

## THE RÔLE OF INNOVATION IN REGIONAL COMPETITIVENESS

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**ABSTRACT** The paper reports on an eleven-region, European Union-funded research project on Regional Innovation Systems (RIS). The RIS concept is relatively new, though increasingly being used by academics and policy-makers to seek to fashion a new approach to regional policy in which innovation capabilities of regional firms and organisations are emphasised. The key research findings are that regions warranting the RIS designation are found in Europe, but that by no means all regions have functional, systemic innovation. Most firms' R&D activities in Europe are remarkably regionally and nationally focused. Direct effects of globalisation mainly affect large firms. Regions are also important for supply-chain relations and inter-firm co-operation. Innovation is nowadays seen as a core business activity for many firms because their customers demand higher quality products and services at lower cost. Despite this, much of the enterprise support infrastructure for small and medium-sized firms is not reaching them satisfactorily and is generally in need of overhaul.

### 1. INTRODUCTION

It is well-known that the European Union is anxious to encourage closure of the competitiveness gap with Japan and the USA (EC, 1994). A major part in the disparity between European competitiveness and that elsewhere concerns perceived innovation deficits (EC, 1995). These two are considered also to be of fundamental importance to the improvement of social cohesion (EC, 1996) since, it is presumed, better economic performance is associated with improved prospects for employment. The question of what kinds of innovation improve prospects for both competitiveness and cohesion is an important one. *A priori*, it seems likely that product innovation could improve both, since new products should mean a demand for new workers to produce them (Edquist, 1997). On the other hand, few existing products are unaffected by the advent of new ones, so the net effects of product innovation may be less positive for employment. Process innovations usually improve efficiency and may well be job-destroying. Both "lean production" and "business process re-engineering" have recently been criticised for this (MacIntosh and Francis, 1997). Yet, they may be premature judgements since Japanese process and organisation innovations in the past certainly generated substantial employment and at much higher incomes over the long term.

A problem in the past, however, has been that such growth, competitiveness and employment gains have tended to be geographically over-concentrated. This leads to the kinds of agglomeration diseconomies suffered by cities like Tokyo, prompting attempts to decentralise growth opportunities to other regions. But

when this has been stimulated by attempts to decentralise science and technology infrastructures, as in Japan and France, the results have often been disappointing. This is now understood as a failure of top-down, linear thinking about economic development processes. Increasingly, in a world of interactive learning and innovation, firms are seeking to become more 'embedded' in a regional milieu where they can build up close supplier, training and innovation links. This is because, more and more, they seek to externalise production and where this occurs, the regional economy where they locate becomes more specialised in not only the production but the soft infrastructural support aspects of business activity. As Krugman (1995) presents it, increases in intra-industry trade produce increasing returns to scale in a world of imperfect knowledge, and endogenous technical change reinforces a tendency to spatial monopoly. But the new kind of monopoly is more specialised than the universal monopoly that many large metropolitan centres used to enjoy. So regions have the capability to become specialist spatial monopolies. Global free-trade and the growing efforts of regional agencies and governments to promote the competitive advantage of 'their' region further reinforce these tendencies with respect to the attraction of Foreign Direct Investment (FDI).

If this theory is true (and we have to accept that it may not be) then its implications for regions are profound. From being a *tabula rasa* on which are inscribed the results of past resource-based business decisions, decentralisation effects of central government decisions, and the decisions of both indigenous smaller firms and indigenous or FDI large firms, the region now becomes a proactive space in which all of its assets are mobilised to try to secure regional economic competitiveness. Thus the building up of a strong cultural offer, the integration of universities with industrial requirements and the focused training of young people and older unemployed people to fit into the new occupational needs of firms becomes more pronounced. Competitiveness as a regional attribute becomes a product of systemic interaction between diverse players who must be 'associative', 'networking' and consensus-minded. At the heart of this is the desire, if not the imperative, to be seen as innovative and supportive of innovation by firms and other organisations. To what extent can regions really achieve this?

In this paper, the results of a large-scale EU-funded research project on 'Regional Innovation Systems' will be summarised and an attempt made to judge the degree to which diverse European regions match up to the theory and practice of '*the new regionalism*' (see also Cooke et.al, 1999). The research examined nine EU regions and two from Central and Eastern Europe and sought to find out the extent to which the competitiveness of regions was related to their degree of systemic innovation capability. Some surprising results ensued from the studies, both in terms of the competitive posture of European firms and their culture of innovation. Certain of these results suggest reasons for a relatively weak innovative capacity amongst European firms. Amongst the stronger findings was the conclusion that where regional governances are weak or passive, associativeness tends to be low. Yet the capability of firms to solve innovation

problems internally is also low while their willingness to engage in cooperative solutions is high, but frustrated. The paper proceeds by examining competitiveness problems of regional firms in the study, followed by exploration of innovation problems. The conclusion is preceded by a section on policy-issues for regions.

