The London School of Economics and Political Science

Public investments in R&D as a tool for regional economic development

Under which circumstances do the European Union's Structural Funds investments on research achieve their objective to contribute to economic convergence of regions?

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Declaration

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Abstract

In the last decade the endogenous growth theory has been said to have found into the difference of endowment of knowledge that different regions possess both an explanation of semi permanent differences in prosperity levels and, consequently, a recipe for eliminating the gaps.

The theory had significant policy consequences and the impact was particularly large on the European Commission when it was decided to drastically increase the share of structural funds – the money meant to produce economic convergence of regions – into R&D.

However, statistical data show a weak correlation between R&D expenditure and economic growth acceleration, and more specifically, the correlation becomes even weaker if applied to EU poorer regions.

More precisely, the evidence suggests that R&D programmes can display different returns. This work wants to be contribution to better understand the reasons that lie behind these differences.

The research tests an hypothesis described through a framework that we called innovation value chain.

The result is that better performing innovation strategies are associated to: a more concentrated allocation of available resources and a higher capability of the initial *public* investments to stimulate further *private* investments; a clearer distribution of responsibilities for decision making over structural funds programmes and independence from policy making of the implementation processes of the programmes; a presence of partnerships amongst business, universities, government and public opinions that pre exist the implementation of the programmes and are based on specific per projects objectives.

The analysis is carried out through case studies that compare similar OB 1 programmes in regions that were similarly endowed as far as R&D assets at the beginning of the 2000 – 2006 programming period and that, yet, showed opposite results and patterns of economic growth.

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You have learnt something. That always feels at first as if you had lost something.

George Bernard Shaw

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INTRODUCTION

Innovation has become in the last fifteen years the priority that is shared by the political economy strategies of countries at different stage of development and by virtually all political sides. However, statistics appear to sometimes contradict such a wide consensus: the propensity of economies and societies to invest in innovation has not always increased as much as promised and technology driven changes have not always been capable to significantly impact economic data.

More specifically as far as the regional development policies, the endogenous growth theory has been said to have found both an explanation of semi permanent differences in prosperity levels amongst different countries and regions and, consequently, a recipe for eliminating the gaps. Knowledge was theorized to be not freely transferrable across geographical areas and the spontaneous concentration of it in some places was identified as the determinant of lasting differences in productivity levels. The consequence of such a position was that convergence cannot happen spontaneously and, therefore, there is a need for the state to invest into knowledge related assets in less advanced regions.

The theory had significant policy consequences in many countries. The impact, however, was particularly big in the European Union (EU): a new emphasis was placed on knowledge by the EU Lisbon Strategy and by its policy targets in both the 2000 – 2010 period and the 2010 – 2020 one; the European Commission (EC)'s investments into research and development (R&D) was increased; even sharper was the shift towards this typology of expenditures of the structural funds' budget that finances the EU cohesion policies whose aim is to reduce differences in prosperity amongst EU regions.

Currently 140 billion euro are being spent by the EC - through structural funds and framework programs - in R&D and, more broadly, in innovation. Of this amount, 70 billion are specifically allocated to projects to be carried out in less developed European regions with the objective to achieve the full use of their economic potential. This sum doubles when we take in account the co-financing that beneficiaries - national public administrations and private - are required to provide.

However, notwithstanding the expectations, no systematic account of the results is available to the Commission or member states, nor there is any timeframe for reaching the policy targets.
However, both in Europe and elsewhere, the validity of the expectations that the endogenous growth theory raises, is rarely questioned.
The ability of knowledge creation to increase the wealth of nations is taken for granted by most policy makers and most of public opinions, and there is seldom accountability for results either before, during or after the programs. The very academic literature tends to focus on the conditions that affect the propensity of states to invest in research or at the most on the overall impact of national or regional innovation policies (Hall et al, 1999, Grilisches, 2000, Levy, 1990) and more specifically on the effects of government funded investments on the propensity to invest of firms.
Little has instead been done in terms of acknowledging that R&D investments can have dramatically different returns according to the tipology of industry, the kind of investments, the actors that have the responsibility to implement. Additionally, little is discussed as to what can generate differences in efficiency of public investments in research, whereas the evidence suggests that one euro spent on research can yield dramatically different results.

This research aims to respond to the aforementioned gap.

The puzzle from which the investigation is originated is, in fact, that statistical data do not confirm expectations inspired by the endogenous growth theory of most of the international organisations and especially of the EC: there is not a strong correlation between European countries and regions increasing R&D expenditure and economic growth acceleration, and more specifically, the correlation becomes even weaker if one considers the capability of poorer regions to converge towards EU averages. More precisely, spending on R&D appears to be a condition which is necessary but not sufficient for less developed regions to converge towards European averages. The evidence suggests that R&D programmes can display different levels of efficiencies and this work intends to investigate the reasons behind these differences.

This thesis, therefore, stands at the crossroads of two questions that have dominated European regional and national development agendas for some time. First, is it worthwhile to spend taxpayers' money on R&D programmes as a regional development tool and, if so, when? Secondly, is the sizeable increase in funds that the EC allocates to R&D programmes in less developed regions justified, and under which conditions do structural funds investments on research contribute to the reduction of differences in economic prosperity amongst European regions?

In order to find answers to the above main questions, the thesis explores three hypotheses that are to be interpreted as dependent, independent and pre existing variables along a process through – as for the "innovation value chain" that we are introducing in this thesis as our main methodological framework - which innovation strategies are developed and realized.

Firstly, we want, then, to test whether the higher capability of public R&D programmes to generate economic growth in less developed regions is associated with a more concentrated allocation of available resources in industry sectors, academic domains, geographical areas and segments of recipients. This can in turn foster a higher propensity of the initial *public* investments to stimulate further *private* investments.

Secondly, it is hypothesised that a more concentrated resources allocation and a higher ability to increase private investments are associated respectively with a clearer distribution of responsibilities for decision making over structural funds programmes, as well as with the presence of partnerships amongst business, universities, government and public.

Thirdly, the thesis also explores the pre existing conditions – in terms of the independence from policy making of the implementation processes of the programmes, as well as of the existence of explicit strategies meant to develop and maintain the above mentioned partnerships – that are supposed to be associated to the above hypothesized success factors.

The above mentioned factors are hypothesized to be decisive vis a vis other factors – human capital limiting spill overs of public investments in R&D (as in Rordiguez Pose and Crescenzi, 2006), specialization (as in Porter, 1990, and Midelfart-Knarvik and Overman, 2002), institutions (as in the tradition of the "new institutions economics" as in North 1993) - that are considered by other authors as far as the success of innovation policies.

This hypothesis is tested using as case studies structural funds spending on R&D, and the outcomes of such spending in two regions in the United Kingdom, and two in Spain.

The 2000 – 2006 programming period was chosen because it is the last that was completed and for which we can evaluate even the impacts on economy which are likely take few years to unfold after completion of the programmes.

The cases were selected – as explained at a greater extent in the methodological part of the work – because for each pair, the injection of public investments in R&D during the 2000 - 2006 period were similar in that they represented equal percentages of Gross Domestic Product (GDP) spent on R&D. Moreover the productivity and income per person before this period were also similar in both regions,

as well as their propensity to spend in research. Regions within each pair also appeared to be endowed similarly of the other factors (human and social capital, specialization, institutions) that we just mentioned as alternative explanations to the hypotheis we are testing as determinants of success of innovation strategies.
Yet the outcomes of the expenditures in R&D were markedly different: in the UK, the two regions differed significantly in terms of indicators like effects on private investments, speed by which the funds were utilized by firms and universities and, ultimately, productivity growth rate; in Spain, the two regions differed a lot in terms of the rate of private investments in R&D that structural funds expenditure attracted, as well as effects in terms of employment and productivity.

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The results produced through this analysis are expected to be of interest for scholars, practitioners and mangers of regional innovation programmes both in Europe and beyond the domain of the cohesion policies and outside Europe. Likewise some of the results may be relevant for those studying, evaluating, designing or implementing innovation strategies at national levels. The structural funds must, in fact, be considered as a context which is interesting for testing hypotheses whereas some of the conclusions are meant to be generalizable to other similar policies.

The work is articulated according to the following structure:
Chapter one describes the background to the problem. Firstly, the research is positioned within wider debates concerning the factors underlying economic growth of less developed regions, the recent success of the innovation based explanations of differences in economic progress of regions and the impact of such theories on European Union's and European Commission's choices. We will, then, show that notwithstanding this enthusiasm with R&D as a priority, a higher expenditure in knowledge does not automatically translate into an acceleration of growth. The last section of the review of relevant literature considers the strands of research upon which the thesis and its methodology is constructed with the better identification of the factors that according to this author may explain different performances of similar public investments in R&D and of different regional innovation strategies persued in less developed regions.

Chapter two addresses various issues relevant to the methodology of the work. It first introduces the causal chain – we will call it the "innovation value chain" - that is supposed to account for how an investment in R&D turns into a sustainable gain in productivity or economic growth. Next, the criteria for selection of case studies are introduced and applied in order to identify the countries and regions ultimately selected for study. We will, then, go through a survey of additional factors that may influence outcomes of R&D investment and explain how the research strategy was crafted with the aim of minimizing their impact. The chapter continues with the a review of some of the definitional probems associated to operationalization of the key variables - research, economic growth and regional competitiveness – whose relationships will be investigated. The section also clarifies that the focus of the thesis will be on R&D related investments, although we also explain why the thesis will have also to consider the wider notion of innovation. The section is concluded with a survey of the main research instruments.

Chapter three gives an account of the analysis undertaken in preparation for the field work conducted in the UK and Spain. The role of R&D as a lever of regional development in each country, and the pre-existing economic conditions - in terms of development, research assets, and institutional setting - are described.

Chapter four and five describe the case studies, according to the following structure. First, the main choices of the development programmes and the structure of the measures dedicated to innovation are described. Secondly, results are assessed, on the basis of macroeconomic data, programmes, official documents and interviews with both the beneficiaries and the individuals in charge of the programmes. This provides the basis for testing the hypotheses that: i) better performing programmes are associated with more concentrated resource allocation patterns and mobilization of private investments in R&D; ii) that more concentrated resource allocation patterns are in turn explained by clearer decision making procedures and independence of implementation from policy-making process; and, eventually, iii) that a higher capability to mobilize private investment in R&D depends on the presence of partnerships between certain categories of actors relevant to regional innovation strategies and agents that create, maintain and facilitate such alliances.

Chapter six then summarises the investigation's main findings, while also drawing out advice for policy makers and finally identifying areas for further research.

CHAPTER ONE – MERITS AND LIMITS OF INNOVATION AS A REGIONAL DEVELOPMENT POLICY

The initial chapter will frame the problem we are investigating, present the puzzle from which the study was originated and account for the literature in order to better define the contribution that this research is going to provide.

The first part of the chapter will position the research within a wider review of relevant literature and background data. More specifically we will review the arguments for considering regional development policies as a provider of a public good – convergence amongst regions in terms of prosperity levels - which otherwise would not be spontaneously offered by markets and, more specifically, we will frame public investments in innovation as a tool of regional development and try to explain the impact of endogenous growth theory on policies meant to generate economic growth. We will then review, in the second part of the chapter, how European cohesion policies reflect an higher priority being attached to innovation in terms of resources allocation, we will also show the consistency between the strategic choices upon which these EU policies were constructed and the basic beliefs of innovation based theories of economic growth. In the third part we will, however, see how numbers falsify the idea that always higher investments in knowledge translate themselves in acceleration of economic growth and introduce the explanations that have been given to explain different performances of different innovation strategies. In the last section we will, thus, review the literature on regional innovation strategies to whose broad domain this thesis is going to contribute and, more specifically, we will account for the main academic works done on how the quality and the quantity of cooperation within the region and different organisations of the decision making process may have an impact on outcomes: these last pages will provide the theoretical background that will serve as foundation of the thesis and of the methodological framework – the innovation value chain – that we will describe in the second chapter.

1.1 THE LITERATURE ON INNOVATION WITHIN THEORIES OF REGIONAL DEVELOPMENT

The question of the effectiveness of public investments in R&D and innovation as a tool of regional development must be positioned within a number of wider debates, concerning questions: should government do anything in order to accelerate economic growth and, more specifically, economic growth in less developed regions? Is otherwise a better option simply not to hinder a convergence that should take place spontaneously, as an effect of market forces? Is there a market failure to which public investments in R&D is asked to respond? Alternatively if we believe that convergence will not take place without intervention, which is the best mix of possible public investment and what should the role of R&D be within the policies aiming to produce it? And lastly even when these policies are effective on aided regions which is the effect on developed regional economies that did not get the funds?

It is, therefore, preliminary to a research like ours on the effectiveness of various instruments of regional development to try to address the very issue of the justification of the regional development policy and, more specifically, of a policy meant to generate regional development through innovation. The question is, at the end, about establishing if there is a particular market failure such that faster than average economic growth of the poorer does not spontaneously happen and if in particular there is a lasting underinvestment in the knowledge assets of less developed regions that, in turn, produces lasting differences in terms of prosperity.

The question we are referring to, reflects the dialectics between the main theories of growth: it is a vast academic domain dominated by the conflict between the neoclassical approach, on one hand, by which convergence does ultimately take place, and the new economic geography, on the other, that maintains that differences are here to stay. We will shortly see that as far as Europe is concerned, the first theory of market driven “convergence” seems to apply to the states which are increasingly similar as far as level of prosperity, and the second seems to, instead, explain why gaps amongst regions stay the same or become bigger. We will see later that the latter theory finds the reason why divergence does not go away spontaneously, in the presence of tacit, not tradable, not transferrable knowledge.

1.1.1 The justification for regional development policies and the hypothesis of market driven convergence.

The supremacy of markets and, thus, the idea that no role should be played by the State to directly foster economic growth finds its origin back to the standard neoclassical growth theory that explains economic growth through the argument of **decreasing return on capital**. Such a factor is considered a driver of convergence and it is expected to generate in the long run a decrease in the difference in terms of GDP per capita[1]. If this theory is to be believed, **regional income per inhabitant should tend to converge and there should be no need for public money to be spent on achieving such an objective**.

On the basis of a number of time series[2], Solow (1956) and Swan (1956) were amongst the first to argue that the rate of profit on capital may be generally falling in time and thus – transferring the argument to a macro level - that it may increasingly fall the more capital a nation accumulates. In the argument that Solow developed, countries reach – through a path of decreasing return on capital – a **steady rate** where capital and labour are employed at their equilibrium with the best possible efficiency (meant as in Pareto). Further increase can only come from technology improvements which are seen as exogenous to the system and perfectly transferrable from one country to others[3].

A decreasing return to capital may thus explain why poorer countries tend to grow more than richer ones and why such a trend continues until they reach a regime that the theory describes as a "steady rate". This is, after all, the explanation employed for three decades (sixties, seventies and eighties) to explain why relatively less-developed countries (Germany, Italy, Japan) tended to outperform in terms of growth rates the countries (USA, UK and up to some extent France) that inherited wealthier and larger industrial bases after World War II[4].

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[1] It must be said that the micro economic concept of "economies of scale" says exactly the opposite. Smaller industry bases may be doomed by their size, not to have same return of investment of bigger ones and thus not to attract same amount of capital. If we now assume – in order to go from the micro to the macro case – that more advanced regions tend to have not only more capital, but also larger, more capitalized firms, the distance may become bigger. A transposition of the economies of scale argument to the plane of macro economic performance is at the heart of the "new economic geography" theory that we will analyse later.

[2] The classical study of Denison (1967), for instance, that provides evidence through cross-country data. The study run comparisons in a relatively limited period of time (1950 – 1962) for UK, Germay, Denmark, Norway, Sweden, France, Italy, the Netherlands and the US. Similar results are reached by other studies by Kendrick and Sato or by the US bureau.

[3] Neo classical growth theories appear to be, in fact, a theoretical development of the idea of convergence towards equilibrium that comes from microeconomics and from Leon Walras' classical work. In a sense, the European cohesion policies that wil be investigated by this thesis, appear to reflect the main critique to the general equilibrium theory as in the very Keynes when he points out to the fact that these models can only be valid in the "long run" and overlooks the "suffering" that will happen in the adjustment process.

[4] Wars, however, can also be the real explanation for the GDP to more fastly grow in countries that were more hardly hit. The reconstruction – which in the case of world war II was even financed from other countries - might have, in fact, provided extra fuel to the economy of countries like Italy, Germany and Japan. However, these countries outpaced the others for longer than the period needed for the reconstruction, hence other explanations appear justified.

The policy implications for such an interpretation of development are that the best option for accelerating growth in less developed regions is to increase the free movement of capital as much as possible. Capital will tend to be allocated to where marginal returns are bigger and thus, accumulated investments are smaller. In fact, in a world of perfect capital mobility, perfect information and decreasing return, convergence would take place instantaneously and no differences among countries would ever occur.
Although the neoclassical growth model seemed to hold true – as far as the comparison amongst developed countries - for the three decades after the Second World War, the advantage of Japan, Germany and Italy – that were pointed for a long time as the examples of the validity of the theory - started to be eroded since the eighties wih USA, UK and - up to less of an extent – France that found an apparently new way to gain a competitive edge. Data (as in Jorgenson and Khuong, 2005) have, in fact, continued to undermine the very theoretical premise of decreasing return of scale of the elegant model developed by Solow.
However, a new even more powerful tipology of market driven convergence was about to happen with reference to the differences between developed and developing areas.
A new, export driven convergence has been, in fact, taking place since the early nineties at a global scale, with the rise of economies like South Korea, Taiwan, Singapore and more recently giants like China, India, Brazil. Similar process was, at the same time, happening in Europe with Spain, Ireland and more recently a number of eastern European countries rapidly catching up.
The reason for this trend is, however, slightly different from the neoclassical model.
The neoclassical model considered, in fact, economic systems that were substantially closed and although significant exchanges amongst the group of most developed countries were an important factor for development, the world economy (Maddison, 2001) was much more fragmented.
The new wave of convergence between more and less industrialized states was, instead, characterized by much deeper and wider fall of trade barriers and to **comparative advantages** that poorer countries hold at the beginning of the process in terms of costs. The theory that comparative advantages may trigger economic convergence is, in fact, not at all recent and it can be traced back to Ricardo (in *The Principles*, 1821 but also amongst others Grossman and Helpman, 1991).
Although different, the neoclassical and the comparative advantage theories shared two common traits.
Firstly, in both it is industrialization that triggers rapid economic growth: under the neo classical hypothesis, convergence is generated mostly by movement of capital in search of better remuneration

in the less developed regions; under the world of comparative advantages it is mainly the increase of exports and, thus, turn-over of the (local and foreign) industrial sites that are located in developing countries that erode the market share of the ones that are based at the centre.

Secondly, in both contexts the only possible development policies are the ones that aim to minimize the interference of the State in the economy (Olson, 1982, Hirsch, 1976, Kraus, 1968, Tsoukalis, 2005[5]); in both, convergence is an unavoidable result and **no need seems to exist**, within this account, **for specific development policies** (like the cohesion one).

Even less space is left for allowing public money to be spent on R&D endowments in less developed regions given that spontaneous development appears to trigger endogenous investment in knowledge and research. This last assumption appears to be confirmed by the behaviour of many catching up countries: after a first phase of cheap labor driven development, they tend to increase their expenditure in R&D even more than developed countries in order to compete on technologies and skills (see Zhou and Leydesdorff on China, 2006, and Dahlman and Utz of World Bank, 2004).

However, notwithstanding the fact that neoclassical theories have appeared to be often successful, few fundamental critiques have not gone away and have, in fact, been strengthened by the very financial and economic crisis erupted in year 2009.

In certain contexts, in fact, markets have failed to produce convergence: if we, for instance, look to European regions gaps amongst them appear to endure any attempt to significantly reduce them. Not less importantly, notwithstanding the accusation of the dominance of liberal theories, practically all countries of the world, including the ones that are traditionally more used to trust markets, have felt the need to develop an increasingly richer and more diversified menu of regional development policies.

The persistence of gaps amongst regions appear to have found one of its most interesting explanation in the "new economic geography" which also has got far reaching consequences for the idea to invest into the R&D basis of less developed areas.

Whereas "growth theory" theoretically applies to cases where only exchange of capital and no exchange of goods takes place among economic systems that present different return on capital, the "new economic geography" (Krugman and Venables, 1995, Puga, 1999, Midelfart-Knarvik and Overman, 2002, Boldrin and Canova, 2001) literature focuses on the effect of growing market integration on inequalities amongst regions.

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[5] As far as the EU' case, Lucas Tsoukalis (2005) even theorized that the growth of countries like Spain, Portugal and Greece in the last tow decades, is to be more associated to the liberalization process that began due to their joining the EU (he, in fact, even asked himself – in "what kind of europe?, page 55, 2005, if "economic integration is a validation of liberal theories" after having noticed that EU "seems to have acted as a convergence machine" and having reasoned on the causal relationship between increase of trade due to liberalisation and growth) than to the investments of structural funds on thos countries.

An increase in international trade and, more precisely, **a reduction of barriers** to exchange is seen – in a way which turns on its head the neo classical argument - the cause of higher inequalities.

When trade costs decrease, **agglomeration**, meant as concentration of industrial activity in certain places, **increases** for two reasons (Puga, 1999 and 2002, Forslid *et al*., 2002):

a) Competition among firms is less restrained by trade costs and the initial outcome should be the elimination of less efficient producers and a concentration within industries (and consequently among suppliers and buyers); this means that more profitable firms are likely to concentrate in regions that can provide better access to suppliers and work supply; consequently, these regions tend to grow more in terms of industrial base, and, eventually, GDP per capita;

b) Firms whose factories were located in different regions have a smaller incentive to be closer to final customers (as in a model where two regions are separated by high "trade" costs) and the incentive for them is to concentrate their assets in the same (most likely home) location.

As a result, the regions with better "endowments" [6] (education, infrastructure, legal system and security, natural resources, etc.) capture shares of other regions' markets so that they increase their share of the total production base[7].

It is, as we mentioned before, the very European Union to provide some of the most interesting statistical back up of new economic geography: regions are converging only slowly (like in Spain which is one of the two country that we selected for our research) or are, in fact, deverging (like in UK the other chosen country). This is seen as a consequence of the large redution of trade costs created by not only the single market but also the wider policy called "integration" [8].

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[6] Some argue that such an agglomeration takes place even if the endowments of the regions are equivalent (i.e. their "comparative" positions are equal). In fact, the agglomerated industries tend to enjoy increasing returns to scale even if the geographical contexts are equivalent at the start (Allen *et al.*, 1998, again Krugman, 1999, Porter, 2000). Competitive pressures tend to increase the average productivity, and proximity to suppliers tends to reduce prices of the initial production factors. So even if it is just by chance, the movement of a firm from one region to another is expected to produce – in a low trade cost model - a self-accumulation process that can significantly concentrate the industry base.

[7] The entire forecast of the "new economic geography" is, however, further complicated by the implication of the wide diffusion of Information and Communication Technologies (ICT). This discontinuity makes it in theory (Cairncross, 1997, Quah, 2000, Maignan and others, 2003) less valuable for a firm to be geographically closer to its competitors, partners and suppliers, while it makes feasible the creation of "clusters" which happen to be geographically dispersed but "logically" very compact. This point will be the basis of one of the hypotheses that we will test when we investigate the importance and the nature of partnerships within regional innovation strategies.

[8] An application of economic geographic reasoning to the EU case requires, however, clarifications on both the dependent and independent variables whose relationship we are trying to assess. More specifically as far as a) the definition of the economic shock against which policies are to be drafted, b) the definition of the outcome expected and, thus, the policy's objective pursued.

First, as far as the shock, there is a difference between a *reduction of trade costs* – modelised by th new economic geographers – and the concept of *integration*. Reduction of trade costs and, as an expected consequence, increase in trade between regions, appear at a global level as a result of deliberate policy choices as well as technological novelties allowing for transaction costs to fall. Integration, by contrast, is a more sophisticated set of policy tools, because it also includes increasing coordination of policies. It thus also considers the elimination of a number of "invisible" barriers that

Looking reality from the "new economic geography"'s proint of view, the argument of the market failure leads to the idea of convergence being a public good requiring a dedicated policy.

One consequence of an approach of this kind has been, in fact, the push on the creation of an industrial basis (Hoffman, 1958 but also Perroux, 1955) as a platform to respond to economic backwardness and to promote further agglomeration[9]. Once a basis exits, comparative advantages will be produced from the expansion of that basis and will allow that region to catch up. Greece, Spain, the Italian *Mezzogiorno* were sort of laboratories to test the validity of this approach even before the structural funds interventions could take off (Leonardi, 2005).

However, new economic geography models do not necessarily imply a constant relationship between a reduction in trade costs and accumulation and thus inequality. The paper of Krugman and Venables ("Globalization and the inequality of nations", 1995) shows that the effect of higher international integration is a "U shaped pattern of economic change, of divergence followed by convergence". If, at an initial stage, the fall of trading costs will mean that producers of intermediate goods, as well as the users of them, will find it convenient to locate near to each other, at a later stage, when trading costs fall further, the importance of being close to suppliers will diminish. Cheaper labour costs in the periphery as well as a surge of costs due to congestion in the centre will **reverse** the agglomeration pattern.

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prevent goods and services, people and capital from moving and the creation of a number of positive actions aiming to favour trade.

Secondly, the final outcomes are different. There is, in fact, a difference between "agglomeration" – to which the new economy geography refers - and "convergence" – the final outcome pursued by the cohesion policies. The former refers to the distribution of industrial activities amongst different areas and the latter concerns the reduction of difference in GDP per capita. We can obviously have one without the other, although we may have expected (more in the past than now) some correlation to exist between the two.

Moreover, within the idea of "agglomeration", we need to further distinguish between "clustering" which is the concentration of sectors in certain areas (it can be measured by the "specialisation" of certain geographical entity), and concentration of the manufacturing base (Porter, 2000). Again, we can have the former without the latter (when regions relocate productions sites so that the loss of the region's production in one industry are exactly compensated by gains in another sector), and vice versa. Whereas the overall manufacturing base concentration normally implies inequality in employment rates, specialization has more immediate consequences on productivity.

The evidence suggests that, for instance, Europe is experiencing different evolution patterns on concentration and specialization ("clustering") and that such patterns are differentiated according to whether we are referring to regions or countries (Knarvik and Overman, 2002): a) member states are specializing but at a slow pace; b) even slower is the pace by which regions become more specialized; c) the overall manufacturing sector does not get concentrated when we consider states and there is instead a significant concentration amongst regions in the same state.

[9] New economic geography's analyses were, in fact, not completely new in their foundations and implications. A few decades before, Myrdal (1957) had proposed a theory of "circular cumulative causation" by which the development of richer regions will subtract potential of development from the poorer ones which prevents economic systems from converging and forces the economy to be in a permanent situation of non equilibrium created by increasing gaps. In fact, even in Myrdal (according to the *Economic Theory and underdeveloped regions,* 1957) there is – like in the new economic geography some spill-over from developed to less developed areas, although the effects of these were supposed to be low as far a Europe is concerned.

Even more radical than Myrdal are the economists of Marxian tradition: to them development is a zero sum game and unless the cost of the industrialization is paid by the centre, no development can happen (Frank, 1974, Holland, 1976, but also the Rosenthal report, 1974).

A U-shaped pattern of economic change does, however, has got two further qualifications.
The first is that adjustment and convergence would imply (and this may be the case that applies to the USA that does, in fact, display – according to Puga, 1999 – lower differences amongst states that is the case amongst European regions) costs in terms of differences of wage and workers relocation.
The second is that the models do not provide a clear answer to what is going to happen in a given time to convergence amongst different geographic areas. According to Krugman and Venables, immediately following the shock agglomeration occurs and proceeds for some time afterwards, and at a later stage a reversal will unfold, equalizing incomes. It is evident that nobody can tell beforehand what stage the economic system is going through: nobody knows the length of time of each leg of the agglomeration–decongestion cycle. Such a forecast becomes even more difficult when reductions in trade barriers are not one-off events, but are rather a sum of a number of sometimes contradictory small steps towards liberalization. The answer depends, in fact, on where the economic system lies at a certain time with reference to the process of adaptation to a certain shock (the reduction of trade barriers) and the long term may last long enough to create consequences for social cohesion and political consensus (Forsild et al., 2002).

The second point may offer a justification for policies – like the EU cohesion policy– meant to reduce differences. It is – as we will see in the next section – the rather peculiar meaning that the EU attributes to the concept of convergence - the idea of pursuing reduction of prosperity levels without bearing the human costs associated with workers relocation and the costs to cohesion produced by differences in salary - that is needed to understand why cohesion has become not only an idea widely accepted by European policy makers but also one of the feature that qualifies a so called "European social model" that the EU has been pursuing for decades.
Here is where the "endogenous growth theory" comes into play as the theoretical backing and the idea that European cohesion policies were looking for: the investments in the innovation assets of the less advanced areas must have been perceived as the only way to make prosperity levels to convergence without going through competition on costs amongst European regions.

1.1.2 The justification for innovation policies and their role within regional development

The link between knowledge and economic growth has long been recognized. As Howells (2005) reminds "from Marshall (1890) through to Kuznets (1971) there has been a recognition that, directly or indirectly, knowledge changes economic activity and economic activity changes knowledge in constant round of changes".

However, as mentioned before, in the neo classical word (from Solow, 1956 through Mankwin et al., 1992) knowledge and technology[10] – being this latter the ultimate product of knowledge – is totally exogenous, available to everybody and everywhere (and in this sense it is "public good") and in the long run the rate of technological progress is equal for every place.

The "endogenous growth theory" turns this approach on its head: knowledge decomes endogenous to a given system (country or region) and cannot be transferred without significant transaction costs[11]. Endogenous (and neo shumpeterian) growth models, thus, integrate the endogenous component of technological progress as one of the independent variable generating economic growth as technology progress is seen as the product of the actions of speficic economic actors (Romer, 1990) that decide to invest in human capital and R&D.

Moreover two further qualifications contribute to render innovation "a disequilibrating factor in the process of economic growth between geographical areas" (Howells, 2005): the neo shumpetrian interpretation of growth that introduce the notion of monopolistic competition on generation and exploitation of knowledge and intellectual property rights that make knowledge even less transferrable (Temple, 1999); and the idea that investments in knowledge may have increasing returns (Verspagen, 1997) that make likely the rise of strong cumulativeness effects in the impact of a region's research assets.

In this context, **it is the difference in endowment of endogenous, not tradable** (Rodrigeuz - Pose and Crescenzi, 2008, call it "tacit" to differentiate it from knowledge that is formalized and protected in patents) **knowledge that explain a divergence** in long term growth rates that can last over extended periods of time and the political consequence that has been derived is that if you want these gaps to disappear you need to invest into the R&D base of the less developed region.

The endogenous or new growth theories represent a rather differentiated body of analyses that stem from the same basic assumption of the contingent transferability of technological progress. Therefore under the same theoretical umbrella different readings of economic reality and very different policy recommendations co-exist (Watson, 2004).

The origins of the theory can be traced back to Arrow and Romer whereas Lucas also provides some important contributions.

Starting from the basic belief that it is knowledge that makes economic performance of countries and regions to differ, Arrow and Romer focus their research on investigating the networks, the places

[10] There are important differences between a number of terms – knowledge, innovation, technology, research and development – that can change in a significant way both the premises and the conclusions to many of the arguments that we and many authors develop. We will come back to these differences in chapter two of this thesis.

[11] Technologies is not the only factor that has been considered as not easily transferrable. Social capital (Putnam, Nanetti and Leonardi, 1993) and more broadly production factors (Cappellin 1993, Stoehr, 1990, Suarez – Villa, 1898; Wadly, 1986) tend also to stay.

where knowledge and production meet. This is, in fact, will also be one of the focus of this thesis when we will concentrate on partnerships and hubs where innovators come together.

The difference between the two is that the former focuses on the effectiveness of the mechanism by which *ideas and goods* meet and leverage each other (Arrow, 1962), the latter on the meeting of proper *technologies and* again *goods* (Romer, 1986). Points of view like Arrow's one highlight the importance of investments and reforms of the education system; whereas Romer seems to theorize an entire school of thought which underlines the importance of public investments aimed to embed R&D into the industrial and research base of a nation. It is Romer, therefore, that can be seen as the beginner of the theory that produced later the literature on regional innovation systems which is particularly relevant to this thesis.

The question that is not less important to qualify the endogenous growth theory and the role of knowledge in regional development is, however and once again, the one about the role of the state. Is innovation something that needs to be triggered by public intervention?

An other important contributor to the theory, Lucas (Lucas, 2001) stresses the importance of free markets and lessening constraints for entrepreneurs to freely pursue innovative modes of production or original products. According to him, innovation, like in a destruction – creation Schumpeterian cycle, is the production of entrepreneurial greed and ingenuity and, therefore, he gives priority to the creation of the ideal conditions for entrepreneurs to deploy their energy and potential (Lucas, 2001).

According to some others, however, the role of the state is essential for two reasons.

The first is that private firms may underinvest as opposed to what would be optimal to the general welfare and this underinvestment may be particularly large and damaging in some domains. This outcome may be because of "incomplete private appropriability" problems: markets would not invest as much as it would be necessary to maximize welfare because the benefits of innovation is too uncertain, too wide in geographical terms and too long to materialize when compared with the criteria with which private investors tend to assess the attractiveness of different possible investments (amongst others, Arrow, 1962, and Nelson, 1959).

The second is that in less developed regions this suboptimality may be even bigger because of the costs that firms and universities may pay for a disadvantage in terms of distances from markets and researchers, whereas R&D investments may tend to concentrate in specific areas even more than the manufacturing base (Midelfart-Knarvik and Overman, 2002).

The role of the State within R&D accumulation processes can be, then. reconducted to a market failure. This market failure and thus underinvestment tend to differ greatly according to the typology of research we are talking about (basic research is supposed to have harder time to attract private investors funds), the industry (the defence depends almost entirely on public decisions) and the area (R&D tend to be heavily concentrated so a goal – like the cohesion policies' one – to over invest in less developing areas may be necessary to compensate private investors' investment decisions to focus on developed ones).

Therefore it is widely acknowledged that there is a role for the State and that it is theoretically convenient for purpose of welfare maximization to spend taxpayers' money in R&D, although the decisions about the optimal size of this investment and the area where to spend pose – as we will see in the third section of this chapter - important choices to policy makers and civil servants that may be charged with the responsibility to choose.

The theoretical backing of innovation oriented policies is, however, challenged by both, as we will see, statistical evidence and qualifications of the validity of the arguments on a theoretical plane.

As far as the latter, it is worthwhile at this stage to mention two problems that have been raised.

The first is about the real endogeneity of knowledge. Nordhaus (1969) does, for instance, notice that although we admit that technology is privately owned, the very nature of the intellectual property right (acquired via patents or publications) require a formalization of the innovation that makes by definition knowledge less tacit and thus, theoretically, on the contrary, more tradable and thus exogenous. Moreover, empirical studies have demonstrated that these transfers of knowledge are indeed very large and that for a country like the United States half of technology progress can spilled over to the rest of the world (Eaton and Kortum, 2002).

Secondly, it must, also, be said that all the considerations that we synthesized, refer mostly to countries and that their application to regions – to which this thesis is interested - imply few problems. Vavakova (1999), for instance, raises an issue of coordination and minimum scale with reference to the French case of regionalization of research strategies. Legislation and regulations that may have an effect on propensity to invest in risky projects are normally outside regions' institutional competences. Wehereas, spillovers tend to be higher and thus knowledge is a less endogenous asset (Gumbau-Albert and Maudos, 2009) especially when we are talking about small regions.

Notwithstanding these doubts even when we acknowledge that many things may go wrong with innovation based regional innovation strategies, we still need to admit , as Rodrigeuz-Pose (2001) recognizes, that "R&D investment in lagging areas may prove in the long run to be a better and cheaper alternative to social transfers and to the investments linked to traditional development strategies".

This must have also been the view of the policy and strategy makers that have recently adopted innovation as main priority of cohesion policies.

1.2 EVOLUTION OF COHESION POLICIES AND THE SHIFT TOWARDS INNOVATION

With the rise of new growth theories innovation becomes, therefore, the main factor driving economic growth and ultimately prosperity at both national and regional levels. In this section we will start from a broader contextualization of the growing importance that has been attributed to knowledge by the European Union as a lever of competiteveness and defence of its social model; we will then follow up with a review of the reasons why innovation may have appeared to have a fit with the ideological premises of the particular kind of cohesion that European Union pursues, and we will conclude with the numbers showing how this new priority has changed the resources allocation within the budget of the Union and of cohesion policies.

1.2.1 The Lisbon strategy

The priority on research is recognized nearly everywhere in the world and this has recently produced an increase in the percentage of GDP dedicated to R&D: both in the most advanced economies (in Japan between 2000 and 2008 the percentage went from the already high 3,04 to 3,44%, whereas in the USA it increased less from 2,7 to 2,8) and in the most recently industrialized ones (in China it went from 0,9 to 1,44%, in South Korea from 2,3 to 3,2%, whereas the rise was lower in India) that are deliberately trying to develop new competitive advantages in technology as opposed to cheaper labor costs (OECD, 2010).

Altough the rise in the propensity of EU to invest in R&D has not been equally large and the percentage of GDP spent on R&D has stayed around a relatively low 1,2% in the last decade, the European Union launched - at the beginning of the period we are considering (2000) – an ambitious pla, the so called “Lisbon Strategy” as a new political priority of the EU.

In fact, the strategy was not only the result of the influence of the endogenous growth theory on an academic plane. It was a wide literature and media discourse on the rise of a brand new “information society” that attracted lot of policy makers’ attention (Watson, 2004). The idea that dominated some of the European councils in the last years of the nineties (and more remarkably the Luxembourg Council in 1997) was that in order to revitalize or, even more drastically, save the “European social model” which was felt to be faced by the competition of the rest of the world and, particularly at that time, of the USA, it would have been necessary to incorporate in the EU policies some of the elements of the new paradigm which was based on information – intensive production systems that were believed to have made the United States (as well as other Asian economies like South Korea, Taiwan and Singapore) to enter into a "new economy" characterized by superior economic growth with no inflation, no business cycle and a frictional unemployment (Freeman and Soete 1994).

Some of these considerations were clearly underestimating certain economic processes as the stock market crash and tech downturn showed in 2001. And yet in Lisbon, the European leaders felt the urgency to respond with a grand strategy meant to increasingly become a vital goal of the Union. The Lisbon strategy' objective was to make the EU "the most dynamic and competitive knowledge-based economy in the world by 2010" and one of its two qualifier targets (being the other an employment rate of 70% by 2010) was, in fact, to reach by 2010 a percentage of GDP spent in R&D of 3%. Moreover, this transformation was to achieved by preserving at the same time public and private financial stability.

As a matter of fact, a more complete reading of the Lisbon Strategy's objectives is for the EU "to become capable of sustainable economic growth with more and better jobs and greater socialcohesion and respect for the environment" (European Council, 2000). The idea was, thus, to preserve (and "sustain") EU's unique social model by increasing productivity and competitiveness in the face of global competition[12].

Not less important was the recognition that such an ambitious strategy "could not be pursued at EU level alone but through the co-operation between the EU and Member States" (European Commission, 2010). This method of cooperation – that was, then, called Open Method of Coordination – was not a novelty (Hodson and Maher, 2001) for the Union governance and, yet, some of the mechanisms – benchmarking, peer review, target setting – were explicitly adopted for the first time as a tool for influencing and coordinating national agenda.

The limits of the strategy were, however, apparent almost since the start: first of all the OMC appeared to be not enough to provide the European Union the power to really enforce the agenda. Moreover EC's own financial capabilities to promote the strategy were also relatively small (European Council, 2000, European Commission, 2001).

These problems were made even more evident by the partial incapability of the Strategy (see the *evaluation* of the strategy issued by the EC in February 2010) to achieve its targets and, more specifically, on the small impact that the strategy (including here the choice to use structural funds) had had on the percentage of GDP spent on R&D.

A major factor in the failure to reach the initial targets was, certainly, the crisis that took a toll on employment rates and public deficit. However, even before the crisis the initial objectives appeared difficult to reach.

[12] A very similar agenda has been reproposed for the renewed strategy covering the 2010 – 2020 period, called Europe 2020.

Over time concerns about the ability of the EU to achieve the targets of the strategy had, in fact, considerably grown even after the first half of th Lisbon Strategy deployment period (2000 – 2005) (Pisani – Ferry, 2006).

Reports like the one produced by the Independent High – Level study group established in 2003 by the President of the Commission (at that time Romano Prodi) and led by Andre Sapir (Sapir et al, *An Agenda for a Growing Europe*, 2003) reminded in its very introduction that one the major concern underlying the Lisbon decisions - the gap in competitiveness of the EU vis a vis the USA – had stayed the same. One possible political response (according to a number of EC and EC commissioned reports like the *Facing the Challenge: The Lisbon Strategy for Growth and Employment* commissioned by the EC to a High Level Group coordinated in 2004 by the previous Dutch Prime Minister Wim Kok) has been seen to dedicate to the objective of "competitiveness" a bigger portion of the EU budget and more specifically a much larger share of the structural funds (Kok et al, 2004).

The structural funds that support the implementation of cohesion policies did, thus, provide a much needed financial back up. Altough there were other more profound reasons for cohesion policies and Lisbon strategy to become instrumental to each other, as we will see in the rest of this section.

1.2.2 The reasons for the "lisbonization" of cohesion policies

The alliance between the argument of the innovation as driver of economic growth and equalizer of prosperity levels between poor and rich areas and the argument of cohesion was, therefore, based not only on financial considerations. In fact, there are at least three fundamental reasons why the European Commission and the community of policy makers and experts dedicated to cohesion must have considered with increasing interest the possibility to put innovation at the centre of their agenda (EC, fifth, 2008, sixth, 2009, cohesion reports). The first has to do with the peculiar kind of cohesion that Europe has been looking for; the second with the idea that convergence is not, as we will see, a zero sum game; and the third a certain dissatisfaction with the results achieved with structural funds until the period (2000 – 2006) that this thesis studies. We will, however, start from a overview of the nature and evolution of cohesion policies.

Cohesion policies as distinctive feature of the European model

The acknowledgment of the reduction of regional imbalances as one of the missions of the Union can be traced back (Leonardi, 2005) to the founding Rome Treaty Preamble of the 1957 where the initial six members express – firstly - their "[anxiety] to strengthen the unity of their economies and to ensure their harmonious development by reducing the differences existing between the various regions and the backwardness of the less favoured regions" and immediately after they stated their "[desire] to contribute, by means of a common commercial policy, to the progressive abolition of restrictions on international trade" (EU, 1957).

However, notwithstanding the principle that the treaty put forward, an autonomous Community regional policy was not established for more than a decade: the reasons for this delay have been said to be basically two: the idea that integration of markets would contribute to reduce regional disparities (Vanhove and Klassen, 1987 page 258); but also the fact that France, Germany and Italy had recently started their experience with regional policies and that an European one was felt to be a possible duplication producing confusion (Wallace, 1977, page 140).

During the 60s, however, a number of papers showed that some of the optimism that convergence was a spontaneous process was misplaced (Van Campen 1959, p. 167, Motte 1960, p. 827 , Birkelbach 1964 , p. 114).

However, the report that signals a significant advancement of the Union's position towards the approach that we observe today was the report issued by the commissioner for regional policies George Thompson in 1973 (European Commission, 1973). The Thompson report is, in fact, significantly modern in most of its major statements. Firstly the report acknowledges the definitive failure of the idea of spontaneous convergence, when it recognizes that the Community, which at the time had six members, had experienced an economic expansion that had been "continuous – with GDP growing at a rate of more than 5% - but not balanced – with richest areas having an income per head five times that of the poorest". Secondly the report underlined the case for regional policy from the points of views that were "moral, economic and environmental". By **moral** need, the report meant that cohesion was indispensable in preserving the very meaning and motivation of citizens towards the commission and, thus, here there is the political side of the cohesion policy perceived as indispensable for the survival and the development of the European project. The **environmental** dimension is mentioned because the new policy was meant to reduce the cost of congestion in areas where aggregation was exceeding its optimal level and it is interesting to notice here both the fact that the report anticipates the concern for the environment and that it puts forward the idea that the development of the periphery of Europe is necessary to the centre as well. This approach is confirmed when the report outlines the **economic** side of cohesion and explicitly says that its aim is to increase the use of untapped potential and thus the wealth that overall the European community is able to produce. In the report, which is considered the ideological foundation of the cohesion policies, it is, thus, underlined that the entire argument for launching a proper regional policy (and a specifically dedicated European Regional Development Fund) was to, simultaneously, make economic growth not only more balanced but also higher.

Not less interestingly, the report also clearly mentions that the regional policy objective was then to "move capital towards underutilized human resources" and to avoid the opposite situation. It is a precise qualification of the idea of convergence that Europe decide to promote whereas – unlike the United States – gaps are closed, as we will see shortly, not by large migration of workers, but by creating the conditions for capital to move towards the less developed areas.

Nowadays the European cohesion policies has become been the best endowed, best known and most sophisticated of all regional development policies and it is certainly the most significant regional development policy being designed and deployed on an international scale and whose coordination is carried out by an international organisation (Leonardi, 2005). In fact, the cohesion policies budget amounted to 71,4 BN Euro in the first 1989 – 1993 programming period, rising to 184BN Euro for the 2000–2006 cycle that we are analyzing in this thesis, and rising further to 344 BN Euro for the current expenditure cycle (2007-2013). This amount equals to more than one third of the EC's total budget and approximately 0.3% of member states' total GDP.
Cohesion policies are, thus, enacted through the realization of a number of operating programmes funded by the so called "structural funds" [13] whose reform was mandated to the EC by the article 130 (d) of the Single European Act (1986) [14] and reviewed by three successive wave of regulations[15] each starting a new five years programming period (thus we so far had a 1988 – 1993, 1994 – 1999, 2000 – 2006 and 2007 – 2013 programming periods). The structural funds target different objectives[16] that mostly correspond to different areas facing different problems, wheras the biggest is the Objective 1 dedicated to support regions whose GDP per habitant was below 75% of the European Community average[17]. As said before, these programmes operate mostly on a national or regional[18] basis and are

[13] European Regional Development Fund (ERDF), European Social Fund (ESF), European Agriculture Guidance Guarantee Fund (EAGGF) plus since 1993 the Cohesion Fund for the member states whose GDP pro capita was less than 90% of European average (Spain, Portugal, Ireland, Greece).
[14] Regulations 2052/ 1988; 4243/ 1988; 4244/ 1988; 4245/ 1988; 4246/ 1988
[15] In 1993, 1999, 2006.
[16] Objective 1, 2, 3 & 4, 5a, 5b to which one wants to add the so cllaed Community Initiatives that were managed directly by the European Commission and the Integrated Mediterranean programme whose introduction in 1985 anticipated some of the principles of the reform in Italy, France and Greece where they were spent. From 2007 there has been a reduction of the objectives to three.
[17] Objective 1 became "convergence regions" under the 2007 – 2013 regulation.
[18] By region here we mean the definition that EU has identified to distinguish regional entity (called Nuts II in the Eurostat terminology) from the sub regional/ provincial ones (the Eurostat Nuts III).

therefore administered by regional and national administrations, coordinated by the European Commission (mostly the Direction for Regional policies and the one for Employment).
The outcomes of a policy constituting such a substantial investment financially and politically are thus crucial for the continuing viability of the European project. Additionally, the policy represents a key “case study” for other “macro regions” experiencing growing regional inequalities.
Some of the distinctive features of the cohesion policies also serve as theoretical justifications of the recent introduction of innovation as the concept around which to reconceptualise cohesion policies and regional development strategies.

Investment in knowledge as a response to the integration versus cohesion dilemma

The first reason of looking to innovation with interest is that it must have appeared as a way for Europe to solve the contradiction between integration and cohesion – Europe’s two main missions – that has characterized most of its history.
The success of the former (**integration**) has, in fact, always been believed to augment the reasons for raising the (financial and political) commitment to the latter (**cohesion**).
It is, in fact, not a coincidence that the entire regional development strategy with the reform of structural funds of 1988 with which the first programming period was launched, almost coincide with the creation of the “single market” that according to the Single European Act (SEA) of 1987 was to be completed by 1992. In the SEA the notion of single market was meant a goal that, more ambitiously than for the “common market” envisaged by the founding treaty of 1957, had to be parallelled by policies meant to reduce regional imbalances that may become gretaer because of increased competition (Leonardi, 2005).
As Boldrin and Canova (2001) notice, the EU buys a “divergence” vision of integration that reflects at least partially the forecast that the “new economic geography” would do in terms of impact of a reduction of trade costs on regional imbalances. Lower barriers and more competition are expected to expose the weaknesses of backward regions and to attract – when proximity to final clients become less of an issue – capital in the more developed ones (Graziano, 2003, Widgren, 2001).
However, this effect does not – in the case of the “model” that European Union pursues – gets compensated at a later stage by the relocation of workers and competition on salaries that according to the economic geographers would bring the system to a new equilibrium with lower differences amongst areas when agglomeration costs become higher than agglomeration benefits.

In Europe a mix of deliberate policies and social characteristics has, in fact, limited both the **labour mobility** (Janssen and Gijsel, 2000) amongst states[19], whereas much mobility has happened amongst regions within countries and the **wage differentials**, whereas salary levels differ at a large extent amongst countries but not amongst regions within countries (Molle and Van Mourik, 1989, Andersen et al, 2000, Boeri et al, 2002). The combination of the two effects make European region to differ in terms of income level more than other areas of the world (Puga, 2002) where salaries move more freely and workers relocate themselves looking for better opportunities[20].

This situation of a mobility that *de facto* limited to capital and goods, thus, resulted into a situation where

1. countries tend to converge thanks to the comparative advantages of new comers and the mobility of capital that moves to countries with cheaper labour (Puga, 2002);
2. regions within countries tend to diverge because of low differences in wages within countries given that wage bargaining systems are largely national[21] so that within countries poorer regions can not make for their gap in productivity by providing chaper labor (Boldin and Canova, 2001).

This is demonstrated by looking to the numbers of the evolution of differences in income per capita – as a proxy of convergence - amongst regions and member states in Europe that the author reconstructed for the 1995 to 2007 period.

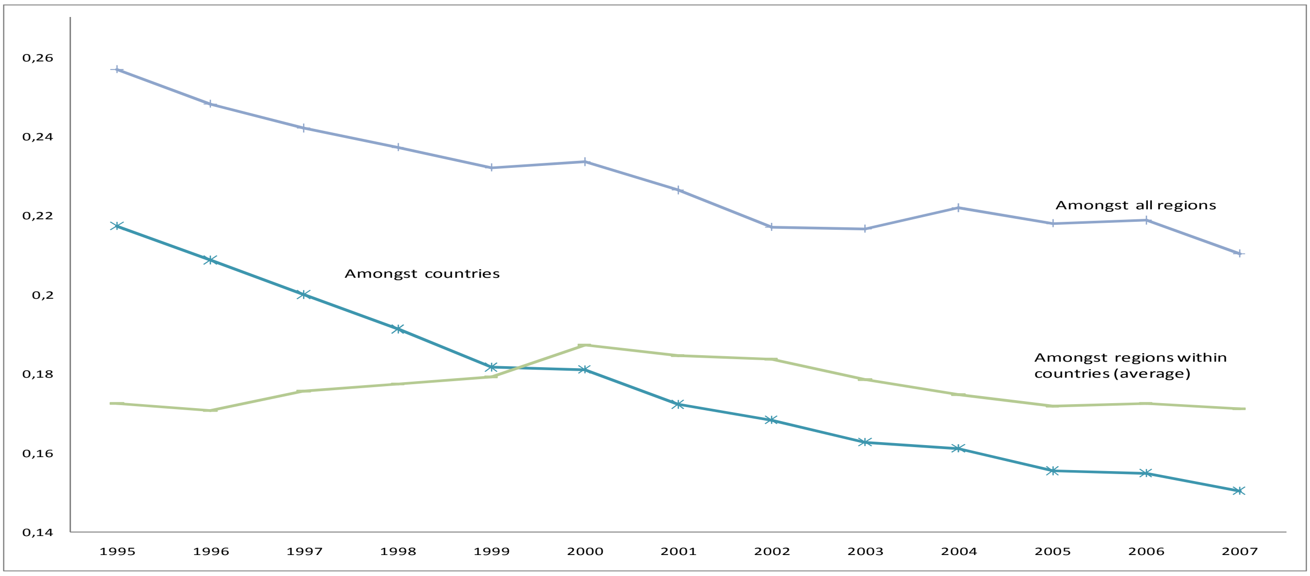
[19] Surprisingly, in fact, the number of EU's employees being born in a European country and working in an other was much higher (up to 6%) in the seventies before the SEA than today (Janssen, 1999).

[20] As some authors (Puga, 1999, 2000 and 2003) have put forward, numbers appear to even say that higher mobility and wages flexibility make regional gaps in income smaller in more market driven economies like USA than Europe.

In fact, the ten best-off (NUTS 2) regions in Europe have GDP per person equal to 3.5 times that of the ten worst-off regions, whereas in the USA, the ten best-off states have a GDP per person equal to 1.5 times that of the ten worst-off states; moreover whereas nearly 25% of EU citizens live in Regions whose GDP is below the 75% of the average threshold and thus qualify for Objective 1; in the USA the similar percentage, applying the same mechanism, would be only 2% and only two states, Mississipi and West Virginia, would be considered "less developed". However, the weakness of this analysis is that it compares (American) states with (European) regions, where there are large differences between the two - both in terms of institutional and size – that makes the comparison questionable. Moreover, America's industry base seems more concentrated, given that to account for half of the European industrial production we have to sum the 27 more industrial European regions with 45% of the population (and 17% of the land), to get to half of it in the USA is sufficient to consider 14 states which have 21% of the inhabitants (and 13% of the surface).

[21] With the partial exception of Germany (Hancke, 2002).

Graph 1.1 – Coefficient of variation in income per capita amongst regions and amongst countries, EU 15, 1995 – 2007



Source: Eurostat, access November 2011

The chart does clearly indicate that if we focus on old (EU 15) member states which were beneficiary of structural funds in the period we are studying, whereas countries are converging fast, differences amongst regions are being reduced more slowly. If we then try to measure convergence not amonst all regions but as **average of the coefficient of variation amongst regions within countries** (so that we neutralize the measurement of the intra countries effect), the curve becomes practically flat with no gain of less vis a vis more developed regions (notwithstanding the expenditure of structural funds).

In this situation, the expenditure in R&D in less developed regions may have appeared as the tool to make regions to converge on a curve of economic development characterized by higher added value without competition on cheap labor amongst them (as, for instance, for the second "cohesion report" released at the beginning of the programming period we are considering, European Commission, 2001). This reasoning becomes even stronger when regions become "vulnerable" due to the increase in global trade (see, for instance, the study of Affuso, Capello and Fratesi, 2010, on strategies adopted by different regions to respond to the so called globalization).

Cohesion as a lever to pursue efficiency and innovation as an enhancer of economic growth

There is, however, a second reason that makes the case to invest in R&D particularly interesting for European policy makers. Since the start, cohesion policies have been, as we mentioned, explicitly said **not to be a form of subsidy** or of compensation. The objective has been in fact said to use cohesion instruments to increase the wealth of the entire community by tapping into the most evident unused potential which was supposed to be hidden in the less developed regions. This point has been even more highlighted recently by the EC's documents (European Commission, Second, 2003, Third, 2005, Fourth, 2006, Fifth, 2008, and Sixth, 2009, Cohesion Reports).

Since the 1986, the view of cohesion as a lever to use a particularly large and underutilized potential for growth was associated to cohesion instruments. This was the view that was, for instance, endorsed and theorized by a study group appointed by the President of the Commission Jacques Delors and chaired by Tommaso Padoa Schioppa (Padoa Schioppa et al, 1987). In that report *efficiency, stability* and *equity* were conveyed as the three overarching aims of the Community. The idea was to put at work factors that were underused and, in this context, an investment in knowledge was perceived as pivotal not only to reduce inequality but also to increase the capability of lagging regions to contribute to general wealth and, thus, to maximize the economic growth of EU as a whole.

The clarification that the objective of efficiency is to be perceived as distint and to be persued with different instrument as opposed to the aim of equity did further contribute to legitimate the investments in the innovation capacacity of backward regions as one of the pillar of the new cohesion policy.

The independent report released in April 2009 by Fabrizio Barca at the request of Danuta Hubner, Commissioner for Regional Policy (Barca, 2009)[22] can be, in fact, seen as the outcome of a debate that has taken place especially during the programming period that this thesis considers.

The Barca report argues that both considering the latest choice and the history of the policy, Structural Funds are, in fact, serving not one but two objectives. One of ***equity***[23] whereas the EU wants to make sure that European citizens or European *places* are not excluded and that thus cohesion of the Union is not reduced, and one of ***efficiency*** where overall levels of prosperity can be increased by making full use of the potential of people and areas that may be underutilized.

In Barca's view efficiency can be further specified (adapting Bourguignon and other, 2007) as the full achievement of economic potential. Such a definition envisages an increase of output through

[22] The rationalization that Barca proposes leaves open questions on the very identification of the policy's objectives (see, for instance, the recent 'Cohesion or Confusion: A Policy Searching for Objectives by Iain Begg, 2010). However, the acknowledgement that two objectives co-exist under the same umbrella raises an even more important issue which has to do with the structure of the programmes and the organisation of the implementation processes. Is it efficient to pursue the competitiveness of more and less developed regions under the same umbrella of the structural funds, or would it not be better to separate the two areas and thus policies (Tewdwr-Jones, 2005, Wishlade, 2008)?

The idea that the instruments pursuing efficiency and equity should be separated is probably the most interesting innovation that the Barca report (2009) suggests. This is, in fact, one of the most far reaching indications that the report provided which also appears to be consistent with the thesis that we proposed. The weakness of the report is, however, that the consequences of such a separation are not fully elaborated.

[23] The concept of equity is clarified by the report by associating it to the idea of social inclusion and referring to a multidimensional approach which is richer than income per person (the report refers for justifying its theorization to Amartya Sen's capability approach, but also to recent works of both the EC – the First European Quality of Life Survey – and the OECD, Giovannini and others 2007).

two typology of actions: a static one that is meant to increase the utilisation of a certain economy at a given time (essentially through the increase of the employment rate of people and the deployment rate of investments), and through a dynamic one whose objective is to increase wealth in time by increasing the output per factor. This latter, in turn, means to increase the productivity of workers and of industrial assets by improving skills and technologies.

The report provides some further interesting input into the debate and into this thesis when it defines the rationale for the intervention (Barca, 2009, pages 20 -21 and page 31): “it is the failure of institutions and of the motivation within a society which calls for an external intervention that can break the path towards underdevelopment and that is, both, capable of delivering results and creating the conditions for the development process not to be reversed”. The report, accordingly, suggests to focus on both the pursuit of efficiency and on the achievement of equity by providing “integrated bundles of public goods and services” because they increase the visibility of the intervention, produce early wins and create the accountability between program managers and population.

The “public goods and services” that are needed for achieving efficiency are, then, associated with the infrastructure necessary for investing innovation, the education and the volume of expenditures in research which all represent assets upon which the market would underinvest because of a lack of convenience and, thus, of the above mentioned appropriation problems.

Cohesion partial failure and innovation as a possible change

The third and final reason why innovation has become so important in the structural funds experience is that the experience of cohesion policies falls short of a definitive confirmation of achievement of its own objectives: inversitments in R&D appeared to have the potential to make possible a change in direction.

In fact, the few analyses[24] of the overall performance of cohesion policy are available (Leonardi, 2005, Barro and Sala-i-Martin (1996), Armstrong and Taylor, 2003) “leave us with the question of whether the Cohesion policy has been fully able to achieve its objectives” (Leonardi, 2006).

Data, in fact, do not provide any definitive answer[25]. Even the evolution employment rates mentioned by some of the papers that support cohesion policies (Leonardi, 2006) do not support any strong,

[24] These studies show that convergence is taking place in Europe but at a slower pace than in other large economies like the USA (where states are taken – with a lot of institutional approximation – as proxies of regions) and Japan. Leonardi (2006) distinguished convergence for Objective 1 as opposed to not Objective 1 regions in Europe and found that the former were growing faster than the latter (and the same was said by the Third Cohesion Report, EC, 2004).

The researches do use as tools of measurement both Beta and Sigma convergence, whereas Beta convergence happens when we find a negative correlation between the growth rate of income per capita and the initial level of income and Sigma convergence takes place when the dispersion of real income per capita among group of regions tends to fall over time. They both show that notwithstanding larger regional development policies, convergence is proceeding at a slower rate in Europe than in other continents.

generalized conclusion (even when we limit to the comparison between cohesion countries and the rest). Moreover, the data of even our previous graph 1.1 showed that the cohesion policies' results have at least mixed: convergence within countries amongst regions is practically not happening notwithstanding the structural funds, whereas, even the mere fact that only eleven of the fifty seven regions that were elected as objective 1 regions in 1994 did succeed abandon their status of less developed region by 2000 – being this the overall objective of a public intervention of this kind – says that it is plausible that cohesion policies did, at least partially, miss their target.

More likely, performances of structural funds programs do vary a great deal according to the decision that are taken at national and regional levels and no unique answer to the question of performance exist, with some examples of outright success (Ireland as for the account given by O'Hearn, 2001, and Barry and Crafts, 1999) and other of quasi permanent failures (as in the independent evaluation that involved your author and that assessed the effectiveness of structural funds programmes in South Italy, Vision&Value and LSE, 2007). These differentiations and the impossibility to give one answer to the question of the impact is, after all, a natural consequence of the empowerment of regions: different regions take different decisions, develop different institutional capabilities and achieve different results and a research like the one that we are developing is meant to understand what does explain these gaps in performances[26].

Moreover, however, even more doubts exist when it comes to assess the capability of cohesion policies to not only support less developed regions, but also to promote EU wide economic growth through the use of underutilized resources.

Reports like the one produced by the Independent High – Level study group established in 2003 by the President of the Commission (at that time Romano Prodi) and led by Andre Sapir (Sapir et al, *An Agenda for a Growing Europe*, 2003) urged the EU to consider growth (both in terms of productivity and employment base) as its overarching priority. A trade off between cohesion and growth was, once again, exposed and the concern of opinion leaders and policy makers appeared to shift again towards the need of efficiency[27].

Investing in innovation and, more precisely, in making through innovation each region leading edge in its specialization (as the Barca report, 2009, suggests when it encourages the European

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[25] There is, in fact, a problem of both data at region and programme level - Leonardi, 2006, notice, in fact, that "measuring whether change has taken place should be easy" and instead it is not so due to lack of data and dis homogeneity in the methods to collect them which is *per se* an issue of accountability and institutional capability – and of models capable to isolate from other factors the impact on GDP levels and employment of the programme.

[26] In fact, the argument of differentiation of outcomes can be applied to both cohesion policies and single market with (authors and) regions being dispersed in each of the four quadrant resulting from the combination of the positive – negative outcome of both structural funds and fall in the trade barriers.

[27] The Sapir report also proposed a number of radical reforms of cohesion policies with a re nationalization of the structural funds programs. These proposals appeared, in fact, in contradiction with the above mentioned aim of "multi level governance" being an aim (and not only a method) of cohesion and with the priority that the same report appeared to attach to the idea of improving institutional capabilities.

Commission to adopt a wider interpretation of what innovation may mean so that each region may find its way – even in traditional sectors and portion of value chain of not innovative industry – to be innovative in its own way) has, therefore, a strong appeal and certainly may have appeared to promote a change in programmes that displayed, at very least, the possible problem to be too similar amongst them.

The next section will discuss how the decision to invest structural funds in research and innovation must have, therefore, appeared as the compromise to bridge between the need to facilitate the transformation of Europe into a knowledge – based economy and the idea to keep the cohesion effort going.

1.2.3 The shift on the allocation of structural funds

The impact of the evolution of the theories of growth on cohesion policies has been constant. We already saw how the rejection of the idea of convergence as a natural process assumed by the neoclassical theory of growth, found an important back up in the economic geography forecast of the single market producing divergence.

Priorities also changed over time both in terms of the weight of the structural funds in the EU budget (and thus in terms of the role of cohesion policies within the EU strategies) and of the composition of the portfolio of structural funds funded investments (again European Commission, Second, 2003, Third, 2005, Fourth, 2006, Fifth, 2008, and Sixth, 2009, Cohesion Reports) and this again can see as being influenced by the evolution of theories of growth.

Although there is no systematic account for the evolution of the structural funds portfolio in terms of change of weight of different typologies of investments, one can recognize a general shift in instruments mix through the five programming periods that can be accounted for in the following way:

1. an approach to development that was initially neo-Keynesian; investments in **transportation** infrastructures tended to be seen as crucial to avoid isolation but also to produce an increase in the production function (through investments and the consumption variable);
2. a shift at a later stage towards the concept of regional competitiveness meant as strengthening of the competitiveness of **firms** and “districts” of firms (as for Michael Porter, 2003) through the provisions of financial and real (consulting, information, ..) support, although this was tempered by the need not to violate the concurrent principles of competition and of restriction of state aids;

3. an increasing concern towards **training** as a way to improve the employability of individuals and the human capital assets that the firms can leverage where this approach was encouraged by a number of studies that underlined human capital and education as success factor of the recent rise of some economies like South Korea, Singapore and, also, Ireland (see, for instance, the estimation of impact of educational achievement on economic performances in Aghion et al, 2003, and OECD, 1996, 1999, 2003);
4. a growing emphasis of the EU on environmental and lately climate change policies; **environment** was, in fact, one of the three "pillars" of the very Lisbon strategy (where the need to "decouple growth from the use of natural resources" was put forward) as it was confirmed by the Goteborg Strategy in 2001 (EC, 2001, but also the report on the role of environment within cohesion policies of the Regional Environmental Center under the auspices of the European Network of Environmental Authorities, 2008, and the case for electing "adaptation to cilimate change as one of the cohesion priorities in the above mentioned Barca report, 2009)

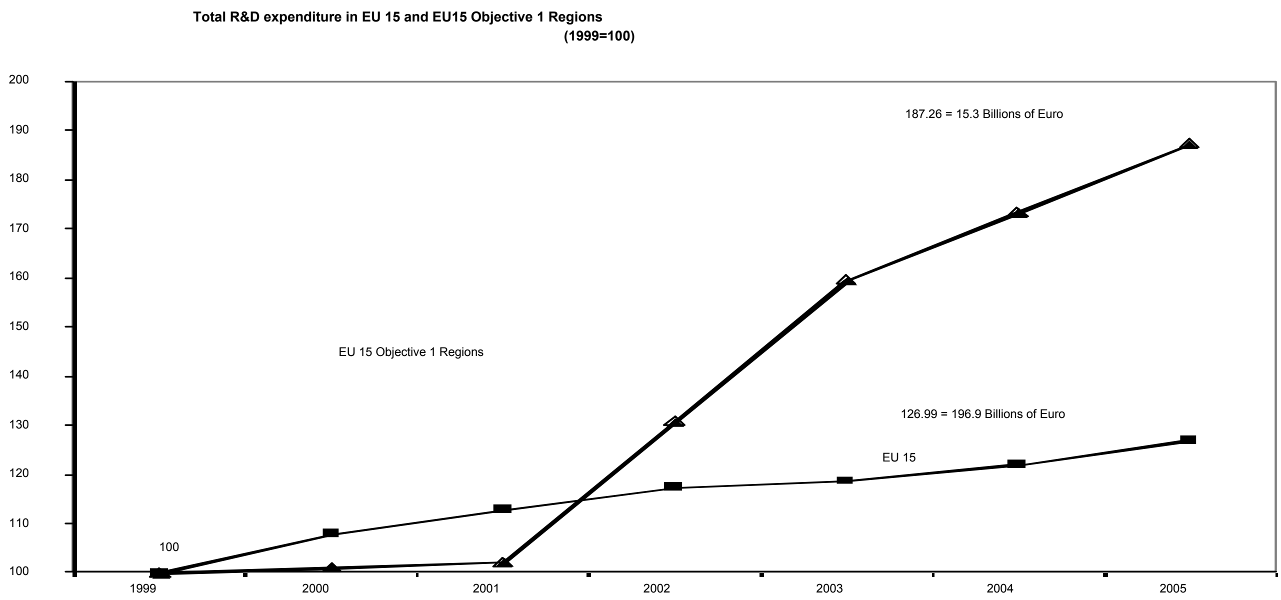
and ultimately

5. a strong increase of the importance of **R&D** and Information Communication Technologies (ICT) in the current programming period (for the theoretical and political reasons that we just described).

Throughout this evolution, cohesion policy has progressively increased its distinctiveness as an intervention aiming to reduce inequalities, not through redistributive measures, but through the creation of "conditions" under which the potential of the less developed areas within the Union and their resources can be untapped. In the EU's vision such a policy should not only impact positively on the economic performance of less economically able regions, but also deliver a net gain for the growth of Europe's economy as a whole (European Commission, Second and Third Cohesion Report, 2002, 2004). Investments in R&D have been perceived the instrument that more immediately can tap into underutilized potential of economic growth.

The effects of the new priority on R&D can be found already for the 2000 – 2006 programming period and can be seen in the graph 1.2 that shows the evolution of R&D investments:

Graph 1.2 – Total R&D expenditure in EU 15 and EU 15 Objective 1 Regions (1999=100)



Source: Eurostat, accessed March, 2008

In the latest programming period investments in R&D have accelerated much more in less developed than in advanced regions and such a redistribution appears to be mostly the effect of structural funds. It must be, in fact, said that the increase of funds spent on R&D only partially happened for the period that we are studying. In fact, the Lisbon strategy was officially launched after or at the same time that the 2000 – 2006 structural funds programmes were drafted. And yet the numbers appear to say that the debate that was taking place at the end of the nineties, did impact on the choices of structural funds programme managers.

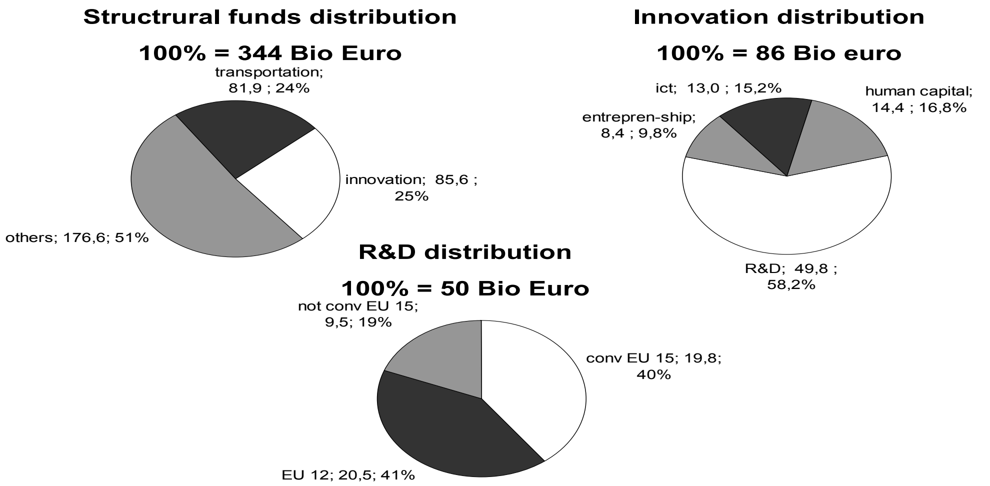
The shift has been even larger for the programmes that started in 2007 and will last until 2013 as it is summarized by graph 1.3:

1. Out of the 344 bn Euro one quarter is to be spent on "innovation"; this amount is roughly three times that planned for the 2000 – 2006 period and the growth is such that innovation becomes the first type (field) of intervention, and, in fact, becomes even greater than transportation that used to be the largest area of investment in previous periods.
2. Of the four categories of innovation related investments, the largest is R&D taking more than half (almost 60%) of the resources[28]; the other types of investments in innovation being investments in human capital (mostly tertiary education), ICT (within ICT structural funds are focused on applications meant to improve public services), and measures to promote entrepreneurship.

[28] ; This adds up to 50 billion euro of structural funds to be spent on R&D that transforms the cohesion policies in a source of EU money to research that is even larger than the VII Framework programme.

3. In terms of geographical distribution, 80% go to less developed regions (more or less evenly distributed between new member states and less developed regions across EU 15 countries).

Graph 1.3 –Structural allocation, 2007 - 2013



Source: EC DG Regio

If we, then, add to 40 bio spent in research in the less developed regions, the money spent on not R&D innovative projects we reach about 60 bio of structural funds spent on innovation in convergence regions to which we can add, further, approximately 10 bio of R&D financed by the commission through framework programs. This makes 70 bio euro of EC money to which one should add further 70 bio euro of funds coming from private firms and public administrations as co finance: the total of 140 billion euro in seven year represents the possibility to double the expenditures in research in less developed regions.

The priority on innovation is most likely a priority to be strengthened in the next programming period (Barca, 2009) and yet a number of fundamental problems in terms of efficiency of the strategy and the factors explaining higher performances are still to be solved.

1.3 THE PUZZLE AND ITS POSSIBLE EXPLANATIONS

Investing in knowledge must, thus, have appeared as the tool to square more than one of the dilemmas that European policy makers have tried to tackle for decades. But does it effectively work? How effective is the use of structural funds as a lever to achieve both convergence (of less developed regions) and higher competitiveness of the EU as a whole? Do numbers and empirical studies confirm expectations?

The question can be, in fact, broken down into two parts:

1. First, we want to ask ourselves how well are structural funds spent on R&D in less developed regions in terms of serving the aim of fostering economic growth in those regions.
2. Secondly, we should try to understand the effect on the rest of Europe (regions that are not qualifying for the status of “convergence” or of “objective 1”) of spending structural funds on R&D in less developed regions (whereas we also have a smaller portion of funds that are in fact allocated to be spent on R&D of non-convergence regions).

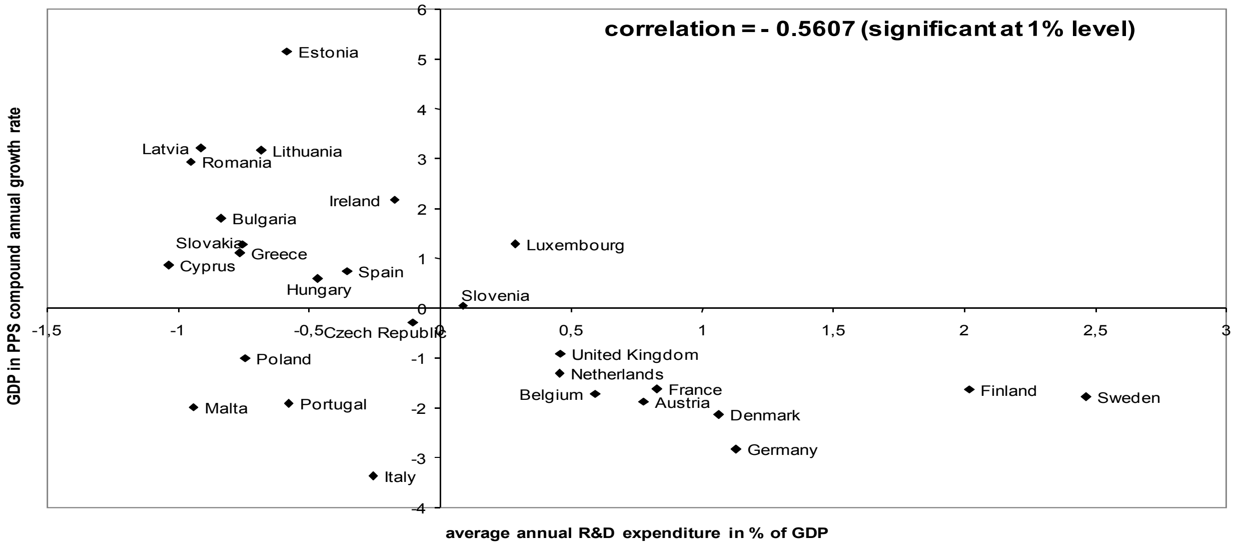
We will now present few empirical data that appear to cast few doubts on the validity of some of the assumptions that we have mentioned.

