. Is the link between large firms and SMEs

Low	4	3	4
Medium	1	2	3
High			1
Cluster	1	2	3

30. Doe SMEs supply primarily the

Local market	5	1	4
Large firms in the local market	1	2	3
External markets &/or firms		4	4
Cluster	1	2	3

31. Is the level of knowledge in SMEs generally

Low	3	2	
Medium	2	3	8
High			
Cluster	1	2	3

32. What is the level of adoption and adaptation of technology in SMEs

Low	3	4	1
Medium	2	1	6
High			1
Cluster	1	2	3

QUESTIONS ON THE ENVIRONMENT

33. How would you rate the following characteristics of the environment in relation to the RIS/RITTS programme (from 1-10)

CHARACTERISTIC	RATING	RATING	RATING
Accepting change	3,5,6,4,7	6,7,6,4,7	6,4,7,6,7,7,6
Acknowledging entrepreneurship	3,5,5,6,8	6,5,4,4,7	5,4,7,8,8,7,5
Level of flow of ideas and information from outside the region	3,3,7,5,7	5,5,7,6,9	3,3,7,3,5,8,5
Awareness of best practice in industry	4,1,4,4,6	5,4,6,4,8	8,3,7,3,7,8,6
Outward looking attitude	4,3,6,8,7	6,6,5,4,9	4,3,6,7,7,8,5
Level of suppliers and infrastructure to support firms	5,1,5,4,8	6,6,6,6,8	5,4,7,5,7,6,7
Level of technical skill in local industry/s	6,5,4,7,7	4,7,6,5,9	4,5,8,5,8,7,8
Level of current technology in region, including stock of knowledge	6,5,5,7,9	7,7,6,5,9	7,6,8,4,8,7,7
Openness of region	3,5,7,8,8	7,5,7,5,9	6,2,8,5,7,8,5
Mix of enterprise size – low is 1	1,5,2,3,5	8,4,2,4,8	7,2,7,3,8,6,4
Mix of sectors in region – low is 1	3,5,1,3,6	7,3.4,4,8	7,3,7,3,6,7,7
Cluster	1	2	3

34. How would you rate the level of the following entrepreneurial characteristics in relation to the RIS/RITTS programme?

CHARACTERISTIC	RATING	RATING	RATING
Education resources – higher and technical	7,3,7,9,9	8,8,6,6,8	8,6,8,4,5,7,8
Quality of labour	6,5,6,8,8	7,7,8,7,7	9,6,8,6,8,9,6
Quality of local government	4,7,7,10,8	8,7,7,8,8	7,4,8,6,7,8,7
Telecommunications	4,4,6,7,9	8,7,6,6,9	10,9,8,6,6,9,9
Quality o life	5,7,7,9,7	8,8,7,8,9	9,7,9,8,9,9,9
Cluster	1	2	3

QUESTIONS ON THE OUTCOMES OF THE PROGRAMME

35. Have the majority of projects outlined at the end of the process primarily in either

Technology importing		2	1
Research & development		3	3
Education		1	2
SME partnership creation	4	2	7
Other – please specify New Technology	1 – New technol-ogy	1 - support meas-ures for univer-sities	1 not specifies 1 – transparency of innovation support
Cluster	1	2	3

36. What problems are inherent in the region that have effected the RIS/RITTS programme? Particularly network building

Highly fragmented economic & political fabric & powers	Low level of human resources x 2	Difficulties in accepting leadership of organisations for programme that are not normally leaders
No strong key actors	Low levels of telecommunications	Regions not being able to define itself
Large base family owned SME alongside modern & large indus-tries	Dependence on foreign firms, and resulting duality in region	Finding a common strategy for actors
Location	Non integration of Branch Plants	Lack of long term strategies in SMEs
Problematic geomorphology	Low capability of local groups to use technology infrastructure	No definition of responsibility for technology transfer in institutions
Low internal communication	Industrial sector sill specialised in traditional activities	Co-operation between actors x 2
Infrastructure deficienies	Size & character of SMEs	Distance between companies
No links between SMEs and re-search institutes	Cyclic nature of agriculture	
Little Vision to exploit existing capabilities	Low level of R&D expenditure at enterprise level	
Weak system of innovation	Dependent on EU for funding	
Lack of innovation finance	Technical support centres still young and without a market	
Low level of business/university links	Lack of networking	
Low level of SME expenditure in R&D		
Differences in market access & communication between SMEs		
Cluster 1	Cluster 2	Cluster 3