## **2. REGIONAL COMPETITIVENESS IN EUROPE**

Regional competitiveness is a concept with 'double articulation' in the sense that regions can be competitive on a 'low road' trajectory if they have low factor costs and 'good business climates', including low environmental, trade union and building regulation. Alternatively, they can be competitive on a 'high-road' trajectory of high skills, incomes, value-added, government enterprise support, innovativeness, infrastructural and general economic efficiency. While we presume that competitiveness of the second kind is the type most favoured in the EU, we must recognise that there are regions whose characteristics approximate more to the first category within the EU. A key problem for them is that there are regions and countries elsewhere in the world, and nearby in Central and Eastern Europe, which are even better-equipped to offer 'low road' investment opportunities, so that option is not a particularly good one for the EU's less favoured regions (LFRs) to pursue in any case. The Structural and Cohesion Funds<sup>1</sup> and associated regional policies of the EU correctly recognise this fact.

In any case, it has already been noted in the introduction that 'the new regionalism' is a matter of recognising and acting upon the theory that modern, competitive economic development rests increasingly upon the capability of regions to offer significant opportunities for firms both large and small, indigenous and FDI, to gain from the external economies of embeddedness, mutual learning and opportunities for interactive innovation<sup>2</sup>. This places responsibility upon regional governance organisations to be 'intelligent' with respect to their knowledge and information services, 'evaluative' with respect to understanding the fit between policies and objectives and to have a 'monitoring' disposition towards the overall performance of the regional economy (Cooke and Morgan, 1998). The debate within Regional Policy DG16 of the EU, about whether the new regionalism should be matched by a 'new regional policy' which promotes innovativeness is an interesting reflection of processes of economic evolution (Landabaso, 1997).

But whether or not Structural Funds could usefully be used to promote and fund a greater emphasis upon the fashioning of 'soft infrastructures' in the way, in the past, they have been used to develop 'hard infrastructures' like roads and other basic facilities, depends to some extent, on the evidence that regions in the EU are meaningful economic entities with which policy of this more sophisticated type can sensibly interact and find some purchase.

One way of approaching this is to survey firms in EU regions to find out the nature and extent of firms' attachments to the region in which they find themselves. In the 'Regional Innovation Systems' study firms in the EU regions

demonstrated rather high functional and trading relationships within their region and member-state, as well as variable, but not insignificant interaction within the region for competitiveness-enhancing services and support associated with innovation.

The regions studied were representative of four conceptually derived categories (five with the transition economies of F  jer in Hungary and Lower Silesia in Poland). For most of the paper we will focus on the EU regions, drawing the transitional ones in for relevant illustrative purposes:

- Category 1 - High Performance Engineering  
Southeast Brabant; Baden-W  rttemberg,
- Category 2 - Reconversion with Upstream Innovation Emphasis  
Styria; Tampere,
- Category 3 - Reconversion with Downstream Innovation Emphasis  
Basque Country; Wallonia; Wales
- Category 4 - Regions with Industrial Districts  
Friuli; Centro.

The upstream-downstream distinction for reconversion regions signifies whether major interaction by firms looking to become more competitive with innovation support occurs upstream towards knowledge-centres, or downstream towards the market via customer demand. The industrial sectors (sometimes also 'clusters' in the Porter, 1990, sense) focused upon were mostly in manufacturing industry or services closely linked to manufacturing. This was because most innovation support tends to be directed towards manufacturing because it continues to play a key r  le in GDP exports even though it mostly plays a lesser r  le in employment.

If we look first at the decision autonomy of multiplant firms within their region for R&D (a very high order business function), the origin and destination of inputs and outputs, the location of their main competitors and the location of firms with whom a cooperative partnership on any aspect of business functions is to be found, we find that regional focus is rather pronounced for key business activities (Table 1). It is generally the case, where data permit, to observe that the stronger regional economies such as Brabant and Baden-W  rttemberg more generally have a regional business focus at a reasonably high level across more business practices (or perceptions, in the case of recognition of where main competitors are) than the reconversion or industrial district regions. Anomalies occur, of course, such as Brabant's lower R&D than most other regions and the Basque Country's higher than normal regional economic introversion, not unconnected with its industrial and political history. Moreover, relatively high scores for conducting R&D by regional firms need to be treated with caution since they register - for those firms that conduct R&D, the proportion that conduct it in the region, rather than representing the proportion of R&D being conducted by all firms in the selected

sectors or clusters. Finally, the interpretation of R&D developed from follow-up interviews with representative firms suggests strongly that much of it is, of course, incremental development work rather than applied research, particularly in the industrial districts. Many qualifications! However, there are less with respect to the other indicators and what we see are far from negligible regional interactions for firms in key manufacturing industries, even in economies that have suffered from problems in their traditional industries. This should not surprise us since, not least, the majority of firms interviewed comprise small and medium enterprises for whom regional and national markets still reign supreme. Nevertheless, many of these are in supply-chain relationships to larger firms and, in turn, these are likely to be engaged in larger-scale competitive struggles. So global forces can react back significantly upon smaller, more regionally focused producers.