1.3.1 The empirical data

One methodological caveat to any of these analyses is that it is impossible to isolate the so called impact of a certain independent variable (being it the overall expenditures in innovation or the use of structural funds) whose effect we want measure on a certain dependent variable (productivity, employment or GDP pro capita) from the impact of other levers. We will introduce in this research some results that are proxies of effects directly due to structural funds programmes. However, it is enough at this stage to consider the statistics that indicate how much economic growth tends to be associated with R&D expenditures.

Let us then start from the very general question of how effective is R&D expenditure as an instrument of economic growth.
As we saw in section 1.1.2, the link between innovation and growth has long been acknowledged by authors like Marshall, Kuznets, Schumpeter and yet a definitive answer on the capability of R&D to accelerate economic growth is still missing.
The numbers seem to present a reality that is different from the one we would expect taking the forecasts of the new growth theory at face value. The graph below maps EU countries by comparing expenditures on R&D as a percentage of GDP and economic growth. The results are precisely opposite to those we would expect.

Graph 1.4 – EU 27 countries by average annual R&D expenditure in % of GDP (differenge vs. average) and GDP compound annual growth rate (difference vs. average) 1999-2005



Source: Eurostat , accessed March, 2008

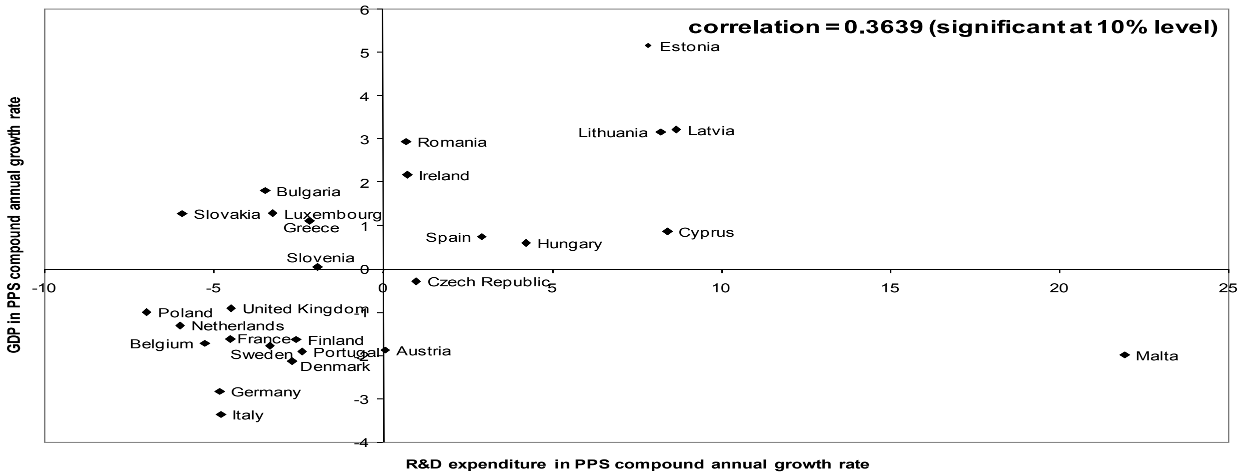
The correlation is significant and strongly negative. Countries that have recently grown more rapidly, can still spend less in R&D.

One obvious objection to these results is that they can be by the simple fact that new member states have outperformed generally older ones on a cheap labour and taxation that have determined the former to outperform the latter in terms of attraction of Foreign Direct Investment (FDI). Altough rather obviously that the former spend less on R&D than the latter.

However, if we neutralize this fact and divide the analysis in two – with one part focused on older and the other on newer member states – the situation does not change and the correlation between propensity to spend in R&D and economic growth stays negative (-0,42% for EU15 only and - 0,19 for EU 12).

A more precise operationalization of the endogenous growth theory expectations may, however, be that we expect that a quicker **acceleration** (and not the absolute level) of R&D expenditures is associated more frequently with quicker economic **growth**. This redefinition of expectations yields the results shown in the following graph 1.5: correlation is positive and significant with countries such as Estonia, but also Ireland and Spain, seeming to find a competitive advantage from an acceleration of R&D investments over the norm.

Graph 1.5 - EU 27 countries by R&D expenditure compound annual growth rate (difference vs. average) and GDP compound annual growth rate (difference vs. average) 1999-2005



Source: Eurostat, , accessed March, 2008

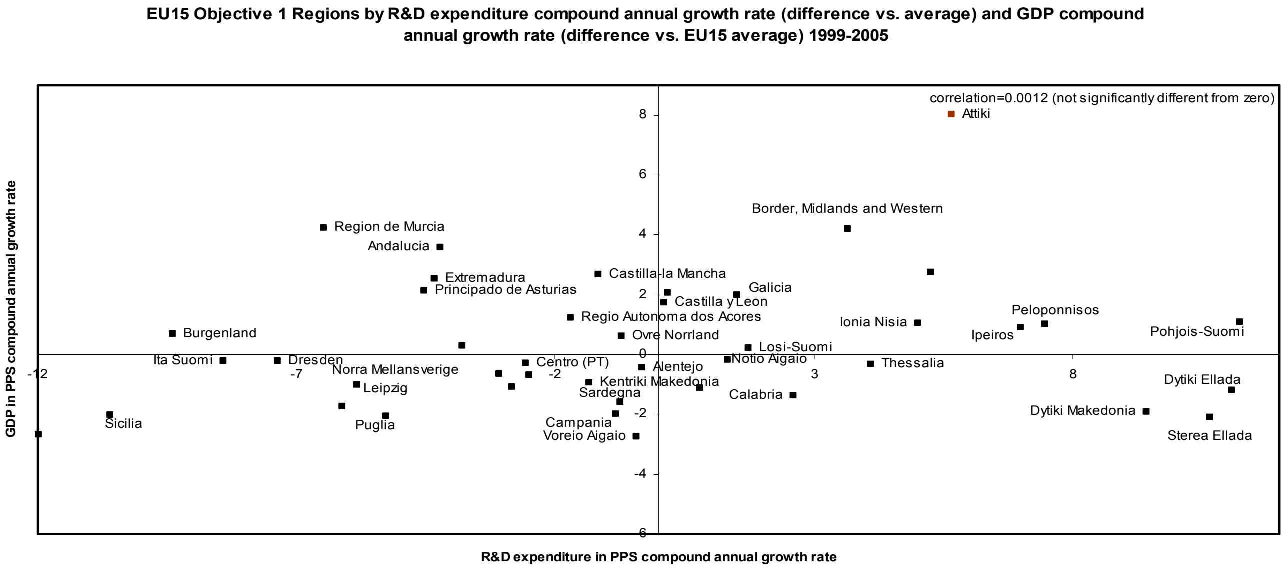
The correlation becomes in this case positive and significant but again the magnitude of both the coefficient and the significance fall short to avoid a great variance of outcomes for each level of R&D growth rate with, for instance, Slovakia or Sweden decelerating more than similar Slovenia or Denmark their investments in R&D and yet growing more.

The results appear confirmed by the analysis performed on the same period by Crescenzi (Crescenzi, 2005) who interestingly deployed an econometric analysis on EU 25 regions (and not countries like for the previous graph). Crescenzi tried to check how much is GDP per capita growth rate explained by three different indicators of innovation – R&D expenditure as a percentage of GDP, R&D personnel as a percentage of the labor force and High Tech patent as a percentage of the labor force – plus one overall indicator that compose the above three. The results are moderately positive (obscillating from a positive 0,33 to a much lower 0,14 for patents), moderately significant (with the exception of patents which is not a surprise consideting that patents may, in fact, reduce, as we will see later, the quantity of endogenous, tacit knowledge that is the asset whose effect this thesis is studying) and with a very large variance.

These results appear even clearer if we transpose the theory from a national level to a regional level and, moreover, if we focus on the subset of the less developed European regions.

As the following graph 1.6 shows, R&D and GDP growth are practically uncorrelated, and regions seem scattered in each of the four quadrants that couple R&D and economic growth as over or under-average.

Graph 1.6 - EU 15 objective 1 Regions by R&D expenditure compound annual growth rate (difference vs. average) and GDP compound annual growth rate (difference vs.EU 15 average) 1999-2005



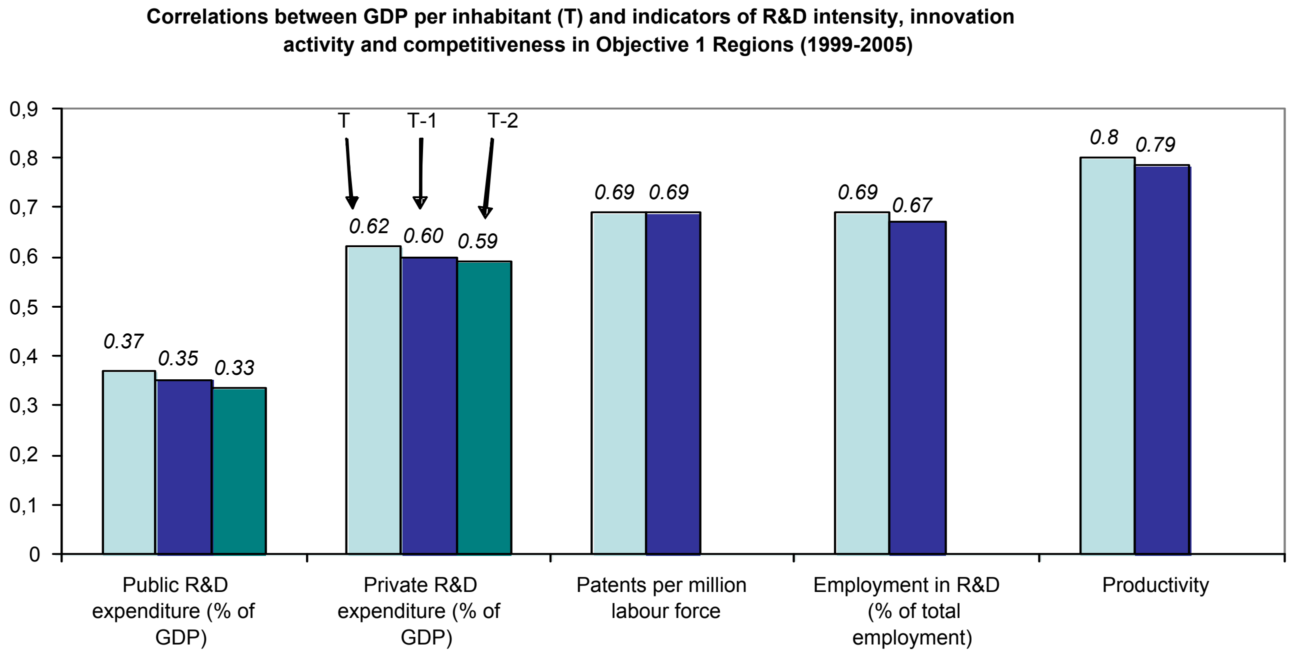
Source: Eurostat, , accessed March, 2008

It appears that if we consider a long enough period (justified with reference to the supposedly long term nature of the effects of the R&D) R&D expenditure growth rates are not associated with GDP growth rates at all.

Moreover, variability of outcomes tend to be larger at the extreme of R&D growth rates: when you spend more or less than average, you tend to have either an above or below normal outcome in terms of capability to converge.

A number of other correlations were run and calculations made of how different levels of prosperity – that can be proxied by absolute level of GDP – are associated with R&D expenditures, whereas we separated public from private investments and we compared this correlation with other parameters like productivity, patents and employment in R&D (all indicators, as we will later elaborate, that are considered targets of the so Lisbon strategy).

Graph 1.7 – Correlation between GDP per inhabitant (T) and indicators of R&D intensity, innovation activity and competitiveness in Objective 1 Regions (1999-2005)



Source: Eurostat, accessed March, 2008

Once again the results indicate that public expenditure on R&D is the variable which is – amongst the variables that we are considering (public and private expenditures in research, patents, employment in R&D and productivity) – the one that is less associated to GDP per inhabitant. Moreover, we ran the regression with time lags (calling T-1 for the year previous to the one when GDP per person was recorded and T-2 for two years before) and obtained the interesting result that the introduction of lags does not change the correlation in any significant way.

It is, of course, possible that investments in R&D take more than three years to materialize[29]. Nevertheless, the fact that the correlations do not change in time may – as we will elaborate in the second chapter – hint to the fact that the lag argument that has been voiced many times as one of the complications of evaluations of R&D, may be somehow less important than it is normally thought to be.

[29] In fact, it is impossible to understand how long will be necessary for an investment in R&D to fully impact macroeconomic results and, in addition, the response would be different for different typology of innovation (radical versus incremental), different phases of the value chain being impacted (product versus process innovation), different industry and academic domain.

Not less interesting is the result that says that private investments may, in fact, matter much more than public ones. This result (confirmed by other analyses see for instance Hall et al, 1999) will, as we will elaborate in the second chapter, support the idea that we are going to develop in chapter two that private investments in R&D are a good proxy of success.

The data investigated so far, are, however, data that describe correlations amongst different features of an economic system. What, more specifically, is the impact of the expenditures of structural funds in R&D?

The last numerical exercise of this paragraph shows – in Table 1.1 – the results of a regression (that unlike correlations try to measure how one independent variable explains variation in the value of the dependent one) of convergence (increase of GDP per capita of less developed regions) on structural funds spent in R&D measures[30].

Table 1.1 – Main results of a regression of GDP growth rates on structural funds expenditures in R&D (OB1 regions, 2000 – 2006, p-values in parenthesis)

Dependent Variable Independent variable	GDP per capita average compounded growth rate
Structural Funds Expenditures in R&D as a percentage of GDP	1,77 (0.075)
GDP (1999)	-0.00000066 (0.583)
Percentage of population with tertiary education (1999)	0,372 (0.153)
Constant	-0,014 (0,83)
N	39
R2	0.6726

Source: EC, DG Regio, Eurostat, accessed November, 2009

The regression applied a linear equation where the percentage of growth in GDP per capita was to be explained by three independent variables: structural funds expenditures in R&D, initial level of GDP

[30] Data with the actual allocation and expenditures are available for only 39 of the 59 objective 1 regions.

per capita before the beginning of the OB 1 expenditure period (1999) (this is to control for an internal convergence within OB 1 regions), and differences in education attainment (plus a set of country indicators variables that capture country specific differences in factors that affect regional economis growth – e.g. national economic policies).
The p value of the t-test on the coefficient of the structural funds is under 0,1 which indicates that the result is statistically different from zero at the 10% significance level. The R2 shows that the regression is able to explain a substantial amount of the variation in GDP growth rates. The expenditure of an additional 1 per cent of the GDP in R&D is, on average, expected to yield an increase of the GDP per capita of 1.77% which is good value for money. However, even this analysis (the details are in the annex in the annex table a.1) confirms that the variation can be very large given that the 95% confidence interval for the point estimate oscillate from a maximum increase of the GDP per capita of 3.73% to a minimum of – 0,2% (where GDP would actually shrink because of the injection of public money in R&D).
The validity of the results is somehow limited by the relative lack of data on structural funds expenditures. Yet, the statistical significance of the data say that normally structural funds spent on R&D are likely to impact positively on GDP growth rates, whereas this was also found by others (for instance, Rodrigeuz-Pose and Crescenzi, 2008) who also demonstrated that such an impact is likely to be higher than the one of other typology of expenditures (like infrastructure or aids to SMES).
Even less specific analyses have been deployed as far as the impact on other regions and EU's economy of the expenditures of structural funds in R&D in less developed regions.
One of the most interesting - Midelfart-Knarvik and Overman (2002) - focused on effect of EU aids to R&D on the specific issue of specialization of EU industry and on the impact that more or less specialization may have on overall EU's wealth. It was found that

a) specialization is taking place slowly at country level and even more slowly at regions level; b) EU aid – as opposed to what they found for state aid – is effectively distorting the polarization which would have taken place without them; thus the policy is in fact having some counter-market effect as one would expect, especially by attracting R&D investments in less developed regions, and c) this is, nevertheless, a result which may be negative from the EU's point of view (crowding out potential High Tech expenses in other parts of Europe), and ineffective in terms of increasing the growth rates of less developed regions because they appear to have low endowments of high skilled labour and thus are not able to leverage on the increase of their R&D capabilities.

Midelfart-Knarvik and Overman's point is very interesting because of their analysis of the composition – per industry – of the manufacturing base. Overall scepticism on a possible geographically redestribution of R&D expenditures is supported.
Other systematic assessments of the validity of the choice to use structural funds to finance R&D provide very little and the few, mostly qualitative, evidence (Technopolis, 2006) showed concern for the adoption as far as investments in innovation of "the sprinkler principle (a little for everybody) without prioritization and without proper evaluation". One of the main hypothesis of this research is, in fact, that concentration of investments in one specific industry or portion of the value chain of an industry is, in fact, important for success.
Overall the statistical evidence that we presented in this section does, however, indicate that:
a) spending structural funds in R&D seems to have a significant and positive impact on GDP growth rates; b) however, there is no guarantee that this will happen because the variability of the outcomes seems very high; further c) if we want to more correctly associate R&D expenditures and economic performance, we should consider private investments in research as more strongly associated to GDP growth rates; d) the impact of public investments in the R&D of less developed regions seem to have a negative impact on the rest of Europe that may overcompensate the benefit in aided regions.
It is therefore worthwhile to identify the reasons that can explain this variability of results. This is also because the fact that EU has just decided to confirm its strategic choice to become a "knowledge based economy" by 2020 notwithstanding the partial failure of 2000 – 2010 strategy, says that innovation is a choice that is here to stay and for the long term. It is, thus, important to understand how can we maximize its results.
Whereas however the very few analyses that have been made systematically (Crescenzi, 2005, Rodriguez-Pose and Crescenzi, 2006), tested the possibility that pre existing region's conditions (geographical accessibility, percentage of population with higher education achievement) may explain the differences, this research will attempt to test instead the explanatory power of the independence of the decision maker from politics and her accountability, as well as of the capability to develop partnerships amongst business, universities, civil society and government with the specific purpose to incorporate information (as, once again, Barca, 2009, recommends) in the innovation strategy and solve specific problems.
This set of evidence do carry us on the following question which is on the reasons why performances may differ so greatly.

1.3.2 Reasons for differences in the performance of innovation strategies

We, therefore, need to understand which are the most mentioned reasons why regional innovation strategies may fail. They can be categozied in four distinct possible problems: the possibility of public investments having the effect to reduce the private ones; the difficulty for bureaucrats and innovators to interact, the issue of adding expenditures in context that do not have the minimum scale to compete; the spill overs that may disperse to other regions the knowledge that has been accumulated in the region. Their combination may generate, as we will see, a fifth problem which is specific to less developed areas and that academia uses to call "the regional innovation paradox".

The question of the crowding out of private investments

Public investments in research may be complementary to private investments and thus encourage further expenditures in knowledge, but may, also, on the contrary, substitute private undertakings and this may turn out only in no increase in the overall volume of R&D expenditures but even in a net dmininution of social welfare if private undertakings present a lower return than public ones.

The study of Hall, David and Toole (Hall et al, 1999) is one of the most useful in order to have an overall view of the problem. The paper, in fact, presents both an aggregation of many different studies on this matter and a methodological framework to analyze the issue.

The paper suggests, then, that the results must be assessed by measuring separately the impact of public investments on "marginal rate of return" and the "marginal cost of capital" of investments on R&D to be conducted by private firms.

The reasons why public investments may improve the prospective profitability of private investments in research appear to operate on a more macro level through the mechanisms of spillovers and expectations. The outcomes of publicly funded projects may, in fact, provide to all potential investors the initial knowledge or the infrastructure whose lack would have, otherwise, raised the costs of the investments and may, even, raise the expected profitability because they could increase the number of expected clients by enabling individuals that may demand a certain product.

The mechanisms by which public investments may, instead, substitute private funds seem to be more associated to both a reduction of the expected return on investments due to the competition that public investments may create to private investors and the increase of the inputs necessary to conduct research due to the expansion of the demand that public investments will produce.

More interestingly it is the conclusion of the study where "the usefulness of searching of the right, unifying answer" is doubted and the impact of differences amongst industries and typologies of research is acknowledged. More specifically it is recognized that substitution may be minimized by the extent to which public investments are targeted to sectors with large "appropriation problem" and thus with little private investments and large positive consequences for welfare. Similar considerations should hold true when public investments target less developed regions where private investments would be scarce without any public intervention.

The problem of the dialogue between innovators and administrations and the role of institutional arrangements

An obstacle that the design and deployment of programmes of public investments in R&D is believed to encounter is about a possible clash between two different social and corporate culture.

As a number of authors recognized (Head, 2011, Potts, 2009)) despite the enthusiasm for the use of innovation in order to modernize policies, public services and public investments' menu, the public sector entrepreneurship is not "generally the hallmark of public sector behaviour" and managing innovation requires at leat what we may call entrepreneurial approach.

The conflict **between innovators and bureacrats** is, indeed cultural: civil servants tend to be - even because of the legal definition of their job position - risk adverse and keen on predictability, whereas innovation means by definition risking failure.

Moreover allocating public investments amongst different possible industries or even phases of industries' value chains require a internationally wide knowledge - of different industries' main trends and different academic domains' characteristics - that can not be expected from public administrations.

Not less acute, however, the potential conflict is **between innovators and policy makers**: political cycles tend to be shorter than the time span that innovation requires to unfold its potential and politicians tend to please their constituencies by splitting evenly resources whereas R&D requires critical mass and concentration (as we will see in the "worse" cases that the thesis investigated).

The intensity of the spill over and the issue of the human capital

The third limit of public investments in knowledge is that even assuming that the investments do succeed to support local innovative firms and universities or to attract innovative firms from outside, the benefits may spill over to other regions (Shearmur and Bonnet, 2011). As mentioned, studies have demonstrated that even for a country like the United States half of technology progress can spill over to the rest of the world (Eaton and Kortum, 2002), that this percentage becomes higher the smaller is the area (region) to which a certain innovation strategy applies (Gumbau-Albert et al., 2009), and Rodriguez-Pose and Crescenzi (2006) found that the percentage of population having a higher education degree may be a good indicator of how knowledge can become embedded to the region.

The question of scale and specialization

A problem that especially any investment in less developed region needs to address is the issue of the minimum scale that is necessary to develop through innovation a competitive advantage that can be sustained on a global scale.

As we mentioned before investments in knowledge may be characterized by return to scale that show an exponential pattern which may be the opposite of what we expect from manufacturing (Solow, 1987a) and, thus, of a cumulativeness that make different areas to increasingly diverge.

This feature becomes even greater if we consider the very characteristic of the mobility of the high end of most educated workers that tend to constitute a large part of the workers employed in research and high technology sectors. Their mobility – meant not as true emigration but as constant flows form one country to an other – has increased a lot (OECD, 2008) unlike the mobility of other workers (as we saw in section 1.2).

They move amongst countries, end up to live in few capital cities, London, Paris, Frankfurt, Barcelona, Milan and, thus, they tend to drive a concentration process at the European level.

The resulting concentration of the research assets in Europe is paralleled, after all by a similar trend in the US where Seattle, Boston, DC and the Silicon Valley account for two thirds of the US R&D expenditures.

It has, however, to be mentioned that recently two possibilities to circumvent the problem seem to emerge.

The first is the idea that we need to widen a lot the definition of what innovation is (as for the Barca, 2009) going beyond the conformism that led hundreds of regions of Europe to declare in their innovation strategies similar choices – using often buzz words like High Tech, ICT and even biotechnology - in terms of industry where they may find their "specialization", whereas one may even specialize itself by becoming particularly innovative in mature sectors like agriculture (as our case of Castilla Y Leon will show) or steel (like we will see in Yorkshire) or in not obviously technology intensive service industry like tourism or education.

The second is to use ICT as a lever to overcome the problem of geographical proximity. IN the last decade studies have shown that Information Communication technologies have made phisical clustering and expecially of innovation activities is not anylonger a condition necessary for success (Cairncorss, 1997, Quah, 1997a, Maignan et al, 2003).

The regional innovation paradox

We just saw the four explanations for regional innovation strategies to go wrong. The first two – the problem of public investments being additional to private ones, and the differences in the semantics of administrations and innovators – has to with most of regions. The second two – the question of the spillover and the scale – mostly apply to less developed regions that are the object of this study.

The basis for the complex relationship between economic growth and R&D investments in less advanced regions is often referred to as the *Regional Innovation Paradox* (as in Oughton C., Landabaso M. and Morgan K., 2002), according to which, in essence:

1. Investments in innovation and knowledge are, in fact, key to economic growth that may be sustainable in the long term;
2. Yet, less developed regions display both a lower absorption capability (whereas by absorption is meant here capability to spend public investments that may be allocated to them for R&D projects) and
3. Lower efficiency in terms of economic outcomes of the investments that they succeed to finance;
4. This lower performance results from a disadvantage in terms of scale, because R&D investments tend – as for the arguments of some new economy geographers (Krugman and Venables, 1995) – to require high critical mass before they can achieve results that can yield returns in terms of productivity that may be robust enough to last in time (Boldrin and Canova , 2001); and
5. A further disadvantage in terms of institutional capabilities, because public administrations of less advanced areas tend to display a gap in terms of skills (Milio, 2007) as opposed to bureaucracies of more advanced regions and the effects of this gap may be larger when it comes to managing complex, innovative programmes like the ones dedicated to investing in research.

It is the question of the institutional capabilities the one upon which even, more recently, the Barca report (2009) focuses when it comes to describe the problems that structural funds funded programs aimed to produce innovation and regional innovation strategies may encounter. The report identifies three risks of using R&D within the framework of the cohesion policies: policy imitation with an excessive tendency of regions to follow exogenous models (the report refers to imitation of models emerged in other contexts to which we would add the tendency of the EU frameworks to require too often consistencies amongst innovation strategies designed at different levels); local capture which happens when the strategy is controlled by local stakeholders that want to use it for their own interests that do not coincide of tapping into unused potential; financial redistribution which is the danger that is produced by the point of view by which the objective of the innovation policy is the mere re alignment of the percentage of GDP spent in research by all regions and that may make worse the problem of scale that we just mentioned.

The presence of such distortions will be controlled for in our empirical work and the investigation of the reasons that may explain why even innovation strategies sometimes fail will be futher focuse and operationalized by looking to three strands of literature to which this thesis is nearer: the research on the role of management in the performance of policies, the literature on the real value of partnerships, both to be considered a part on the wider work on regional innovation strategies.

1.4 REGIONAL INNOVATION SYSTEMS AND OUR HYPOTHESIS ON THE CONDITIONS FOR SUCCESS

The notion of regional innovation system (RIS) has been very popular in both academia and policy making circles, for purposes of both economic and innovation developmenent for at least the last couple of decades.

The basic idea underneath the conceptualization of RIS is that

1. innovation or more appropriately - considering the semantic of the endogenous growth theory – the tacit knowledge that is essential component of innovation cannot be understood or even created "purely in terms of independent decision making at the level of a firm" (Dilling-Hansen M., 2000) or of a single inventor and that thus it can be viewed as an "interactive, collective, entrepreneurial learning process" (Lundvall, 1992) across different organisations and domains (public and private, research and business)

and that

2. the more adequate level to observe such a learning system to operate is subnational[31], indeed local where the reduced spatial distance makes easier for the complex interactions that innovation may require to happen (Lundvall et al, 2007) and for the trust[32] - which is also necessary for this form of strategic collaboration – to consolidate (Freel, 2001);

   this local level has been commonly interpreted as regional (although there are a number of inconsistency between the institutional definition of "region" and the natural boundary of a

[31] Altough the first systems of innovation to be conceptualized were the national ones by Lundvall (Lundvall, 1992) and Nelson (Nelson, 1993)

[32] Putman (Putman *et al.*, 1993)would have called it social capital, although here we are talking about a more committing and pervasive form of it.

proper local system of innovation – see for instance Martin, 2003 and Yu and Jackson, 2011), even if the same concept has also been applied to city (Cooke, Davies and Wilson, 2002).

An interesting description of regional innovation systems is the one that we found in the work of the American management guru Michael Porter (The competitive advantage of nations, 1990). Porter's work leverages on the seminal research done investigating the industrial districts of the so called Third Italy (Beccattini, 2003 and 1998; Brusco, 1992; Camagni, 1995, but also Bianchi, 1994, for a critique to this model) to describe a system where competitive advantage of firms are constructed on the basis of mutually reinforcing interactions amongst firms and other players competing and cooperating with each other: strong suppliers, demanding consumers, universities providing high level workforce, foreword looking regulators and, of course, competitors (Porter 1985, 1990).

The model that according to some had emerged in some parts of Italy as well as in Germany and elsewhere was also associated to a much wider process of transition to an organisation model that "in contrast with the pre-eminence of Fordist and Taylorist practises during the postwar period postulates that efficient production, and even more succesfull innovation processes are increasingly associated with vertical disintegration and flexibility" (Freel 2001, but also Hansen, 2011 and Lawson, 1999). The necessity of a distributed model of production and innovation is due to two major reasons: the need to be more flexible and responsive to increasingly diversified and changing market needs; the acknowledgment that new ideas will increasingly come from outside.

In fact, the systematization that Porter proposed was, more precisely, named by the same Porter as "cluster" meaning by that an area that beyond the above mentioned specifications is also characterized by being geographical concentration of firms operating in the same industry, whereas the similar concept of "regional innovation clusters" (Yu and Jackson, 2011) applies to regional clusters of innovative firms and as such have been recently identified as a "driver of the national economy" by the Obama Administration (National Economic Council, Strategy for American Innovation, 2009).

Despite the announcement by some of the theorizers of regional innovation strategies (Sallet et al, 2009) that the economic advantages of innovation oriented clusters have been demonstrated, there is a lack of solid empirical demonstrations capable to support the argument of a positive effect of clustering of firms on propensity to invest in R&D, leaving alone the most complex issue of the impact economic growth: there are researches that found that in some highly innovative industries firms in non cluster areas may fare better in terms of employment growth of firms in cluster palces (Feser et al, 2008) whereas others even claim to have demonstrated the opposite and so that diverse economies tend to outperform economies concentrated in few sectors (Partridge and Rickman, 2003).

More over there are authors that questioned the assumptions of a higher likelihood to invest in R&D of firms operating in clusters vis a vis other firms that do not belong to these agglomerations (Lee, 2009) and others that have demonstrated how uncertain is the impact of specialization of a certain region (and thus the need to concentrate public investments in sectors that represent a share of regional GDP that is higher that the share of that sector on national or European GDP) on the efficiency as well as the volumes of R&D (Fritsch and Slavtchev, 2009).

As a possible key to explain the cases of relative failure of clusters to achieve superior economic performance, it is worthwhile to mention a number of studies that investigated the relationship between cooperation and efficiency (Fritsch, 2004 and, especially, Katz, 1986).

The results of such empirical studies appear to, not only, falsify the expectation that collaboration is always good, but also to provide some indications of when collaborations may work. As a study which is not even recent of the Rand Corporation (coordinated by Michael Katz of Princeton) demonstrated real cooperation (to be strongly distinguished by “free riding” of one the two cooperant on the other) is more likely too happen when there is not much product competition (like it happens in vertical integration along the supply chain), when the risk of spill over would be great even if one attempts to protect intellectual rights (like generated knowledge is largely tacit) and the cooperation concerns basic research more than development activity.

We will see in our field work that these are the characteristics, in fact, that distinguish the interactions amongst the firms and the research centres based around the technology parks in South Yorkshire and Castilla Y Leon.

In a sense this result have the merit to sort of turn the argument of regional innovation system on its head: it is not that RSI have a higher capability to generate successful innovation because people in an RSI cooperate but it is that people in an RSI are more **likely** to cooperate - because of the prevalence of interaction between actors positioned differently across the value chain and of higher risk of spillover - and such a cooperation creates opportunity of innovating that do not exist elsewhere.

However, in order for this statement to be true, we need to recognize that not all forms of cooperation are good or feasible and not all clusters work equally well to achieve better performance on the plane of productivity or efficient innovation.

The question that has worried the most the literature on agglomeration economies is, more precisely, about the right level of diversification in economic structure of the clusters.

Here, the dispute has been between one school of thought that appears convinced (as Glaesler et al., put forward already in 1992) that specialization is key to better innovation and economic performance (in order to overcome the so called MAR externalities[33]) and an other who has emphasized the virtue of diversified economic structures and the so called Jacobs' (Jacobs, as early as 1969) externalities.

This entire discussion has led to a profound rethinking of the modelization of the regional innovation systems which has found recently a systematization produced by one of the first to propose a definition of RIS (Cooke, 1998 and 2007). Philip Cooke (2007 and together with Asheim and Boschma, 2011) does, in fact, qualify the very idea of regional innovation system by introducing the idea of

1. "**related variety**" where it is theorized that between full diversification and strong specialization, the best clusters may be situated in the middle where not one but more than one industry are represented although they are "related" because they may add value to each other and they operate in activities that do have a link;
2. "**knowledge base**" where a distincition is put forward between "analytic" (typically new drug development and, more broadly, natural science where research's results tend to be codified and patented and where break through in product innovation are more frequent), "synthetic" (also called engineering research where innovation tend to proceed per marginal improvements and most of knowledge is incorporated in the individual employes' experience and skills) and "symbolic" (like in production of culture and art where changes happens through interactions with an even wider set of actors and the personal relationship, the "know who" other is engaged in the creativity process is key).

The implication of the discourse is that the application of a similar framework to various regional economies appear to say that more successfully innovative clusters tend to be the ones where exchanges amongst different knowledge bases are maximized.

The most important implication of this line of reasoning is, however, on the plane of the role that the state may play in this revised version of a regional innovation system. Cooke and his colleagues do, in fact, maintain that in this newly understood environment the policy maker and the public administration should refrain from being too much directive (as Cooke had already contested both in general, 2000, and in the specific case of the Welsh Assembly Government, 2005, for reasons that we will see examine later in this work) and should, instead, "construct regional advantage by building a **policy platform**" (Cooke et al, 2011).

The idea is that leaving to the state the role of selecting sectors where to invest in R&D may produce two problems.

[33] Based on Marshall (1890), Arrow (1962), and Romer (1986).

The first is about the impossibility to predict (even more from the point of view of an administration that is not – as we mentioned before in section 1.4 – in the business to make such previsions) which is going to be the winng sector.
The second is that such a "picking-the-winner" policy tends to result in the same choices made everywhere as demonstrated by the reading of few regional innovation strategies developed by different European regions where almost unavoidably all tend to say that they want to imitate "silicon valley" and invest in biotechnology and information communication technology. The consequence of this would be the likely denial of the growth potential that almost all regions would have if one does not limit herself to a mainstream definition of R&D and does invest in making local knowledge to become part of the strategy for innovation.
Policy platform is, therefore, a communication platform where the state (the programme manager in the case of structural funds funded investments in innovation) only plays the role of a) promoting this exchange of knowledge (and interactive, collective learning exercise as Lundvall, 1992), of b) identifying (as Cooke, 2007, clarifies) the actors that are capable to add value (and knowledge) and of c) avoiding that this exercise becomes captured (as Barca, 2009, reminds) by either too few (as in the case where a firm or a university plays a monopolistic game and exploits the public intervention in its favour) or too many (which would produce a dilution of the investments like the one that this author witnessed in Murcia and West Wales).
As such this transformation of the role of the state does not imply a reduction of the concentration of resources being allocated (which in fact is, as we will see a pre condition to success) but an involvement in the choice of local partners which have the experience and the skills to add information.
The concept of technology platform – where the state plays a strategic role and yet it is relatively hands off when it comes to a priori choose where to allocate resources – will be, as we will see shortly, one of the theoretical foundation of our hypothesis about the characteristics of the management of an innovation strategy which is more likely to achieve its own objectives.
Last but not least, it is necessary to remind an even bigger modification that the RIS literature will need to dal with in the next years: the validity of the idea of regional innovation system can not, in fact, avoid to be confronted against the reality of the Information Communication Techonology (ICT) which has reduced of hundred of times the cost of communication with far away partners. As we mentioned and will elaborate further ICT, has not[34] meant the end of the "tyranny of distance". Yet technologies are also changing dramatically the boundaries of RIS – one can, in fact, imagine the

[34] So far. Here a word of caution is necessary because of the continuous evolution of technologies and the largely unpredictable impact on human relationships (Grasso and Grillo, 2004).

emergence of virtual RIS which are not bounded to an area – and the typology of exchanges that do, instead , require face to face interaction.

The idea that we elaborated in this section of partnership which are centred on specific problems and, thus, only involve who can contribute to their solution – rather differently from the formalistic interpretation of "partnership" given by the European Commission – is the basis of the second hypotheis that we want test.

However, the ICT argument is also key to a second substantial critique of the way partnership and regional innovation strategy have been interpreted so far: regional innovation strategies, in fact, almot invariably present RIS as a closed system, where partnerships can only involve local actors. We maintain that partnerships are capable to integrate local knowledge with a global one and to involve actors that can bring this added value.

1.4.1 The role of the organisation of the implementation processes

The literature on the importance of the so called institutional (Bukowski et al, 1997) or administrative (Milio 2007) capacities as a success factor in the implementation of structural funds funded programmes include a number of mainly country specific accounts of how they may explain different performances.

The emphasis on measuring and strengthening the capacities of public administrations as a precondition to enjoy structural funds programmes, grew during the negotiations with Central Europe candidates for the accession in 2004 (Bollen, 2001) when it clearly emerged that "states with weak administrative capacity at the regional and local levels were more likely to have serious problems with the mismanagement of funds or even accessing them" (Hughes et al, 2004). In fact, would be members of the European Union could use a programme – Phare – whose first priority was to promote institution building so that candidate countries could develop "the structures, strategies, human resources and management skills needed to strengthen economic, social, regulatory and administrative capacity" meant to be necessary for managing – amongt other things – the complex procedures of structural funds expenditures (Milio, 2007, but also applied to a broder notion of "institutional capacities" beyond cohesion policies Barman and MacIndoe, 2012).

In this author's opinion existing research presents three problems.

First of all only few (Milio, 2007, is one of these exceptions) attempt an operationalization of the concept with some obvious consequence. The definitional problem makes impossible (as Hughes et al, 2004, points out) the development of a strong, controllable asssment model. Even the exercise that Milio (2007) proposes, is based on a rather subjectively developed model articulated in four macro capacities being them managing, programming, monitoring and evaluating and, thus, on a qualitative assessment for each of this capacity (whereas the study compares two different Italian regions that are distinguished by consistently scoring the highest and lowest capability to spend structural funds although other conditions appear to be the same in the two cases).

The second problem is that these analyses assume that there can be a single administration - a region in Milio's work, for instance (Milio, 2007) – to whose "administrative capacity" differences in performance may be due(). This is not the case almost per definition. In fact, it is the very regulation of the structural funds – as it has been established in 1988 and confirmed by each successive new regulation at the beginning of each programming period - that established that although each programme does have a a "managing authority", they are implemented – as for the principle of "partnership" to which we will return in the next section - through a distributed decision making and management process – supposed to last from the start to the end of each programming period – that involve in addition to regions (and national and supernatonal authorities), local public administrations, economic and social partners (representative of employers and trade unions), civil society (amongst other NGOs), member of the research community. Such an involvement can display at least three different levels of intensity: at the lowest possible level it only requires the region to get an opinion or to inform other stakeholders; at the highest possible degree of involvement we may have the responsibility to manage entire portions of the programmes to one of this stakeholder (and this is the case, as we will see, of some of the measures meant to promote innovation); whereas in the middle we have the instances where it is required the agreement of the other administration or institution to go ahead. In this situation the ultimate result will depend no longer on one administration and its administrative capacity but on the joint capabilities of a network of different actors.

The third issue is that both above arguments appear even more important when we consider the implementation of regional innovation strategies. The very definition of administrative capacity (as Farazmand, 2009, but see also the argument in previous section 1.3.2 on the possible reasons for failure of many RIS and on the structural disalligment between bureaucrats – as well as policy makers – and innovators on the plane of the objectives and the semantics) appears, in fact, to be almost born obsolete when confronted with the world of instability, risk, unknowability, speed that is associated to innovation.

These limits do lead us to consider a narrower and more pragmatic definition of the organisation features whose impact of the return to public investments on R&D will be investigated.

We, in fact, maintain that as per Cooke's (2010, 2007) what is going to matter is that programme manager refrain from making choices for which they do not possess the specific skills and that they

should rather “develop the platform” through which informed actors will join the problem solving exercise that is required by the design and the implementation of a regional innovation strategy and take the responsibility to choose these actors on the basis of their likelihood to contribute.
Even such choice will, however, need autonomy of the programme manager so that her decision does not get captured (as Barca, 2009, would fear) by the interest of too few (so that they can exploit the funds at their advantage without scrutiny) or too many (so that the resources are given proportionally to everybody with a loss of concentration).
In this sense our hypothesis does not even point to any certain organisation layout and any ideal degree of publicness of the decision maker and rather will try to access the autonomy of decision making as such. This is, in fact, consistent with few researches that have demonstrated (Andrews et al, 2011; Rainey and Kline, 1979; Bozeman, 1987) that the choice between the implementer of a policy being public, private or a quasi public body (like for the regional development agency – RDA – that we will encounter in this research in all regions that we studied).
What is, therefore, really important for the hypothesis that we will test is the recognition that the programme manager is granted by the relevant partners as networker standing amongst different “knowledge bases” and interests.
This authority must be, then, tempered by a strong accountability (again like in Farazmand, 2009) on results that, however, must be assessed, given the nature of investments in innovation, at least with the time horizon of a structural funds programming period (seven years).

1.4.2 The impact of partnerships on drafting and realizing innovation strategies

Partenership is one of the principle upon which the functioning of the entire cohesion policy is based since the reform of 1988 that launched the first programming period. However at the beginning partnership basically meant collaboration between the Commission and the member states. More recently the concept has been enlarged both in terms of the scope of the collaboration – now it is not only the initial design of the strategy and its verification - and the stakeholder to involve, as we mentined in the previous section.
Liesbet Hooghe and Gary Marks (2009 and 2008) distinguish at this purpose Type 1 multilevel governance which largely coincide with a form of flexible federalism where the power to run a programme is allocated in a changeable way to the most efficient level, and Type 2 multilevel governance which is even more flexible and can involve innumerable (both private and public) jurisdictions that get together around specific policies and issues.

The partnership that we are referring here is mostly of second type (whereas we were mostly referring to institutional partnership of the first kind in the previous section when we described the distributed decision making and management process which is typical of structural funds implementation).
Partnership become, however, even a “sine qua non condition for undertaking regional innovation strategies” (Pellegrin, 2008). Pellegrin clearly says why: innovation programmes require more than others competence and information coming from different domains to come together and “in a conext in which they are scattered between different agents, effective coordination mechanisms are necessary to help determine clear strategic objectives while avoiding replications and competing effects”.
The results of partnership appear – in the broader case of structural funds - to have been oscillating between failure and success both in terms of the effects on democracy and on effectiveness and efficiency of the programmes.
In fact, whereas some cases (like West wales, as we will see in the empirical work, but Royles, 2006 propose the same assessment) appear to fare not satisfactorily on both accounts, others (like South Yorkshire that we wil examine further, but Bache and Chapman, 2008, confirm) do seem to do well on both fronts.
The argument of a unavoidable Faustian Bargain – whereas partnership add value in terms of efficiency at the cost of transparency and, even more, of decreased centrality of elected officials – appear not to be an unavoidable outcome of partnerships (Peters et al, 2004). In fact there are others that advocate that the mere fact to include a diversified and numerous set of constituencies in the decision making is an antidote for the agenda of policy making not to be captured by the interests of a single organisation (it is the formula of “safety in numbers” proposed by J. Rosenau, 2004).
The mixed results do, in the author’s opinion, point to the rather obvious point of diversified approaches, different pre existing condition and thus different capability and motivation to use the partnership lever.
To this thesis the concept whose importance will be tested is the one of “problem solving partnerships” whereas the formalistic approach to partnership (emobodied in, for instance, the formal composition of the not very effective monitoring committees of the structural funded operation programmes, as noticed by Bristow et al., 2009 in West Wales which is going to be one of our four case studies) is surpassed by the existence of partnership, or more precisely, the empowerement of pre existing partnerships whose membership, enlargement and function is based on specific objectives and the capability of partners to jointly solve them.

One additional feature of the sort of partnership that we will look for is their capability to be not only local but open to contributions from outside the region and the country. Such a simple evidence (as Morgan, 2004, puts it "endogenous" does not mean "indigenous") appears almost entirely ignored by the representation of Regional Innovation System that most of regional innovation strategies make.
The two independent variables that we are proposing – organisation and partnership – do, of course, influence each other (a good public manager will be essential for partnerships to emerge and the existence of these coalitions will make life of the programme manager easier). We will try to operationalize the two concepts and highlight the differences in the next chapter.

CONCLUSIONS

The chapter confronts main theories for growth and main arguments that could support the hypothesis of neoclassical growth models that envisage spontaneous convergence amongst different geographical areas against the ones that expect the persistence of the gaps in economic prosperity amongst them. The experience in the last decades shows clearly that convergence is happening *amongst countries* – recently this has been the case with the rise of Asian and south American countries at a global level and of new member states within Europe, whereas differences *within countries* and *amongst regions* tend to stay large. This is especially true for the EU where the market driven process that may produce - according to the new economic geography - a reduction of differences between core and periphery can not happen: this is because of the existence of a *European social model* that tends to avoid both the migration between regions and the flexibility on salary that are seen by the economic geographers as necessary to convergence.

In this scenario there seems to be a rationale and, thus, a legitimacy for a cohesion policy that is meant to provide the "social good" of territorial cohesion that market alone would not deliver. This policy is, in fact, drafted as not a mere redistribution of funds, but as the creation of the conditions for untapping the potential of less developed regions and, thus, as a way to increase EU's overall wealth and competitiveness.

More specifically, the endogenous growth theory appears to provide a tool to reach convergence in a way which is compatible with the European values: it is the size and the productivity of the research assets that a region possesses that can improve competitiveness and medium term prospective for economic prosperity; thus investments into R&D (and in innovation as it has been specified by the above mentioned definitions of the European Commission) quickly has become the priority of the structural funds programmes, where 40 billion euro are supposed to be spent on less developed regions.

The puzzle, however, is that the analysis of growth rates of GDP and of absolute levels of expenditures on R&D (or of their growth rates), show that the correlation between the two parameters is low and that, more importantly, the returns of public investments in R&D are very differentiated.
The thesis is an attempt to understand which are the factors that may change the efficiency of the different regions. The research will more specifically test factors like the independence of the decision maker from politics and her accountability, as well the capability to develop partnerships amongst business, universities, civil society and government with the specific purpose to incorporate information (as, once again, Barca, 2009, recommends) in the innovation strategy as key to the success of regional innovation strategies.
Three strands of literature appear, in fact, linked: both the research on the role of management in the performance of policies and the literature on the real value of partnerships can be considered a part on the wider work on regional innovation strategies.
The next chapter will describe the methodology by which we want to test our hypotheses on which those factors can be.

CHAPTER TWO - THE HYPOTHESIS AND THE METHODOLOGICAL DESIGN

After having put forward the puzzle and the thesis that we are proposing to solve it and having positioned this work within the relevant literature, this chapter describes the structure of the research undertaken.

As said the hypothesis that we are about to test is that certain organisation and social features - the programme manager acts like a “communication platform” (like in Cooke et al, 2010) amongst partners that are capable to provide to the implementation of the programs added value information (as recommended by Barca, 2009) – are key to the success of regional innovation strategies.

However, the assessment of the capability of R&D programmes to achieve economic growth and the identification of the determinants of such performance face two problems.

The first concerns the nature of the innovation process and the fact that, according to some authors, this process is intrinsically with a long time lag and with many different factors impacting the same variables that this study is investigating. The second is about definitions and, more specifically, the operationalization of the concepts of innovation, economic growth and regional competitiveness, whose relationships we are investigating.

These two main issues have limited the number of studies that try to provide policy relevant indications on how to draft and execute regional innovation strategies based on an assessment of the return to investments in regions approaching the policy with different organisation lay out. This is the gap that researches like the one we conducted is trying to fill with a methodology that is articultated by this chapter in the following way.

First, the thesis is put forward. We formalize the idea of the causal chain that transforms an additional investment in R&D into a sustainable gain in productivity or economic growth is identified, and the analyses to be performed are explained. More specifically, the dependent variable (the characteristics of the R&D investments portfolio that are more likely to produce long term productivity gains) and the independent variable (the decision making procedures and the partnership mechanisms) are identified, as well as the pre-existing conditions (the independence from politics of the implementation process, and the existence of agents specialized in developing and maintain the above mentioned partnerships). Second, we will identify case studies and explain the research strategy.

Thirdly, we will more specifically categorize the competing explanations of the outcomes that we are investigating and the reasons by which the research design minimizes their impact are described. Fourthly, we will describe some of the definitional problems that the operationalization of the dependent and independent variables imply. Fiftly we detail the method through which the field work and the desk analysis has been conducted and the reliability of the information has been checked.

2.1 THE HYPOTHESIS TO BE TESTED

The question of measuring the return of public investments in R&D and, more importantly, of identifying the reasons for failure so that policy making relevant suggestions can be generated is still to be adequately addressed. The reasons for this lack of clear answers to the question of the impact of R&D and other structural funds supported policies may be, partially, explained by the fact that the literature generally comprises:

1. Evaluations undertaken by a number of practitioners and consulting firms for each programme that tend a) to be concentrated on implementation mechanisms, in part because they are "interim evaluations" or due to lack of data that could allow more concrete evaluations of results of the programmes; and b) to lack the possibility to compare regions, because their scope is set at the programme level.

or

2. Academic works that either a) seek to evaluate effectiveness of the programmes at EU level but fail to appreciate differences amongst the regions, or b) offer comparisons amongst regions but miss the information on different programming choices that appear to be important to understanding the reasons for the differences in performances amongst regions.

In other words, either a) studies are too narrow in scope and qualitative, or b) and too wide and too concentrated on quantitative models. In both cases they appear to fail to produce enough generalizable indications to be useful to regional managers.

The relative lack of studies that try to respond to research questions similar to the one that we asked ourselves is explained by a number of problems that we will review later in this chapter.

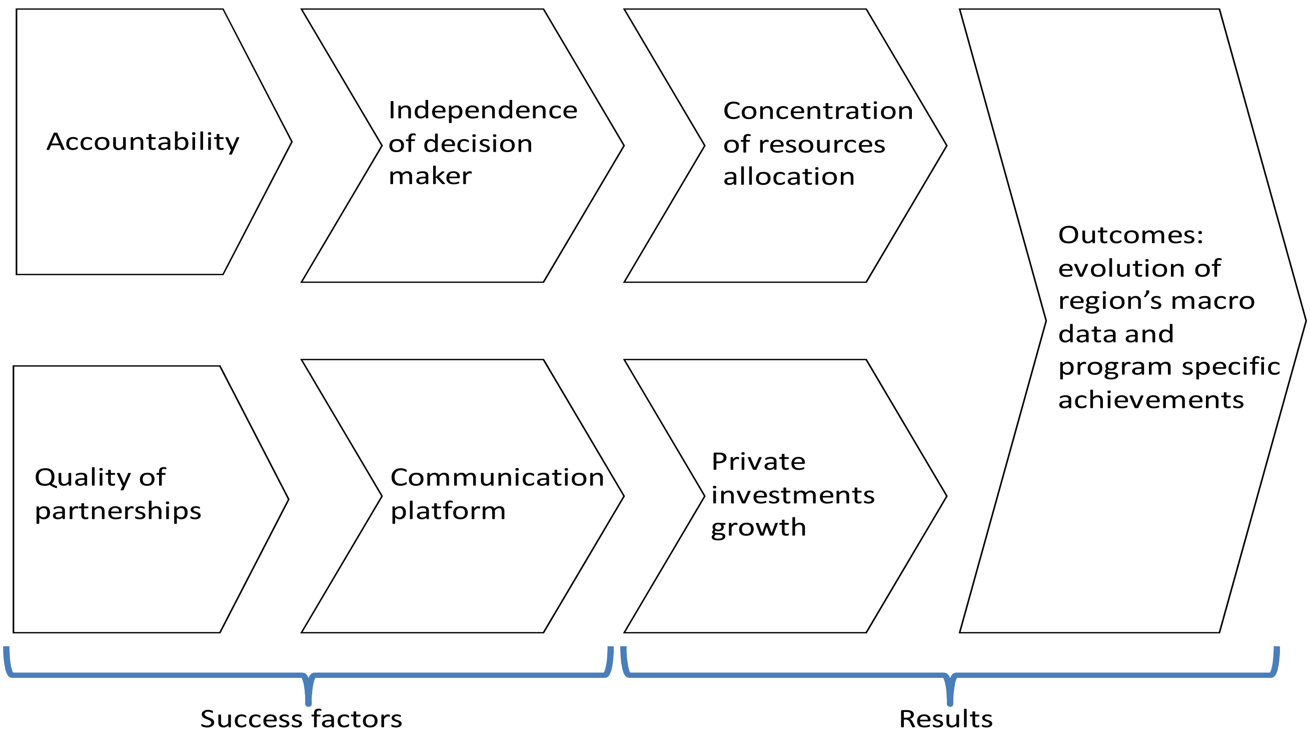
However, the overall idea of this research is to combine the two above mentioned typologies of approach and available knowledge to add some insights into the relationship between performances and choices. We will likewise combine macro and micro, industry or firm-wide considerations (as in similar studies conducted, for instance, by Hancke - 2002) to understand dynamics that imply causal chains that are rather long for the very nature of the phenomena we are studying.

The hyopothesis to be tested and the methodology devised are grounded on the review of the factors that can influence performance of public investments in R&D and that we reviewed in the third and fourth section of the first chapter, whereas our focus will be the organisation of the strategy implementation process and the quality of the partnerships that support the realization of the programmes.

2.1.2 Our framework: the innovation value chain

The innovation value chain is a systematization of the phases through which a regional innovation strategy is implemented and, at the same time, of the conditions for a successful strategy of investment in research, and it is the methodological framework whose explanatory power is going to be tested in this study. Its logic is visualized by the chart 2.1. The framework is based on the selection of most relevant literature contribution reviewed in chapter one and especially in the third and fourth section. It is worth noting at this point that the public administration are normally not aware of such a flow, even if the civil servants that we interviewed in this thesis' field work recognized that this could be an effective way to reconstruct the process by which strategies are realized.

Chart 2.1 – The innovation value chain



The chain is such that observing it from right to left we have a sequence of associations so that we expect that:

1. **results** which we will measure with reference to a number of different data of which we will attempt triangulation and more specifically
    a. the evolution of the **macro data** at regional level;
    b. the **programme indicators** that signal the achievement of the objectives of the various measures;
    c. the growth of the the **propensity of firms to invest in innovation**, whereas altought this is not technically an outcome of the programme we can safely assume (see section 1.3 and the exercise by which we compared the correlation between GDP per capita's growth and the growth of private investments in R&D with the one between again change in GDP per capita and increase in public investments in R&D) that this is a rather strong **signal** of the capability of public expenditures programmes to have improved the endowments that make the region more innovative (as Hall, David and Toole, 1999, argument as far as the importance of complementarity between public and private investments in research);
    d. the **concentration** of the funds on the areas (industries, academic domains, locations) where the region seems to have competitive advantages, which is again not exactly a result of the programme but a **condition** which – in a less developed region (whereas it may be different the case for an already developed one) is necessary (as Midelfart-Knarvik and Overman, 2002, but also see the argument of cumulativeness of the R&D expenditures and of increasing return to scale, Krugman and Venables, 1995, Solow, 1987) although not sufficient to success (as some authors questioning the effectiveness of concentration – Feser et al, 2008, Lee, 2009 – have demonstrated);

    we, thus, decided to consider **a range of indicators of performance which is wider than mere macro economic evidence** to avoid to rely exclusively on trying to explain a relationship between variables whose influence may go through a chain which is too long and this is expected us to be able to better test the capability to explain of the following
2. **success factors** and thus
    a. the degree of **autonomy** of the individuals responsible for implementation processes and, more specifically, their capability to be independent by either (as in Barca, 2009)

too many for political or bureaucratic reasons - actors that result into dilution of the strategy or

too few actors which may yield the capture of the policy maker by a private interest

and, thus to choose the partners that are capable to join and improve the collective learning experience (Lundvall, 1992) that the implementation of a regional innovation strategy represents;

b. the **accountability** of the programme managers that is the check against the above autonomy must be balanced (Head, 2011); such accountability must be drafted so that decision makers respond of results that neither too short term nor linked to one single project (Frolich, 2011);
c. the above mentioned partnerships are expected to be facilitated by **communication platforms** (as in Cooke et al, 2011) meant to host or promote collaborations amongst the stakeholders to be involved (like in Leysedsdorff, 2000 and Landabaso et al, 2002);
d. capability of programs to increase the propensity of private actors to also invest in innovation requires the presence of **project based partnerships** amongst the various actors – government, business, universities, public opinions – whose knowledge is necessary for the implementation of innovation strategies (for instance, Morgan, 1997a) and that, thus, may be also external to the region (Pellegrin, 2008).

The various phases of the innovation value chain can be considered, as in the chart 2.1, as dependent and independent variables and pre existing conditions of a causal process.

The method of decomposing an implementation process in phases with the intention to make each phase to correspond to a specific assessment reflects an approach that is applied both in micro economy (the "value chain" that Porter, 1990, 1985, proposes to uncover the "competitive advantage" of firms and countries) and in the evaluation practice (Mairate, 2002, 1999).

On this basis, the research will now detail the three characteristics that we expect in successful regional innovation systems. We will, therefore, first of all enumerate the features that we expect to find in successful R&D programmes in terms of resource allocation; secondly, the main characteristics in terms of programmes' strategy design, implementation and institutional context; thirdly, we will describe the nature of the partnerships amongst research, firms, government and civil society that we expect to be functional to success and we will elaborate on the actors and the mechanisms that can facilitate the development and maintenance of such partnerships.

The methodology will, then, articulate the three steps through which our theory (and connected assumptions) will be tested and the impact of competing explanations will be verified.

2.1.2 The resources allocation in successful innovation strategiess

As a consequence of the framework - the innovation value chain - that we just presented, we expect that successful programmes display :

1) A high **concentration** in terms of the allocation of resources amongst different industries and phases of the value chain whose improvement can allow for a quicker achievement of competitive advantages, as well as academic domains where the region's research community has a current or potential leadership, and geographical areas that host a disproportionate high percentage of innovative firms or research centres,

2) A high capability of public money to mobilize further **private** funds to be invested in R&D.

The latter factor is to be considered both as one of the conditions for the programmes to be more efficient (as for the reasons elaborated from the literature in section 1.3.2), but also a sign of success in itself (as we saw in graph 1.6 where we compared the correlation of private investments in R&D with public ones). If private funds are, in fact, spent on the same projects financed by public money this is a symptom of economic viability of that project (EC, 2007). A similar argument holds if, instead businesses increase their propensity to fund other non publicly funded projects that are still in the same region because this means that R&D program is credible enough to improve expectations and attract private investors willing to risk their own money.

The two parameters are expected to be correlated, given the importance of economies of scale and, thus, specialization (Boldrin and Canova, 2001, Porter, 2000, Midelfart-Knarvik and Overman – 2002 -, Krugman and Venables – 1995 -, amongst others).
We will, however, see that for the argument of few authors (Cooke, 2007, but also for Mark Harrison's paper on the dangers of concentration in the JRC report, 2010), it is also important that concentration and, thus, choices are achieved not as an imposition from the top, but as a shared objective of the actors involved into the innovation strategy.

The first assessment about the resources allocation focus will be conducted, wherever possible, by comparing a) the break down by industry and/ or geographic areas and/ or academic domain of structural funds spent on R&D and b) the breakdown of the regional economy by sector and/ or of the population and/ or or the academic faculty as a whole. Significant differences between the two distributions say of an allocation of resources that do not simply replicate the structure of the economy or its demography or its research.

The second analysis will be carried out considering

a) monies that cofinance with public funds the same projects that the administration has selected, or
b) investments (attracted from outside or generated by local entrepreneurs) that are undertaken because of a positive modification of the expected return to investments into R&D due to public programmes increasing the demand for research.

There is, then, a further level of analysis that we will, only partially, try to address: in fact, we can ask ourselves not only whether there were clear choices in the innovation strategies, but also how good these choices were.
It is entirely possible, in fact, that choices within the wrong sectors may achieve a return which is worse than the one realized by a more diversified projects portfolio.

The analysis will be implemented – when feasible - by assessing the potential of the industries and of the areas that were the priorities of the innovation strategies (that can be proxied by the growth rates of the industry in terms of added value) and the position of the region in that industry (and this can be measured by referring to the market share of the region on national or international production).

Within our field work, we will observe how in South Yorkshire (SY), for instance, an entire regional innovation strategy has posed the issue of moving local firms towards the high end niche of the metal industry or how in Murcia natural resources related industries are trying to add value to their production.

In addition, an assessment of the quality of the innovation programs may also try to evaluate the capability of specific projects to target specific needs within the business models of the firms in those prioritized industries. This, however, will be difficult in a research like the one that the author is carrying out and we will try to assess indirectly by assessing the capability of the programme as a whole to involve actors that are relevant to success: their commitment may signal better quality of the investments; but it is also a condition for a positive outcome.

Public investments which are highly leveraged by private ones, show a strong capability to make choices so that investments are concentrated in sectors with the highest potential. We believe that these data can account for a test of the likelihood of a programme to achieve a high efficiency in terms of R&D investments to produce gains in productivity (and convergence) which are sustainable in the long term.

However, a more focused resources allocation pattern requires also a number of organisation conditions that we are going to consider in the next paragraph.

2.1.3 The organisational conditions to success

Which then are the organisational features that seem to be a pre requisite of a well drafted portfolio of innovative projects? These features appear to be somehow a logical consequence of the two main features that we just identified in terms of concentrations and attractiveness to firms.

We will first need **clear decision making procedures** (Bollen 2002, but also Cooke and Morgan, 1992, Jones – Evans, 2002, De la Fuente, 2002, Bristol and Blewitt, 2001 on the specific experience on structural funds in UK and Spain, as we will elaborate in chapter three where we will revise the literature specific on regional development in these two countries) so that high level choices on which are the region's preferences in terms of sectors and academic domains do not get diluted along the implementation process.

Skills will, then, be necessary to select the right sectors and to design bidding procedures capable to select projects which can address specific needs along the beneficiaries' value chain (Feiok and Strema, 1998, but also Coe and Helpman, 1995, Rodriguez-Pose, 2001, Lundvall, 1992 on the challenges of managing regional innovation strategies).

It will, then, required the existence of clear targets and incentives attached to these targets, as well as evaluation arrangements to measure achievements, so that to any allocation of decision making power corresponds a responsibility (Bachtler and Michie, 1995, Mairate, 2000, Eser, 2001, Grillo and Iannacci, 2009 on the merits and limits of evaluation and monitoring in the structural funds experience, but also, more in general Dunleavy, 2006) against which programme managers are held **accountable**.

Last, a "**knowledge management system**" which applies in particular to implementation of innovation strategies, whose nature is intrinsically experimental and whose return is, also, in terms of knowledge that a system - a region, an organisation - accumulates through successes and failures of experimentations (as for Davenport and Prusak, 1998).

These organisation factors, however, point to – as we have seen in the "innovation vale chain" – a pre existing institutional condition.

We, in fact, argue that choices require a certain degree of – formally recognized or informally achieved - strength of the program managers – especially in the project selection phase – and their capability to resist to political pressures that may determine a redistribution of resources amongst different local consistuencies (see, for instance, as we elaborated in chapter one Lundequist and Power, 2002, Rodriguez-Pose, 2001, Puga, 2002, but also Midelfart–Knarvik and Overman, 2002, on the risks of using R&D as redistributive tools at European level and similar reflections by Jones-Evans, 2002, Armstrong et al, 2001, Raymond and Garcia, 1994, Serrano and Cabrer, 2004 on the specific cases of Spain and UK).

The entire question of the **independence** of the technical decision maker will, however, invole the investigation of the usefulness of agencies and, more specifically, the Regional Development Agencies (see, for instance, Bull, 2009, for a theorization of main trends, but also, for instance, Morgan, 1997, on the case of the continuation of the Welsh Development Agency (WDA)) that constitute a form of semi privatization of certain parts of the policy implementation (see, however, also also, Geva-May, 2004 on the problems of the so called "termination" of public policy).

2.1.4 The features of effective partnerships

Programmes that are organisationally developed so that accountability is ensured and knowledge management systems are made available are, according to our overall theory, strongly associated with certain specific social, institutional and economic characteristics.

Notwithstanding the difficulty of defining and measuring innovation (see section 1.1 above), most people by now acknowledge that innovation cannot happen in isolation. The idea that meaningful research can be produced by lone researchers or single laboratories located in a desert is seen as no longer adequate, with the rise of the so called network society. Not only is accumulation of firms in a certain area or of talents in a certain organisation indispensable for sufficient knowledge to be shared and competitive pressures to be felt, but also innovation projects are increasingly projects that entail not only efforts on product renewal or invention, but also marketing, political support, and societies that are friendly enough towards the change that is associated with many innovations.

In a sense the importance of partnerships depends, in turn, on the importance that information is incorporated in the decision that programme managers take. Better informed decisions produce projects that are more feasible and capable to find less obstacles and more motivation. It is a classical argument (see, for instance, Von Hajek, 1945) that applies both to the issue of local knowledge (that the Barca report, 2009, underlines), to the question of international knowledge (like in Rodriguez-Pose, 2001) and to the very idea that the drafting of strategies need to consider and include experts knowledge.

The idea of networks and partnerships is not new, and yet the argument that the thesis will explore is that the nature of these alliances is changing. Various authors have stressed the importance of the relationship between firms and universities (Salet and Gualini, 2007 as far as projects of development at city level). Others (for instance, Cassia et al , 2008, and their comparative analysis of world class regional innovation systems in UK, Sweden, Germany and USA) have, instead, introduced government as a third actor and from this strand of research emerges "the model of the triple helix" (Leydesdorff, 2000, and Landabaso et al, 2002) meant as local partnerships between government, business and research. It is submitted that even this last model needs further qualification because it omits at least two elements whose importance has grown recently: the role of **civil society** (as for Wilson, 2004) and the importance of **long range relationships** with firms, researchers and governments of other regions and countries (Pellegrin, 2008, on structural funds R&D programs, Niosi and Zhegu, 2005, Ernst, 2005, on the globalization of the very concenpt of cluster, but also Quah – 1997b – as we just elaborated in chapter 1, on the impact of ICT on distances).

Regarding civil society, its importance has increased because of the increased demand for participation at local level. Civil society, in fact, can be seen as essential for at least three reasons: Firstly, endogenous growth theory itself is – as we saw in the first chapter – mostly about accumulating knowledge of the *tacit* type (Rodriguez-Pose and Crescenzi, 2006), as opposed to the one that is *formalized* in patents and scientific articles and can be more easily traded. To develop the former requires cooperation amongst a number of actors within the region so that it becomes a common asset to be shared by them; in turn this demands trust within the region of the kind associated with the presence of social capital (as for Putnam et al, 1993).

Secondly, some of the most interesting innovation practices address the production and delivery of public goods (e.g. internet based transformations of the way health, security, transportation is organized) and thus a strong citizens' demand for such modifications can be an asset (Grillo, 2001 and 2004). on the contrary, civil society appears in practice still often expresses resistance towards change and the minimization of such resistance is crucial for innovation to happen.

Thirdly and more broadly, the value that society attaches to personal investments in knowledge (and thus in education and scientific research) and in innovation (and thus the cultural attitude towards the natural greed and failures that innovation processes imply) is essential to attract and maintain talent and innovative firms/ research groups (as in Florida, 2005, or "The war for talent" - 2001 - of the McKinsey partners Michaels et al).

The combination of these reasons combined with the idea that regions possess actors that are crucial to innovation and flows of knowledge amongst them has produced the idea that regions (and, thus, their stakeholders and civil society) are a "learning" entity (Lundvall, 1992, Dunford, 1996) and that they can be "innovation prone" or "innovation averse". Some specific social features, such as the relative rigidity of the labour market, skills shortages, and an ageing workforce (Konstadakopulos, 2000) thus become decisive in any innovation policy effort.

The issue of long-range relationships (Pellegrin, 2008) is similar to the question of civil society. If *tacit*, shared and, thus, endogenously embedded knowledge produces durable productivity gains, the possibility to draw skills and expertise with international exposure into the design and implementation of innovation strategies is also essential (Rodriguez-Pose, 2001). This is because of the very nature of the innovation market that is intrinsically global, but also because of the reduction in the cost of such relationships, due to ICT. Not all elements must be present in the same geographic area: actually, one may argue that it is crucial that regions or pieces of a regional innovation system (its government, business, research or civil society) outsource talent and knowhow from other eco systems (either from other countries or other regions within the country).

The idea is thus that the propensity towards innovation of a region is, in fact, a function of a number of elements that can be theoretically measured and acted upon (Wilson, 2004, in *Information Revolution in Developing Countries*):

1. The comparative size of the four worlds (Wilson, 2004, call them *quads* meaning by them government, business, research or civil society and their numerous possible sub segmentations) because imbalances in size and, thus, in power may impair credible, useful partnerships amongst the four;
2. the number of links and their thickness; the relationships should not be only formal (as for some applications of the partnership principle within EU financed programmes) but become working relationships;
3. The capability to link eco systems amongst themselves, according to specific needs, so as to establish virtual districts that may achieve performances superior to geographic concentration of firms (clusters) that were seen a decade ago as instrumental to regional competitiveness.

These would appear, then, to be the elements both in terms of actors and interactions amongst them that can make a society more or less "prone" (Rodriguez-Pose, 2001) to innovation. There is, however, still one question that remains open. What can a policy maker or an administration do if a region finds itself in the unfortunate position of lacking a critical mass of research expenditures, clear political endorsement to make choices on how to allocate research funds, or a preexisting practice of partnerships amongst the various "worlds" whose interactions are crucial to produce sustainable innovation and high return R&D programmes (this was the reflection of the empirical study that, for instance, Tödtling, and Kaufmann - 2001 – conducted with reference to an European project[35] meant to study patterns of SME to innovation and more specifically to develop partnerships for innovation)?

The response (as suggested by guidelines from international organisations like the OECD, the EC) by many less developed regions has been the creation of a web of actors whose presence is deemed necessary for an innovation strategy to happen: technology parks, incubators, science parks, and offices within universities meant to sell knowledge and raise funds. These can be grouped into three main types:

(1) Innovation brokers: these act as an intermediary between the four types of actors transferring or facilitating the transfer of technologies, funds, information, consulting. Institutions that have these tasks as their core activity include the office for the transfer of knowledge that many universities have set up (as we will see with OTRI in Spain); agencies that are supposed to help innovative firms to get funds from the government for supporting their research activities; public or private consulting firms that identify firms' innovation needs;

[35] SMEPOL financed by the EU Commission's TSER programme

and bodies that some regions have created to realize seminars, workshops, and courses that bring students and local communities closer to regional R&D capacities (as for the NAMTEC in SY that we interviewed during the field work).

(2) Innovation hubs: these provide the sites and the services that make firms, universities, and governments work in the same environment, and the networking services that establish, maintain and develop the relationships amongst them. This category will include, for example, technology parks that are dedicated to hosting innovative firms and universities departments and the science parks that are normally born at the initiative of universities.

(3) Hybrids that mix the characteristics of the first and the second actors above, like the incubators that are dedicated to the creation and development of new innovative firms by providing logistics, services and sometimes funds.

The case studies will investigate how these actors have promoted partnerships and, thus, innovation and we will see to what extent they have been a reflection of a deliberate strategy meant to increase the efficiency of research and innovation oriented public investment programmes. Further, the empirical Chapters 4 and 5 will follow the same structure as just described: we will test whether concentration and high leverage on business' investments are associated with better results. We will, then investigate the quality of the implementation processes and the impact that institutional contexts may have on them. Finally, partnerships and actors specialized in developing them will be analysed.

2.2 RESEARCH DESIGN AND CASE SELECTION

The hypotheses that we just put forward will be tested through case studies.

Case studies will be, first of all, selected by referring to the effects of structural funds programmes within the programming period 2000 – 2006.

The choice of structural funds is due to the need to observe regions employing similar regional development instruments which are similarly large relatively to the size of their economy and public investments. We will shorty see that this weight is indeed rather high so that we can confortably assume that other smaller development policies could not make much of the difference. The programming period 2000 – 2006 was chosen because is the last one for which we have concluded programmes (the current 2007 – 2013 is still under way) for which we have data and for which we can assume that we can also observe impacts that may take some time before materializing (normally evaluators consider that at least two years after the conclusion of expenditures are necessary for impacts to unfold). It also has to be considered that notwithstanding that the programmes we are observing are called as 2000 – 2006, some of the investments lasted until December 2008 (as last moment for programmes' expenditures to take place).

Our observation will be focused on the differences between pairs of regions and, thus, we will not be concerned by differences between countries. This should minimize the impact of differing national policy contexts on outcomes (see also the next section on "the control of competing explanatory theories") so that differences in performances can be expected to depend on differences in regional structural funds strategies.

Such a methodology (Verba et al, 1994, George, 1982) will allow us to understand which are the factors along the *innovation value chain* that can explain how similarly endowed regions perform differently. Moreover, we also identified cases that had a greater difference: within countries we selected regions that, beginning from a similar situation, exhibit significant differences in the behaviour of macro indicators associated with performance that investments in R&D are supposed to explain albeit the expenditures in R&D were not higher in the better performing regions.

2.2.1 Country selection

The case studies were selected in two steps. First of all, two countries[36] were selected, within which a further selection of regions was then made. The criteria used were the following:

1. Large countries were preferred because they present more regions and thus a higher possibility of choosing a better pair of regions[37]. They also provide more opportunity for generalization. Although the analyses we will perform are expected to generate results that may be relevant at European level, generalization is still more immediate at country level, which should thus account for a larger portion of total structural funds spending. Italy (with 7 OB 1 Regions), UK (6) , Germany (5) and Spain (8) seem to respond to this first criterion, whereas French Objective 1 Regions are too few (4) and more importantly not comparable to other European regions (they are all islands or overseas territories).

[36] The author has, in fact, also been involved – beyond the scope of this research – into a similar inter regions comparison amongst Objective 1 Regions in Italy and Greece. However, the results of the analysis are not completed and are not expected – for the reasons that we are exposing – to be as significant as the ones that are presented in this research.

[37] Greece is also characterized by many – 13 – Objective 1 regions. However, as a consequence of the size of the country, these regions are too small and thus they are expected to be characterized by much spill overs of knowledge amongst them and thus not ideal for a regional innovation strategy.

2. Amongst large countries, those where deviations in R&D and GDP growth rates in the 2000 – 2006 period were highest were given a further priority which appeared to exclude Italy where the behaviours of Objective 1 regions seemed more similar according to main macroeconomic trends;
3. Finally, we also considered as interesting the case of countries where regionalization and structural funds reforms have taken place at the same time. This will allow, as we will elaborate in chapter three, to capture situations where changes in institutional setting may affect results and thus provide an interesting test case for our initial hypothesis; this condition make Spain and UK the countries to focus on.

Thus, Spain and UK were, eventually, selected. As per our criteria they represent a large enough share of structural funds (42,4 Bio Euro in the 2000 – 2006 period that makes one third of the total - EC, 1999). In addition they present – amongst the big countries - the highest differentiation in terms of their Objective 1 regions and, thus, the highest potential for a method of comparison between outliers as ours to generate useful recommendations.

The choice of Spain and the UK was also confirmed by four additional factors

1. both countries are accelerating their investments in R&D and both have been concentrating a higher share of these investments in less developed regions – unlike France and Germany, whose R&D spending is above the European average and Italy, which spends less and is not catching up;
2. they are the countries where effects of structural funds and, specifically, of regional innovation policies have been most investigated, allowing this study to leverage upon and develop previous research;
3. they are countries where the author had (together with Italy) better access to programme managers and data;
4. last but not least, in Spain and the UK – more than in any other large European countries – the regionalization process has been, as mentioned, in parallel to the structural funds implementation periods: this will provide the research with an interesting viewpoint from which to see how the institutional setting may become an explanatory factor in terms of performance and vice versa, how the institutions and their concrete functioning are influenced by the necessity to spend EU funds and get the best possible results from them.

2.2.2 The selection of regions

The regions within the two countries were selected in parallel manner. Firstly, we selected regions with different performances that are not explained by the quantity of public investments into R&D, and secondly regions with similar starting conditions except for some specific differences whose influence we want to test.