37. What factors in the region have had a positive influence on the programme?

Increasing attention to bottom-up politics from reg. & local bodies	Dynamic created by tourism	Strong interest in new European projects
Impact of RIS into Agenda 2000	Good innovation centres	Strong Regional government
Strong commitment from national & regional authorities	Higher education linked to business needs	Strong intermediary infrastructure
Reputation of the main actor	Location	Co-operation of partners x 2
Needs analysis of both large & small firms towards increasing competitiveness in production	Technical application focus of training institutes	Location
Commitment of local agents – being most business men and realising benefits	Recent improvement of communication infrastructure	Political backing
Good research institutes and universities	Self-knowledge in SMEs	Large number of integrated actors
Innovation opportunities	Support structures in place	
Technological capability	Resources are avaliable	Bottom-up stance of gvt.
Cluster 1	Cluster 2	Cluster 3

APPENDIX 4

MAP AND TABLE OF CLASSIFICATIONS BY CLUSTER

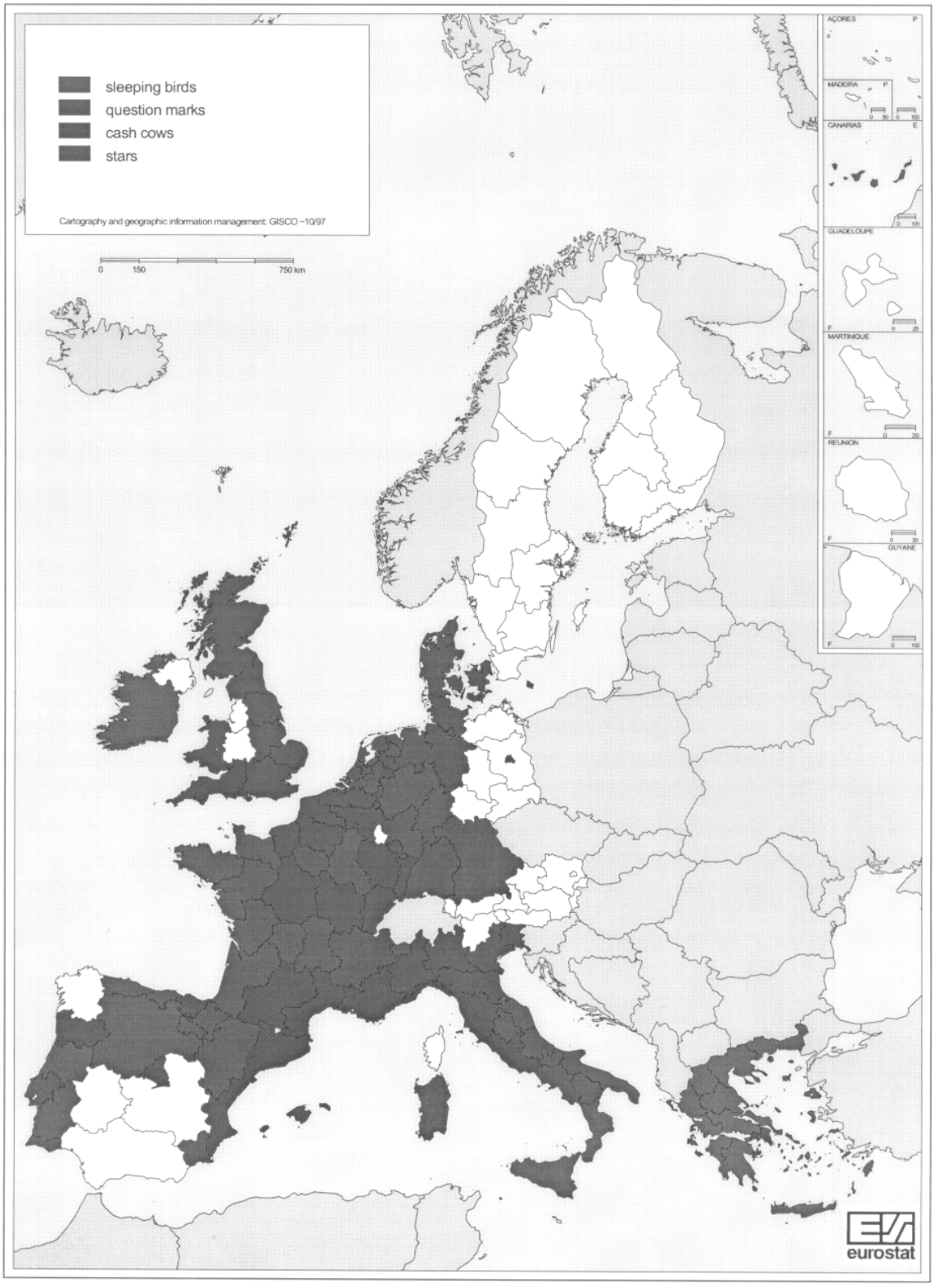

Figure A4.1 Map of classifications (source: Second European Report on S&T Indicators 1997)

Table A4.1 List of classifications (source: Second European Report on S&T Indicators 1997)

Cluster 1 (13 members)	Cluster 2 (33 members)	Cluster 3 (56 members)	Cluster 4 (8 members)
Galicia (E)	*P. Asturias (E)*	Brussels (B)	Baden-Württemberg (D)
Anatoliki Makedonia (EL)	*Cantabria (E)*	Région Wallonne (B)	Bayern (D)
Kentriki Makedonia (EL)	La Rioja (E)	Vlaams Gewest (B)	Hessen (D)