It is in this respect that the competitiveness judgements and perceptions of surveyed firms across a wide variety of regional and member-state settings are so revealing, especially considering also the variety of manufacturing sectors to which they belong. In Table 2 a summary of firms' views of their competitive advantage, how they plan to sustain it, the competitive advantage of their main competitors, and their response to that competitive challenge reveals the nature and apparent universality of the current 'drivers' of competition and the force

**Table 1.** Percentage of Multiplant Firms in Key Manufacturing Sectors Reporting Regional Business Focus

Region	R&D Conducted (%)	Inputs Purchased	Outputs Sold	Main Competitors	Main Cooperations
<i>High Performance</i>					
<i>Engineering</i>					
SE Brabant	28	38	35	42	NA
Baden-Württemberg	83	44	28	65	49
<i>Reconversion (Upstream)</i>					
Styria	50	21	19	27	47
Tampere	33	28	26	30	44
<i>Reconversion (Downstream)</i>					
Basque C.	58	52	28	40	59
Wallonia	34	26	25	21	30
Wales	47	22	20	21	32
<i>Industrial Districts*</i>					
Friuli	27	22	12	45	40
Centro	55	18	17	18	39

\* All Firms

Source: REGIS Survey Data<sup>3</sup>

**Table 2.** Main\* Competitiveness Practices and Challenges of Regional Firms (1996)

Region	Main Competitive Advantage		Sustain Competitive Advantage		Competitive Challenge		Competitive Response	
<i>High Performance</i>								
<i>Engineering</i>								
SE Brabant	Quality	(89%)	Skills	(94%)	Quality	(72%)	Cut Cost	(68%)
Baden Württemberg	Innovation	(86%)	R&D	(68%)	Price	(77%)	Cut Cost	(74%)
<i>Reconversion (Upstream)</i>								
Styria	Quality	(82%)	Skills	(70%)	Price	(76%)	Cut Cost	(62%)
Tampere	Quality	(78%)	Skills	(83%)	Quality	(59%)	Organisation	(57%)
<i>Reconversion (Downstream)</i>								
Basque Country	Delivery Time	(50%)	R&D	(39%)	Price	(63%)	Cut Cost	(58%)
Wallonia	Quality	(73%)	Skills	(87%)	Price	(70%)	Cut Cost	(69%)
Wales	Quality	(84%)	Skills	(70%)	Price	(70%)	Organisation	(61%)
<i>Industrial Districts</i>								
Friuli	Quality	(86%)	Skills	(67%)	Price	(75%)	Organisation	(53%)
Centro	Quality	(89%)	Organisation	(65%)	Quality	(74%)	Cut Cost	(62%)

\* Likert Scale 4-5 Responses

behind the imperative to innovate. We see, very clearly, a broad statement of the nature of competition within the EU. Most firms rank "quality" as the main selling point or competitive advantage with which they face the market. Even in Baden-Württemberg and the Basque Country where "innovativeness" and "delivery time" score highest, "quality" ranks a close second. Most firms then rank "skills" (and knowledge levels of their labour force) as the most important strategy to develop in order to sustain their present competitive advantage. Where improving internal R&D or firm organisation comes first, most regional firms rank skills enhancement second or third in importance, ahead of patenting, marketing, inter-firm cooperation or support of other institutions. Hence human capital is ranked above social capital in the struggle by firms to retain competitive advantage.

However, when we examine what firms perceive to be the main competitive challenge they presently face, we see that price-competition generally comes first. Where it is transcended by quality-competition, price-competition ranks a close second in all three regions. There is a noticeable unanimity in the proportion of surveyed firms placing price-competition first (mostly 70%-77%). But there is also unanimity for firms assailed by price as a competitive weapon regarding what ranks next most importantly. In the majority of cases quality is the next most highly ranked variable.

Finally, how do firms propose to respond to the price and quality threats of

their competitors? Mainly it is to “cut costs”. Even for those regions where firms stress the primacy of initiating “organisational change” in the firm, they usually place cost-cutting as the second priority. The other expressed intentions scoring relatively highly are to intensify internal R&D and “speed-up product development” in more or less equal measure.

Hence, the “drivers” of innovation are the twin imperatives of raising the quality of products or processes produced and lowering their costs. To maintain quality, firms recognise the centrality of enhancing human capital, yet in the face of cost-cutting by competition, firms in a considerable variety of EU regions propose - inevitably - cost-cutting but also some improvement in business organisation and, to some extent, further investment in R&D. Two additional things should be noted at this point. First, most of the firms in the survey are SMEs, many in supply-chain relationships with customers who are demanding quality and cost improvement as condition of supply contracts. Second, firms internalise the quest for innovativeness to a very high degree, ranking cooperation with others as a solution relatively low in their hierarchy of imperatives.

Results for the two Central European regions involved in the study are quite similar to those for regions in the EU. Thus, in F  j  r region in Hungary, located west of Budapest, “quality” (70%) just outscores “time of delivery” (68%) as the highest ranked competitive advantage. In both cases “skills” is the key mechanism for sustaining competitive advantage, at 68% in F  j  r and 86% in Lower Silesia, followed by “innovativeness” and “marketing” respectively. The main competitive challenge in F  j  r is “price competition” (78%) followed by “requirement of increasing product quality” (71%), while in Lower Silesia it is “price competition” (72%) first, followed by “organisational restructuring” (54%, F  j  r; 60% Lower Silesia).