The regions in both cases will, thus, have in common at least the following characteristics: initial level of income per person is similar; structural funds spending represents (as we will see in section 2.4.2) a high share of the public investments meant to generate development, of total GDP and of public and total expenditures in R&D; these percentages are also equivalent across each of the two couples of regions; the initial expenditures on R&D and the number of researchers and graduates are also similarly low in all cases. This criterion is important in order to minimize the impacts of other public (and, in fact, private and, more precisely, private that were not stimulated by public intervention) investments programmes, as we will elaborate in the next section on the "control of competing explanatory theories".

Within these two Objective 1 groups we selected SY and West Wales (WW) in the UK and Castilla Y Leon (CYL) and Murcia in Spain.

The first of these pairs will let us investigate an apparent paradox: the region that is more rapidly increasing its expenditures in R&D is one of the worst performers in terms of the overall OB 1 programmes objective of achieving long term GDP and productivity gain. In this situation, the only way to prove the assumption that differences in endogenous knowledge assets explain differences in economic growth still holds true is to find in the two regions different capability of investments in R&D to generate economically relevant knowledge that becomes an asset of the region (Rodriguez-Pose, 2001).

On the other hand, the Spanish case allows us to investigate the situation where productivity gains appear proportional to the increase in R&D expenditure and, where, in fact, the difference in performance turns to yield a radically different capability of the public investments to attract further private funds to be spent on research and thus an overall different increase in the ratio between R&D and GDP.

The two UK regions, thus, start from similar situations in terms of income per person and propensity to spend in R&D but diverge in terms of evolution of the basic data that we will consider as indicators of performance and, in fact, they can be considered outliers within the Objective 1 as shown by the table below[38].

Table 2.1 indicates in bold GDP per capita, propensity to spend in R&D, growth rates for GDP procapite, productivity and R&D in the 2000 – 2006 period. The numbers in bold represent the Objective 1 Programmes. However we also indicate the data for the regions (Wales for WW, Yorkshire for SY, North West England for Mersey Side and South West England for Conwall & Scilly) because the R&D numbers are not available for some of the OB 1 sub regions but only for the "region" (as for the UK laws and the definitions of the Office for National Statistics) to which they belong. We are, then, assuming that R&D evolution in the OB 1 sub regions can be proxied by the one of the region they belong to.

On the basis of this assumption, the data point to an interesting inverse correlation between R&D expenditure and GDP growth rates. This appears to contradict the expectation of the EC and, even, the endogenous growth theory, unless – and this will be the real core of our field work – we find that in different regions R&D investments have a very different return.

Table 2.1 – Selected macro indicators, Objective 1 Regions UK, euro, percentage

	GDP procapite 1998	R&D/ GDP 1998	GR GDP (2006 - 1998)	GR productivity (2006 - 1998)	GR R&D (2006 - 1998)
Northern Ireland	**16.000**	**0,75%**	**0,44**	**0,32**	**0,66**
Wales	15.600	0,83%	0,37	0,27	0,80
West Wales	**13.400**	**0,23%**	**0,37**	**0,24**	**n.a.**
Yorkshire	17.600	0,86%	0,38	0,29	0,27
South Yorkshire	**15.200**	**n.a.**	**0,44**	**0,41**	**n.a.**
North West England	17.600	1,69%	0,40	0,30	0,51
Mersey Side	**14.400**	**n.a.**	**0,42**	**0,23**	**n.a.**
South West England	18.500	2,01%	0,41	0,38	0,40
Cornwall & Scilly	**11.800**	**n.a.**	**0,55**	**0,48**	**n.a.**
Highlands & Islands	**19.200**	**n.a.**	**0,11**	**n.a.**	**n.a.**

Source: Eurostat, ONS, accessed May, 2008

[38]Higlands & Islands is a special case of OB1 Programme. Infact, the programme is called the *Highlands and Islands Special Transitional Programme (HISTP)* granted to H&I because of their geographical remoteness, whereas the GDP per person ins much higer than in other OB1 areas in UK.

The two UK regions appear to be rather polarized, with SY being one of the regions that is growing the most in terms of GDP per person and, more so, in productivity, and the least as far as expenditure in research; WW on the other hand is doing exactly the opposite. The comparison between the two is thus expected to unveil reasons underlying the difference in the return of public investments in R&D.

In Spain, by contrast, the two regions were at the beginning of the period average amongst the OB1 Regions in terms of overall R&D expenditures and percentage of these expenses coming from business. In addition they both faced the same problem of insufficient scale of spending on R&D and, yet, they achieved different results: CYLhas increased more than other regions the ratio between R&D and GDP and the percentage of expenses coming from business and the opposite is true for Murcia. The comparison was thus envisaged to provide some insights on the conditions that may make a certain portfolio of public investments more attractive for business funders.

Table 2.2 – Selected macro indicators, Objective 1 Regions Spain, euro, percentage

	GDP procapite 1998	R&D/ GDP 1998	business on R&D 1998	GR R&D (2006 - 1998)	business on R&D 2006	GR public R&D
Galicia	12.800	0,53%	30,4	85,0%	37,6	68,7%
Principado de Asturias	13.800	0,55%	42	65,0%	43,7	62,5%
Castilla y León	**14.800**	**0,51%**	**42,2**	**93,0%**	**57,3**	**68,5%**
Castilla-La Mancha	13.100	0,48%	51,6	41,0%	44,5	47,5%
Extremadura	10.200	0,42%	20,4	41,0%	32,1	26,1%
Comunidad Valenciana	15.700	0,60%	35	89,0%	34,6	90,0%
Andalucía	11.900	0,65%	29,3	76,0%	35,4	62,9%
Región de Murcia	**13.500**	**0,55%**	**41,8**	**65,0%**	**37,8**	**71,9%**
Canarias	15.500	0,51%	15,3	58,0%	21,5	41,3%
Average OB 1 Regions	13.478	0,53%	34,22	68,1%	38,28	59,9%

Source: Eurostat, INE, accessed May, 2008

Table 2.2 shows, firstly, how the conditions in terms of propensity to spend in R&D, growth rates and percentage of R&D expenditures coming from firms were very similar between Murcia and CYL at the beginning of the period we will observe. Secondly, however, it shows how large the difference in the quantitative growth of investments in research and the contribution to this growth from business have been in the programming period we are considering, although the injection of public funds has been similar. The polarization in results can unveil in a very effective way the reasons why similar amounts of public investments in two regions that appear very similar in terms of research assets, can yield two very different results in terms of stimulating business to also invest in innovation.

Moreover, similarities emerge even from an account of more qualitative parameters that the field work allowed: the cohesion of the regions we selected – meant as social capital (like in Putnam, Leonardi and Nanetti, 1993) or as connectivity (like in Monastiriotis and Petrakos (2009) studying the reasons for different regional inequalities in the Balkans, or Wilson (2003) analysing the factors that make more or less a country innovative) – appear to be similar. It was, in fact, a different decision in terms of leveraging on the relationships existing amongst government, business, universities and civil society, that made the difference.

In fact, the selection of the two regions in the UK is crafted so that most pre existing conditions appear similar but for one that may be relevant as an explanatory factor: the level of autonomy of the region. In both cases the development programmes are being applied to sub regions to which no proper institutional level correspond. Yet in one case – SY - the development programme is substantially managed by a Government Office formally part of the central government while in the other – WW – the similar OB 1 programme is managed by a regional administration that is elected and to which powers have been devolved. Different levels of efficiency that – according to the macro data that we mentioned – exist between the two UK regions may be explained by differing institutional capabilities and this in turn by different institutional settings.

In Spain although income, relative size of R&D expenses, and geographical position towards the centre of the country are similar, the main difference in the preexisting conditions is the presence – in CYL- of big actors (prestigious universities and big multinationals) capable of playing a leadership role in the implementation of innovation strategies, whereas in the other case – Murcia – we mostly have small firms and smaller research institutions.

It was also indicated above that the selection of these regions allow us to focus on regions and policies that have already been investigated and evaluated more than others. This is certainly the case of SY and Wales, that tend not only to be the two cases of regional development most studied within the UK but are also home to some of the most influential regional policy analysts in Britain (working from the Universities of Sheffield and Cardiff). CYL has likewise been frequently investigated and presented as a benchmark by the EC.

2.3 THE CONTROL OF COMPETING EXPLANATORY THEORIES

As discussed before, other theories clearly need to be considered as offering alternative possible explanations for the phenomena under inquiry: differences in initial endowments and independent variables other than quality of regional programme managers' strategies certainly may impact differences in regional performance. Therefore, we distinguished two groups of explanations for different results of similarly endowed innovation policies other than the ones – organisation of the implementation processes and partnership - whose impact on performances we are assessing: differences in pre existing conditions and differences in changes intervening after the start of the programmes.

The objective of this section is to specify how we will control control methodology, so that the measurements performed isolate the effect of the factors under investigation from the effects of other variables which also impact the above defined performances (on limits of the case methodology and the complexities on "designing social inquiry" this author referred especially to King, Keohane and Verba et al., 1994). We will, thus, distinguish:

1. Differences in *pre existing conditions* that may determine different patterms of development that may pertain to differences that other authors have controlled for, whereas the ones that have been more frequently explored where it comes to differences amongst less developed regions, regard (as mentioned in section 1.3.2):
    a. human capital;
    b. propensity to spend in R&D and differences in the size of pre existing research assets of the regions;
    c. institutions;
    d. other less specific to innovation strategies (accessibility to core markets, development levels, social capital).

    As we anticipated in the previous section the cases have been selected with the specific intention to minimize such differences so that the explanation for different performances is likely to be found in other factors.

2. Changes *exogenous to the region* or *at regional level but outside the structural funds programs and the innovation strategies* being triggered by either

a. Policies meant as change in regulations or
b. Public investment programmes meant to foster – directly or indirectly - economic growth and which are neither financed by structural funds nor belong to the domain of the innovation strategies;
c. Other changes in overall economic and financial conditions, in technologies and in industry trends or within industries competition.

Although the influence of any of the above can not be excluded, this section will thus provide an explanation of

1. why these other factors may be not as relevant as the independent variable which is the focus of this study;
2. and how research's methodology design has been designed so that their impact is minimized.

2.3.1 Differences in pre existing condition

We will now recapitulate how the research is going to minimize the impact of assests - human capital, propensity to spend R&D and pre-existing research assests, institutional arrangements - other than the quality of programme management and partnership, whereas we will control in the next chapters that the regions that we are going to study are similarly endowed of them.

Firstly, human capital is an important differentiator because when investments do succeed to support local innovative firms and universities or to attract innovative firms from outside, the spill over of the benefits to other regions (Shearmur and Bonnet, 2011) is believed to become higher, the smaller the percentage of population having a higher education degree (Rodriguez-Pose and Crescenzi, 2005, Gumbau-Albert et al., 2009).
However, as we will see, the education qualifications is similar in the two regions. And similar is the emigration of the most qualified portion of their population – especially amongst people attending or having completed higher education- to the core areas of the two countries (London in UK, Madrid and Barcelona in Spain) suffered by all four regions that we are going to observe.

The second factor whose differences within regions also mut be controlled is the size of research assets and thus the distance from the minimum scale that is necessary in order to develop through innovation a competitive advantage that can be sustained on a global scale.

Altough not all authors agree with the argument of the return to scale of investments in research (Cooke, 2007, Fritsch and Slavtchev, 2009), size and concentration are widely believed create a cumulativeness (Forsild et al, 2002) that make different areas to increasingly diverge and this does, in fact, work in two ways that reinforce each other: on one hand the return to investment, as we mentioned before, may, in fact, be characterized by return to scale that show an exponential pattern (Solow, 1987); on the other even the size of private investors' investments tend to concentrate as well as the numbers of researchers that strongly tend to aggregate in the same locations (OECD, 2008 and 2009, but also Guena, 1998).

The regions that we observed, however, display, as we will see shortly in section 3.4, similar percentages of GDP spent on R&D and similar proportion of the population engaged into research.

A more precise analysis should, of course, be by research assets (both in terms of expenditures, researchers and infrastructure) measured by academic domain and industry (because it is by sector that distance from minimum scale must be assessed). Even data on economic structure and distribution of faculty and students amongst studies fields do not appear to say that any of the regions we are considering is significantly more concentrated than others.

Differences do, in fact, exist in terms of quality (and in the case of Spain tradition) of the universities hosted in the regions that we are investigating and this difference may, as we will see, potentially matter in terms of being a source of potential leadership for the innovation strategies. However, in terms of quantity not significant gap appears to exist at the beginning of the period that we are studying between the better and worse case considered by the research.

The third explanation to policies performance that we need to consider as an alternative to the ones we are studying is probably the most mentioned: there is, in fact, a rather large literature that consider the consequence of different institutional settings on performances of economies, policies and even on innovation strategies. (the new institutional economics as for the account, amongst many others, of North, 1993). In section 1.3.2 we already elaborated on the reasons why there may be a structural problem in the relationship between public administrations and innovators (Head, 2011, Potts, 2009) but also of likelihood of imitation of other regions' choices with little research of a *smart specialization* (Barca, 2009, but also McCann and Argiles, 2011) that may allow to reach minimum scale although with limited overall R&D investments.

More specifically the former problem may advise - according to some (for instance Morgan, 1997) to delegate the core functions to entities that are outside the public sector (or that are quasi public bodies like the regional development agencies that we will observe in our selected regions), although not everybody (Diefenbach, 2009) would agree with the superiority of the choice to outsource public

administrations functions to the so called quangos; the latter issue may, instead, suggest according to others (for instance, Hooghe and Marks, 2003 and 2009) to make the decision making process as close as possible to the regions so that local needs may be identified, although there is also who advises that not always the more devolution, the better (as for the arguments made by Rodriguez-Pose and Gill, 2004, with reference to statistical correlations in Europe between devolution and inequality and by Cooke and Clifton, 2005, with reference to the devolution in UK).
We will see that none of these differences appear to be able to determine *per se* differences in performances: the presence of a regional development agency appears to be an advantage in the UK case, and yet in Spain a public administration led decision making process appears to still be able to achieve success; differences in autonomy from the central government is associated in the UK couples to differences in performance, and yet in Spain similar empowerement does not prevent to produce very different results.

Finally accessibility to core markets are also similar with the regions being similarly distant from the economic and innovation centres of their country (again London, Oxford and Cambridge in UK and Madrid and Barcelona in Spain). And the same can be said for prosperity levels who are – by definition similar – for regions that are considered less developed. Lastly as far as social capital not only the regions that we are considering appear similarly endowed: it also appears that this factor is more relevant for the development of a broader notion of “prosperous community” (as in Putnam, 1993) that for the effecteveness of innovation strategies that appear dependent on relationships amongst specific actors (Leysedesdorff, 2000, Andersson, 2009) who are relevant for the formation of the partnerships that we are studying.

2.3.2 Shocks other than cohesion and innovation policies

As stated above, such factors include new policies, public investment programmes and market shocks, which are decided or take place above the regional level or within regions but outside the structural funds domain.
We will then separate between shocks happening **outside** or **inside** the regions, starting from the former.

Changes in policies at national and European level

The influence of such discontinuities is undeniable, but minimized by the terms of definition of this study's research question. It is useful to distinguish such changes with respect to the level at which they materialize, i.e. national or European (supranational):

:

1. Changes at **European level** affect all the regions under consideration. More specifically, they can be seen as lacking relevance when considering that it is sought to explain variation in differentials between particular regions' performance and EU average. Political decisions that may affect performance on convergence (such as the decision to liberalize movement of capital, or to liberalize trade) do not therefore make a substantial difference to our analysis because they apply equally to all European regions.[39] Consequently these policies which, according to neoclassical theories, explain the greater part of differential convergence between, for instance, the USA and the EU, are not relevant in understanding differences observed as between EU regions.

2. Changes at **national level**, again, will be neutralized by the method of construction of case studies, selecting one pair for each member state, permitting concentration more specifically on differences between regions within nation states.

   Political decisions that may impact the ability of a whole nation, or of the whole group of Objective 1 regions belonging to a certain member state, to converge, will not be relevant for the differences between regions within a member state to be analysed[40].Thus important factors, like the differences in national labour market regulation (which the "new economic geography" identifies as crucial), can explain why, in general, groups of Objective 1 regions belonging to various nations show differential ability to produce economic growth, yet they cannot account for gaps in performance between regions within the same member state.

[39] In reality, same political decision applied equally to different regions may impact them differently because of differences in their productive and industrial basis. For instance, trade liberalisation may affect differently regions which have high propensity to export as opposed to others who are less used to international trade. Such a factor should, in any case, be of limited importance given that all the Objective 1 observed regions tend to display similar macroeconomic data and, often, similar composition of the productive basis at the beginning of the observation period (and this will be even more true if comparisons are carried out between regions belonging to the same member state).

[40] Again this may be not completely true because similar decisions (on labour market regulation) have a different impact according to different composition of the workforce of different regions. However, as we said before, regions belonging to the same Objective 1 status should – from this point of view - display similarities (at least between the Objective 1 regions belonging to the same Member State).

This method does not deny the importance of factors external to the region, but targets and restricts the analysis to the component of differences in regional performance that results from regional level factors.

Public investment programmes at national level others than structural funds

The dependent variables that we are studying can, in theory, be impacted by decisions on public investment taken from outside the region, and which may also contribute to accelerating economic growth or facilitating achievement of productivity gains.

In practice, though, this effect should be minimal in observed regions, because:

1. In the regions (objective 1) subject to analysis, there is little public investment beyond structural funds (as shown by the table in the section on "public investments at regional level"); there is a very low probability that any intervention other than European aids can explain convergence behaviour.
2. The relatively small amounts of funding dedicated to development are further divided according to an equitable mechanism (the amounts are determined on a GDP per capita basis); the fact that selected cases start from similar situations (in terms of macroeconomic indicators) therefore suggests that levels of other public money invested in the regions should be similar.

Since we are focussing on testing the *quality* of public investment strategies as a determinant of differential regional performance, we also need to isolate this factor from impact of their *quantity* (amount per person, or percentage of GDP). Accordingly, we will control for this factor through selection of case studies showing similar amounts of public investment and, especially, structural funds dedicated to development.

Market shocks

Neither is it envisaged that factors external to the region or external to the public-led domain are important factors influencing regional performance. Principal shocks in this category would include:

1. Dynamics in different economic sectors which may affect regional outcomes, because the weights of such sectors may be different amongst observed regions. As will be seen, by and

large, the composition of economic activity in selected regions is similar, so that any such effect should be minimal. Verification of this expectation will require a closer examination of the incidence in studied regions of industries displaying different performance, which will be undertaken in the course of this project. It should be noted that difference in industry structure able to produce differences in performance will require the presence, on one hand, of comparative advantages that the region has been "gifted with", and, on the other, a structural funds spending strategy (whose quality is the independent variable under scrutiny) able to intentionally exploit them;

2. Technological or economic changes having variable impact on different regions according to certain characteristics, for instance geography[41] or composition of the population by age[42]. As before, similarities across Objective 1 regions belonging to the same member state allow us to envisage that such a factor should not play a major role. Once again, shocks improving regional performance without any deliberate political action and, by contrast, modifications resulting from specific choices exercised by the regional programme managers, in order to take advantage of these shocks, will need to be distinguished.

To reiterate, it is not expected that these exogenous change possess significance in the explanation of the differences under investigation.

Changes in regional policy

Policies decided at regional level do not appear as highly significant in determining regional differences. Principally this is because most decisions potentially relevant to convergence and competitiveness are decided either at national level (labour market regulation) or European level (trade liberalisation, liberalisation of capital movements).

Nonetheless, the selection of cases was undertaken in order to minimize any impact of regional policies, by ensuring that:

1. Member states (like the United Kingdom where the NUTS 2 regional notion had to be introduced for structural funds allocation) without significant regionalist tradition are privileged. And that

[41] We are hereby referring to technological advancements which may be more or less important to a region according to its geography and, for instance, we may assume that diffusion of Information and Communication Technologies may make less important, in some industries, to be centrally located or, on the contrary, at the periphery of Europe.

[42] We are thus considering modifications like, for instance, shift towards a higher curve of the interest rates structure that may benefit some segment of population (for example, the elderly with substantial savings) at a disadvantage of others (younger people with higher financial leverage) and, therefore, affect differently different regions according to the composition by age of their population.

2. Within regionalist member states, regions with lower autonomy (like CYLand Murcia in Spain) are investigated.

Public investments at regional and sub regional level others than structural funds

Structural funds account for a significant portion of public investment in the Objective 1 regions regions, and "cohesion policy" can safely be considered to be a decisive part of policies impacting on the variables under analysis[43]. Table 2.3 calculates per each Objective 1 region which is the weight of the sum allocated to the structural funds programmes and to the specific R&D realted measures within the same programmes respectively on regional GDP and on the total (private and public) regional expenditures in research (each of the two allocations at the numerator was divided by seven – the years of the programming period - in order to have the yearly potential impact).

Table 2.3 – Weight on GDP of structural funds expenditures (average for Objective 1 regional programmes with R&D dedicated measures)

REGION	Structural Funds total allocation (mio euro)	Structural Funds on R&D (mio eruo)	Structural Funds total allocation on GDP (per year)	Structural Funds R&D on total R&D expenditure (per year)
Brandenburg	5055	1067	1,7%	25,6%
Mecklenburg-Vorpommern	3727	525	1,8%	29,1%
Galicia	5321	182	2,5%	10,5%
Principado de Asturias	2164	48	2,4%	5,1%
Castilla y León	5032	133	2,2%	9,4%
Castilla-La Mancha	3183	61	2,3%	6,2%
Extremadura	3188	139	4,7%	29,6%
Comunidad Valenciana	4533	421	1,2%	11,8%
Andalucía	12115	358	2,3%	8,0%
Región de Murcia	1917	65	2,0%	11,1%
Canarias	2932	122	1,8%	12,3%
Anatoliki Makedonia, Thraki	1014	7	2,5%	3,0%
Dytiki Makedonia	520	2	2,0%	9,2%
Ipeiros	638	5	2,8%	2,3%
Dytiki Ellada	675	6	1,4%	1,2%
Sterea Ellada	744	5	1,1%	3,5%
Notio Aigaio	521	9	1,8%	51,1%
Kriti	681	8	1,4%	1,5%
Campania	7748	388	1,5%	6,9%
Puglia	5281	74	1,4%	3,0%
Basilicata	1696	21	2,8%	4,0%
Calabria	4036	45	2,3%	8,3%
Sicilia	8459	157	1,9%	3,7%
Sardegna	4258	82	2,5%	6,4%
South Yorkshire	3088	100	2,0%	13,3%
West Wales and The Valleys	4040	234	2,0%	15,0%

Source: EC DG Regio, Eurostat, accessed May 2008

[43] Moreover the way the analysis we will perform is constructed, is such that all investments (including infrastructures) will be considered taking in account the impact on productivity (like Overmans, 2001, suggests).

The yearly total structural funds expenditure was running in 2005 between between 1.2 and 4.7% of GDP of aided regions.

Much higher was the weight of structural funds on R&D expenditures, whereas those same numbers are even higher when we calculate the weight of structural funds on the public expenditures on R&D: in the regions that we selected as case studies, the structural funds were more than the yearly total public expenses in research (including salaries and other non investment expenses for universities).

It is, thus, plausible to expect that structural funds are playing a pivotal role in building the knowledge base of Objective 1 Regions.

In summary, this section enumerated various possible changes that may be seen as competing with this study's target independent variable in terms of influencing achievement of the outcomes of convergence and competitiveness. It has been proposed that these competing forces can be resolved into three different categories:

1. Factors whose importance appears low with respect to the variation sought to be explained i.e. differences between regions (such as non-structural funds public investment, as being of a scale insufficient to trigger significance).

2. Factors (such as national- and European-level policies) which may explain overall performance at European level or at national level, but lack explanatory power in relation to differences between regions within the same national context, or lying within the same cluster (less developed regions, and regions whose starting point is similar at the beginning of the observation period).

3. Factors (such as technological changes that different regions may have exploited with different levels of effectiveness) which may have an impact and whose importance must be verified through the case study phase, and that cannot be ruled out as insignificant at this point in the research project.

The table below presents a list of competing explanatory factors and the responses that the research offers to minimize their impact.

Table 2.4 – Competing explanations and reasons why the impact is minimized

	Public investments	Policies	Not government driven (likely business)
Exogenous to the region	The choice to focus on differences between regions should neutralize this impact under the assumption that national investments are distributed proportional to regions' size	The choice to focus on differences between regions should neutralize this impact under the assumption that national policies should impact regions having the same economic and research in a similar way	The choice to focus on regions with similar economic structure should minimize the impact of different trends in different industries
Endogenous to the region	The choice to focus on structural funds should minimize the impact of other investments that are small relatively to structural funds	Most of the research (and other relevant policies e.g. labor market) policies are national so impact of different policies between different regions should be minimal	The choice to focus on regions which are not core in their countries should minimize the number of big players and, thus, the impact of decisions and of the results of single firms

This framework, together with the deliberate choice of regions displaying similar endowments of human capital, research assets and institutional arrangements, should then provide the mechanisms by which the research can control the minimization of the influence of factors others than the independent variables that we want to control.

2.4 PROBLEMS WITH DEFINITIONS

In this section we will deal with three main queries relevant to our research: a) We do not know what we should exactly mean by "innovation" and, thus, the exact parameter of the **independent variable**. Consequently, we do not know how to measure the input of our equation. b) There is no universal consensus about what should be meant by economic performance leaving alone the notion of citizens' wellbeing which after all should be the bottom line of any policy, including one having innovation as lever. Accordingly, there are uncertainties about how should we operationalize the **dependent variable**. Lastly, and although a less central issue c) even as far as the concept of **regional competitiveness** is concerned, there are a number of conflicting definitions and measurements demanding a choice preliminary to the research. These questions and their solutions are now considered.

1. Innovation

Research & Development in its various declinations[44] is normally considered the proxy for innovation; the ratio between expenses on R&D and GDP is normally considered a measure of the "propensity of a certain region to innovate" and the Lisbon Strategy selects R&D/GDP as one of its most important quantitative targets.

However, this definition has a number of problems (OECD's Frascati Manuals – OECD, 1963 and 2002 – are probably the most comprehensive and authoritative attempt to solve them). For instance, there is the fact that large and increasingly significant investments in innovation are not captured by R&D: a) innovation in Small Medium Enterprises (SMEs) seems difficult to detect through R&D; b) process innovations are also underestimated whereas R&D is mostly centred around product development; c) service (and, in fact, also agriculture) innovations tend to be neglected.

An interesting definition of innovation is offered by the Green Paper on Innovation of the European Commission, where innovation is defined as "the successful production, assimilation and exploitation of novelty in the economic or social sphere". Important here is the idea that innovation is considered in a broad sense: although the definition appears still to be mostly about new products that tend to be produced by quantum leaps changes. There is also a recognition that innovation can be produced by "assimilation" (imitation), "exploitation" and that can go beyond the "economic" domain. Innovation, however, remains distinct from mere speculation whose impact may extend beyond a reasonable time horizon.

[44] The most recent EU documents talk about RTDI as Research Technologies Development and Innovation and from a statistical point of view we observe many mentions of GERD (Gross Expenditures on Research and Development)

Even this definition seems to overlook two important issues. The first is that innovation is necessarily linked to change (as the Commission acknowledges in other reports[45]) that tend to be **disruptive** (as in the classic Schumpeter's classic, 1935) or, at the very least, cause old modes of production to fail and goods to disappear from the market.
The EU's definition of innovation seems to have difficulty in accepting the destructive part of the innovation process; innovation is not something that can be added to an economy's infrastructure but which in fact requires profound changes to an economy's dynamics.

The second issue that EU documentation often fails to acknowledge is that innovation is **not necessarily successful**. As many authors argue, "success" comes from "failure" (Peters, 1988; Zider, 1998; Hardgadon and Sutter, 2000); and failure is valuable as long as it can provide the possibility to learn (Drucker, 1998).

Lastly, the mainstream EU definition of innovation appears to be somehow too simplistic as far as the innovation process goes. "Innovation is not a linear, but an evolutionary, cumulative and feedback process, which can only be realized in the cooperation and in the economic and social interaction of different actors, and as a result produces technological, organisational and social innovations" (Koschatzky, 2001:62). As a consequence, innovation can be about localized (incremental and minor) or structural (radical, unpredictable) change (Boschma, 2006)

It is, then, necessary to distinguish a number of overlapping concepts: innovation; knowledge; technology; (investments in) R&D; and (investments in) business competitiveness. It should also be noted that:

1. Innovation (as well as R&D, in fact) is not entirely about technology;
2. Not all R&D produces innovation; some of it will increase knowledge (like the funds spent on training or non research oriented higher education) but will not produce (at least not in the short – medium term) changes.
3. Not all innovation is produced within a knowledge creation process; some of the change may occur by chance (for instance within companies) and not on the basis of an explicit codified, intellectual process.
4. Some investments in business which are outside the proper R&D domain are still about producing innovation (for instance, in marketing, organisation, design).

[45] "Innovation is about change and the ability to manage change over time"; European Innovation Progress Report – Trendchart; 2006; Commissioned by European Commission DG Entreprise and Industry)

5. Innovation can also be produced outside both the business and the R&D (universities and research centres) fields; public administrations and civil society, for example, are increasingly producing significant transformations.

In addition to establishing the parameters of innovation and thus understanding how well R&D succeeds in capturing the extension of the area covered by innovation there are at least two other measurement problems (faced by Wang, for instance, when he attempts to measure R&D efficiency, 2007):

1. R&D expenditures put together investments (for instance in equipments) and current expenses (for instance, salaries of researchers); it would be important to distinguish them if we want to construct a production function;
2. immediate outputs of R&D like academic publications or patents have been considered parameters of production; however these present significant problems of comparability.

Notwithstanding these limits, the merit of R&D is that it is one of the measurements for which there are sufficiently long time series and adequate geographic disaggregation. It is also a dimension (although not the only one) of innovation that seems to be more immediately linked to industrial production cycles. Thus it is contended that taking R&D as the independent variable is an interesting proposition, as long as we do not seek to extrapolate conclusions to be deemed as relevant to the entire innovation domain.

On the other hand, we will also try to include in our analysis elements that may indicate how other forms of innovation are proceeding in the particular region in question. We will also try to divide observed investments in innovation according to a number of main typologies.[46]

2. Economic performance

The evolution of regional prosperity - proxied by GDP per habitant as well as productivity that is still derived from GDP - will be the principal dependent variable. Yet there are, at least, two problems: a) the limits of GDP and productivity as a measurement of the economic performance and the well being of a certain society on a macro level; b) the economic value added to firms on a micro level. Obviously both are questions of adequacy of the definitions and hence of the measurements of the

[46] DG Regio, for instance, propose a codification that assigns to innovation a number of specific "measures" of the operation programmes 2007 – 2013 and distinguishes innovation amongst R&D, human capital (tertiary education), investments for e – government and entrepreneurship.

dependent variable directly impact the strength of the relationship between innovation and its economic effects.

The first question is one of the most debated in economic theory. To cite just a few relevant contributions: Amartya Sen's (in Choice, Welfare and Measurement - 1997) conceptualization of development; Richard Layer's (Happiness: lessons from a new science – 2005) arguments on the merits of assessing other factors that may overcome the limits of GDP; the recent OECD project (Measuring Society's Progress: A key issue for policy making and democratic governance at www.oecd.org/progress) and the proposals to involve citizens and NGOs in the construction of the indicators; but also the very instruments (like the Human Development Index) that international bodies like the UN have been using for assessing the advancement of societies. Further, Easterlin (1974 in Does Economic Growth Improve the Human Lot? Some Empirical Evidence) has even identified a paradox that seems to contradict the relationship between GDP per capita and wellbeing that one would expect; solutions such as Gross National Happiness (in Tella, 2008) have been proposed and attempts have been made to apply it (see, for example, the Butan - Preisner (2004) ranking).

The possibility, here, is that more innovation may produce (positive or, even, negative) effects that may not be detected by indicators like GDP per capita or productivity and effects. We will refer to other values that investments in R&D may produce, however, the main dependent variables that we will consider are still the traditional indicators of macro economic performance. This is also justified by the choice of the EC to consider GDP per capita as the measurement of differences amongst regions and, thus, as the quantitative target of cohesion policies. This equates to say that we will assess performance defined as capability of the programs to reach their self declared objective.

The second similar issue – not at macro but at micro economy level – of the capability of firms' economic value to reflect the impact of innovation is considered by various authors, a number of whom have demonstrated how quality (that can be enhanced by technology) or higher efficiency (lower costs that can be, once again, triggered by technologies) may fail to translate into higher productivity (see, for instance, Gordon on the innovation paradox, 2000). This is, again, a problem of definition that is also reflected in problems of causalities that we will elaborate in the next section.

3. Regional competitiveness

Last but not least, there is the additional issue of clarifying what we mean by regional competitiveness. The last decades have witnessed a surge of academic, political and media attention dedicated to the notion of "competitiveness" meant as a feature of a certain "system" (Gardiner et al., 2004 or Best, 1990, 1998). By "system" here we are referring to a geographically defined area and, thus, the concept seems applicable to cities, as well as regions, nation states and to entire continents (the EU for instance). In all instances, the notion that countries compete for "limited" resources within global markets and globalized societies is assumed to be increasingly important. As far as the present study is concerned, we are particularly interested in the more specific idea of "regional competitiveness".

In fact, it seems that definitions of "regional competitiveness" can be grouped into three main categories. A first definition makes competitiveness coincide with the very concept of economic performance (measured with macroeconomic indicators as GDP growth rate or absolute values or variation in employment rate). The second assimilates competitiveness of a region to the volume or again the growth in exports and/ or the trade balance. The third definition concentrates on the capability of a region to "attract" or "maintain" firms which are "competitive", and therefore able to achieve a higher level of productivity and obtain high market shares in markets exposed to international competition.

This thesis' choice is to use the third concept, because of logical inconsistencies in the first two that we are now going to describe, but also not less importantly because the third definition is more consistent with the objectives that the EU has outlined for itself and which we are assessing: amongst other things – the consistency between policy objectives and instruments employed to achieve them.

Firstly "regional competitiveness" cannot coincide with overall economic performance and thus cannot be measured by employment rates or GDP growth rate. If, in fact, "competitiveness" is a novel concept with autonomous predictive and narrative power, it cannot coincide with general economic performance. It is, instead, one of its components or of its determinants, as the Sapir report (2003) reminds us.

Secondly, some authors assimilate regional "competitiveness" to a region's export level, export growth, share of international trade, or even trade balance (Rowthorn, 1999, or Tyson, 1992). Such association is, in fact, explained as the transposition of the "competitiveness" semantic from the context of private firms (to which the idea of being "competitive" is originally associated) to the world of macro economy and of *the wealth of nations*. In fact, the above measures resemble respectively turnover, turnover growth, market share and net income concepts typical of private enterprises.

However, various authors find such analogies misleading. As Krugman (1999) recalls, international competitiveness cannot be regarded as coincident with the concept of large trade balance (or with rising or high shares of world exports) because many poor countries are in exactly that position and yet still do not experience the rising living standards that countries with chronic imbalances have experienced (such as Italy in the 1980s, and the USA in the 1990s).

A more radical critique of this concept is however one that exposes the essential logical flaw of the transposition: to assume that the higher the exports/ the lower the imports and the better off is a given country overlooks the fundamental value that trade can generate through the acquisition of goods and services from other locations which are able to leverage comparative advantages.

Country competitiveness cannot, then, be identified with GDP or other measurements of "bottom line" economic performance because it must be a component of it. Additionally it cannot be equated with exports because they are influenced by factors other than "ability to compete" and large advantages in trade are not necessarily associated to higher living standards. These arguments leave us with the third notion mentioned above.

Thus, we have to look to another strand of indicators and economic phenomena, and more specifically to two characteristics:

a) the increase (or the level) of "productivity" as one of the two legs (the other being employment rate) whose multiplication gives the per capita GDP: this is relevant in assessing the ability of the firms located in a certain area to command higher return for their products or to produce such goods and services in a more efficient way;
b) the presence or "increase" of some endowment factors which make productive firms more likely to stay in a certain area where productivity has increased. Therefore "regional competitiveness" is a measure of the ability of a region to host a sufficiently high number of "competitive" firms (measurable with enough precision by "productivity") and to maintain

them in the area (due to the presence of certain factors which make easier to persuade actors with a high productivity to localise or maintain their production in that region).

This same line of reasoning is followed by Porter. For instance, in *The Competitive Advantage of Nations*, (1990) he suggested that the "correct" question for investigation of "regional competitiveness" should then be re-phrased as follows: "why does a region become the home-base for successful competitors in a given industry?" This question may in fact be viewed, according to Porter, as even more apt when posed at regional level because industry agglomeration tends to be concentrated in sub-national areas and is increasingly influenced by regional economic and development policies rather than national ones.

Regarding measurement of how regional endowments affect competitiveness and the identification of factors which make one region more or less likely to attract or maintain competitive industries, an important source is the already mentioned Sapir report (An Agenda for a Growing Europe, July 2003). The report emphasises the importance of the so called "intangible assets" that a Region possesses and underlines that higher education is crucial to growth. A study conducted across 80 countries and run for data series covering the 1960 – 2000 period shows that for both total factor productivity and labour productivity the influence of skilled labour is positive and statistically significant (Aghion et al., 2003).

Another relevant factor and indicator Sapir draws attention to is the pace of patents registration. This in Sapir's view is in turn impacted by a number of factors:

- R&D expenditure and manpower
- regulations concerning intellectual property protection (which has to strike a balance between the interest of knowledge diffusion and innovation reward);
- composition of the R&D expenditure between public, universities and private.

These criteria generate indicators and composite indexes that are used to measure how competitive a certain area is.

2.5 RESEARCH TOOLS AND RESOURCES

As mentioned, the data of the research will mostly come from the desk analysis – whereas on this basis we will mostly measure the “results” as for chart 2.1 – and from the fieldwork – upon which we will develop most of our investigation on the presence of the features that according to our thesis explain success or failure.

2.5.1 Desk analysis and research resources

The research has been conducted with the objective to verify the presence of the conditions that for our theory – described in section 2.2.2 on the “innovation value chain” - are supposed to be present in the successful case (and therefore absent in the less efficient region). The test of the hypothesis have been made by analyzing secondary and primary data that allowed to cross check the findings. Secondary data include the programming documents of the OB1 programmes to be implemented in the regions, their regional innovation strategies, the annual reports that tracked the results, the independent evaluations that the regions commissioned to consulting firms and research institutes, the European, national and regional statistics, the region and country specific literature (details are accessible in the annex 1), the economic reports produced by the selected regions and countries and by the European commission.

2.5.2 The fieldwork: interview guides, selection of interviewees and interview methods

Primary data are mostly interviews conducted with individuals belonging to the four below described categories:

1. elected officials and civil servants at national and regional governments as well as regional development agencies;
2. entrepreneurs and managers of firms;
3. rectors and academics of universities hosted by the region;
4. representatives of NGOS and opinion makers.

For each of them a specific interview guide (see annex 4 for the guides) was drafted and sent to the interviewee before hand.

As far as firms, universities and NGOS the interview guide is articulated so that we first identify the category to which the interviewee belongs, secondly the quantity and typology of aid that she got and thirdly the likely effect of it.
The meeting with programme managers and policy makers were mostly meant to unveil objectives and lay out of decision making processes.
Primary and secondary data were continuously cross checked in order to spot inconsistencies and should these arise, further meetings and interactions through remote means (emails, conference calls) were used to clarify.
Both recipients and not recipients of funds were consulted so that they could be compared in order to assess reliability.
The names of the individuals and organisations that were interviewed and the interview guides are in the annex 3 and 4.[47].

CONCLUSIONS

What is innovation? And what do we mean by economic performance or, even, convergence? The misunderstandings of both we mean by investments into knowledge and by the objective of these programmes could hide a number of reasons why numbers may not yield the results that one would have expected.
The definition of the independent variable that we are considering are many and even the official definition of institutions like the European Union leaves room for misinterpretation. In the reality of programming activities by innovation some of the regions we studied (like Wales) meant not only R&D, but also incremental change and realignment of firms towards some pre established standards of quality. These not innovative projects are normally financed by research dedicated measures and this dilutes the investments made in research and it is one of the reason why the net final effect is not as large as we would have expected. And yet it is perfectly reasonable that on the contrary the R&D definition does not capture innovations that are of the type that we are considering: radical, capable to potentially produce competitive advantage (and *smart specialization* – for instance McCann and Argiles, 2011, but also OECD (2010) - which is a concept that we will elaborate later with examples from the field work).
The concept of economic growth as the dependent variable of the equation we are studying is not less tricky for reasons regarding the indicators, but also for the dynamics of a strategy meant to increase

[47] All interviews were noted. Part of them were taped (but for the cases where the interviewee preferred not to).

the knowledge assests of a region. Innovation is about to promote change, and, thus, to make room for newer, more efficient business and research systems to replace older ones. Innovation can, therefore, have in the short term some not net positive results.

The research strategy to consider innovation what appears to coincide with a competitive advantage and to observe the results in long enough time periods, should mitigate the two above problems.

The main hypothesis to be tested is that higher effectiveness of public R&D programs tends to be associated to strategies whose higher efficiency can be measured along the phases of an implementation process that we called "innovation vale chain".

Better performance is expected to be associated to higher capability of these expenditures to multiply themselves into business investments. In order to achieve such a result public resources need to be concentrated in terms of industry, research domain, geographical areas, and beneficiaries so that critical mass is achieved. The research will also try to understand what lies behind more focused choices. The idea is that innovation strategies depend on clearer allocation of responsibilities and higher independence from politics of programmes' management, but also on the development of a number of working interactions between government, finance, business, universities and civil society alongside explicit strategies that can facilitate the creation and growth of these partnerships.

The selection of the regions is deployed with the objective to maximize the potential of the outcomes to be extended to other situations by selecting areas that were similar at the beginning of the programmes, were exposed to similar national policies and that yet displayed very different results. The size of the financial aid package also similarly appeared to be enough to make of the structural funds the most important if not the only lever for generating economic growth.

This reduces the importance of alternative explanations – both in terms of policies and shocks other than structural funds, and of differences in pre existing conditions and in terms of economic or social endowments - to convergence.

UK and Spain as countries were, thus, selected and within them respectively the couples South Yorkshire – West Wales and Castilla Y Leon – Murcia were chosen, so that the above criteria could be satisfied. Countries and regions seem to be an ideal setting for the analysis to be carried out for reasons that we will elaborate further in the next chapter.

CHAPTER THREE - REGIONAL POLICIES AND PUBLIC INVESTMENT PROGRAMMES IN RESEARCH IN UK AND SPAIN

The cases were selected, as we detailed in the previous chapter, so that they could display – at the beginning of the programming cycle - similar economic structure, and similar endowments of assets like human capital, accessibility to core markets and propensity to invest in research: moreover structural funds programmes appeared to have similar and rather significant potential to impact economic growth and accumulation of expenditures in research in all four regions. And yet performances in terms of convergence and capability of public investments to attract private capital resulted very different at the end of the period we are observing: this maximizes the potential of an analysis like ours which is focused on the difference in performances that is due to organisation choices and quality of partnerships amongst firms, academia, governments and public opinions.
This chapter allows –through secondary data and information collected in the fieldwork - for a further contextualization of the research within the political and economic situation of the two countries that we are going to investigate, as a well for an analysis of the similarities and the differences amongst the selected regions that provides the ground upon which the empirical work of chapter four and five is based.

In fact, Spain and the UK are also interesting due to a number of additional features.
First, in both countries the regionalization process has been parallel to the structural funds implementation periods, whereas in the other large EU countries regionalization preceded the structural funds programming cycles. This difference will provide the research with an interesting viewpoint from which to evaluate how the institutional setting becomes an explaining factor with regard to structural funds concrete functioning. However, vice versa, we will also see how the institutions and their concrete functioning are influenced by the requirement to spend the EU money and get the best possible results from it (Bache and Jones, 2009; Burch and Gomez, 2002). This will be confirmed and articulated by the interviews on the field with decision makers at regional and central level.

Secondly, they are both accelerating their investments in R&D. Both have been concentrating a higher share of these investments in less developed regions and have increased the priority attached to investigating the question of what can make investments in R&D more or less effective (Howells, 1997; Konstadakpoulos, 2000).
The recent evaluation of the Lisbon strategy (EC, 2010) says that Spain has been one of the country that has accelerated R&D expenditures the most and that UK is one of those that, more intensely, employed expenditures in research as a tool of regional development.

The above points are, in fact, reflected in a literature on regional development and innovation policies (for a literature review on the debates we will refer, amongst others, to Konstadakpoulos, 2000, and Cooke et al., 2011 and 2003) that is certainly larger than the one that we can find as far as France and Germany[48] are concerned.
The chapter is thus articulated as follows. The first section reconstructs how structural funds implementation processes have promoted changes in the institutional layout and, vice versa, how the organisation of the programming cycles appears to have been impacted by the existing institutional frameworks in the two countries. The second section shows how regional innovation strategies have expanded and changed their scope in UK and Spain and addresses debate in the two countries on innovation as a lever of economic growth. In the third section we will show which main paths towards research seem to emerge for different groups of regions in the two countries. Finally, the fourth section presents in greater detail the two pairs of regions selected, explaining why they pose a puzzle in terms of differences in patterns of economic and research assets development notwithstanding the similarities that will be identified by comparing them against their peers in UK and Spain. These elements provide the framework for empirical testing of our hypotheses and of our framework of the "innovation value chain".

3.1 THE RELATIONSHIP BETWEEN REGIONALIZATION AND STRUCTURAL FUNDS

The implications of EU cohesion policies on regionalization have been debated since the beginning of the 1990s. The milestone is seen to be the establishment of the so called "partnership principle" with the structural funds regulations of 1988, where partnerships are defined as "close consultation

[48] As far as Italy is concerned, a broad literature exists although the focus is mostly on sub regional, local level of districts which display a strong specialization (see Capello, 1997, Camagni, 1991 and Porter, 1990 amongts others).

between the Commission, the member states .. and the competent authorities designated ..at national, regional local level.. with each party acting as a partner in pursuit of a common goal (Bache and Jones, 2009 and EC, 88).

The partnership principle meant that (as noticed by Nanetti, 2007, Nanetti et al, 2004) regional policy became for the first time not just a policy *for* the regions but also *by* the regions. According to a number of studies (amongst which Marks and al, 1996, Hooghe, 1996, Bache, 2010) the effects of the introduction of the principle, however, appear to have been neither linear nor immediate.

In fact, Hooge produced in 1996 a Europe-wide study trying to assess whether European cohesion policies had pushed regions towards a more central role in managing economic development strategies in any uniform way. The results were rather differentiated amongst countries: in some, like the UK, the government maintained a role of gatekeeper, whereas in others, like Spain, even direct negotiations between the regional administrations and the EC had been established.

The differences amongst countries were, according to Bache and Jones, 2000, due to four factors. First, of course, very different institutional settings prevailed in different countries going from very decentralized situations (like in Germany) to others where regions were de facto created to satisfy a requirement of structural funds regulations (like more recently happened in new member states). However, even beyond institutions concrete technical capabilities and capacities to maintain and develop relationships with the EC, also, made a difference with some regions being formally empowered and yet informally delegating the representation of their interest to central governments. Political trends also changed the patterns: in the UK the election of the Labour government in 1997 signalled an acceleration towards devolution and decentralization, and similarly in Spain narrow majorities made the support of nationalist parties from Catalonia and Basque Countries essential to the governing party and, thus, triggered a shift of the structural funds budget towards regions. Relevant, thirdly, was the different weight of structural funds on the public investments into a certain region or country: we, then, would expect cohesion policies' decision making lay outs being more important in Spain than in UK and more to CYL than to the administration of the Community of Madrid, due to the different share of structural funds on total public investments available to development policies.

As mentioned, however, the British and Spanish cases were those most extensively investigated. One main difference between the UK and Spain and the rest of the largest EU15 countries is that regions and regionalism were born in the UK and Spain in parallel with the programming periods of the cohesion policies, whereas in Italy, France and Germany regions came to existence before the start of the structural funds spending (in 1984) and its first significant reform in 1988[49].

In the UK and Spain, some of the most important milestones of regionalization, such as the autonomy agreements in 1992 in Spain and the introduction of the integrated regional "government offices" in 1994, were rather more recent than the above mentioned developments in France, Germany and Italy.

Anther commonality is that both in the UK and Spain regionalization proceeded asymmetrically between a group of more autonomous regions (Scotland, Wales and Northern Ireland in the UK and Catalonia, the Basque Country, and Andalusia in Spain) and the rest. This distinction was clearly recognized in 1978 in Spain with the constitution and in 1999 in UK with elections for both the Scottish Parliament and Welsh Assembly that had important and yet somehow unexpected consequences on structural funds as our interviews found[50]. In France and Germany, regionalization proceeded with less differentiation between regions whereas Italy similarly distinguishes two different degrees of regional autonomy.

In addition, the relationship between structural funds and the evolution of the general institutional setting can be seen to be one of mutual influence (Bache and Jones, 2000). On one hand, the institutional setting, until the end of the 1990s, was very centralized, hindering any substantial application of subsidiarity and partnership principles. Bache (2010) find, for instance, that central government not only acted as a gatekeeper, but also chaired all the committees through which the structural funds programmes were implemented and selected the partners. In the UK, however, it was once again skills and motivation that were, sometimes, able to create exceptions to this layout. Scotland pioneered, for instance, the use of an "independent" secretariat which, though nominated by the central government, had a strong technical profile.

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[49] In fact, in France, regions drawn to current boundaries were recognized in the Constitution of the Fourth Republic in 1946 although they were identified already in the Vichy years. In West Germany, the much more powerful Länder, first recognized in 1870 at the birth of the modern German state, were acknowledged by the Allies before becoming part of the new state under the constitution of 1949. In Italy, the regional form of the State was established in the Constitution of 1946, although the regions were formally established only in 1970. Even if all these developments towards regionalization were encouraged by the parallel process of the progressive creation of European institutions, there was evidently no practical linkage between them and any issue of the management of European regional funds.

[50] Interview with Professor Phil Cooke, Director, Centre for Advanced Studies, Cardiff School of City and Regional Planning
Cardiff University, 14th May 2008

The Scottish secretariat was, in a sense, the anticipation of the independent Programme Directorate that, as we will see in Chapter Four, was one of the success factors of the OB 1 Programme in SY during the 2000 – 2006 period. More broadly, in 2000 – 2006, the overall institutional setting became more regionalized: in the UK structural funds are, in fact, understood to be one of the main reasons for the recent acceleration in regionalization (Burch and Gomez, 2002).

It is remarkable that Yorkshire and Humber and Wales were, just before the start of the last programming period, considered as demonstrating worst practices as regards decentralization of decision making: in both cases, relationships between the main implementation bodies (the government office of Yorkshire and Humber - GOYH - and WDA) and other local partners were seen as largely unsatisfactory. However, as Bache and Jones, 2000, remind us, and as we will see in Chapter Four, it is not necessarily a case of "the more partnerships the better". The involvement of local communities in the drafting and implementation of the strategies and, more specifically, of local councillors, was admitted by some of our interviewees as detrimental to effectiveness when these local authorities lacked the skills required by the program impllmentation processes[51].

The Spanish case was different both in terms of the significantly more regionalized institutional layout, and the much greater weight of structural funds within the Spanish economy: Spain has been the largest recipient of CF since the start of the policy. However, even in Spain the *effective* empowerment of regions has deviated from what we would have expected looking just at the formal legal provisions[52].

Before 1988, the choice of eligible regions and negotiation of regional plans were undertaken by the national governments with the EC (Lazaro, 1986). In the 1988 – 1993 period, although nine OB1 regional Community Support Frameworks (CSF) were established, the overall amount allocated to each of them was decided by the government and the EC, excluding regions (Morata and Munoz - 1996). Even in the 1994 – 1999 period, the overall amount of structural funds being directly managed by the regions did not increase (around 34% according to Conejos I Sancho, 1993).

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51 Interview with Gill Browning, Strategy Manager, Yorkshire Forward, Leeds, 20th March 2007

52 Interview with Aurelio Jiménez Romero, Independent Evaluator Murcia OB 1 Programme 2000 – 2006, Red2Red Consultores S.L., Madrid, 14th, April 2008

As in the UK case, as we were said during the fieldwork, it was a strong leadership of some but not all regions and, specifically, leadership substantiated in skills, relationships with the EC and motivation to acquire a higher role that made the differences in the effective level of each region's autonomy[53]. In fact, the degree of autonomy exercise was not the same, with Catalonia and the Basque countries being highly critical of attempts by the national government to preserve control of the expenditure (as for the official documents of the debates at the Congress, 1993, 1995 mentioned by the Ministry of Economy, 1995) and successful achieving greater room to establish their own priorities.

The 2000-2006 period witnessed a further shift towards greater regional responsibility as we were said during the fieldwork at the Ministry of Economy in Madrid[54]. Still, as we will describe in Chapter Four, decentralization has produced differentiated outcomes especially for those policies, such as R & D, requiring skills and international relationships.

3.2 THE EVOLUTION IN REGIONAL INNOVATION POLICIES

If the criteria for claiming the existence of a regional innovation strategy include a specific policy and of government structures to support it (Konstadakopoulos, 2000; Capello, 1997; Camagni, 1991) then regional innovation strategies are a relatively novel concept, and came to existence much after the birth of the European Community: in Italy in the late 1970s, in France and Spain in the late 1980s.

The UK became one of the most fertile terrain for differentiated approaches to regional innovation much later, in the 1990s with Wales being – unlike most recent periods - the most prominent case, and in the last decade with the devolution and the creation of regional development agencies.

In the UK, in fact, although the Thatcher government launched the ambitious so-called "enterprise politics", the innovation strategies almost coincided with the attraction of FDI. More sophisticated

53 Interview with Harvey Armstrong, Professor of Economic Geography at Sheffield University, Sheffield, 18th June 2008

54 Interview with Jose Luis Kaiser Moreiras, Subdirector General de Programación Territorial y Evaluación de Programas Comunitarios, Ministerio de Economía y Hacienda, Madrid, 21st April 2008

strategies meant to increase the transfer of technologies to indigenous firms were neglected until the mid-1980s (Howells, 1997). The result is that small firms in areas heavily impacted by FDI (which were sometimes driven by big government contracts, such as the defence contract that spurred the development of the aerospace industry along the M4 corridor in the South West Region and which for some time drew parallels with Silicon Valley) appeared to have no or very little internal R&D capacity (Konstadakpoulos, 2000).

The most recent trends since the creation of regional development agencies (RDAs) have almost reversed this pattern. As Mikel Landabaso of the DG Regio at the European Commission told us during the interviews[55], the drafting of regional innovation strategies has become one of the most important objectives of the RDAs, the budgets dedicated to innovation have been increased and, alongside the RDAs, a proliferation of actors engaged with promoting and realizing innovation has taken place. Paradoxically, recent surveys of the Confederation of British Industry (CBI, 1997) have shown that the public or quasi public bodies engaged in supporting small firms appeared to their very "clients" (the small and medium entrepreneurs) as too many in number and not well coordinated: this consideration will emerge in a particularly concrete way when we describe the case of Wales later on.

The relationship between economic growth and, more specifically, regional inequalities and knowledge in UK has been, in fact, treated with a wider scope of the analysis by a number of authors. Amongst others, Duranton and Monastiriotis found (2002) that although the premium that different UK regional economies can afford to give to education is becoming similar, the increasing return that labour markets recognize to knowledge and a different composition of the workforce (with more educated people moving towards the centre) has produced an increase in the gap amongst regions in average regional earning with both Yorkshire and Wales lagging the others. Similar considerations were being heard during the field work of this research by the professors and rectors of the universities of both regions that we analysed in Spain: knowledge is, in fact, transferred – in a way that the endogenous growth theory only partially envisages – with a brain drain from the periphery to the centre of the country.
Within this context, regional innovation strategies can be understood – this was very much the case of some of the programme managers we heard in Murcia – as a programme whose main objective is to improve the number of knowledge workers that decide to stay and their percentage on the workforce.

[55] Interview with Mikel Landabaso, DG Regio, European Commission, Bruxelles, 27th May 2010

Spain also saw regional innovation strategies unfold only at the end of the 1980s, with the regions representing the core of research and innovation activities (Catalonia, Madrid, Valencia and the Basque country) developing their first innovation plans at this time. It is interesting to remark that one of the typical features of Spanish regional innovation strategies has been fragmentation and, more specifically, the separation of innovation policies between ministries, with resulting conflicts between research, industry and economy competences (Konstadakpoulos, 2000): this, as we will see in the empirical chapters, has also been the case of Murcia for the programming period that we are studying. A further consequence was polarization of investments, with the expenditures managed by research ministries concentrating in basic research, and those by industry ministries in restructuring firms and new production processes (Buesa, 1996, Heijis, 1997) – a model we will see as prevailing in Murcia and being overcome by the experiences of technology parks in other more advanced regions in Spain.

Technology parks have, in fact, been one of the most important features of the approach of Spanish regional innovation strategies with an early significant success in Barcelona (the Valles Technology Park) and shortly after the Boecillo Park in CYL, whose far reaching impacts will be described in Chapter Five.

Both the UK and Spain are following similar patterns as regards evolution of their R&D expenditures: they both demonstrate a below average propensity to spend in research; both are catching up; in both countries, the R&D expenditures result to be geographically concentrated and in both there has been a recent acknowledgment of the importance of investments in research as a tool for regional development. Lastly, the two countries host a significant share of the most prestigious European universities and of the most innovative multinationals.

In the UK, the propensity to invest in R&D is slightly lower than EU average (1,76% as R&D over GDP average in the 2000 – 2006 period that we are going to consider versus 1,92 at EU 15 level), although the UK seems to have been catching up in recent years (in the same period the yearly compound growth rate of R&D expenditures was 4,6% in the UK versus 3,63% in the EU) in a context of economic performance that has been strong relative to other EU countries (at least until the recent crisis which is beyond the time horizon of this research).

Spain's recent past has been characterized by convergence towards EU averages across all the main economic indicators (GDP per capita, employment rate and propensity to invest in R&D) although differences with Union averages are still large as far as percentage of GDP spent on R&D (1,12% versus 1,9% in 2005).

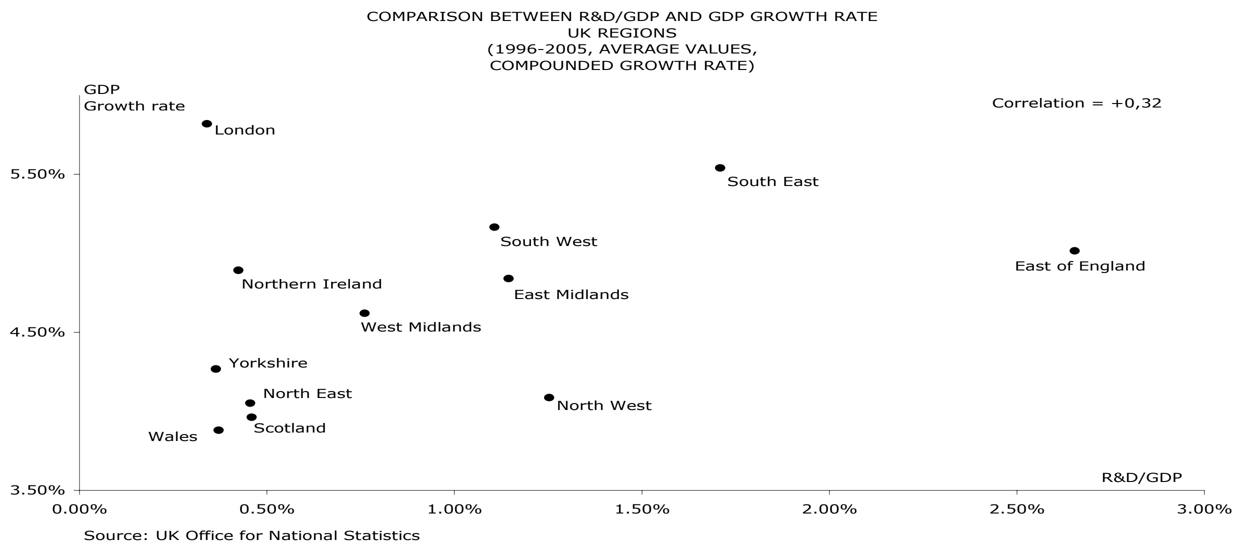
The other trend that emerges in both countries is that public investments in R&D are displaying a redistributive effect, with expenditures growing more in regions that used to spend less, albeit the gaps are still very large. Such redistributive effects are mostly due to structural funds-driven public investments.

3.3 THE STATISTICAL EVIDENCE

This section will, now, reiterate for each of the two selected countries the analysis that was performed at European level in graphs 1.3 and 1.4, after having surveyed the main literature on the effectiveness of public investments in research as a tool for economic development of less advanced regions. The question is, therefore, do the expectations of a strong association between economic growth and R&D expenditures hold true for the British and Spanish regions?

As regards the comparison between regions within UK, we have measured how strongly differences in terms of size of R&D expenditures are associated with differences in economic growth over a 10 year period (1996 – 2005) that includes the time frame we are investigating.

Graph 3.1 – Comparison between R&D/GDP and DGP growth rate UK regions (1996-2005, average values, compounded growth rate)



The differences between propensity to invest in R&D are large: the Region East of England invests more than 2,5% of GDP in R&D and South East almost 2,0%. Scotland, North East, Wales, Yorkshire, and Northern Ireland invest just over one half percentage point, which is very small by European standards and related benchmarks.

The main message is thus that correlation between R&D and economic growth appears to be positive enough. However, one remarkable exception is London, exhibiting a difference so large that it seems to cast a shadow over the entire theory of the importance of investing in research.

London is one of the most striking examples of a context where a very low level of R&D expenditures (less than 0,5% of the GDP is spent in R&D) does not prevent a city - region to display both the highest growth rate of GDP in UK and the highest absolute level of GDP per capita in Europe. In the case of London, low R&D investment does not even signal a low propensity towards innovation. Additionally, London is a region where it is most evident that the notion of R&D only captures a fraction of investments in innovation.

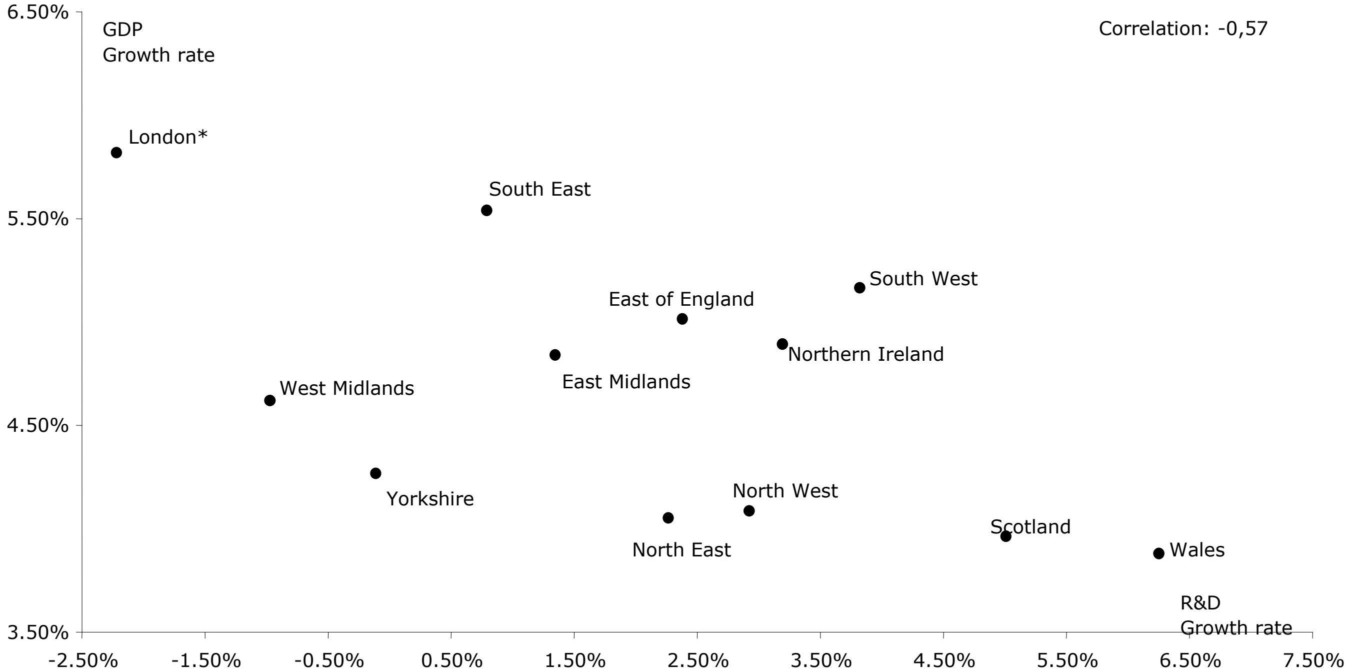
This is mostly due to London's industry structure: here, the financial and high end service sectors have a greater weight than in any other UK or European region. Financial and service firms do not account for significant R&D expenditure, in the sense that although they may be heavy spenders in innovation, these expenditures do not qualify as within definitions of R&D applied for statistical purposes (as already elaborated in Section 2.1). Thus, economic growth may still be strongly explained by a typology of innovation which is beyond the domain of strictly defined Research & Development (OECD, Frascati Manual, 1963 and 2002).

If we take, then, London, evidently an outlier, out of the group of UK regions, the correlation between GDP growth rate and the ratio between GDP and R&D becomes very high (+0,76) and sounds as a confirmation that the expectations of the endogenous growth theory hold rather well in the UK, with the exception of London: the more a region invests in R&D, the higher is its overall economic performance.

As stated previously, however, this association cannot be considered a causal relationship: the correlation may even be simply a sign that richer regions have more money to spend in R&D and therefore the relationship is not such that R&D is a cause of higher economic growth but rather that the causality goes in the opposite direction, with faster increase of wealth explaining higher percentages of wealth spent in research (Perrin 2002).

This picture tends to be almost reversed if, instead of looking to the percentage of GDP invested in R&D, we look to R&D growth rates and their correlation with economic growth.

Graph 3.2 – Comparison between gerd and GDP growth rate UK regions (compounded growth rates 1996-2005)



Source: UK Office for National Statistics
* 1996-2004 data used for London.

Once again, the differences are large: in the West Midlands and South East the nominal growth rates of expenditure on R&D has been around zero. In Wales and Scotland R&D spend has grown at annual rates higher than 5%.

It is also interesting to note that regions with a higher propensity to invest in R&D have not increased their spending relative to GDP. The "laggards" are catching up (with the exception of West Midlands and London which, however, is, as we said before a rather peculiar case). The regions which have accelerated R&D investments, starting from low levels of R&D expenditures (Wales and Scotland) have failed to achieve superior patterns of economic growth.

The result of this analysis is the mirror image of the one observed previously: the correlation between growth rates of R&D and growth rates of GDP is negative (-0,57); whereas the one between the absolute level of R&D spending and GDP growth rates was highly positive (+0,76 if, as said, we remove London as an outlier).
How can the apparent contradiction between the two results be explained? The finding that these numbers suggest is that R&D expenditure is, by and large, and with the exception of London, critical to achieving superior economic performance. However, a situation of disadvantage, in terms of lower growth associated with low investments in knowledge, cannot easily be overcome.

One of the explanations for the relatively low response, in terms of economic growth, in UK regions to accelerating R&D expenditures is that investments in knowledge are effective only if they achieve a competitive advantage measured on a national, if not international, scale (Midelfart-Knarvik and Overman, 2002). Accordingly, we can assume that the relationship between the accumulation of R&D investments and economic growth is not linear, but exponential. The return of investments will be small, if not negative, at the beginning, and become gradually more positive as economies of scale and minimum critical mass are achieved by cumulatively investing for a long enough period of time (Krugman and Venables, 1995). This may well be the case in the UK, where the openness of the economy to global competition is particularly strong: nevertheless, this first hypothesis will need further confirmation within the field work conducted.

This puzzle, however, is the evidence upon which the first half of the empirical research will be developed. We, in fact, selected two regions that – as for section 2.3 – that display opposite patterns in terms of R&D assets accumulation and productivity: the one – WW - that is growing the most – amongst UK regions - on the former indicator is, also, the slowest on the latter, and the other – SY – is doing the opposite. This contradiction makes the comparison a good case to test our hypotheses as attempt to explain drastically different levels of efficiency between R&D programs.

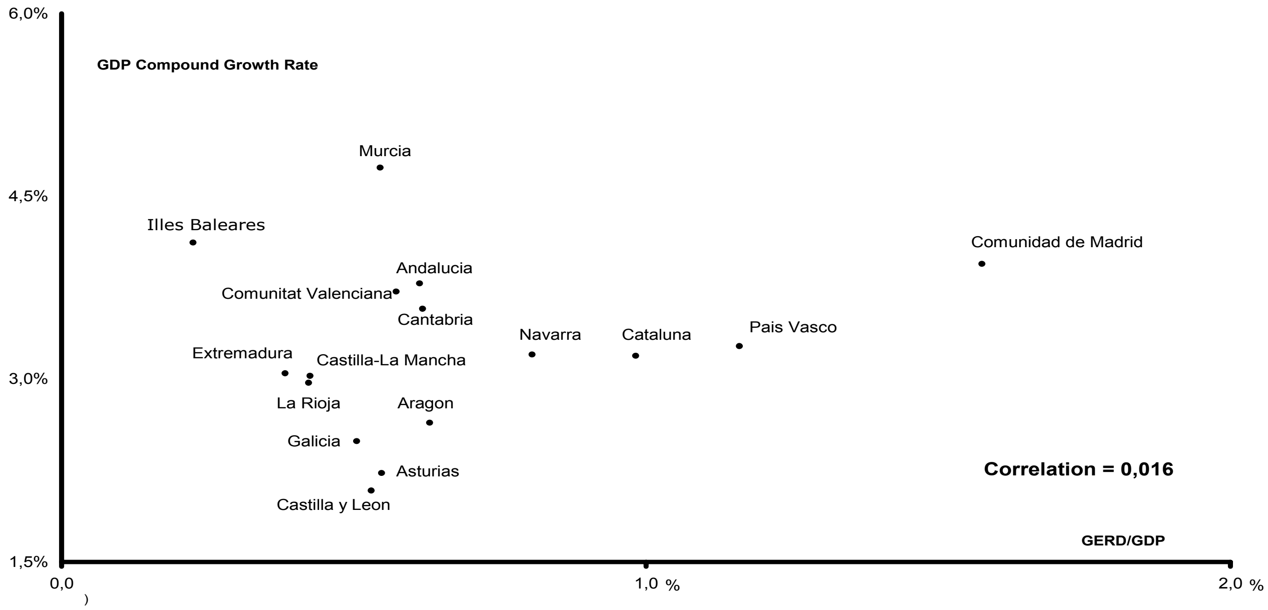
As regards Spain, it must be said that, first of all, Spain has been one of the few country that increased the percentage of GDP spent on R&D as for the Lisbon strategy objectives (from 0,8 to 1,4% between 2000 and 2008). The differences between regions in terms of the general picture certainly follow in line with a strong concentration of R&D expenditures: Serrano and Babrer (2004) remind us that more than half (55%) of R&D expenditure is concentrated in just two regions (Madrid and Catalonia) and the concentration of firms' expenditure on R&D is even higher.

Not less interesting is the study that has been conducted by Pilar Beneito (Beneito, 2002) with the support of a data set which was developed within a project (*Encuesta sobre Estrategias Empresiarales* , ESEE) conducted by the "Public Enterprise Foundation" on the relationship that firms have with research and innovation in different Spanish regions.

However, the more recent years have witnessed a contradiction between a) growth rates of R&D which are higher in less developed regions and thus point to a "catching up" process and b) gaps in productivity and, more specifically, in TFP (total factor productivity) differentials that have, in fact, increased (as in Serrano again but also Cuadraro–Roura – 1999 – and De La Fuente – 2002).

The following chart describes the situation as far as the comparison amongst regions.

Graph 3.3 – GDP and R&D expenditures growth rates, 1995 – 2004, Percentages

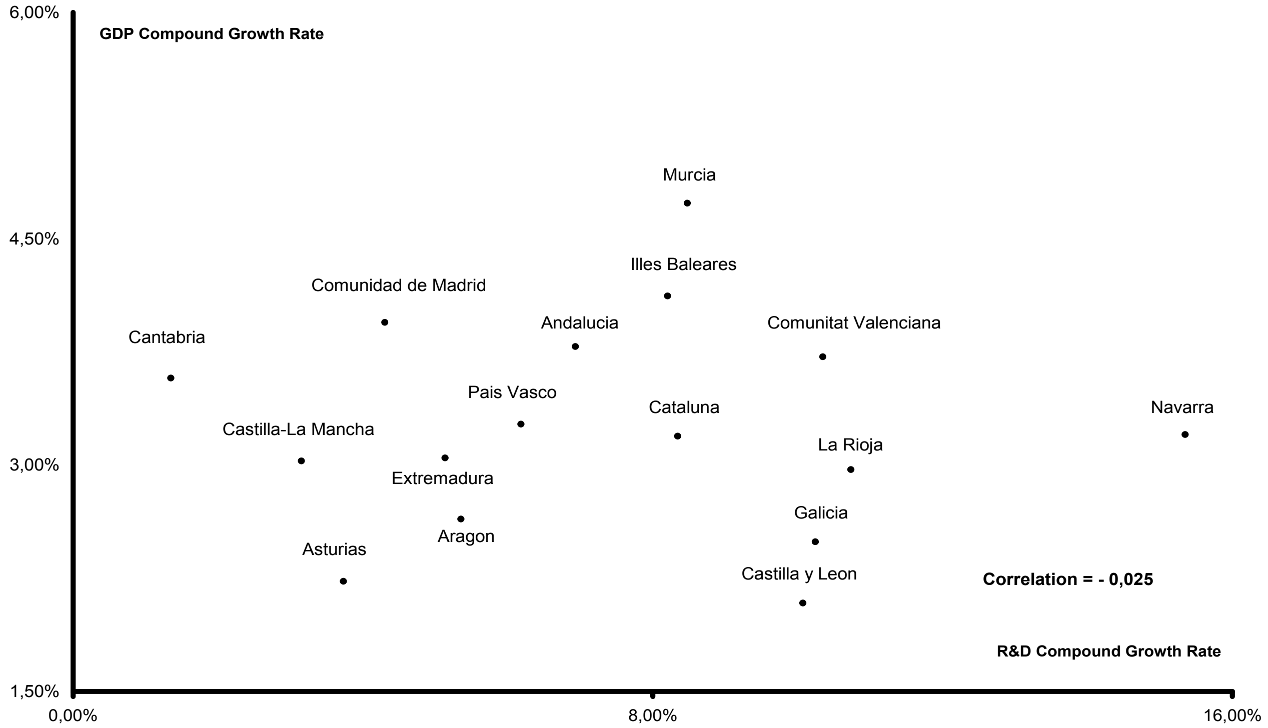


Source: Eurostat, INE; accessed May, 2008

The propensity to invest in R&D is, however, below 1% of GDP in all Spanish Regions except Madrid, Pais Vasco and Cataluna.
We will see later the above the average growth of Murcia (one of our two case) is wiped out once we discount it for the population growth and the below average growth of CYL (the other region we selected) corresponds, in fact, to an above average increase of productivity.

The correlation between propensity to invest in R&D and GDP growth rate is not significant, and the situation does not change when one considers the correlation between R&D and GDP growth rates in the following chart.

Graph 3.4 – GDP and R&D expenditures growth rates, 1995 – 2005, Percentages



Source: Eurostat, INE; accessed May, 2008

It is also interesting to notice that, like in the UK, the regions that are growing the most, are the ones that have the lowest starting level of expenditures in R&D (with the exception of Navarra) and this partially contradicts the results of other research on the difficulty to change attitudes towards innovation in the less advanced regions in Spain (see, for instance, Coronado et al, 2008).

The same trends are confirmed if we consider a larger measurement of expenditures in innovation[56]. The correlation of GDP growth rate to the level of innovation expenditure is moderately positive (0,13%), the one to the growth rates of this category of expenditures is moderately negative (-0,19%) and neither is statistically significant.

[56] This is a different typology of investments that is calculated by the Spanish Institute for Statistics (INE) on the basis of questionnaires collected by firms.

