

Strategic Evaluation on Innovation and the Knowledge Based Economy in relation to the Structural and Cohesion Funds, for the programming period 2007-2013

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Executive Summary

Denmark has been shown to be an innovative society which manages to maintain high standards of living through network-based learning economy in which inter-regional disparities are fairly limited. Moreover, the relatively limited size of the country may even suggest that it would be possible to address existing disparities through public policies, but a ‘spatial stickiness’ that tends to tie knowledge workers to large/growing labour markets and an innovation model relying on networks and proximity, geographical distances that may seem limited by European standards still seem to hamper the access of non-core actors to knowledge resources in urban areas, both in the manufacturing heartlands and rural peripheries that straddle across existing administrative borders.

In terms of public policies promoting innovation and knowledge economy, current initiatives are concentrated in two areas: national initiatives – often with explicit reference to the Lisbon agenda – focusing on the conditions under which universities operate in order to increase the immediate relevance of their activity for private economic actors and society at large, and regional preparations for taking on a greater role in economic development policy and support for clusters/networks in particular. While both are relevant in view of the characteristics of the Danish innovation system, the first group of initiatives would also seem to be driven by other concerns – e.g. curbing the autonomy of especially the largest and oldest universities – and hence the effects of the new regulatory framework would seem to be less certain from an innovation perspective.

The current Danish Objective 2 programme integrates innovation and knowledge as an important aspect across policy activities, and evaluations of the existing programme period would seem to suggest that this has not lead to a marginalisation of knowledge-intensive projects and, indeed, that their effects have been significant. In terms of policy priorities this approach is in line with both the perceived characteristics of the national innovation system and regional development policies as they have been pursued to a greater or lesser extent in regions across Denmark. The main importance of the current programme would seem to be twofold: to reinforce existing national priorities with particular focus on less well-off regions, some of which are not only relative poor in terms of earned income per capita but also with regard to knowledge institutions.

The general policy recommendations following from the preceding analysis suggest a two-prong approach that increases basis research funding in line with Lisbon agenda while at the same time attempts to support and improve the Danish innovation model by Stretching the reach of innovative networking through regionally differentiated policies relying on framework measures supported by other policy instruments.

In the context of the Structural Funds this implies that the existing focus on knowledge and innovation should be increased even further, that the proximity of different economic geographies should be utilised through ‘bridge building’, i.e. permanent networks between knowledge institutions in core urban areas and firms outside, bearing in mind that both parties must be motivated and have the competences to engage in innovative networking. In practice this will mean that Structural Fund measures will strengthen the emerging trend to work across existing institutional divides within the Danish innovation system – something that may be useful in its own right – and that the current and long-standing main emphasis on provision of physical and organisational infrastructure for networking may have to be supplemented by additional policy instruments, possible of both an experimental and a more traditional character.

1 Introduction

In March 2000, the EU Heads of State and government launched an ambitious political initiative for the European Union to become “the most competitive, dynamic, knowledge-based economy by year 2010”. The agenda, which has become known as the ‘Lisbon Strategy’, has included a broad range of policies and regulatory measures to achieve this goal.

At the 2005 Spring Council of European Union, Heads of State and government concluded that all appropriate national and Community resources, including those of Cohesion Policy, should be mobilised in order to renew the basis of Europe’s competitiveness, increase its growth potential and its productivity and strengthen social cohesion, placing the main emphasis on knowledge, innovation and the optimisation of human capital. In short, the Council recognised that while some progress has been made since 2000 in moving towards the goals enshrined in the Lisbon Strategy there remains a need to create “a new partnership for growth and jobs”¹

In launching the discussion on the priorities for the new generation of cohesion policy programmes, the Commission published on 6 July 2005 draft Community Strategic Guidelines entitled “Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013”. One of the specific guideline is to improve the knowledge and innovation for growth. More specific areas of interventions, which are proposed by the Commission, include: improve and increase investment in RTD, facilitate innovation and promote entrepreneurship, promote the information society for all, and improve access to finance.²

Innovation is an important factor in releasing the potential of the Lisbon agenda. The knowledge captured in new technologies and processes can drive growth and competitiveness and create new jobs. But knowledge must be treated as part of a wider framework in which business grow and operate. Developing knowledge-based economy requires adequate levels of investment in R&D, education, and ICT as well as creating a favourable environment for innovation.

Less developed areas of the Union are also confronted with this new competitiveness challenge. Increasing cohesion leads to improvements in living standards and the reduction of economic and social disparities, which depend to an important extent on increases in productivity. Increasing competitiveness implies economic change through the introduction of new technologies and new methods of production as well as the development of new skills. Innovation is at the heart of this process. Technological and organisational change and new demands generated by rising income levels and factors which create new economic opportunities and therefore, contribute to the growth potential of these countries.

¹ Communication to the Spring European Council (2005) “Working together for growth and jobs: A new start for the Lisbon Strategy”, COM(2005) 141. Available at: http://www.europa.eu.int/growthandjobs/key/index_en.htm.

² Communication from the Commission (2005) “Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, 2007-2013”, COM(2005) 0299. Available at: http://www.europa.eu.int/comm/regional_policy/sources/docoffic/2007/osc/index_en.htm.

Structural Funds are the main Community instruments to promote economic and social cohesion. In the past and current programmes, they have contributed to enhance the research potential and innovation in businesses and to develop the information society, particularly in the less developed areas. Cohesion policy has also promoted the development of regional innovation strategies and other similar initiatives in the field of the information society.

The overall objective of the strategic evaluation study, as set out in the terms of reference, is that the study should provide conclusions and recommendations for the future of Structural Fund and Cohesion policy. In particular, the Strategic Evaluation will be used to prepare the negotiations with the Member States for 2007-13, to prepare the next operational programmes and to provide input into the 4th Economic and Social Cohesion Report.

In line with the tender specifications, this country report addresses the following issues:

- An analysis of the current situation in the field of innovation and the knowledge-based economy at national and regional level. For the national level, performance is compared to the average performance for the EU25 Member States plus Romania and Bulgaria; and at regional level, where possible given available statistics, compared to a typology of EU regions;
- Lessons from the past and current experience of implementing innovation and knowledge economy measures in the Structural Funds, both in terms of priorities and strategic approaches; as well as in terms of operational implementation;
- Main needs and potential for innovation in the eligible regions drawing on available studies, strategy development and future and foresight studies; and
- Recommendations on main investment priorities for Structural Funds over the programming period 2007-2013 and their implications for regional development.

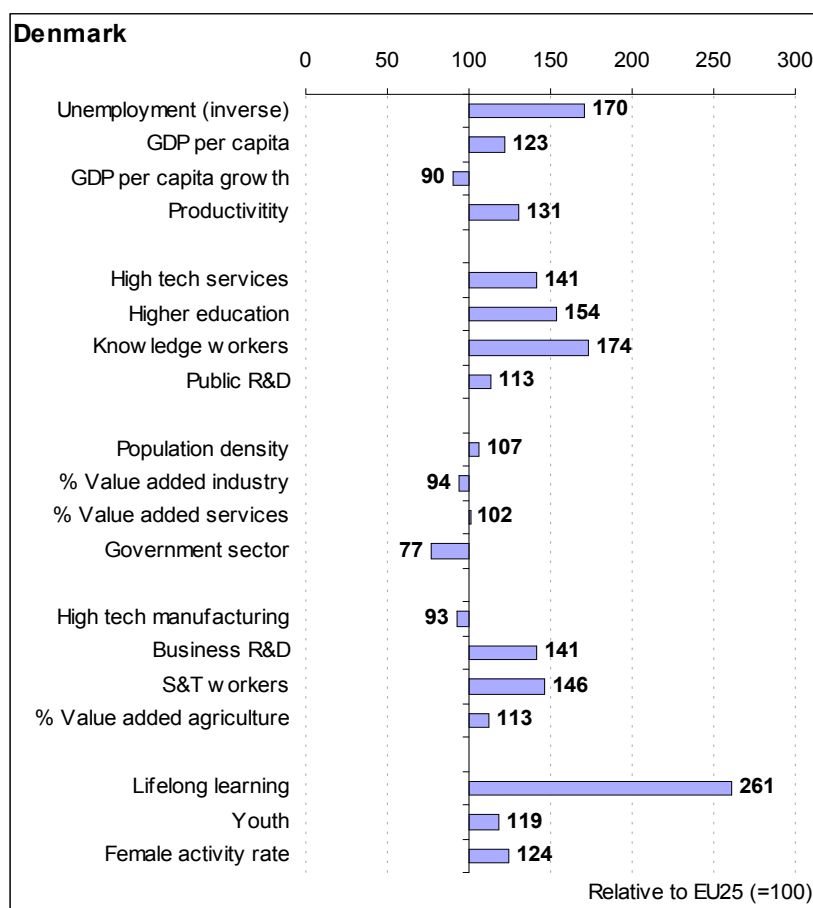
2 Investing in innovation and knowledge: A comparative overview of regional performance