### 3. INNOVATION PRACTICES OF EUROPEAN FIRMS

Firms were asked a battery of questions about innovation. First, the question of organisational innovation was put in an attempt to ascertain the extent to which modern management techniques such as Total Quality Management (TQM), Group or Team Working and System or Modular Supply (as distinct from discrete parts or components supply) were practised. Thereafter, with a view to seeking information which would indicate the nature and extent of *interaction* regarding innovation, questions were put concerning sources of innovation knowledge and information and main partners in innovation. Questions were also asked about R&D expenditure as a percentage of turnover and staff in the knowledge that while R&D statistics do not necessarily measure innovation, they do indicate an important commitment to innovation on the input side. Firms were asked to state their product and process innovations, new to the market and new to the firm, and also to identify the main constraints experienced in pursuing innovation aims.

Regarding organisational innovation, first, it is interesting to note that *team-work* is the most widely-introduced organisational innovation, though only just over half the sample had introduced it, yet it has been more or less equally spread

**Table 3.** The Six Most Common Organisational Innovations of Regional Firms in Europe

Region	Organisational Innovation (% of Firms)						Total
	ISO 9000	Team Work	Total Quality Management	IT Systems	'Just In Time'	Flat Hierarchy	
<i>High Performance Engineering</i>							
SE Brabant	24	57	46	24	40	51	40
Baden-Württemberg	68	49	51	25	24	73	48
<i>Reconversion (Upstream)</i>							
Styria	60	59	36	51	37	71	52
Tampere	52	54	39	67	28	45	47
<i>Reconversion (Downstream)</i>							
Basque C.	69	54	59	60	43	11	49
Wallonia	54	53	59	25	68	11	45
Wales	70	28	51	60	45	33	48
<i>Industrial Districts</i>							
Friuli	42	62	59	63	53	49	55
Centro	54	47	65	30	33	28	43
<i>Transitional Regions</i>							
Féjer	44	59	25	43	21	32	37
Lower Silesia	18	46	40	42	58	28	39
<i>Total</i>	50	52	46	45	41	39	46

across the regions despite their varying economic situations. Secondly, *quality*-oriented organisational innovations such as ISO9000 and TQM have been introduced to a nearly equivalent degree to team-work, reinforcing the widespread claim that *quality* is seen as the main competitive advantage. Moreover, TQM is most-widely practised in the regions which probably have more market-driven supplier relationships with major customer firms, e.g. the “downstream reconversion” and “industrial district” regions. And thirdly, there tends to be a rather sharp decline in the adoption of “flattened hierarchies”, a fairly sophisticated management tool, outside the “high-performance engineering” and “upstream reconversion” regions (with the exception of Friuli) suggesting, perhaps, cost-cutting by reducing management hierarchies has proceeded further in the higher labour-cost regions. Regarding organisational innovations with low uptake, the weakest, on average, “system supply” was only practised by 21% of



**Table 4.** The Four Most Important Sources of Innovation Information.

Region	Journals	Conferences, Fairs, Exhibitions	Customers	Suppliers	Total
<i>High Performance</i>					
<i>Engineering</i>					
SE Brabant	28	23	48	24	31
Baden-Württemberg	52	71	71	26	55
<i>Reconversion (Upstream)</i>					
Styria	55	57	55	50	54
Tampere	19	25	29	17	23
<i>Reconversion (Downstream)</i>					
Basque C.	20	40	44	25	32
Wallonia	22	27	16	20	21
Wales	51	42	46	39	45
<i>Industrial Districts</i>					
Friuli	23	29	23	23	25
Centro	38	66	31	35	43
<i>Transitional Regions</i>					
Féjer	30	35	51	34	38
Lower Silesia	88	85	61	55	72
<i>Total</i>	39	46	43	32	40

firms, the “industrial districts” regions being exceptions with 45% (also Lower Silesia). Just-in-Time sourcing is an organisational innovation for 41% of firms and its incidence is regionally quite variable. If anything it is practised most in weaker economies, suggesting they see a need most clearly, while stronger regions already have satisfactory supply chains established over a lengthy period. Other generally weakly-practised organisational innovations were “interdisciplinary design” (simultaneous or concurrent engineering) at 22% and “interorganisational networking”, also 22% though, again, Friuli and Centro were higher than many on these “associative” practices.

Moving to *sources* of the awareness amongst firms of innovation information, the top four sources are as presented in Table 4.

With respect to the testing of systemic interaction in the quest for sources of information concerning innovation, it is evident that the German and Austrian regions are in some ways open to public domain sources such as journals, conferences etc. but also rather closed in their scope of sources with respect to firms. Both are rather heavily reliant on their customers for innovation information, though rather less on their suppliers. Styria is the region in the EU with most dependence on supplier-firms for innovation information (except Lower Silesia, which is astonishingly high, for unexplained reasons, on all dimensions). There is no strong regional pattern, regions in the same category often performing

very differently in respect of acquisition of innovation information. The strong conclusion here, echoed in comparable surveys, is that firms learn most from other firms with whom they interact in market transactions involving innovation and its associated information exchange. If we add in other possible sources such as; consultants, industry associations, technology transfer centres, universities and other educational bodies, most regions score mainly in single figures, i.e. very low percentages of regional firms learn from these sources. The slight exceptions are industry associations in Brabant, BW, Wales and Centro, and universities in Styria and Wales where learning at twice the average rate is registered. Mainly, though, the "soft infrastructure" of innovation support is weakly used for interactive innovation compared to journals, conferences/fairs/exhibitions and firms in the supply chain.