However, the picture changes if we disaggregate the data for the eight Objective 1 regions[57] as opposed to the seven regions that are considered developed[58].

Table 3.1 – Correlations between some main indicators of economic performance and research assets growth, percentages, 1995 - 2005

	all regions	*only ob 1*	*only not ob 1*
average growth rates r&d	49,31%	55,55%	42,18%
corr. gdp c.g.r. and r&d/ gdp	0,016	0,265	0,695
corr. r&d c.g.r. and r&d initial level	-0,309	-0,228	-0,118
corr. innovation c.g.r. and innovation initial level	-0,602	-0,911	-0,299

Source: Eurostat, INE; accessed October, 2009

The picture that emerges from this table directs us to evidence that will be relevant for analysis of the selected cases.

The growth rates of R&D are higher in less advanced regions than in more advanced regions; in fact, the correlation between initial level of expenditure on R&D and its growth rate are negative for Spain as a whole (-0,31) and this correlation becomes even greater (-0,6) if we consider the expenditure in innovation (as defined and measured by the Instituto National Estatistica – INE). This process of catching up is, in fact, mostly driven by the very structural funds that are displaying a rather strong redistribution effect.

However, the numbers become more interesting if we disaggregate the analysis by typology of regions: the tendency to increase faster R&D expenditures is confirmed even when we confront amongst them all structural funds aided Objective 1 regions, on one hand, and regions who were not. In other words it is plausible that even if we control for structural funds there is a tendency to close the gap amongst regions in terms of propensity to spend in research.
Innovation strategies do, then, appear to be perceived as crucial to development, although the country also appears to acknowledge that a redistribution of researches may imply a cost – as recognized

[57] In the 2000 – 2006 period, they were Galicia, Asturias, Castilla Y Leon, Castilla – La Mancha, Extremadura. Valencia, Andalucia, Murcia (not considering the islands).
[58] Aragaon, Cantabria, Pais Vasco, Navarra, La Rioja, Comunidad de Madrid, Cataluna: these were assigned the funds under Objective 3 for more developed regions.

during the meetings in Madrid[59] - in the overall efficiency of the country's R&D public investments (as per the argument of Midelfart-Knarvik and Overman, 2002 and Krugman and Venables, 1995, amongst others).

The four regions that we are, more specifically, analyzing confirm, however, that they represent two polarized situations. First, in the UK, we will investigate the region that displays the slowest growth in R&D and the highest capability to converge, with one demonstrating the opposite characteristics. Thus, assuming that investments in research are still one of the best explanations (as per endogenous growth theory) of above-average economic growth, we will be comparing the most efficient region with the least efficient. Second, in the Spanish case, we will contrast two regions which, against a similar injection of public investment in research show respectively the highest and lowest capability to multiply public expenditures by attracting additional private funds related to the policy.

Accordingly, we should expect a comparison between a situation that ought to provide insights into differences in terms of institutional capabilities and another that ought to suggest how, more specifically, the administrations of less advanced regions attempt to overcome the problem of minimum scale that investments in research pose.

3.4 THE PRE EXISTING CONDITIONS OF THE SELECTED REGIONS

For each of the two countries, the main similarities and differences between the two regions will be described, in terms firstly, of institutional setting and organisation of the development and innovation policies before the start of the last programming period; and secondly, the main macroeconomic data, economic structure and research base before the programming period as well as demography and historical legacy.

[59] Interiew with Jose Luis Kaiser Moreiras, Subdirector General de Programación Territorial y Evaluación de Programas Comunitarios, Ministerio de Economía y Hacienda, Madrid, 21st April 2008

3.4.1 South Yorkshire and West Wales: similar economic characteristics within diverging institutional profiles

In the UK the two selected regions were SY and WW. In this work we will also refer to the wider regions to which they belong: Yorkshire & Humber and Wales. As it will be elaborated shortly, SY and WW do not fit into the common definition of regions: they are statistically recognized as such by EUROSTAT (in Eurostat terminology so called “Nuts 2”), however, they do not correspond to any administrative or policy unit. WW and SY were, at least partially, created with the specific purpose of making a sizeable allocation of structural funds possible and manageable.

WW and SY correspond, thus, to the sum of a number (fifteen for WW and four for SY) of local communities (in SY they are called boroughs). WW accounts for 63% of Wales’ total population. However the area is mostly rural: Rhondda Cynon Taff (232,000 people) and Swansea (226,000) are the largest cities. SY, by contrast, has a smaller share (25%) of the total population of the Region to which it belongs, but it is formed by communities that tend to be larger than those of WW: Sheffield has 531,000 inhabitants and the other three (Doncaster, Bransley and Rotherham) host more than 200,000 people amongst them.

Regionalization and devolution

The institutional setting is an important pre existing condition as regards the decision making processes that are applied to regional development policies. The UK’s political and administrative framework incorporates two diverse models: England, which represents a large share of the UK (84% of total GDP and 80% of population), is internally centralized with a level of delegation significantly lower than in states of comparable size like Spain, Italy, Germany or France. On the contrary, Wales, Scotland and Northern Ireland demonstrate high levels of political autonomy which are even larger than those enjoyed by most autonomous regions in the above mentioned larger European Member States.

The two cases under consideration are therefore different and yet, surprisingly, as we will see, they do not exhibit great differences in terms of degrees of autonomy in Research & Development and competitiveness related choices, although they do show different degrees of politicization of structural funds choices (as already hinted by Cooke and Clifton, 2005).

In order to understand the nature of the institutional framework affecting the two regions, we need briefly to consider the processes by which they were established. Regional autonomy in the UK has been an important issue for some time, with strong cultural and political feelings surrounding the transfer of power from London to Scotland, Wales and Northern Ireland; on the other hand, regional devolution has not yet become a politically strong trend in England[60]. As a result, with the exception of London, assemblies in England are not directly elected by the people, rather representatives to regional assemblies are nominated by the councils within each region. In addition, 30% of members represent regional stakeholders. The nine English regions have limited competences[61] even if they are rather important in training activities related to and management of European Funds. Yorkshire & Humber is one of the nine English regions created within this framework.

During 1997 and 1998, referenda were held in Scotland, Wales and Northern Ireland on how those countries and regions should be governed. In Wales the results fell far short of indicating a firm popular commitment towards autonomy: at the referendum held on 18 September 1997, 50.3 per cent voted in favour of a Welsh Assembly with a turnout of 50 per cent. As a result, elections for a new National Assembly for Wales were held on 6 May 1999 and devolved powers were formally transferred from the UK Government to the devolved administration on 1 July 1999. Low support for devolution and the under overwhelming turnout are important, however, in explaining some of the differences between outcomes of devolution in Wales and Scotland which, in turn, seem to have impacted on the effectiveness of the management of development policies in the two contexts.

The Government of Wales Act provides that the National Assembly of Wales, located in Cardiff, assume almost all the power previously vested in the Secretary of State, including those relating to

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[60] The creation of the regional governments in England is due to the Major government that created ten Regional government offices in London, South East, South West, North East, North West, East Midlands, West Midlands, Yorkshire and the Humber, East, Merseyside. In 1998 Merseyside was merged with North West and since then the Regions and Regional Government Offices have been nine.
In 1998, regional assemblies were created in each English region. The powers of the assemblies are essentially devolved to them from Government departments or have been taken over from pre-existing regional bodies, such as regional planning conferences and regional employers' organisations. Each region has, as mentioned before, a Government Office and each of them has got a Regional Development Agency.
In fact referenda were planned to establish elected regional assemblies in some of the regions with the objective to legitimize further empowerment. The first referendum was held in London in 1998 and was successfully passed. The London Assembly and the Mayor of the Greater London Authority were created in 2000.
However after that the referendum in North East England on 4 November 2004 was rejected, plans to hold further referendums were cancelled.

[61] Since 1999, the nine regions have also become England's European Parliament constituencies and statistical NUTS level 1 regions for the prupose of the Eurostat statistics. In addition Regions have, as this research has witnessed, the responsibility to manage European Union Structural Funds funded programmes.

the Welsh language, water, arts and heritage, industry, education and training, economic development, social services, agriculture and fisheries, environment, housing, health, highways, local government, town and country planning, and tourism. The Assembly does not, however, have tax-varying powers In addition, the UK Government retains responsibility for non-devolved areas of overall economic policy, such as defence and the armed forces, foreign policy (including EU matters), the justice system and police. Research is not explicitly mentioned and it is in fact not straightforward to understand whether it is or it is not devolved. What is certainly not devolved is funding and the decision making mechanism through which funds are allocated by the Research Councils[62]. However, the way Scotland, Wales and Northern Ireland approach research and the drafting of their innovation strategies is such that it is considered *de facto* a policy where regional decisions matter because the impact on regions themselves can be decisive[63].

As we will see in greater detail, one paradoxical consequence of devolution in Wales has been the progressive de-legitimization of technocratic bodies such as the WDA, which was central in the regional development strategy until 1999. The parallel politicization of the implementation processes of the development strategies partially explains the suboptimal allocation of resources dedicated to innovation; this contention will also be developed further in this research.

As mentioned previously, neither SY nor WW are politically-constituted Regions and both are products of the need to implement structural funds funded programmes. However, whereas SY is an administrative unit within a larger administrative body, WW is an administrative unit in a elected entity that is in principle more autonomous and important than a Region.

This scenario has two main consequences. The first is that whereas SY OB 1 Programme Directorate was on an equal institutional footing with Yorkshire regional government (they were both technical, non-political bodies), the WW management of OB 1 programme was hierarchically subordinate to the Welsh Government Assembly. Moreover, this lower level of independence, institutionally, of WW OB 1 programme was symbolized and accentuated by the circumstance that whereas the SY OB

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[62] There are seven of these councils and they are specialized by academic domain.
[63] It is worthwhile to mention the First Minister and Minister of Science, Rhordi Morgan's forward to *A Science Policy for Wales, 2006* "Our future lies in a knowledge economy, enriched by scientific, technological.. know how. Although science policy and funding is not devolved, a science policy tailored to Wales' needs will help to accelerate the development.., education system, health service, environment, agriculture and evidence – based government in general."

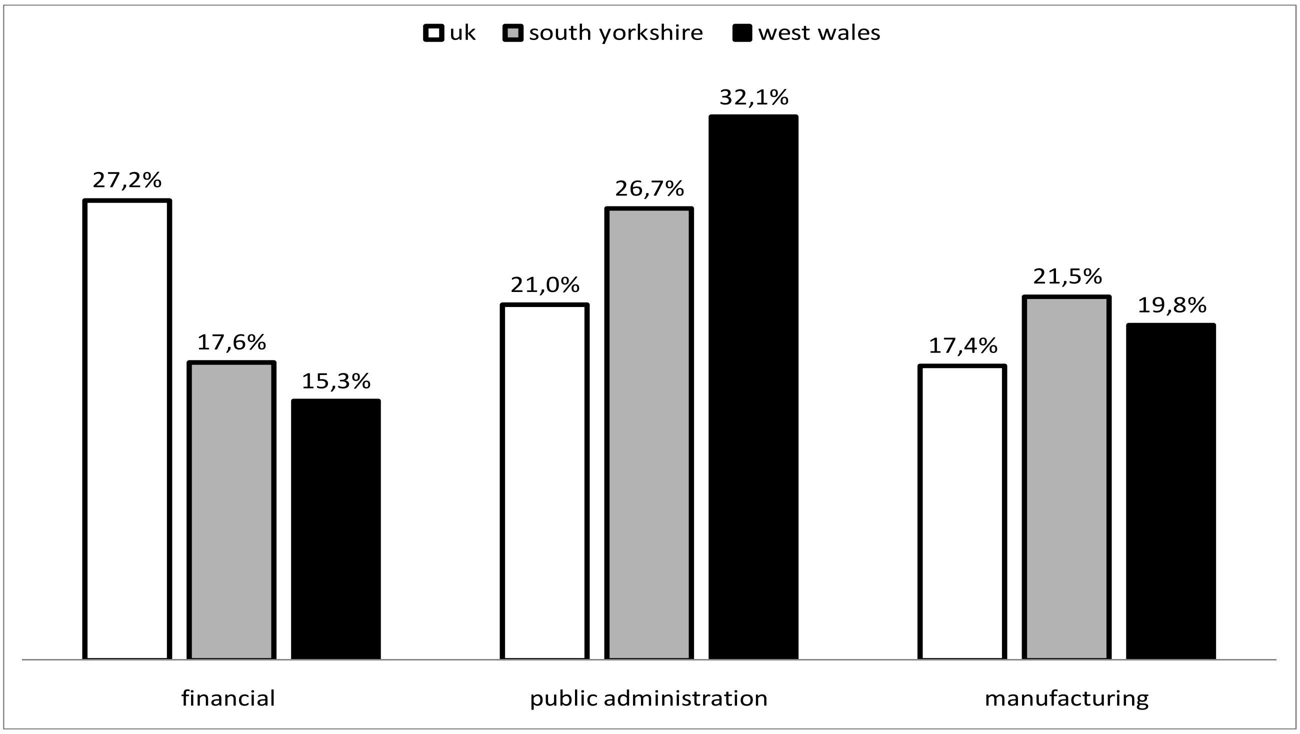
1 programme is managed in SY, and more precisely Sheffield, where the Programme Directorate has been based, in WW it was run in Cardiff, outside the beneficiary area[64].

The second effect is that, paradoxically, SY OB 1 programme decision makers appeared to be stronger vis a vis local communities than WW ones, because in the former case the decisions were made on a technical level by unelected administrators, whereas in the latter elected officials at regional level had to negotiate decisions with elected administrators with responsibilities local communities. Both of these factors appear to have contributed to the results described in Chapter Four.

The economic structure and research expenditure similarities and differences in terms of university systems' capabilities

In terms of economic structure, the two regions appear similar. The table below considers the distribution of GDP by the EUROSTAT Nace definition of sectors.

Graph 3.5 – Sector weight in terms of added value over GDP, 2000, %



Source: Eurostat; accessed October, 2009

[64] It must be said that more recently the operations of the WEFO have been moved to OB1 area. In fact WEFO for the 2007 – 2013 period has been decentralized to four locations in the convergence region: Carmarthen, Colwyn Bay, Machynlleth and Merthyr Tydfil. The opposite has happened in Yorkshire: the "competitiveness" programme for 2007 – 2013 will, as we will see shortly, be managed by Yorkshire Forward in Leeds, also because the interventions for South Yorkshire will be merged in the same programming document where there will be provisions for investments in the other parts of the Region.

The reconstruction of the most relevant deviations between the two sub-regions and the national average indicate that SY and WW share common traits that differentiate them from the rest of the country. In both sub-regions, the financial sector is much smaller than in the rest of the country. This is however accompanied by a more substantial public administration (being 10 percentage points larger than the national average in WW and five in SY), and a larger manufacturing sector. These differences increase if we consider the breakdown not of added value but of employment, with WW and SY having again a much stronger base in manufacturing by comparison with UK averages.

However, two opposing trends have prevailed in recent decades. In the 1990s Wales found a way (that we will describe shortly) to leverage on its traditions and save its manufacturing base by adding value to it. The contrary took place in the last decade and, more specifically, in the programming period that we are observing (as described in Chapter Four), where Yorkshire managed to move its traditional industry base to a high level of innovation and competitiveness, whereas Wales has struggled to further improve its competitiveness.

These trends are confirmed if we look at the evolution prevailing in the decade before the start of the last programming period.

Table 3.2 – UK regions Manufacturing employment, yearly growth rates, percentage of total, 1991 – 1998

Regions	Change % 1991 – 98	Percentage of total employment in manufacturing 1998	Average size of manufacturing firms (number of employees)
East Midlands	- 1,2%	21,5%	29,38
Eastern	- 2,6%	17,1%	23,30
London	- 2,2%	7,8%	17,36
North East	- 0,5%	21,1%	41,51
North West	- 1,9%	20,2%	30,71
South East	- 1,6%	13,9%	23,13
South West	- 0,7%	13,9%	26,70
West Midlands	- 2,3%	25,7%	32,27
Scotland	- 2,2%	15,4%	34,16
Yorkshire & Humber	- 1,7%	21,3%	30,08
South Yorkshire			32,11
Wales	+ 0,1%	21,7%	38,21
West Wales			42,49
UK	- 1,9%	17,4%	27,77

Source: ONS; accessed October, 2009

As the table indicates, Wales was **the only region where the number of people employed in manufacturing increased** in the period before the start of the 2000 – 2006 expenditures cycle and the region with the second highest employment in manufacturing as a proportion of the total. Wales and WW were also the areas in the UK where manufacturing firms tended to be largest. This legacy reflected the presence of large companies that could have been (as in SY and CYL) a lever for the regional development strategy and innovation plan. We will see, however, that the 2000 – 2006 Welsh OB 1 programme seemed to deliberately distance itself from this possibility and immediately to focus on local SMEs. This was, at least, the opinion of most of our interviewees including Professor Dylan Jones[65] who has been critical to most of the choices of the administration, but also in order to double check the plausibility of such assessment of some of the key people in the programme management of cohesion policies programmes like Victoria Chambers[66] that we met in Cardiff.

These features are a reflection of an historic pattern. Wales was one of the pioneers of the industrial revolution and hosted some of the champions of the steel and coal industry mainly located around the harbour of Cardiff. The entire system entered into decline after the first World War, this continuing also throughout the Second. In the post-war period, the UK government's policy was to encourage engineering and manufacturing firms to relocate to the industrial belts that once thrived in South and North Wales. Companies like Ford and 3M became the flagships of massive American investments partially aided by the Marshall programme which had an important role in the reconstruction of the UK economy (Cooke, 1998). During this period (1945 – 1975) the strategy of foreign investment attraction was rather simple, with branches of US manufacturing multinationals recruiting semi-skilled workers in Wales and limited use of local suppliers.

The establishment in 1976 of the **WDA** as one of the very first regional development agencies in Europe created a benchmark, and provided inspiration to those later founded elsewhere in the UK and in many other European regions. According to Professor Cooke[67] (but see also Morgan, 1997) who was interviewed by us, the agency signalled a significant change as a body capable of expressing and implementing a regionally tailored strategy, for the first time.

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[65] Interview with Professor Dylan Jones – Evans, Deputy Director, Centre for Advanced Studies, Cardiff School of City and Regional Planning, Cardiff University, Cardiff 19th June 2008

[66] Interview with Virginia Chambers, Director Technology & Innovation, Welsh Assembly Government, Cardiff, 9th October 2009

[67] Professor Phil Cooke, Director, Centre for Advanced Studies, Cardiff School of City and Regional Planning, Cardiff University, Cardiff, 14th May 2008

It is worthwhile to notice that, notwithstanding the lack of a proper economic or corporate plan until the early 1990s, the results were impressive (by contrast with the useless proliferation of strategic documents seen in Wales in 2000 – 2006 and described in Chapter Four). As Cooke (1995) notices, from 1983 to 1993 Wales attracted a share of the total UK' s inbound FDI between 15 and 20 per cent, while possessing just 5 per cent of the UK's population.

The table below shows Wales' performance on FDI on the basis of two performance indicators: number of projects/ firms attracted and employment generated.

Table 3.3 – Regional performance index of foreign investment

Region	Average 1982-92 Project index	Region	Average 1982-92 New Jobs Index
Wales	3,85	Wales	3,71
North	2,03	Scotland	2,68
Scotland	1,77	North	2,33
West Midlans	1,65	West Midlands	1,48
North West	1,10	North West	0,72
Yorks/Humber	0,71	East Midlands	0,69
East Midlands	0,65	South West	0,66
South West	0,42	Yorks/Humber	0,56
South East	0,41	South East	0,30

Source: Hill and Munday (1994)[68]

On this basis it is clear that Wales used to represent a success story, and one that was largely linked to the WDA that accordingly became a benchmark for many European regions and states.

Furthermore, FDI to Wales also used to be rather diversified. After a first wave of FDI inflows, these investments came not only from the USA (Sharp, ITT and others were amongst the largest) but also from European countries (especially Germany, with Bosch being one of the most sizeable examples), and Japan (Sony). The South Korean LG was the last big deal (intended to deliver the greatest employment impact) that the WDA unsuccessfully attempted before being absorbed by the Welsh Assembly.

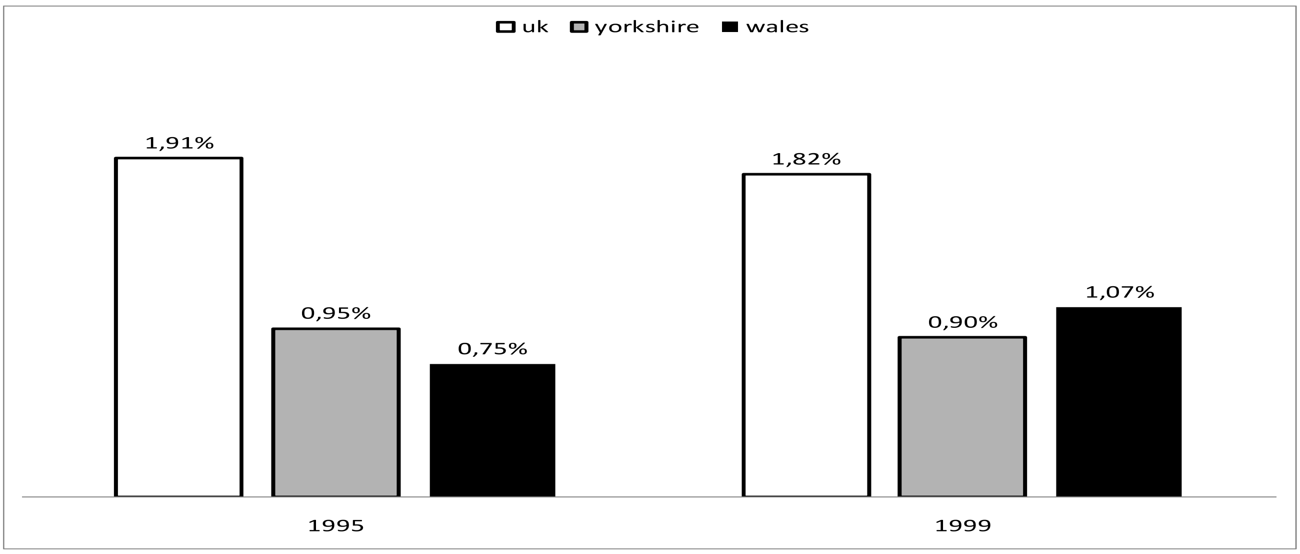
[68] The performance index is calculated from Investment in Britain Bureau and is calculated as ratio between regional share of FDI/ new jobs on national totals and regional share of total UK employment

FDI attracted by the WDA were, mostly, so called "green field investments" with high impact on employment and high technology contents. Examples of this include the 200,000 engines produced per year for Toyota at the Bridgend factory and exported back to Japan, and the 325,000 engines produced for Jaguar at the same location. More broadly, the boom of the ICT industry, which more than doubled between 1980 and 1990, underlines the nature of this FDI-driven expansion phase of the Welsh economy. The focus on innovation of FDI was also recognized by the EC, and the WDA was awarded the prestigious first European pilot Regional Technology Plan by DG Regio in 1994.

Until 2000, thus, Wales was, in a sense, thus the forerunner of the regional industrial strategies in UK. Immediately after 2000, whereas the WDA was absorbed by the administration, the RDA Yorkshire Forward was launched. Results since then have reversed, with Yorkshire improving its regional competitiveness and Wales witnessing deterioration.

The evolution of the manufacturing base and FDI was, in fact, also mirrored by the change in R&D expenditures as shown in Graph 3.6. Both Yorkshire and Wales lag behind the UK by a little more than half (relative to GDP) of the national averages. However, the propensity of Wales to invest in innovation increased more than 40% in the four years preceding the start of the programming period observed. As a consequence, Wales appeared to overtake Yorkshire and to substantially reduce the distance from the UK average. In the meantime the propensity to invest in research decreased slightly both for the UK and Yorkshire.

Graph 3.6 – R&D expenditures over GDP, Per cent



Source: Eurostat; accessed October, 2009

Macro trends, as far as R&D, are, after all, very similar. Both regions were spending on R&D much less than the national average and spending a similar amount of money relative to the size of the economy. Another commonality is that in both the share of R&D expenditures coming from higher education institutions is much higher than the national averages (as for table 3.4).

Table 3.4 – R&D expenditures and breakdown by sources, in billion GBP and percentages, 1999

	UK	Yorkshire	Wales
Total R&D expenditures	17.277	636	348
% business	66,6	47,8	41,4
% government	12,4	7,5	18,7
% HEI	21,0	44,7	39,9

Source: Office of National Statitsics; accessed October, 2009

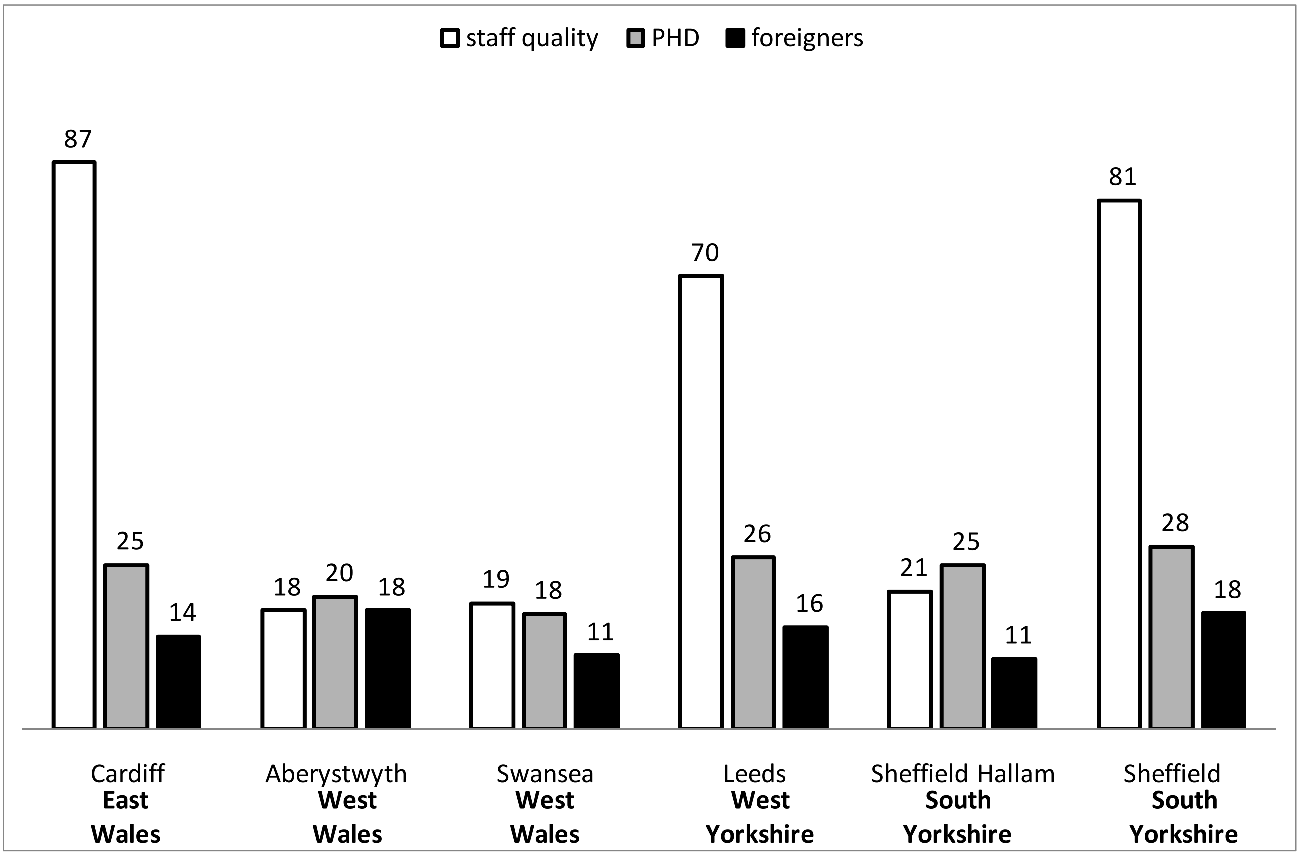
The overall result - multiplying the gap on total R&D expenditure as a percentage of GDP and the one on the percentage of expenditures coming from the business - is, thus, that business in SY and WW spend roughly one third of what UK companies on average invest in research, notwithstanding the higher percentage of employment and added value of the two regions coming from the manufacturing sector (which is still supposed to invest more than other sectors in research). Moreover, in both regions higher education is much more important to the overall research base than in UK, making a consideration of the role that **university** are playing crucial for this thesis.

If we, then now get a closer look to higher edication institutions, the quantitative evidence indicates that SY's universities play a role within their wider region that is central, whereas in Wales the research base tends to be concentrated in the area that is not targeted by the OB 1 programme: thirty per cent of Yorkshire professors are in SY, which accounts for 25% of the population, whereas only 46% of Welsh academics are in WW, with 63% of the Welsh population.

WW' universities in addition tend to dilute the research base amongst six different institutions which are not well connected in terms of transportation and of which a number seem to focus rather on agriculture and liberal arts than on technologies. SY universities are only two, they are both in the same city and one appears to be the best in the entire region.

Graph 3.7 compares the two areas' most important universities. SY can more easily leverage on world class institutions which also appear to display a high concentration on research, to have a high international exposure and, at the same time, to be closely connected to the geographical area that is to be developed. This difference is a rather important because universities are, certainly, amongst the possible leaders that may take the lead of innovation strategy.

Graph 3.7 – University Performances, Measured as percentage of staff being rated 5 or 5 at the RAE (2001), percentage of students who are postgraduate (2006), percentage of students who are foreigners (2006)*



Source: *RAE conducted by HEFCE, SFC. HEFCW and DEL, Higher Education Statistics Agency.*

The table is constructed by considering: the number of staff scoring the highest (5 or 5+) in the RAE, the share of students that are focusing on research (proxied by the number of postgraduates), and the percentage of students who are foreign (which is a signal of the international recognition of the university). SY performs consistently better on all indicators and especially on quality of staff.

One of SY's best assets appears to be the University of Sheffield, which can also leverage on tradition and on five Nobel prizes, coming from the departments - Medicine and Chemistry – where the university concentrates much of its efforts. It is also to be noticed that Chemistry – as one of the leading departments of the school but also one of the best at international level – is linked to the industrial specialization of SY in metals. We will see later in Chapter Four that Sheffield University was not only the largest recipient of OB 1 funds meant to foster innovation but also one of the four leaders – through partnership with multinationals companies – of the innovation strategy.

Moreover, the University of Sheffield's ratio between professors and students, a benchmark for the quality of teaching, is almost twice as high (3,8 professors for 100 students) as the UK percentage (1,9), whereas the corresponding numbers for the whole Yorkshire, Wales and WW are all below the national average.

The only world class institution in Wales, Cardiff University, is outside the relevant area and this has created (as described in Chapter 4), a tension between the need to leverage on its skill base and the resistance of progam managers to involve institution outside the beneficiary area. In fact, Cardiff is also home to some of the most influential experts on regional development (Morgan, Cooke, Evans, Jones, Bristow, Healy). Yet, they all lamented, when interviewed during the field work for this study, that they have had very few interactions with relevant decision makers within the Welsh Assembly.

The overall picture that emerges from the comparison is of two regions that had similar gaps in relation to the quantity of research investments at the beginning of the period. The remarkable difference is that whereas SY has an advantage in the quantity and quality of its university base, WW higher education institutions appear marginal in their region. This difference in credibility and potential leadership may anticipate – as we were reminded by Adrian Healy during the fieldwork[69] - a problem for a public investment effort that is to be channelled mostly through universities.

3.4.2 Castilla y Leon, Murcia and two different paths towards convergence

Whereas the UK case allowed the comparison of two regions that diverged because of an institutional change that took place at the very beginning of the structural funds programming period that we are investigating, the two Spanish regions were characterized – during the same period - by the same level of autonomy towards central government.

[69] Interview with Adrian Healy, Director ECOTEC Research and Consulting Ltd, 19th June 2008

The two cases we are going to study are CYL and Murcia. As mentioned in chapter two, they represent a rather polarized pair of regions because with similar, and low, R&D spend at the beginning of the programming period and similar composition of these investments between business and the public sector, they achieved in the period observed very different results in terms of mobilizing private investments around their publicly funded innovation strategy. This outcome is crucial because in both regions the research assets appear to display a significant problem of scale.

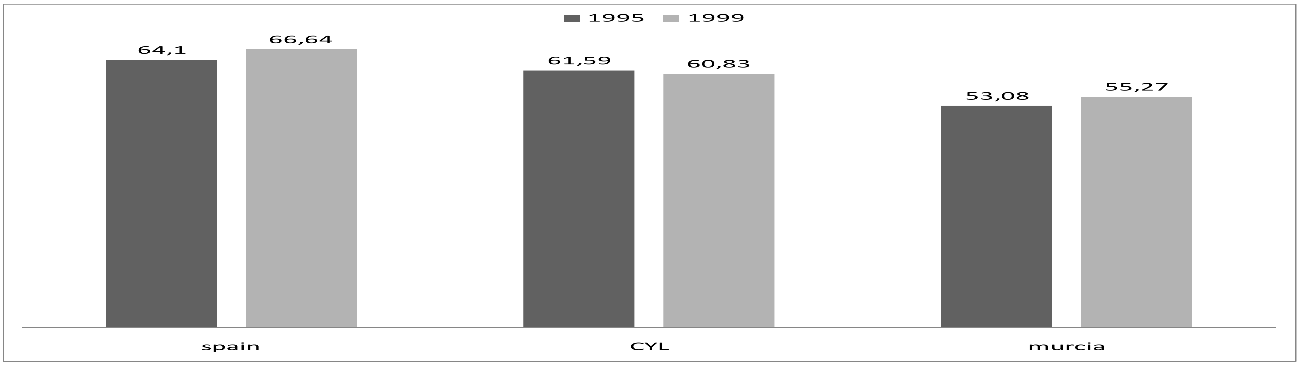
These observations concerning the pre existing conditions, as in the UK cases, point to more similarities than differences in terms of development and R&D expenditure. However, two prior conditions appear to differ significantly. First, the absence of alternatives, as perceived by CYL programme managers and policy makers, to a path towards growth based on productivity gains and innovation, whereas the easier approach to economic growth through cheap labour was available to Murcia. Second, the presence in Castilla of research and business leaders that are used to competing at the international level, whereas both academic and company structures appear to have a more local scope in Murcia.

We will now observe the main demographic, geographic and economic characteristics that our two regions displayed at the beginning of the programming period, as well as the historic legacy that seems to be an important differentiator between the two regions that we are considering. We will also observe the propensity for investment in innovation that each region presented in 1999 and the quantity and quality of their research assets. The section is concluded by describing the main features of the OB1 programmes and of the innovation strategies.

The advantage of having no alternative but to invest in innovation

At the beginning of the programming period 2000 – 2006 the two regions seemed to be coming closer as regards GDP per person. Graph 38 notes that in the years before the last programming period, the growth of CYL had been smaller than of Murcia. In fact, as shown in the 1995 – 1999 period, CYL was diverging, albeit slightly, from the EU average (from 61,6 to 60,8% of the EU 15 in terms of GDP per habitant), whereas Spain and Murcia were catching up. As a result the difference between CYL and Murcia was – at the beginning of the period that we will consider - relatively small: the GDP per inhabitant was 13,300 euro in CYL and 12,000 in Murcia.

Graph 3.8 – GDP per habitant, EU 15 = 100



Source: Eurostat; accessed October, 2009

The two regions were also very similar in terms of economic structure. The breakdown of the economy in terms of distribution of added value amongst different NACE (the statistical definition of sectors that the Eurostat employs) is such that the difference between the various sectors is never higher than two percentage points and, in any case, always very close to the national average (see annexes). The same applies to the distribution of employment and to other parameters like the density of firms (ratio between number and population).

However, other important differences emerge in some of the basic features of geography and demography that, in turn, seemed to create a different degree of urgency on the plane of the economic policy and political priority. CYL is the largest region in Spain (and the third largest in Europe), but also one of the least densely populated. Murcia is almost nine times smaller and has less than half of the population, and, as a consequence, four times more inhabitants per square kilometre (Eurostat). More interestingly, however, is the evolution of the size of the population and of its age structure as shown in Table 3.5.

Table 3.5 – Main evolution in demographics, population, age brackets, Spanish regions, 1990 - 2007

	Population			***% population between 20 – 30***			***growth rates***	
	1990	***1999***	***2007***	***1990***	***1999***	***2007***	***1999 – 1990***	***2007 - 2000***
Galicia	2.744.800	2.689.042	2.723.915	14,5%	15,5%	14,2%	-0,2%	0,2%
Principado de Asturias	1.101.087	1.067.081	1.058.059	14,6%	15,1%	13,4%	-0,3%	-0,1%

Cantabria	527.538	529.568	563.611	15,5%	15,9%	14,3%	0,0%	0,9%
Pais Vasco	2.114.894	2.069.723	2.124.235	16,7%	16,5%	13,1%	-0,2%	0,4%
Comunidad Foral de Navarra	519.106	542.559	596.236	16,1%	16,3%	13,5%	0,5%	1,2%
La Rioja	262.941	265.274	306.254	15,2%	15,4%	14,3%	0,1%	1,9%
Aragón	1.192.383	1.195.496	1.275.904	15,0%	15,1%	13,4%	0,0%	0,9%
Comunidad de Madrid	4.931.541	5.128.470	6.052.583	16,7%	17,6%	14,9%	0,4%	2,2%
Castilla y León	**2.561.818**	**2.475.112**	**2.486.166**	**15,7%**	**14,8%**	**13,4%**	**-0,4%**	**0,1%**
Castilla-la Mancha	1.659.033	1.719.480	1.929.947	16,1%	15,1%	14,5%	0,4%	1,6%
Extremadura	1.066.274	1.058.687	1.074.419	16,5%	15,1%	14,3%	-0,1%	0,2%
Cataluña	6.054.382	6.182.921	7.085.308	15,7%	16,6%	14,3%	0,2%	1,9%
Comunidad Valenciana	3.839.122	3.966.639	4.759.263	16,1%	16,5%	15,1%	0,4%	2,5%
Illes Balears	705.700	798.961	1.014.405	15,9%	17,0%	15,0%	1,4%	3,0%
Andalucia	6.896.678	7.202.974	7.917.397	17,1%	17,1%	15,7%	0,5%	1,3%
Región de Murcia	**1.038.380**	**1.132.821**	**1.370.802**	**16,9%**	**17,8%**	**16,2%**	**1,0%**	**2,6%**
Canarias (ES)	1.487.057	1.643.006	1.997.010	18,5%	18,4%	15,6%	1,1%	2,5%
Spain	**38.826.297**	**39.802.827**	**44.474.631**	**16,2%**	**16,5%**	**14,7%**	**0,3%**	**1,5%**

Source: Eurostat; accessed October, 2009

Murcia, in fact, displayed the strongest population growth in the nine years that preceded the start of the last programming period[70]. On the contrary, CYL was the region with the fastest shrinking population. The growth of Murcia is explained by the high inflow of immigrants arriving mostly from North Africa. CYL seems to be rather insulated from such migration patterns.

The differences in the regions are also large in terms of demographic age structure. The people of Murcia were – in 1999 - the youngest in Spain. This phenomenon was also attributed to immigration, and to the fact that immigrants tend to be young relative to the regional averages. CYL's population was, instead, the oldest and continues to age. This difference is rather relevant to our research: Murcia can afford to increase its GDP, thanks to population growth and to the lever of cheaper labour force to be engaged in sectors like housing and tourism. CYL has few alternatives to improving productivity through innovation and focused investments in R&D.

[70] If one excludes the islands of Canarias that cannot be considered as homogeneous as the continental regions

The difference in terms of leadership potential

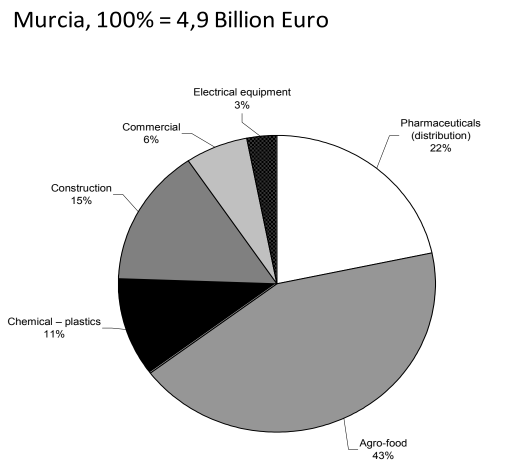
For both our selected regions, to achieve growth through innovation must have appeared – at the beginning of the 2000 – 2006 period - to present difficulties typical for less developed regions. As far as R&D expenditures are concerned, the evolution of the two regions appeared almost identical in the period immediately before the last programming period. In both regions expenditure on R&D was 0,47% of GDP in 1995 and became 0,62 in 1999 before the start of the OB 1 Programmes. Both were also accelerating, in the relevant period, the investments in innovation at a higher rate than for both Spain overall and the OB 1 Regions as a group. In both regions, in addition, the percentage of R&D investment coming from business was lower than the national average and very similar (42% for CYL and 43% for Murcia).

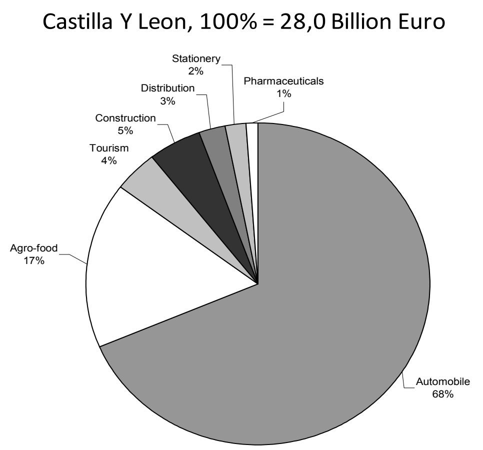
Moreover, if we consider the question of generating, attracting and retaining the segment of the workforce with most potential (young with highest education achievements), geography seemed to pose a problem for both regions – a factor lamented by some of the university professors interviewed during this research in CYL and by the head of the Seneca Foundation in Murcia (Chapter Five). The "brain drain" was perceived in both places as a very significant competitive disadvantage (but cf. Skeldon, 1997 and 2008, on how the disadvantage has been transformed into an opportunity in some instances). Both regions are too close to the capital city to prevent the most talented individuals from going there in search for jobs, and too far away to have their firms and organisations benefit from any spillover from innovation that the capital is capable of generating. And, in addition, both regions seem to suffer from the agglomeration effects that the new economic geography theory forecasts without benefiting from the benefits that at a later stage should lead to a new equilibrium between centre and periphery (see Krugman and Venables, 1995, as in Chapter 1).

Differences, however, existed between the two: in CYL, but not in Murcia, there were actors with enough international exposure and credibility potentially to express leadership within novel innovation strategies. CYL hosts the Spanish production sites of large automotive multinationals like Renault, Nissan, Iveco, Michelin, of local automotive suppliers (Antolin) but also some large home groups within the agro food industry (Ebro, Lenche). The largest Murcian firm, Reguladora de Compras del Mediterraneo, which is a distributor of pharmaceutical products, would, instead, rank only ninth in CYL classification (Centro Regional de Estadistica de Murcia, 2008 and CYL Economica, 2008).

The total turnover of the top fifteen firms is equivalent to 38% of the regional GDP in Murcia as opposed to 85% in CYL. Moreover, Graph 3.9 shows that the large companies in CYL appear to be more concentrated, with automakers in Castilla comprising more than two thirds of the total. The most important industry in Murcia, Agro food, by contrast represents less than half.

Graph 3.9 – Distribution of turnover of largest fifteen firms by industry, %, 2006





Source: Axesor, Castilla Y Leon Economica

It is thus clear that – as we were confirmed by Carmen Rebollo, head of the CYL's regional development agency[71] - large companies play a more important role in CYL and that they appear to be more concentrated in a certain sector. However, important differences also emerge when one considers the history, which brings us to the question of the research assets of the two regions. CYL has been at the heart of Spanish history[72], whereas Murcia has played a peripheral role.

CYL is, in fact, the only region in Europe that hosts two of its ten oldest universities: Salamanca, founded in 1218, and Valladolid, founded in 1241. The situation is different in Murcia: its largest

[71] Interview with Carmen Verdejo Rebollo, Jefe del Departamento de Innovación, ADE Inversiones y Servicios (Agencia de Inversiones y Servicios de Castilla y León), Valladolid, 22th April 2009

[72] It is the union of the kingdom of Castilla and of Leon with the *Tratado de las tercerias* in 1230 that is seen by historians as the real beginning of the history of Spain as one of the first Nation States of Europe. It is in Leon that in 1188 the first parliament (*les cortes*) was established with representatives of the people to join the nobles and the clergy into decision making. It was also Valladolid which was named the capital of the largest kingdom of Europe until the early seventeenth century. Other cities – Avila, Burgos, Salamanca, Segovia, Palencia – have also witnessed some of the most important moments of the history of Spain and in a sense Castilla Y Leon, even more than Madrid or Toledo, is at the heart of the history of the country.

University was founded in 1912 and the other two less than ten years ago. This difference of tradition – together with the different weight of large companies within similar regional economic structures - implies a potential differences in terms of the two regions producing and sustaining the leaderships that, as we will see, is important to success of innovation strategies as both the independent evaluator of Murcia[73] and of CYL[74] confirmed during the interviews.

However the above does not, as we anticipated previously, also entails a difference in size between the two university systems.

Table 3.6 – Weight on total for spain of CYL and Murcia universities, Percentage, 2000

	Population	professors [1]	students
CYL	6,22%	6,90%	6,57%
Murcia	2,85%	2,92%	2,53%

[1] Here by professors we adopt the definition of the "investigadores" that are the most senior figures in the university system in Spain: according to the terminology of the Ministry of Education their number is the sum of *Catedraticos de Universidad*, *Titulares de Universidad* and the *Catedraticos de Escuela Universitarias*,. The number of teaching staff is higher because the above categories do not include the *Titulares de Escuela Universitarias*, the *Asociados* and staff with Temporary contracts (visiting, ect..)

Source: INE

If we compare the number of students and academic staff with the population, as per Table 3.6, CYL and Murcia appear to host a number of professors and students per capita which is similar.

CONCLUSIONS

An analysis of different levels of efficiency of different programmes using public investments in R&D as a tool for regional development, finds in the UK and in Spain two of the most interesting national contexts.

This is for different reasons: both countries appear to be relatively late comers to the club of countries that share enthusiasm for investing in R&D, and both of them seem to have recently discovered that innovation can be lever for convergence: as a consequence both contries have in recent years

[73] Interview with Aurelio Jiménez Romero, Independent Evaluator Murcia OB 1 Programme 2000 – 2006 , Business Development Director, Red2Red Consultores S.L., Madrid 14th April 2008

[74] Interview with Olga Ogando Canabal, Evaluator of CYL 2000 – 2006 OB 1 programme, Departamento de Economía Aplicada, acultad de Ciencias Económicas y Empresariales, Universidad de Valladolid, Valladolid, 3rd May 2007

accelerated the accumulation of R&D assets more than other European countries. Moreover, both UK and Spain tell about an evolution of the relationship between the centre and the periphery that has been far by linear with a constant tension between further devolutions and temptations of recentralization.

Also in UK and Spanish regions the statistical association between investments in R&D and economic growth is not straightforward and this rises the importance to understand which are the success factors.

In this chapter we described significant similarities between the UK and Spain and between the two pairs of regions – SY and WW, CYL and Murcia – that will be our case studies: in terms of pre existing conditions – level of income per habitant, propensity to spend in R&D, human capital – they appear remarkably similar.

The analysis also highlighted, however, some differences that are less about the macro picture of economic and social data and more about the micro features of the reputation of the universities hosted in the beneficiary regions and the size and involvement of the hosted firms in the regional environment. We will see in the next chapter that these difference may be associated to the emergence of leaderships that may explain the differences in results with regard to efficiency of public investment in research.

CHAPTER FOUR - THE IMPACT OF DEVELOPMENT AGENCIES AND OF PARTNERSHIP BASED ORGANISATIONS IN THE UK

The UK case provides an interesting test for the validity of our theory. We will, in fact, confront two regions that were similarly endowed at the beginning of the period and that yet displayed very different results at the end of it.

As per the thesis that we want to prove the differences appear to be explained by two main factors: on one hand the development of effective regional innovation strategies appear to be associated to decision making processes that are independent enough from political pressures and, yet, are evaluated on outcomes being produced; on the other it looks vital the existence and even the strengthening of partnerships amongst firms, universities, governments and public opinions that allow to gather the information that the drafting of regional strategies require and that make easier to implement those strategies.

In fact, if Wales was one of the benchmark in terms of productivity growth and Foreign Direct Investments (FDI) attraction and Yorkshire appeared to lag behind before 2000, the opposite happened in the first part of the current decade (as elaborated by Armstrong et al, 2001). The turning point took place in 2000 – at the beginning of the period that we are investigating - when a regional development agency (RDA) was created in Yorkshire, at the same time that in Wales the newly born regional government abolished the RDA that had led the development strategies in the nineties (as in Morgan, 1997a).

More specifically, the two Objective 1 portions – West Wales (WW) and South Yorkshire (SY) - of the two regions drafted and implemented very different innovation strategies that seem to explain part of the difference in terms of economic performance: starting from the wording of the programming documents up to the specific choices in terms of resources allocation, the SY's strategy is more focused on specific areas and industries, whereas WW's one is characterized by a more even distribution of available resources amongst economic actors and local communities.

The field work revealed that these differences appear to be largely due to a different degree of indepence of the programme manager to resist the pressure from local lobbies and to its capability to incorporate outside expert knowledge into the strategy (Cooke et al, 2003 and 2005).

The case gives also the opportunity to explore what may appear to be a paradox. The worse performace coincides with the devolution that happened in Wales and not in Yorkshire at the beginning of the period we are observing.

This looks contrary to common wisdom because devolution just like decentralization, federalism and similar trends, is normally expected to be associated to better performances due to higher accountability of the policy makers (as, for instance, in Oates, 1972). Welsh policy makers adopted a rather risk adverse approach to regional development by dismantling the development agency – at the time that Yorkshire and other regions decided to delegate to such institutions the implementation of development programmes – and redistributing funds amongs local communities and small firms when it came to decide where to allocate the available funds. The opposite happened in Yorkshire where development strategies were governed by technical bodies that were only accountable on results.

Stronger decision maker also appear to be associated in Yorkshire to stronger partnerships amongst business, universities, associations and government (Armstrong et al, 2001). In Wales the just born national government appears to be simply not ready to get engaged in promoting relationships with firms or universities (Jones – Evans, 2002).

The final result is, then, that the Yorkshire's regional innovation strategy is both more focused and more effectively delivered than the one in Wales. The explanation of the paradox lies, in fact, not in a negative effect that devolution in se may have on regions, but in the typology of devolution that took place in Wales (unlike the one that happened, for instance, in Scotland) and the rather thin level of public support that the creation of the new state managed to win (Cooke and Clifton, 2005).

The chapter is structured, for the phases of the innovation value chain that we presented in section 2.1 and that are reflected in the articulation of the analysis we conducted, into the five following sections.

In the first, we will present the main features of the Objective 1 programmes and more specifically the measures designed for increasing the research and innovation capabilities of the Region. In the second, we will show the results of our two cases in terms of capability of the regions to use public money to increase the propensity of private firms to also invest in R&D, productivity growth and impact on employment, In the third, we will verify how these differences in performance are associated to more or less concentrated choices as far as resource allocation. In the fourth part we will, then, investigate the processes by which programmes are drafted and realized and how the institutional context impacts performance. In the fifth we will describe the mechanisms by which partnerships amongst different actors that are relevant to innovation, are constructed and leveraged upon in the two regions. The chapter is concluded by summing up its main findings.

4.1 THE DIFFERENCES IN THE LAY OUT OF THE DEVELOPMENT PROGRAMMES

The structural funds awarded to WW and SY in 2000, represented roughly half of the structural funds allocated to Objective 1 Regions in the UK, and the two regions benefit respectively from the largest and the third largest allocations amongst the six objective 1 UK regions.

Structural funds represent, as mentioned in chapter two when we reasoned about explanations of differences in economic performances other than the one that we are investigating, a big portion of development policies in regions like South Yorkshire or West Wales and they be big enough if compared with the economies' size to be able to account for a large part of the results in terms of economic growth.

The following chart calculates the weight of the Objective 1 programme and of the measures dedicated to R&D respectively on the two region's GDP and R&D expenditures.

Table 4.1 – Comparison between Objective 1 and main economic data of beneficiary areas, 2000 – 2006, (in mil euro and percent)

	(1) Objective 1 funds (total) (7 years)	(2) GDP (2001 figure)	(3) % (1) / (2) [1]	(4) OB 1 measures on R&D	(5) R&D expenditures region (2000) [2]	(6) % (4) / (5) [2]	(7) R&D public expenditures (2000) [2]	(8) % (4)/ (7)[2]
South Yorkshire	3,089	22,732	13,6%	100	108	92,3%	52	194%
West Wales	4,040	28,637	14,1%	234	224	104,6%	104	225%

Source: Programming documents

[1] The percentage are of the seven years programme on the yearly figure of GDP and R&D. This gives the maximum potential impact given that the expenditures do not have to be uniformly distributed in time.

[2] The data at NUTS 2 level (South Yorkshire and West Wales) are not collected systematically at national level where the larger definition of regional government office (and thus Wales within which we have West Wales and Yorkshire & Humber within which you have South Yorkshire) is used. In order to estimate the West Wales and South Yorkshire R&D expenditures, we have assumed that the percentage of regional R&D spent at sub regional level can be proxied by

a) the weight of R&D expenses of the four districts of SY as opposed to the Y&H figure (provided by South Yorkshire Economic Assessment) and by b) the weight of West Wales employment in high technology sectors on the Wales employment in those sectors (as for the consultation on convergence programmes). The split between the public versus private funds have been assumed to be equal to the one that is given for the larger regions.

As said EU funds amount to almost 2% of the GDP per year. Moreover, the amount that OB1 can spend in R&D is almost equal to the entire regional R&D expenditure in one year and twice as much as the state and the universities spend in a year beyond what is spent via structural funds programmes.

As Nigel Graddon, Technology and Innovation branch of the Welsh European Funds Office (WEFO)[75] acknowledged structural funds were seen as almost the only lever to give substance to the priority that the newly elected government in Cardiff gave to research and innovation. Similar considerations were true for SY.

It is, therefore, likely that the way structural funds programmes are drafted and concretely implemented does have a significant impact not only on the indicators of knowledge society but also, although more loosely, on the overall economic performance.

The comparison between the two regions also say that the weight of the programme is similar both when it is confronted with the economy size and the expenditures in R&D. It is, however, remarkable that at the beginning of the programme, as we mentioned in chapter three, Wales had surpassed Yorkshire as far as percentage of GDP spent on R&D, although as we will see this will not translate itself into a superior economic performance.

Notwithstanding the similarities in terms of funds available to development policies and innoovation strategies, the difference between the two programmes start from the wording that they use and the objectives that they identify or, more precisely, the clarity with which they declare their choices and targets.

The overall difference between the two programmes

The SY Objective 1 Programme is constructed with an approach that is rather clear from the outset: as in the words of the programme that were confirmed to us by the Director of the Objective 1

[75] Interview with Nigel Graddon, Technology and Innovation branch, Cardiff, 6th September 2006

Directorate Kevin Bennett at the beginning of the field work[76], "the money is seen as an investment which buys impacts"; to achieve them, "the money is concentrated by geography and sector" and "the management of the money and its allocation will use" criteria that include "incentives and sanctions". Generally speaking, however, the programme seems to establish, since its inception, some evidence based clear choices and guidelines. We will shortly see that this focalization of the strategy is maintained in the description of the innovation related measures.

As far as West Wales, Paul Casey, Head of Research at the Managing Authority of the Programme clarifies[77] since the start that "the structural funds were seen central to the regional development strategy of Wales and West Wales". This centrality was even "more true when it comes to R&D[78]" – as Sue Price - who more specifically follows the innovation strategy - said to us (we will, in fact, see in Spain that failure can be due to not enough priority given to innovation whereas this was not apparently the case as far as West Wales).
The objectives of the 2000 – 2006 Welsh Objective 1 Programme were, in fact, rather ambitious. According to the programme's evaluators (Bristow and Blewitt, 2001) the targets were: a) to raise per capita GDP in the region from 73 per cent to 78 per cent of the UK average; and, therefore, to abandon the status of less developed region by the end of the programming period, and b) to have a significant impact on employment with a reduction of the number of those who are economically inactive by 35,000 and the creation of 43,500 net additional jobs[79] which is not a trivial objective for a region with a stock of unemployment which has been around 60,000 people throughout the last decade.

The programmes themselves are then articulated in a way which is broadly the same[80] in our two cases. The regulations of the EC have, in fact, imposed in both regions six priorities (plus the so called technical assistance that is for buying services supporting the implementation of the projects)

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[76] Interview with Kevin Bennett, Director, Objective 1 Programme Directorate, London, 7th September 2006

[77] Interview with Paul Casey, Head of research, Managing Authority, West Wales, Objective 1 Programme Directorate, Cardiff, 6th September 2006

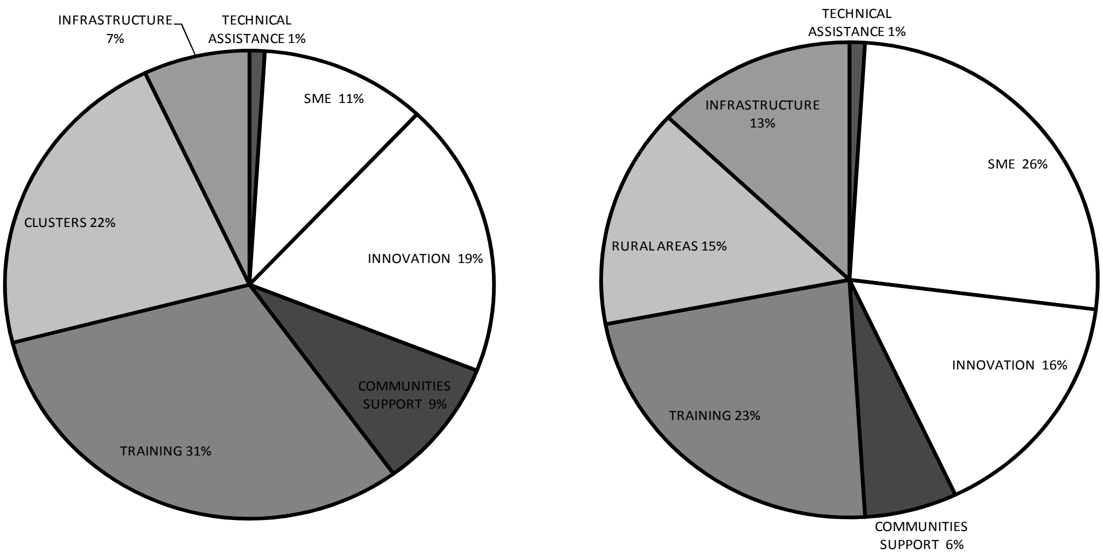
[78] Interview with Sue Price, Head for Programme Management Division, WEFO, Merthyr Tydfil, 16th April 2007
[79] Net jobs are the jobs that have been created once we subtract the ones that would have been created anyway (the so called "deadweight" effect) and the ones that will be eliminated at firms that have not enjoyed the support (the so called "displacement").
[80] There are, in fact, some editorial differences: the innovation priority is the first in the financial table of the South Yorkshire's OPs and in the second of the West Wales's ones; the funds to SMEs are in the second in the former and the first in the latter; the community support is the third in WW and the fourth in SY; and conversely the training is the fourth in WW and the third in SY.

and in both regions the investments portfolio is structured so that funds do belong to six broad objectives[81]:

1. strengthen companies (in most cases SMEs);
2. foster innovation (including R&D and the investments that we associated in this thesis to the rather broad concept of knowledge based economy);
3. promote economic and urban regeneration of weak local communities which is focused on some small neighbourhoods in SY, whereas it is spread on the entire territory in WW;
4. improve employability through professional training;
5. improve quality of life in rural areas in WW, whereas this priority is replaced by a priority on strengthening clusters in SY;
6. generate economic growth by developing "infrastructure" which includes transportation – roads, airports, railways, but also energy and environment.

The comparison of the two programmes is summarized by the graph below which shows the distribution of the funds.

Graph 4.1 – Distribution of funds amongst priorities, Percent, 2000 – 2006 Objective 1, South Yorkshire left and West Wales right; 100% = 3.089 Mil Euro SY; 4.040 Mil Euro WW



Source: Programming documents

[1] The support to SME is in South Yorkshire under Priority 2

[2] The funds for innovation (including R&D and ICT) are in South Yorkshire under Priority 1

[3] The Communities support is in South Yorkshire under priority 4

[4] The training is in South Yorkshire under priority 3

[81] The priorities are all mostly financed by the ERDF, except for the fourth which is financed through the European Social Fund (ESF) and the fifth which gets funds through the EGGF.

Notwithstanding similarities in the programmes' structure, there are still four main differences, as far as funds allocation:

1. whereas WW is supporting the regeneration of a number of communities (with priority 3) and systematically all rural areas (with priority 5), SY is targeting few areas that are – regardless if they are rural or urban – particularly deprived on one hand (priority 4), and on the other hand, has a measure that specifically tries to concentrate resources in areas with high potential (priority 5);
2. if we sum up the priorities that are most closely associated to "competitiveness" (the first two), we discover that WW spent a significant amount on them, almost half of its resources (42%), and significantly more than SY (30%); the effort for SMEs seems much larger in WW: the first priority is the one with the highest budget (26% of the total) in WW, whereas it is only the fourth (with 11%) in SY. This becomes more evident, if we more specifically, observe the priority meant to finance innovation
3. WW also spent more in the measure which is technically dedicated to R&D: 234 million euro, which is 5.8% of the total programme, against 100 million euro in SY which is 3.2% of the total;
4. however, SY seems to prefer to invest more into "innovation" that is not R&D (473 million euro which is 15% of the total versus 401 which is 10% of the total).

In other words, West Wales seems more keen to distribute evenly funds amongst different geographic areas (with funds like the one in priority 3 and 5) and more on SMEs and strictly defined R&D. SY is more keen on innovation, whereas this will have to be meant as commercially exploitable research.
This difference in approach to the design of programmes was confrmed during the field work by Sue Price[82]; Head of Programme Management, in Wales that confirmed that the Welsh OB programme managers need to consider the wishes of local communities when it comes to distribute funds. On the other hand, Costas Georgiu[83], Research and evaluation manager at the SY's OB 1 programme directorate, recognized that SY'S decision was from the start to concentrate R&D assets in the same location.

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[82] Interview with Sue Price, Head for Programme Management Division, WEFO, Merthyr Tydfil, 16th April 2007

[83] Interview with Costas Georgiu, Research and Evaluation Manader, SY Objectibe 1 Directorate, Sheffield, 10th November 2006

An other difference that the numbers and even more the wording of the programming documents appear to indicate is that unlike SY's one, WW programme is skewed towards small and medium companies. In 2000 this preference for SMEs as opposed to large companies represented a radical shift - as Virginia Chambers, Director Technology & Innovation of the Welsh Assembly Government recognized[84] - from the strategy pursued in West Wales until the end of nineties. Although, as Dr. Chamber explained, "this change is at least partly due to the awareness that an FDI driven regional development was not possible any longer and that a new balance had to be found between having innovative local smaller firms and leveraging on multinationals".

SY's programme managers, on the contrary, show a higher propensity to concentrate funds in areas with a higher potential (priority 5) or, on the contrary, with specific problems (priority 4); it spends more on measures that are about generating business related innovation and that provide support to SMEs not under the form of financial aid.

Such differences in the overall approach to programming strategies are reflected into the approach to the drafting of the programmes' measures dedicated to R&D and innovation[85].

The differences in research related programmes' measures

Both in the case of SY and WW we are considering interventions whose impact – in the short and even more in the long term – is expected to be higher than the one associated to the other policy fields in the OB1 programmes.

In SY one euro of investment in innovation is forecasted to have a return ranging between 4 and 7 euro of additional sales, whereas such forecast is around 2 euro for the entire OB1 programme. In WW against the above mentioned creation of 43,500 net jobs for the programme as a whole, the policy field dealing with innovation is expected to produce 14,000 new jobs and to safeguard another 10,400 positions. Moreover, WW also promises to concentrate this impact in high added value areas and, thus, half of the identified additional jobs are supposed to be in high tech industry where 2,000 additional firms are envisaged to be created.

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[84] Interview with Virginia Chambers, director Technology & Innovation, Welsh Assembly Government, Cardiff, 9th October 2008

[85] We will refer mostly to measure 1.1 in SY and 2.3 in WW that are related to R&D projects and infrastructures in a way that is closer to R&D definitions. We will also occasionally refer to the measures 1.4 in SY and 2.4 in WW that are more about enhancing high level human capital.

Differences, however, emerge if we compare the narrative and the wording that the two programming documents use. SY appears to be more pragmatic and clear in terms of decisions amongst different possible strategic choices. This is, in fact, true to start with the
diagnosis of the gap in innovation versus more advanced regions, which is conducted differently in the two regions.
In WW, the strategy start from a generic acknowledgment of the "low level of investment in research and innovation" as one "the region's main weakness".
In SY, the starting point is "the structural evidence of under-representation in new and growth sectors and under investment in business R&D with consequent low levels of business product and process innovation". Therefore, the gap is more clearly identified not in a generic low percentage of GDP spent in R&D (such a way to measure the innovativeness of a region may be the consequence, as we mentioned in section 2, of the rather generic metrics that the European Commission documents on the "Lisbon strategy" propose) but in the low number of firms which are present in new and growth sectors in the region and in the low propensity of private investors to spend in R&D. Within such an approach, public investments become a lever to increase both the number of innovative firms and the commitments of all firms to invest in innovation.

This difference is consistent with the reading of the innovation strategies overall objectives. Whereas in WW the aim is to generically create an environment which supports innovation, R&D, and improve Wales' competitiveness in a global market place", SY wants "to achieve a substantial increase in business investment in R&D and in new technologies". Thus, in SY's case, there is a clear mention of having business (private) investments in R&D and not just total amount of expenditures on research as targets.
Finally, whereas WW's strategy proposes a rather broad target to "develop the long term R&D capacity in the region", SY's strategy is meant to "build and commercially exploit the research and technological development and innovation capacity of SY".

The measure dedicated to R&D is, then, named "exploiting a business centred research capacity" in SY, whereas it is more generically about "supporting for the development of innovation and R&D" in WW. Once again, the former seems to be more clearly dedicated to the start of the development of the technology park that, as we will see, is one of the likely cause of the differences in performance.

It also has to be said that in SY the measure mentions that – even if the priority will go to local universities and innovation centres – "in certain circumstances businesses may need to tap into expertise only available on an international basis" and that "support will be given to establish a limited number of high profile, world class centres of technological excellence which would draw on and link up with the major centres in other parts of the world".

IN SY strategy there is then an explicit opening to international actors that may include firms or universities: not only they are mentioned as possible recipient of the funds, they are also encouraged to provide strategic advice. This is – according to our methodological hypothesis, a rather important recognition.

It must also be said that these choices of concentrating on internationally recognized and connected excellence represents a departure from the ortodoxy that the European Commission promotes of regional innovation strategies as a connector of localactors. This circumstance underlines that SY's programme does represent a programming exercise originally conceived and tailored to the region's needs, whereas this does not happen in WW where most of the programme echoes European Commission's jargon and guidelines.

More broadly, there are also differences between SY and WW as far as other families of interventions which are meant to more directly boost competitiveness of firms.

In WW the measures of "financial support for SMEs" aim to "increase the birth rate of SME", "develop competitive SMEs", and "develop sites and premises". No mention can be found of any follow up of leveraging on the FDI (foreign direct investments) strategy that was so distinctive of Wales in the period before the one we are investigating.

In SY, instead, the goals are slightly but significantly different and thus the programme managers seem to be willing to "invest in targeted SMEs, develop growth sector start ups, attract growth sector firms" and "exploit new market opportunities". Once again, there is an explicit choice of attracting firms from outside the regions that is different from the priorities that the OB1 programmes seem to normally display.

Lastly, as far as the measures meant to foster ICT: WW uses 65 mil euro for ICT infrastructure and 166 mil euros for developing innovation and the knowledge-based economy", whereas SY is once again more focused and more clearly "maximizing the potential presented by e-business". The first choice is mostly about enhancing public administration, the second hints to the promotion of the channels that may improve WW firms' sales.

The wording of the SY's programming strategy seems, therefore, to imply an approach which is rather focussed on and engaged with innovations closer to the end part of the value chain. WW., on the other hand, does not commit itself to any specific choices. This results in a number of consequences that we will shortly discuss.

4.2 THE DIVERSITY IN RESULTS

"Unless somebody wants to deny the reality of the numbers, the 2000 – 2006 objective 1 programme did simply fail to achieve the objectives that the very Welsh Assmbly Government established for it at the beginning of the period": the overall assessment of WW programme's results provided by the independent evaluator[86] Gillian Bristow[87] at Cardiff University was rather clear. She, however, also recognized that "the experience of managing an important regional development programme without the assistance from London may have been an important learning opportunity for the newly established government".

The comparison between the two regions and more specifically between the two sub regions is, firstly, given by the overall success of the structural funds policies which coincide with the capability of a region to "converge", and therefore, to overcome – by the end of the programming period - the 75% of EU average GDP per capita. From this point of view the two regions diverge significantly in terms of results.

After the 2000 – 2006 programmin period that we are considering, WW is still - notwithstanding the four billion euro of structural funds spent on development – a *convergence*[88] region (and, in fact, it has been awarded 1.4 Billion euros for the new programming period) and, thus, it has failed to achieve the very final aim of the structural funds programme[89].

[86] The independent evaluator is an institutionally recognized actor that is part of the structural funds programme and that the regions must nominate in order to carry out an independent assesement of the results of the programme in order to identify problems and possible improvements of the programmes.

[87] Interview with Dr Gillian Bristow, Reader in Economic Geography, Cardiff School of City and Regional Planning, Cardiff University (and project manager of the Mid Term evaluation of West Wales and the Valleys Objective 1 Programme 2000 – 2006, conducted by Old Bell), Cardif, 14th May and 19th June 2008.

[88] Under developed regions receiving the maximum possible aid from EC were called "objective 1" regions in the 2000 – 2006 period and "convergence" in the 2007 – 2013 period.

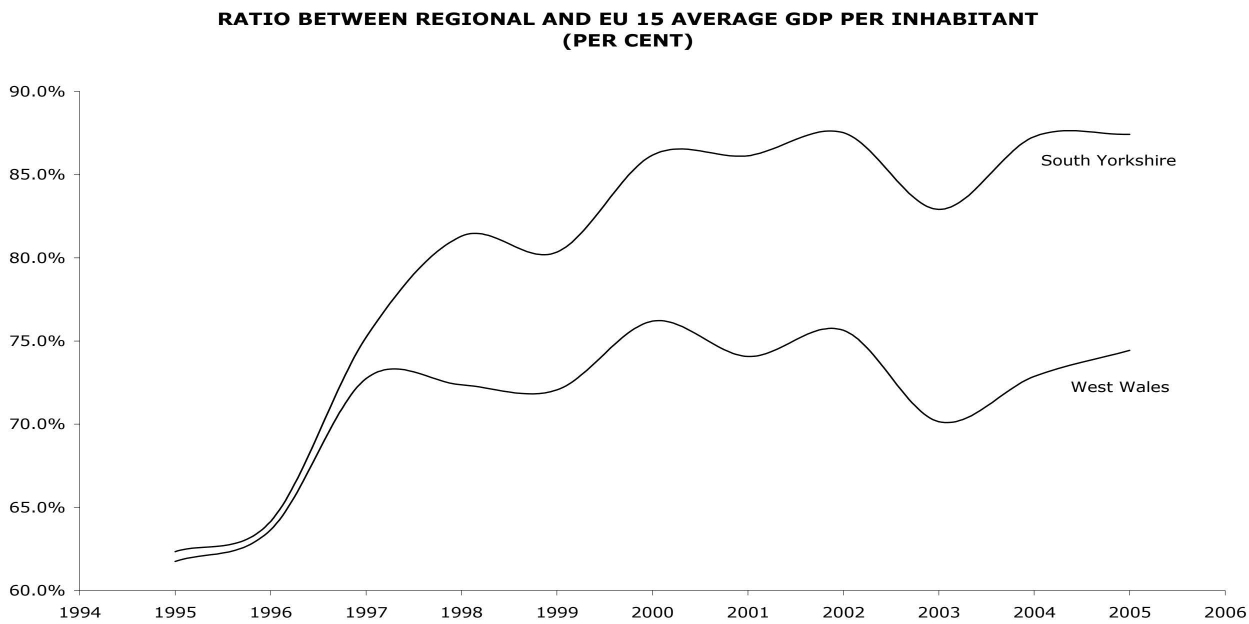
[89] Few authors do, in fact, notice that the system is somehow paradoxical, with regions that perform worse being – de facto – rewarded for not having achieved the initial objective of the programmes.

SY has, in fact, achieved the objective, will not be an Objetive 1 Region anymore, and will be in the 2007 – 2013 period a *phasing in* region[90]. As a consequence, in fact, the new programming period SY is financed within the "regional competitiveness" programme for the whole Yorkshire[91].

Overall the assessment of SY performance was provided by Professor Harvey Armstrong[92] at Sheffield University who is one of the leading expert in Europe on regional development "the programme managers had the merits to differentiate the stakeholders to involve for each typology of investments' and as a consequence they were successful both in maximizing the mobilization of civil society for the measures meant to increase equity as well as in involving the right experts where the priority was efficiency (like in the case of innovation seeking interventions).

The graph 4.2 describes how the differences between the two regions have materialized in recent years.

Graph 4.2 – ratio between ragional and UE 15 average GDP per inhabitat (per cent)



Source: Eurostat; accessed October, 2009

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[90] In the structural funds regulations the former Objective 1 Regions can be either "phasing in" or "phasing out" regions: the former have achieved the objective of reaching 75% of the average GDP per capita of the EU 15 to which structural funds applied in year 200o when the New Member States were not yet part of the EU since they joined in 2004; the latter are regions that have moved beyond the 75% GDP per capita of EU 27 but not of EU 15 and thus they are considered to have converged for a statistical effect.

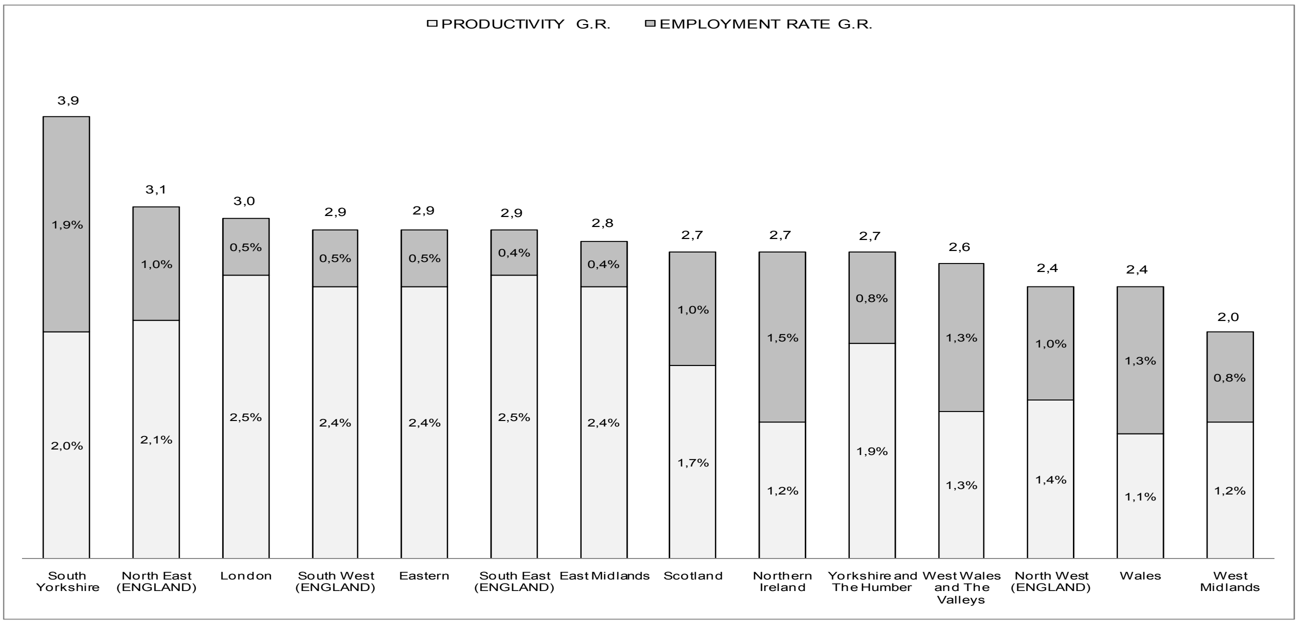
[91] Within this programme, one of the five priorities (the priority four Economic Infrastructure for a Competitive Economy) has been ring-fenced to SY. Therefore, overall Yorkshire was awarded 960 mil euros (583 mil euros from ERDF and 380 mil euros from ESF) of which 445 mil euros (271 mil euros from ERDF and 175 mil euros from ESF) goes to SY, whereas the programme is to be managed centrally by Yorkshire Forward and not any longer from Sheffield.