This section provides a synthetic overview of the relative performance of the country, and where relevant main regions, with respect to the EU25 average for a number of selected key structural indicators of innovation and knowledge. The analysis aims to identify main disparities and needs at national, and wherever possible, regional level with a view to supporting the definition of priorities for future Structural Funds interventions (see sections 5 and 6 of this report).

2.1 Country overview: Innovation and the knowledge economy

Exhibit 1 below provides a snapshot picture of the relative position of Denmark compared to the EU-25 average for a series of key knowledge economy indicators.

Exhibit 1: Relative country performance for key knowledge economy indicators



Source: calculations of MERIT based on available Eurostat and national data from 2002-2003 depending on indicator. Detailed definitions and data for each indicator are provided in Appendix B.

As illustrated by Exhibit 1, Denmark is clearly above the EU average in a large number of knowledge-economy indicators, something which confirms the picture presented in the TrendChart surveys which placed Denmark in 3rd place in the most recent Summary Innovation Index.³ Furthermore, in general terms this position appears to have been relative stable since the turn of the century, although GDP growth has been below the EU average, presumably due to the high rates of growth achieved as the economies of the new member states are in the process of ‘catching up’.

This favourable overall picture is, however, the summation of a rather more uneven situation with high scores with regard to education, learning, knowledge workers and business R&D, while more average scores are found with regard to the sectoral make-up of the economy and public R&D. Moreover, some of these apparent strengths and weaknesses should be taken at face value. On the one hand a relatively limited supply of new S&E graduates has long been seen as a problem,⁴ but even recent improvements have not taken the country above EU average, and since the late 1990s the prevailing political climate in Denmark of scepticism against foreigners has made it difficult to compensate through recruitment from abroad. On the other hand the average levels attained with regard to public R&D and high-tech manufacturing may simply reflect different patterns of public support for innovation and a long-standing capacity for network-based innovation in traditional or low-tech sectors which have not been captured by the indicators in Exhibit 1 but which complements more science-based forms of R&D in e.g. pharmaceuticals, biotechnology and telecommunications.⁵

All in all it would appear that despite the overall favourable position, room for improvement exists along three lines in particular, if the aim of reaching the Lisbon goals in 2010 are to be achieved: improving the supply of relevant graduates to both traditional and high-tech sectors of the economy, to strengthen the position of especially the latter by increasing public funding for R&D in a broad range of relevant areas, and to extend the existing commitment to support for network-based innovation across the economy as a whole. And as significant investments in public R&D need to be undertaken if the Lisbon target of 1% of GDP is to be reached,⁶ the scope for addressing the areas identified above would clearly seem to exist.

2.2 Regional disparities and recent trends

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables into a small number of factors by means of factor analysis. These factors are:

³ http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf

⁴ http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf

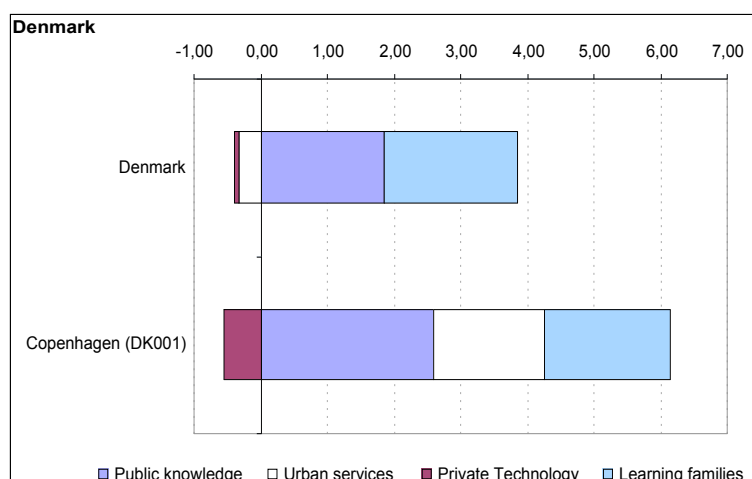
⁵ Cf http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf and Peter Maskell: Learning in the Village Economy of Denmark: The Role of Institutions and Policy in Sustaining Competitiveness, in P. Cooke *et al.* (eds.): Regional Innovation Systems. The Role of Governance in a Globalized World, 2nd ed., Abingdon: Routledge, 2004.

⁶ See e.g. the MSTI press release 4.4.06 http://www.videnskabsministeriet.dk/cgi-bin/doc-show.cgi?doc_id=272830&doc_type=35.

- Public Knowledge (F1): human resources in science and technology combined with public R&D expenditures and employment in knowledge intensive services is the most important or common variables in this factor. Regions with large universities will rank high on this factor.
- Urban Services (F2): The most important variables for this factor are value-added share of services, employment in government administrations and population density. A key observation is that academic centres do not necessary co-locate with administration centres.
- Private Technology (F3) This factor is most strongly influenced by business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries.
- Learning Families (F4). The most important variable in this factor is the share of the population below the age of 10. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a ‘knowledge-society-life-style’ based on behavioral norms and values that are beneficial to a knowledge economy.

Denmark being one of one of the small member states, it is to be expected that the main regional differences to be found revolve around the contrast between the metropolitan area of Greater Copenhagen and the rest of the country. However, as illustrated by Exhibit 2, even this difference is only significant with regard to two of the four composite indicators – urban services and to a lesser extent private technology – while basic similarities are found with regard to Public Knowledge and Learning Families. Neither of these findings would appear to be particularly surprising:

Exhibit 2: Regional factor scores per region



Source: MERIT. The bars are stapled factor-scores showing the deviation ($1 = \text{standard deviation}$) per factor from the average of 215 EU regions (0.00). The longer the bar, the bigger is deviation.

- it has long been argued that the difference between the metropolitan core and the rest of the country is relatively limited in Denmark compared to other European countries,⁷
- this is best explained by the equalising Nordic welfare model that impacts both individual citizens (Learning Families) and institutions (Public Knowledge), with uniform welfare services and a relatively high degree of decentralisation of major knowledge institutions to the major urban centres in Jutland and Funen (Aarhus, Aalborg, Odense),
- the concentration of major financial services and national-level administration in Copenhagen is bound to have an effect on the Urban Services parameter, while at the same time manufacturing activities have generally moved towards the west from the 1970s onwards.⁸

In order to understand the issue of regional disparities in Denmark it is, however, important to move beyond the basic (and fairly limited) contrast between the capital of Copenhagen and the rest of the country. As illustrated by Exhibits 3 and 3a, outside Greater Copenhagen (Central Copenhagen, Københavns Amt, Frederiksborg Amt, Roskilde Amt), differences persist with regard to unemployment, GDP and employment shares.