Further investigation of more systemic linkage in the innovation process revealed very convergent results. In every region the main innovation partner is usually the customer firm, with supplier firms second. This ranking is reversed only for Wallonia, Friuli and Centro. At third place are universities and consultants equally. There is no evident pattern, in terms of regional economic character, in these third-choice partners. What is slightly surprising is the appearance of consultants, given their low average visibility as sources of innovation information. This may be interpreted to mean firms use consultants for expertise in problem-solving rather than as sources of innovation ideas. The geographical location of customer and supplier partners in innovation is predominantly national followed by European Union-based and regionally based. The use of universities tends to be regional then national and consultants regional. Thus, a picture is reinforced of regional firms operating primarily on a regional or national scale with respect to inter-firm relations in rather the same way that they do with respect to inputs and outputs (Table 1). The lesser use of innovation partners regionally contrasts with the higher levels of interaction with regional partners for non-innovation activities, as shown also in Table 1.

Although R&D expenditure is a poor measure of innovativeness, it is, as already noted, an indicator of commitment to an annual input of investment of relevance to possible future innovation. In the regional firms surveyed and for the mainly manufacturing sectors focused upon, the overall average R&D investment for 1995 was 3.9% of firm turnover, while the range was from 10% in the Basque Country to 0.1% in South East Brabant. In the first Community Innovation Survey (CIS) of "innovation intensities" measured by current and capital expenditures on innovation activity as a proportion of turnover of firms in Norway and ten EU member states in 1992, the average was 7.2%, ranging from 10% in firms employing less than 50 persons to 4.5% in firms employing more than 499. Three things may account for this; first, regional sectors were more representative of low and medium - technology industries (most of the nine EU regions are recipients of Structural Funds); second, response rates were better from medium or larger firms (certainly true in the "industrial districts" regions) who spend a lower share of turnover on R&D. Finally, we also have the CEE regions in the survey, and they

lower the average considerably.

Hence, we are discussing what may be a more representative picture of European innovation capacity than that presented in the CIS data. Anyway, the regions in question mostly tend to be those with problems of reconversion and development and are therefore the kind of economies specifically targeted by EU Structural Funds and Regional Policies. Given this, it is important to establish the extent to which firms in such regions have innovation potential and what their practices are in seeking to realise that potential. On some of the chosen indicators, we are again able to compare with CIS survey data. Firms were asked had they introduced products and processes new to the firm and new to the market between 1993 and 1996. It is normal practice to ask if a firm's innovation is new to the market because if it is only new to the firm it may be an imitation rather than an innovation in product or process. The results are presented in Table 5. They show three key things. First, product innovation inside regional firms is rather high in most EU regions and the two Central and Eastern European (CEE) regions, but product innovations new to the market are much lower, only about two-thirds reach the market. The figure of 44% of firms introducing product innovations new to the market 1993-96 is similar to that found in the CIS Study 1990-92 where 48% of firms in seven EU countries reported new products in sales. Thus an

**Table 5.** Product and Process Innovations 1993-6 and CIS Comparison.

Region	Innovation (% of Regional Firms)			
	Product	New to Market	Process	New to Market
<i>High Performance Engineering</i>				
SE Brabant	36	17	28	8
Baden-Württemberg	79	63	39	13
<i>Reconversion (Upstream)</i>				
Styria	67	48	44	21
Tampere	76	44	51	43
<i>Reconversion (Downstream)</i>				
Basque C.	66	26	52	12
Wallonia	74	43	41	17
Wales	64	45	52	20
<i>Industrial Districts</i>				
Friuli	80	51	76	26
Centro	83	52	74	26
<i>Transitional Regions</i>				
Féjer	59	40	51	19
Lower Silesia	58	55	47	43
<i>Totals</i>				
EU-CIS 1990-92	67	44	50	23
(New Products in Sales)	NA	48	NA	NA

average statistic of around 46% of firms being product innovators seems a sound one. Second, process innovations are less common, though an average of 50% of regional firms reported them. However, less than half of these firms (23% on average) take their process innovations to the market. The “industrial district” regions tend to be the more innovative regarding processes new to the market while Baden-Württemberg is the most innovative with respect to placing new products on the market.

Third, clearly, European firms engage in a considerable amount of innovative activity which does not result in a return on investment made, at least in direct terms. However, it appears, on the basis of face-to-face interviews with a representative sample of regional firms that much unsold process innovation occurs in order to achieve product innovation. Indeed, the two often go hand-in-hand.

A representative sample of regional firms was further interrogated regarding the constraints or barriers they experienced in seeking to produce innovations. As can be seen from Table 6, which lists only the five most frequently cited constraints on average across the regions, “funding” comes first, marginally ahead of “management time” and the “costs of research personnel”, followed by lack of appropriate “skills” and “know-how”. Unimportant factors are “market information”, “finding sources of know-how” and “finding specialists” to assist in innovation activities. Thus firms are hampered by internal rather than external factors in the main. These devolve into funding and costs of personnel, management time, skills availability, and know-how issues. These results are not inconsistent with those of the CIS findings, though, there, the magnitude of the barrier constituted by inadequate finance is much higher. But if “funding” and “costs of research personnel” are combined, the financial barriers to innovation are much closer (59% compared to 55%). “Management time” and “skills” together also come close to the CIS “competence” barrier (42% compared to 36% on average). Variations between the regional categories show the “reconversion” regions having the higher “know-how” barriers and the “transitional regions” the higher “funding” constraints on innovation.