Dytiki Makedonia (EL)	Aragon (E)	Berlin (D)	Nordrhein-Westfalen (D)
Thessalia (EL)	*Castilla (E)*	Bremen (D)	Rheinland (D)
Dytiki Ellada (EL)	*Extremadura (E)*	Hamburg (D)	Île de France (F)
Sterea Ellada (EL)	Com. de Foral (E)	Niedersachsen (D)	Rhône-Alpes (F)
Pelopponisos (EL)	*Region de Murcia (E)*	Saarland (D)	Noord-Brabant (NL)
Kriti (EL)	Canarias (E)	Schleswig-Holstein (D)	
Calabria (IT)	Champagne (F)	Danmark (DK)	
Centro (P)	Basse-Normandie (F)	Pais Vasco (E)	
Alentejo (P)	Pays de la Loire (F)	Com. de Madrid (E)	
Algarve (P)	Bretagne (F)	*Com. de Valencia (E)*	
	Poitou-Charentes (F)	Cataluña (E)	
	Aquitaine (F)	Islas Baleares (E)	
	Limousin (F)	Picardie (F)	
	Auvergne (F)	Haute-Normandie (F)	
	Ireland (IRL)	Centre (F)	
	Valle d'Aosta (I)	Bourgogne (F)	
	Umbria (I)	Nord-Pas de Calais (F)	
	Marche (I)	Lorraine (F)	
	Abruzzi (I)	Alsace (F)	
	Molise (I)	Franche-Comté (F)	
	Campania (I)	Midi-Pyrenées (F)	
	Puglia (I)	Languedoc (F)	
	Basilicata (I)	Provence (F)	
	Sicilia (I)	*Attiki (EL)*	
	Sardegna (I)	Piemonte (I)	
	Norte (P)	Liguria (I)	
	Lisboa e Valle do Tejo (P)	Lombardia (I)	
		Veneto (I)	
		Friuli-Venezia Giulia (I)	
		Emilia-Romagna (I)	
		Toscana (I)	
		Lazio (I)	
		Groningen (NL)	
		Friesland (NL)	
		Drenthe (NL)	
		Overijssel (NL)	
		Gelderland (NL)	
		Flevoland (NL)	
		Utrecht (NL)	
		Noord-Holland (NL)	
		Zuid-Holland (NL)	
		Zeeland (NL)	
		Limburg (NL)	
		Yorkshire (UK)	
		East Midlands (UK)	
		East Anglia (UK)	
		South East (UK)	
		South West (UK)	
		North West (UK)	
		Wales (UK)	
		Scotland (UK)	

Note: Regions in *italics* are classified as objective 1 regions.