Exhibit 3: Recent trends per region in key indicators

<i>time</i>	<i>Unemployment rates at NUTS level 3 - EU-25 (%)</i>	<i>GDP (PPP) per capitat at NUTS level 3</i>	<i>Population density</i>	<i>Employment shares</i>		
	<i>2003a00</i>	<i>2002a00</i>	<i>2002a00</i>	<i>Industry 2002a00</i>	<i>Agriculture 2002a00</i>	<i>Services 2002a00</i>
EU25	9,2	21,17	116,9			
Denmark	5,4	25,94	124,7	22	4	74
Central Copenhagen	5,9	42,62	6088,9	10	0	89
Københavns amt	4,2	33,85	1168	16	1	83
Frederiksborg amt	4	20,94	275,8	20	2	78
Roskilde amt	3,9	18,71	264,1	19	3	77
Vestsjællands amt	5,8	19,83	100,5	25	6	69
Storstrøms amt	5,9	18,49	76,7	21	7	72
Bornholms amt	:	18,53	75,3	21	5	74
Fyns amt	6,4	21,51	135,7	24	6	69
Sønderjyllands amt	5,6	23,78	64,4	30	7	63
Ribe amt	4,6	24,94	71,7	30	6	64
Vejle amt	5,2	24,68	117,5	30	4	66
Ringkøbing amt	4,3	26,03	56,7	34	7	59
Århus amt	6,2	23,19	141,6	22	3	75
Viborg amt	4,3	24,34	56,9	33	7	60
Nordjyllands amt	7	22,61	80,3	25	6	70

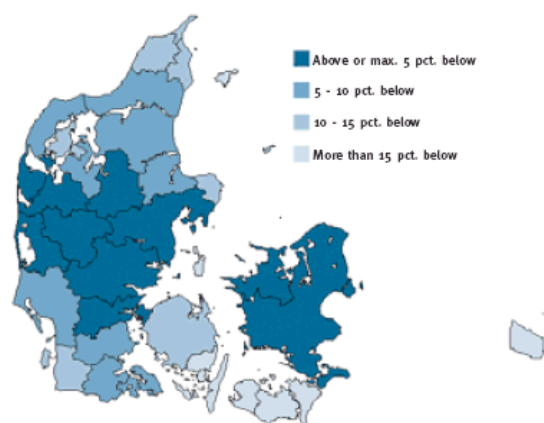
Source : MERIT based on Eurostat data for period indicated

⁷ Regeringen: Den regionale vækststrategi [The Strategy for Regional Growth], Copenhagen: MEBI, 2003.

⁸ Regeringen: Den regionale vækststrategi [The Strategy for Regional Growth], Copenhagen: MEBI, 2003, cf. Peter Maskell: Industriens flugt fra storbyen - Årsager og konsekvenser, Copenhagen: CBS Press, 1986.

The contrasts registered by the Eurostat figures in Exhibit 3 are, however, to a certain extent overshadowed by the existence of inter-regional welfare transfers and the relatively arbitrary nature of regional boundaries in relation to economic activities, and thus it is useful to introduce additional indicators. Focusing solely on business-related incomes (wages and profits), Exhibit 3a suggests that in terms of private economic activity the core area of Denmark is in fact constituted by the travel-to-work areas situated around a line from Copenhagen in the east via the second-largest city Aarhus to the industrialising rural areas of West Jutland, while the periphery is made up by peripheral areas in the far north and far south of the country.

Exhibit 3a: Regional earned income per capita compared with national average by travel-to-work area, 2001



Source : Regeringen 2003 p 26, calculated on the basis of Statistics Denmark information.

All in all this suggests that in the case of Denmark inter-regional should be seen as more than a binary capital-versus-the-rest and will require the introduction of distinctions more sensitive to the characteristics of individual regions.

2.3 Conclusions: Innovation and knowledge performance

Denmark has been shown to be an innovative society which manages to maintain high standards of living through network-based learning economy in which inter-regional disparities are fairly limited. Moreover, the relatively limited size of the country may even suggest that it would be possible to address existing disparities through public policies: with the exception of the Baltic island of Bornholm no business is more than a three-hours drive away from an urban core area, and universal welfare services in terms of e.g. access to education should also have an equalising effect in terms of human resources. In practice the situation is, however, complicated by specific features of Danish society in general and the national innovation system in particular: the otherwise favourably high rate of female participation contributes to a 'spatial stickiness' that tends to tie knowledge workers to large/growing labour markets in

order to maintain two incomes per family,⁹ and with the Danish innovation model relying on networks and hence proximity, geographical distances that may seem limited by European standards can hamper the access of non-core actors to knowledge resources in urban areas.

Therefore, by combining the various indicators, three groups of regions can be identified in Denmark, allowing for the fact that these stylised ideal-types reflect different positions on a continuum and that regional administrative borders are less optimal in the context of economic development than are travel-to-work areas.¹⁰ Bearing this in mind, it is, however, still possible to distinguish between

- *Urban cores*: Innovative high-tech and/or service oriented commuter regions around the capital (Central Copenhagen, Copenhagen and Frederiksborg Counties) and the three largest cities (Aarhus, Aalborg, Odense)¹¹
- *Manufacturing heartlands*: Regions of more or less innovative manufacturing in mainly traditional industries in central parts of Jutland (Vejle and parts of Sønderjylland, Ringkøbing, Viborg, Ribe, Aarhus, Fyn and Nordjylland Counties) and the southern and western parts of Zeeland (Vestsjælland and Storstrøm counties)
- *Rural peripheries*: Less industrialised regions with lagging behind in economic growth and relying heavily on the use of natural resource (farming, fishing, nature-based tourism) for economic purposes (Bornholm and parts of Nordjylland, Viborg, Ringkøbing and Ribe counties)

As summarised by Exhibit 4, these three groups of regions constitute rather different challenges in terms of economic development in general and innovation policies in particular.

Exhibit 4: Summary of key disparities and needs per region

Region / group of regions	Key factors explaining disparity of performance (weaknesses)	Key needs in terms of innovation and the knowledge economy
Urban cores	<ul style="list-style-type: none"> • relatively low level of public R&D • limited spatial mobility of knowledge workers 	<ul style="list-style-type: none"> • increase public R&D • labour market measures
Manufacturing heartlands	<ul style="list-style-type: none"> • potentially vulnerable sectoral structure • uneven access to knowledge-based networks 	<ul style="list-style-type: none"> • support diversification • strengthen network initiatives
Rural peripheries	<ul style="list-style-type: none"> • very traditional sectoral structure • poor access to knowledge-based networks 	<ul style="list-style-type: none"> • support diversification • local knowledge institutions

⁹ The Danish female participation rate is currently 60% (or 25% more than the EU average), and the increasing size of travel-to-work-areas around urban areas are well documented in e.g. Regeringen: Den regionale vækststrategi [The Strategy for Regional Growth], Copenhagen: MEBI, 2003.

¹⁰ In the following typology the three categories have been associated with the NUTS 3 regions in Exhibit 3, allowing for the fact that economic regions straddle administrative borders.

¹¹ The reasonable performance of Odense is somehow overshadowed by the relatively poor performance of the Island of Funen as a whole, cf data supplied by Merit.

3 Innovation and knowledge: Institutional context and policy mix at national and regional levels

Structural Fund support for innovation and knowledge is contingent on and seeks to generate strengthen the existing national (and/or regional) innovation system¹² in each Member State. In particular, institutional, legal and financial factors in the innovation system can limit the potential for certain types of intervention. Moreover, within the framework of the EU's "Lisbon objectives", Structural Fund interventions are expected to complement and provide added value to national (or regional) policy framework. In some Member States, Structural Fund interventions in favor of innovation and knowledge are marginal with respect to the national investment and policy effort, in others Structural Funds provide a main source of funding for such interventions. In both cases, there is a need to identify relevant national and EU policies which can have an impact on decisions on funding priorities.