Finally, firms were asked about cooperation in relation to innovation. The key hypothesis here is that cooperation between firms and among them and various elements of the innovation support infrastructure are signs of systemic product and process innovation, a factor that is reinforced to the extent such cooperation is strongly regional, or (from a national innovation systems perspective) national. The results of responses to this question strongly confirmed those in Table 4 concerning cooperation partners for innovation information sources. Here are some key findings:

- Baden-Württemberg is entirely distinctive in the intensity of its firms’ innovation cooperations with *customer* firms at regional level (80% of respondent firms having such links), national level (84%), EU-level (65%) and with the rest of the world (39%). Brabant firms have their main innovation partnerships at regional level with *technology-transfer* agencies (40% of firms

have such links), at national level contract research organisations (13%), at EU level, universities (7%) and they have no rest of the world innovation partnerships. Surveyed Brabant firms are all SMEs.

- Upstream reconversion regions have their strongest innovation partnerships with national *customers* (Styria, 72%; Tampere 66%) followed by regional customers (Styria, 54%; Tampere 37%) and thereafter EU customers (Styria, 20%; Tampere, 39%) and rest of the world customers (Styria, 11%, Tampere, 22%).
- Downstream reconversion regions have their strongest interactions with national *customers* and *suppliers* (average 42% of firms) followed by EU customers and suppliers (average 35%) followed by global customers (average 19% of firms). But their strongest innovation partnerships at regional level (mentioned by 44% of firms on average) are with government agencies for grants and technology-transfer services.

**Table 6.** Constraints on Innovation, 1996 and CIS Comparison.

Region	Innovation Constraint (% of Firms Stating)				
	Funding	Know-How	Management Time	Skills	Research Personnel Costs
<i>High Performance</i>					
<i>Engineering</i>					
SE Brabant	27	10	39	12	20
Baden-Württemberg	25	9	17	20	40
<i>Reconversion (Upstream)</i>					
Styria	40	26	38	19	40
Tampere	21	18	30	13	19
<i>Reconversion (Downstream)</i>					
Basque C.	29	15	21	15	18
Wallonia	40	11	26	25	13
Wales	18	18	35	31	17
<i>Industrial Districts</i>					
Friuli	18	7	14	16	20
Centro	26	16	9	21	26
<i>Transitional Regions</i>					
Féjer	48	9	10	13	39
Lower Silesia	78	9	16	20	24
<i>Totals</i>	34	13	23	19	25
		(Information)	(Competence)		
EU-CIS 1990-92	55	27	36		NA

- The “industrial district” regions have their main innovation cooperations with national (45%) and EU (40%) *customers* and suppliers, as at a lower intensity with the rest of the world customers and suppliers (15%). At regional level 23% of firms have innovation links with customers or suppliers.
- In the “transitional regions”, customers and suppliers again dominate, 67% of Lower Silesian firms engage in innovation partnerships with customer firms, made up of 32% regional, 21% national, 12% EU and 2% in the rest of the world. Féjér region has a comparable pattern but, due to the strong presence of foreign multinationals, 24% of innovation interactions are global customers, 50% are EU and 70% of firms have both regional and national innovation partnerships.

Although the CIS data do not differentiate the spatial level of cooperations engaged in by product innovators, it is striking that for eight EU member-states plus Norway the average share of products obtained with technical cooperation with external partners by companies innovating in 1992 was 71%. It is noted that in most EU countries incremental innovation involving technical cooperation with an external partner accounts for a large share of sales. Our results suggest such partnerships are overwhelmingly with customer, and to a lesser extent, supplier firms and that the type of region mainly affects whether or not such partnership is mainly national or regional, and in the latter case, whether it is a public partner or not.

When firms do have interactions with the public innovation infrastructure, something most in fact do engage in for innovation purposes, though not as a priority, the most commonly cited partner is the regional university system, closely followed by the national universities. Other regularly used services are those of regional, and to a much lesser extent, national technology centres or transfer agencies and venture capital sources at, first, national then regional level. Contract research organisations at national then regional level are also quite widely engaged in support of firms’ innovation activities.

When firms were further asked about the impact of using such services on their capability, the most common response from firms in all regions is that it “speeds up the product development process” and “enlarges the firm’s technological base.” Less important impacts were those on skills, and collaboration with other firms or encouragement of wider collaboration with R&D centres. Once again, firms use such services for internalised solutions to problems arising in the course of conducting their own business activities. If firms were not participating in publicly-funded research projects or, more generally, interacting with the innovation infrastructure, it is typically because of “no need to”, “internal solutions adequate”, “lack of information about services” or “bureaucratic application processes.” Cost was not usually a major consideration nor was “risk of losing know-how”, though “quality of services on offer” was a relatively important reason for not using the services of innovation organisations. These findings were broadly common for all types of region, though the ability to access information of a technical nature was a key reason for using services in the less

accomplished regional economies.