APPENDIX 5

DATA FOR INSTITUTIONAL THICKNESS GRAPHS

NETWORK DENSITY (INITIAL DATA -NO PERCENTAGES)

Cluster 1

REGION	Loc.	Reg.	Nat.	Political-Admin	Tech. Transfer/ Higher education	Devt. agencies	Chambers	Others (Assoc, Innov. Centres	Financ-ing/Fun ding
Thessaly	19	7	7	7	7	2	3	10	4
Sterea Ellada	14	4	9	7	3	4	7	4	2
E. Macedonia	8	10	5	3	2	3	3	10	2
Crete	8	17	7	10	4	8	8	1	1
Calabria	13	21	9	9	3	9	5	12	5

Cluster 2

REGION	Loc.	Reg.	Nat.	Political-Admin	Tech. Transfer/ Higher education	Devt. agencies	Chambers	Others (Assoc, Innov. Centres	Financ-ing/Fun ding
Puglia	13	14	6	11	3	4	4	7	4
Castilla	10	11	6	8	4	1	1	11	2
Asturius	6	17	8	11	3	4	3	7	3
Shannon	5	11	7	5	6	0	3	9	0
Lisbon	0	1	7	4	0	0	0	2	2

Cluster 3

REGION	Loc.	Reg.	Nat.	Political-Admin	Tech. Transfer/ Higher education	Devt. agencies	Chambers	Others (Assoc, Innov. Centres	Financ-ing/Fun ding
Overijssel	6	14	2	5	6	1	1	6	3
Limburg –NL	6	18	3	5	6	1	2	12	1
Utrecht	2	8	3	5	3	1	2	1	1
Limburg –BE	3	24	2	5	7	3	1	11	2
Lower Austria	2	22	4	7	4	4	3	9	1
Strathclyde	21	10	16	10	5	2	16	5	9
Weser-Ems	21	12	0	15	1	7	7	0	3
RAHM	23	11	6	16	4	6	6	5	3
Neubrandeburg	17	9	5	13	7	3	1	5	2
East Sweden	15	17	2	17	2	2	2	7	4

NETWORK DENSITY - (AGGREGATED DATA)

NB – the numbers in the brackets ( ) are the percentages of the three levels

CLUSTER 1

THESSALY

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. Agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	2 (28)	1 (14)	0 (0)	2 (66)	1 (10)	1 (33)	21%
REGIONAL	1 (14)	3 (43)	0 (0)	0 (0)	3 (30)	0 (0)	21%
LOCAL	4 (58)	3 (43)	2 (100)	1 (34)	6 (60)	3 (67)	58%
% By Category	21%	21%	6%	9%	30%	13%	100%

STEREA ELLADA

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	1 (14)	1 (33)	0 (0)	3 (43)	3 (75)	1 (50)	33%
REGIONAL	1 (14)	2 (66)	0 (0)	0 (0)	1 (25)	0 (0)	15%
LOCAL	5 (72)	0 (0)	4 (100)	4 (57)	0 (0)	1 (50)	52%
% By Category	26%	11%	15%	26%	15%	7%	100%

EASTERN MACEDONIA & THRACE

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	2 (66)	0 (0)	1 (33)	0 (0)	1 (10)	1 (50)	22%
REGIONAL	1 (33)	2 (100)	0 (0)	2 (66)	5 (50)	0 (0)	43%
LOCAL	0 (0)	0 (0)	2 (66)	1 (34)	4 (40)	1 (50)	35%
% By Category	13%	9%	13%	13%	43%	9%	100%

CRETE

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	4 (40)	0 (0)	2 (25)	0 (0)	1 (100)	0 (0)	22%
REGIONAL	2 (20)	4 (100)	6 (75)	4 (50)	0 (0)	1 (100)	53%
LOCAL	4 (40)	0 (0)	0 (0)	4 (50)	0 (0)	0 (0)	25%
% By Category	31%	13%	25%	25%	3%	3%	100%