[92] Interview with Professor Harvey Armstrong, Professor of Economic Geography at Sheffield University, Sheffield, 18th June 2008

The graph shows the evolution of the ratio between GDP per capita of the two regions and the average GDP per capita in EU 15 as the main indicator of convergence. WW and SY started from very similar levels of income per habitant in the mid 1990s with almost 40 points of disadvantage versus European averages. The gap was rapidly reduced in the second half of the 1990s. However, a gap between the two started to materialize in 1998 and became wider while SY continued to converge and WW seemed to find a barrier to further convergence within the very 75% of the EU 15 average .

It is also interesting to see how the GDP growth rates, in the two regions, are a result of productivity versus employment increase. The table 4.2 shows the situation and compare it to the rest of UK regions.

Graph 4.3 – Contribution of productivity and employment date growth rates to GDp growth trates (1999 – 2005)



Source: Eurostat; accessed October, 2009

The data shows situations which are rather extreme for our two sub regions: SY is the fastest growing UK region and by far the one with the highest growth in employment rate. WW is one where economic growth has been the slowest and, more specifically, Wales has been the region with slowest increase of productivity.

These trends apply at a lesser extent to the two regions – Yorkshire and Wales – and, in particular, as far as productivity growth in Yorkshire, it is twice as high as in Wales.

The data on productivity are paralleled by other evidence which may be influenced by factors others than investments in R&D and that yet we expect to be impacted also by the capability of firms to innovate.

Before 2000 Wales's region (and WW) was, as we mentioned in chapter three, the region diplaying the largest number of FDI attracted, hosting the largest manufacturing firms and the only one whose manufacturing sector had not witnessed a decrease in number of people employed. By the end of the programme the situation appeared rather different. The table below summarizes the evolution as far as the size of manufacturing firms.

Table 4.2 – Average size of the firm

Region	*2000*	*2005*	*% change*
West Wales and The Valleys	**42,49**	**23,50**	**-44,7%**
North East (ENGLAND)	41,51	25,78	-37,9%
Wales	38,21	25,03	-34,5%
Scotland	34,16	23,10	-32,4%
Northern Ireland	33,84	19,71	-41,7%
West Midlands (ENGLAND)	32,27	19,64	-39,2%
South Yorkshire	32,11	22,11	-31,1%
North West (ENGLAND)	30,71	21,30	-30,6%
Yorkshire and The Humber	30,08	21,35	-29,0%
East Midlands (ENGLAND)	29,38	20,95	-28,7%
United Kingdom	27,77	18,45	-33,6%
South West (ENGLAND)	26,70	17,31	-35,2%
Eastern	23,30	15,82	-32,1%
South East	23,13	14,47	-37,5%
London	17,36	11,35	-34,6%

Source: Office of National Statistics; accessed May 2010

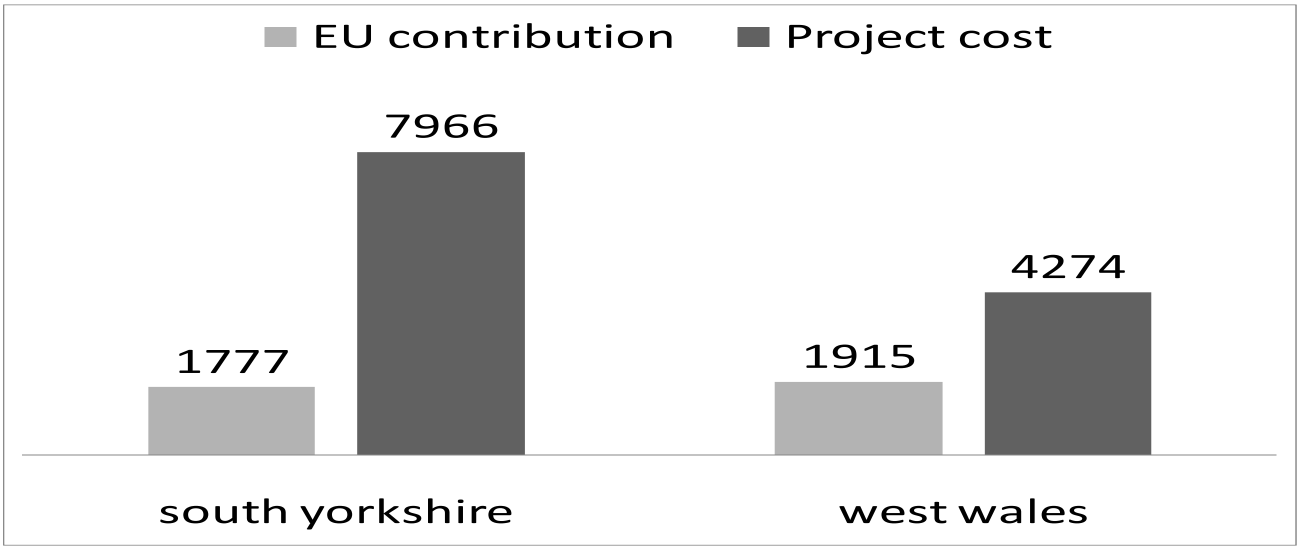
Whereas, WW was the area with the largest manufacturing firms at the beginning of the expenditures period that we are considering, the situation was very different only five years later and the reduction (-44,7%) of the size has been by far the deepest. The outcome does, in fact, appear even more worringsome if one considers that it is more the effect of the disinvestment of bigger firms than of the replacement of larger with smaller enterprises. The data on FDI attraction and the qualitative analysis on the investors' assessment on the quality of Wales' environment as a possible location of new industrial sites point – as mentioned to us by Ed Sheriff, Economist for the Economic Research Advisory Panel[93] - to "a sharp worsening of the region in the consideration of investors, whereas many mention the friendliness of the region towards innovation as a disadvantage".

These outcomes are, as we mentioned in chapter 3, in apparent contradiction with the behaviour of Wales and Yorkshire as far as the accumulation of research assets. If we, in fact, consider the percentage of GDP invested in R&D, in the 1998 -2003 period, it went up of 0,3% percentage points in Wales (from 0,83% to 1,13%) which is an increase almost double that of the one registered for Yorkshire (0,17% from 0,86% to 1,03%)[94]. This may, therefore, point to a much different efficiency between the two programmes as far as the way they spend R&D dedicated money.

Such a gap appears to be confirmed by the different capability of structural funds funded investments to attract further investments from private investors in the two regions: as we argued in chapter two, this can be considered a proxy of the quality of investments done, or of at least of their financial sustainability.

The graph 4.4 compares the two sub regions in terms of the capability of OB1 investments on R&D to yield co finance from private firms.

Graph 4.4 – Leverage of EU funds, Thousand of euro, Average EU contribution per project and average project investment, 2000 – 2006 Objective 1, South Yorkshire and West Wales (measure 1.1 for SY and 2.3 for WW)



Source: WEFI Database and SY OB 1 Directorate[95]

[93] Ed Sheriff, Economist for the Economic Research Advisory Panel, Cardiff, 6th September 2006
[94] Data for the two sub regions are not systematically collected but OB1 programme complements numbers support the hypothesis that growth rates for regions and subregions have been similar.
[95] The results should be further elaborated because part of the funds are awarded to the Yorkshire Forward and to the Welsh Assembly Government and then passed to the real recipients.

The SY programme is capable of mobilizing twice as much money per euro spent by the EC than WW. This is a signal of better selection of projects as well as better involvement of private investors in the main choices of the implementation process. We will shortly see that this pattern is associated – as per pur forecast in chapter two – to very different patterns in resources allocation strategies.

4.3 THE DIFFERENCE IN TERMS OF CONCENTRATION OF RESOURCES

We will now assess the presence of the two characteristics of a portfolio of successful innovation investments according to the innovation value chain we presented in chapter 2: the level of concentration and capability to mobilize private investments on interventions that have been triggered by the public administration. We will, first of all, consider the issue of the concentration that many on the fieldwork commented to be high in SY[96] and diluted in WW[97]: their opinions are confirmed by the numbers

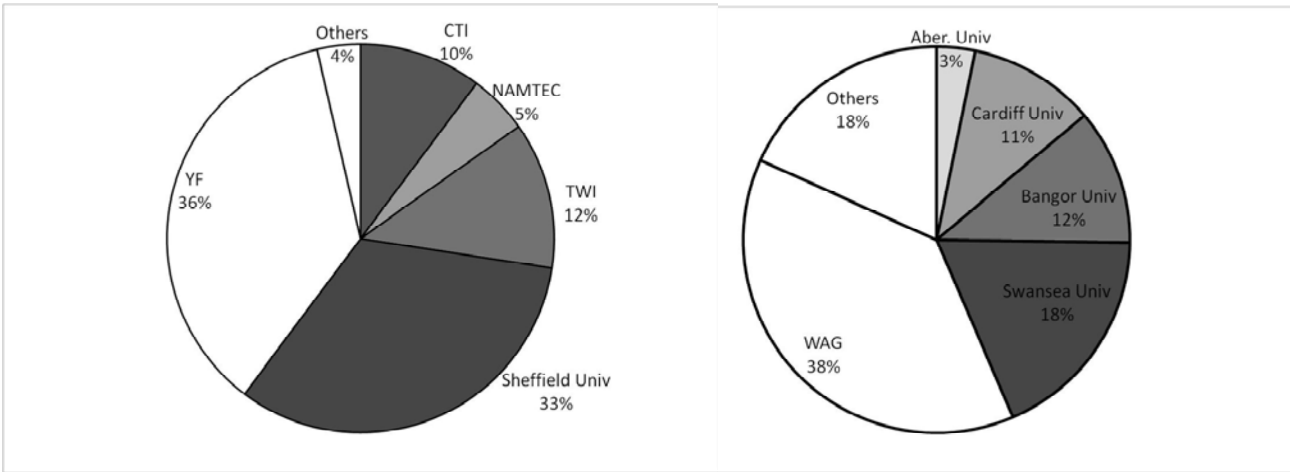
Two dimensions that are important when one considers the resource allocation are the distribution of funds amongst beneficiaries and amongst areas. We will first consider the former and then the latter.

The comparison between the two programmes in terms of distribution amongst beneficiaries is summarized by the following chart.

[96] Interview with Bea Jefferson, Programme Manager, Yorkshire Futures, Leeds, 19th June 2009

[97] Interview with Richard Rossington, Head of Science, Innovation & Enterprise Policy, Welsh Assembly Government, Cardiff, 19th June 2008

Graph 4.5 – Distribution of funds amongst beneficiaries, Percent, 2000 – 2006 Objective 1, South Yorkshire left and West Wales right; measure 1.1 and 1.4 for SY and 2.3 and 2.4 for WW; 100% = 100 Mil Euro SY ; 234 Mil Euro WW



Source: WEFI Database and SY OB 1 Directorate (October 2008)

If we consider that the funds awarded to Yorkshire Forward and to the Welsh Assembly Government (WAG) where passed to smaller recipients, and that the chart explicitly mentions the four final largest beneficiaries, two elements clearly emerge.

Firstly, in SY the allocation of resources tends to be more concentrated with the four largest recipients of funds being awarded 60% of the money. The allocation of the funds appears to be rather concentrated also in WW but to a lesser extent, with the four biggest recipients receiving 44% of the total.

These findings are confirmed by the other programmes' data on the number of the assisted companies that, again, say that SY's programmes managers are more focused than WW's ones: in WW the number was six times higher (64 against 10) which is also a consequence of the above mentioned choice to concentrate on SMEs in WW versus larger companies in SY.

More importantly, the chart says that the four biggest recipients are very different in the two cases. In WW they are all universities, including the Cardiff University, which is outside the aided area. In SY, although the biggest share of funding goes to Sheffield University which receives one third of the structural funds contribution, there are also three other private organisations.

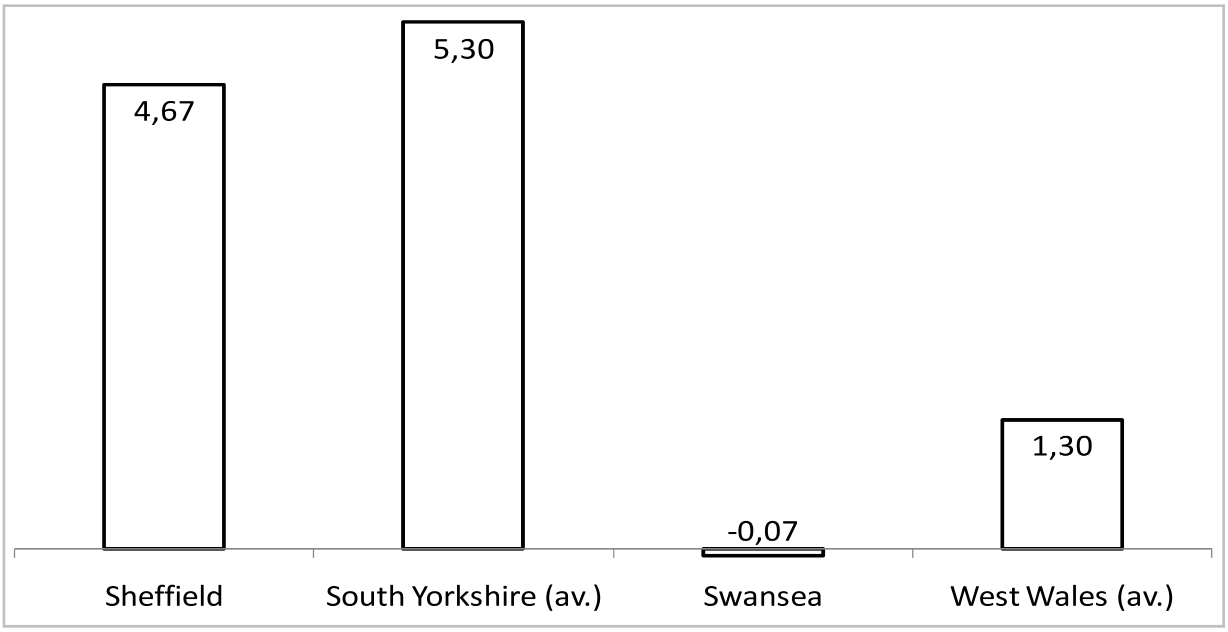
They are all very peculiar, no profit bodies (as we will see shortly in section 4.2.2) whereas CTI and TWI are *Research and Technology Organisations* - as for the definition of the british government - that are, in fact, joint ventures of metal industry related private multinational companies whose expertises could, then, be engaged into the implementation of the programme, and NAMTEC is a

public administrations led charity that provided to the programme managers the possibility to outreach the schools and the local communities.
On the contrary in WW the independent evaluator[98], which found that “only two percent of a sample of beneficiaries of firms benefiting from incentives (within priority 1 measures 1, 2 and 3 and within priority 2 measure 2 and 3) declared to have had R&D support or advice”. And it is the same evaluator that concluded that “priority 2 interventions may have been less focussed on high technology than might have been anticipated”.
Once again this difference in focus is the consequence of different choices that one can find in the programming documents: in WW, for instance, the priority was from the start the preservation of existing firms (jobs safeguarded were expected to be more than new jobs), whereas in SY there was, as mentioned, a bias towards the creation of new firms (new jobs were supposed to be twice as many as the safeguarded ones).
These data appear to not only say that SY’s programme was more concentrated in terms of resource allocation, but also that it was able to engage with more diverse, more qualified, specialized and internationally minded constituencies.
Whereas, the distinction between support of innovation and generic support of firms has further weakened in WW throughout the implementation of the development programmes, as the above mentioned independent evaluator appeared to find out.
We also tried to run a test of geographic concentration in the two programmes, and more specifically we tried to understand how strong the deviation is between the geographic distribution of the funds and the distribution that we would have had if we had allocated them just on the basis of the population. This is likely to be a sign of the ability of programme managers to make choices that are capable of contradicting a neutral distribution that may be in function of the distribution of population only.

In order to calculate the geographical concentration we compared the difference between population and structural funds intervention intensity[99]for each local community (four in SY and 15 in WW). We then calculated the average of the absolute values of these differences where a higher than average difference signals a distribution that is more dissimilar to one that would simply mirror the population, and thus concentration of money on some communities versus others.

[98] Old Bell 3 Economic Development and European Services, Mid Term Evaluation Update for the West Wales and the Valleys Objective 1 Programme 2000 - 2006
[99] This parameter was calculated using an indicator of job creation that in both programme was proportional to the money spent.

Graph 4.6 – Concentration index; Difference between population and job creation within local communities; Percent, 2000 – 2006 Objective 1, South Yorkshire (priority 1) and West Wales (priority 2)



Source: WEFI Database and SY OB 1 Directorate (October 2008)

The results of the table show a concentration that is four times higher in SY as opposed to WW. It is also to be noticed that whereas in SY there seems to be a concentration of funds on its most urban and research equipped community (Sheffiled receives a share of funds which is 5 per cent points higher than its share of the population), the same cannot be said for WW (where Swansea gets a share of funds which is almost identical to its share of population).

In conclusion, resource allocation seems to reflect clearer choices in SY than in WW. In SY the intention seems to have been to reward an excellent university and coalition that is multinational minded, or specialized businesses and research centres. In WW the programme seems to be dominated by universities (and public administration) with little involvement of firms and the money appears to be distributed according to size of local communities.

In the next two sections we will try to understand which specific institutional, administrative and social features produced these resource allocation patterns following the hypotheses envisaged by the innovation value chain which we described in chapter two. We will, thus, investigate the quality of decision making processes and the way the relationship between politics and administration impacts on it. Then in the section after the next, we will study how the implementation of the innovation strategies involves relevant partners and which is the role of innovation brokers and innovation hubs in developing and maintaining partnerships.

4.4 THE IMPACT OF DECISION MAKING PATTERNS

We will now explore the main decision making processes as well as the mechanisms by which programmes get implemented in the two regions.

We expect –as per our thesis - that better results tend to be associated to the concentration of R&D funds on specific industries and geographical areas that may present the critical mass that is indispensable for achieving a certain level of efficiency and that, in turn, such concentration is associated to higher capability to make choices.. Our hypothesis is that an increased focus will depend on clearer decision making processes in the strategy design and project selection, and that this will, in turn, be associated to an institutional context where politics has the responsibility of the main strategic choices , but where implementation is independent from political pressure (Dunleavy et al., 2006).

We will, now, consider the different ways by which strategies and project selection occur in the two regions, and the mechanisms by which the projects are implemented.

4.4.1. The impact of devolution in Wales

The real difference between SY and WW has, almost entirely, been due to the way Wales implemented devolution, whereas Welsh case appears to contradict some of the accounts of the effects of decentralization that we can find in, for instance, Oates, 1972, and Tanzi, 2008. In fact, as mentioned in chapter three the change in the process by which regional development is managed and the design of the organisation lay out of the 2000 – 2006 OB1 programme, coincided with the transfer of power to the newly elected Parliament being completed in July 1999.

This change has – in the case of Wales – produced two main effects: a) the creation of a large administrative body – the WAG - which has absorbed many technocratic bodies including the WDA and that according to the evidence of the field work changed the entire organisation culture of the bodies responsible for managing innovation programmes; and b) the empowerment of local communities that have found in the WAG a politically charged body with which to negotiate which is something that was much less possible when the administration in charge was a technocracy whose principal was the national government.

This was confirmed to us by the very people in charge of innovation strategies. For instance, the Finance Wales' Director Steve Smith[100] did confirm that the replacement of the regional innovation strategy did, in fact, imply the substitution of the agency with a "zero risk environment" with negative impact on the capabilities to pursue innovation that "requires that you account for failures". On the other hand, Adrian Healy[101], one of the main expert of Cardiff University on regional development policy, similarly recognized that local communities felt that "the new political ground had empowered them to ask redistribution of funds, much more than when they had to deal with WDA that was perceived as an representative of Whitehall".

It must, however, be said that this effect of devolution was far from obvious, where authors (Cooke and Clifton, for instance, 2005) reported that similar devolution patterns had opposite effects on the organisation of regional development policy in Scotland and Ireland[102]. As far as Wales, one, in fact, can not fully understand the type of devolution that was conducted if she does not consider the true political reasons for such decision. Morgan (1997b), for instance, saw the abolition of the otherwise successful Welsh Development Agency as "the culmination of a politically grounded, long lasting attempt to get rid of an organisation widely perceived to be the agent of a Conservative government in a Labourist region".

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[100] Interview with Steve Smith, Director, Development Funding, West Wales, Cardiff, 20th June 2009

[101] Interview with Adrian Healy, Director ECOTEC Research and Consulting Ltd. Expert of Regional Innovation Strategies, Cardiff School of City and Regional Planning, 19th June 2008

[102] Cooke defines, in fact, the Wales approach to govern development as *precautionary* and the one that emerged in Scotland as *visionary*[102]. Whereas a different approach is, then, the one that was followed by the third devolved region Northern Ireland.

The terms here refer to the higher propensity of Scotland to have produced innovation strategies based on projects of a significant scale and the tendency of Wales to give priority to what we called (in chapter one) *equity* when it comes to the distribution of funds.

The difference between the two cases appears in that in Scotland there has been more of a sense of a vision of what the devolution was about and what kind of Scotland was supposed to emerge from the process (which are, reflected by the larger turn out and bigger differences between the "yes" and "no" to the devolution referendum). These differences in institutional and political conditions have – amongst other things - led Scotland to delegate some of the economic governance to the Scottish enterprise which has enjoyed autonomy and has deployed an ambitious plan both in terms of targets and capability to establish specific priorities. Whereas, as mentioned, Wales has decided for the gradual absorption of one of the first and most distinctive RDAs - the Wales Development Agency - into the WAG.

The trend was different in Northern Ireland, where notwithstanding political problems, the Industrial Research and Technology Unit (IRTU) is considered a benchmark with its attempt to integrate private venture capitalists into the public resources allocation and project selection processes (Cooke, Roper and Wylie, 2003).

In any case, the combination of the two effects – change in the organisation of the programme management, change in the the role of local communities - did result into a shift towards public administration of the responsibility of carrying out tasks that require added value skills and some propensity to risk taking. Such a shift weakened - according to a number of authors including, for instance, Jones-Evans, 1998 - the efficiency by which these activities are performed. Moreover, the replacement of a quasi private agency with a public administration/ political body has meant that the entire process of resources allocation tends to be less capable to resist political pressures and this may mean that the portfolio of projects tends to get more diluted.

SY did not experience the same discontinuity. Institutionally, it has always been a sub region within a region whose government body is not elected and is, in fact, appointed by the national government. The OB 1 programme is managed by a programme directorate and programme monitoring committee that has been capable of engaging private and non profit partners. The role of the RDA has – unlike the one in WW - gradually increased along with the number of the employees and the agency itself has increasingly been able to operate as a coalition of government and business partners.

We will now firstly explore the formal mechanisms by which the OB1 strategies are developed; we will then see how the expansion (in SY) and reduction (in WW) of the role of the regional development agencies makes a difference.

4.4.2 Two different implementation processes within the same structural funds regulation framework

The SY programme management is characterized – even in the institutionalized decision making procedures – by a strong pragmatism and thus accountability to results – within the so called Programme Directorate that we will describe shortly – and a partnership that seems to be oriented towards leveraging on skills and financial or technological capabilities that may be helpful in the implementation of the programmes and projects.

In fact, the main contributors to the development of the strategy and of its implementation are:

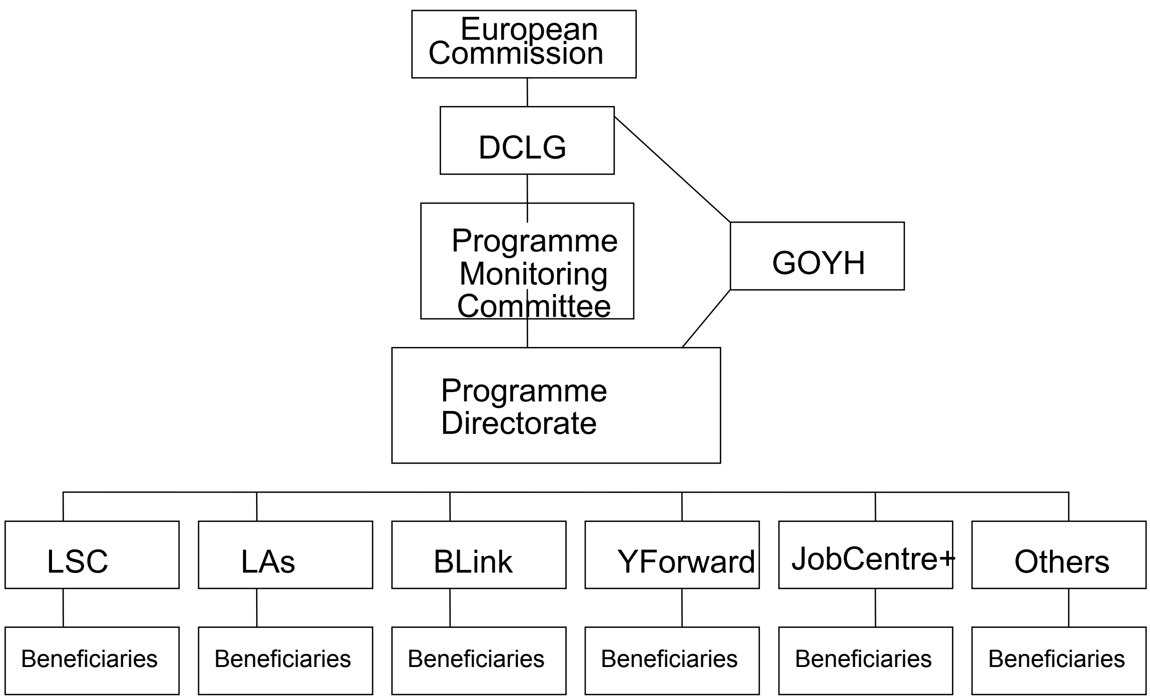
1. the Government Office for Yorkshire and the Humber that were responsible for drafting and negotiating the original programme (using a local Drafting Team); the Government Office outpost is part of the Department of Communities and Local Government (DCLG).

2. the SY specific Objective 1 dedicated institutional infrastructure articulated into: a Programme Monitoring Committee and a programme Directorate (both appoint a number of groups that specialize themselves for typology of investments or specific issues);
3. a number of “sponsors” are then responsible – together with the programme directorate – to select the beneficiaries that are the ones that implement projects; amongst them the most important is Yorkshire Forward, the RDA that is responsible not only to manage a portion of the funds, but also to design (and implement) the innovation and development strategies for the wider Yorkshire against which the consistency of the whole OB 1 programme and, in particular, of the measures dedicated to innovation must be assessed.

The chart below describes the reporting lines between the Directorate and the organisations - local authorities and other lead organisations: Business Link, the RDA, LSC and Job Centre Plus, local authorities, to which some of the decisions and of the activity of selection of the projects are delegated.

Chart 4.1 - Programme Management (South Yorkshire, objective 1, 2000 – 2006)

Programme Management (South Yorkshire, objective 1, 2000 - 2006)



Source: YF

The Programme Directorate and the RDA – Yorkshire Forward – have been de facto, the leaders. The Directorate is the ultimate decision maker and it is a temporary, project based organisation (the programme directorate) referring to a regional office part of the English public administration. It reports to the Monitoring Committee, to the Regional Office, to the Government and, ultimately, to the EC. Half of the employees are civil servants (they come from the local communities) and all are employed on a programme base and their contracts finish when the programme comes to an end[103].

The temporary nature of the programme managers job is considered to have both positive and negative consequences: on one hand this is a powerful incentive to the staff to achieve the programme objectives because this can improve their employability within the public sector for further assignments of similar nature; but on the other, the risk is that the institutional capabilities that are established may be wasted after the conclusion of the implementation process.

As one of our interviewee, Costas Georgiou[104], Research and Evaluation Manager of the Objective 1 Programme Directorate, warned when the programming period was still running in 2006, this latter possibility had already materialized for some employees that had been recruited by Cornwall and the remaining UK convergence regions[105].

The comments from most of the people we met is that, however, the net effect of the flexibility and per project organisation of the OB1 Programme was that " the programme was steered – as one of the expert of regional development, Professor Armstrong[106] , acknowledged - towards realistic objectives". Moreover, "through a good project selection its effectiveness was increased by minimizing the waste that programmes like this normally produce". This is especially true, according to some, for the investments in R&D whose return risk is sub optimized when distributed to small and medium firms.

WW structural fuds programmes' strategy definition and implementation processes have been within the political responsibilities of the Welsh Assembly Government that nominated the Welsh European Funding Office (WEFO) responsible of managing Objective 1 and other Structural Funds programmes.

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[103] Similar arguments hold for the Regional Development Agency and other bodies like the Business Link

[104] Interview with Costas Georgiou, South Yorkshire Objective 1 Directorate, Shefield, 10th November 2006

[105] Mr. Georgiou himself, however, was recruited by other Yorkshire's regional institutions meant to foster development and his human capital was not lost.

[106] Interview with Professor Harvey Armstrong, Professor of Economic Geography at Sheffield University, Sheffield, 18th June 2008.

The WEFO was set up on 1 April 2000 as an Executive Agency of the National Assembly for Wales, incorporating the staff and functions of the Welsh European Programme Executive Ltd. and certain divisions of the National Assembly for Wales. In July 2003 WEFO became part of the Economic Development and Transport Department of the WAG. In April 2006, following the above mentioned incorporation of the WDA and the Wales Tourist Board (WTB) into the WAG, a wider Enterprise, Innovation and Networks Department was established. More recently (May 2007) the Department has been renamed the Department for Economy and Transport (DE&T) and WEFO remains the designated Managing Authority and Paying Authority within the WAG under its own Chief Executive.
The difference with SY is evident. In Wales we have a public administration, staff are civil servants and permanently employed, incentives are small, and objectives tend not to be OB1 programme specific. The WAG is accountable to its electorate, which obviously makes its opinions on the basis of a number of policies of which structural funds are only one (although important).
In SY staff are not civil servants. Civil servants are to be reallocated on the basis of a number of factors (including programme's results) to other functions at the end of the programme. Accountability lies with the central government that can use the programme directorates (and regional development agencies) of other regions as benchmarks.

The WEFO has the leadership of the process, the power of controlling, steering, and revising the OB1 programme which was formally with the Programme Monitoring Committee. The PMC is chaired by a Member of the National Assembly for Wales (who is nominated by the Economic Development Minister), and has other members, six from each of the public, voluntary/community and private/trade unions sectors (as well as 8 specialist statutory advisors and 4 EC advisors).

The Programme Monitoring Committee has, then, both in SY and WW, the overall responsibility of ensuring that the Programme is delivered according to plan and takes strategic decisions about the allocation of resources. Even in this case, the differences are clear.
In SY the participants to the committee are fewer and they represent specific industries (mostly metal), research domains, and NGOS that are relevant for the programme objective to reach it's potential targets.
In WW the partnership structure is diversified and fragmented and this is important in terms of the selection and implementation of projects, and the subsequent consequences of the dilution of the project's portfolio. As we will elaborate in the section on the approach to partnerships, the programme's governing body exposes the programme itself to political pressures of the various local

communities. The focus becomes mostly on political bargain and less on possible solutions to specific problems. The resources also tend to be allocated in a less concentrated way (as we demonstrated) and the chances to create competitive advantages in terms of innovation of firms and research centres become smaller.

4.4.3 Two opposite evolution patterns for the regional development agencies

In most structural funds programmes – and this also applies to Spain as we will see in the next chapter - the design of the strategy is centred around the programme directorates. The implementation process is, however, mostly delegated or supported by development agencies working alongside the administration.

The evolution patterns followed by regional development agencies are, as we anticipated, one of the main differences between the two programmes we are analysing. Whereas Yorkshire Forward (YF) were founded at the beginning of the programme and, since then, has continued to expand its scope, in WW the WDA, which used to be considered one of the European benchmarks of a regional development body, has been gradually absorbed into the Welsh Administration during the programming period itself.

Yorkshire Forward was created in 2000. It is not a governmental organisation, and its employees are not, technically speaking, civil servants. Out of 300 employees, 200 are retained on a long term basis and the remainder are project managers. Their appointments last as per the duration of the project. This project based tenures do, then, represent a common feature of the entire structural funds and development programmes implementation processes in Yorkshire.

Most of the employees have a similar background: their core experience is in the public sector, frequently dealing with private entities[107]. The organisation is meant to be based - as confirmed by Alex Mc Whirter, working in Business support unit at Yorkshire Forward[108] - on identification of objectives (general and articulated by business units), continuous monitoring of the results, and incentives. The departments of the Agency are, in fact, identified on a management-by-objectives

[107] It is directed by Terry Hodgkinson, as Chair, and Tom Riordan, as Chief Executive. They both have backgrounds in between the public and private sectors. Mr Hodgkinson' s main other experience is in the regeneration of industrial sites and areas (he is currently the chair on Magna Holding Ltd, a property development and investment company), and Mr Riordan's is on the environment (he represented UK in UN negotiations on climate change and endangered species).

[108] Interview with Alex Mc Whirter, Business support, Yorkshire Forward, Leeds, 20th March 2007

approach and correspond mostly to business lines to which specific products/ clients/ targets can be attached[109].

The organisational chart is not immune of problems and as Gill Browning[110], Strategy Manager at Yorkshire Forward clarified “it is to be better defined in terms of clearer separations of vertical/ clients or product related areas and horizontal/ services functions”. Yet the organisation appears to allow for the identification of objectives and of individual and group responsibilities for their achievement that matter in terms of remuneration and career paths.

One of the main tasks of the YF is the development of the overall economic development strategy[111] as well as the innovation strategy for Yorkshire and The Humber. The Objective 1 and the future Competitiveness Programme are supposed to be consistent with the plans for the entire region.

In the case of OB1, however, the peculiarity is that the programming documents of Objective 1 for the 2000 – 2006 expenditure cycle were drafted before the RDA was created. The influence of the agency has therefore been exercised on the review of the programme Single programming Document in 2004 and it has contributed more significantly to the drafting of the programming for the 2007-2013 period.

The organisational features of the YF confirm most of the considerations we made about the programme directorate. It is a technocratic structure which has the advantage of being responsible for objectives to the government, and has also been drafted in a way so that it maximizes the dialogue between government and business. The fact that the responsibilities of the agency are clear (and not confused with the roles of many other policies) and the temporary nature of the assignments of most staff seem, moreover, to have created a corporate culture where as Gordon Todd[112], Innovation

[109] More specifically the Agency has five main organisation units: a) business directorate which deals with enterprise development, science, technology & innovation, cluster development (and also marketing & communications for the agency) etc.; b) environment directorate that follows rural and urban renaissance, tourism, property & development; c) economic inclusion function that is responsible for transport, learning & skills, communities and human resources; d) strategy directorate which is in charge of economic policy, investment planning & strategy, Yorkshire futures (the body that develops statistics and studies on the Region’s performance); and e) finance directorate that is in charge of evaluating performance, knowledge & IT.

[110] Interview with Gill Browning, Strategy Manager, Yorkshire Forward, Leeds , 20th March 2007

[111] The strategy developed by Yorkshire Forward is a three year process and goes through two draft exercises. Formally the document is for a ten year period but, in fact, it is reviewed in a major way every three years with a longer term view on the subsequent seven years.

[112] Interview with Dr. Gordon Todd, Innovation Manager, Yorkshire Forward, Leeds, 16th May 2008

Manager at YF declared “the agency is used to being scrutinized and appears to be more open to engaging in public debates”.

As far as Wales, instead, the incorporation of the WDA in the WAG has signposted the history of the regional development strategies (Cooke and Clifton, 2005, Morgan, 1997).

At the time of the incorporation, one of the problems of the WDA was said to be the lack of public accountability (Morgan, 1997) seen as a price to be paid for high autonomy in decision making. Public accountability, however, did not seem to have been increased by the end of the experience of the WDA and its partial replacement with organisation like Finance Wales (FW) (Cooke and Clifton, 2005).

FW is, in fact, the most relevant of the agencies still engaged into regional development still outside the public administration. FW is described as the financial vehicle to realize the creation of new innovative companies and spin offs as a key driver of the Welsh Innovation Strategy. FW was established in 2000 with the objective to provide commercial funding (debt and equity) to small and medium-sized businesses (SMEs) throughout Wales, enabling them to realise their potential for innovation and growth at critical stages of their life cycle.

Even FW, however, has a degree of autonomy which is not comparable to other development agencies. It is, in fact, a subsidiary company of the WAG, although it operates on a commercially independent basis. Its decisions are still influenced by policy makers and the public administration at the board level, “where it is the board’s investment committee that approves the most important deals” as Steven Smith[113] confirmed to us. In fact, although the law says that the seven board members must be independent representatives of business and research communities, they are nominated by the Welsh Government (and employees of the company and its directors can only be observers).

The political nature of the projects selection process seems to have as a consequence the fragmentation of the investments (as it was observed as far as the measures of the OB1 programmes dedicated to innovation and that we described in the section 3): the company’ s initial capital of 130 million GBP (provided by the Welsh Assembly for 15 million, the structural funds for 50 million - 70% from Objective 1 and 30% from Objective 2 - and by Barclays for the remaining 65 million) has been distributed to 1,700 investments into Welsh SMEs which accounts for less than 100,000 GBP

[113] Interview with Steven Smith, Director, Development Funding Finance Wales, Cardiff, 20th June 2009

of support per firm. This result seems even more sub optimal if one considers that, in theory, FW should have as its core business, the provision of capital for “early stage”, “expansion”; MBOs, MBIs and employee buy outs that typically require much more significant funding per firm.

In short, the two regions experienced opposite patterns in terms of evolution of the regional development agencies. In Yorkshire, the RDA was created at the beginning of the programming period and became progressively more important by giving the management of the development and innovation programmes the added value of a dedicated, independent infrastructure. In Wales, the RDA was progressively dismantled and absorbed within the public administration where the decisions became more risk adverse and more exposed to the political pressure of different constituencies.

The next section will significantly develop these results. The independent body of SY also seems to have been better capable of engaging stakeholders whose skills, strengths, and technology is essential for the success of the programme, into the process. Whereas the elected assembly of Wales seems to have, instead, consumed a lot of energy in the development of merely formal participation channels.

4.5 THE ROLE OF PARTNERSHIPS

The second main hypothesis to be tested is an explanation of how differently focused and differently efficient portfolios of innovation projects, which depend on different degrees of involvement of partners that may be relevant to the capability of programme manager, are able to identify the areas where to invest and to mobilize additional investments on research

We expect that better outcomes are associated to partnerships amongst research, government, business, and civil society since those programmes have the advantage of incorporating local knowledge of problems and opportunities, and that the decisions may be more effectively implemented because they are shared, and that the visibility of the projects and the expectations that they raise are higher.

We, however, expected these partnerships also to be collectively accountable to results and, as a consequence, focused on project or programme related concrete activities or choices, whereas they sometimes risk to be purely formal or to represent a cost in terms of time and quality of choices (Wilson, 2004).

In the framework of the innovation value chain that we introduced in chapter two, the hypothesis of the importance of high quality partnerships is completed by the idea that specific actors (innovation brokers and innovation actors) and mechanisms are necessary for these partnerships to develop.
We will now explore the formal mechanisms by which partnerships are developed and engaged in WW as well as the approach that SY has developed.

4.5.1 The weight of local communities in West Wales

The procedures through which local stakeholders are involved in the implementation of the programmes in WW are rather complex and the overall impression is that an attempt is made to formalize each detail of how participants are selected and how they get involved into decisions.

As Sue Price[114] who was in charge of the R&D portion of the OB 1 Programme noticed during the interview "the main partners with whom Welsh programmes need to be negotiated are the *local partnerships* consisting of representatives of the public administrations as well as private and voluntary sectors". The local partnerships represent the fifteen local communities. They were established in 1999 and were given operational responsibility for implementing some aspects of the programme, notably in respect to supporting project development. The aim used to be the promotion of partnerships working throughout the region to secure high quality and integrated regeneration and economic development programmes[115].

For the specific role of assessing projects, it must be said that for certain measures the programming documents maintain that "indicative allocations to local partnerships have been established". In this case the role of the partnerships becomes much more important and thematic groups maintain a strategic overview.

In addition to local partnerships, the implementation of the Objective 1 Programme was also supported by *regional partnerships*. It took slightly longer than local partnerships to set up, with the first in place in January 2000 and the last one established in August 2001. In some cases, most notably the Agri-food Partnership, the regional partnerships emerged out of existing all-Wales

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[114] Interview with Sue Price, Head of Branch for Programme Management Division Business support, Tourism, ICT, R&D, Energy, Transport and Environment, Welsh European Funding Office, Merthyr Tydfil, 16th April 2007

[115] The key roles of the local partnerships were established such as to: a) "Develop and review a local strategy or action plan to target Objective 1 resources to local areas of need and opportunity; b) Monitor progress in implementing the strategy and identify gaps in provision; c) Assist applicants in developing projects which will deliver the objectives of the strategy; d) Promote the programme locally"(Notes from WEFO's statute)

partnerships and were thus relatively quick to develop. Others, such as the infrastructure partnership, were entirely new entities and thus took longer to become established.

Unlike local partnerships, regional ones are differentiated according to the theme of their specialization[116].

Each of the partnerships was required to develop a strategy for its area (Local Action Plan - LAP in the case for the local ones), and for its sector (Regional Action Plans - RAP in the case for the regional ones). The two sets of strategies were to be submitted simultaneously[117]. The reasons for such a provision was to ensure parity of esteem, whereas in fact, one may argue that most importantly the strategies were to be coordinated with each other.

Local and regional partnerships, thus, created a framework that since the outset seems characterized by a multiplication of partnerships and, as a consequence, of strategic documents with fifteen local and ten regional strategies to be drafted. And the situation was further complicated by the subsequent creation - advised by a consultant called to "streamline" the process[118] - of four further strategy partnerships[119].

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[116] The objectives of the regional partnerships are on paper "to: a) Develop a regional strategy for the use of Objective 1 monies to add value to national policy within their area of expertise; b) Assist, where appropriate, with project development; c) Assess and recommend projects to the strategy partnerships (see below); d) Identify gaps in provision; e) Liaise with local partnerships on project assessment and development".

[117] The first time by September 27th 2000

[118] The presence of this organisational problem was, in fact, immediately recognized by the very Welsh Government in November 2000 and a *Task and Finish Group* was established with the objective to overhaul the just established structure for delivering the Objective 1 programme. The Group was composed of a core group of seven individuals, all of whom were individually selected by the National Assembly, to develop with immediate effect a revised model for implementation. More specifically, the remit of the group was to:
"Bring together the local and regional action plans and look at their fit within the strategy of the SPD; allow the delivery of Objective 1 to go ahead on time and bring back confidence into the process; secure absolute clarity and a strategic approach to the process
Brought together for the first time as a group on November 20th 2000, the deadline for producing a strategy was December 12th 2000. The report produced focused on three areas of the Programme's delivery.

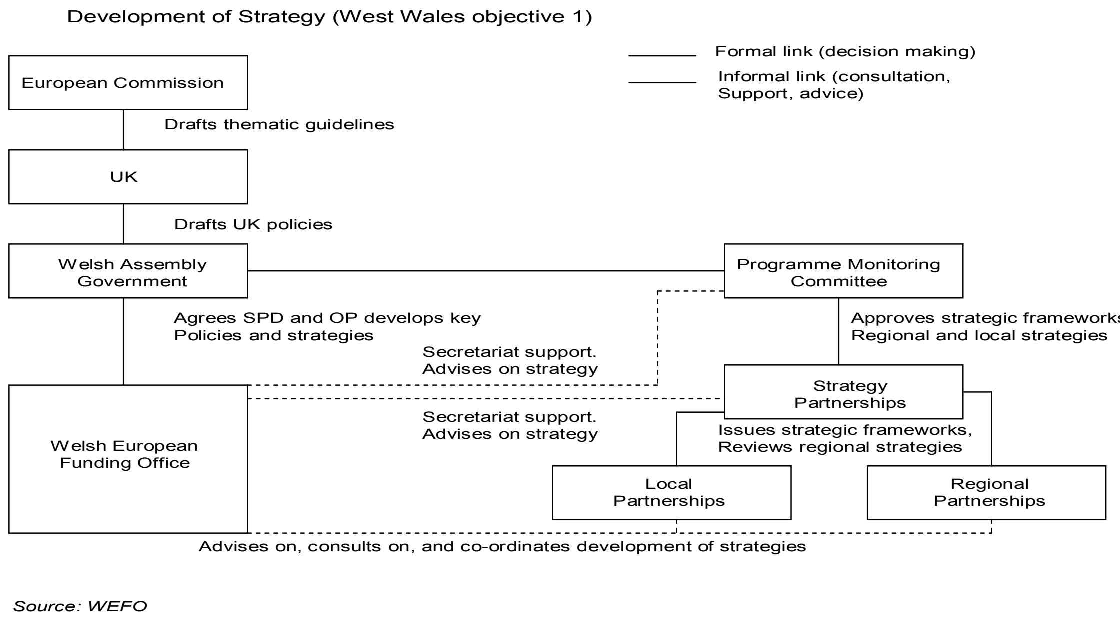
The main area of weakness identified was the fragmentation between local and regional partnerships. This was tackled in two ways. Firstly, the recommendation was made for a cutback in the number of RAPs (see above).Parallel to this, the different partnership groupings were 'encouraged' to reflect 'cross fertilisation' through their membership. WEFO officials were required to attend the RAP and LAP meetings in an advisory capacity, thereby helping to ensure consistency of the process across the board.

[119] However, the real paradox was that – vis a vis a problem of multiplication of structures - the Task and Finish Group recommended the establishment of further four strategy partnerships. Constituted on a 50:50 local/regional basis (and also gender-balanced), the expectation was that 'their existence would make competition between local and regional partnerships redundant'. The Task and Finish Group report was approved by the Programme Monitoring Committee on December 15th 2000 and in January 2001 these recommendations were implemented and one more layer of partnership was realized. The four *strategy partnerships* were:

In addition to an already complex architecture, and in response to the Commission's 'encouragements' for all three sectors to be represented in Structural Fund partnerships, Wales has sought to encourage equal representation from the public sector, the social partners, the voluntary, and community sectors in the composition of certain key partnerships – the so-called 'three-thirds principle'. This principle was initially agreed upon in 1999 by the Economic Development Committee (EDC) of the Assembly. It was agreed that each of the three sectors should be represented in equal number within each of the partnerships. In addition, it was also established that there should have been a gender balance in each of the partnerships which meant, in practice, that at least 40 per cent of members should be women. This target for the gender balance of partnerships was a requirement for all aspects of the partnership. In summary, the map consists of almost thirty groups each constructed to balance the gender and representation of various stakeholders.

Overall, the interaction of managing authority, monitoring committee and partnerships create an implementation process as summarized by chart 4.2.

Chart 4.2 – Development of Strategy (West Wales objective 1)



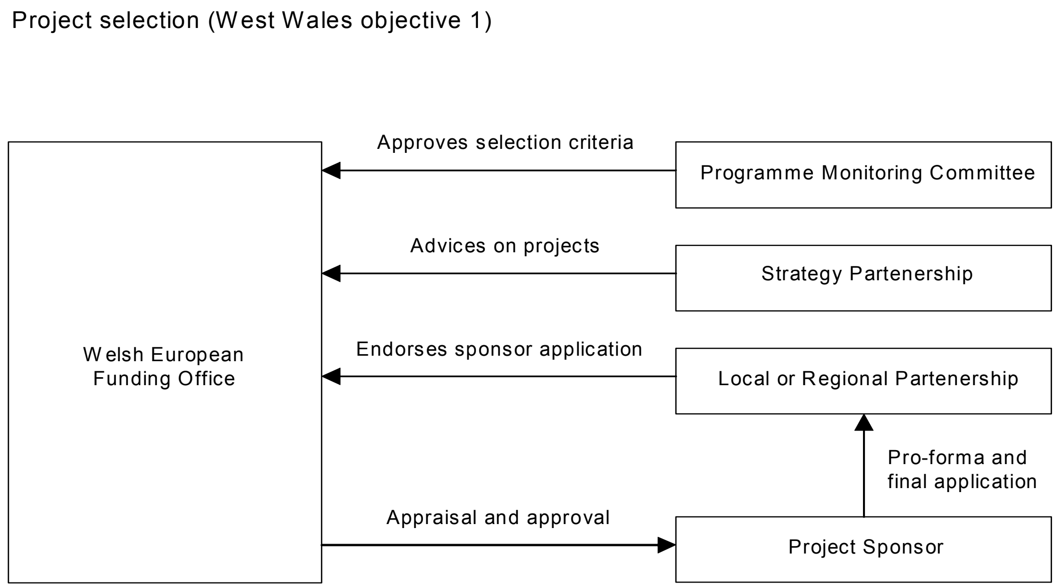
Source: WEFO

Business Assets Strategy Partnership (BASP): considers projects submitted under Priorities 1, 2 and 6, with the exception of stand-alone ESF projects submitted under Priority 1, Measure 4 (apart from projects relating to entrepreneurship) and Priority 2, Measure 4; Community Assets Strategy Partnership (CASP): considers projects submitted under Priority 3; Rural Assets Strategy Partnership (RASP): considers projects submitted under Priority 5, Human Assets Strategy Partnership (HRASP): considers projects submitted under Priority 4 and stand-alone ESF projects submitted under Priority 1, Measure 4 (with the exception of entrepreneurship) and Priority 2, Measure 4.

According to WEFO the strategy partnerships were charged with the aim: "to develop and review of strategic frameworks for the use of Objective 1 funds; to carry out a qualitative assessment of individual projects already proposed by one of the regional or local partnerships, and making final recommendations to WEFO on the selection of projects; to monitor the impact of the Programme against these strategic frameworks and the identification of gaps in delivery; to facilitate the effective communication amongst all partnerships".

The above chart describes the role and the interaction of the various actors involved into the definition of the strategy. It is even graphically evident that the process is a rather participative one. However, the decision making process as far as selection of projects is even more interesting.

Chart 4.3 – Project selection (West Wales objective 1)



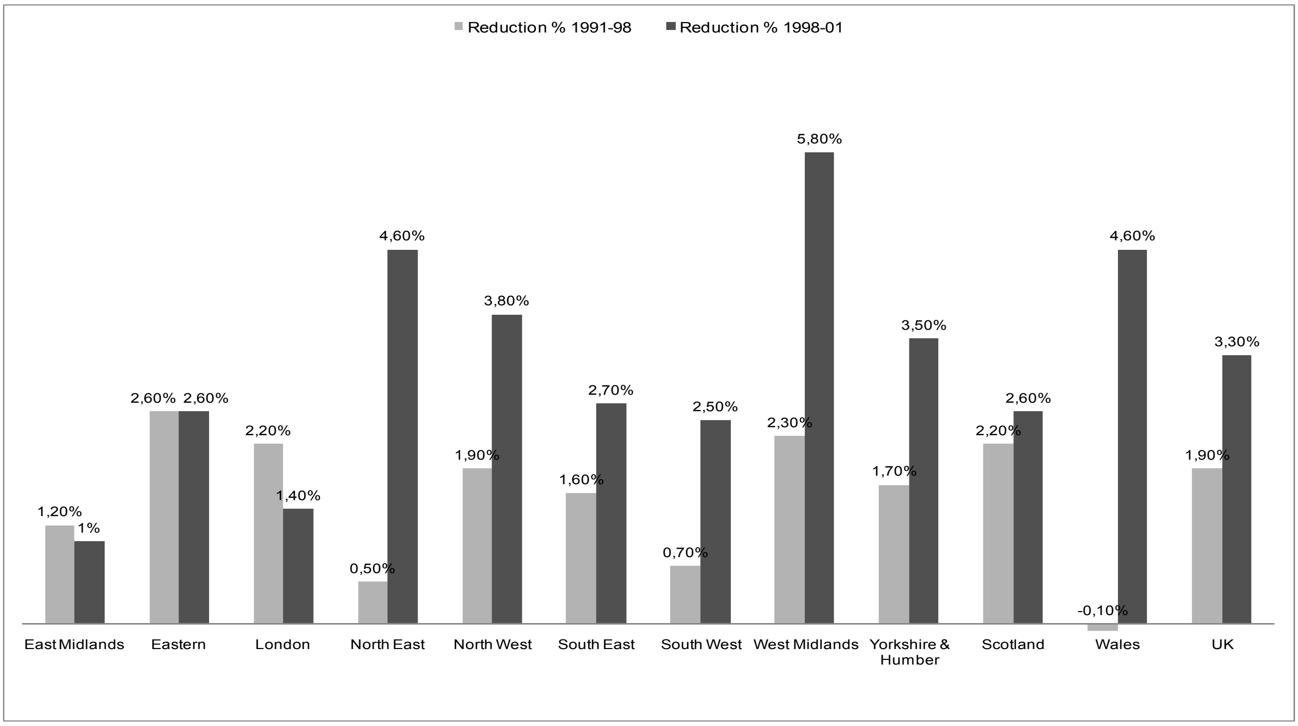
Source: WEFO

It appears that WW partnerships have a significant power with strategy partnerships "advising" and local and regional partnerships even having the final word ("endorsing") on projects. Overall it appears that the governance of the programmes is steered by the public administration and goes through an intense negotiation with local partnerships. The result is, however, a system which looks rather fragmented, more based on institutional relationships than oriented to completing projects. This resulted, as we will see later in this chapter, into a dilution of the funds targeted to R&D and most likely in a diversion of these funds to financing projects with low contents of research or, even more broadly, innovation.

The even more important feature of the mechanisms by which in WW partnerships have been developed is that they have been almost entirely delegated to procedures written in programming documents. No real provision was made in order to promote the emergence of an actor – one of the innovation brokers or of the innovation hubs – that are, in our theory, indispensable to making partnerships capable to deliver results. In fact, it was the very WDA that in the 1990s (Morgan, 1997) tried to play this role in fostering partnerships of different actors within the same value chain and, thus, even this approach to partnerships seems to be a legacy of the institutional modifications that we have described before.

However,iIt should be, recognized that as Richard Rossington[120], Head of Science, Innovation & Enterprise Policy of Welsh Assembly Government recognized "the partnerships layout that we have described is, also, the result of a change in the economic structure of WW that was more rapid than the similar evolution elsewhere in Britain".
If one looks, in fact, to the evolution of employment in manufacturing industries finds a situation as the one pictured by graph 4.7.

Graph 4.7 – UK regions Manufacturing employment, yearly growth rates, percentage of total, 1991 – 2001



Source: ONS

It is interesting to notice that Wales went from being the only region where the number of people employed in manufacturing was not shrinking, to being the one, in the 1998 -2001 period, where the decrease was the largeest one.

This hints towards a rapid process of deindustrialization of a regional economy that seems to heavily depend on manufacturing. It happened within a much larger process of restructuring that saw the

[120] Interview with Richard Rossington, Head of Science, Innovation & Enterprise Policy, Welsh Assembly Government, Cardiff, 19th June 2008

entire UK loose in six years (between 1994 and 2002) half a million of the 4.8 million manufacturing jobs that it had in 1994 – with the trend in WW even stronger. This loss was more than compensated by the gains in services and especially in public administration where in the same period UK gained 1.2 million jobs (an increase of around 15%). Such an increase in public services was even more pronounced in Wales where the public sector grew by one third in the same years.

It is, therefore, likely that these trends facilitated a modification in institutional and organisation settings which started since the devolution (Cooke and Clifton, 2005).

Attraction of FDI of large multinationals was replaced by a different strategy focused on SMEs. But it is also true that – viceversa – the reduction in number of large firms had an impact in terms of possible leadership in industrial policy. Moreover, as described before, the expansion of the public administration may have consequently had the same fate of the WDA , in that it went from being an independent body to being absorbed into the WAG and the people in charge of igniting and sustaining economic development became civil servants.

We will shortly see that the SY approach was rather different. The choice here has been not to create complex mechanisms of partnership generation but rather to encourage and strengthen partnerships that already existed. This reduced the lead time necessary to create them, but also empowered coalitions that were not artificial, drafted around specific programme requirements, or motivated by specific projects and their expected outcomes.

4.5.2 The partnership based organisations in South Yorkshire and the advanced manufacturing park

As far as partnerships, the SY strategy is significantly different from the one we found in WW. In fact, as we will see shortly, the case of SY does, in fact, introduce a way by which partnerships are developed that is different from the one that is envisaged by our "innovation value chain" (in chapter two) as well as by the mechanisms that the EC appears to promote.
SY partnerships are, in fact, embodied into special not for profit organisations whose members come from diversified backgrounds – research, firms, civil society, government – and whose interactions is seen by this author and others as crucial in order to generate sustainable innovation. The difference of this approach is that not only that these partnerships are already existing and thus the programmes do not incur in the lead time necessary to create them, but also that they are not artificial, drafted around

specific programme requirements. In fact, the various stakeholders are motivated by specific projects and their expected outcomes.

Alongside these industry specialized partnerships, the Programme Directorate of SY OB1 Programme is also developing partnerships with local communities. The local communities involved however do not cover the entire territory but only the very poor areas and are mostly involved in community regeneration projects and not in R&D activities. The project appraisal is, unlike WW, made independently by the Programme Directorate. Moreover, the picture of the partnerships is completed by the OB1 Programme Monitoring Committee that features less participants than the one in WW and has less intrusive functions.

However, as pointed out, the real mechanism to generate partnerships and leverage on them is through pre-existing bodies that are, in fact, partnerships themselves.

The way SY has approached the development of partnerships has been rather peculiar in terms of pragmatism. The main actors of the strategy have been organisations that are themselves no profit and partnerships amongst firms and universities, whose core activity is R&D in a way that is rather particular. Barry Jackson, Head of Finance and Management Services of Castings Technology International (CTI) explained, in fact, to us that some of the knowledge that these organisations produce becomes, at least partially, a "common good" of the partner organisations[121]. This method of pooling technical know-how and experiences, provides a reduction of the costs of the R&D and competitive advantages to companies are engaged into different industries, although they all demand metal for different uses.

The strategy that SY has envisaged, is one of saving the traditional focus of the region's metal industry and, in fact, gradually specializing in the research segment of it. The OB 1 programme has, in part, reflected and, in part, facilitated the emergence of such a strategy and we, therefore, observed a quite interesting case of an innovation strategy extremely specialized on the core competences of a region and of high added value for the regional economy.

More specifically, one of the main choices of the OB1 Programme has been to fund the creation of an innovation hub (one of those that we described in chapter two and that we will find in different forms

[121] Interview with Barry Jackson, Head of Finance and Management Services, Castings Technology International (CTI), Rotherham, 15th May 2008

in CYL in chapter five) where these networked organisations could meet and leverage on each other's contacts and strengths. The hub is the **Advanced Manufacturing Park** (AMP) based in Rotherham.

The location is a joint venture between UK Coal and the RDA, Yorkshire Forward, which was launched in September 2000, becoming fully operating four years later. The actual site of the park was built upon a 100-acre brown field site, a piece of "previously developed land" which was once seen as unacceptable for future use and that was transformed into a location whose environment friendliness is one of the most publicized features of the initiative. The location is also easily accessible to a highly used motorway on the Rotherham-Sheffield border.

Structural funds were crucial to the start up and success of the park's activities as well as the attraction of organisation outside the region and to the development of the ones already operating there. Some of the field work to develop this thesis, in fact, took place in the park and its surroundings in conjunction with the management of all three organisations – the above mentioned **CTI**, **The Welding Institute** (TWI), The **Advanced Manufacturing Research Centre** w/ Boeing (AMRC) - that are hosted at the AMP – plus the **National Metal Technology Centre** (NAMTEC) - that is just outside it – were extensively interviewed[122]. It is also to be noticed that these four organisations were – as we mentioned in the section on resource allocation– the most important private actors involved in the implementation of the OB1 programme's measures on R&D.

Unlike technology parks in Spain (and in particular the *Parque Tecnológico de Boecillo* in Valladolid that we will describe in chapter five), the AMP infrastructure has a very narrow mandate which is basically limited to managing the logistics. As a consequence firms based at the AMP hold a very loose affiliation with the Yorkshire Forward: simple inquiries can be made and are followed up as far as possible funding goes. Yet, links and partnerships between firms at the park are strongly independently from any specific top down efforts.

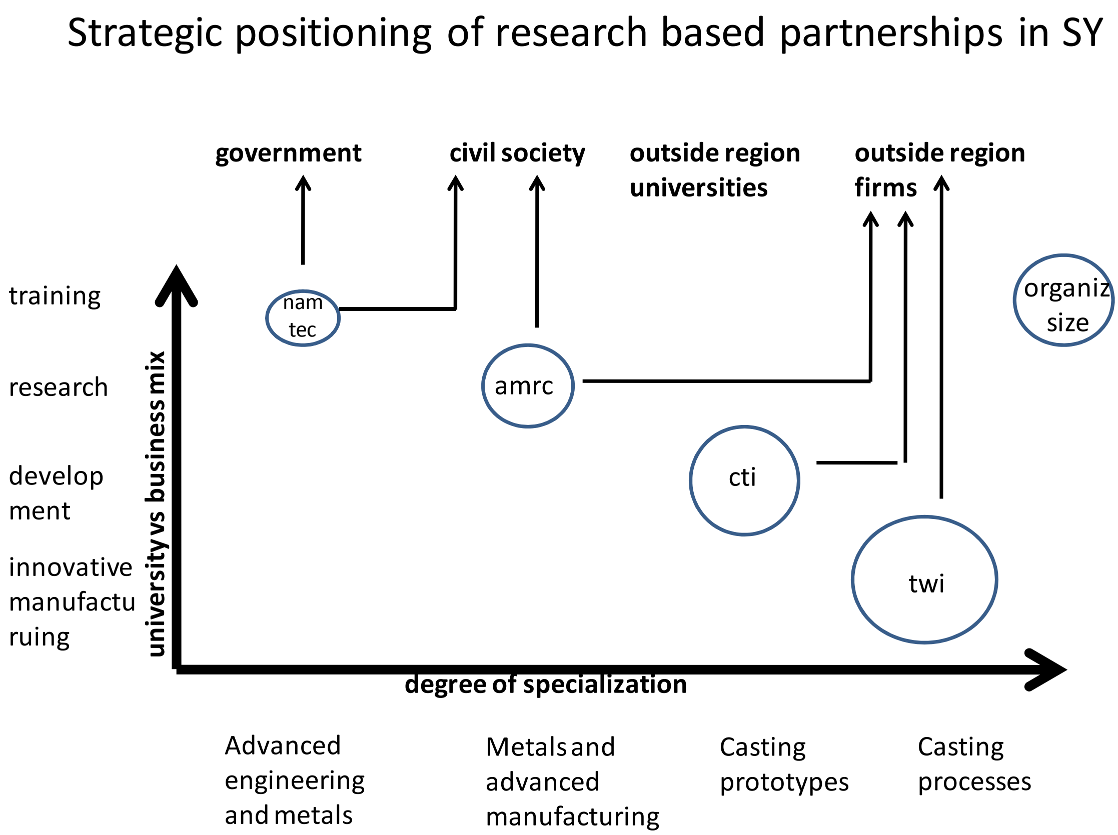
In fact, the difference with the more developed parks that we observed in Spain, is that the organisations that are hosted by the AMP are very few (only three as opposed to almost one hundred in the park in Valladolid) but much bigger and unlikely to accept or to need any guidance from a

[122] See annex five for further details of the interviewed organisations.

public administration (like the one that would manage a normal technology park). The RDA and the OB 1 programme directorate, thus, rightly decided to have an approach to the partners that has been very hands off. Yet, as we were told by Yorkshire Forward, not only partnerships and relationships amongst the hosted organisations were created, but these bodies also spontaneously adjusted their positioning so that overlaps were reduced, the potential for collaborations was maximized and the potential for competition was minimized.

The following map shows, then, a differentiation of the four research based organisations around which the innovation strategy for SY was drafted.

Graph 4.8 – Strategic positioning of research based partnership in SY



A rather simple but yet clear innovation system seems to emerge. It is not generic but focused on a specific research/ industry domain – metal – which is, at the same time, embedded into the tradition of the region, but also narrow enough to let SY's firms and institutions achieve a position of international competitive advantage. The four organisations do play different roles with minimum overlaps.

TWI is the biggest and most skewed towards the business side of the business versus university spectrum in terms of composition of its members; it is also the most specialized and, in fact, the one that is – de facto – a very high end supplier of innovative manufacturing processes that use sophisticated joining materials technologies; the meeting with Mark Roughsedge, the technical business developer[123], was a rather significant one and acknowledgement of one of the most remarkable success of the OB1 programme strategy: in fact, TWI with more than 3,000 partners, headquarters in Cambridge, UK and offices in the USA, South Asia, Middle East is at the leading edge of metal technology; according to Mr. Roughsedge, the negotiation with the directorate responsible for the OB1 programme (facilitated by the already existing relationship between TWI and CTI) was crucial to the decision to staff 100 of the 600 employees in SY. At the same time, from the point of view of Kevin Bennett, director of the OB 1 Programme, it was important to have attracted TWI because its involvement could provide to its SY's partners the experience and exposure to international markets that was seen as indispensable for the regional innovation strategy to succeed.

CTI is positioned slightly more than TWI towards research and has heavily invested into an experimental technology (vacuum manufacturing casting process) that can increase productivity and sales of its members (by providing a lightweight and high quality castings). An interesting feature that we found was that TWI and CTI developed a partial vertical integration with TWI accessing to some of the results of the experimentations carried out at CTI, and CTI materials being proposed to some of the TWI's clients.

AMRC, also called "the factory of the future", is a University of Sheffield initiative; it is broadly working to innovative materials (thus a broader scope of TWI and CTI) with, however, a specific focus on aerospace industry and thus partnering with Boeing, Messier – Dowty and Goodrich. Although technically speaking AMRC is part of the University of Sheffield campus, Professor John Baragwanath, AMRC's Project Director[124], pointed out the independence of the organisation and its

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[123] Interview with Mark Roughsedge, Technical Business Developer, The Welding Institute (TWI), Rotherham, 16th May 2008

[124] Interview with Professor John Baragwanath , Project Director, Advanced manufacturing research centre (AMRC) with Boeing
The Factory of the Future, Rotherham, 15th May 2008

business orientation. The frequency by which visits of students to the site are taking place, anticipates another feature of SY's programme: the consideration of civil society being an important component of the innovation strategy.

This feature is - even more clearly – displayed by NAMTEC which is gradually specializing in consulting, training and seminars although still with a focus on metals. One of the services NAMTEC is providing is the Special Metals Forum – and, more specifically titanium – a group of NAMTEC members have established a Titanium Information Group.

As Dr. Richard Cinderey, responsible for Knowledge Transfer at NAMTEC[125], explained "the objective is the promotion of the image of metal industry in order to sustain a flow of entry-level graduates and high-level professionals into the traditional sector". NAMTEC concern on the supply of new work force appears to be an interesting reversal for an industry and a region that appeared to suffer of all the problems that are typical of mature industries.

The picture emerged from the research reveals a specialization in the four organisations in terms of developing relationships with the actors – government, civil society, outside universities and firms - whose involvement, according to the theory we presented in chapter two, is relevant to a successful innovation strategy (given that the even more basic link between local universities and businesses is ensured by the very nature of the organisations that we have observed in SY):

1. The relationship with the **Government** is not only through the implementation phase of the development and innovation strategies (and, thus, for instance the development of the Advanced Manufacturing Park), but also in the strategy development phase where NAMTEC is partner of YF and functions as a sort of consultation forum (focused on metal industry);

2. The outreach towards **civil society** is, concretely, demonstrated to be essential in the SY case; the objective – as discussed during the interviews at NAMTEC and at AMRC – is mostly to ensure that a sufficient inflow of graduates can support the strategy to heavily specialize the region on across the industry research on metals; the seminar and communication campaign

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[125] Interview with Dr. Richard Cinderey, Programme Manager - Knowledge Transfer, The National Metals Technology Centre (NAMTEC), Sheffield, 16th May 2008

of NAMTEC and the visits to the "factory of the future" are two of the most important tools through which the aim gets achieved;

3. The relationships with the rest of the world and more specifically **foreign firms and multinationals** (less with foreign universities) is, probably, the biggest point of strength with TWI being itself an out-of-the-region organisation (the headquarter is in Cambridge) that has been attracted to SY by the OB 1 programme directorate; CTI being in a phase of constant expansion of its foreign memberships; and the AMRC partnering with some of the largest multinationals in the aerospace industry.

It is, therefore, clear that such a system – which also has the advantage of not having been imposed – creates a win - win situation where each of the four organisations has played a role, has enjoyed considerable support from structural funds and is creating high tech jobs for the entire region (in Rotherham alone, according to the programme document "over a fifth of businesses and 43% of jobs supported" belonged to AMM at the end of the programming period [126]).

The difference between SY and WW is, therefore, rather clear. In WW we have a framework by which the generation of new partnerships is somehow **pushed** through formal mechanisms. In SY, instead, the policy maker appears to have deliberately chosen to make the centrepiece of its implementation strategy, the **already existing** partnerships to whom funds and a place is provided (without the further technical assistance that according to EC text books should be necessary for partners to get together). Not less inetresting it is through the interactions of these actors and not a decision taken from the above, that SY programme management found in one niche of the value chain of the steel industry a smart specialization capable to be sustained (as all intervieweed underlined) also beyond the time frame of the public support.

4.5.3 The limits of an SME centred strategy and the technium

The difference between SY and WW is even more clear if we consider the much debated (and often criticized, see for instance in Cooke and Clifton, 2005) experience of the Technium in WW in contrast with the AMP in Rotherham.

The technium is a network of micro technology parks dedicated to small innovative firms and that was born as a partnership between Swansea University and the WDA (immediately before the

[126] Objective 1 Programme Directorate, Research & Evaluation (June 2006). *Businesses and Jobs Supported by the Objective 1 Programme: December 2005*, p. 49.

absorption of the agency in WAG). The initiative was launched – like the Advanced Manufacturing Park in SY – in 2000 but is still yet to produce any significant results (in fact, the occupancy of the spaces that have been created is still less than one third) as shown by the following table summarizing per site the main parameters: typologies, ownerships, date of opening (if any), number of available spaces and occupancies as for the end of the programming period we are considering[127].

Table 4.3 – Swansea-based Technium characteristics

Technium	Day of Opening (projected)	M²	Spaces	Occupancy (at Jenuary 2006)
T-1	April 2001	2000	14	12
T-2	May 2004	3639	13	10
T-Digital	July 2004	1200	12	12
T-Dig.@Sony	July 2004	800	8	2
T-Sust.Techs	November 2005	3397	32	2
T-Perf. Engin	(April 2006)	2200	15	
T-Pembs	(September 2006)	814	14	
T-Life Sciences	(?)	1600	12	
Total		15 650	121	37

Source: Innovation Office, Swansea University

The most striking feature of the technium initiative is, however, the dispersion of these sites: an account made on the basis of WAG's data show that techniums have proliferated to the point of becoming twelve. This anomaly was acknowledged by the same representatives of Welsh government that we met: Virginia Chambers, Director Technology & Innovation of the Welsh Assembly Government [128] did, in fact, admit that "possibly they were too many" and even her justification of West Wales being not easy to travel does not account for the fact that seven of the ten techniums are located in the same city (Swansea). The number of research site is a further evidence

[127] One of the issues that has been debated is the assessment of the costs of the investments and of its maintenance is rather different, ranging from 260 million GBP to 52 million GBP (for the eight Swansea based Techniums). Different figures brings, of course, to very divergent assessments when it comes to understanding the return on investments of the incubators.

[128] Virginia Chambers, Irector Technology & Innovation, Welsh Assembly Government, Cardiff, 9th October 2008

of the dilution of choices that similarly, as we will shortly see, the proliferation of so called "technology centres" produced in Murcia.

The differences between WW and SY results and strategies are evident if we consider both the quality of the partnerships and the ways they have been generated. The Advanced Manufacturing Park proposes a more modest goal to **attract** organisations that already exist in the same place, which possess technical and R&D skills in a specific industry/ research domain and represent partnerships between research and firms. These organisations can also bring the added value to involve government and outreach to civil society and are able to leverage on stable relationships with worldwide leaders. The Techniums put forward a much more costly objective to **generate** innovation and to facilitate the emergence of a rather large number of small innovative firms where no specific industry or research choice seems to have been made.

CONCLUSIONS

UK is one of the country where the endogenous growth driven idea to use public investments in research as a tool for regional development has been more widely debated and the discussion has often considered as paradigmatic cases the very two regions – Wales and Yorkshire – that this work focused on (Armstrong, 2001, Bristow, 2001, Cooke, 2005, Jones – Evans, 2008, Morgan, 1997).
Since the end of the nineties, R&D expenditures had been considered by the British government (H.M. Treasury, 2001, CBI, 1996) as an increasingly important strategic tool for finding novel ways to facilitate economic development of regions that are lagging behind and that tend to be characterized by a history of dependence on industries that are mature and have undergone heavy restructuring of production processes and labour force (Konstadakpoulos, 2000, Howells, 1997).

More specifically, Wales and Yorkshire experienced opposite growth paths throughout the decade that preceded the launch of the Objective 1 programme in year 2000.
The Wales economy was distinct from all other UK regions in that the largest percentage of its workforce hailed from the manufacturing sector. Moreover Wales was the only region where the number of manufacturing jobs had not declined in the nineties. The real driver behind the growth of the Welsh economy, however, was a much higher ability to attract FDI when compared to any other UK region. Moreover, FDI was greatly increasing the propensity for the Welsh economy to invest in innovation and as a result the percentage of GDP spent on R&D had significantly increased. The

driving force behind such an expansion was undoubtedly the WDA, which was one of the first UK regional development agencies and one of the most benchmarked at the European level (Cooke, 2005).
Yorkshire and SY were, in the meantime, experiencing difficulties in maintaining their manufacturing base and per capita income levels. Many of the regions' firms were struggling through the metal industry's restructuring and the region's R&D investment was gradually tapering off during this period (Armstrong, 2001).

In fact, by the end of the nineties Wales had completed a catch up with regions like Yorkshire that, in the meantime, had witnessed stagnation in most of the indicators measuring innovation and prosperity: the picture of the two regions taken before the beginning of the start of the programmes whose results we are investigating, turned out to be very similar in terms of GDP per capita, productivity, propensity to invest in R&D and universities, presence of multinationals and openness of regional economy, economic structure.

The OB 1 programmes implementation period 2000 – 2006 that we are considering in this thesis, coincided with a radical reversal of these trends.

Since 2000, SY was, by far, the most rapidly growing regional economy in the UK, whereas Wales showed the worst performance as measured by change in indicators like the employment rates. SY's GDP per capita continued to converge towards European averages and was no longer classified as a "less developed region" by the end of the 2000 – 2006 programming period; WW instead hit a sort of ceiling in its convergence process and the gap with European average has stayed the same for the first half of the last decade.

Structural funds programmes represented a large share of investments for development in both regions and, although the money made available to the two regions and the amount allocated to the R&D specific measures were similar, they appeared to have had a significant impact on the reversal of fortunes of the two regional economies. More specifically, the regional innovation strategies and the different effectiveness of structural funds investments in R&D played an important role in a way that is consistent with our hypothesis (and some of the literature as in Boldrin and Canova, 2001, or Midelfart-Knarvik and Overman, 2002): the better region was the one that decided to concentrate resources and to develop a strategy meant to use public money to mobilize further private investments. Moreover the choice was not in terms of a broader sector but of a selection - within the value chain of an industry – of the niche that SY firms and research centres could occupy and upon which develop a competitive advantage (and, thus, a *smart specialization* as more recently the search of niches by the regions has been theorized by, amongst others, McCann and Argiles, 2011 and OECD, 2010).