#### **4. POLICY ISSUES FOR REGIONS**

The portrayal of competitiveness and the rôle of innovation in promoting it in European regions is remarkably clear. European firms, in general, compete on quality while they are competed against on cost. As unbiased observers, we must temper this rather paranoid view by adding that since most of the cost-competitors are European they must also be competing on quality too! But moving beyond the therapeutic level to that of treatment, in what ways can a rôle for policy be identified, assuming that policy has any justification in any case? There is justification for policy support for regional firms in Europe, not least because they both report and reveal the effects of market-failure regarding innovation and competition. They report it when they say "funding", "management time", "skills" and "personnel costs" are constraints on innovation. They reveal it when, in a collective way, they show lack of competitiveness, innovativeness and job-generation capacity when compared with the USA and Japan. But they do so, more specifically, when they state that their customer or even supplier is the main source of the information they draw on for innovation. Similarly the difference between innovations and innovations new to the market is revealing. Also a tendency towards introversion with respect to innovation activity, echoing a strong sense that firms believe they can solve their own problems. suggests they are price-takers from customer-orders rather than market-makers.

If European firms appear timid, then the organisations that apparently exist to help them innovate and become more competitive do very little to reduce their fears. Clearly, these organisations, into which substantial amounts of funding have been invested to employ significant numbers of public and private "consultants", are not working. They are fragmented, overlapping, confusing, bureaucratic, and, perhaps worst of all, perceived to be insufficiently skilled and expert to meet firms needs. This is not surprising. Such organisations are new, inexperienced, their staff are often untrained in innovation support, they do not have much real responsibility or control of budgets and they can only ever work with a few, favoured firms. They, mainly, do not even have the resources or the incentives to find out from their market what its real needs or experiences of market-failure in fact are. The very recently introduced and very thinly spread EU support for Regional Innovation Strategies recognises this but does not enable those regions fortunate enough to secure such projects to do very much to implement funded solutions to problems identified. Let us be clear here — without EU thinking and pilot project funding there would be almost no innovation-related enterprise support in less favoured regions. The need, therefore, is not to destroy the relatively little good that comes from such efforts but to build upon them in a major way and make sure that funding is available from regional, national and EU levels to finance policies that meet actual firm needs.

This means radical change in regional innovation support funding. In a recent book, we argued that large firms should cease to be the main recipients of EU

Framework Funding (Cooke & Morgan, 1998). This was because, in cases like Olivetti and Bull, both of whom have been major recipients, the money was wasted and for Siemens, it is a drop in the ocean compared to their vast internal R&D budgets. Further, we argued, backed by studies such as that of Malerba (1993), that large firms who are major recipients of national R&D funding from the public purse, may not be innovators while those that receive nothing, at least in Italy, are both SMEs and modest innovators. Finally, supported by work such as that of Edquist (1997) we said that large firms who receive public R&D funding, are often in declining sectors, so even if they innovate, the impact will be negligible. Regions cannot change this waste of resources themselves, but they are the main, strategic level of governance in close touch with SMEs. The most important actor who can change the present, massive imbalance is the EU itself. This is because, unlike most, member-states, the EU recognises regional innovation as an important issue and funds various programme in support of that view. The problem is that it mainly gives money for R&D to large firms who do not need it or cannot make use of it for serious innovation efforts.

So, starting at the EU level, future funding for science and technology should be allocated, through a competitive bidding process, to networks of firms, mainly small, supported by, mainly, universities, research institutes or highly-rated (by firms) technological centres. A large firm that can show its involvement in the network is relevant or whose presence in the network is demanded by SMEs may be a network-member and recipient of an appropriate share of the project funding. Networks of firms must show they have already experienced collaboration, rather than simply coming into existence for the purpose of bidding. In this way funding will go to those who most need it and who are likely to contain the most innovative potential. By encouraging firms into a more cooperative stance they will be made more efficient because of learning gains from each other thus reducing the need for them to keep on wasting resources by constantly “re-inventing the wheel”. Maybe it will help them get more objective innovation information than they now rely on from their “closed system” of main customer and suppliers. Universities are the most used support element in many regions and their involvement will help force them to become more relevant to the wider community in at least some of their research activities.

But what of the regional governmental level? We have seen how, in a remarkably straightforward way, substantial R&D resources can be diverted to those who can make most use of them. There are plenty of things that can be done and done better to help, but again the EU is potentially very important — more so than many member-states — as an *animator*. One of the most useful starting points is to conduct a Regional Innovation Strategy (RIS) project. Regions often wait to be given the idea and opportunity of funding to do such a thing, but why? These are not particularly expensive exercises, regions could easily fund them themselves, and some, like the Basque Country, have already done some of the strategic innovation analysis involved in RIS-type work, three times at least. But the problem is that the performance of RIS is only a beginning. It tells you what



innovation assets the region and its firms possess, it enables the regional authorities to bring actors together and develop a consensus on future strategy, it even enables concrete projects to solve existing problems or meet present needs to be designed. But can they be implemented?

One way they can be for less-favoured regions (LFRs) is for RIS outputs to be "mainstreamed" into Objective 1, 2 and 3 Single Programming Documents for future regional bids for Structural Funds<sup>4</sup>. This should be the EU's "new regional policy" approach. The EU is correct in shifting, or seeking to shift, its infrastructural spending in the 15 member-states towards innovative "soft" infrastructure such as enterprise and innovation support and away from road-building and other "hard" infrastructure expenditure. This recognises the gravity of the innovation gap in Europe and tries to help remedy it. This can be done without RISs, of course, but it is better for such programme bids to be coherent and well-informed as well as supported by a regional consensus. The key thing is for the EU to make it clear to LFRs that they want RIS-type analysis and ensuing project-proposals to be contained in requests for Structural Funds from 1999 onwards.