CALABRIA

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	3 (33)	0 (0)	4 (45)	0 (0)	0 (0)	2 (40)	21%
REGIONAL	1 (11)	3 (100)	5 (55)	1 (20)	8 (66)	3 (60)	48%
LOCAL	5 (56)	0 (0)	0 (0)	4 (80)	4 (33)	0 (0)	31%
% By Category	21%	8%	21%	11%	28%	11%	100%

CLUSTER 2

PUGLIA

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	4 (36)	0 (0)	0 (0)	0 (0)	1 (14)	1 (25)	18%
REGIONAL	1 (9)	2 (100)	4 (100)	2 (50)	1 (14)	3 (75)	42%
LOCAL	6 (55)	0 (0)	0 (0)	2 (50)	5 (72)	0 (0)	40%
% By Category	33%	10%	12%	12%	21%	12%	100%

CASTILLA-LA MANCHA

	Politic al-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	2 (25)	1 (25)	0 (0)	0 (0)	3 (22)	0 (0)	22%
REGIONAL	1 (12)	3 (75)	1 (100)	0 (0)	4 (36)	2 (100)	41%
LOCAL	5 (63)	0 (0)	0 (0)	1 (100)	4 (36)	0 (0)	37%
% By Category	30%	15%	4%	4%	40%	7%	100%

ASTURIUS

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	6 (55)	0 (0)	2 (50)	0 (0)	0 (0)	0 (0)	26%
REGIONAL	5 (45)	3 (100)	2 (50)	0 (0)	4 (57)	3 (100)	55%
LOCAL	0 (0)	0 (0)	0 (0)	3 (100)	3 (43)	0 (0)	19%
% By Category	35%	10%	13%	10%	22%	10%	100%

LISBON AND TAGUS VALLEY

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	3 (60)	0	0	0	2 (100)	2 (100)	87%
REGIONAL	2 (40)	0	0	0	0 (0)	0 (0)	13%
LOCAL	0 (0)	0	0	0	0 (0)	0 (0)	0%
% By Category	50%	0%	0%	0%	25%	25%	100%

SHANNON

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	1 (20)	2 (33)	0	1 (33)	3 (33)	0	30%
REGIONAL	2 (40)	4 (67)	0	2 (67)	3 (33)	0	48%
LOCAL	2 (40)	0 (0)	0	0 (0)	3 (33)	0	22%
% By Category	22%	26%	0%	13%	39%	0%	100%

CLUSTER 3

OVERIJSSEL

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	1 (20)	0 (0)	0 (0)	0 (0)	1 (17)	0 (0)	9%
REGIONAL	1 (20)	6 (100)	1 (100)	1 (100)	2 (33)	3 (100)	64%
LOCAL	3 (60)	0 (0)	0 (0)	0 (0)	3 (50)	0 (0)	27%
% By Category	23%	27%	5%	5%	27%	13%	100%

LIMBURG – THE NETHERLANDS

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	1 (20)	0 (0)	0 (0)	0 (0)	2 (18)	0 (0)	11%
REGIONAL	1 (20)	6 (100)	1 (100)	2 (100)	7 (64)	1 (100)	66%
LOCAL	3 (60)	0 (0)	0 (0)	0 (0)	3 (28)	0 (0)	23%
% By Category	18%	22%	4%	8%	44%	4%	100%

UTRECHT

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	2 (40)	1 (33)	1 (100)	0 (0)	0 (0)	0 (0)	23%
REGIONAL	1 (20)	2 (67)	0 (0)	2 (100)	1 (100)	1 (100)	62%
LOCAL	2 (40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	15%
% By Category	37%	23%	8%	16%	8%	8%	100%

LIMBURG - BELGIUM

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	1 (20)	0 (0)	0 (0)	0 (0)	1 (10)	0 (0)	7%
REGIONAL	1 (20)	7 (100)	3 (100)	1 (100)	10 (90)	2 (100)	83%
LOCAL	3 (60)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	10%
% By Category	18%	24%	10%	3%	38%	7%	100%