3.1 Institutional and legal framework for innovation and the knowledge economy

This section of the report appraises two broad factors that condition the potential for coordinated intervention of EU and national (regional) policies in favor of innovation and knowledge:

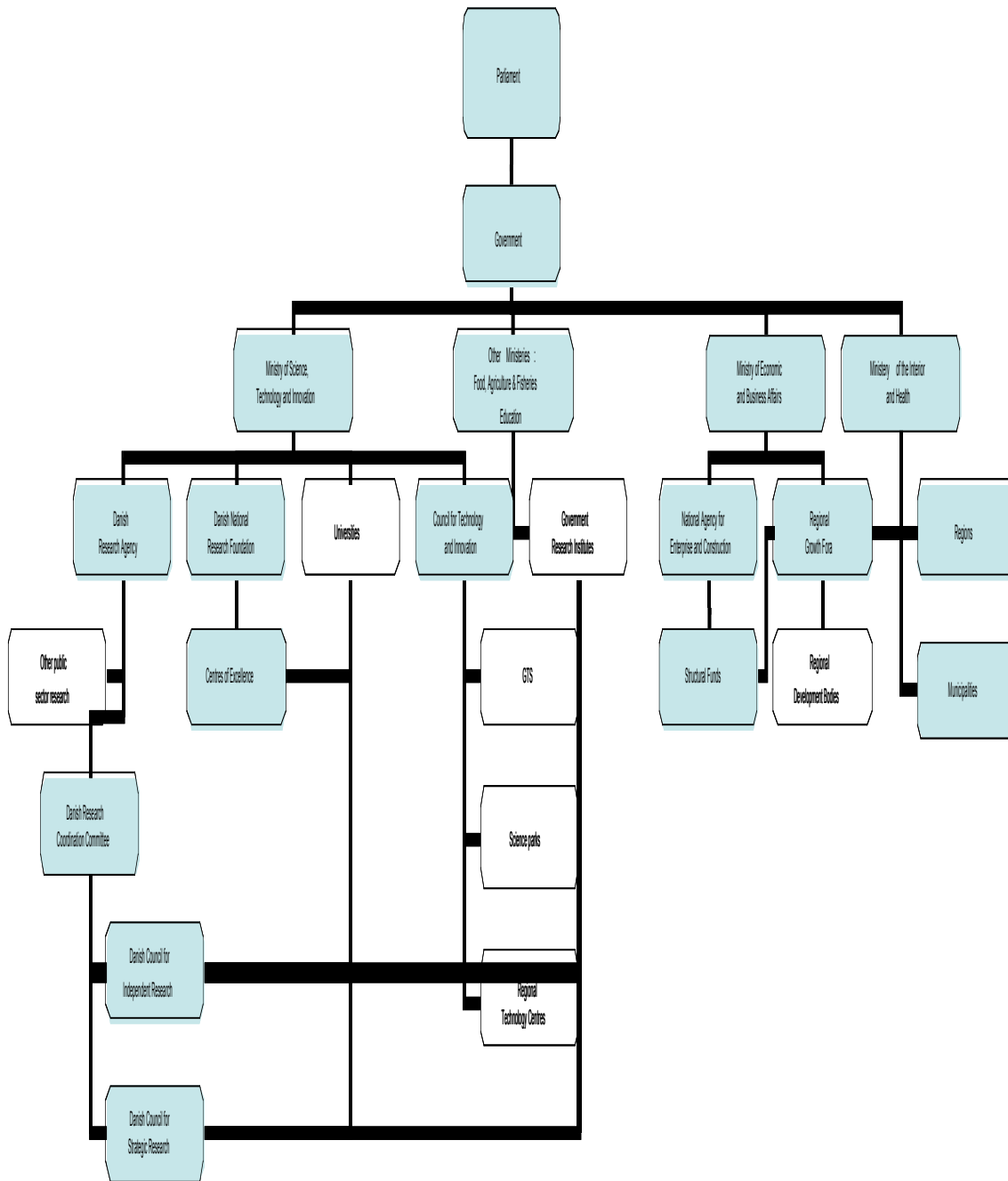
- The first concerns the organisational structures of public and semi-public bodies responsible for the design, implementation and monitoring of innovation and knowledge economy policies. In particular, the analysis considers the responsibilities for funding or managing specific types of measures liable to be considered for support under the Structural Funds;
- The second concerns the institutional, legal and financial frameworks, which condition the linkage of national (regional) financing with EU financing.

For more than a decade rationalising and increasing coordination both with regard to research funding and innovation policies has occupied policymakers and administrators at the national (and to some extent regional level).¹³ Whether or not fragmentation and lack of coordination has been a serious problem for the performance of the Danish economy with regard to innovation is another issue – it could be argued that competition and ample supply can be important in making research institutions and firms innovative – but for better or worse, the assumption

¹² The network of organisations, individuals and institutions, located within or active within national or regional boundaries, that determine and shape the generation, diffusion and use of technology and other knowledge, which, in turn, explain the pattern, pace and rate of innovation and the economic success of innovation.

¹³ Cf http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf and Henrik Halkier & Charlotte Damborg: Development Bodies, Networking and Business Promotion - The case of North Jutland, Denmark, in Mike Danson *et al.* (eds.): Governance, Institutional Change and Regional Development, Aldershot: Ashgate, 2000.

Exhibit 4a: The Institutional Framework for the Danish Innovation System from 2007 onwards



Source: http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf, and Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005.

about the need for rationalisation has driven central government initiatives since the early 1990s and, indeed, in particular since the advent of the current Centre-Right government in 2001.

Compared to the previous situation, the organigram in Exhibit 4a may in some ways represent a more streamlined system with more activities now taking place under the umbrella of the Ministry of Science, Technology and Innovation (MSTI),¹⁴ but despite the declared intentions of ministers and central government administrators, the overall picture would still seem to a fairly complex one, to say the least. Moreover, for the sake of clarity (and bearing in mind the future-oriented nature of the current report) the situation depicted at the regional level is the position from 2007 onwards after the implementation of the ongoing local government reform that will dramatically reduce to number of subnational government units at both the regional and local levels, and, importantly, make regional development a statutory task to be carried out jointly by the so-called *Regional Growth Fora* (RGFs), partnership bodies comprising public and private actors as well as knowledge institutions in each of the five new regions.¹⁵

At the same time three particular features of the coming institutional set-up should be emphasised:

- Unsurprisingly, administrative regions remain different from the economic regions identified in Exhibit 4, as the former have been designed primarily on the basis of considerations relating to health care.
- The number of actual contact points between knowledge institutions and private organisations does not appear to have been greatly affected by current reforms, and thus the organigramme still contains many regulators and funders which interact with a more limited set of knowledge producers and transmitters;
- Although public support for knowledge activities at the national level have gradually been consolidated under MSTI, regional-level activities including Structural Funds programming are still the responsibility of the Ministry of Economic and Business Affairs (MEBA) handled through its executive arm National Agency for Enterprise and Construction (NAEC). Interestingly, MSTI activities have also recently acquired a regional dimension through support for Regional Technology Centres aiming to make university-level knowledge accessible to smaller firms outside the major urban centres through the creation of networks.¹⁶

This division of labour within and below central government could be a sensible way of distinguishing between different types of innovation activities, i.e. basic and applied research/development, but from the perspective of Structural Funds programming it is also a challenge because it could make it more difficult to use national funds as co-funding for regional projects because of the inter-ministerial coordination which could be involved.

¹⁴ Cf http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf .

¹⁵ See Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005, cf http://www.im.dk/publikationer/government_reform_in_brief/index.htm .

¹⁶ Thomsen, personal interview.