Some of the kind of things such funding could be spent on would be aimed at assisting firms overcome major constraints on innovation they currently experience. All have some kind of difficulty in accessing investment capital to develop innovation, so a major element should be the establishment of regional venture capital funds and networks (for example, networks of "business angels"). Firms continue to lack "know-how", so clearly both the market and the enterprise support systems at regional level are failing. Much more market-focused research needs to be done on this in an ongoing, repetitive way and solutions to know-how problems found. Skills shortages are a major problem. For instance Europe is short of about 2.5 million software programmers. There are many other technical skills shortages. EU-funding linked to national and regional programmes targeted on this are vital. Management has insufficient time to focus on innovation. Why not relieve management of the burden of trying to do too many things inadequately, and subsidise (for one or two years) "Innovation Assistants" in SMEs, to arrange the better coordination and networking focus that innovation requires. Germany, the Netherlands and parts of the UK such as Wales have experience of the successful operation of such a scheme, sometimes called "SME Graduates", in which case the problem of graduate unemployment is also moderated.

This is just a taste of thinking and action that can flow from taking a more systemic, regional view of the innovation question. From pursuing a new regional policy which places SMEs and knowledge-centres at the heart of the innovation process, the EU and the regions together can make major steps in meeting expressed needs.

## 5. CONCLUSIONS

There are three key points that emerge from this account of innovation and competitiveness amongst firms in diverse parts of Europe. The first of these is that, despite the hype about "globalisation", most European firms spend most of their time and energy operating mainly on regional and national markets. Regions, in particular, are rather important (to between 27% and 83% of EU manufacturers) for R&D-related matters. They are also, to a rather lesser extent, important for sourcing of inputs for production, but the national level is more important for sales of outputs. Finally, and crucially, in an age of interactive innovation, regions are significant as the sites of main cooperative activities between firms. So the regional level is most important for innovation and both competitive and cooperative input-related interaction. We may say the region is the heart of interactive innovation.

Second, firms innovate because to compete they must produce higher quality at less cost. This is the universal story. Firms are forced to innovate whether or not they want to, in order to produce better things more cheaply. This is why such high figures are recorded for the proportions of innovative firms. But much of this effort is wasteful and firms are both too introverted and dependent on the customer or supplier for ideas. They need to be brought out into the open much more.

Finally, the organisations that exist to help firms innovate are failing to do so. They are not used and not respected by firms because they do not meet their needs or help them to identify their needs. The whole regional innovation and enterprise support system is in need of serious overhaul with re-focusing from the EU, regarding Framework and Structural Funding and more innovative thinking and action on innovation from the regions.

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## END NOTES

- <sup>1</sup> The EU has two kinds of fund to assist lagging economies. The Structural Funds are allocated in response to strategic plans for less favoured *regions* (such as those experiencing the decline of heavy industry) in any of the member-states. The Cohesion Funds are allocated to the poorest *countries* such as Greece, Spain, Ireland and Portugal for inclusion in national development plans.
- <sup>2</sup> The term 'region' has a long history of contestation in geography and regional science. In the EU it means the level of government between local and national. A clear majority of EU member-states have regional government. In some cases these units coincide with historic culture regions, like Catalonia in Spain, Brittany in France or Sardinia in Italy, though (except for islands) the modern boundaries may not coincide exactly with *longue durée* cultural areas. However, the key point from a policy angle rather than a point of view which seeks to identify the spatial extent of a specific cultural (or, perhaps, also economic) sphere of influence, is that some degree of delegated or devolved power to make strategic policy interventions at the meso-level exists and can be activated, to some extent distinctively from local, national or neighbouring regional policy interventions.
- <sup>3</sup> REGIS is the acronym for a large research project coordinated by the author and funded by the EU's 'Targeted Socio-Economic Research' programme. Eleven regions were studied in depth, though the quality of data for some variables was sub-optimal in the two Central and Eastern European regions and Portugal. A postal survey of firms in key sectors of each regional economy was administered (approximately 300 firms of all sizes overall response rate 34% per region). Follow-up interviews were conducted with a representative sample of firms in each region. Interviews were conducted with up to twenty innovation support organisations per region. Firms were asked about the nature and extent of innovation, in relation to competitiveness and cooperation with other firms and organisations. Innovation support organisations were interrogated about their innovation policies, their cooperations and their perceptions of firm and agency practices. Both kinds of respondent were interrogated at length about the extent to which innovation could be said to be regionally systemic.
- <sup>4</sup> Allocation of Structural Funds for regional development varies in accordance with the depth of economic weakness. From 2000 onwards there are three categories: Objective 1 means average GDP in the defined problem area is less than 75% of the EU mean; Objective 2 means regions have higher than average unemployment and need for industrial reconversion; Objective 3 means that there are pockets of urban deprivation (mostly in cities). In rural areas justifying Objective 3 status, grants are for infrastructure investment and re-training due to agricultural or fishing industry restructuring.

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