Behind these outcomes, there were two rather differently drafted regional innovation strategies: choices are clearer in the better performing region where public investments favoured *efficiency* rather than internal *equity* (by "efficiency" and "equity" we refer to recent definition suggested by Barca, 2009, and the European commission, EC, 2009) with precedence given to the concentration of research assets in certain hubs, involvement of larger firms, attraction of champions of innovation from outside the region. It was, however, not less important the creation of mechanisms which allowed the spill over – through suppliers and local universities – of innovation to the rest of the economy.

This approach appears to be more adequate when it comes to dealing with investments in innovation that, by definition, have for objective the creation of a competitive advantage that can be sustained in global markets (as related by the most recent literature on cohesion policies acknowledges, Barca, 2009). More focus coincides with more attractiveness to private investors: R&D projects in SY have mobilized approximately twice as much private investments as their homologues in WW.

However, more generally there are two main factors – organization and partnerships as envisaged by this thesis - that explain the differences in performances and choices (as the table 4.5 summarizes).

Table 4.4 – Main differences between West Wales and South Yorkshire along the innovation value chain

Factors	**West Wales**	**South Yorkshire**
Concentration of innovative projects' portfolio and leverage on private funds	Redistribution of funds amongst local communities on the basis of their size Low leverage	Focus on the high end of the metal industry as region's specialization High leverage
Organisation settings	Devolution and absorption of the regional development agency (as leader of development strategies) at the beginning of the period	Creation of the programme directorate and of the regional development agency (as leader of development strategies) at the beginning of the period Independence of program manager in

		the implementation and result based relationship with the public administration
Partnerships	Partnerships centred on local communities and dedicated to the programme	Partnerships pre existing the programme and capable of engaging with civil society (students) and in long range (international) collaborations
Performance	Weak in the period after having been the best performing UK region as far as FDI and manufacturing	Fastest growth in productivity in the period

First, the case points to a sharp difference in **organisation** of the processes through which innovation programs are designed and implemented. In Yorkshire, at the beginning of the programming period, the responsibility of designing and implementing the innovation and development strategies was delegated to a body outside the public administration: a Regional Development Agency – Yorkshire Forward - that is jointly governed by government and business. More specifically, the SY' s OB1 programme was managed by a "directorate" that was accountable to the central government in London for the programme's outcomes and was supported – especially for the innovation portion of the programme – by Yorkshire Forward.

At the very same time, in WW, the opposite happened with the WDA's absorption into the public administration. As previously stated, the Agency had been the leading force behind a decade long phase of industrial development and foreign investment attraction in Wales. This decision appears to be due to the wish of the newly established WAG to exercise control on an important lever of economic value creation (as Cooke et al, 2000, and before him, Jones – Evans, 1998 and Morgan, 1997, pointed out and few managers dealing with Finance Wales confirmed in the filed work). As a consequence of putting an elected body, the regional assembly at the centre stage not only of strategy design but also of strategy implementation, the political pressures coming from local communities increased and a push towards a mere redistribution of resources occurred reducing the focus of the programmes.

The new organisational arrangement, thus, produced a reduction of motivation and accountability.

This change coincided with Welsh devolution and yet as Cooke, 2005, noticed, this outcome can not be seen as an unavoidable consequence of devolution. It was, in fact, crucial the particular way devolution happened – with very moderate public support and weak majorities in the regional government – in Wales as opposed to, for instance, Scotland where a stronger policy maker could afford a more results oriented strategy.

Another important factor appears to be the difference in terms of the **nature of the alliances** of business, government and research actors that were involved into the implementation of the regional innovation strategy.

The difference was not about the number of partnerships – whereas Wales witnessed a proliferation of them – but in their quality and ability to retrieve information on local economy and global prespective before making decisions.

In WW partnerships were constructed *ad hoc* for the programme as a response to a requirement coming from the EC and they were designed to be mechanisms of interactions amongst institutions of different levels that need to negotiate where to allocate funds.

Partnerships were developed through mechanisms that were supposed to guarantee representativeness to multiple stakeholders.

The unexpected outcome was a much slower decision making processes, very little capability of partnerships to add value to innovation projects in terms of expertise and a diluition of the resources.

In SY, partnerships were facilitated by the fact that there were organisations that existed before the introduction of the programmes and could leverage on a broad basis of firms around research. The four main organisations around which the innovation strategy was constructed, composed an informal system that was able – with minimal overlaps and competition – to reach internationally recognized competitive advantages in research, to engage regional government on a daily basis, and to outreach public opinion.

Not less interesting even the strategic choice of a smart specialization appears to happen through the interactions of the key business and research partners with no imposition from the management of the regional development policy.

In this context, the innovation hub – Advanced Manufacturing Park - that the government provides in order to host main actors of the innovation strategy, is a very hands off contribution of the public administration that limits itself to creating a place for skilled organisations to collaborate with each other.

This is different from what we observed in Spain where less mature industries still call for a presence of the region in terms of stimulating networks amongst firms and universities.

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An implementation process that is not micromanaged by the public administration and policy makers, as well as accountability for results and the quality of partnerships appear to be, thus, key to explaining the performance of the regional innovation policies.

It is no less interesting, however, that the two factors – quality of the organisation through which strategies are realized and quality of partnerships – reinforce each other: in the better performing region actors that possess the dual knowledge of both research along with the business acumen to recognize its potential, appeared to have strengthened the trust and relationship between programme managers and the central government thereby according an even greater independence to the programme manager. By contrast, in the less efficient region, programme managers appear to be made weaker by the obligation to negotiate redistribution of funds with different institutions. Consequently, programme managers are more reluctant to engage expert outside partners in the implementation of innovation policies. This has resulted in partnerships themselves having become less adapt at incorporating information on competitive advantages of the region into the implementation processes.

The two cases that we compared are, however, distinguished by a different institutional arrengement. In the next chapter we will compare two regions that have the same levels of autonomy from the centre. Accountability of programme managers as well as clarity in the allocation of responsibilities and presence of places where partnerships develop will, however, also in the next case prove to be decisive. This appears to say that the institutions, per se, do not create the difference in performance; the organisation and the capability to promote integration amongst different stakeholders do.

CHAPTER FIVE - THE ROLE OF DIFFERENT ORGANISATION LAYOUTS AND OF THE INNOVATION BROKERS IN SPAIN

The Spanish case provides a confirmation of the thesis: it does, in fact, appear to be capable to explain differences in performance even in a context that is different from the UK one both in terms of the economic structure of the two regions and their institutional settings.

Whereas the two UK regions are heavily focused on mature, research intensive industries, in Spain we will investigate two areas where manufacturing is relatively small as opposed to farming, food industry and services. If in the UK case, one main difference between the two regions was devolution (taking place in Wales at the beginning of the programming period that we are studying, whereas Yorkshire continued to be governed by a not elected central government office), in Spain the regions that we are observing live of the same institutional settings. And if in UK one consequence of the devolution was that in one of the region the management of the innovation strategies was delegated to a body outside the public administration and in the other it stayed within the region, in both Spanish cases the responsibility stayed with the regional government,

This, therefore, hints that pre existing institution settings may not be able per se to explain why regions may diverge significantly in their development patterns (Rodriguez-Pose and Gill, 2004). The organisation layout of the program management and its capability to resist pressures from local lobbies to merely act as a redistributor of resources; the existence of parternships capable to engage business, firms, administrations and civil society in the design and draft of the strategies: the hypothesis to be tested is that these are the strongest differentiators between the better and the worse performing region in the Spanish as well as the UK cases.

The chapter is structured in five different parts that similarly to the UK correspond to the phases of the innovation value chain that we described in chapter two. In the first, we have an overview of the regional development policies and of the regional innovation strategies in the two regions.

In the second, we will consider the economic performance of each region, as well as their accumulation of research assets during the recent programming period. In Spain, in fact, we will consider the growth of private firms' R&D assets as a particularly important proxy of success both for the reasons that we explained in chapter two (an acceleration of private investors' investments can

be considered per se an indicator of effectiveness of public investments - as in Hall et al, 1999) and because the very low level of R&D investments gives a strong priority in Spain to the need to create some minimum mass of assests (as for the expectation of the new economic geographers – as in Rodriguez-Pose, 2001, and Puga, 2002). Such critical mass appears to be necessary to escape to the innovation paradox (Landabaso et al, 2002) that regions with very low research endowments face.
In the third, we will discuss how the regions differ in terms of concentration of resources allocations. In the fourth, we will consider the differences in the decision making processes that may explain the performance disparities and different choices. In the fifth we will observe how innovation hubs can make a difference by providing in CYL the platform for developing and maintaining the partnerships that can explain part of the differences in performances of the two regional innovation systems. The chapter is concluded by summing up its main findings.

5.1 THE STRUCTURE OF THE OB 1 PROGRAMME AND THE PROBLEM OF SCALE IN THE REGIONAL R&D STRATEGIES

In the 2000 – 2006 period CYL and Murcia were both awarded Objective 1 status. This resulted in funds which summed up to slightly more than 5 bil euro for Castilla and almost 2 bil euro for Murcia. We calculated how important the structural funds are within the structural funds strategy. The following chart presents the results of the same analysis we showed in table 4.1 for SY and WW.

Table 5.1 – Importance of structural funds to regional development and innovation strategy, million euro

	(1) Objective 1 funds (total) (7 years)	(2) GDP (2001 figure)	(3) % (1) / (2) [1]	(4) OB 1 measures on R&D	(5) R&D expenditures region (2000) [2]	(6) % (4) / (5) [2]	(7) R&D public expenditures (2000) [2]	(8) % (4)/ (7)[2]
Castilla y Leon	5,033	33,435	15,1%	134	202	66,1%	116	115%
Murcia	1,918	13,630	14,1%	66	85	78,0%	38	172%

[1] The percentage are of the seven years programme on the yearly figure of GDP and R&D. This gives the maximum potential impact given that the expenditures does not have to be uniformly distributed in time.

Source: Programme complements, Regional Research and Innovation Strategies, Eurostat

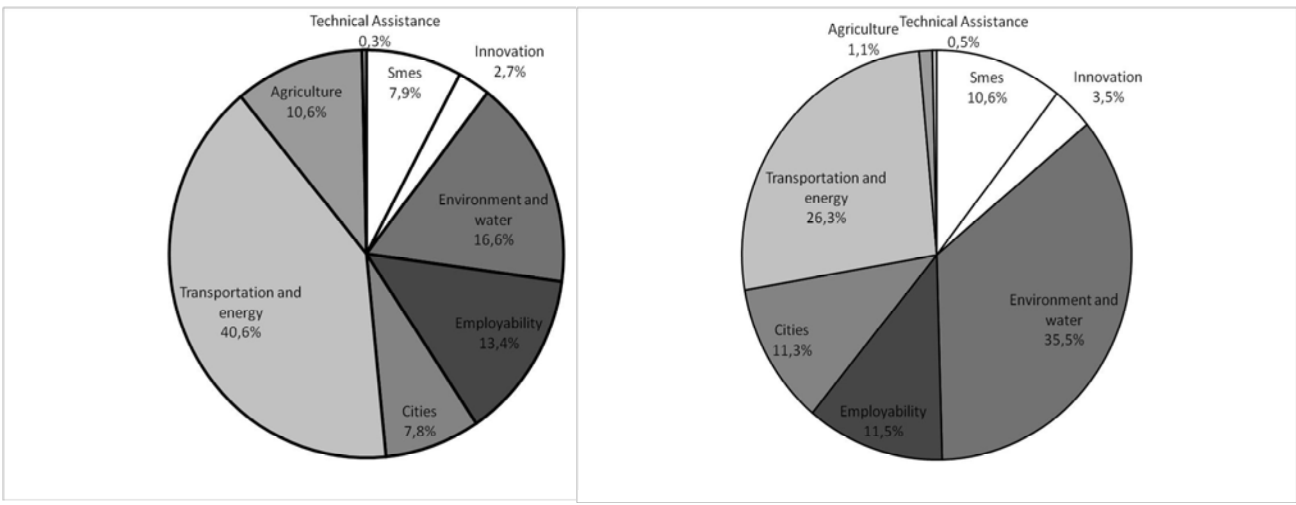
Similarly to SY and WW the Objective 1 funds are about 2% of the GDP per year (in the seven year period). The amount that OB1 can spend in R&D is about two thirds of the entire regional R&D expenditure per year and significantly more than the sum that the state and the universities spend in a year on research. Therefore as said in the methodological part and at the beginning of the chapter on UK, it can be safely assumed that the effect of other public investments are rather small and it is, therefore, arguable that the way structural funds programmes are drafted and concretely implemented can make a difference in terms of evolution of macro-economic indicators.

This, also, creates an expectation of structural funds being able to make a difference in terms of development as this was confirmed to us during the fieldwork by stakeholders like the president of the firms association in CYL[129] and the head of the regional development agency in Murcia[130].

Altough the structural funds are similar in size relative to economy's size, there are, nevertheless, differences both between these two cases and the UK ones and between the two Spanish regions themselves when we consider the structure of the programmes.

The following table gives an overall picture of the distribution of funds to different priorities[131].

Graph 5.1 – Distribution of funds amongst priorities, Percent, 2000 – 2006 Objective 1, Castilla Y Leon left and Murcia right; 100% = 5.033 Mil Euro CYL; 1.918 Mil Euro Murcia



Source: Programming complements of CYL and Murcia, 2004

129 Interview with Valentín Fernández-Soto Vélez, General Director, Consejo Regional de Cámaras Oficiales de Comercio e Industria de Castilla y León, Valladolid, 3rd May 2007

130 Interview with Juan A. Aroca, Head of the Innovation Department, Instituto de Fomento de la Region de Murcia, Murcia, 14th September 2006

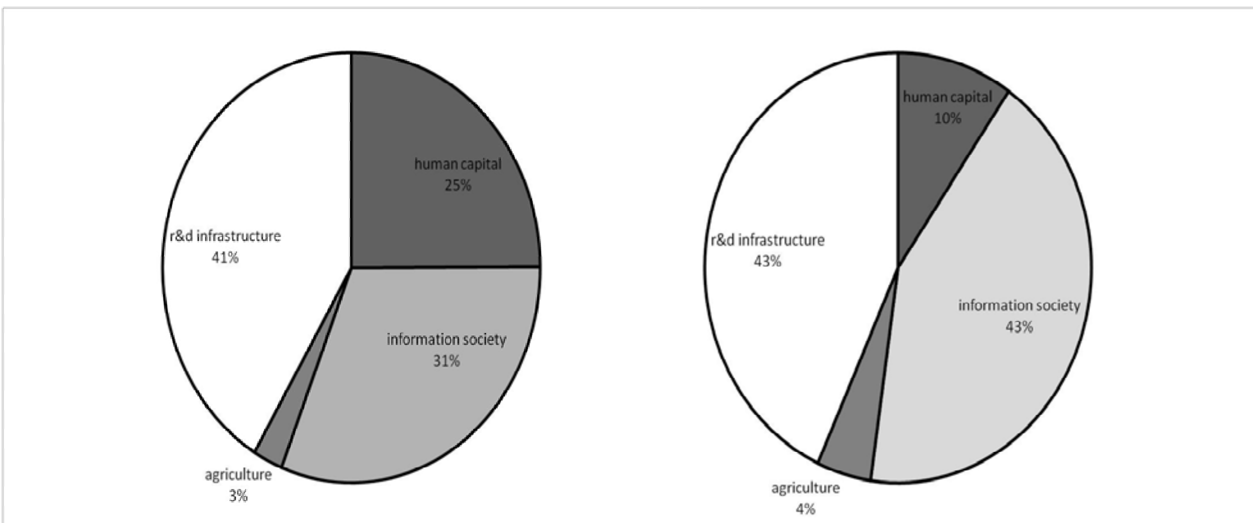
131 It includes also the funds earmarked to instruments called *global subsidy*. Global subsidy are measures of the programmes whose implementation is allocated to an intermediary in the place of the programme managing authority (the regional administration). The intermediary are the regional development agencies and, thus, in CYL it is the ADE and in Murcia the INFO.

CYL and Murcia's programmes are different in terms of priorities. Overall, CYL has decided to invest heavily on transportation (including the high speed train infrastructure) whereas Murcia has selected the environment and, more specifically, the water resources (given the scarcity of it in the region) as its main priority.

The percentages dedicated to priorities concerning competitiveness and innovation can be proxied by the sum of the first two priorities and, as mentioned, they are – in percentage of the entire programmes - much smaller than the ones that we have seen in UK. If we sum the two priorities, we get slightly more than 10% in CYL and 14% in Murcia against the much higher percentages we saw in UK - 30% in SY and 42% in WW. Moreover, the measures dedicated in CYL to innovation are relatively small and they take slightly more than 3% in Murcia and slightly less in CYL, whereas in SY they absorb 19% of the programme and in WW the 16%. These differences reflect a rather broad concern on the capability of Objective 1 regions to get more funds that they could possibly spend. In fact, in the words of Jose Luis Kaiser Moreiras, Subdirector General de Programación Territorial y Evaluación de Programas Comunitarios of the Ministry of the Economy in Madrid "the problem with R&D expenditures is that some regions – OB1 regional economies that are still based on traditional industries – simply do not have enough firms to demand innovation".

More specifically the allocation of the funds of the R&D priorities amongst measures CYL and Murcia is summarized by graph 5.2.

Graph 5.2 – Distribution of innovation priority funds amongst measures, Percent, 2000 – 2006, Objective 1, Castilla Y Leon left and Murcia right; 100% = 134 Mil Euro CYL; 66 Mil Euro Murcia



Source: Programming complements of CYL and Murcia, 2004

It appears that – as it was confirmed to us by Maria Jose Bernal Torres[132] of the Unit that is responsible for OB1 programme at the regional administration – "Murcia is investing a lot in information society meant as interventions on ICT applied to public administrations". CYL, instead, is giving priority – as for the indication we got from Francisca de la Fuente Lopez[133] that supported the drafting of the OB1 programme in CYL – "to human capital, training of researchers and PHDS". The funds that are specifically dedicated to projects that are strictly about R&D are less than 50% (thus about 56 mil euro in CYL and 28 mil euro in Murcia) of the total funds allocated to the priority. It is evident that, as we mentioned in the introduction, the innovation strategies had to face, in both regions, a problem of scale much larger than their colleagues in SY or WW: a problem in terms of size in both the pre existing research base of the region and the available budget to counter this situation.

The programme structures, however, appear similar, unlike Britain where differences emerged even when we compared the mere articulation and wording of the programme. The field work helped us to unveil differences in resources allocation patterns that were, in fact, created by the later stage of the implementation of the strategy and the concrete choices made in terms of resources allocation.

5.2 THE RESULTS: TWO DIFFERENT PATHS TOWARDS CONVERGENCE

The two regions share similarities: they both lag behind Spanish and EU averages in terms of income per habitant and propensity to invest into R&D. They, in fact, were both assigned an Objective 1 Status within the 2000 – 2006 programming period and more importantly, they were both influenced by the fact that as Daniel Miguel San José – the deputy rector at the University of Valladolid [134] - said "they are geographically, economically and culturally peripheries of the country and suffering a substantial brain drain towards Madrid". More importantly, the share of GDP spent on R&D and the

[132] Interview with Maria Jose Bernal Torres, Relation with Servicio de Fondos Europeos, Direccion General de Presupuestos y Fondos Comunitarios, Consejeria de Hacienda, Instituto de fomento Región de Murcia, Murcia, 14th September 2006

[133] Interview with Francisca de la Fuente Lopez, Servicio de Fondos Europeos, Direccion General de Presupuestos y Fondos Comunitarios, Consejeria de Hacienda, Junta de Castilla Y Leon, Valladolid, 14th September 2006

[134] Interview with Daniel Miguel San José, Vicerrector de Desarrollo e Innovación, Universidad de Valladolid, Valladolid, 15th September 2006

percentage of R&D expenditures that come from business was practically the same (0,62% as far as the first parameter and 42,1% for CYL and 41,9% for Murcia as far as the second).

The differences appear to be a) the possibility for Murcia to grow by leveraging on cheap labour and population growth due to immigration, whereas CYL has no alternative but to seek productivity led economic growth and b) the presence in CYL of potential leaders (the rectors and academic faculty of the most prestigious universities, the management of the multinationals) that any innovation strategies may need (see our chapter two and section 2.2.4) and that Murcia is missing.

Against this background two different paths towards economic growth emerge.
In CYL it was – as for the words of Gregorio Munoz Abado, leader of the innovation strategy at the Consejería de Economía y Empleo of Castilla y León that supported the author in the field work[135] - clear "since the beginning of the last programming period that convergence had to go through an increase in productivity and a higher political priority on innovation".
In Murcia – according to Rafael Martinez, Director of Innovacion of the Instituto de fomento Región de Murcia (INFO) that was the main reference point of four visits to the region – "less pressure was felt due to the possibility to expand its economic base through industries that had a reduced added value (especially housing) and cheap labour".

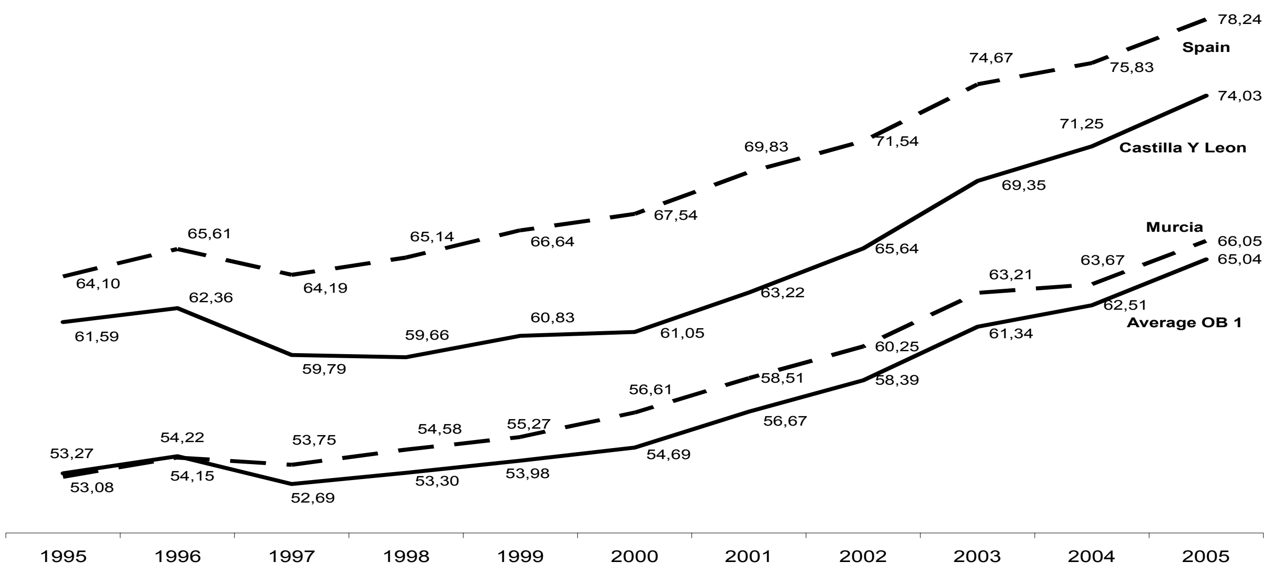
The results follow consistently with a change of gear for CYL that did not materialize in Murcia. We will now consider macroeconomic evidence relative to R&D and innovation and the results of the programme themselves.

Firstly, it must be acknowledged that in the next phase CYL will be "phasing in" because it has overcome the threshold of 75% of the average GDP per capita of the fifteen EU regions. Murcia will be, instead, "phasing out" which is the status that applies to the regions whose GDP per capita happens to be still lower than the 75% average GDP per capita of the EU 15 countries and yet higher than the 75% of the same measure for the EU 27, and thus they are said to not qualify any more as a "convergence" region for the so called "statistical effect". In this very strict sense, CYL, therefore, achieved its basic development target, whereas Murcia has yet to do so.

[135] In annex three and five more details of the field work are available. In annex four the interview guides for each category of interviewee can be consulted.

The graph 5.3 compares the performance of the two regions versus the EU average on GDP per capita (the income per habitant is the most important performance indicator of the structural funds programmes) for the period during and before the start of the last programming period.

Graph 5.3 – GDP per habitant, EU 15 = 100



Source: Eurostat; accessed May 2010

It is interesting to notice that 1999 – the first year of the 2000-2006 programming period – constitutes a turning point for CYL as mentioned in the section where we discussed the antecedent conditions of our two cases.

In the four years before 1999 the gap between CYL and the EU average has stayed largely the same and actually – unlike Murcia and the average for both Spain and Spanish OB1 Regions – it has slightly increased. The opposite scenario has happened from 1999 onward where there has been a convergence of CYL whose rate has consistently outpaced the peers.

More broadly, the table 5.2 considers changes in basic macro economic data of the two regions within the group of eight[136] Spanish Objective 1 Regions in the 2000 – 2005 period.

[136] In fact also Ceuta, Melilla and the Canarias were considered objective 1 regions. However they are not considered – because of their size, geography and institutional characteristics – comparable to Castilla y Leon and Murcia.

Table 5.2 – Main macroeconomic and population data, Changes in the 2000 – 2005 period, Per cent

Region	Gdptot	population	Gdppc	productivity	employment rate
Galicia	41,9%	1,0%	40,7%	27,1%	10,5%
Principado de Asturias	39,5%	-0,4%	40,1%	21,1%	15,7%
Castilla y León	39,8%	0,2%	39,1%	20,9%	15,4%
Castilla-La Mancha	46,1%	7,4%	35,2%	17,7%	15,5%
Extremadura	43,7%	1,1%	42,1%	25,2%	13,5%
Comunidad Valenciana	44,6%	12,7%	27,6%	14,9%	11,7%
Andalucía	50,6%	5,9%	41,6%	16,3%	22,3%
Región de Murcia	54,4%	13,2%	35,7%	20,3%	13,3%
Average	**45,1%**	**5,1%**	**37,8%**	**20,4%**	**14,7%**

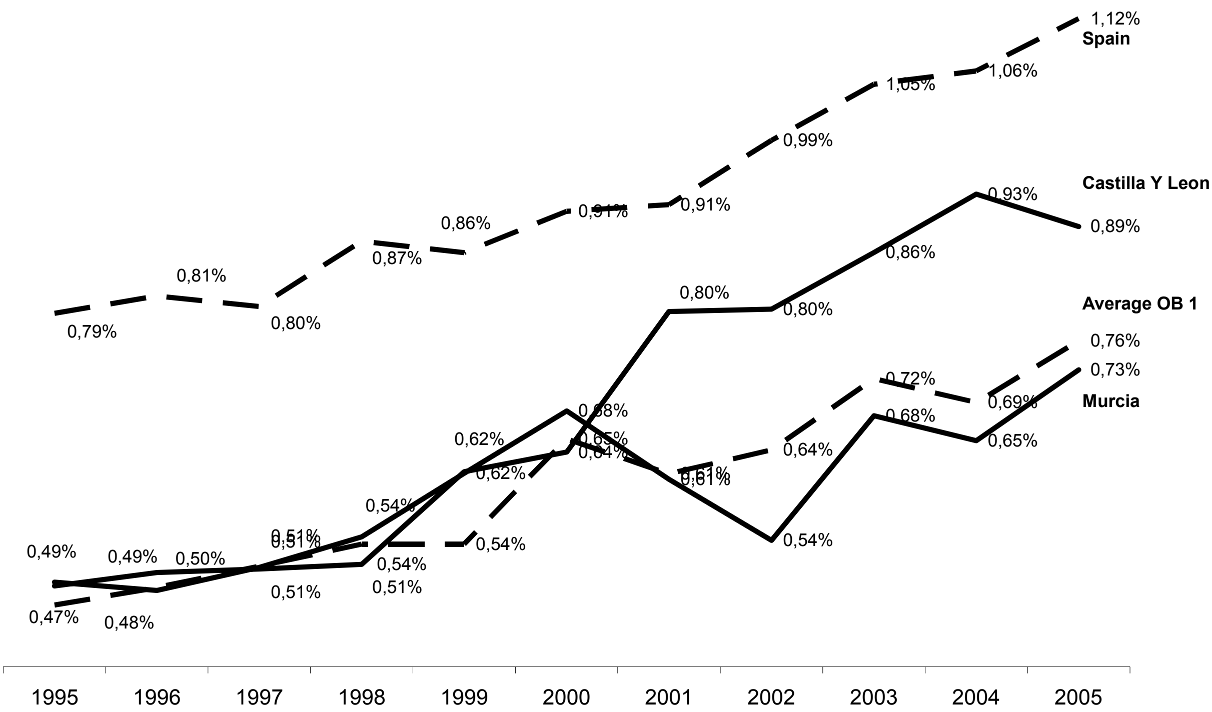
Source: Eurostat; accessed May 2010

It looks like the eight regions can easily be divided into two groups with rather different trends: one mostly from the North which are characterized firstly by a population size that has been roughly stable; and one mainly from the South where the population is increasing (mostly because of immigration). CYL belongs to the first together with Galicia, Asturias and Extremadura; and Murcia to the second with Castilla – La Mancha, Comunidad Valenciana and Andalucia.

The differences then are reflected by the main economic indicators: total GDP grows more in the second group. Murcia tops the lot with 55% growth in the five year and CYL is at the semi last position with less than 40%.However, the situation is reversed if we consider GDP per capita and even more if we consider productivity, where the differences are particularly large and growth rates go from more than 27% in Galicia to less than 15% in the Comunidad Valenciana. More specifically, CYL displays a growth rate that is higher than the average for Spanish Objective 1 regions both on productivity and employment rate, whereas Murcia lags behind on both.

The differences in the results between the two regions, however, are clearer if we look to another indicator that together with productivity is considered relevant when we attempt to evaluate the effects of public investments into R&D: the change in total volumes of R&D investments and, even more interestingly, the change in the size of expenditures in R&D coming from enterprises.

Graph 5.4 – R&D expenditures as percentage of GDP, Per cent, 1995 - 2005



Source: Eurostat, INE; accessed May 2010

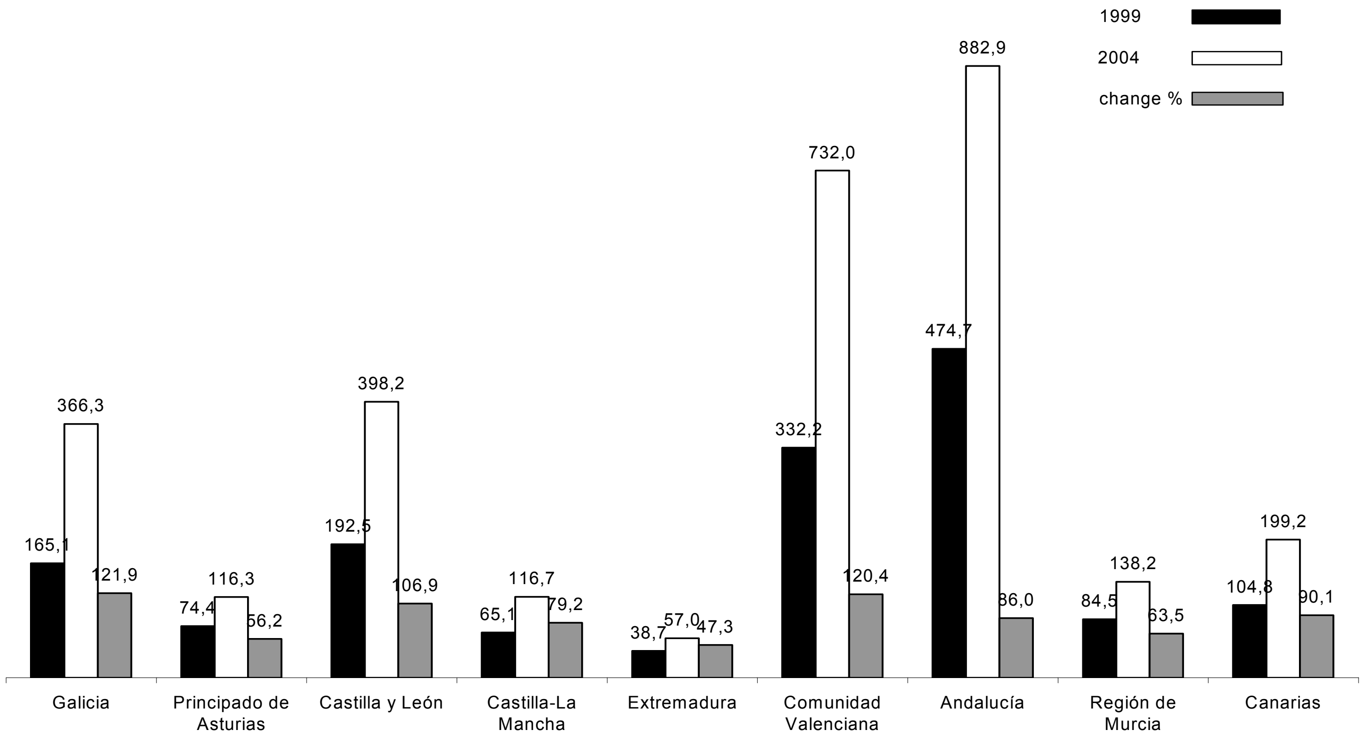
As the graph shows the trends were rather similar up to 1999. It is the start of the new programming period that saw CYL speed up and Murcia slow down in the propensity to invest into innovation.

However, it is, once again, interesting to see the evolution of the two regions within the group of similarly developed Spanish regions sharing the OB 1 status. The chart below visualizes the evolution of the total R&D expenditures in the nine regions as far as the first part (1999 – 2004) of the programming period (2000 – 2006) we are studying.

The picture in recent years seems very different from the one we observed before in the 1995 – 2005 period (paragraph 1).

It is rather evident that the regions that start from a higher level of R&D investments are growing more than the others and that the final effect is that the differences amongst objective 1 regions end up being higher at the end of the period.

Graph 5.5 – Total R&D expenditures and percentage changes, 1999 – 2004, Million Euro and per cent



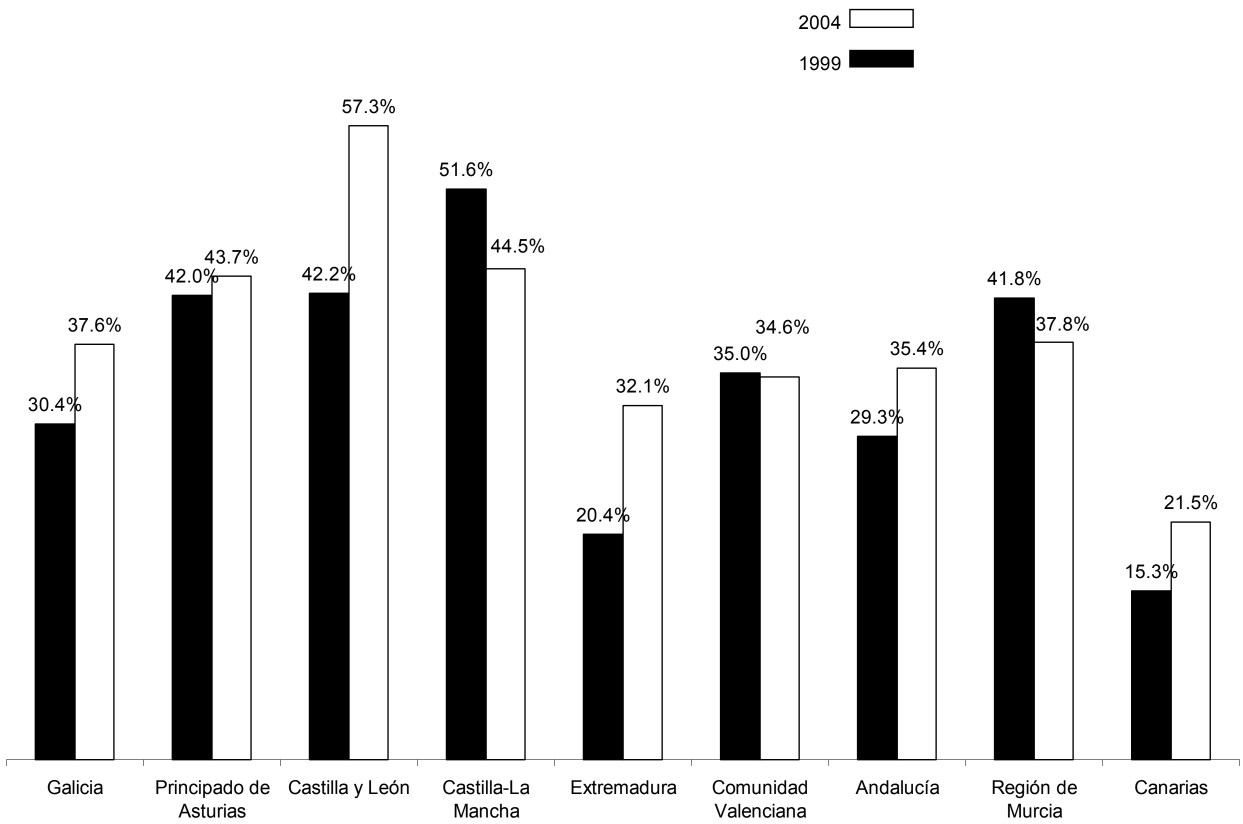
Source: Eurostat; accessed May 2010

The distance grows and as a simple proxy of the dispersion within this group, the difference in the size of R&D investments between the region that spent more (Andalucia) and the region that spent less (Extremadura) doubles in five years (from 436 mil euro in 1999 to 825 mil euro). More specifically, the four regions that have increased more and that, in fact, have more than doubled their R&D expenditures are the four regions that previously spent more at the beginning of the period: Galicia, Comunidad Valenciana, Andalucia and CYL[137]. The last one has gone from an overall spending of almost 200 milion euro to almost 400 milion euro in five years. On the contrary, Murcia has been the region that has grown less – 53,5% - after Extremadura. In fact, the correlation between the initial level of investments in R&D and growth rates (+0,51%) is rather strong.

[137] In fact, the percentage increase of R&D expenditures has been larger in Canarias than in Andalucia, but the island regions are not comparable to the other OB1 inland regions.

A similar trend is witnessed if we observe private investments as for graph 5.6. The distance between the highest and lowest levels of spending more than doubles from 131 mil to 295 mil. It is even more interesting to see what happens to the ratio between private and public investments into R&D.

Graph 5.6 – Percentage of private investments on total R&D investments, 1999 – 2004, Per cent



Source: Eurostat; accessed May 2010

The general trend, as depicted, is of an increase of the share of private to public investment.

CYL is, however, the region where this increase has been fastest and the contribution of private investments to the overall increase of R&D investments has been the highest (71% of the increase in the period came from business). Murcia, on the contrary, has witnessed the second sharpest decrease in the ratio and has been the region where the percentage of the increase of R&D due to private investments has been the lowest (31%). As discussed in chapter two, lower capability of public investments to attract private funds on R&D projects is both a cause of lower efficiency of public

R&D public investments, but also a sign itself of a lower return on the public investments that have been made.

The capability of OB1 programme in CYL to mobilize private investments was confirmed by the field work and the description that entrepreneur like Alfonso Calderón Vergandone[138], Owner of Cenit Solar, one of the world leader in renewable energies provided about his experience of the partnership with the regional government. He, in fact, showed to us how structural funds played an essential role to his decision not to leave the region and to increase the fixed investments.

The difference between the two regions is further demonstrated if we move from the view of the regional data to the results of the programme.

Table 5.3 – Comparisons of capability to attract private investments, measure 2.52, 2000/ 2004

	Murcia	*Castilla Y Leon*
Payments	4.379.879	34.708.286
private investments	24.014.908	541.338.951
private inv./ program payments	5,5	15,6

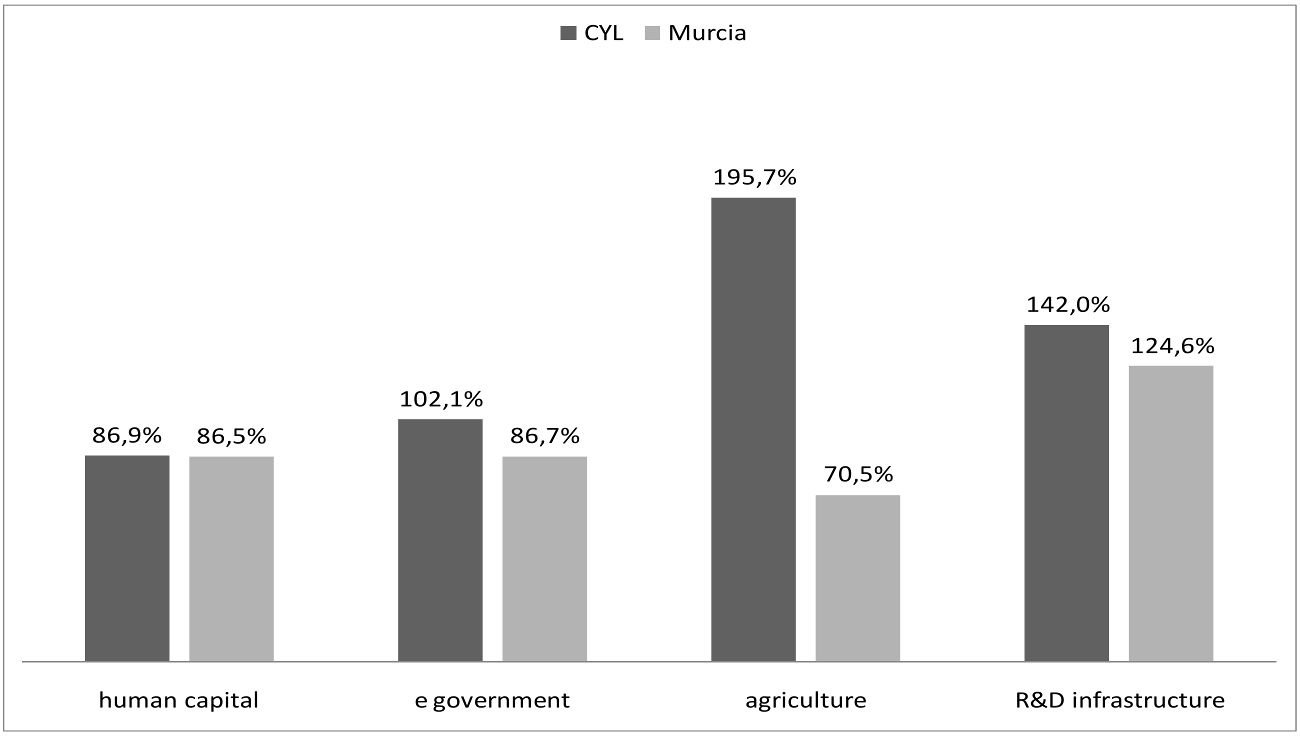
Source: Intermediate evaluations

Once again, the comparability is limited to one measure – which is however one of the largest and is focused on R&D projects – but the numbers show that the performance of CYL is three times higher than that of Murcia. This result seems consistent with the higher capability of the programme managers in CYL to outreach, hence mobilize the region's industrial and research community.

Different performances of the two programmes and, more specifically, different capabilities to draft measures that meet demand from firms and universities are also shown by the absorption rates (speed by which the programmed expenditures get realized). The table below compares by measure actual versus expected expenditures in CYL and Murcia.

[138] Interview with Alfonso Calderón Vergandone, Owner, Cenit Solar, Boecillo, 18th April 2008

Graph 5.7 – Absorption rates (effective expenditures over expected ones), CYL and Murcia OB 1 Programmes 2000 – 2006, selected innovation measures, first half (2000-2004) programming period



Source: Intermediate evaluations

The real remarkable piece of information here is the success of CYL in quickly absorbing the expenditures on R&D with three out of four measures having been overspent versus the expectations for the first part of the expenditure cycle. Murcia is proceeding much more slowly.

Absorption is, as we mentioned, a proxy for the demand that a certain region expresses in an investment programme and, thus, it is a sign of a higher consistency between the design of the interventions and the concrete characteristics of a certain region. Ultimately, it thus shows higher capability to incorporate local knowledge in the choices that are being made by the programme manager, whereas such capability is, as we have elaborated in chapter one, crucial to success (see Barca, 2009, for instance).

We will shortly see in the next section that the interviews made clear that this higher consistency is due not to the initial, on paper design of the programmes, but to different, concrete choices made during the implementation phase of two rather similarly constructed programmes.

In turn, higher demand means higher expectations and, thus, likely, better multiplication effects of the public investments when these expectations are met.

Similar evidence is provided by the number of individuals that are reached in the two regions. The only measure where this indicator is available for both CYL and Murcia is the one on human capital.

CYL seems capable to reach – in proportion to the size of the programme – twice as many individuals (in fact, the unit cost is half in CYL as opposed to Murcia).The data of the intermediate evaluations for the first half of the programming period (2000 – 2004) report that in Murcia, for every 1 mil euro spent, 200 individuals were reached, where in CYL they were 422.
As far as jobs creation the indications are less clear: the unit cost for additional job appears higher in CYL than in Murcia (see annex ..), however this may be a consequence of investments being more focused on positions being more research based, capital intensive position in CYL than in Murcia.
Overall CYL's programme appears superior as far as involving business and convincing firms to invest more or even alongside the state, and as far as being more consistent with the demand of the region's economy and research base. This, in turn, appears to have made the programme more visible and to have created – as the field work recorded – higher expectations.
The macro and micro evidences appear, then, robust enough to conclude that Castilla did achieve a higher returm from its structural funds funded interventions on innovation. This is, however, as we saw in the first section of the chapter less due to the overall programme structure and design (which is similar in the two cases), and more related to the concrete choices that have been made in the draft of the bidding procedures and the project selection when it comes to actually selecting recipient firms, research centres and highly skilled individuals.
This is associated, in our theory, to more credible investment choices and a higher concentration of resources in industry, areas, research domain, and niches where the region may have some pre existing scale and competitive advantage.

5.3 THE DIFFERENCE IN CONCENTRATION OF RESOURCES

Our theory is that – industry and the geographic concentration of resources is associated to higher efficiency of R&D investments and similar conclusions are reached by country specific literature (like in Serrano, 2004) on R&D.
The resources allocation appear to confirm this expectation. We, therefore, firstly compared the distribution of R&D investments with the existing economic structure. We expect that higher deviations between the two indicate that stronger preferences have been expressed, whereas in an inertial scenario the two breakdowns should be similar with funds allocated according to the different size of the industry regardless of their concrete potential for innovation. This potential is, in fact, supposed to be different, with manufacturing being traditionally the sector that spends more on R&D.

The results show that both regions express an allocation of funds that does not mirror the current economic structure. However, CYL choices express a higher concentration, whereas the focus of Murcia has recently been diminished. The overall sector allocation – in Murcia and CYL - of R&D dedicated public investments is shown in table 5.5.

Table 5.4 – Breakdown of GDP and R&D public investments in the economic sectors by region, as compared to 1999 breakdown by sectors.

	Agriculture	Commercial	Industry	Services	Construction	Other	Total
Murcia							
GDP 2006	4.7%	12.8%	14.3%	33.3%	4.2%	30.7%	100%
R&D 2006	**28.6%**	3.4%	49.6%	13.6%	4.8%	-	100%
Castilla y Leon							
GDP 2006	4.9%	10.9%	16.2%	31.3%	4.3%	32.3%	100%
R&D 2006	9.7%	3.4%	**64.9%**	21.9%	0.2%	-	100%

Source: Eurostat, and regional databases on R&D expenditures; accessed May 2010

The categories[139] considered by the databases are too broad to pick up specific sectors, but the macro categories already show that CYL has chosen to concentrate more than 60% of the funds in manufacturing where there are, in fact, the most R&D intensive firms and industries although it represents about 16% of the economy.

The choice seems also to stabilize in time with minor changes in the share of different sectors in the innovation pie. This mirrors the presence of multinational companies in CYL, which represent – as we referred in chapter three on the economic structure of the two regions - a significant share of the regional economy that is concentrated in few specific industries – automotive, agro foods, pharmaceuticals.

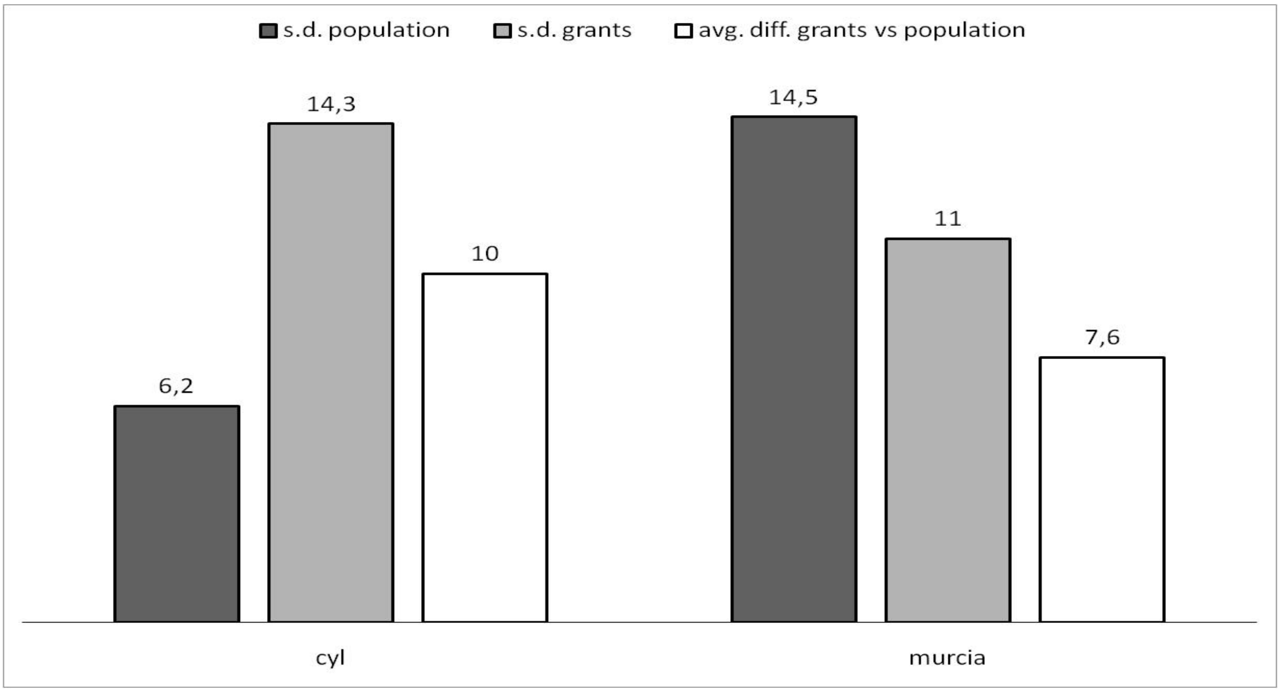
In Murcia the choices are less clear cut: there is a bias towards agriculture (and more specifically agri foods and equipments for agriculture). More recently, there has been a large shift of funds dedicated to "services" (up to 43% of total) that reflects the importance given to the "information society"

[139] The forms in which the regions of Murcia and CYL separately categorize investments and grants vary along with the NACE codes each region classifies its different projects with. However, the two regions make use of four general categories in which to allocate their R&D investments: Agriculture, Commerce, Construction, and Industry. CyL's database categorizes the investments and grants as "approved proposals" and "approved subsidies" in comparison to Murcia's "investment" and "grant approved", respectively. We consider subsidies and grants as measures of public investments (to which private co finance may be added).

measure and to ICT investments especially in automation of procedures of public administrations and in the so called "e government". The dispersion of the funds is –after all and as we will elaborate – the result of a strategy that "was never integrated" as Rafael Martinez Fernandez[140], the Director for Innovation of the Murcia regional development agency (INFO) acknowledged to us.
The allocation of funds per geographical areas confirm the pattern of clearer choices being made by the programme managers in CYL. The concentration of the funds distribution is higher than the concentration of the population with urban, knowledge incentive provinces receiving a disproportionately higher share of the funds. The same does not apply to Murcia where dilution takes place.

The table that follows proposes a measurement of concentration using two indicators: the comparison between the standard deviation in the population distribution amongst provinces and the standard deviation in the distribution of R&D funds amongst them; and the average difference between the shares of the population and of the grants received by the different provinces.

Graph 5.8 – Distribution by city (municipality) of R&D grants, Percentage, 2006



Source: INFO Database; accessed June 2010

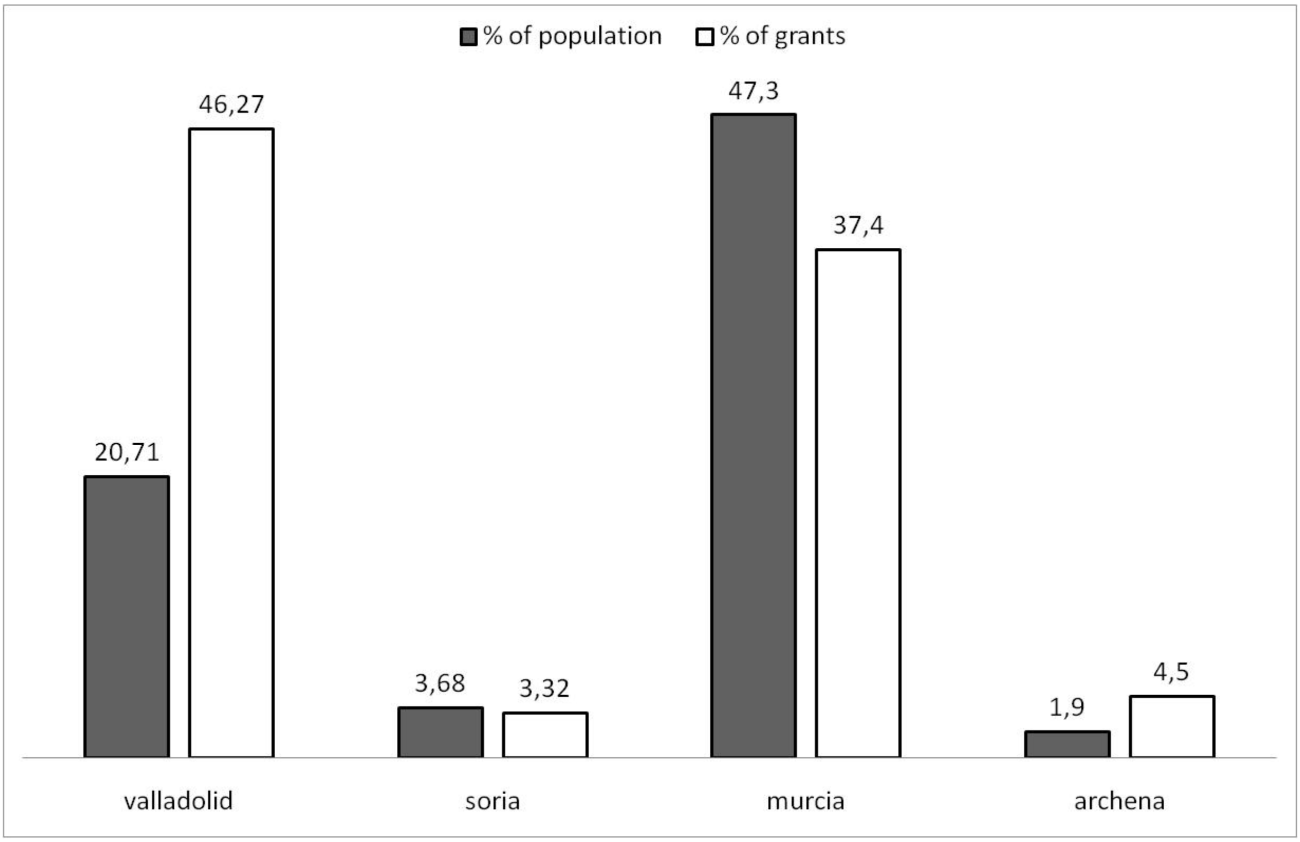
The first two values say that the population tends to be more concentrated in Murcia than in CYL, and yet the funds tend to be distributed in a more concentrated way in the latter region. The average

[140] Interview with Rafael Martinez Fernandez, Director of Innovacion, Instituto de fomento Región de Murcia, Murcia, 14th September 2006

absolute value of the difference between the share of the population and the funds is higher the more dissimilar the distribution of funds and population and, again, say that resources allocation patterns reflect stronger choices in CYL than in Murcia[141].

The differences in terms of preferences is further clarified if we consider the weight that the two regions have given to the most urbanized areas. In CYL Valladolid, which hosts the largest university, has received almost half of the innovation grants although the capital accounts for one fifth of the population. In Murcia the situation is reversed where one third of the capital has been distributed to a city where almost half of the population lives. The same applies to Carategena, the host city of the second university of the region and thus, although Cartagena and Murcia have more than 70% of the population and the entire university base, they get less than half of the funds.

Graph 5.9 – Distribution by province of R&D grants, Percentage, 2000 - 2004



Source: Mid Term evaluation OB1 Programme CYL

The pattern is confirmed if we observe the smallest local community: the most rural area of Murcia – Archena - receives almost twice as much of the share of the R&D funds as opposed to its share of the

[141] The analysis does, in fact, discount some limits of a) consistency: in Murcia we are considering a sample of the municipalities, in CYL the provinces that cover the entire region; and of b) completeness: in Murcia we only have the numbers for 2006, in CYL some of the projects have not been assigned to a specific area.

region's population, whereas the smallest locl community of CYL gets a share of funds which is smaller than its share of population.

CYL choices, in fact, appear even more tailored to each of the province's characteristics if we consider the specific measures of priority 2. Valladolid, in fact, seems to specialize itself in R&D infrastructure projects where it gets almost 90% of the funds (within measure 2.53). Salamanca, instead, gets the largest share of money to be spent in tertiary education.

The highest geographical concentration is an "explicit strategic choice of CYL regional government" as the *independent evaluator* of the OB1 programme, Olga Ogando Canabal[142] from the University of Valladolid, told us.

Concentration of choices is, however, also reflected in the selection of the main actors with whom to implement the innovation strategies. This applies to the technology centres that are being financed in each region.

In CYL, , the beneficiary technology centres are much fewer and their actions seem more streamlined. In CYL, in fact, there are six technology centres, whereas in Murcia, which is less than half of the size of CYL, there are ten (which is a really large number considering that in the entire country their number is 64). Moreover in CYL there is a further concentration amongst them due to CIDAUT (Transport and Energy Research and Development Foundation) which specializes in mechanics and has approximately the same revenues (17 mil euro in 2007) and the same number of employees (365) of the other five put together.

The field work[143] unveiled the results that are associated to these two different approaches.

Since there are fewer technology centres in CYL , it also means that they are better supported. They are all housed in their own premises[144]. This may better explain the results in CYL, because four out of six of the centres in CYL get half or more of their revenues from the market (the less solid of the parks seem to be ones that are trying to focus on ICT and biotechnology, which are innovation areas that are not close to the core of the economy of CYL). However, one of the main factor for success has been that in CYL the technology centres were born around a number of research and business initiatives that, , like in UK, pre existed the structural funds aids and that, therefore, "will go ahead

[142] Interview with Olga Ogando Canabal, Departamento de Economía Aplicada, Facultad de Ciencias Económicas y Empresariales, Universidad de Valladolid (Evaluator of the IOP) , , Valladolid 3rd May, 2007

[143] See annexes three, four and five

[144] Whereas, on the contrary, two of the smallest – shipping and energy – have, very recently, established their premises in the technology park

even when the OB1 programme will finish" as in the words of CIDAUT's Director Juan Carlos Estévez[145].

In Murcia, instead, the initial objective to achieve profitability in a 5-years period, has now been "abandoned" – as we were told by Rafael Martinez Fernandez[146] - Director of Innovation of the Regional Development Agency (INFO) of Murcia - told us "and although the funding system of the centres has changed[147], they still continue to depend on public money.

The justification that a privatised centre will not invest in ameliorating its technological expertise and in long term projects that we collected in some of the interviews in Murcia, seems to be contradicted by the typology of investments successfully carried out by CYL's technology centres. But again, the concentration of thin resources on competitive advantageous sectors may have been crucial. In short, although we are still discussing a (cohesion) policy that has amongst its objectives the redistribution of resources, we are still witnessing different strategies within the same group of OB 1 regions. Whereas in Murcia there is also a redistribution internal to the region, in CYL there has, instead, been a strong preference in terms of concentrating resources in industry and areas where there was already a pre-existing research base.

The interesting finding is that whereas dilution was associated in the UK comparisons to higher political pressure of local communities on the newly established regional government, in the Spanish cases it is the presence in CYL of a strong political priority on R&D that has made possible more rational choices.

[145] Interview with Juan Carlos Estévez, Director, CIDAUT, Transport and Energy research and Development Foundation, Boecillo, 22nd April 2009

[146] Interview with Rafael Martinez Fernandez, Director of Innovacion, Instituto de fomento Región de Murcia, Murcia, 14th September 2006

[147] In the past, there were direct funds from INFO and regional ministries. Now each centre has a plan, and the funding is provided on a project-based system in which the centre applies for grants, scholarships and research projects, coming both from INFO, Fundacion Seneca, regional and national ministries. Moreover, the centres are also funded through "by-pass" methods based on programmes which fund SMEs to acquire technological advice and assistance.

5.4 THE ROLE OF THE ORGANISATION OF DECISION MAKING

The differences between the two regions as far as the government of the R&D and innovation system seem to be both in terms of institutional settings and of organisational layouts.
In brief, we will see that the two regions differed mostly in terms of strategy execution as it is recognized by external institutional observers. CYL managed to be identified by the EC a benchmark in the use of R&D regional led strategies. In fact, the European Trend Chart on Innovation[148], cited CYL as the "region most committed to R&D … by reinforcing regional guidelines around traditional sectors such as farming products, wood and furniture, mechanics, textile, natural stone, automotive components and promoting new emerging sectors such as biotechnology and aeronautics industry." Murcia is, instead, believed to present some structural problems in approaching innovation: this was, after all, confirmed by the same Spanish Ministry of Economy and, more specifically, by Mr. Moreiras's team that we mentioned before as the head of the department that follows the structural funds funded programmes meant to foster innovation[149].

What did produce this divergence in approach between two regions, that at the beginning of the period were characterized by similar problems in terms of insufficient scale of research assets, and by expenditures on R&D – both total and private – and that were almost identical when measured relatively to the size of their economy? The difference appears to be mostly about a specific political decision that CYL has taken, as well as the presence of leadership in the better performing region of the political, business and research that could support such a strategy.

We will now investigate the independent variables that according to our theory, should account for the differences in the results. In the process we will describe the decision making and implementation processes, as well as the approach to partnerships whose high quality is supposed – per our hypothesis – to be a pre-condition to a successful programme.

Firstly, it is worthwhile to mention that – unlike the UK case - the regional governments of CYL and Murcia share similar institutional frameworks, and they are progressively acquiring new competences. More specifically, they have both achieved the power to manage education and

[148] *European Trend Chart on Innovation*: *Annual Innovation Policy Trends and Appraisal Report 2004-2005*.
[149] Personal interviews with the team of the Ministry of Economy in Madrid which is responsible for structural funds expenditures. See annexes for names and dates.

universities. This last feature impacts the decision making processes in research. As a consequence, the OB 1 programmes are managed by regional governments.

The similarity of institutional settings, however, does not prevent the two regions from taking two rather different routes towards the design and the implementation of OB 1 programmes and of the innovation strategies. The main difference between CYL and Murcia is in terms of a different degree of fragmentation in the decision making process and of a different priority that the regional government attaches to innovation strategies.

Murcia's main actors of strategy design

As far as Murcia, the recent law (2007) and reorganisation (October 2008) of the regional government acknowledges that the problem for the entire period we have observed (2000 – 2006) has, mostly, been one of lack of coordination when it comes to both the design and deployment of the strategy. In fact, these recent moves reunified at least two of the three parts of the strategy – "research" and "innovation" – by creating a new ministry called *Consejeria de Universidades, Empresa y Investigation* from which both the targeted measures of the firms and the ones targeted by the universities depend. The decision has, basically, been to forgo the difficult search of a balance between the power of the Ministry for Education and the Ministry for Industry that has escaped – as we will shortly see two different reorganisations – and to, instead, merge the two.

The new approach seems to also point out that the Region has realized that successful innovation strategies are even more important than other policies that are within the portfolio of the ministries. Even in this new situation, however, the third part of innovative policies – the so called "Information Society" which is mostly about the introduction of ICT in the public administration – remains outside the innovation framework and, in fact, is under the responsibility of the Ministry of Economy. Anyhow, the effort of coordination has been recognized as indispensable and we were told during the field work by the new director general of the *Consejeria de Universidades, Empresa y Investigation* - Eduardo Osuna Carrillo[150] who was called from the University of Murcia with the very purpose of delivering the reorganisation that, in fact, "the regional government of Murcia recognized the absolute importance to gradually achieve the highest possible coordination of all institutional actors involved in the deployment of the research and innovation strategy".

[150] Interview with Edoardo Osuna Carrello, Director General de Universidades y Politica Cientifica, Region de Murcia, Murcia, 18th May 2009 (see annex three)

In Murcia the governance of innovation has gone, in fact, through a number of transformations that were not always designed as a coherent plan meant to achieve some pre-conceived model. The innovation strategy of 2003 – 2006 was designed by the Ministry for Industry - *Consejeria de Economia, Industria e Innovacion*; the 2007 – 2010 strategy was written by the ministry in charge of education, universities and culture - *Consejeria de Educacion y Cultura*.

In both cases the governance was the result of reorganisations introduced by specific laws few years before the period to which the strategy was dedicated. This means that the first organisational layout operated approximately since the start of the 2000 – 2006 period and that the second has governed the choices and their implementation in the second half of it.

The common trait between the first and the second period has been the lack of integration between innovation strategies for firms and universities. However, the two governance regimes were also very different.

The first model was led by an approach centred on firms, led by the Ministry of economic development and, operationally, by the RDA – Instituto de Fomento (INFO). Moreover, in the 2003 – 2006 plan, there was a specific body supposed to coordinate activities: the Council of Science and Technology - *Consejo de Ciencia Y Tecnologia* – which was aimed to combine the four ministries - education and culture, industry and environment but also healthcare and agriculture and water, in the same institution. In addition, the President of the Region was supposed to be also the head of this council.

The strategy for 2007 – 2010 was, on the contrary, the product of the Ministry of education, universities and culture, whereas the real author of the document was the *Foundacion Seneca*, which is an agency that similar to the INFO, is supposed to advise the Ministry on all major choices.

The shift from one minister to the other carried out - amongst other consequences - a drastic change in the focus of the strategy that has altered the priority from supporting firms and a broader concept of innovation, to one concentrated on aiding universities and more codified research.

More importantly, however, the plan became even less coordinated in the 2007 – 2010 period as opposed to the previous one because – as we were said by Aurelio Jiménez Romero[151], Independent

[151] Interview with Aurelio Jiménez Romero, Independent Evaluator Murcia OB 1 Programme 2000 – 2006, Business Development Director, Red2Red Consultores S.L., Murcia, 14th April 2008

Evaluator of the Murcia's OB 1 Programme 2000 – 2006, "the above mentioned council meant to supervise overall strategy was replaced by a Commission – *Comision Interdepartmental de Ciencia, Tecnologia e Innovacion* – that was ranked at a lower, more administrative level".

The falilure of any attempt to integrate explains – as we said before mentioning the interview - the most recent move that appears to be very bold: instead of making the two main ministries – industry and education - agree, the new law merges them into a larger ministry with a fully fledged institutional integration.

The causes of the fragmentation of the decision making are – according to few programme managers like Antonio Jose Mula Gomez[152], head of the department resposnible for universities and research at the regional Administration that we interviewed – "mostly explained by the absence of a real history of research activities in Murcia, and lack of leadership: after all two of the Universities have been founded after 1996 and no lrge companies was engaged into the draft or the implementation of the strategy". Sub optimal lay-out of the decision making appeared to explain most of the problems of the innovation strategies in Murcia:

1. the very late start up of both the technology and the science park, which was delayed by conflicts between the two ministries, as well as conflicts amongst different local communities contending the location;
2. the proliferation of the research centres with a further dilution of the research base;
3. more generally, an approach of universities, on one, side, and firms, on the other, that only established a relationship when there was a specific demand from firms, or of some specific know how to be supplied by universities (and intermediated by their of *oficina de transferencia de los resultados de la investigacion* - OTRI);
4. the absence of clear choices in terms of industries and/ or scientific domains to which available funds should be allocated as we mentioned in the previous section 4.

This lack of integration is also reflected in the approaches, organisational culture, and lastly, results of the two bodies that were – in different periods of time – in charge of the innovation strategy.

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[152] Interview with Antonio Jose Mula Gomez, Jefe de Servicio de Universidades, Direccion General de Universidades, Consejeria de Universidades Empresa e Investigacion, Region de Murcia, Murcia, 18th May 2009

Murcia main actors of strategy implementation

The 2003 – 2006 innovation strategy was centred around – like in our two UK Regions, Wales and Yorkshire - the Regional Innovation Agency INFO - *Instituto de Fomento de la Region de Murcia***.** INFO's mission is the "development of SMEs in Murcia by means of economic promotion, investment, raising, elimination of obstacles, and the establishment of an environment favouring competitiveness"[153]. As such INFO is supplying a complete "package" of services that range from networking to consulting[154].

INFO - whose total revenues (including grants from the regional government) have been 38.8 M€ (46.5% for R&D) in 2007 and which has around 100 employees – is, therefore, similar in functions and services to Yorkshire Forward and to the Agencia de Desarrollo Econonomico (ADE) of CYL. However, the difference is that, unlike YF in Yorkshire and ADE in Castilla Y leon, INFO is totally public and, thus, all of its employees are all civil servants.
More over as we already mentioned INFO works in partial competition with the Seneca Foundation, whereas in CYL the RDA concentrates all of the most important functions of the innovation strategy. This will result – according to what Rafael Martinez, Director of Innovation at INFO referred to this author - in "a decreased incentive for employees to reach targets and also unclear levers for responsibility of the final results"[155].

Fundación Séneca is the institution that shares the responsibility of implementing innovation programmes with INFO and it, in fact, had the ultimate responsibility to draft and follow up on the 2007 – 2010 strategy. It is - with approximately ten employees - a much smaller organisation. Séneca was founded by the Government of the Autonomous Region of Murcia, "for the promotion of scientific research and technological development and know-how in the region."[156] The organisation is under the jurisdiction of the Ministry of Education and Culture, and acts much like INFO (with the Ministry of Industry and Environment), as an operating arm of the regional government's department.

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[153] *Qué es el INFO*. Instituto de Fomento Región de Murcia (INFO) http://www.ifrm-murcia.es/contenido/info/queesing.html

[154] In particular, INFO is managing at the moment the following innovation programmes:
R&D support to SMEs (covering 60% of expenses, including equipment); Technology transfer support (covering 50%, consulting costs); Implementation of innovation (40%, personnel); R&D Unit development (40%, equipment, personnel); ICT development (40%, implementation of ICT); Technology-based companies (40%, investments).
Moreover, INFO supports programmes for the access to financial instruments (financial management, financial guarantees), internationalisation, support to family businesses.

[155] Personal interview with INFO (see annexes)

[156] *Presentación.* Fundación Seneca. http://www.f-seneca.org/seneca/html/inicio.htm

According to its mission, the organisation supports: the appropriate environments that would help promote scientific and technological advancements in the region, proper collaborative efforts between universities and research centres and the private sector, innovation and competitiveness and scientific dissemination and diffusion.[157]

However, Seneca officers come mostly from University and substantially Séneca's main concerns are – in the words of its Managing Director, Juan Antonio Sanchez Martinez - to improve the position of the researchers as for its declared mission:"the education of researchers after the attainment of a degree, and the attempt of attracting and incorporating the doctorate level in the firm."[158]

The field work has, in fact, confirmed that Seneca's organisational culture tends to be very focused on university, and rather far from industry. This choice was made explicit to us during interviews. Our hypothesis is that this attitude is both the consequence and the cause of the lack of integration between business and research which is reflected into the organisation of governance that we have just mentioned.

One of the main concerns of the agency is the relevant *brain drain* that the region suffers. In the interviews with the director of Seneca, it also appears that the regional funds apparently aim to further the education of those at the doctorate level, whereas the national funds are intended – again in Mr. Martinez's view - "to collect the results of these investments and prevent the money spent in education from being dispersed otherwise."[159] The foundation is also engaged with "educating its population, and also in assuring that its most talented academics are kept in the region". The entire approach is oriented towards fostering research as a mostly cultural dimension.

Seneca handles approximately 70% of public investments in basic research. One important factor regarding the dispersal of these public investments comes with the classification of the type of research done: basic or applied. In order to receive financial support, the application of basic research activities must fit into the mould set out in the agency's definition, which envisages – in the view expressed by Mr. Martinez that "applied research is defined on the necessities of the firm, while basic research comes from the researcher's initiative. Basic research is entirely financed by public funding, while applied research is co-financed with firms."[160]

[157] *Presentación.* Fundación Seneca. http://www.f-seneca.org/seneca/html/inicio.htm
[158] Interview with Juan Antonio Sanchez Martinez, *Fundación Séneca*. Murcia, 28 May 2007.
[159] Interview with Juan Antonio Sanchez Martinez, *Fundación Séneca*. , Murcia 28 May 2007
[160] Interview with Juan Antonio Sanchez Martinez, *Fundación Séneca*. Murcia 28 May 2007

Interviews at Seneca displayed some problems in dealing with European funds. Aside from what is seen as a quantitatively small support from Structural Funds, Seneca corporate culture appears to be not consistent with the nature of the projects that structural funds tend to finance. Since the Commission requests that predetermined specifications are written explaining the way in which funds will be used, those at the agency see themselves as being often excluded from these sources. According to those at the foundation, it is difficult to set out predetermined projects for the next programming period since "this is not the way science works."[161] The scientific and technological priorities change continuously, as experienced within the most recent programming period.

However, as a partial contradiction one interesting note was the level of influence placed on researchers by the regional ministry. As a result, this influence often plays a role – as Mr. Martinez suggested - in "structuring the money in directions that reflect the ministry's priorities."[162]

The focus of Seneca on researchers and, more specifically, the creation and maintenance of researchers' jobs is reflected in some of the results we showed before: less clear cut choices in terms of industry and research domain, less capability to mobilize private investments

The Murcia's innovation system is completed by a complex web of institutions[163]. However Mr. Rafael Martinez of INFO revealed that the operations closed by these financial vehicles were fewer than budgeted, where the innovative nature of the financed projects was not always clear [164].

Castilla Y Leon main actors of strategy design

The design and the implementation of the R&D strategy in CYL is – vis a vis Murcia - characterized by a strong priority placed on research in the last programming period.
As mentioned the public investments in R&D were similar to the ones we found in Murcia (as for the evidence in chapter 3) at the beginning of the programming period in 2000. However, by the end of the period the regional administration increased its propensity to invest in research even beyond the

[161] Interview with Juan Antonio Sanchez Martinez, *Fundación Séneca*. Murcia, 28 May 2007
[162] Interview with Juan Antonio Sanchez Martinez, *Fundación Séneca*, Murcia, 28 May 2007
[163] They include: the entrepreneurship centres and incubators of Murcia (CEEIM) and Cartagena (CEEIC); the technology Park of Fuente Alamo (with MTorres) of which INFO owns 30% of the capital which is still largely unoccupied; the science Park of Murcia (with local public Universities) which was still to be opened at the end of the programming period we are studying; the technological centres that, as we anticipated, appear to be not clearly focused in terms of sectors to follow. Moreover, INFO has established a number of bodies which are intended to financially support innovative SMEs and more specifically: a) Invermur whose objective is to provide seed capital and risk capital; b) Undemur which is a mutual guarantee society for SMEs; c) Murcia Emprende which is supposed to operate as a public-private venture capital company with the participation of INFO and three local banks (Cajamurcia, Caja Ahorro del Mediterraneo and Cajamar).