Exhibit 5: Main organisations per policy area

Policy objectives	Type of organisation	
	National (&/or regional) authorities and agencies	public Key private or non-profit organisations
Improving governance of innovation and knowledge policies	<ul style="list-style-type: none"> • MSTI (research) • MEBA (trade, IPR) • NAEC (Regional Growth Fora) 	
Innovation friendly environment	<ul style="list-style-type: none"> • Universities (graduates, research) • Regional Development Bodies 	
Knowledge transfer and technology diffusion to enterprises	<ul style="list-style-type: none"> • Regional Technology Centres • Government Research Institutes • Universities • Regional Development Bodies 	<ul style="list-style-type: none"> • GTS - Advanced Technology Group • Science parks
Innovation poles and clusters	<ul style="list-style-type: none"> • NAEC • Regional Development Bodies 	
Support to creation and growth of innovative enterprises	<ul style="list-style-type: none"> • NAEC • Regional Development Bodies • Regional Technology Centres 	
Boosting applied research and product development	<ul style="list-style-type: none"> • NAEC • Regional Development Bodies • Government Research Institutes • Regional Technology Centres 	

Source: http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf based on national/regional policy documents, TrendChart reports, OECD reports, etc. See appendix C for a detailed definition of the policy categories.

As illustrated by Exhibit 5, several actors and activities can be found in all of the six policy areas, with public actors being dominant and the role of private actors reduced to providing input on the dense network of advisory bodies that accompany most funding and implementation bodies.¹⁷ Moreover, a relatively clear division of labour would also seem to be in evidence, with overall governance, basic research and high-level education being pursued at the national level and mainly through the MSTI system, while measures that involve direct contacts between private firms and (semi-)public knowledge institutions also have a strong MEBA and/or regional component through e.g. NAEC initiatives, the GTS institutes and the regional development bodies sponsored by regional and/or local government. It is, however also noticeable that some scope for concrete interaction between the two parts of the institutional system at the level of implementation would seem to exist through the involvement of the regional tier of government, and thus the prospects of increased direct coordination between the MSTI and MEBA systems may well come as much from below as from central government above. This relatively clear division of labour would, however, also seem to reflect a situation where MSTI institutions through production of knowledge and graduates provide a general framework or environment which facilitates the operation of MEBA-sponsored activities – i.e. a less visible, but nonetheless important, indirect type of synergy.

¹⁷ http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf.

3.2 Policy mix assessment

This section provides a summary overview and analysis of the national and regional policy mix in favour of innovation and knowledge in which the Structural Fund interventions take place. The analysis is conducted with respect to seven broad categories of objectives of innovation and knowledge policies.

Measures identified per category of the policy objectives are then further sub-divided in terms of the direct beneficiaries of funding (or legislative) action. To simplify, the report adopts three broad types of organisation as targets of policy intervention:

- Policies supporting academic and non-profit knowledge creating institutions;
- Policies supporting intermediary/bridging organisations involved in innovation support, technology transfer, innovation finance, etc.;
- Policies supporting directly innovation activities in private sector.

The matrix below summarises the current policy mix in at national and regional levels. A simplified coding system is used with intensity of support (financial or political priority) for different policy areas and targets indicated by a colour coding system.

As can be seen from Exhibit 5, Danish public policy currently covers most of the 18 possible combinations of policy areas and targets, but at the same time the varying intensity is also evident.

With regard to overall *governance of innovation and knowledge policies*, recent years have been dominated by central government attempts to make universities more efficient organisation with stronger links to private businesses and society at large,¹⁸ something which seems to be more pertinent with regard to the older universities but still hits across the sector, including the two business schools and Aalborg University. As the new regulations both in terms of governance and funding are currently being introduced, it is too early to say anything about the scale of change in the wake of reform.

At the regional level the introduction of regional development as a statutory task organised through RGF partnerships is the first major systemic innovation in regional policy since the termination of central government financial subsidies to designated problem areas in 1991,¹⁹ but again the extent to which coordination and efficiency in policy making and implementation will follow is, as yet, uncertain.

In terms of promoting an *innovation-friendly environment*, the aim of targeting research funding can be seen in many measures, most importantly in the recent setting up of the Council for Strategic Research which supports research activities in politically defined programmes,²⁰ but whether this will seriously affect the profile of activities or is little more than symbolic institutional reengineering remains to be seen.

¹⁸ http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf pp 5ff.

¹⁹ Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005.

²⁰ http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf pp 5ff.

Attempts to increase the production of (younger) graduates have till now been limited to public statements aimed at universities and prospective students.

With regard to *knowledge transfer and technology diffusion* recent initiatives have concentrated on encouraging universities to be more extrovert (through their development contracts with MSTI),²¹ while at a more low-key level support for organisational infrastructure such as the GTS advisory and certification institutes, public-private partnerships and networking has continued, e.g. the innovation consortia supported by MSTI.²²

Exhibit 6: Policy mix for innovation and knowledge

Policy objectives	Target of policy action		
	Academic /non-profit knowledge institutions	Intermediaries/bridging organisations	Private enterprises
Improving governance of innovation and knowledge policies	<ul style="list-style-type: none"> • university reform • research funding reform 	<ul style="list-style-type: none"> • introduction of Regional Growth Fora via local government reform 	<ul style="list-style-type: none"> • continued trade and IPR regulation
Innovation friendly environment	<ul style="list-style-type: none"> • increase production of graduates • targeted research funding 		<ul style="list-style-type: none"> • regional venture capital • targeted tax rebates for research
Knowledge transfer and technology diffusion to enterprises	<ul style="list-style-type: none"> • university development contracts 	<ul style="list-style-type: none"> • maintaining/increasing organisational infrastructure • facilitation of public-private networking 	<ul style="list-style-type: none"> • facilitation of public-private networking
Innovation poles and clusters	<ul style="list-style-type: none"> • cluster/network initiatives 	<ul style="list-style-type: none"> • cluster/network initiatives 	<ul style="list-style-type: none"> • cluster/network initiatives
Support to creation and growth of innovative enterprises	<ul style="list-style-type: none"> • encouragement of graduate entrepreneurship 	<ul style="list-style-type: none"> • consolidation of advisory services 	<ul style="list-style-type: none"> • consolidation of advisory services
Boosting applied research and product development	<ul style="list-style-type: none"> • university IPR clarification 	<ul style="list-style-type: none"> • maintaining/increasing organisational infrastructure of intermediaries and research centres 	<ul style="list-style-type: none"> • continued trade and IPR regulation
Legend			
Top policy priority			
Secondary priority			
Low priority			

Source: calculations of study team based on national/regional policy documents, TrendChart reports, OECD reports, etc.

Innovation poles and clusters have been supported through a variety of initiatives, providing infrastructure and networking opportunities in the form of ‘framework measures’, i.e. initiatives targeting groups of firms rather than individual ones, and

²¹ http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf pp 6ff.

²² http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf pp 7ff, Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005.

this is likely to gain additional momentum after the five RGF partnerships have become fully functional, because the underlying regional analysis provided by FORA, an research offshoot of MEBA, has adopted a cluster-oriented approach. At the moment cluster-oriented initiatives are sponsored both by regions through regional development bodies, MSTI through the Regional Technology Centres and the Regional Growth Alliances of MEBI/NAEC.

Support for *creation and growth of innovative enterprises* has been a constant priority for more than a decade, and the main recent developments are one the one hand the gradual consolidation of business advisory services,²³ something which may increase visibility but also potentially undermine the position of more specialised organisations, and on the other hand an increasing focus on making graduates aware of the possibilities of becoming self-employed entrepreneurs, mainly through courses, seminars and other PR activities.

Finally, with regard to *boosting applied R&D* the main emphasis would still seem to be via public support for intermediate organisations such as the GTS institutes, science parks and the Innovation Consortia partnerships sponsored by MSTI, although steps have also been taken to clarify IPR in relation to universities and other public research bodies.