LOWER AUSTRIA

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	1 (14)	1 (25)	0 (0)	1 (33)	1 (11)	0 (0)	14%
REGIONAL	4 (57)	3 (75)	4 (100)	2 (67)	8 (89)	1 (100)	79%
LOCAL	2 (29)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	7%
% By Category	25%	14%	14%	11%	32%	4%	100%

STRATHCLYDE

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	4 (40)	0 (0)	2 (100)	2 (12)	2 (40)	6 (66)	34%
REGIONAL	4 (40)	2 (40)	0 (0)	1 (6)	0 (0)	3 (34)	21%
LOCAL	2 (20)	3 (60)	0 (0)	13 (82)	3 (60)	0 (0)	45%
% By Category	21%	11%	4%	34%	11%	19%	100%

WESER-EMS

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0%
REGIONAL	4 (27)	1 (100)	7 (100)	0 (0)	0	0 (0)	37%
LOCAL	11 (73)	0 (0)	0 (0)	7 (100)	0	3 (100)	63%
% By Category	45%	4%	21%	21%	0%	9%	100%

RAHM

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	3 (19)	0 (0)	0 (0)	2 (33)	0 (0)	1 (33)	15%
REGIONAL	2 (12)	4 (100)	1 (17)	1 (17)	1 (20)	2 (67)	28%
LOCAL	11 (69)	0 (0)	5 (83)	3 (50)	4 (80)	0 (0)	57%
% By Category	40%	10%	15%	15%	12%	8%	100%

NEUBRANDEBURG

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	3 (23)	2 (28)	0 (0)	0 (0)	0 (0)	0 (0)	16%
REGIONAL	3 (23)	2 (28)	1 (33)	0 (0)	1 (20)	2 (100)	29%
LOCAL	7 (54)	3 (44)	2 (67)	1 (100)	4 (80)	0 (0)	55%
% By Category	42%	23%	10%	3%	16%	6%	100%

EAST SWEDEN

	Politi-cal-Admin	**Tech. Trans-fer/ Higher educa-tion**	**Devt. agencies**	**Chambers**	**Others (Assoc, Innov. Centres**	**Financ-ing/Fun ding**	% By Level
NATIONAL	2 (12)	0 (0)	0 (0)	0 (0)	0 (71)	0 (0)	6%
REGIONAL	2 (12)	2 (100)	2 (100)	2 (100)	5 (29)	4 (100)	50%
LOCAL	13 (76)	0 (0)	0 (0)	0 (0)	2 (0)	0 (0)	44%
% By Category	50%	6%	6%	6%	20%	12%	100%

APPENDIX 6

DATA FOR VERTICAL INTEGRATION GRAPHS

Cluster 1

REGION	Local (x) as a proportion of Non-local (y)	Local (x) as a proportion of regional (y)	Regional (x) as a proportion of National (y)
Thessaly	0.74	0.37	1.00
Sterea Ellada	0.92	0.28	2.27
E. Macedonia	1.88	1.25	0.50
Crete	3.03	2.13	0.41
Calabria	2.30	1.61	0.43

Cluster 2

REGION	Local (x) as a proportion of Non-local (y)	Local (x) as a proportion of regional (y)	Regional (x) as a proportion of National (y)
Puglia	1.54	1.07	0.43
Castilla	1.72	1.11	0.54
Asturius	4.17	2.86	0.47
Shannon	3.57	2.17	0.63
Lisbon	-	-	7.14

Cluster 3

REGION	Local (x) as a proportion of Non-local (y)	Local (x) as a proportion of regional (y)	Regional (x) as a proportion of National (y)
Overijssel	2.70	2.30	0.14
Limburg –NL	3.60	3.03	0.16
Utrecht	5.50	4.00	0.37
Limburg –BE	8.30	8.30	0.08
Lower Austria	1.40	1.10	0.18
Strathclyde	3.00	1.22	1.47
Weser-Ems	0.57	0.57	0.08
RAHM	0.74	0.48	0.54
Neubrandeburg	0.83	0.41	0.55
East Sweden	1.26	0.47	0.12