[164] Interview with Rafael Martinez Fernandez, INFO, Murcia, 19th May 2009.

structural funds pot. By 2005 CYL used to spend a percentage of its own total that was the highest amongst Spanish regions as shown by table 5.6.

Table 5.5 – Percentage of regional administration budget spent on R&D, 2005

REGION	%
Castilla y Leòn	2,30%
Madrid	1,67%
Paìs Vasco	1,37%
Navarra	1,10%
Andalucìa	1,00%
Galicia	0,80%
C. Valenciana	0,77%
Aragòn	0,70%
Murcia	0,70%
Asturias	0,60%
Catalana	0,50%
Castilla-La Mancha	0,40%
Rioja	0,37%
Extremadura	0,30%
Islas Baleares	0,20%
Islas Canarias	0,10%
Cantabria	0,03%

Source: Castilla y Leon, Regional Innovation Strategy, 2007 - 2010

Such a rise in R&D within the portfolio of the region can also be seen a consequence of better results coming form the management of the OB1 programme that in turn appear to be associated with better management. However it works also the other way around with a strong priority and a strong political leadership being driver of more focus and better results.

As far as the 2000 – 2006 programming period, the formal line of decision making of the R&D strategy in CYL is rather simple:

1. The commission for coordination of Science and Technologies Policies - *Commission de Coordination de Ciencia Y Tecnologia* - is responsible for coordinating all investments in science and technology and is, also, responsible for designing the strategy, defining its structure in programmes and measures, allocating the funds amongst different objectives, evaluating the results, and adjusting the allocation of funds accordingly. The president of the

Commission is the president of the region which is an indicator of how high of a priority R&D is in the portfolio of the Region's policies. Almost all other ministries (and the director general) sit on the commission.

The coordination is, however, made more effective by the fact that the president of the Region delegates most of decisions to the secretary of the Commission, Mr. Juan Casado Canales[165] and his assistant Mr. Gregorio Munoz Abado who was also the main source of the field work in CYL that this research developed. These two individuals have been considered the leaders of the regional innovation strategies since their inception in 1997. This reinforces a strong leadership on most important strategic choices.

The coordination is intended to become even more pervasive vis a vis the innovation and economic community of the region when the council for science and technology (*consejo assessor de cienca y tecnologia*) is established. The council is still not working and is supposed to be representative of all social and political partners of the region.

2. Underneath the junta there is the real implementation core of the R&D policies: ADE – which still stands for *Agencia de Desarrollo Econonomico* (RDA) although the name has been recently changed to *Agencia de Inversiones Y Servicios* - and the various bodies that are owned by ADE (ADE Financiacion, IBERAVAL, ADE Capital Sodical, ADEUROPA, Gesturcal).

3. ADE and its subsidiaries, in turn, coordinate – in various fashions – with five different typologies of organisations that complete the picture: three technology parks; six technology centres; four science parks; eight laboratories and investigation centres; three business innovation centres.

On a more informal plane – as Professor Olga Ogando Canabal, team leader of the work group of the University of Valladolid that conducted the independent evaluation of the Operational Programme, said [166] - "the presence of a few national level leaders of each of the worlds – regional administration,

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[165] Mr Canales has been since 2001, Secretary of the Science and Technology Co-ordination Commission; since 2007, Commissioner for Science and Technology, and Director General of Universities and Research; from 2003 to 2007, Director General of Industry and Technological Innovation; and from 1996-2007, Head, Innovation Division of the Regional Development Agency ADE. Moreover he has been in charge of the elaboration and implementation of all regional innovation strategies for Castilla Y Leon: the Regional Technology Plan 1997-2000, and the two regional R&D&I Strategies (2002-06 and 2007-13).

[166] Interview with Professor Olga Ogando Canabal, Departamento de Economía Aplicada, Facultad de Ciencias Económicas y Empresariales, Universidad de Valladolid, Murcia, 3rd May 2007

university, business – whose interactions are necessary for innovative projects to happen, simplified the decision making process" and created an informal dialogue amongst these leaders who are oriented to solve problems and find opportunities.

Castilla Y Leon main actors of strategy implementation

As Dr. Carmen Verdejo Rebollo, Head of the Innovation Department of ADE Inversiones y Servicios (Agencia de Desarrollo Economiquo Inversiones y Servicios de Castilla y León) told us the agency is the "principal promoter of development in the economic activity and the system of productivity in CYL."[167] One of its main activities is the distribution of regional funds to firms. All money received by the region passes through the agency before being dispersed to individual enterprises. The agency holds offices in each of the sub-districts in the region of CYL, assuring that its overall objective is implemented in all areas of its jurisdiction.

These objectives include[168] a number or rather general purposes that appear characterized by a more strategic approach than the ones we mentioned as far as INFO that seem to provide services on demand.

In fact, the RDA works much like a full-service strategic consulting firm. It not only acts as an outlet for the region's businesses to obtain funding, but it also works to promote and sustain competitiveness for all firms.

Since its establishment in 1989, the agency has been involved with the objectives set out in the regional strategy[169] produced by the Junta de Castilla y León. Although its programmes may be facilitated independently, it has a close working relationship with the regional government. Consequently, this collaboration has established various institutions and centres helping with the goals set forth in each regional strategy.

ADE is a public body, functionally dependent on the *Consejeria de Economia y Empleo* and consists of different organisations:

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[167] Interview with Carmen Verdejo Rebollo Jefe del Departamento de Innovación and Maria Lopez, ADE Inversiones y Servicios (Agencia de Inversiones y Servicios de Castilla y León), Valladolid, 22nd April 2009

[168] Objectives of the ADE include - as per the description at http://www.ade.jcyl.es: "a) fortifying the weaving of business, by means of an increase in the creation of businesses and the promotion of an entrepreneurial spirit; b) favouring an increase in the size of businesses, by means of professionalization and consolidation, and by the innovation in its processes and products and inter-business cooperation; c) designing sector politics with spatial attention to the production sectors with a significant presence and high repercussion for productivity".

[169] The most recent being the *Regional Scientific Research, Technological Development & Innovation Strategy of Castilla y León 2007-2013* (2007). Junta de Castilla y León.

(1) The main one is ADE itself that changed, as mentioned, its name to Agencia de Inversiones Y Servicios: the new name implies a role which seems more focused on the implementation than in the design of the strategy; in fact, as opposed to Seneca or INFO in Murcia, but also Yorkshire Forward in SY which are the informal owners of the regional strategy on innovation, ADE is not involved into the strategy drafting exercise; the ADE is a public body although its roughly 200 employees have a contract that is substantially similar to the contract of civil servants (high security, low variability of salaries, ..); amongst other functions ADE has the rather pivotal role of developing and maintaining the technology parks and half of its workforce are engaged in this task; in fact the firm is going to increasingly integrate within its functions Gesturcal which is the owner of the industrial parks;

(2) ADE Financiacion, SA is the owner of Iberava that is in charge of distributing various products insuring from defaults the banks providing loans to innovative firms (and thus making loans more accessible and cheaper) and Sodical that is supposed to provide risk capital especially to spin offs; ADE Financiacion staffs 20 employees;

(3) ADEUROPA has 40 employees, it is in charge of supporting firms and universities seeking grants for supporting R&D projects and of internationalizing them mainly by promoting exports and attraction of investments.

The difference between the two regions is, therefore, a clearer distribution of responsibilities and also stronger leadership of the RDA as the main implementer of the regional innovation strategy. This is reflected by the very distribution of OB 1 funds amongst bodies responsible for the implementation, summarized by table 5.7.

Table 5.6 – Distribution of R&D measures by beneficiary (i.e. body responsible for implementation), OB 1 Programmes 2000 - 2006

CASTILLA Y LEON				MURCIA			
Beneficiary	Measures	Managed amount (mil euro)	% of total	Beneficiary	Measures	Managed amount (mil euro)	% of total
ADE (regional development agency)	2.1[1], 2.52, 2.53	88,4	66,2%	INFO (regional development agency)	2.52, 2.54, 2.55	18	27,3%
Ministry of family (with education and healthcare)	2.7	41,7	31,2%	Ministry of agriculture	2.1[2], 2.2, 2.3	19,8	30%
Ministry of Agriculture	2.2	3,4	2,5%	Ministry of Economy	2.7[3]	28,1	42,6%

[1] Together with Ministry of Education

[2] Together with Ministry of Labour

[3] Together with Ministry of Industry

Source: Programming documents

It is evident that in CYL there is a higher concentration of resources on the RDA. Meanwhile in Murcia, INFO manages less than 30% of the funds and the largest beneficiary happens to be the Ministry of Economy which is outside the arrangement between the Ministry of Industry and Ministry of Education for the governance of the innovation strategy that we have observed in this section.

Like in the UK, the less efficient region appears to make a larger use of the public administration as a decision maker. This may be the consequence of an environment that may be more or less focused on the creation of opportunities on the basis of evidence: when this attitude does not emerge, the public administration fills the vacuum with its formal impartiality.

5.5 THE ROLE OF PARTNERSHIPS

The specific literature on Spain's regional development seems to buy the argument of the need of regional innovation systems and, thus, of partnerships and agents promoting such alliances for innovation (see for instance, Torrejón, 2008).

These arguments appear similar to those that we introduced in chapter 2 when we described the "chain" by which a regional system produces innovation.

The approach to the selection of the implementers of the strategy and to the role of partnerships in our two regions will be described by referring to the institutions that act as hub of the interactions amongst the various actors of the innovation strategy and, more specifically, to a) the technology parks that had an important role in matching business and research in Spain, b) the offices that Spanish universities developed in order to market their research product and, then, c) a number of companies that we interviewed and that helped to qualify the approaches to partnerships in the two regions.

The Spanish case provides, thus, the possibility to focus on the effectiveness of the *place*, of the mechanism by which ideas, technologies, and business models *meet* each other and leverage on each other which is also the core of the argument of the mainstream endogenous growth theory in Arrow (1962) and Romer (1986) whose theoretical premises are the starting point of this research.

5.5.1 The technology park in Castilla y Leon

The technology parks are seen as the most effective tool to promote, maintain, and leverage upon partnerships amongst universities, firms, and administrations. The country – since the 1980s – has developed a number of technology parks with the help of respective regional governments, universities, private businesses, and development agencies.

The importance of the parks is remarked by a study of the Association of the Scientific and Technology Park (APTE – *Association de Parques Cientificos Y Tecnologicos de Espana*): the parks employ an increasing share of the total employment in R&D sectors (5% in 2001 – 6% in 2005) and the productivity meant as the ratio between total turnover and number of people employed seems to be more than 50% higher (134,000 euro versus 83,000) than the general one for Spain. The study shows that such productivity is also higher than that of the UK (107,000 euro), Finnish (116 000 euro) or American (122 000 euro) economies.

Spain, since the 1980s, was one of the first countries to understand how important Information Communication Technologies (ICT), in particular, and research, in general, is to economic development that may be not only based on a competitive advantage of cost and sustainable in the long run. One of the characteristics of Spain's strategy was the focus on technology parks. These infrastructures were thought, since the beginning, to operate both as a place for firms and research centres to meet and to share resources, and also to provide them a number of services.

Within this scenario, CYL has literally pioneered some of these concepts and has, therefore, been imitated. CYL' s technology parks are, therefore:

1. Boecillo Technology Park (*Parque Tecnologico de Boecillo*); this is, by and large, one of the main actors of the research strategy in CYL; it was founded in 1992 and since then has accumulated specific know how and as a result has constantly increased the number of people employed, the number of firms and the turnover;
2. the park of Leon completed in 2004: and
3. the park of Burgos still in development.

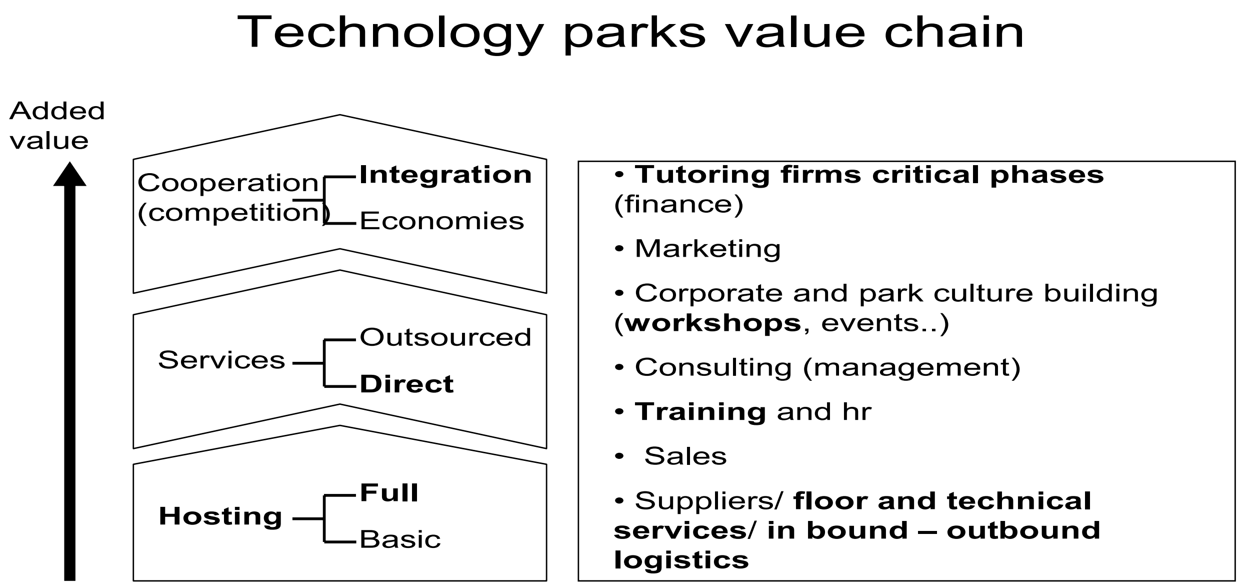
The Boecillo Technology Park was one of the very first technology parks constructed in Spain and Europe. In fact, it gained mentions in various reports of the EC including the report to the European Spring Council 2008 where the committee of the regions mentioned CYL as a best practice for having promoted a technology centred cluster.

The decision to build a park dedicated to technology while focusing on the sectors most important to the region – specifically, transport and agriculture – began in 1988. The technology park was authorised by the Junta de CYL, in 1990, and was inaugurated in 1992. The park, as a whole, was designated as a *Sociedad Anónima* which is similar to the structure of a private limited company in the United Kingdom. The technology park is a true collaborative effort by private business (El Banco de Santander), regional planning (El Ayuntamiento de Valladolid), government (Junta de Castilly y León) and higher education (La Universidad de Valladolid). This effort gains its competitive advantage through the high-level research done by the university system and the effective, results-based nature of the business sector.

The administrative staff at the Technology Park, unlike the case of the Advanced Manufacturing Park in SY, seems to be involved in adding value to the firms that are hosted into the park. The chart 5.1 maps the possible services that a technology park can provide and the organisational choices that the

Park of Valladolid has been progressively made[170]. The map was reconstructed on the basis of the interviews with Mr. Jose Antonio Menendez, Director and José Pérez Marín, Head of the Innovation and network departments of the Technology Park.

Chart 5.1 – Technology parks value chain – In bold the services provided by the Parque Tecnológico de Boecillo



Source: Personal interviews

The field work showed that:

- the "hosting" of the firms tends to be full and goes well beyond the provision of floor service and basic infrastructure; more broadly, the scope of ICT (ICT) services is wide and the updating of the structure is frequent; logistics to and from the park are also conceived as both personalized (if needed) and shared (if cost arguments prevail) arrangement;
- the "services" tend to be provided directly by the staff of the park and they are relatively simple; the staff is engaged in organizing trainings, workshops and the tutoring of firms in their spin off phase (business plan development of new candidates to be hosted by the park) as well as expansion or consolidation (mostly through the acquisition of grants from the region or the EC, within or outside the structural funds programmes);
- through hosting and not hosting services a significant degree of "cooperation" is developed; in fact, this has become a deliberate strategy and has overcome the stage when collaboration is basically meant to acquire higher bargaining power (discount on volumes, larger market

[170] Interview with Jose Antonio Menendez, Director and José Pérez Marín, Head of the Innovation and Network (Departamento de Innovación y Redes) of the Boecillo Technology Park, Boecillo, 16th – 18th April 2008.

share in some niches, ..) and is producing integration of value chains that are the most important feature of the ecosystem that a park is nurturing.

The nature and the results of the technology park were explained to us by the technology park staff, but also by some of the firms that are being hosted. We extensively interviewed the management of three firms - Ingeniería y Sistemas de Ensayos no Destructivos (ISEND), Proxima Systems, Cenit Solar, Proyectos e Instalaciones Energéticas - that are each representative of one of three different typologies of relationships with the park's business system (roughly one for each stage of development of the technology park value chain that we have just shown in the map) and of an evolution in the nature of innovative firms that is interestingly dependent on the partnerships that they manage to develop within the park:

1. ISEND – a high technological start up company - was the youngest of the three firms that we visited and as a consequence the less integrated into the park's systems; even in the case of ISEND, however, the park was – according to the owner José Manuel Bernárdez[171] - not only the logistic support, but also the guidance if not the possibility to outsource to the park's staff some crucial activities like looking for government funding – which is a rather obvious activity to delegate to the park's staff given their close link to the regional administration – and, more remarkable, "the scouting of prospective clients" - which can be part of the relationship assets of the park; this support – although not as sophisticated as the one enjoyed by other firms that we visited – is crucial for allowing the entrepreneurs – normally highly skilled engineers – to focus on the development of technology which is obviously the core for start up firms;
2. Proxima Systems is, instead, at a different stage of the park's value chain; the owner Emiliano Muñoz[172] was – unlike the founder of ISEND – not interested in public money because it is "too complicated to be managed" – and, instead, very keen on "pulling resources" and even more in "developing joint technologies" as they did by combining their remote control devices and the know how of other firms on how to build eco compatible and energy efficient houses;
3. Cenit Solar (the oldest and largest of the firms hosted in the innovation hub of Valladolid) has been recognized a leadership of the park; it is Cenit Solar that - according to the interviews

[171] Interview with José Manuel Bernárdez, Owner, iSEND, Boecillo, 17th April 2008

[172] Interview with Emiliano Muñoz, Owner, PROXIMA SYSTEMS, Boecillo, 17th April 2008

we were released by other entrepreneurs and by the park managers, as well as by its founder Alfonso Calderón Vergandone[173] – that is leading most of the joint new markets/ new technologies development that involve various firms based in the Boecillo.

All three cases (described extensively into the annex five) point to another even more profound impact of the technology park: by having firms and research centres working side by side, the firms themselves are changing their nature. The transfer of technology and knowledge does not have, anymore, suppliers and demanders but becomes a day-by-day circulation that spills out of formal agreements. This has created an ever changing ecosystem where firms and researchers share common marketing strategies, product development, funds raising ,and obviously research project.
It is in this environment that – in a way which is similar to the one we reconstructed for the SY' s technology park in Rotherham – the CYL programme (and innovation firms by and large) found in technologies applied to energy saving and energy generation their smart specialization.

Similar considerations apply to other technology hubs like the Technology Institute for Agriculture (Instituto Tecnológico Agrario de Castilla y León - ITACyL[174]). The centre has, in time, increasingly become the leader of a number of researches that actively involve firms positioned at different stages of the agri food value chain. Moreover, ITACYL is, also, like Cenit Solar, leader in the development of relationships with European and South American organisations that give to CYL firms an international exposure seen as crucial to develop competitive advantages. Like within the technology park, business and research, firms and research centres become much more integrated and knowledge gets jointly developed and shared.

5.5.2 The market place of know how in Murcia

Partnerships are considered, in Murcia, as in CYL, crucial for innovation. According to the great majority of the actors we met in the field work, small firms have two main options: cooperate with a technological centre or collaborate with other firms. However, interviewees made clear that cooperative arrangements are difficult to achieve and that cooperation between companies is particularly complex.
This is, also, true for mature industries like the agro food. As Angel Martinez Sanmartin, Director of Technology Transfer of the *Centro tecnologico Nacional de la Conserva Y Alimentacion* - a

[173] Interview with Alfonso Calderón Vergandone, Owner, CENIT SOLAR, Boecillo, 18th April 2008

[174] Interview with Cristina León, Head of the Technology Transfer Area, and others, ITACyL, Burgos, 16th April 2008

technology centre that in theory operates on a national scale, altough it is based in Murcia – explained to us "in a region like Murica, vertical cooperation is considered easier (in terms of creation and management) than horizontal cooperation: local firms prefer to cooperate with suppliers and clients, instead of competitors". Moreover, the cooperating agreements are achieved with the intermediation of a public institution, like Universities, INFO or other technological centres which try to promote the creation of consortiums between companies. How is the regional system faring against such a need for partnerships?

As far as technology parks, Murcia is positioned – if compared with CYL - in the opposite side of the spectrum. If CYL has been one of the pioneers of the concept, Murcia has been one of the laggards as far as developing places where to aggregate innovative firms. The absence of these networkers has been consistent with an approach to innovation where firms and universities do not interact like in CYL, and rather they exchange specific know hows demanded by firms and provided by universities. It is a pragmatic vision of the role that innovation can play in a region that does not seem to be able to afford an innovation based regional strategy aiming to create or sustain region's competitive advantages. Even with regard to the agriculture and agrifood industry the difference with CYL is clear: whereas in CYL as Cristina León[175] of the Institute in charge of research in agriculture described what she called "an innovation strategy in the agrindustry", in Murcia "universities are waiting for a specific question raising from industry before acting" as Luis Almela Ruiz[176], Director of the Departmement of chemistry applied to agriculture of the University of Murcia, told us.

In fact, as far as the entire period we are observing – 2000 – 2006 – Murcia operated without technology parks or science parks, notwithstanding the allocation of more than 16 million euro within measures 2.52 and 2.55 of the Objective 1 programme that were explicitly dedicated to develop these kinds of infrastructures.

Moreover, the park that is being developed seems to already display some important pitfalls as opposed to the basic requirements that a structure of this kind should have in order to respond to the expectations of promoting innovation.

The technology park of Fuente Alamo, in the area of Cartagena, is an initiative by a local large company, Manuel Torres (wind energy and industrial equipment), two local banks (CAM and Caja

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175 Interview with Cristina León, Head of the Technology Transfer Area, ITACyL, Burgos, 17th April 2008

176 Interview with Luis Almela Ruiz, Director, Departmento de Quimica Agricola, Geologia Y Edafologia, Universidad De Murcia, , Murcia, 15th April 2008

Murcia), two business associations (Camara de Cartagena and Coem) and INFO. In particular, INFO has a participation of 43% into the project, Manuel Torres 11% Caja Murcia 22, CAM 22 .The remaining 2% is split between the two business associations. The board of the park is composed by two people coming from each of the four major shareholders, one from each of the smaller associations, plus the rector of the University of Murcia, and the rector of University Politecnica de Cartagena.

This shareholders' structure has rendered the technology park a private initiative. This is a rather peculiar condition because almost all other technology parks are public (and, in fact, one may argue that they provide a "public good" that the market on its own may not provide). The most practical consequence is that while on one hand, the park can operate more easily, and construct and sell "parcels", on the other, it cannot apply for public funds being allocated in a not competitive way.

The technology park partially opened in 2005 and by 2006 the first five firms (amongst them the founder and co-owner of the park Manuel Torres, the Israelian BEL that is working on desalinization technologies, the pharmaceutical firm Villapharma) occupied their parcels. The technology park has now around 20 companies already settled, including high-tech multinational companies, like Siemens (which moved its corporate European R&D centre for biomedical research), Indra (the Spanish largest ICT company) and Bionet (engineering services). Moreover, two technological centres - the one for shipping industry and the one for energy and environment - are being established in the park together with the contact points (OTRI) of the two public universities.

The further development of the technology park includes the intention to complete the portfolio of added-value services for the companies that will be hosted. However, until now only three people (director, and engineer for the physical development and a deputy director) work at the park with general management duties. The only service provided to companies is the logistics (the building, the electricity and heating, the gardening and more importantly the security) by an external body (*the entidad de consercìvaciòn*). Moreover, Joaquin Juan Aguera, the director of the park has acknowledged, that "it is not clear enough how they are different from a industrial park ("industrial polygon") which is basically a real estate development initiative to host firms[177]".

It is, however, evident that for a long time, although things are now finally moving, Murcia – unlike CYL – has not been able to leverage on a concentration of innovative and high tech firms like the one that has gathered around the main technology park in Valladolid.

The delay in the process of developing the technology park seems due to two main reasons: a) a priority given to this initiative that was much smaller than the one that we described in CYL; b) a

[177] Interview with Joaquin Juan Aguera, Director, Technology Park de Murcia in Fuente Alamo, Murcia,18th may 2009

lengthy negotiation to find a compromise between conflicting interests. As Mr. Aguera explained to us “the clash of interests has been mostly on the plane of different municipalities” interested to host the park in order to minimize the distance from the park (that, in fact, at the end has been constructed in a rather remote location half way from Murcia and Cartagena), and to get the taxes that hosted firms are supposed to pay (whereas now it is paradoxically happening that the initial plant is expanding and going to enter into a municipality different from the one where it was supposed to be established).

In the absence of adding value brokers, Murcia’s strategy has been the promotion of a business-university market place that is used quite extensively – along with the creation of parks and other intermediaries - in the Spanish move toward modernisation.

The model was created by the General Secretariat for the R&D National Plan in 1988 and proposed the use of the University Knowledge Transfer Offices (KTOs) within the Spanish system for innovation. This program spurred the creation of *oficina de transferencia de los resultados de la investigacion* (offices for the transfer of research results - OTRIs) with the intention of strengthening the relationship between the worlds of science and business.”[178]

The establishment of this body has led to a number of results. In 2005 alone, 9.916 R&D contracts were signed for a commercial value of 339 million €. This resulted in 336 national patent applications, 117 international patent applications, 116 license contracts and 88 new technology-based firms.[179]

Each research institution has created a transfer unit with the support of national dedicated programmes. The OTRIs, which employ research, administrative and commercial staff, are now carrying several activities[180].

The Centre for Technology Transfer assists with the procurements of contacts and contracts for projects and research activities. Prior to its establishment, each department within the university was responsible for contacting firms and obtaining the appropriate information for suitable research agreements. The OTRIs manage the collaborative research projects during the entire life cycle, and manage all the bureaucratic and accounting aspects, including relations with other administrative

[178] *RedOTRI Annual Report 2006 (2007)*. Red OTRI Universidades – CRUE.

[179] Ibid, p. 5.

[180] In particular the OTRIs are involved in: communication of the research activities of the Universities/research centres to local companies and stakeholders (one-to-one meetings through commercial staff and events); internal support for patenting; internal support for spin-off development (business plan, legislation, bureaucracy); internal and external support for regional and national funded schemes/grants applications; negotiation with external industrial/research partners and setting up of contracts; accounting and project management; management of patents and research results.

departments of the institution (for instance the public competitions for scholarships related to funded projects and other legal issues). As a consequence, for research projects the OTRI represents the only administrative interface both for researchers and for external partners. Moreover, software information systems for accounting and monitoring have been implemented to facilitate the management of funded projects. For all these reasons, the activities of local OTRIs have been recognised as one of the main changes in the local academic and research organisations in the last decade. The OTRIs are perceived as pro-active units, and thanks to their commercial unit and public relation activities manage to find an industrial partner in around 50% of research projects carried (with an increasing share year by year), overcoming the outcome of the usual networking activities carried by research groups to start projects. The ultimate objective of the OTRI is to put the researchers in the position to not waste resources on administrative duties and, therefore, to maximize their focus on their investigations.

OTRI seems, in fact, more common in Murcia than in CYL. The reason for that is, according to our theory in chapter two, not entirely surprising. The broker of innovation between academia or business is more common in regions with a lower level of development of their innovation strategy; in a more advanced context there should gradually be a move towards a situation where universities (or individual researchers) and firms end up converging into innovative firms that integrate innovation and research together with the processes by which new products and processes get developed and streamlined.

However, the general limit that, as Juan Francisco Pacheco Martín, Project manager of the OTRI at the University of Murcia told us, is that OTRIs do not really have the capability to do marketing and "their staff does not have the time or the capability to visit firms and proactively identify their need of innovation along their value chain [181]".

The other important feature of the relationship between universities and companies is signalled by the value of the projects that are being carried out by the universities as a result of demand from companies. As mentioned, in 2007 the University of Murcia managed around 500 projects for 9 Mil euro and the University of Cartagena 250 for 1.9 Mil euro which sums up to an average value per project of less than 20,000 euro for the former and less than 10,000 for the latter. Most of the industrial applied projects are funded directly from business companies, which consider the academic

[181] Interview with Juan Francisco Pacheco Martín, Project manager, Oficina de Transferencia de Resultados de Investigation, Universidad De Murcia, Murcia, 14th April 2008

groups mainly as engineering service providers. As a consequence, these projects, which are focused on finding technical solutions more than developing a long term research activities, are featured by very short duration, very limited funding and value added. Long term projects are mostly funded through public schemes and have an overall greater amount and greater value for the companies involved.

The firms that we interviewed themselves confirmed the typology of relationship that universities and firms have developed (the field work described extensively into the annexes). They are both characterized by innovation that seems connected with Murcia's traditions – Duralmond[182] literally invented a process and a product (almond made wall coverings and ceilings) and Hydraconta[183] is specialized in finding technological solutions to irrigation as one of the greatest problems of Murcia – and they both established relationships with the local universities to better their products.
In both cases the relationship between research and entrepreneur is of a kind where the firms asks for a specialized, precise quality improvement and no real partnership is being developed.

CONCLUSIONS

The comparison between Murcia and CYL provides a complement to the research in the UK, because unlike the UK here we are confronted with regions whose economy was traditionally centred around agriculture (whereas both Wales and Yorkshire face a massive problem of industrial restructuring) and they both have a similar institutional setting and level of autonomy from the government (whereas the devolution and the creation of the new regional government made Wales divergent from Yorkshire that at the same time - at the beginning of the programming period that we are investigating- delegated most of regional development functions to a newly established regional development agency). Moreover unlike UK the ultimate decision maker is in both regions the public administration. Yet notwithstanding these differences in Spain like in UK it is the gap in terms of capability of the programme manager to conceive a high quality innovation strategy and to engage innovators the differentiator that is capable to explain the differences in performances.

The case allows to consider one of the European country that has witnessed both one the highest increase of the expenditures in R&D and of the priority that innovation plays in the political agenda

[182] Interview with Pedro P. Carrillo González, Duralmond, , Lorqui, 14th April 2008

[183] Interview with Alfonso Corbalán Carreño, Hidroconta, , Santa Catalina, 14th April 2008

and in the regional development strategy. Consequently, the results of regional innovation strategies in Spain have been widely investigated (amongst others De La Fuente, 2002, Pilar, 2002, Rodriguez-Pose, 2001, Puga, 2002) although these analyses have been focused more on a country wide assessment of the performance, rather than on a region specific identification of the reasons for differences in the outcomes (Landabaso et al, 2002).

More specifically, our two regions provide a comparison between two situations that were very similar as far as pre existing conditions and endowment of public investments to be spent on R&D, and that yet achieved very different results in terms of multiplication of public effort into more durable private expectations and investments.

At the beginning of the 2000 – 2006 period, CYL and Murcia had the same absolute value of R&D expenditures on GDP and were both exceeding the national growth rates on the same indicator by the same margin. The percentage of these investments coming from business was the same (40%) and both were lower than the national average.

The percentage of funds available to research in both OB 1 programmes was similar and in both cases much smaller than the average that we observed in the UK cases. The two regional innovation strategies were believed to be constrained in both regions by the expenditures in research failing to reach the minimum critical mass necessary to compete (Rodriguez-Pose, 2001, Cuadraro, 1999) in a country that displayed - at the end of the nineties - a very polarized distribution of R&D investments (Coronado et al, 2008, Rodriguez-Pose, 2001) towards few industrialized areas (Madrid, Cataluna, Basque countries).

However, notwithstanding these similarities the results between the two regions differed in a remarkable way between the beginning and the end of the 2000 – 2006 period.

In fact, while both had allocated similar amounts of funding on R&D, the funds were dispensed of more quickly in CYL attracting more private investments than in any other Spanish region and significantly increasing the share of R&D expenses coming from business (to 58%).

The opposite happened for Murcia where the percentage of expenditures on R&D coming from business actually dropped to 36%. As a result, whereas at the beginning of the programming period the expenditure in R&D per habitant was roughly the same, in only 5 years it became twice as high in CYL when compared with the Murcia.

Moreover, CYL achieved the final goal of the OB 1 Programme which was to rise above, in terms of GDP per capita, the 75% of the EU average. Murcia did not reach the same result and failed to leave the status of “less developed region”. If CYL exceeded the national and OB 1 average both in terms of growth rates of GDP per person and productivity, Murcia lag behind along both indicators.

The Objective 1 programmes that we analyzed, can explain these opposing trends. The resources that they made available were significant when framed as a percentage of the regional GDP and, more specifically, funds dedicated to R&D represented a large percentage of public investments in research: therefore, as elaborated in chapter 2, we can safely assume that the explanatory power of factors other than structural funds, can be expected to be low.

CYL concentrated more resources in the manufacturing sector than Murcia; likewise in CYL, the concentration was also geographically focused, especially when we consider the allocation of funds meant to finance R&D infrastructure – on metropolitan areas like Valladolid. In Murcia, the opposite happened with the only two cities with a university getting a share of the money that was lower than their percentage of the population and, therefore, the structural funds spent in R&D tended to be used as a redistributive tool and get skewed towards to rural locations.
The argument of agglomeration of R&D (Krugman, 1999) appears to find an interesting regional interpretation with one region accumulating few assets on city universities and the other diluting further the available funds and transforming investments in R&D into expenditures for incremental up grading of small firms in mature sectors (connected with agriculture).

One is the consequence of more focus is that CYL OB 1 financed projects received three times the quantity of co-financing from business investors than the projects in Murcia.
More broadly, the innovation measures appeared to have been designed in such a way that they met the demand from universities and firms more rapidly than in Murcia and that the funds were spent much faster.

Beyond these results, the field work unveiled that **decision making patterns** and **differences in the layout in the relationships between firms and universities** (as for the table 5.8) were crucial - as envisaged by the thesis that this work is testing - to determine differences in performance (in a way which develops the accounts of regional innovation strategies in Spain provided amongst others by Landabaso, 2007, and De la Fuente, 2002).

Table 5.7 – Main differences between Murcia and Castilla Y Leon along the innovation value chain

Factors	Murcia	Castilla Y Leon
Concentration of innovative projects' portfolio and leverage on private funds	Redistribution of funds towards rural areas Low leverage	Concentration on university cities High leverage
Organisation settings	Separation of implementation processes between strategy for universities and strategy for firms	Integration and strong political sponsorship Political accountability
Partnerships	Deliberate separation between demand (firms) and supply (universities) of innovation (where innovation is meant as incremental improvement) No leadership	Strong priority on technology park where firms and universities partner and innovate together Presence of pre existing leaders (universities and multinationals)
Performance	Spanish OB1 region where the percentage of R&D expenditures financed by private firms has decreased the most	Spanish OB1 region where the percentage of R&D expenditures financed by private firms has increased the most

The decision making programmes in CYL are more streamlined with political and management leadership that appears to be clear both on a formal and informal plane, and a higher integration between strategies that support universities and those that promote business innovation.

More importantly, CYL has developed technology and science parks that act as hubs between firms and universities which have succeeded in developing strong relationships.

It is interesting to see how both firms and research centres change progressively in their approach to research and as a result they become more similar (and this is a confirmation of behaviours that Wilson, 2004, and Blake, 2009, have noticed in innovation systems outside Europe). The park becomes an ecosystem whose leadership is not formally governed anymore by a public administration in a top down mode, but with the largest and more innovative organisation hosted by the park becoming the partnership leader.

In Murcia, for the entire programming period the issue of leadership between the Ministry of Industry and the one of Research was never solved. This was acknowledged by the same regional administration with the recent creation of a brand new ministry that may overcome the institutional impasse.
In the meantime, a rather pragmatic model of an innovation market with clear distinction and separation between those who demand technological knowhow (mostly small firms) and those who supply it (mostly universities through their *Office of technologies transfer*) seems to have prevailed. The attempt to create more proactive technology centres has, instead, witnessed a multiplication of beneficiaries (ten against six in CYL and against 64 in the entire country) that have never achieved financial and economic independence from the regional administration. More importantly, no innovation hubs were finalized until very recently and, notwithstanding much discussion, the technology park is only partially utilized while the science park is still under construction.

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These variations in results, decision making and strategy implementation models do, in fact, point to two other higher level differences that – as it was confirmed by policy makers and programme managers - differentiated the two regions at the start of the programming period in 1999.

Firstly, the realization in the better performing region that higher **productivity**, and thus an investment in innovation, was the only way to accelerate GDP growth, whereas Murcia, instead, appeared to have the option to grow through immigration and cheap labour in more traditional industries. Secondly, the existence in the winning case of a potential source of **leadership**: a group of multinationals with international exposure; universities with great traditions; and a policy maker and a team of senior civil servants that clearly hold the ownership of the strategy and could focus the entire innovation strategy on solving the problem of scale without significant political bargaining.

Moreover, like in UK, the two factors – capabilities of programme managers and partnerships - are correlated: it was the lack of places where academic pursuits and business could intermingle that prompted Murcia not to integrate the two strategies for universities and firms and, consequently, to reduce the leadership of the regional administration. On the contrary, it was a stronger political leadership that made it possible in CYL to pioneer the concept of technology parks.

If the UK case highlighted the effects of having the decision making processes on innovation strategies brought back to the public administration as opposed to delegating it outside to a development agency, the Spanish case concentrated on the difference that can be generated by two *different organisational models* that are both inside the public administration. The result is, however, similar: clarity of governance mechanisms and objectives, leaders and the presence of places dedicated to creating innovation through the development of partnerships, are crucial to improving the efficiency of R&D expenditures.

CHAPTER SIX - CONCLUSIONS AND AREAS OF FURTHER INVESTIGATIONS

One of the more distinctive features of endogenous growth theory is the belief that differences between regions do not go away spontaneously and that these disparities are permanent because of a difference in terms of knowledge and research assets that are not easily transferrable from one region to another (as in Arrow, 1974, Kaldor, 1972, Lucas, 2001, and Romer, 1986, amongst others).

The consequence for development policies is that lagging countries or regions must concentrate their efforts on filling this distance in terms of innovation.

The influence of the theory on policy makers around the world has been large. Governments of some of the fastest growing economies in the world – including Singapore, South Korea, and more recently India, Brazil, China – have explicitly declared that innovation and research are their key priorities to achieve sustainable growth. In the meantime, the United States and Japan continue to consider the country's propensity to produce technological breakthroughs as their greatest competitive advantage.

The success of the endogenous growth theory has also been particularly high with EU policy makers who have, in recent years, made public investments in innovation the undisputed priority in the toolkit for producing or stabilizing economic growth and for reducing regional inequalities. Endogenous growth theory is, thus, also the inspiring principle of the EU Lisbon Strategy (EC, 2005, 2000) and of the most recent re-design of the EU's cohesion policies (in the European Commission's *progress reports on economic and social cohesion*, 2003, 2005, 2008, 2009).

This priority has been confirmed recently (in the so called Europe 2020 strategy) and the recent crisis appears to have made it even more urgent to preserve social cohesion and to spend scarse public resources by targeting typologies of investments whose return can be higher.

As a consequence of such a choice, 85 billion Euro of structural funds are being spent on innovation, with 50 billion in R&D and 81% of this in the poorer European Regions. The public investments allocated to R&D and to R&D investments in less developed regions become even bigger if we consider the co-financing of member states, regions, private firms (which double the contribution coming from the EC) and the framework programs that are outside cohesion policies but still finance investments in research. Moreover, the rise of public investments in the structural funds programs for the 2007 – 2013 programming period has, in fact, continued a trend that started in the 2000 – 2006 cycle, where the structural funds spending had produced a widespread catch-up process of less developed regions that have grown much more than the advanced regions in terms of investments in research.

However, although there is substantial literature that deals with the importance of increasing the expenditures on innovation (EC, 2009, 2008, 2006a, 2003, OECD, 2010,2009, 2003, 2001, 1999 just to mention few), there is much less investigation into the factors that impact on the actual return on these categories of investments.

This lack is particularly significant when it comes to the quality of decision making because statistics appear to contradict the optimism of the EU and other national and supernational agencies with regards to R&D investments. The statistical association of higher economic growth with higher absolute levels of R&D expenditures, as well as faster growth rates of R&D assets, is weak.

Equally important is the evidence that notwithstanding the growth of public investments in R&D, the percentage of European GDP spent in research has not significantly grown, is *per se* a signal that, in fact, private investments were not stimulated by the public push which, then, failed to achieve one of its main targets.

The correlation between R&D investments and economic growth becomes, in fact, even smaller when we observe the sub group of European regions that are defined as less developed.

However, it also must be said that R&D was indeed central to the strategy of the few less developed regions that did succeed (like Castilla Y Leon and South Yorkshire, two of our cases) to largely outperform other areas.

In general, it can be safely said that according to statistics, R&D investments appear capable of impacting upon economic growth more than other typologies of expenditures (see our section 1.3 but also Rodriguez- Pose and Fratesi, 1997) and yet the outcomes are very differentiated.

What explains the difference in performance?

Little has been attempted in terms of systematic identifications of performance of regional innovation strategies and of the reasons underlying these differences.

Relative exceptions are authors like Wang, 2007, Rodriguez-Pose, 2001, Crescenzi, 2005 that have tried to define and measure pre existing conditions – human capital, specialization, accessibility to main markets – that may account for differences in efficiency levels, although the conclusions are still far from certain.

This thesis chooses a different approach and start from the demonstration that even initial regional endowments – in terms of education achievements, propensity to spend on R&D, institutions, accessibility to markets - do not fully explain differences in performance: the cases that we have investigated demonstrate that similarly endowed regions showed very different outcomes and more

importantly that regions that started from poor endowments appear to have been able to break away from paths of under development by putting innovation at the centre of their development agenda.
The field work tried to identify the reasons that may explain differences in performances and what the manager of a regional innovation strategy should then do in order to increase the likelihood of the success of the policy she is managing.

This thesis is therefore meant to provide a contribution to better understanding the conditions under which public investments in research can be an effective tool for regional development. More specifically we have investigated the role of different organizations in the programme management and of different approaches to developing, maintaining partnerships amongst business, research, government and civil society and involving them within the implementation process.
As such the thesis constitutes an evolution of the idea that less developed regions seem, in fact, to face an "innovation paradox" that is described in the literature on regional development and economic growth (amongst others see Landabaso, 2002, Miedlfart-Knarvik and Overman, 2002, Boldrin and Canova, 2001): it is indispensable to invest in their research base if the EU wants them to grow; and yet these regions appear to have significant problems when it comes to manage innovation strategies.
They, in fact, face two problems that make it difficult for them to effectively spend in research. The first problem is the public administrations' processes and, even more, specifically their culture which tends (not only in less developed areas) to conflict with the identification and promotion of innovation (for instance, Potts, 2009, Pellegrin, 2008, Milio, 2007). The second problem is an issue of scale according to which research investments tend to agglomerate where they already exist beyond some minimum critical mass (again Kaldor, 1972 and Krugman, 1999).

Putting the problem differently, it seems that public administrations are incapable of retrieving the knowledge which is necessary to understand where to concentrate investments and specialize, and how to overcome a certain threshold of scale which is indispensable to be competitive in a global market.
This is because according to some (Barca, 2009, for instance) public administrations are neither able to communicate with innovators that tend to be – especially in the less developed regions – small, nor to have a view on what is state of the art at global level in a certain research or industrial domain.
In this context the design of the strategy risks being an imitation of what other regions have done whereas a creative approach to strategy design and priority selection appears indispensable to identify the possible "smart specialization".

Moreover, the absence of what we called "administrative leadership" may determine either that implementation is captured by the strongest local interest or, alternatively, that resources are distributed to all possible categories of recipients proportionally to their size with no real choice: in both cases results will be sub optimal.

Solutions to the paradox are not easily found: even the proposal to recentralize the management of regional policies does not seem to be the solution (Begg, 2010): the analyses of the policies' performances in UK (Cooke and Clifton, 2005) and Spain (Serrano, 2004, Konstadakopulos, 2000) demonstrate that top-down managed and nationally conceived regional strategies will also fail to gather the local knowledge that is necessary to identify the niches where less innovative regions may find their advantages.

Therefore, the question of understanding under which conditions regionally managed innovation strategies succeed is still to be addressed. Our hypothesis was that the higher capability of R&D programmes to generate economic growth depends on a number of factors that can be positioned along the phases of a chain - the "innovation value chain" - through which a regional system can produce innovation. More specifically the productivity of R&D programmes is supposed to be a function of: a) the ability to concentrate resources on the industries (and academic domains and areas) where the region has better chances of developing a competitive advantage or to use a more recent and effective wording its "smart specialization" (McCann and Argiles, 2011); b) clear decision making and implementation mechanisms at a programme level and independence of decision makers in the project selection from politics; c) coalitions amongst business, research, government and non profit actors that can propose, contribute or execute innovative projects and provide the leadership that can develop and maintain these alliances.

The research considers the 2000 – 2006 R&D programmes financed by structural funds and the regional innovation strategies, in two regions in the UK – WW and SY, and Spain – Murcia and CYL as cases of a wider phaenomena. The choice of the structural funds and of the period is due to the need to compare similar instruments but also to the fact that by selecting this programming cycle we are able to observe impacts that are supposed to require few years before unfolding (whereas the expenditures of the programme lasted until 2008 after the nominal conclusion of the period).

The cases were selected considering that each couple was characterized by similar conditions at the beginning of the programming period, similar endowments of structural funds and yet the results have been very different in terms of productivity of R&D investments.

The research has – by and large – confirmed the thesis and raised some further questions that are worth investigating.
Its conclusions are discussed in the next sections following the articulation of the innovation value chain that we just described.
They can partially be scaled up to European regional innovation strategies not financed by structural funds and to programme managers of regional or national innovation strategies outside Europe. However they of course have the potential to more immediately feed the debate on the EC budget review and on how the EC should use structural funds in the coming years. The last three sections of this concluding chapter will spell out the recommendations for the European policy maker, the areas of further investigation that this research calls for and the wider conclusions suggested by the research.

6.1 THE IDENTIFICATION OF SUCCESS FACTORS THROUGH THE FIELD WORK

We will start by summarizing the characteristics of the selected regions as far as the characteristics of the decision making processes that we analyzed, the main features of the partnership strategy that has been persued and the overall institutional characteristics that may have an effect on the other two. The overview gives the opportunity to add a cross country comparison to the analyses that we described in the "conclusions" sections of chapter four and five.
The field work, in fact, considered six features that constitute a further operationalization of the independent variables of hypothesis (the innovation value chain) that we introduced in chapter two:

1. the degree of devolution of power and, therefore, autonomy of the region that according to various authors can make a difference ((Hooghe, 1996, Marks, 1996, Rodriguez-Pose and Gill, 2004);
2. the balance of power between the public administration and the technocratic body (normally it is a regional development agency or a financial institution meant to finance SMEs) to which the design and the implementation of the strategy can be delegated; such relationship in the opinion of some (Morgan, 1997, Cooke et al, 2005) is one of the differentiators that is more able to discriminate between success and failure;
3. the existence of a main technology park able to be the hub of innovation driven firms and research centres (as claimed amongst others by Yu and Jackson, 2011);

4. the capability to leverage on already existing partnerships that are not constructed ad hoc for the realization of the structural funds programmes and that thus tend to be focused on specific problems and objectives (that according to, for instance, and Batory and Cartwright, 2011, are crucial);
5. the capability of the decision maker to resist pressures from local lobbies (as in David, Hall and Toole, 1999);
6. the existence of accountability either at an administrative or political level so that the achievement of the overall programmes objectives matter for the decision maker (Mairate, 1999).

The results can be summarized – as for the table below - by tracking down which of the above features correspond to which of the cases we investigated.

Table 6.1 – Main characteristics of the selected regions as far as organisation, partnerships and overall governance

	Overall institutional characteristics		Partnership strategy		Programme management lay out	
	Devolution	RDA based (verus PA based)	Existence of technology parks	Pre existent partnerships	Involvement of local communities in project selection	Accountability
South Yorkshire		X	X	X		X
West Wales	X				X	
Castilla Y Leon			X	X		X
Murcia					X	

The table appear to say that institutional characteristics are not necessarily the ones that make the difference.

Although South Yorkshire has been advantaged by the decision of creating a technocratic body (the regional development agency and the programme directorate) operating outside the public administration, the case of Castilla Y Leon appears to say that decision making processes driven by public administration are not necessarily doomed to failure. And even if devolution seems to have had the unexpected outcome of exposing the innovation strategy to the pressure of local communities that then diluited it, in Spain the same degree of autonomy did not prevent the performances of the two regions from diverging much.

As for the hypothesis that we tested the programme management and the quality of the partnership appear to be able to explain a great deal of the difference in performances. However, the study allowed us to better clarify the specific features that can make an innovation strategy more successful:

1. As far as partnership is concerned, the existence of "places" where innovators from different industries as well from different research domains meet appears to be consistently one of the characteristic that susseful innovation strategy meet (as for some of the intuitions in Arrow, 1962, and Romer, 1986); in South Yorkshire (the ATM technology park) and in Castilla Y Leon (the BOECILLO one) the hub of innovators is essential for partnerships to be born and developed;
2. An other feature that is present where the investments in R&D appear to be more productive, is the possibility to leverage on partnerships that pre exist the programme (like in SY where, in fact, partnership based organisations are the pillars of the strategy and in CYL where business relationships have only been furthered by the structural funds programmes) and are likely to last after its conclusion; the existence of these kind of relationshis make it more likely that partnerships are organized around specific purposes and problems (as wished by – amongst others – Leydesdorff, 2000, and Pellegrin, 2008);
3. Leadership (that for instance, Wilson, 2004, sees as a pre condition to the development of underdeveloped) is essential and more specifically it is essential that the programme manager resists the pressures from local communities (or from local business interests); although local communities must be involved in the implementation of the strategy, it is equally important that all partners are involved only as long as they are able to contribute – with the information that they possess – to the problem solving exercise that above mentioned strategy pose to all participants (as this research and other authors – including Armstrong et al, 2001 – found);
4. Accountability is also necessary and the concept can be interpreted (Head, 2011) both as a administrative accountability (whereas there is a responsibility of the programme manager on certain targets towards politics like in SY) and a political one (where, like in CYL, is the policy maker that has accepted the challenge to be assessed on the basis of the results of the innovation strategy).

We will in the next pages detail more the outcomes of the field work that point to unveiling the overall conclusions that we just anticipated.

6.2 THE IMPORTANCE OF MAKING CHOICES AND THE IDEA OF SMART SPECIALIZATION

One of the main challenge to doing innovation in a less developed region is (as programme managers in Castilla Y Leon demonstrated to be aware of) about the difficulty to reach the minimum mass (as warned by Midelfart-Knarvik and Overman, 2002) that can allow the achievement of a competitive advantage which is sustainable once the public aid is finished. This question implies a real innovation paradox (Oughton and Landabaso, 2002): public investments innovation is one of few policies to escape an underdevelopment and yet to invest public money in R&D can imply a severe loss of overall efficiency of public investments, as opposed to alternatively spend money in regions where research assets are larger (Rodriguez-Pose, 2001, Midelfart-Knarvik and Overman, 2002, Sapir, 2003).

The hypothesis that we put forward in the second chapter of this work, regarding the features of successful portfolio of publicly funded innovation projects is confirmed. More efficient programmes display two main qualifications: high capabilities to attract private funds and highly focused resource allocation patterns (where these features are consistent with the argument of agglomeration that we find in the researches carried by amongst others Midelfart-Knarvik and Overman, 2002, Krugman and Venables, 1995 or even Kaldor, 1972) . The thesis has also clarified the strenght of the relationship between these two factors.

However, even more interesting was the way our selected regions decided where to focus an anticipation of the idea of smart specialization (JRC, European Commission, 2009) concretely deployed before the most recent theorization of the concept.

In CYL a number of different technology providers grouped themselves around the unifying idea to provide solutions for saving energy and replace fossil one with renewables produced locally. Yet the space for investing in a totally different sector (highly specialized agrifood industry was not denied) so that variety (as for Cooke's argument, 2007) was not lost.

In SY the organisations that we interviewed concentrated their effort in researching and testing new joining materials for the steel industry: this was, in fact, a choice not of an industry but of a niche within that industry's value chain (as in Porter, 2000).

It was also interesting to notice that the selection of the possible competitive advantages was neither imposed in a top down fashion from the region or some consultant, nor deliberated bottom up

through lengthy democratic procedures. As we will elaborate shortly, partnerships amongs firms and research centres animating technology parks were crucial.
This method was found to be essential to avoid some of the problems that concentration may still yield (as for the note written by Mark Harrison – JRC report, 2009 – on the unpleasant consequences of concentration imposed from above).

The data of the OB1 programs first says that both pairs – the one in UK and the one in Spain - are characterized by a large difference between the more and less performing regions in terms of capability to attract private investments. For each euro of structural funds spent on R&D, the private money that is being used in co-financing the projects was three times higher in SY and CYL, respectively, than in WW and Murcia.
This is consistent with the macro data, where the share of R&D expenditures coming from firms rather than government and higher education, has increased more in CYL than in any other Spanish region, whereas it has dropped in Murcia.

Different abilities to attract private investments is strongly associated with concentration: the allocation of resources is four times more geographically concentrated in SY than in WW. In fact, the distribution of money in WW mirrors almost exactly the distribution of the population. The same applies to the Spanish case.
More geographic concentration is, in fact, the consequence of more focused choices in terms of beneficiaries and industries.
As said, the choice in SY has been one of not only choosing the traditional metal industry as the target, but also of focusing on the high end phase of the business system of this industry where special manufacturing of components and prototypes are produced.
This decision is explicitly mentioned in the programming document that deliberately prefers high growth firms (with a bias towards steel making) and declares the intention to attract firms from outside. And as a consequence four specific organisations – each of them being an association of business, research centres and civil organisations – were selected as the champions of the innovation strategy.

A similar choice does not emerge from the reading of WW OB1 programme which appears to be a rather generic transposition of EC guidelines.
In fact, this is possibly a wider problem of the last generations of cohesion programmes: the need for regional programmes to be consistent with the EC's guidelines which are imposed in a top down

fashion, appears to have produced some conformism that may have been detrimental to the emergence of distinctive choices in terms of priorities. Region specific strategies are, instead, indispensable given that resources are scarce and that the regions express different needs and potentialities (see Begg, 2002, on the hypothesis to apply a different “open” method of coordination to structural funds in the place of the adoption of guidelines and Scharpf, 2002).

As a result, the picture of the recipients of funds is much more fragmented in WW than in SY. Moreover, firms benefit from only a small share of the money; they are all small and dispersed into a network of nine micro technology parks located in a number of rural, remote locations.

In Spain the programmes are more similar because of stronger dependence of the regions both from the centre and the EC guidelines.
Unlike UK, the differences in terms of concentration versus dilution of choices emerge in the stage of the selection of projects and recipients and the final result is the same as in UK in terms of strong differences in terms of concentration.
An example is provided by the number of the “technology centres”. There are six in CYL and are all agglomerated in the same technology park; in Murcia, which is less than half the population and nine times smaller, there are ten similar centres which are more geographically dispersed.
The two regions express, in fact, two different approaches: CYL’s strategy is focused on the identification of competitive advantages upon which to concentrate resources, whereas Murcia appears to adopt a redistributive approach.
CYL concentrates the R&D resources in terms of industry (manufacturing where there is the bulk of R&D expenses) and geographical areas (the urban and university agglomeration of Valladolid). Murcia appears to use structural funds to correct imbalances in R&D assets across territories, where rural areas get a larger share relative to their population than the two cities – Murcia and Cartagena – where the universities are located.

Although a different concentration of choices in terms of sector - industry or academic domain - appear enough to make a difference (as for our initial theory), the work also found that none of the regional innovation strategies that we considered showed neither a systematic analysis of the value chain through which a competitive advantage in that sector was built nor a comparison against other clusters with which the region may compete.
Therefore, although we may have in SY an indication of investing in high-end, research intensive activity within the metal industry and in CYL a suggestion to concentrate on industries that link ICT

and renewable energies, more specific choices were left to the main actors through which the strategy got implemented.

6.3 THE PROGRAMME MANAGEMENT AS KEY FACTOR

As for our initial hypothesis, the quality of the innovative projects appear to be associated to two conditions. Firslty, the capability to keep programme managers accountable for the results and to provide them clear enough levers of decision making in order to implement strategies (as in De la Fuente with regard to the Spanish context, 2002, and Bristol and Blewitt with regard to the British one, 2008). Secondly, a layout that facilitates the independence of the technical decision maker from the public administration (as theorized by Morgan, 1997, discussing the case for the continuation of the WDA).

However, the empirical work sees two main differences emerging as determinants of different abilities to express more or less focused strategies.

In the UK case the real difference was at the level of **autonomy** of the main implementation body vis a vis local communities. This was the disadvantage of WW where devolution had two rather unexpected effects.
First, the RDA that had been, until 2000, one of the European benchmarks for the attraction of foreign investors and the realization of development programmes was absorbed into the regional assembly. This diluted the presence of performance based mechanisms and made a number of experienced professionals to leave (in some cases to join other RDA including the Yorkshire Forward).
Second, the presence of a regional electorally charged body exposed the entire process to the negotiation of the allocation of resources between the regional assembly and the local communities. The result was a distribution of money that closely mirrored the distribution of electorates.
In SY, the selection of projects were delegated by the cental government to an RDA (created just at the time WW dismantled its own agency: as a result independence was higher, the performance based mechanisms were more important, and the political bargain with local communities was smaller.

The integration of different levers to promote innovation is recognized as complementary to autonomy. The field work demonstrated that the fragmentation of the policies prevents empowerement of the programme management and, thus, it is a precondition to autonomy. The level of **integration** amongst different innovation strategies was instead the most remarkable difference between Murcia and CYL.

In Murcia such an integration did not exist in the 2000 – 2006 period where the R&D programmes, were separated between two different political (the industry and the research ministries) and organisation units (where a third meant to promote ICT triggered changes into public administrations was delegated to the economy ministry) mainly operating as a piece meal "seller" of opportunities to small medium firms and universities.

In CYL the opposite appears to be true: a strong leadership from the President of the regional administration and the experiences of a rather small team of programmes managers could guarantee several important targets: an integration amongst regional innovation strategies aimed to reach different clients; clearer lines of responsibilities; a stronger - mostly informal - capability to promote partnerships amongst universities and business; and a higher capability to resist to the pressures from local lobbies to use innovation strategy as a redistributive policy.

The field work also showed that in better performing regions higher level of empowerement of the programme management goes hand in hand and is reinforced by higher **accountability**. It is the case of SY programme that displayed fewer, more relevant and understandable indicators than the one in WW, suggesting for more accountability and transparency in SY. In Spain, accountability was ensured in a different manner: to similarly drafted programmes and monitoring systems, corresponded different political priorities with the CYL government explicitly asking to its electorate to be assessed on economic performance measurements and sharing these objectives with the administration.

The institutional aspects - which according to some (Hooghe, 1996, Marks, 1996, Rodrigeuz - Pose, 2004) can be the determinant of innovation programmes' success - **appear here less decisive** if one cross reads the cases. Although the delegation to a regional development agency appears to be a key differentiator in UK and devolution seems the change that triggered a sharp decline in regional development policies' performance in Wales, Spain allowed the comparison of two differently performing regions where public administration had a similar role and the degree of autonomy from the centre was formally the same.

The comparison says that you can still have successful regional innovation strategies where the programme manager is a regional public administration: in this case it is crucial that there is a political leadership capable to design the strategy and share the expected outcomes whereas partnerships are used in making decisions on specific projects.
Institutions do, in fact, matter – as the UK case shows. However as found by others (Cooke and Clifton, 2005 as far as the opposite impact on Scotland and Wales of devolutions that were formally equivalent and yet concretely implemented in very different ways) the range of possible outcomes tends to be large and may depend on other less evident factors (like the differences in opinion making's support for that particular institutional arrangement).

However, on a more general level, the research conducted in UK and Spain, showed that all observed strategies share some common limits: none of the public administrations that we observed had developed neither the skills capable to have an internationally minded approach to regional innovation strategies, nor the attitude towards risk that is necessary to encourage innovation (and to accept that some of them may fail). Moreover, none of them developed the knowledge management systems that would be essential (Davenport, 1998) to organize the knowledge generated by the execution of the experimentations that innovative projects imply.

6.4 THE EVOLUTION OF THE PARTNERSHIP PRINCIPLE

The thesis that we propose is completed by the idea that the technical – administrative and managerial – pre-conditions to a successful resource allocation pattern needs to be paralleled by the existence of partnerships that can make each phase of the implementation process more relevant to the needs and potentialities of the local economy and research community. The existence of these partnerships appears, even intuitively, fundamental – together with the concentration of choices – to respond to the problem of incorporating local information in the strategy (as for the classical arguments of Sen, 1997, that have been more recently echoed by Barca, 2009) and getting other investors to also fund innovation in order to reach a critical mass of R&D assets which is necessary for achieving high enough levels of efficiency (Rodrigeuz-Pose, 2008, Midelfart-Knarvik and Overman, 2002, Krugman and Venables, 1995).

The research demonstrates that the development of these typology of partnerships are not necessarily to be referred back to the existence of social factors like **human** (as in Rodriguez-Pose and

Crescenzi, 2006) **or social** (Putnam, Leonardi and Nanetti, 1993) **capital**. In fact, the observed regions appeared to be similarly endowed in terms of social factors. Effective coalitions, then, can be created but in order for this to happen it is necessary that priority is given to specific typologies of innovators and that specialized actors are dedicated to the development of those coalitions (Arrow, 1962, Romer, 1986).

The concept of partnerships is – in the context of this thesis – an evolution of the one we find in most of literature (amongst others Porter, 2000 and Leydersdorff, 2000, where a "triple helix" should link administrations, enterprises and research). The thesis has, in fact, suggested that the concept of partnerships must be developed considering three different factors.

Firstly, the research confirmed that in order to be relevant, partnerships need to be oriented to **solve common problems** and not to be driven by negotiation on how to divide initial, available resources.

A problem solving oriented partnership is distinguished both by a) instances when one of the partners dominates the others; and b) cases where partners can veto each other and decisions are taken in such a way that funds are distributed evenly amongst different interest groups and efficiency is lost in the dilution of resources (similar arguments can be found in Bauer, 2002, and Olsson, 2003, with regard to the application of the partnership principle applied to structural funds and, more in general, development programs).

Secondly, the thesis reinforces the idea that it is necessary to add as a fourth element of the partnerships - alongside governments, firms and universities - **non profit organisations** which aim to promote the propensity to innovation within certain segments of the population (Putnam, 1993, Wilson, 2004, but also Craig, 2004, on the effects that partnerships with government can have on the autonomy and independence of voluntary sector organisations). NAMTEC in SY is an example of an organisation whose mission is to make students and families more interested in metal industry and the opportunities that it may represent in terms of finding a job and developing valuable skills. The SY's case also says that the involvement of civil society works when there is a) a specific segment to be involved (students in our case, as we just reminded) and b) a specific objective to be achieved (in SY, it was to increase the attractiveness of the metal industry to new potential, highly qualified employees whose supply is vital for the survival of the industry).

Thirdly, the research confirmed that for cohesion policies applied to R&D programmes it is necessary to escape the trap of **too much localism** in the approach to project selections and beneficiaries; the relevance of relationships that goes beyond the region and that links the innovation system to other contexts across regions and countries (as Niosi and Zhegu, 2005, Ernst, 2005, found for other areas outside Europe). An example of this comes from the partnership based organisations operating in SY. These organisations' mission is, in fact, knowledge-sharing and prototype development amongst a large number of UK and foreign firms and universities. Strong partnerships in SY , therefore, also intended to create the opportunity to engage in long range collaborations with research centres and firms located in other countries. This proved to be a powerful factor in pushing the Region's investments into leading edge research and applications (such a finding is confirmed by other studies that found similarly evidence of the importance of internationally connected clusters in other European regions).

Finally, the thesis also attempted to not only evaluate the presence and importance of this web of relations, but also to assess **the possibility to develop these coalitions through an explicit strategy** and, thus, through rules, as well as specific innovation aggregators and innovation intermediaries.

We believe that the field work says that this is possible but also provides **four main qualifiers** of such feasibility.

First of all, both WW' and Murcia's experiences underline the limits of mechanisms that are supposed to live for the duration of a development program and that are imposed from the public administration without considering the effective representativeness and added value of various partners.

In WW, a **formalistic** application of the EC's partnership principle produced such a large number of consultative bodies that – *de facto* – became detrimental to decision making. Strategic decisions were made by the regional assembly and project selection was delegated to the single local community within a budget distributed geographically to each of them.

The situation is similar, although at a different level of the implementation process, in Murcia. Formal partnerships between universities and Ministry of Education, on one hand, and firms and Ministry of Industry, on the other, have resulted in the separation of the innovation strategy in two strands – an innovation strategy for business and one for research. Formally the two components joined the same monitoring committee and "commission for innovation"; in reality there is an ex ante separation of the resources with no real effort to conceive an integrated strategy.

In fact, both SY and CYL point to a second finding: the importance of identifying and leveraging upon **already existing alliances**, working collaborations that preceded the programming period. The fact that they existed even before the development programme, makes it more likely that they are based upon the ability of the partners to provide value to each other and allows them to live even beyond the end of the programme.
A strong example of such an approach is SY: partnership developments are facilitated by the fact that even before the establishment of the innovation strategy there were sector (in the case of our region *metal*) specific non-profit organisations (such as *CTI*, *TWI*, *the factory of the future*) that involved different stakeholders on the basis of the realizations to be carried out. Within these partnership models, universities and firms converge towards similar models both oriented towards the production of economic value through innovation.
As a consequence, in SY the OB1 programme designs a much smaller and agile participation framework where few actors – capable of engaging with businesses, universities, governments, and civil society, both inside and outside the region – are involved on the basis of their concrete capability to generate projects and to test their feasibility.

In Wales the approach to partnerships was the opposite: the asset of relationships with multinationals that WDA had developed was terminated together with the development agency. The idea to develop brand new mechanisms for encouraging business and universities to engage in dialogue was, as said before, formalistic and did not yield any concrete results.

Situations similar to SY happened in CYL where the programme could leverage on a technology park and on a consolidated web of relationships amongst businesses and universities hosted by the park that pre-existed the program. The *Parque Tecnologico de Boecillo* was, in fact, one of the first to be established in Spain in 1992 and two more parks were completed in CYL during the last programming period whereas a science park was recently started up.
Technology parks have, in fact, become in Spain, more than in other countries, the place where partnerships happen every day in the mode and with the scope that partners were willing to pursue (OECD, 2001) and CYL has been a pioneer and a benchmark in the practice.
In Murcia, on the other hand, no innovation hubs were finalized until very recently and, notwithstanding much talk, the technology park is only partially utilized, while the science park is still under construction. The model that prevailed was that of a proper market with a clear distinction

and separation between who demands innovation and who supplies it. The consequence is that expenditures on R&D that tend to be small, incremental and rarely about proper product innovation.

Third, the investigation of the technology parks (Advanced Manufacturing Park in SY and the Boecillo in Valladolid), pointed to a further finding that clarifies further our initial thesis on partnerships.
Given that it is crucial to leverage on partnerships and leaderships that already exist, the intervention on the region needs to **not be invasive**.
It is interesting to notice that successful technology parks (as the most frequent innovation promoter) appear to be characterized by a hands-off attitude which encourages firms to take the lead on the processes that are supposed to integrate the actors of these ecosystems.
In the UK park, after the start up the region did not leave any office and the firms took care of themselves. In Spain, it was Cenit Solar – a firm specializing in across the board technologies for the environment – that promoted and maintained not only partnerships but also a corporate culture that is, by now, shared by most of the firms in the park.

Finally, strong partnerships also require **leaders** that are informally or formally the developers and maintainers of the coalition of interests around innovative projects.
In SY there is a strong research base concentrated in some niches and, more specifically, on a university – Sheffield – that is recognized as excellent at international level in some departments (Engineering, Chemistry) and that is also home of some internationally recognized regional development experts that have been interacting with the programme managers.
In WW universities tend to be smaller and not of the same level as the ones hosted in the East part of Wales; the firms' size has dramatically dropped and with it the possibility to leverage on industrial champions whose knowledge and relationships could be used.

The same differentiator that we just referred to for the UK, emerged in the Spanish case as well. Notwithstanding a similar propensity to spend in innovation and an initial level of economic development, CYL could leverage on a much more consolidated university base with two of the oldest universities of Europe located in the region.
Universities together with some industrial champions – multinationals in the car making and Agrifood industry – provided natural leadership for the innovation strategies and for the development of project based partnerships. In Murcia the situation was more similar to Wales with no large university or innovation oriented firm capable of leading research strategies.

Leadership appears to be, in a sense, the ultimate reason to understand why some regions (relatively few in Europe, as we saw in the introduction) do succeed escaping a situation of stable underdevelopment, whereas this may contradict even the idea that there are path dependancies (David, for instance) that makes this difficult to happen.

It is, thus, possible to develop partnerships through explicit strategy and publicly financed actors like the technology park. However this strategy needs to recognize and rely on leaders and collaborations that are able to stand on their feet and to even survive to the end of the programming period and of the aids.

6.5 IMPLICATIONS FOR INNOVATION POLICIES

Although, as we will elaborate in the next section, some questions are left open by the research that we have conducted, a number of policy implications emerge from the study. They can be of more immediate interest for programme managers in charge of regional innovation strategies financed by structural funds, but can also be useful for designing and implementing programmes that aim to promote innovation outside the domain of the cohesion policies. These implications are structured according the main phases of the innovation value chain that we have been using as our methodological framework (section 2): the ability of the programmes to mobilize private investors alongside public ones as a pre-requisite for success; the need for each region to concentrate public investments in few areas and, thus, to understand where to focus its efforts in order to smartly specialize and achieve a competitive advantage ; the quality of the programme management as crucial to performance; the existence of partnerships based on sharing problems and objectives of development; and, ultimately, as a factor uncovered by the research itself, the need for leaders who are essential to initiate and protect the change that innovation necessarily produces within the business, research communities as well as within government and society by and large.

Firstly, then, the mobilization of private investors can be seen not only as a condition to but also as a signal of success. It is a condition which can be expected to be associated with success as our cases demonstrate and this is for the rather obvious reason that a private investor risking its own money can be believed to be the best assessor of an increase in the expected return to investments produced by the additional expenditures in research undertaken by the state.

In fact, the association appears so strong that - as the comparisons in UK and Spain show - the amount of private money being attracted or mobilized by or because of the public investments, is per se a strong signal of success of an innovation strategy.

This indicator may well become the most important to evaluate the performance of regional innovation strategies, whereas it looks otherwise difficult to detect early success of innovation strategies given that the outcomes of a public investment in R&D may take years before yielding its return.

One further implication for the future of the importance of mobilizing private investors would be to involve specialized financial operators (venture capitalists, merchant banks) that may be willing to select the projects to be financed and to share the risk and the funds to be provided to the firms and universities to be aided. Return of the investments should, then, be split between the financial operator and the state, compensating the private investor of the country risk implied by the investment into a less developed region.

Secondly, concentration of the investments in research is necessary and, thus, we expect that certain industry or academic domain and, thus, some geographical areas will be overrepresented in the portfolio of projects that are going to be successful. The expectation of the new economic geography is confirmed: to achieve a competitive advantage in the global market of innovation, a minimum quantity of R&D assets is necessary. The consequence is that programme managers should avoid using R&D as a redistributive tool so that investments get distributed to all stakeholders and areas internal to a region in proportional amounts (the mistake of using R&D funds in a redistributive manner was the one that WWand Murcia did). Preferences should go to the industry where competitive advantages can be achieved more quickly. At the same time, mechanisms that ensure that the rest of the economy interacts with the cluster of innovation that has been created should be developed.

Moreover, in order for each area to have the possibility to achieve a significant scale in a certain niche, a new, wider definition of innovation appears to be needed. Innovation is still about creating new products or processes whose novelty can be judged against a global (or quasi global) prospective and which have the potential to increase social or economic value and thus, we cannot confound innovation with incremental improvements or with realignments to standards of quality that structural funds have frequently financed . However, in order for each region to be an innovator, we need to recognize that the domain in which innovation can be applied is much larger than the mainstream industrial production, and include services (like tourism in Spain), more mature sectors (like

agriculture in Murcia) and relatively small niche as well (like the high-end of metal industry where SY is finding its competitive advantage).
Therefore, diversity amongst regional innovation strategies and amongst different mechanisms of implementing them should be encouraged. An excess of consistency between European, national and regional guidelines may have the side effect (especially in regions - like WW and Murcia- with less experience with managing development policies and lower administrative capabilities) of encouraging imitation. Differences in *choices* are a necessary consequence of what we just said in terms of specialization in order for everybody to afford to be an innovator (as for the *smart specialization* concept as in McCann and Argiles, 2011 and OECD, 2010). Differences in *implementation mechanisms* (for instance, procurement procedures) are, instead, necessary to concretely experiment novel ways to solve the problem that public administrations and especially less developed region's administrations may, in general, have with innovation strategies.

The third condition to success is, as for our thesis is concerned, that there must be a clear decision making process and accountability for results. Various implications emerge from the research.
To start with, although different innovation strategies co-exist in all regions that we observed, it is essential for them to be integrated. The research, however, also shows that integration is to be tested not at the level of a general, abstract political intentions, but at the project level where the concrete, day by day collaboration between universities, firms, government around specific objectives and problems gives substance to coordination of different actors' activities.
A further capability that appears necessary to programme managers for success is a mix of local knowledge and international prospective. This implies two challenges.
The first is about obtaining information on which are the niches in which the region can manage to be state-of-the-art, will require the involvement of the potential local innovators not adequately represented by mainstream entrepreneur associations and sometimes not even fully aware of their potential.
The second is that having acquired local knowledge, the region will have to be complemented with a vision of the characteristics of markets, competitors and possible partners in the international arena.
Examples of these capabilities - dialogue between public administration and innovators and, more importantly, amongst innovators - are what the technology parks have been providing for a decade in CYL and SY. However, although CYL and SY did manage to partially solve the problem, our field work still demonstrated that public administrations do still have a structural problem with managing some of the activities involved in the design and implementation of an innovation strategy.

There were two reasons for this. Firstly, the selection of the right sectors and within these the right firms requires a global vision of innovative processes happening within industries : as our research confirmed, these capabilities are beyond the skills and the professional development path of public administrators. Secondly, conceiving and realizing innovation strategies requires a risk taking attitude that is simply not aligned to a public administration's corporate culture and to its legal framework.

Both the successful cases we investigated say that *development agencies* (Yorkshire Forward in Yorkshire and ADE in CYL) seem to be an effective solution provided they are held accountable on overall results (measured, for instance, on the volume of private investments being mobilized) which does not always happen (as in the case of Murcia's Seneca and INFO).

The fourth condition to success that we tested is the importance of partnerships amongst all actors relevant to innovation that are developed on shared objectives and problems to be solved.

In order to do that, it appears that programme managers should leverage on the existing partnerships as much as possible (Wales demonstrated that to construct partnerships that are dedicated to the program and, thus, are supposed to be dismantled when the program finishes is risky). Coalitions must also be constructed on the basis of skills and must have the specific objective of producing certain innovation in business, society or academia.

The formalistic application of the partnership principle imposed by the structural funds (and often by the European Commission) may have had the effect of promoting coalitions where all stakeholders are represented and this is counterproductive for innovation. Innovation is about change and, thus, about a challenge for incumbents: involving everybody makes the implementation processrun the risk of being captured or influenced by those who may have interests that conflict with such a change.

There is finally a last message that emerges from the research as partially unexpected: leadership is necessary for innovation strategies to succeed (as both the Spanish and the UK cases demonstrate clearly) in order to have an effective programme management, encourage the development of partnerships able to get involved in the implementation of innovation strategies and to concentrate resources on certain possible typologies of beneficiaries.

Leadership is likely to be something that cannot be constructed and yet its development can be consolidated either through a) scouting within industry, government, research or civil society of leaders that are not yet visible or b) attraction from outside (even from abroad) of leading edge organizations that may provide skills, technologies, or advice to the region.