3.3 Conclusions: The national innovation system and policy mix

Although in other words most areas of the policy mix matrix continued to be covered, current initiatives seem to concentrate in two areas: national initiatives – often with explicit reference to the Lisbon agenda²⁴ – focusing on the conditions under which universities operate in order to increase the immediate relevance of their activity for private economic actors and society at large, and regional preparations for taking on a greater role in economic development policy and support for clusters/networks in particular. Although the first group of initiatives would also seem to be driven by other concerns – e.g. curbing the autonomy of especially the largest and oldest universities – both of these would in broad terms seem to be relevant in view of the characteristics of the Danish innovation system, and thus the policy mix comes across as a sensible two-pronged way to stimulate innovation in Denmark.

The key opportunities and constraints for investment by the Structural Funds identified in the analysis so far have been summed up in the adjoining Exhibit 7.

²³ Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005.

²⁴ Cf. http://www.trendchart.org/reports/documents/Country_Report_Denmark_2005.pdf pp 20ff.

Exhibit 7: Key opportunities and constraints for investment by the Structural Funds

Policy objectives	Opportunities for Community funding (national priorities)	Constraints or bottlenecks (factors limiting Community funding)
Improving governance of innovation and knowledge policies	<ul style="list-style-type: none"> • promote improved horizontal and vertical coordination 	<ul style="list-style-type: none"> • limited size of Structural Funds programmes in Denmark
Innovation friendly environment	<ul style="list-style-type: none"> • support provision of regional venture capital 	<ul style="list-style-type: none"> • limited size of Structural Funds programmes in Denmark
Knowledge transfer and technology diffusion to enterprises	<ul style="list-style-type: none"> • support expansion of existing initiative 	<ul style="list-style-type: none"> • geographic peripherality • introvert small-firms culture • knowledge institution insularity • risk of one-off institutional engineering
Innovation poles and clusters	<ul style="list-style-type: none"> • support expansion of existing initiative 	<ul style="list-style-type: none"> • geographic peripherality • introvert small-firms culture • knowledge institution insularity • risk of one-off institutional engineering
Support to creation and growth of innovative enterprises	<ul style="list-style-type: none"> • support expansion of existing initiative 	<ul style="list-style-type: none"> • limited size of Structural Funds programmes in Denmark
Boosting applied research and product development	<ul style="list-style-type: none"> • support expansion of existing initiative 	<ul style="list-style-type: none"> • limited size of Structural Funds programmes in Denmark

4 Structural Funds interventions to boost innovation and create a knowledge economy: 2000-2006

This section of the reports provides an analysis the patterns of Structural Fund expenditures in the fields of innovation and knowledge-based economy during the current programming period (2000-2006 for EU-15 or 2004-2006 for the new Member States). It examines the patterns from both a strategic point of view (the policy mix pursued by the Structural Funds programmes) and at an operational level (consumption of funds, management of innovation measures, indications of relative effectiveness of measures, case studies of ‘good’ practice).

4.1 Strategic framework for Structural Fund support to innovation and knowledge

4.1.1 Strategic approach to innovation & knowledge in Structural Fund programmes

The national SPD formulates the general aim of the Danish Objective 2 efforts for the 2000-2006 programming period as “improving the conditions for development and change in order to ensure welfare, employment, equal opportunities and a sustainable environment in regions with structural problems”,²⁵ focusing in particular on innovation capacity, sustainability, globalisation, coordination and indigenous strengths and potentials. Similar themes run through the programme complement for North Jutland, the largest of the five regional PC areas, where the PC document was even originally entitled ‘Innovation’,²⁶ and on neither level of governance this is any way surprising: similar themes can be found in other general statements about the aims of methods of Danish regional policy,²⁷ and indeed in the previous Objective 2 programme in North Jutland built around the notion of globalisation,²⁸ itself building on a long series of programmes oriented towards regional competitiveness.

As illustrated by Exhibit 8, the current Danish Objective 2 programme covers most areas that have traditionally been supported by national regional policy measures,²⁹ although it is worth noting that in the long-standing ‘problem region’ North Jutland the core areas around the regional capital Aalborg have been downgraded to transitional areas due to recent economic progress associated with especially the development of an internationally successful research-driven cluster in mobile telecommunication.

²⁵ Erhvervsfremmestyrelsen: Danmarks Mål 2-program 2000-2006, Silkeborg, 2000, p 29.

²⁶ Nordjyllands Amt: Innovation - Mål 2-Programtillæg 2000-2006, Aalborg, 2000.

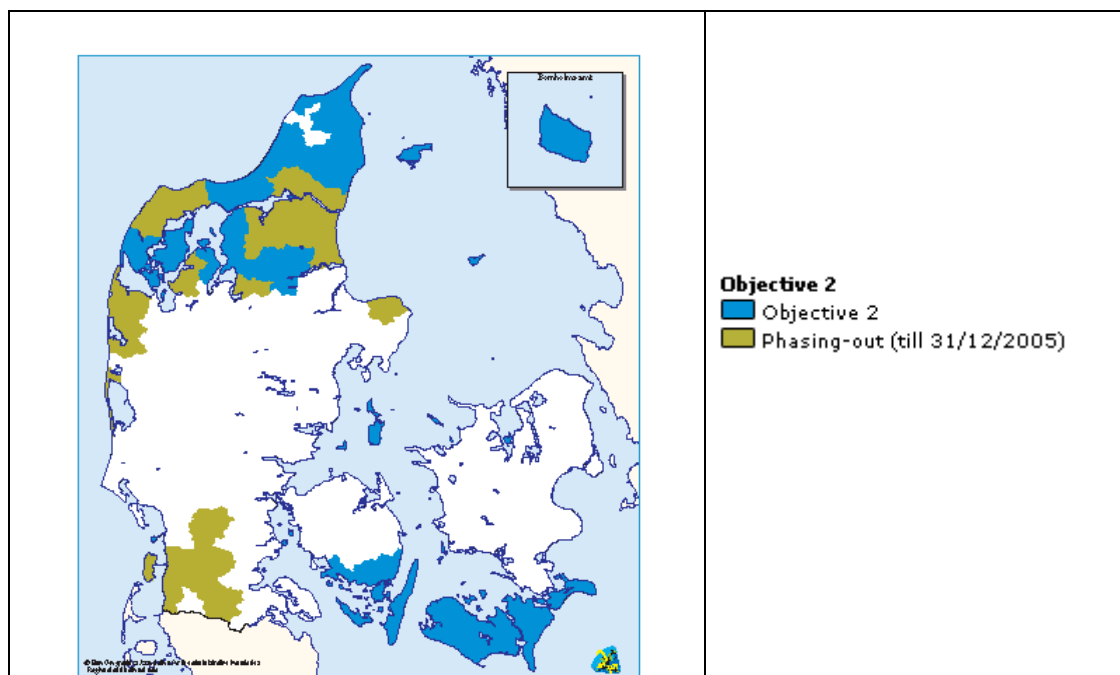
²⁷ E.g. Regeringen: Regional erhvervspolitisk redegørelse .reg21, København, 2001.

²⁸ Nordjyllands Amt: Mål 2: 1997-99. Globalisering. Et program til styrkelse af nordjyske virksomheders konkurrenceevne, Aalborg, 1997.

²⁹ See Henrik Halkier: Regional Policy in Transition - A Multi-level Governance Perspective on the Case of Denmark, *European Planning Studies* 9, 3, 2001, pp 323-38.

Within the Danish Objective 2 programme, the allocation of resources in support of innovation and knowledge is fairly limited when only the four core RTDI codes are included, but nearly doubles and makes up around 25% of programmed spending when shared business services and (especially) telecommunications infrastructure is included, as illustrated by Exhibits 11 and 12.

Exhibit 8: Areas designated for Objective 2 support in Denmark, 2000-2006.



Source: http://europa.eu.int/comm/regional_policy/atlas/denmark/dk_en.htm.

Exhibit 9: Planned allocation of resources: Narrow RTDI definition (Euro)

Objective	Total cost	Structural Funds			National funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 2	68.589.455,34	30.335.172,05	30.335.172,05	0,00	38.254.283,29	0,00
TOTAL COHESION POLICY						
Objective 2	441.363.171,00	197.000.000,00	140.459.584,00	56.540.416,00	217.688.518,00	26.674.653,00

Strict definition of RTDI based on pure EU codes: 18, 181, 182, 183, 184. Source: programming documents and financial data provided by DG REGIO

Exhibit 4: Planned allocation of resources: Wider scope of RTDI (Euro)

Objective	Total cost	Structural Funds			National Funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 2	114.247.773,11	49.539.468,82	49.539.468,82	0,00	64.708.304,29	0,00
TOTAL COHESION POLICY						
Objective 2	441.363.171,00	197.000.000,00	140.459.584,00	56.540.416,00	217.688.518,00	26.674.653,00

Strict definition of RTDI based on pure EU codes: 153, 155, 162, 163, 164, 165, 18, 181, 182, 183, 184, 322, 324. Source: programming documents and financial data provided by DG REGIO.

Even the broad measure would, however, still seem to underestimate the degree to which the current Danish Objective 2 programme is oriented towards knowledge and innovation, because when including all measures entailing knowledge-oriented support for individual firms, e.g. support for use of consultants in relation to product development, market intelligence etc., the original SPD planned to spend 22,4 MEUR on relevant knowledge/innovation-relevant measures,³⁰ adding nearly 50% to the funds identified in Exhibit 10 and bringing the share of knowledge- and innovation-oriented measures in the current programming period to more than one third of total planned expenditure, with a significant proportion of funding being spent on ‘soft’ rather than ‘hard’ measures. Although variations exist between the five Danish programme complement areas, the general distribution is rather similar, and so the relative regional importance of knowledge-oriented measures will depend on the size of their programme, something which in turn mechanically reflects the size of population in areas designated within each region.

It is worth noting that this prominence has not been brought about via a formal set of RITTS/RIS exercises, but reflects a much earlier orientation of at least the largest of the Danish Objective 2 regions, North Jutland, towards a network-based and knowledge-oriented strategy for regional development.³¹ Moreover, it should also be stressed that despite the prominence of knowledge- and innovation-oriented measures in the current Danish Objective 2 programme, funding is still limited in relation to the overall level of public expenditure on similar activities: even when the broadest definition is adopted, the contribution of the Structural Funds only equals around 0.02% of overall expenditure on R&D,³² although the relative importance may of course be larger in peripheral regions without major public knowledge institutions and innovative private firms.

4.1.2 Specific measures in favour of innovation and knowledge.

Given the design of the Danish Objective 2 programme, the gap between broad priorities/measures and specific projects is very large, and in the absence of a systematic classification of all projects published on the website of the national programme administration, the assessment will be kept on a very general level – priorities and measures within the programme - that in some cases most certainly will overestimate the extent to which funds are used for innovation- and knowledge-oriented projects.

³⁰ Calculated on the basis of Erhvervsfremmestyrelsen: Danmarks Mål 2-program 2000-2006, Silkeborg, 2000.

³¹ Henrik Halkier: Regional Policy in Transition - A Multi-level Governance Perspective on the Case of Denmark, *European Planning Studies* 9, 3, 2001, pp 323-38, cf Gjerding, personal interview. This orientation was further promoted at the national level through the Innovative Actions introduced during the current programming period.

³² Calculated on the basis of Exhibit 11, Statistics Denmark databank, and Erhvervsfremmestyrelsen: Danmarks Mål 2-program 2000-2006, Silkeborg, 2000.

Exhibit 5: Key innovation & knowledge measures

Policy area	Number of identified measures (see note 1)	Approximate share of total funding for innovation & knowledge measures (see note 2)	Types of measures funded (possibly indicating importance)
Improving governance of innovation and knowledge policies	1	16.9 MEUR (see note 3), i.e. 23%	Public investment in IT and technology infrastructure (priority 1.1)
Innovation friendly environment	1	At most 22.8 MEUR (see note 4), i.e. 32%	Private investment in production (priority 2.1)
Knowledge transfer and technology diffusion to enterprises	2	105%	Combines the measures in the two rows below
Innovation poles and clusters	1	70.8 MEUR (see note 5), i.e. 98%	Network formation between private firms within/outside region, also including public knowledge institutions (priorities 1.2 and 2.2)
Support to creation and growth of innovative enterprises	1	4.9 MEUR, i.e. 7%	Advisory services and framework projects supporting groups of firms (priority 1.2)
Boosting applied research and product development			

Notes:

1. Given the design of the Danish Objective 2 programme, the best option would seem to be to use a cautious classification of the four main measures that correspond to the activities in the extended version of Exhibit 9, cf. the comments in Section 4.1.1 above
2. Total funding for innovation and knowledge measures are estimated at 72 MEUR (combining Exhibit 9 and Priority 2.2 cf. the comments in Section 4.1.1 above).
3. Relying on the figure given in Exhibit 9.
4. The share of projects involving routine replacement of production factors is generally low in the Danish programme, but claiming that all projects have been innovative is hardly realistic.
5. Calculated as the expenditure on projects involving formation/strengthening of networks between private firms and other private/public actors in priorities 1 and 2, assuming that the expenditure share of network-promoting projects remains the same as in the period reviewed in the follow-up to the Mid-term evaluation (Dansk Teknologisk Institut 2005), namely 55%. Clearly the aggregate figure must involve sizeable overlaps with other categories, and (possibly) a very wide definition of the term networking.

Bearing this important caveat in mind, Exhibit 11 would still seem to suggest that in terms of knowledge and innovation, support for regional development projects that involve networking arrangements, either within the region or on a broader geographical scale would seem to be a significant part of the programme, and it is worth noting that no less than 81% of the firms supported through priorities 2.1 and 2.2 claim that this involved a significant transfer of knowledge.³³ The role of

³³ Teknologisk Institut: Evaluering af Mål 2 Programmet i Danmark 2000-2006. Opfølgning på midtvejsevalueringen, Århus, 2005, p 67.

investment in physical assets – infrastructure and productive technology – would seem to be rather more limited, although of course very much part of the overall picture.

Such an approach would seem to be in line with both analysis of the network-oriented character of the Danish innovation system and, indeed, existing national and regional programmes in support of innovation, the knowledge economy and regional development – and hence not particularly surprising, given the after all fairly limited size of the Structural Funds programmes in Denmark. It is, however, also important to stress that with by focusing a sizeable share of funding on network- and knowledge-oriented measures targeting private firms, the Danish Objective 2 programme would in fact still seem to be able to make an impact in this particular field, given the after all relatively moderate levels of expenditure at the national and regional levels in this particular sub-field of public policy. National expenditure in 2004 on regional development, business advisory services and the Regional Technology Centres amounted to 13 MEUR, while the annual average expenditure on knowledge- and innovation-oriented projects in the Danish Objective 2 programme is 7.3 MEUR, and as the latter target especially manufacturing heartlands and rural peripheries, the difference made by EU support may in practice be sizeable.

4.2 Learning from experience: The Structural Funds and innovation since 2000

4.2.1 Management and coordination of innovation & knowledge measures

This section reviews the overall management of Structural Fund interventions in favour of innovation and knowledge during the current period. It examines the role of key organisations or partnerships in implementing Structural Funds measures for innovation and knowledge, the linkages between Structural Fund interventions and other Community policies and the financial absorption and additionality of the funds allocated to innovation and knowledge.