In any event the research appears to say that leadership is associated (as happened ten years ago in CYL and SY) to the priority that politics, business and society give to innovation as a driver of development and to the change that innovation unavoidably brings about.

6.6 LIMITS OF THE RESEARCH AND FURTHER NEEDS FOR INVESTIGATION

The research provides some answers in terms of the conditions given which public investments in R&D are an efficient policy for regional economic development. Concentration of the investments portfolio, quality of programme management and problem solving based partnerships appear crucial. Each of the findings show, however, limits in terms of its applicability to contexts wider than the one of EU cohesion policies and thus to each of them we can attach further possible research to be developed.

Regarding the issue of the level of focus that the portfolio of innovation projects should express, although our work supports the idea that choices in terms of quantitative allocation of resources amongst sectors, areas and academic domains are needed, we did not explicitly investigate the question of the quality of such choices.

In fact, between similarly concentrated portfolios of R&D projects, resource allocation can still differ in terms of effectiveness and performances because of different capabilities to identify, within a certain industrial sector and along its value chain, the areas whose potential is higher.

In fact, very rarely regional innovation strategies and, even less, structural funds programmes attempt to identify priorities on the basis of a diagnosis of competitive positioning of regional industries and identification of gaps along the value chain of firms and cluster of firms (as in Porter and Stern, 2003). The analysis of operating programmes in UK and Spain said that diagnosis of a certain region is normally made by using macro economic data (for instance, comparing the percentage of the GDP that a certain region is spending in research with national or other regions' averages) and, at the most, confronting industries in terms of growth rate and dimension (like the Murcia innovation strategy (2007) attempted to do). Competitive analysis of the selected industries appears to be beyond the expectation of EC and structural funds practices.

Such a feature may have been encouraged by imitations amongst programme managers across Europe. The extension of the research outside cohesion policies may instead provide examples of finer identifications of possible competitive advantages (and *smart specializations* as in McCann and Argiles, 2011).

Interesting areas of investigation appear to exist also regarding the organisational features that appear to be associated to successful programmes. Enough evidence appears to support the idea that autonomy of the programme manager from politics and integration of innovation strategies are a precondition for drafting more effective strategies. However, there are situations that may alter this conclusion and that, however, do not apply to any of the regions that we examined.
In the case where public aids become significantly attractive to private interests, the partial privatization of the implementation process may produce risks that may even be higher than the ones that exist where project selection and control happen within a public administration where legal and regulatory constraints may limit abuses. In the regions that we observed, the relatively small amount of money spent on R&D in the 2000 – 2006 programming period has minimised this danger and we, thus, could not assess situations where this risk had to be handled. The name of the game was more about convincing, with scarce funds, private investors to increase the priority that they give to research, rather than to protect public funds from appropriation by private firms.

As far as integration of strategies goes, it would also be interesting to notice that unification of strategies and of their institutional owners can, in theory, produce the negative effect of a reduction in the differentiation in the approach towards firms as opposed to the one meant to reach universities. The two targets of beneficiaries require, in theory, different strategies to be outreached.
However, structural funds programme managers do not – in almost all of the cases – design and deploy any communication strategy meant to explicitly involve specific public. Therefore, the potential problem that integration may produce cannot be appreciated within the cohesion policies implementation framework.

The work done on partnerships backs up the idea that the measurement of the effectiveness of these alliances must go beyond the existence of formal mechanisms for different stakeholders to come together and consider the quality of the interactions amongst them.
In fact, the work also suggests that the best strategy is not to impose new mechanisms of partnership development, but rather to leverage on alliances that already exist which may be more reliable in terms of the capability of partners to adopt a problem solving oriented approach in their relationships.

In this context, the limit of the research we conducted is that the differences between the two regions in each of the two national couple was in terms of pre-existing leaderships that are strong in the better performing region and weak or nonexistent in the worse performing one.
We, therefore, could not evaluate an explicit strategy aiming to counter the lack of such a leadership which could be tackled by either scouting smaller innovators in the region or "importing" leaders from other regions.
None of our observed region systematically tried to do so. This is partially due to a framework and, more importantly, a practice where medium firms and other mainstream actors are the players that more frequently partner with public administrations.

Moreover, with regards to the importance of the long range relationships as a factor that can make a regional innovation strategy more competitive, we also need to acknowledge that very few innovation strategies are really international in scope; neither in the identification of the priorities, nor in the role that international partnerships can play.
The insistence on the development of innovation strategies meant to foster relationships between local business and local universities, may have produced a vision (very clear if one reads the operational programme of Murcia, but present also in the other three regions) by which innovation systems may be seen as closed regional system.
We, thus, cannot still compare existing innovation strategies with strategies that are conceived with a fully international approach, whereas if we extend the observation beyond Europe we may find – in the USA for instance – such examples.

These open questions may correspond to the further development of our work, by testing the hypothesis that we tested and revisited outside the structural funds and European domain.

6.7 CONCLUSIONS: ACTORS, HISTORY AND CHANGE

Our hypothesis is confirmed: R&D programmes appear to be more productive when they are more capable of mobilizing private investments and when they are more focused on decision making in terms of choices of industries and academic domains to invest in. Moreover, it is true that these characteristics are associated to more streamlined and integrated decision making processes and to independence of the project selection phase from local lobbies. Additionally, it is fundamental to develop partnerships capable of engaging in a problem solving exercise all the actors whose

contribution (and information) is necessary for innovation strategies to be designed and for innovation to happen.
There are, however, some further conclusions to which the test of the hypothesis leads.
The George Bernard Shaw's quotation mentioned at the beginning of this work refers to the very nature of any innovation, of any (public or private) investment in knowledge (and of any research including the one that I am about to conclude): acquiring new knowledge necessarily calls for change in the way we produce (social or economic) wealth; it also means to "loose" something, to demolish (as in Schumpeter) something that existed before and that is made obsolete by innovation itself.
The impression that this work leaves to the author is that often the problem with many regional innovation strategies and, more in general, with the approach of the EU to innovation, is that they do not allow for real choices to be made in terms of resource allocation, clarity of decision making processes, or of partners to be involved. Such choices are naturally associated to changes, even to the disruptive change without which the ability of innovation to improve prosperity of societies is drastically reduced. Real change, however, is supposed to happen at all levels: industry structure, demand as well as organization settings, layout of the relationships of government with business, universities, civil society. However, the logic of cohesion policies appear to be somewhat contrary to disruptive changes and, in fact, the regions that we observed as being successful, seem to have achieved results because of the very reason that they deviated from that logic.
More generally, the thesis supports an argument that - although consistent with common sense – appears not to have been acknowledged either by policy makers, much of the media or by a portion of the academic debate.
Outcomes of innovation policies (and by and large of any development ones) depends not only on the pre-existing conditions or quantities of resources which are normally determined by policy makers, but also on the allocational, organizational and relational choices concretely made by programme managers during the implementation processes.
Finally, there is an even wider conclusion that this thesis brings about. The study of similarly endowed regions that achieved very different results but used similar amounts of public investments, seems to suggest that very different economic (and possibly even social) development patterns may spur out of similar pre existing situations, similar institutional arrangements and out of similarly organized and endowed policies.
The idea of *path dependencies* (David, 1985, Gerard and Taymaz, 1998, but also Giannitis – JRC, 2009 - on the possibility to more easily break when radical technical changes happen) where evolution is locked in by some inherited factors (human capital, institutions, research base) appears to be contradicted by another less embedded variable called leadership. Both our two explanations –

organization of programmes' implementation and their quality of partnerships - for better performance, refer ultimately to decisions that are taken by individuals (or rather groups of individuals) that can make the difference and invert consolidated patterns. Underdevelopment is not a permanent condition. Policies that are carefully designed, capable of mobilizing public opinions and innovators and that are well implemented can make a region break out from a low growth pattern.

Moreover the research also seems to say that a precondition to leadership is a sense of urgency and of inevitability of change. This was the case of Castilla Y Leon that at the beginning of last decade could not count – unlike Murcia - on immigration and cheap labour to accelerate economic growth and understood that innovation was the only way to create development; and the case of South Yorkshire that did not have– like Wales – a history of successful attraction of foreign direct investments and decided together with the central government that scarce resources had to be allocated on the few competitive advantages that the universities and firms of the region could still count on.

History, institutions and policies frameworks, thus, matter, and yet the destiny of regions and communities is not pre-ordained but can be changed by both leadership and an awareness of the need for change.

This is in one sentence, the message that the author takes away from this work. It will be worthwhile continuing to study the applications of these factors to wider contexts given the intellectual interest that such questions raise and their importance for the possibilities of economic development of less advanced regions in an environment which is more and more confronted by the challenge – dramatized by the current financial crisis – of doing more with increasingly scarce resources.

ANNEX

ANNEX 1 – BIBLIOGRAPHY AND THESIS RESOURCES

Articles, books and papers

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Data bases and other research resources

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the evaluation practice that the ESOC LAB of The London School of Economics has developed together with the firm who is sponsoring the author's doctoral study and more specifically the evaluation of the structural funds programmes in Spain, UK, Italy;

the projects investigating the impact of the Information and Communication Technologies on Pharmaceutical sectors, Transportation and on a number of clusters of SME that the author has lead managed.

Moreover, the European Commission – the desk officers responsible for the selected regions -, the UK and Spanish Government, as well as the regional administrations that were selected made available knowledge base (programming documents, execution reports, independent evaluations) and grant the researcher's access to relevant programme managers.

ANNEX 2 – LIST OF ABBREVIATIONS

ADMRC Advanced Manufacturing Research Centre

CF Cohesion Fund

CTI Castings Technology International

CYL Castilla Y Leon

EC European Commission

EIB European Investment Bank

ESF European Social Fund

ERDF European Regional Development Fund

EU European Union

FDI Foreign Direct Investments

GDP Gross Domestic Product

ICT Information Communication Technologies

INE Instituto Nacional de Estadistica (National Statistics Institute)

ONS Office National Statistics

NAMTEC National Metal Technology Centre

R&D Research and development

RDA Regional Devolpment Agency

SME Small Medium Enterprises

SY South Yorkshire

TWI The Welding Institute

WAG Welsh Assembly Government

WDA Welsh Development Agency

WEFO Welsh European Funding Office

WW West Wales

ANNEX 3 – FIELD WORK – NAMES AND DATES OF INTERVIEWS

All interviews correspond to notes. Most of them were taped although some of the interviewees preferred not to be taped.

West Wales

6th September 2006
Cardiff
Damien O'Brien; Managing Authority Objective 1
Sue Price, Head of Branch for Programme Management Division
Business support, Tourism, ICT, R&D, Energy, Transport and Environment, Welsh European Funding Office
Ed Sheriff, Economist for the Economic Research Advisory Panel
Nigel Graddon, Technology and Innovation branch
Paul Casey, Head of Research, Monitoring & Evaluation, Welsh European Funding Office

16th April 2007
Merthyr Tydfil
Sue Price, Head of Branch for Programme Management Division
Business support, Tourism, ICT, R&D, Energy, Transport and Environment, Welsh European Funding Office
Paul Casey, Head of Research, Monitoring & Evaluation, Welsh European Funding Office

14th May 2008
Professor Phil Cooke
Director, Centre for Advanced Studies
Cardiff School of City and Regional Planning
Cardiff University

Dr Gillian Bristow
Reader in Economic Geography
Cardiff School of City and Regional Planning
Cardiff University

19th June 2008
Richard Rossington
Head of Science, Innovation & Enterprise Policy
Welsh Assembly Government

Professor Dylan Jones - Evans
Deputy Director, Centre for Advanced Studies
Cardiff School of City and Regional Planning
Cardiff University

Dr Gillian Bristow
Reader in Economic Geography
Cardiff School of City and Regional Planning
Cardiff University

Adrian Healy
Director ECOTEC Research and Consulting Ltd
Expert of Regional Innovation Strategies
Cardiff School of City and Regional Planning

20th June 2009
Steven Smith
Director, Development Funding
Finance Wales

9th October 2009
Virginia Chambers
Director Technology & Innovation
Welsh Assembly Government

Adrian Healy
Director ECOTEC Research and Consulting Ltd
Expert of Regional Innovation Strategies
Cardiff School of City and Regional Planning

South Yorkshire

7th September 2006
Kevin Bennett
Director
Objective 1 Programme Directorate
South Yorkshire

10th November 2006
Costas Georgiou
Research and Evaluation Manager
Objective 1 Programme Directorate

20th March 2007
Costas Georgiou
Research and Evaluation Manager
Objective 1 Programme Directorate

Wendy Dodson,
Project Manager
South Yorkshire Business Link

Gill Browning,
Strategy Manager,
Yorkshire Forward

Alex Mc Whirter,
Business support
Yorkshire Forward

15th May 2008

Barry Jackson
Head of Finance and Management Services
Castings Technology International (CTI)

Professor John Baragwanath
Project Director
Advanced manufacturing research centre (AMRC) with Boeing
The Factory of the Future

Mark Roughsedge
Technical Business Developer
The Welding Institute (TWI)

Dr. Richard Cinderey
Programme Manager - Knowledge Transfer
The National Metals Technology Centre (NAMTEC)

16th May 2008
Dr. Gordon Todd,
Innovation Manager
Yorkshire Forward

Costas Georgiou
Research and Evaluation Manager
Objective 1 Programme Directorate

18th June 2008
Professor Harvey Armstrong
Professor of Economic Geography at
Sheffield University

Bethan Sheridan-Jones
Economic Reseracher, Chief Economist Unit
Yorkshire Forward

Costas Georgiou
Research and Evaluation Manager
Objective 1 Programme Directorate

19th June 2009
Bethan Sheridan-Jones
Economic Researcher, Chief Economist Unit
Yorkshire Forward

Sue Richardson
Evaluation Manager
Yorkshire Forward

Bea Jefferson, Programme Manager
Yorkshire Futures

Castilla Y Leon

15th September 2006
Gregorio Munoz Abado
Jefe de Servicio de Innovación Tecnológica
Dirección General de Industria e Innovación Tecnológica
Consejería de Economía y Empleo
Junta de Castilla y León

3rd May 2007
Gregorio Munoz Abado
Jefe de Servicio de Innovación Tecnológica
Dirección General de Industria e Innovación Tecnológica
Consejería de Economía y Empleo
Junta de Castilla y León

Francisca de la Fuente Lopez
Servicio de Fondos Europeos
Direccion General de Presupuestos y Fondos Comunitarios
Consejeria de Hacienda
Junta de Castilla Y Leon

Daniel Miguel San José
Vicerrector de Desarrollo e Innovación
Universidad de Valladolid

Valentín Fernández-Soto Vélez
Director General
Consejo Regional de Cámaras Oficiales de Comercio e Industria de Castilla y León

Evaluator of the IOP, from the University.
Olga Ogando Canabal
Departamento de Economía Aplicada
Facultad de Ciencias Económicas y Empresariales
Universidad de Valladolid

16th, 17th and 18th April 2008

Gregorio Munoz Abado
Jefe de Servicio de Innovación Tecnológica
Dirección General de Industria e Innovación Tecnológica
Consejería de Economía y Empleo
Junta de Castilla y León

Javier Álvarez-Benedí
Coordinador Área de Transferencia

Instituto Tecnológico de Castilla y León
Junta de Castilla y León

Daniel Miguel San José
Vice-rector for Development and Innovation
Director General
Parque Científico de la Universidad de Valladolid

Juan Girbes
Professor
Nutrition and Food Research
Universidad de Valladolid

Pedro Carasa
Professor
Historia Contemporanea
Universidad de Valladolid

Cesáreo Hernández Iglesias
Professor
Departamento de Economía y Organización de Empresas
Universidad de Valladolid

Jiménez Lopez
Professor
Experimental Physics Research
Universidad de Valladolid

Carlos Balbás
Professor
Theoretical Physics - Nanophysics
Universidad de Valladolid

José Manuel Bernárdez
Owner
iSEND

Emiliano Muñoz
Owner
PROXIMA SYSTEMS

Alfonso Calderón Vergandone
Owner
CENIT SOLAR

Francisco Ciudad Bautista
Departamento de Producción Vegetal y Agronomía
Instituto Tecnológico Agrario de Castilla y León (ITACyL)

Marta Hernández Pérez,
Researcher, Molecular Biology Lab.
ITACyL

Cristina León,
Head of the Technology Transfer Area.
ITACyL

Pérez Marín
Deppartemento de Producción Vegetal y Agronomía
ITACyL

David Rodríguez Lázaro,
Researcher, Food Technology.
ITACyL

Luis Rodríguez Ruiz,
Deputy Director for Agri-food Research and Technology.
ITACyL

Gabriel Villamayor, Head of the Agricultural Research Area.
ITACyL

Mª José Pérez Marín
Jefe del Departamento de Innovación y Redes
Parques Tecnológicos de Castilla y León

Jose Antonio Menendez
Director
Parques Tecnolgicos de Castilla Y Leon

Francisco Barredo
Promotion of business projects
Centors Europeos de Empresas e Innovacion de Castilla Y Leon

Juan Carlos Estévez
Director
CIDAUT, Transport and Energy research and Development Foundation

22nd April 2009

Gregorio Munoz Abado
Jefe de Servicio de Innovación Tecnológica
Dirección General de Industria e Innovación Tecnológica
Consejería de Economía y Empleo
Junta de Castilla y León

Carmen Verdejo Rebollo
Jefe del Departamento de Innovación
ADE Inversiones y Servicios (Agencia de Inversiones y Servicios de Castilla y León)

Maria Lopez
ADE Inversiones y Servicios (Agencia de Inversiones y Servicios de Castilla y León)

Juan Casado Canales
Comisionado para la Ciencia y la Tecnología, y Director General de Universidades e Investigación
Commissioner for Science and Technology, and Director General of Universities and Research
Consejeria de Education
Junta de Castilla Y Leon

Juan Carlos Estévez
Director
CIDAUT, Transport and Energy research and Development Foundation

Murcia

14th September 2006
Rafael Martinez Fernandez
Director of Innovacion
Instituto de fomento Región de Murcia

Juan A. Aroca
Jefe Departmento Innovacion
Instituto de Fomento de la
Region de Murcia

Maria Jose Bernal Torres
Relation with Servicio de Fondos Europeos
Direccion General de Presupuestos y Fondos Comunitarios
Consejeria de Hacienda
Instituto de fomento Región de Murcia

4th May 2007
Rafael Martinez Fernandez
Director of Innovacion
Instituto de fomento Región de Murcia

Juan Antonio Sanchez Martinez
Director Tecnico
Fundacion Seneca
Agencia Regional de Cienca Y Tecnologia
Region de Murcia

14th, 15th April 2008

Aurelio Jiménez Romero
Independent Evaluator Murcia OB 1 Programme 2000 – 2006
Business Development Director
Red2Red Consultores S.L.

Rafael Martinez, INFO
Director of Innovacion

Instituto de fomento Región de Murcia

Luis Almela Ruiz
Director
Departmento de Quimica Agricola, Geologia Y Edafologia
Universidad De Murcia

Sancho Banon Arias
Food technology teacher
Departamento de Tecnología de Alimentos, Nutrición y Bromatología
Universidad De Murcia

Juan Francisco Pacheco Martín
Project manager
Oficina de Transferencia de Resultados de Investigation
Universidad De Murcia

Pedro P. Carrillo González
Duralmond

Alfonso Corbalán Carreño
Hidroconta

Pedro Fernández Segura
Hidroconta

18th - 19th May 2009

Joaquin Juan Aguera
Director
Technology Park de Murcia in Fuente Alamo

Edoardo Osuna Carrello
Director General de Universidades y Politica Cientifica
Consejeria de Universidades Empresa e Investigacion
Region de Murcia

Julio Pedayuè Ruiz
Unidad de Gestion del Plan
Direccion General de Investigacion y Politica Cientifica
Consejeria de Universidades Empresa e Investigacion
Region de Murcia

Esteban Salced Arias
Asesor Facultativo
Consejeria de Industria Y Medio Ambiente
Region de Murcia

Antonio Jose Mula Gomez
Jefe de Servicio de Universidades

Direccion General de Universidades
Consejeria de Universidades Empresa e Investigacion
Region de Murcia

Manuel Tarraga
Area de Promocion del Espacio Europeo de Investigacion
Direccion General de Investigation Y Politica Cientifica
Consejeria de Educacion Ciencia e Investigacion
Region de Murcia

Angel Martinez Sanmartin
Director Technology Transfer OTRI
Centro tecnologico Nacional de la Conserva Y Alimentacion

Rafael Martinez, INFO
Director of Innovacion
Instituto de fomento Región de Murcia

Ricardo Pedraz González
Independent Evaluator Murcia OB 1 Programme 2000 – 2006
Director del Área de Consultoría Estratégica
Red2Red Consultores S.L.

Rocco Luigi Bubbico
PhD Candidate in Planning
School of Environment and Development
University of Manchester

Central government – Madrid

21st April 2008

Jose Luis Kaiser Moreiras
Subdirector General de Programación Territorial y Evaluación de Programas Comunitarios
Secretaría General de Presupuestos y Gastos
Ministerio de Economía y Hacienda

Sergio Lopez
Subdirector General de Programación Territorial y Evaluación de Programas Comunitarios
Secretaría General de Presupuestos y Gastos
Ministerio de Economía y Hacienda

Anatolio Alonso Pardo
Dirección General para el Desarrollo de la. Sociedad de la Información
Ministerio de Ciencia y Tecnología

Miguel Angel Tejedor Garcia
Jefe de Servicio de Seguimento de Fondos Comunitarios
Ministerio de Trabajo Y Asuntos Sociales

European Commission – Bruxelles

27th May 2010
Mikel Landabaso,
DG Regio, European Commission

17th November 2009
Mikel Landabaso,
DG Regio, European Commission

ANNEX 4 – INTERVIEW GUIDES

Research questions for firms

The research questions for firms are structured in three sections. The first is about the firm and its market. The second is meant to measure the degree of innovation (if any) of the investment. The third has got the objective to evaluate the effects. The three parts may be compiled by different persons in the firm according to their capability to answer.

The firm and the industry

1. In which industry do you operate?

2. Which are the main trends of your industry
    a. Competition on price
    b. Competition on quality of products
    c. Competition of product development
    d. Geographical expansion of markets
    e. Relocation of firms

3. How would you define your firm?
    a. Private SME individual or family owned
    b. Private Large family owned
    c. Private large non family owned
    d. Owned by the state
    e. Multinational
    f. others

4. Which are your firms' competitive advantages?
    a. Costs
    b. Individual skills
    c. Brand
    d. Marketing

5. Which are your firms' areas to strengthen?
    a. Costs
    b. Individual skills
    c. Brand
    d. Marketing

The experience with structural funds

6. Are you aware that the operational programme xyx supports firms in your region through the measures abc?

7. Have you applied for being supported (if the answer to this question is no skip to question ?

8. What kind of support did you apply for?
    a. Grant
    b. Loan

c. Equity
d. Indirect Support

9. How much funds did you apply?

10. Did you receive the aid?

11. What kind of support did you receive?
    a. Grant
    b. Loan
    c. Equity
    d. Indirect Support

12. How much funds did you get for and which is the share of the investments that you co financed?

The effects

13. Up to what extent did the investment supported by the operational programme xyz, measure abc imply a change into your product portfolio?
    a. It did not imply any change
    b. The change was only analysed; implementation did not start
    c. The change was marginal
    d. The change was significant

14. What kind of production change was financed?
    a. Reduction of defects
    b. Marginal change
    c. Brand new product
    d. Information Communication Technologies add up

15. Did the investment supported by the operational programme xyz, measure abc imply a change into the process?

16. Up to what extent did the investment supported by the operational programme xyz, measure abc imply a change into your process?
    a. It did not imply any change
    b. The change was only analysed; implementation did not start
    c. The change was marginal
    d. The change was significant

17. What kind of process change was financed?
    a. Manufacturing/ Floor
    b. Procurement
    c. Distribution/ sales
    d. Marketing
    e. Training/ skills
    f. Overall re organisation

18. What is the value of the investments supported by the operational programme xyz measure abc?

a. Reduction of manufacturing costs
b. Reduction of procurement costs
c. Improvement of price/ margin on product
d. Improvement of sales/ market share
e. Improvement of skills
f. Improvement of organisation
g. Improvement of financial situation

The outlook for the future

19. In the last year has your willingness to invest in the firm ?
    a. Increased
    b. Stayed the same
    c. Decreased

20. Did in the last year the possibility for you to consider relocation of your production activities increased or decreased?

The answers will be treated confidentially and no relevance will have the identity of the single interviewee given that all data will be aggregated.

Research questions for Universities

The research questions is structured in three sections. The first is about the University and its main features. The second is meant to measure the kind of investment (if any) has been realized. The third has got the objective to evaluate the effects. The three parts may be compiled by different persons in the university/ department according to their capability to answer.

The university

1. Which are the programmes being delivered?
2. Which are the main research centres?
3. Which is the size of the faculty and the student body?
4. Which are the programmes that attract more students?
5. Which are the programmes that are considered the most successful in term of producing research?

The experience with structural funds

6. How much do you know about the structural funds and its innovation related measures?
7. How clear are the choices that the portfolio of innovation projects indicate and how are they relevant/ binding for your strategic choices?
8. How much were you involved into the drafting of the strategies' diagnostic and identification of strengths and weaknesses?
9. Do you have any role in the definition of the processes by which funds within measures are allocated to specific projects/ beneficiaries)?
10. Are you involved into the selection of projects?
11. Were you involved into the development of monitoring systems?
12. Were you involved into the marketing/ communication of the strategies?
13. Were you involved into the identification of the objectives/ targets of the strategies?
14. How strongly is considered the link between local companies and local universities?
15. How much was favoured an approach by which businesses and universities alike are encouraged to find partners from outside?

16. Have you applied for being supported (if the answer to this question is no skip to end)?

17. What kind of support did you apply for?
    a. Technological infrastructure
    b. Costs of time of researchers
    c. Equity for spin offs
    d. Travel costs for developing network

18. How much funds did you apply?

19. Did you apply in a consortium? Were you the leader? How large was your share in the consortium?

20. How many of your applications were successful? And how much funds did you get?

21. What kind of support did you receive?

a. Technological infrastructure
b. Costs of time of researchers
c. Equity for spin offs
d. Travel costs for developing network

The effects

22. What kind of effect did the structural funds funded investments have on the university?
    a. Improvement of the base of researchers
    b. Acquisition of an infrastructure
    c. Completion of an innovation process and acquisition of patent
    d. Creation of a spin off
    e. Increase of knowledge about how to acquire and manage projects
    f. Development and consolidation of network with other universities

23. If the impact was in terms of university's researchers asset base, did it happen through
    a. opportunities of research for current researchers
    b. attraction of researchers from other universities
    c. economic means to maintain current researchers

24. If the improvement was in terms of availability of a technological infrastructure can you describe the infrastructure and how do you evaluate the effective use of the infrastructure?
25. If the improvement was in terms of acquiring patents can you describe the contents of the patent and the kind of economic benefit that may accrue from its use?
26. If the improvement was in terms of establishing a spin off can you describe the business proposition of the spin off and the kind of economic and research benefit that may accrue from it?

The answers will be treated confidentially and no relevance will have the identity of the single interviewee given that all data will be aggregated.

Research questions for NGOS and opinion makers

The questionnaire is structured in two sections. The first is about the segment of public opinions being represented by the interviewee. The second is meant to evaluate the relationship between civil society and innovation, and more in particular the opinion on the effects of structural funds funded investment in innovation.

The association and the individual

1. Which segment of the public opinion can more easily be associated to the interviewee?

2. Which is the relationship between that segment and the interviewee? She or he is about

    a. interpreting its opinion
    b. forming its opinion
    c. representing its needs

3. Are there other bodies associable to that segment?
4. How well associations represent that segment?

The experience with structural funds

5. How much do you know about the structural funds and its innovation related measures?
6. How clear are the choices that the portfolio of innovation projects indicate and how are they relevant/ binding for your strategic choices?
7. How much were you involved into the drafting of the strategies' diagnostic and identification of strengths and weaknesses?
8. Do you have any role in the definition of the processes by which funds within measures are allocated to specific projects/ beneficiaries)?
9. Are you involved into the selection of projects?
10. Were you involved into the development of monitoring systems?
11. Were you involved into the marketing/ communication of the strategies?
12. Were you involved into the identification of the objectives/ targets of the strategies?
13. How would you define the attitude of citizens towards science, innovation, competitiveness (judgement to be distinguished by concept and segment of citizens)?
14. What can be done in order to make the public opinions a force driving change? Were you involved into communication activities promoting the innovation strategy?
15. Which are the priorities of citizens (segmented by demographic characteristics) as far as innovation goes?
16. How representative are mainstream representative bodies (business associations for instance) and government?

The answers will be treated confidentially and no relevance will have the identity of the single interviewee given that all data will be aggregated.

Research questions for Government and Public Administrations

The questionnaire is structured in three sections. The first is about the type of public administration being interviewed. The second is meant to evaluate from the Pas point of view the types of the investments where the PA got involved. The third has got the objective to evaluate the effects and the outlook for the future.

The institution

1. Which institutional mission of your institution?

2. Which is its status (public administration, agency, ..)

The experience with structural funds

3. How much do you know about the structural funds and its innovation related measures?
4. How clear are the choices that the portfolio of innovation projects indicate and how are they relevant/ binding for your strategic choices?
5. How much were you involved into the drafting of the strategies' diagnostic and identification of strengths and weaknesses?
6. Do you have any role in the definition of the processes by which funds within measures are allocated to specific projects/ beneficiaries)?
7. Are you involved into the selection of projects?
8. Were you involved into the development of monitoring systems?
9. Were you involved into the marketing/ communication of the strategies?
10. Were you involved into the identification of the objectives/ targets of the strategies?

11. Which was the role of the central government versus the region in terms of selecting priorities?
12. Which is the role of local administrations?

13. Which were and are the main priorities of the e government strategies, which is specifically the role of the structural funds funded information society measures and how is e government supporting the innovation propensity of the region's industry?

14. Which is the relationship between the overall region's strategy on R&D and the measures meant to fund R&D within structural funds?

The results and the outlook for the future

15. Which is your evaluation of the results of the structural funds investments in R&D?
16. In which area would you believe that the results is having the bigger impact?
    a. economically valuable results
    b. improvement of skill base;
    c. knowledge on how to select and govern innovation programmes.

17. Up to what extent did the structural funds switch investments decisions (so made investors that would not have undertaken the investment to do so)?
    a. Large extent

b. Enough
c. Little
d. Not at all
e. Don’t know

18. Up to what extent did the structural funds discourage to invest companies that di not benefit from the funds?
    a. Large extent
    b. Enough
    c. Little
    d. Not at all
    e. Don’t know

19. Which are the main areas of improvement and which are the evolutions in the next structural funds programming period (2007 -2013) as opposed to the current one? Does the priority on competitiveness/ innovation change as opposed to the importance of investment in internal convergence/ support of marginal areas and segments of the population?

The answers will be treated confidentially and no relevance will have the identity of the single interviewee given that all data will be aggregated.

Research questions for Technology Park

The interview may be focused on the below issues. Interviews are normally followed up through remote interactions. In this case breakdown of activities and output numbers by site would be useful.

1) Which sort of organisation model do your technology park has got? How many sites do you have and if they are specialized what kind of specialization do they have? What kind of central office do you have (if any) and what kind of autonomy does each site enjoy? How many people work at central and local offices? Which is their status (civil servant or private contracts) and do they have any variable pay linked to results? How are results monitored and evaluated?

2) Which phase of firms value chain do you support?
   a) Hosting and logistic support;
   b) funds raising;
   c) administration and fiscal services;
   d) sharing contact with suppliers and logistic;
   e) support on recruiting and training;
   f) internal floor and administrative processes;
   g) research;
   h) marketing and branding.

3) Through which products are the above supports provided
   a) Direct service from your facilities;
   b) Matching with external partners or suppliers
   c) Direct financial support (with more or less intervention into the actual choice/ control of products/ suppliers/ partners);
   d) Internal networking

4) What kind of marketing do you develop
   a) In the regions towards innovators and SMEs
   b) In the country towards SMEs and larger companies;
   c) Outside the country towards large companies

5) What kind of other funds do you seek and through which processes from
   a) Public funders (EU, ..)
   b) Private and banks

6) What kind of results do you monitor/ want to monitor and do you actually know?

7) Which kind of (results – driven) institutional incentives are envisaged?

ANNEX 5 – FIELD WORK REPORTS

South Yorkshire – Description of meetings and organisations profiles

Castings Technology International (CTI) is classified as a research and technology organisation (RTO) focusing in the fields of: casting design, materials development and selection, specifications, manufacturing technologies, quality control and testing and performance.

The firm's workforce consists of 114 employees based in three offices: Sheffield (40), Birmingham (14) and Rotherham (60). Turnover, for the last year (2007), equalled £8.9m and the company seems to be growing steadily, as can be seen from the construction of a new building next to the current site. Five percent of turnover comes from the annual membership-based subscription services offered by the firm, while ten percent comes from grants. The remainder, and majority, is generated from the revenues earned from projects and consultancy service.

Members of CTI are both small, specialized and large, multinational firms within the metal industry and research centres from UK as well as from Australia, Italy, France, Germany, USA, Japan, China, India, Brazil. It is, in fact, a rather peculiar arrangement because it realizes the sharing of knowledge amongst firms that are in competition and it embodies the concept of a partnership that spans at a global level.

Membership is categorised in two levels: Full Membership who pay a maximum of £15000 or £2500 per site and Associate Membership who users pay from £1000 to £2500. Members receive technical advice and analysis on production and manufacturing and can make full use of facilities and services.

The business model is most interesting because the firm reinvest any profits in the organisation development. This structure gives the members of the firm the ability to manage its growth and success. Each member has a vested interest since it pays a subscription fee and receives services from CTI, thus making cooperation an important factor. In addition, the board of directors is made up of elected volunteers that have an interest in the competitiveness and productivity of the South Yorkshire region.

Services is, mostly, knowledge produced by research project that is shared or transferred to all or part of the members. Research product is, therefore, meant to be a sort of "common good" that members produce in a quasi open source method.

CTI moved its headquarters to the Advanced Manufacturing Park in South Yorkshire in September 2006. The very project of moving headquarter of CTI to the AMP was partly financed with OB1 funds provided by the Yorkshire Forward and that – according to interviewees - would not have happened without the financing and the dialogue that took place between the programme directorate/ YF and the company that was looking for a new location. In addition, the organisation was awarded addition EU Structural Funds that were invested into new technologies, which would prove useful for its future operations and ultimately to its members. One of the technologies produced was the vacuum manufactured casting process. This technology yields a product with much higher alloy integrity and decreased weight. The practice has essentially increased productivity and sales by giving CTI the advantage of producing high-quality, lightweight castings.

Overall, according to the Objective 1 Programme Directorate, three grants were awarded to CTI, totalling £4.111.515. The first grant totalled £346.214 and provided support for the development in the field of titanium casting expertise for the advanced manufacturing sector. £1.443.331 was then awarded for a second project, in order to produce technologies for the manufacturing of aluminium and titanium castings, which meet accredited air-worthiness quality. Lastly, £2.321.970 was allotted in order to help the advanced manufacturing programme developed by the organisation. In addition, the Yorkshire Forward RDA provided a great deal of funding for the construction of the CTI head office on the AMP. However, the remaining funds necessary were privately financed by the organisation itself. The buildings are now owned by the company.

Since moving to the Advanced Manufacturing Park, CTI has also seen a rise in international partnerships. Approximately thirty percent of its annual membership-based services are provided to firms in some of the largest global economies, such as India, China and Australia. Although the castings industry continues to shrink in the UK, the firm has continued to grow. Turnover continues to rise steadily each year and it has seen its membership grow in over forty countries. This is, also, an interesting feature of the approach to innovation in SY and it responds fairly well to one of our expectations of well functioning partnerships, as well as programmes capable to generate sustainable innovation: knowledge production is not considered as something to be kept within the region and exchanges of even quasi proprietary know hows are considered essential to make the process of producing and spreading innovation sustainable in time.

Another partnership based organisation is **The Welding Institute** (TWI) which specialises in the field of R&D in materials joining technology. The firm offers a wide range of services to its membership, including: contract work, consultancy, expert advice, technology transfer and research and development.

Established as in 1946, the company has now grown into one of the premier specialists of joining technologies for engineering materials. TWI not only focuses on the manufacturing aspect of joining technology, but also provides a long list of services and products, including: training and examinations, technology transfer, event hosting, case studies and publications, information services and computer software.

Companies prefer to outsource services to TWI because they do not often have the high skilled expertise required within their own organisations. Thus, these firms can reap the benefits of the technology and knowledge fashioned at TWI, while keeping costs lower since it was not necessary to hire additional welding specialists. In addition, TWI members receive the Intellectual Property rights for all technologies developed. As for CTI, services is shared knowledge, with the difference of the TWI' s products being more market oriented and the ones of CTI more focused on research.

TWI' s main office was established, and is still located, in Cambridge, England. However, the organisation has expanded its scope by establishing offices across the United Kingdom, the Americas, Southeast Asia and the Middle East. Memberships now totals approximately 3500 members, all of which pay a subscription fee for the services provided by the company. As a result, this steady growth in membership has led to increases in income and staff. This global presence has broadened relations with firms located outside the United Kingdom. Like for CTI, by establishing headquarters in other countries it has become possible for TWI to easily access a market that was once seen as unfeasible, due to language barriers and differences in general infrastructure.

Staff is numbered at over six hundred individuals and continues to grow each year. In 2006, income went from £33.7m to £36.2m, an increase of 8%. Additionally, TWI has forecasted that a 10% compound growth for the 2007-09 business plan.

The organisation received funding for a number of various projects throughout the years. The opening of the Rotherham office and a portion of the equipment housed at the facility were made possible with the arrival of EU funding.

The first phase of funding was used in order to develop "advanced laser technologies for manufacturing applications" and totalled £975.800. The next funding request was used for the development and use of friction stir welding, which "offers radical changes in fabrication practice" and the possibility of "innovation opportunities and new markets." The amount for this second phase equalled £1.000.000. Lastly, TWI received funding – £2.837.897 – in order to help establish its technology centre in South Yorkshire.

As an already well-established organisation before its arrival at the AMP, TWI was able to fund a significant portion of the construction costs through private sourcing. Yorkshire Forward funds, much like the EU Structural Funds, were used to help purchase the necessary equipment.

It was also made apparent that there is a steady flow of cooperation between the educational and industrial sectors on the Advanced Manufacturing Park. This was best described during our interview at TWI Ltd. According to Mark Roughsedge, Technical Business Developer at the firm, this cooperation is seen as a "*network of competence*." Collaboration is guaranteed because the businesses located on the park have established the necessary rapport in sustaining a high-level of sustained research and innovation.

The **Advanced Manufacturing Research Centre** w/ Boeing (AMRC) is another example of partnership based organisation and unlike the first two is born out of an initiative of the university world and more specifically the University of Sheffield. It focuses on the development of solutions for materials-forming, metal-working and castings. The objective of the organisation is the improvement of the advanced manufacturing supply chain across the UK, and in particular, the Yorkshire and Humber area. The AMRC also hosts partnerships that include some of the principal leaders in the aerospace supply chain, including: Boeing, Messier-Dowty and Goodrich. This international partnership provides the firm with a unique insight on the services needed for the entire market.

As mentioned the facility was produced through a partnership between the private sector, government and international academic institutions. This joint venture is quite interesting mainly because it calls upon the key interests of sectors that usually do not work together. The AMRC w/Boeing has a unique competitive advantage since its activity lies at a crossroads between academia, manufacturing and industry. This often leads to purpose-driven technologies that are based upon high-level research advancements often possible only in the academic field.

Accordingly, AMRC w/ Boeing has seen a period of rapid growth since its inception at the Advanced Manufacturing Park. During its first year, in 2004, twelve individuals were employed at the facility. Currently, there are approximately seventy employers working on a number of projects. It is forecasted that employee growth will steadily rise though, with numbers reaching 150 workers within the next eighteen months.

The research centre now has forty-one partners, which make up its main clientele base. Membership is divided between two categories: Tier 1 and Tier 2. The fixed cost of membership for all Tier 1 partners is £200.000 per annum, while Tier 2 partners pay £30.000. Although the organisation focuses its main efforts on services for its partnership, research and development projects are also carried out for other organisations that do not pay annual membership fees.

Funding was allotted to the University of Sheffield, since the AMRC is considered an off-campus department. The first phase of funding – which developed the facility that first housed the organisation – totalled £2.713.126. The building was considered an instrument that could "promote, secure and strengthen strategic Research and Technological Development projects with S. Yorkshire SME's and major international companies." The second phase totalled £3.000.000 and supported the construction of The Factory of the Future that opened in January 2008. As an off-site department, located at the AMP rather than on the main campus, the centre is *"given fairly free reign"* in terms of the activities performed, according to AMRC's Project Director John Baragwanath. However, the centre is still responsible to the university and has several board members from the institution.

AMRC is, therefore, not only a research centre but a campus and a place where demonstrations and lectures for a wider public takes place. As such it is an important link towards civil society.

The mobilization of civil society is a specific mission of National Metal Technology Centre (**NAMTEC).** The organisation is a "*non-profit, Research and Technology organisation*" focusing on the UK's Advanced Engineering and Metals (AEM) sector. The organisation is fairly small as compared to the others visited during the fieldwork. Total staff equals thirty individuals, but annual turnover for the past year was £3 million.

In terms of government relations, NAMTEC is considered a strategic partner with Yorkshire Forward. Recently, the organisation has been preparing a three-year Business Development Proposal with the agency. As strategic partner, NAMTEC supports the metals industry in the Yorkshire sub-region on behalf of the RDA. Responsibilities will include: support programmes, marketing information, computer analysis, technical support, and communications events. In addition, NAMTEC supports Yorkshire Forward with the development of the regional strategy. The relationship will help both groups. NAMTEC will be provided with a great deal of representation, while Yorkshire Forward will receive information relating to the metals industry in the region.

The organisation operates within three areas: research & development, desk-based research and case studies, and educational resources in the form of training. Although the organisation does not have its own research facilities, it does broker partnerships; thus, making the possibility of projects to be established. Through these partnerships, the development of best practices and new technologies are possible since NAMTEC is provided the use of off-site facilities.

In a broad sense, NAMTEC works much like a technical consultation service. Two membership-based services are available to prospective and current partners: the Titanium Information Group (TIG) and Special Metals Forum. TIG is a subscription service, which provides a technical and commercials service. Technically, members are given answers to any inquiries regarding titanium. Commercial opportunities are motivated by the collection of contacts interested in the purchase of titanium, which is then compiled and circulated to the membership. Lastly, promotion and representation is provided to members since NAMTEC attends a number of tradeshows throughout the year.

Eighty percent of funding for NAMTEC comes from the public sector and the organisation is also a participant of the Seventh Framework Programme (FP7) for research & technological development.

NAMTEC received funding from OB1 in two phases: the first totalled £1.610.299, while the latter amounted to £349.737. The first phase was used for "Infrastructure Project Measure 1" and helped establish NAMTEC. The organisation – according to the South Yorkshire Objective 1 Programme Directorate – would be used "to assist in stimulating innovation and research and development through network and knowledge sharing."

As aforementioned, the public sector provides a substantial share of funding for the organisation. The organisation receives funding on the regional government level, by Yorkshire Forward, and the national level by the Department of Business, Enterprise and Regulatory Reform (formerly the Department for Trade and Industry). Twenty percent of funding comes from private sector contracts.

The interview at NAMTEC was insightful with regard to the industrial situation of the region. It was explained that the metals manufacturing industry may be successful, but the original equipment manufacturers (OEMs) of certain high-level goods (automobiles, aircraft or oil and gas platforms) are simply not present. The supply chain of the metals industry passes through the region, but the final components are made elsewhere. This is considered a vast weakness.

This weakness, however, leads to an explanation of the strong relationship that organisations in the district – especially those visited during the fieldwork – have with external firms. The partnerships mentioned by each firm included well-known, international companies.

The development of the university - industry relationship seems to be in its initiation phase though. Improvements will most likely continue with the establishment of businesses such as NAMTEC, which helps to promote the metals industry and train graduates and professionals. This plan could provide the necessary level of sustained flow of entry-level graduates and high-level professionals into the traditional sector; thus, helping to improve the business outlook of the entire area. Moreover, changing the image of the industry by proving the importance of research and development is an important factor to attract graduates.

West Wales – Description of meetings and organisations profiles

Finance Wales is the most relevant of the agencies still engaged into regional development still outside the public administration. Finance Wales is the financial vehicle to realize the creation of new innovative companies and spin offs as a key driver of the Welsh Innovation Strategy. Finance Wales was established in 2000 with the objective to provide commercial funding (debt and equity) to small and medium-sized businesses (SMEs) throughout Wales, enabling them to realise their potential for innovation and growth at critical stages of their life cycle.

The company' s initial capital of 130 million GBP (provided by the Welsh Assembly for 15 million, the structural funds for 50 million - 70% from Objective 1 and 30% from Objective 2 - and by Barclays for the remaining 65 million) has been invested in 1,700 investments into Welsh SMEs which accounts for less than 100,000 GBP of support per firm.
FW has got as its core business the provision of capital for "early stage", "expansion"; MBOs, MBIs and employee buy outs that typically require much more significant funding per firm.

The **Technium** is a network of micro technology parks dedicated to small inovative firms and born as a partnership between Swansea University and the Welsh Development Agency (immediately before the absorption of the agency in Welsh Assembly Government).

The initiative was launched– in 2000 and the occupancy of the spaces that have been created is still less than one third..

One of the issues that has been debated is the assessment of the costs of the investments and of its maintenance is rather different, ranging from 260 million GBP to 52 million GBP (for the eight Swansea based Techniums). Different figures brings, of course, to very divergent assessments when it comes to understanding the return on investments of the incubators.

Castilla Y Leon – Description of meetings and organisations profiles

Ingeniería y Sistemas de Ensayos no Destructivos, (**ISEND**), is a fairly new organisation, founded in February 2007. The firm focuses on the "investigation, development, production, installation and maintenance of data processing, electronic systems and mechanics for the inspection, measure and industrial quality control in the sectors of transport, aerospace, iron and steel, petrochemical, energy and other industrial sectors[184].

The possibility to be tutored in funds raising, but also to scout prospective clients with the park staff, but also in partnership with other firms was mentioned by José Manuel Bernárdez, owner and technical manager at ISEND[185], as the main competitive advantage provided by the association to the technology park.

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[184] Bernárdez, José Manuel. Personal Interview (16 April 2008) and InfoJobs.net. http://www.infojobs.net/isend

[185] Ingeniería y Sistemas de Ensayos no Destructivos, (ISEND), is a fairly new organisation, founded in February 2007. The firm focuses on the "investigation, development, production, installation and maintenance of data processing, electronic systems and mechanics for the inspection, measure and industrial quality control in the sectors of transport, aerospace, iron and steel, petrochemical, energy and other industrial sectors (InfoJobs.net. http://www.infojobs.net/isend)

According to Mr. Bernàndez, ISEND has a "typical profile of a high technological start-up company," with activities "strongly related with research & development" and it is one of the example of the effectiveness of the technology park based strategy. "The support coming from the regional government, and also coming from, the central government has been crucial for the firm to start operations [186]".

The activity of the firm, for the first year of operation, was mainly focused on research & development. Rather than marketing an unfinished product, ISEND was able to focus all efforts on the process of innovation, ensuring that a quality good would reach potential clientele. These efforts were made possible through the help of structural funds. The arrival of public funding ensured that operations would continue and the organisation would not have financial troubles, even though its efforts were focused on innovation, not sales.

The services attained from the technology park were seen as valuable to the firm. ISEND pays for the leasing of space, but receives a number of benefits from the park's administration. The managers of the firm are often guided on how to go about the attainment of public funding. When deadlines for proposals for publicly funded projects are approaching, the firm's managers are assisted with all aspects of the application process.

It is, however, more interesting to understand that - according Mr Bernárdez – the park is supporting and, sometimes, even replacing the firm for selling possible projects to potential clients and government funding agencies.

Not everybody does, however, believe to the convenience of looking for public funds. **Proxima Systems**[187] was able to secure a public funding concerning a research & development project for a hydrogen producing power plant. Although public money was acquired, Emiliano Muñoz, owner of Proxima, stated that the process of "managing and getting the money [was] a real mess[188]." The firm experienced a number of delays regarding the procurement of funds and it was questioned if the entire process was worthwhile. The problem was not, however, in the case of Proxima, associated with some pitfalls of the staff of the park, but with the adequacy of public funds procedures vis a vis the timing of R&D initiatives.

More recently, the firm is often required to "pull resources" in order to develop new technologies for publicly funded projects. Although organisations at the park often compete with one another for

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[186] Bernárdez, José Manuel. Personal Interview. 16 April 2008.

[187] Proxima Systems was founded in 2004 and focuses on the industrial application of information technologies. They are mainly concerned with: monitoring and telecontrol of industrial and installation processes, automated information, industrial data processing, video security (closed-circuit cameras) and access control.
The organisation's main line of products gives managers the capability of monitoring and controlling the operations of a power plant (or a series of power plants) through the use of remote control access. Plant managers are able to receive messages and updates – on mobile phones or computers – concerning the current state of the facilities they supervise. With this hardware, these managers are given a number of capabilities, the most important being: oversight of problems experienced in the plant, shutting down the entire facility or its electricity and controlling important metres regarding overall operation and efficiency.
For the most part, Proxima Systems services medium-sized industrial facilities and power plants (including photovoltaic power stations). Its partners include Cisco Systems, HP and Siemens Mobile. However, it is currently moving into the market of automated homes. Much of its hardware came about through a very specialised practice. It first took on certain projects for clients and saw that many other similar businesses experienced the same problems. Thus, by looking to answer one problem for one client, it established its main line of hardware: remote monitoring and control.

[188] Munoz, Emiliano. Personal Interview. 16 April 2008.

publicly funded R&D projects, they nonetheless continue to partner together. This can be seen with the partnership between Proxima Systems and Cenit Solar and Besel (both housed at the park) to get projects be funded. The cooperation between firms was seen as "harmonic," since a high level of reciprocity, involving sales and project assistance, is attained between organisations.

In any case, one of the possible future development of the portfolio of services provided by the park is a diversification of finance looked for, including private equity and venture capital. Innovative projects, in fact, require – according to the entrepreneurs that we met at the park – "much time and effort, and if the firm is not able to win public funding, it will nonetheless market the forthcoming product privately that can later be sold privately and on a more international market".

From the point of view of Mr. Muñoz, the single most important service provided by the park is, mostly, a knowledge management system accessible "from so many places and formats in a way that is useful" for him and other employees at the firm.

Managers at Proxima Systems seem to appreciate particularly the activities that according to our framework are supposed to support the development of corporate culture as well as the culture of the firms as part of the same system. Workshops and seminars are often organised for member firms, allowing managers to meet businesses with similar business and project interests. This often provides the easy outlet for gaining partners for publicly funded research and development projects in the region and looking for clients and suppliers.

It is, however, interesting to notice the articulation of services being exchanged between the firm and the eco system of the park. Not only, in fact, the firm retrieve knowledge, it, also, offers services to other firms located in the park. Some of Proxima's most prominent clients include: Apple Computers and Movistar, but also the Junta de Castilla y León, the above mentioned Cenit Solar,.

Cenit Solar[189] is, probably, the largest and up to some extent the most innovative firm hosted into the park. It is also a firm that was born and entirely developed within the park. Cenit's owner confirmed to an even higher added value that the technology park provides: the integration of value chain and, thus, the further specialization of firms that can focus on their core competence.

Cenit's case is, however, a case where it is a firm and not the formal manager of the park, that has developed the leadership vis a vis the other firms. It is a leadership of approach to the market that other firms are acquiring. Cenit's approach is very proactive and totally dedicated to quality.

The firm, in fact, found its competitive advantage by providing free consulting to clients and potential customers. Energy audits are performed in order to realise the total amount of energy used, and then, alternative and more economical sources are then explored for the client. Much like some of the firms interviewed in the United Kingdom – in South Yorkshire – Cenit Solar also offers technical training and assistance. Classes and training sessions, at a number of various levels, are held for professionals when requested. For the most part, the organisation states that its main goal is to raise the competitiveness of its clients, in all areas. Solutions are based upon a holistic approach. The firm studies the nature of the environment, the building in which its product will be installed and the

[189] Cenit Solar, Proyectos e Instalaciones Energéticas, is dedicated to the design and installation of sustainable and renewable energy sources. However, its main product line is concerned with solar energy (both thermal and photovoltaic systems). Although the firm is quite young – founded in February 2004 – much of the staff has acquired a great deal of experience in the field of research & development for sustainable energy sources. Unlike many of the businesses found at technology parks, Cenit Solar does not limit its business activities only to the industrial sector. The design and installation of its products are done so that they offer solutions to all sectors – residential, commercial and industrial.

overall goals of its clientele. Thus, Cenit Solar assures that its solar systems will be environmentally safe, aesthetically appealing, and, most importantly, efficient for each client's specific needs.

This marketing and sales strategy has become the format that many of the firms in the park are following.
This is true, however, also for R&D and product development: one of Cenit Solar's main products, HelioStat, shows the competitive advantage experienced with being housed at the technology park at Boecillo. This product, which allows for the remote access of the solar energy system installed by the organisation, was furthered by the technologies developed by Proxima Systems. It is apparent that the close proximity of the two organisations made the partnership for the HelioStat project much simpler and efficient, in terms of cost and general logistics and planning.

Murcia – Description of meetings and organisations profiles

The **Universidad de Murcia Department of Chemistry** did, in fact, contribute – thorugh its **OTRI** - to produce a lighter composite material to increase the almond product's acoustic capability, durability and capacity to withstand fire at much higher temperatures, as well as stability toward ultraviolet radiation. The ability to develop this new material was made possible partly because of a 300.000-euro financing by the Centro para el Desarollo Tecnológico Industrial (CDTi). In addition, the firm received a 90.000-euro subsidy from INFO in order to help develop the new material.

Duralmond is specialized in producing wall coverings and ceilings. The firm's most interesting feature is how exactly these materials are produced. Rather than using traditional components in forming their products, Duralmond has implemented a strategy that uses a conventional agricultural commodity in the region: almonds. The composite material – which produces the wall coverings and ceilings that can be displayed in residential or commercial buildings – is made from a mixture of 40-45% crushed almond shells and resin. The shells are often considered a waste product in the agricultural sector. Nonetheless, the products provided by the company use this waste in order to produce a biodegradable, recyclable and aesthetic product. Additionally, the firm is able to provide products that mimic more traditional artisanal wood products at a much lower operating cost, since the composite mixture is manufactured rather than hand-crafted.

Duralmond is one of the most innovative small firms in Murcia, literally invented a process and a product – almond made wall coverings and ceilings - and has established a relationship with the University only for further product development.

According to Duralmond's owner and technical manager [190], in the future, the organisation plans to increase technological efficiency and improve the automation of the production process. The development of new machines has been mentioned, which will help improve the speed of production. Also, due to new legislation on improved fire protection, the firm plans to continue to increase the durability of its products to extreme heat.

The relationship with the University is, in this case, seen as positive, although entirely on a technical, marginal improvement plane.

[190] Pedro P. Carrillo Gonzales, Personal Interview (15th April 2008)

The story of **HidroConta**[191] is not much different. The firm specialises in the field of hydration and irrigation; it offers services and manufactures products, such as: water meters, membrane valves, hydrants, backwash valves, pilots and accessories and mixing pumps.

Through the use of funding, HidroConta has developed new technologies and averages two new innovative projects per year. The tasks assigned by HidroConta to the relevant department of the university of Murcia are, again, an example of a relationship which gets developed on mere technical basis.

In addition, European Union funds assisted with the firm's joint venture programme in Italy. The firm was able to establish a collaborative effort with an Italian firm, WaterTech, in order to increase its scope of services across Europe. Hydraconta's owner and technical manager…[192] remarked that non-financial assistance from INFO was also provided to the firm, in terms of establishing the joint venture safely and securely with as few problems as possible. Specifically, funds were used for legal counsel and travel expenses.

[191] The main service offered by the firm is called HIDROCONTROL HC-2002-*C*. This telemanagement service provides monitoring, control and administration of the irrigation systems used by clients. If problems occur with a client's water meters, HidroConta is able to adjust the measures all through the use of this programme. The utilization of an installed programmable receiving transmitter allows HidroConta to not only monitor the systems of all clients, but also regulate any problems without leaving the premises.

[192] Alfonso Corbalàn Carreno and Pedro FernAndez Segura, Personal Interview (15th April 2008)

ANNEX 6 – ADDITIONAL TABLES

Table A.1 – Regression of GDP per capita growth rate on structural funds expenditures as a percentage of GDP. GDP per capita 1999 and percentage of population with a tertiary education diploma; EU Objective regions;2000 – 2006. Results

Linear regression		Number of obs = 39				
		F(7, 28) = .				
		Prob > F = .				
		R-squared = 0.6726				
		Root MSE = .01417				
		Robust				
gdppccagr	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
rtdisftot~99	1,768469	0,9577659	1,85	0,075	-0,193426	3,730363
ter99	0,3722778	0,2535992	1,47	0,153	-0,1471966	0,8917522
gdppc99	- 0,00000066	0,00000119	-0,56	0,583	-0,0000031	0,0000018
at	-0,0078647	0,0137768	-0,57	0,573	-0,0360852	0,0203557
de	-0,0703887	0,0270917	-2,6	0,015	-0,1258835	-0,0148939
es	0,0111972	0,0074818	1,5	0,146	-0,0041286	0,026523
gr	0,0084628	0,0233772	0,36	0,72	-0,0394231	0,0563487
ir	0,0525174	0,012145	4,32	0	0,0276395	0,0773953
it	0,0450645	0,0452878	1	0,328	-0,0477033	0,1378323
pt	0,0345373	0,0363747	0,95	0,35	-0,039973	0,1090476
_cons	-0,014125	0,065026	-0,22	0,83	-0,1473248	0,1190748

Gdppcaccagr: Gdp per capita compounded growth rate; rtdisftot: structural funds allocation in R&D measures; ter99: percentage of graduates on total population; gdppc99: Gdp per capita in 1999

Table A.2 - GDP breakdown by sector, 2000, %, UK, Selected areas

GDP BREAKDOWN 2000	*West Wales and The Valleys*	*South Yorkshire*	*U.K.*	*Wales*	*Yorkshire*
Agricolture, hunting, foresty and fishing	2,0%	0,4%	1,0%	1,8%	1,3%
Construction	6,6%	7,5%	5,3%	6,2%	6,0%
trade; hotels and restaurants; transport and communication	21,1%	24,8%	22,8%	22,1%	23,5%
Financial intermediation; real estate	**15,3%**	**17,6%**	**27,2%**	**21,0%**	**21,3%**
Public administration and defence; education; health and social work	**32,1%**	**26,7%**	**21,6%**	**30,6%**	**23,5%**
Mining and quarrying	0,8%	0,6%	2,9%	0,6%	0,4%
Manufacturing	**19,8%**	**21,5%**	**17,4%**	**15,1%**	**22,1%**
Electricity, gas and water supply	2,4%	1,0%	1,8%	2,6%	1,9%
TOT	100,0%	100,0%	100,0%	100,0%	100,0%

Source: Eurostat

Table A.3 - Objective 1, 2000 – 2006, Financial allocations (in mil euro), UK

Programme	Total costs	EU contributions	ERDF	ESF	EAGFF	FIFG
West Wales	4.023	1.934	1.163	615	133	23
Mersey Side	3.631	1.389	931	453	6	0
South Yorkshire	3,088	1.221	834	365	23	0
Northern Ireland	1.493	929	537	285	78	29
Cornwall & Scilly	1.206	523	327	101	79	17
Highlands & Islands	864	320	190	62	38	29
Total	14.306	6.317	3.981	1.881	357	98

Source: Programming documents

Table A.4 - Breakdown of employment, Year 2000, UK Regions

	agriculture	*manufacturing*	*Construction*	*Wholesale*	*Financial*	*Public Services*
United Kingdom	1,5%	17,9%	7,1%	26,5%	15,5%	31,2%
North East (ENGLAND)	0,8%	21,3%	6,6%	27,1%	10,5%	33,2%
North West (ENGLAND)	0,9%	20,4%	6,8%	27,5%	12,5%	31,7%
Yorkshire and The Humber	1,2%	21,3%	6,9%	26,8%	12,7%	30,9%
South Yorkshire	**0,7%**	**21,6%**	**7,3%**	**26,7%**	**11,2%**	**32,5%**
East Midlands (ENGLAND)	1,7%	24,0%	6,7%	26,9%	12,3%	28,3%
West Midlands (ENGLAND)	1,4%	24,4%	6,7%	25,8%	12,5%	28,9%
Eastern	1,8%	16,8%	7,9%	26,4%	17,6%	29,4%
London	0,2%	8,8%	5,6%	26,6%	25,9%	32,3%
South East	1,5%	15,1%	7,1%	27,1%	18,9%	30,1%
South West (ENGLAND)	2,1%	17,3%	7,5%	26,1%	15,0%	31,7%
Wales	2,7%	19,4%	7,7%	24,7%	10,4%	34,8%
West Wales and The Valleys	**2,6%**	**19,9%**	**8,2%**	**24,3%**	**8,8%**	**36,0%**
Scotland	2,4%	17,4%	7,8%	26,4%	12,5%	33,3%
Northern Ireland	4,9%	17,5%	10,2%	23,7%	8,0%	35,4%

Source: Office of national statistics

Table A.5 - Number of academic staff[1] and distribution by RAE category – 2001, Yorkshire

Institution Name	*Number of research staff*	*Rating 1*	*Rating 2*	*Rating 3b*	*Rating 3a*	*Rating 4*	*Rating 5*	*Rating 5**
University of Hull	337	0,0%	0,0%	0,0%	28,3%	37,0%	34,7%	0,0%
University of Lincoln	75	0,0%	13,3%	45,9%	40,8%	0,0%	0,0%	0,0%
University of Bradford	289	0,0%	0,0%	15,5%	2,3%	50,9%	27,5%	3,8%
University of Leeds	1.137	0,0%	0,0%	0,0%	2,5%	27,8%	59,8%	9,9%
Leeds Metropolitan University	152	0,0%	4,1%	19,3%	70,7%	5,9%	0,0%	0,0%
Trinity & All Saints	10	21,1%	21,1%	15,8%	0,0%	42,1%	0,0%	0,0%
University of Huddersfield	127	0,0%	12,6%	34,2%	19,7%	7,9%	25,7%	0,0%
University of York	554	0,0%	0,0%	0,0%	8,4%	8,2%	65,7%	17,7%
York St John College	33	19,3%	31,6%	38,6%	10,5%	0,0%	0,0%	0,0%
South Yorkshire								
Sheffield Hallam University	227	0,0%	0,0%	14,5%	37,8%	26,5%	21,2%	0,0%
University of Sheffield	956	0,0%	0,0%	0,0%	3,2%	15,5%	62,5%	18,9%
Subtotal South Yorkshire	*1.183*							
Total Yorkshire	*3.897*							
UK	**48.021**	**0,2%**	**2,4%**	**5,5%**	**12,5%**	**24,8%**	**35,9%**	**18,7%**

[1] By academic staff it is only considered the part of it that has been rated by RAE (category a and a*) and they are counted in Full Time Equivalent

Source: RAE conducted by HEFCE, SFC. HEFCW and DEL, Higher Education Statistics Agency

Table A.6 - Number of students and percentage of postgraduate and foreigners – 2006/ 2007, Yorkshire

	Total all students	*Post graduate*	*Foreign students*
University of Hull	22275	16,0%	13,3%
University of Lincoln	16705	8,2%	6,2%
University of Bradford	13600	33,0%	29,6%
University of Leeds	33315	26,4%	15,7%
Leeds Metropolitan University	39310	10,6%	6,6%
Trinity and All Saints(#12)	2690	15,2%	3,9%
University of Huddersfield	19740	18,1%	7,3%
University of York	13270	31,4%	21,6%
York St John University	6435	14,5%	3,1%
South Yorkshire			
Sheffield Hallam University	29700	25,2%	10,8%
The University of Sheffield	25700	28,1%	17,8%
Subtotal SY	*55400*		
Total Yorkshire	*222740*		
UK	**2478425**	**22,6%**	**14,2%**

Source: Higher Education Statistics Agency

Table A.7 - Regional Partnership, Objective 1 Programme, West Wales

Objective	**Lead Body**
Human Resource Development	HRD European Unit/ELWa - National Council
Community Regeneration	Welsh Council for Voluntary Action
Agri-Food	Welsh Development Agency
Forestry, Countryside and Coastl Management	The Forestry Commission
Business Support	Welsh Development Agency
Entrepreneurship	Welsh Development Agency
Innovation and Research and Development	Welsh Development Agency
Information Age	Welsh Development Agency
Tourism	Wales Tourist Board
Strategic Infrastructure	Welsh Development Agency

Source: Programming documents

Table A.8 - Number of academic staff[1] and distribution by RAE category – 2001, Wales

Institution Name	*Number of research staff*	*Rating 1*	*Rating 2*	*Rating 3b*	*Rating 3a*	*Rating 4*	*Rating 5*	*Rating 5**
Cardiff University	710,1	0,0%	0,0%	0,0%	1,0%	11,9%	62,1%	25,1%
University of Wales College	240,6	0,0%	0,0%	0,0%	0,0%	84,3%	15,7%	0,0%
University of Wales Institute, Cardiff	58,0	0,0%	0,0%	23,6%	15,5%	60,9%	0,0%	0,0%
Royal Welsh College of Music and Drama	12,2	0,0%	0,0%	0,0%	0,0%	0,0%	100,0 %	0,0%
University of Wales College, Newport	16,0	0,0%	0,0%	0,0%	59,4%	0,0%	40,6%	0,0%
University of Glamorgan	161,5	0,0%	4,3%	50,2%	17,5%	28,0%	0,0%	0,0%
North East Wales Institute	28,9	0,0%	61,9%	0,0%	38,1%	0,0%	0,0%	0,0%
West Wales								
Swansea University	407,4	0,0%	0,0%	6,3%	33,4%	40,9%	16,0%	3,4%
Swansea Institute of Higher Education	16,8	17,9%	29,8%	52,4%	0,0%	0,0%	0,0%	0,0%
Trinity College	7,3	0,0%	58,6%	41,4%	0,0%	0,0%	0,0%	0,0%
University of Wales, Lampeter	61,0	0,0%	0,0%	6,6%	21,6%	37,4%	34,4%	0,0%
Aberystwyth University	301,6	0,0%	1,1%	5,6%	31,4%	43,7%	4,8%	13,4%
Bangor University	268,1	0,0%	0,0%	2,6%	20,8%	44,9%	19,1%	12,6%
Sutotal WW	**1.062,2**							
Total Wales	**2.289,4**							
UK	48.020,8	0,2%	2,4%	5,5%	12,5%	24,8%	35,9%	18,7%

[1] By academic staff it is only considered the part of it that has been rated by RAE (category a and a*) and they are counted in Full Time Equivalent

Source: RAE conducted by HEFCE, SFC. HEFCW and DEL

Table A.9 - Number of students and percentage of postgraduate and foreigners – 2006/ 2007, , Wales

	Students	*% pg*	*% foreigners*
Cardiff University	30930	25,3%	14,3%
University of Wales Institute, Cardiff	10910	29,0%	19,0%
Royal Welsh College of Music and Drama	660	22,0%	6,1%
University of Wales, Newport	9780	21,0%	4,4%
University of Glamorgan	25465	12,8%	12,8%
North-East Wales Institute	7400	7,3%	21,1%
West Wales			
Swansea University	15525	17,7%	11,3%
Swansea Institute of Higher Education	5800	20,9%	6,3%
Trinity College, Carmarthen	2480	13,9%	2,8%
University of Wales, Lampeter	8925	20,6%	18,2%
Aberystwyth University	12245	20,4%	12,0%
Bangor University	14020	14,5%	7,3%
Subtotal West Wales	**58995**		
Total Wales	**144140**		
UK	2478425	22,6%	14,2%

Source: Higher Education Statistics Agency

Table A.10 - Distribution of GDP by industry, 1999, Percentage, Spain, Regions

Region	*Agriculture*	*Mining and quarrying*	*Industry*	*Construction*	*Services*	*Wholesale and retail trade*	*Financial intermediation*	*Public administration and defence*
Andalucia	4,2%	7,3%	11,9%	4,6%	36,0%	13,6%	9,3%	13,1%
Aragón	3,3%	14,0%	17,8%	3,8%	30,6%	11,9%	8,0%	10,6%
Canarias	1,4%	4,0%	8,2%	4,2%	**41,1%**	**20,6%**	8,7%	11,8%
Cantabria	2,7%	12,0%	16,6%	4,6%	32,0%	11,8%	9,7%	10,5%
Castilla y León	*4,9%*	*11,9%*	*16,2%*	*4,3%*	*31,3%*	*10,9%*	*8,5%*	*11,9%*
Castilla-la Mancha	**7,6%**	11,5%	16,5%	5,0%	29,8%	10,9%	7,0%	11,8%
Cataluca	0,9%	14,4%	17,7%	3,4%	31,8%	13,5%	9,7%	8,5%
Comunidad de Madrid	0,1%	8,5%	12,0%	3,5%	**38,0%**	14,8%	12,8%	10,4%
Comunidad Foral de Navarra	2,3%	**17,0%**	**20,9%**	3,9%	28,0%	10,6%	7,0%	10,5%
Comunidad Valenciana	1,9%	12,3%	16,5%	4,2%	32,6%	13,7%	9,2%	9,7%
Extremadura	**7,4%**	5,9%	11,6%	5,8%	34,6%	11,5%	7,6%	15,6%
Galicia	3,9%	11,5%	16,4%	5,0%	31,6%	11,6%	8,4%	11,6%
Illes Balears	1,0%	4,3%	8,2%	3,9%	**41,3%**	**23,0%**	9,6%	8,6%
La Rioja	6,1%	15,7%	19,3%	3,7%	27,6%	10,3%	8,0%	9,3%
Pais Vasco	1,0%	15,9%	19,4%	3,4%	30,1%	11,6%	8,0%	10,5%
Principado de Asturias	1,6%	12,5%	17,7%	5,1%	31,5%	11,6%	9,2%	10,7%
Region de Murcia	*4,7%*	*10,2%*	*14,3%*	*4,2%*	*33,3%*	*12,8%*	*8,8%*	*11,7%*
Average	*3,2%*	*11,1%*	*15,4%*	*4,3%*	*33,0%*	*13,2%*	*8,8%*	*11,0%*

Source: Eurostat

Table A.11 - Composition of R&D expenditures, 2000, million euro, Spanish Regions

	Total Expenditures	Firms	Government	Higher education	Non-profit
Spain	5.718.988	54%	16%	30%	1%
Andalucìa	542.156	33%	19%	48%	0%
Aragòn	134.169	56%	16%	27%	1%
Asturias	114.586	49%	13%	35%	2%
Cantabria	35.942	25%	22%	45%	8%
Castilla y Leòn	222.811	41%	8%	50%	0%
Castilla-La Mancha	118.578	64%	9%	26%	0%
Cataluna	1.262.168	67%	1%	24%	1%
Comunidad Valenciana	430.512	42%	9%	48%	0%
Extremadura	56.537	26%	23%	50%	0%
Galicia	209.457	3%	17%	50%	1%
Madrid	1.751.983	54%	27%	17%	1%
Murcia	104.216	43%	16%	40%	0%
Navarra	94.595	65%	2%	32%	0%
Pais Vasco	459.617	78%	3%	18%	1%
Rioja	27.377	61%	8%	31%	0%

Source. INE

Table A.12 - Ranking of the 15 largest companies in Castilla Y Leon, 2006

Ranking	Company	Sector	Turnover (M€)
1	Renault Espana	Automobile	7274
2	Nissan Motor Ibèrica	Automobile	3421,09
3	Iveco Espana	Automobile	2702
4	Ebro Puliva	Agro-food	2693,3
5	Michelin Espana Portugal	Automobile	2601
6	Grupo Antolin	Automobile	2189
7	Viajes Halcòn	Tourism	1129,65
8	Grupo Lenche Pascual	Agro-food	1057
9	Bridgestone Hispania	Automobile	990,75
10	Campofrìo Alimentaciòn (Grupo)	Agro-food	968,46
11	Grupo Vaka	Construction	717
12	Grupo El Arbol	Distribution	711,1
13	Grupo Begar	Construction	680
14	Europac	Stationery	525,6
15	GlaxoSmithkline	Pharmaceuticals	344,7

Source: Castilla y Leon Economica

Table A.13 - Distribution by province of R&D grants, Percentage, 2000 – 2004, Castilla Y Leon

Province	*grants*	*% of population*	*% of grants*	*difference*
Avila	369468,29	6,73%	1,32%	-5,41%
Burgos	4787511,17	14,68%	17,06%	2,37%
leon	3368523,47	19,58%	12,00%	-7,58%
Palencia	247484,16	6,77%	0,88%	-5,89%
salamanca	3239200,17	13,70%	11,54%	-2,16%
Segovia	917168,17	6,42%	3,27%	-3,15%
soria	931555,64	3,68%	3,32%	-0,36%
Valladolid	12985883,87	20,71%	46,27%	25,55%
Zamora	1219856,11	7,71%	4,35%	-3,37%
standard deviation	4.019.659	6,23%	14,32%	**10,04%**

Source: Mid Term evaluation OB1 Programme CYL

Table A.14 - Distribution by province of R&D grants, per mesure Percentage, 2000 – 2004, Castilla Y Leon

	% of population	*2.1 Tertiaty human capital*	*2.52 R&D projects*	*2.53 R&D equipments*	*2.7 information society*
avila	6,73%	0,00%	0,00%	0,00%	3,93%
burgos	14,68%	5,20%	22,66%	9,40%	16,32%
leon	19,58%	22,01%	11,38%	3,09%	16,70%
palencia	6,77%	0,00%	1,01%	0,00%	1,38%
salamanca	13,70%	36,22%	6,08%	0,00%	21,79%
segovia	6,42%	0,00%	2,20%	0,00%	7,01%
soria	3,68%	0,00%	2,11%	0,00%	7,28%
valladolid	20,71%	36,56%	52,62%	87,50%	15,04%
zamora	7,71%	0,00%	1,95%	0,00%	10,55%
total	100%	100,00%	100,00%	100,00%	100,00%

Source: Mid Term evaluation OB1 Programme CYL

Table A.15 - Ranking of the 15 largest companies in Murcia, 2006

Ranking	**Company**	**Sector**	**Turnover (M€)**
1	Reguladora de Compras del Mediterraneo	Pharmaceuticals (distribution)	1057
2	El pozo alimentacion	Agro-food	549
3	Sabic (General Electric Plastics)	Chemical – plastics	525
4	Garcia Carrion	Agro-food	445
5	Mivisa Envases	Metal packaging - Agro-food	431
6	Polaris Desarrollo	Tourism – Estates	274
7	Viajes Soltur	Tourism - tour operator	259
8	Hero Espanasa	Agro-food	225
9	La Torre Resort Development	Tourism – Estates	204
10	Fuertes Promociones	Commercial	163
11	Zamora Distribuciones de bebidas	Commercial (agro-food)	161
12	Huertas Motor SL	Commercial	152
13	Diego Zamora	Agro-food	150
14	Himoinsa	Electrical equipment	143
15	AMC Grupo de Alimentacion	Agro-food	134

Source: Axesor

Table A.16 - Distribution by city (municipality) of R&D grants, Percentage, 2006, Murcia

Municipalità	*grants*	*% of population*	*% of grants*	*difference*
ALCANTARILLA	425.721	4,3%	16,7%	12,4%
ARCHENA	115.750	1,9%	4,5%	2,7%
CARAVACA	78.670	2,9%	3,1%	0,2%
CARTAGENA	269.656	23,4%	10,6%	-12,8%
CIEZA	28.702	4,0%	1,1%	-2,9%
MOLINA DE SEGURA	361.085	6,2%	14,2%	7,9%
MURCIA	953.174	47,3%	37,4%	-9,9%
SAN JAVIER	13.761	2,9%	0,5%	-2,4%
TORRE PACHECO	171.762	3,2%	6,7%	3,6%
YECLA	129.762	3,9%	5,1%	1,2%
standard deviation	280.983	14,53%	11,03%	**7,55%**

Source: INFO Database