In Denmark the implementation of the Objective 2 programme has been undertaken by existing organisations – NAEC and regional government – and this pattern will be replicated from 2007 onwards where programme administration at the subnational level will be transferred to the new Regional Growth Fora partnership organisations.³⁴ The key way in which coordination between Structural Funds programming and other public policies is ensured is in other ways organisational integration, i.e. placing similar activities within the same public body in order to ensure political and administration coherence. It should, however, also be noted (cf. the organigram in Exhibit 4a above) that in Denmark the Structural Funds are channelled through the business-oriented MEBI side of the central government set-up handling innovation and knowledge policies, and although individual projects may draw on funding from

³⁴ See Henrik Halkier: Regional Policy in Transition - A Multi-level Governance Perspective on the Case of Denmark, *European Planning Studies* 9, 3, 2001, cf. Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005.

many sources and hence instituting coordination on the ground,³⁵ at least at the administrative level the question of coordination with the, in financial terms, far larger MSTI system has apparently been left unresolved.³⁶

On an operational level the Objective 2 programme has funded many partnership-based organisations in the regions,³⁷ these have tended to be oriented towards innovation and knowledge, and the mid-term evaluation found that in general these were effective and efficient means of supporting regional development, advocating that more should be done in order to extend the concept to especially small and traditional firms in more peripheral geographical locations. This is particularly pertinent, as demand for knowledge-oriented measures was lagging behind other types of measures in the first half of the programming period,³⁸ something that could be interpreted as a combination of weak demand – firms have to realise that e.g. external advice could be helpful – and the preference for network-based delivery mechanisms that may be seen as a barrier by some small firms steeped in an entrepreneurial culture of self-reliance. Moreover, the programming period also saw the introduction of a number of innovations, e.g. the more systemic measures launched by the ‘innovative actions’ at the national level, or the launching of sectorally targeted framework programmes at the regional level in North Jutland.³⁹ No specific top-down measures have been undertaken in order to ensure synergies from various funding sources, and thus coordination have instead relied on project champions wanting to ensure maximum support for their activities and the fact that at the regional level the counties administer a vast range of relevant programme and hence are able to achieve synergies in-house.

Exhibit 6: Absorption capacity by field of intervention (Euro)

CODES	ALLOCATED	DISBURSED	EXPENDITURE CAPACITY
OBJECTIVE 2			
164 - Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs) (only for SMEs)	2.311.486,86	1.589.068,94	68,7%
18 - Research, technological development and innovation (RTDI) - detailed information unavailable	30.335.172,05	14.030.950,48	46,3%
32 - Telecommunications infrastructure and information society (detailed information unavailable)	16.892.809,91	9.921.038,14	58,7%
TOTAL OBJ. 2	49.539.468,82	25.541.057,55	51,6%

Source: programming documents and financial data provided by DG REGIO

³⁵ Christensen and Thomsen, personal interviews.

³⁶ As the European research programmes are administered through MSTI, this would also apply to the relationship between the Structural Funds and e.g. the 6th Framework Programme, although the different time scales involved would seem to make it difficult for the two programmes to join in supporting the same project.

³⁷ Case studies can be found in the mid-term evaluation (Teknologisk Institut: Midtvejsevaluering af Mål 2 programmet i Danmark 2000-2006, Århus 2003) and its follow-up study (Teknologisk Institut: Evaluering af Mål 2 Programmet i Danmark 2000-2006. Opfølgning på midtvejsevalueringen, Århus, 2005), cf. the project database on the NAEC website <http://www.ebst.dk/regionaleprojekter/0/65/0>.

³⁸ Teknologisk Institut: Midtvejsevaluering af Mål 2 programmet i Danmark 2000-2006, Århus 2003, pp 61f.

³⁹ Gjerding and Christensen, personal interviews.

In terms of absorbing the funds available for knowledge- and innovation-oriented measures, it is likely that – give and take a small margin due to the n+2 rule introduced in the current programming period – funds will be absorbed almost completely, and as can be seen from Exhibit 14, expenditure on innovation (in broad terms) is on par with or well in advance of expenditure in the programme as a whole. Demand for measures which would seem to support innovation and knowledge would in other words seem to be good, and perhaps even having been underestimated in the original programming phase in the late 1990s, but given the intertwining of such measures with other types of activities, this could simply reflect increased expenditure on other types of projects. This issue has become even more relevant since the mid-term evaluation was followed by a restructuring of the Danish programme that effectively merged measures under each of the three main priorities – i.e. funds are no longer earmarked for the knowledge-intensive measures 1.2 and 2.2⁴⁰ – and thus priorities can easily be shifted between more or less innovation-oriented measures, making sure that the programmes will again spend the entire amount allocated (with the exception of individual projects which may be caught out by the N+2 rule).

4.2.2 Effects and added value of Structural Fund support for innovation and knowledge

This section of the report analyses the effects and added value of the Structural Fund interventions in favour of innovation and knowledge during the current programming period. The analysis is based on two main sources, namely: a) available evaluation reports or studies concerning Structural Fund interventions; b) interviews and additional research carried out for this study. Accordingly, this section does not pretend to provide an exhaustive overview of the effects or added value⁴¹ of Structural Fund interventions but rather is based on the examination of a limited number of cases of good practice. These good practice cases can may concern the influence of the Structural Funds on innovation and knowledge economy policies (introduction of new approaches, influence on policy development, etc.), integration of Structural Funds with national policy priorities, promoting innovative approaches to delivery (partnerships), or measures which have had a particularly important impact in terms of boosting innovation potential, jobs and growth.

The best source of information about the performance of the Danish Objective 2 programme is undoubtedly the recent update on the midterm evaluation undertaken by external consultants,⁴² which was based on an extensive review of quantitative and qualitative data. The English summary of the Update Report concludes that

The programme has fulfilled most of its effect goals with regard to the number of jobs created, number of course participants, number of projects, etc. By the middle of

⁴⁰ Helle Hjortnæs: Recent Structural Fund Developments in Denmark: Autumn/Winter 2004 - Paper for IQ-net, Vaarst: KatPlan, 2005.

⁴¹ A good definition is “The economic and non-economic benefit derived from conducting interventions at the Community level rather than at the regional and/or national level”. See Evaluation of the Added Value and Costs of the European Structural Funds in the UK. December 2003. (Available at : www.dti.gov.uk/europe/structural.html)

⁴² Teknologisk Institut: Evaluering af Mål 2 Programmet i Danmark 2000-2006. Opfølgning på midtvejsevalueringen, Århus 2005.

2005, approx. 5,000 jobs had been created or maintained as a result of the Objective 2 programme, a number that is considerably higher than anticipated.⁴³

As promotion of knowledge and innovation are not concentrated in particular priorities/measures, the relative importance of this type of interventions is of course difficult to ascertain. It is, however, interesting to note that some of the main specific findings of the evaluation concluded that projects involving networking and ‘bridge building’ between knowledge institutions and private firms appear to have had sizeable effects⁴⁴ - and the setting up of a venture fund for the current North Jutland Objective 2 area have of course perpetuated the availability of loan capital for innovative/high-risk projects in this part of the country.⁴⁵ While the relative high impact in terms of jobs created/maintained has not been able to stop the widening of the gap between prosperous and less prosperous regions in Denmark – although these differences are still limited by European standards – due to even higher levels of growth in the urban centres, important results have still been achieved with regard to increasing the level of education, the supply of competence development courses, the level of regional cooperation and, not least, the competitiveness of private enterprises. An example illustrating this can be found in the adjoining box.⁴⁶

Denmark: Innovative Business Development

The Metal Supply project created a transparent market for metal and engineering industries through a digital communication platform. Today 500 firms from across the country have become paid-up members of the network, and it is thus likely that the initiative will be able to become self-funding and exist also after the end of Structural Funds support. The initiative been considered a best practice because it is an example of the introduction of new technology and business practices in traditional industries, which filled a gap in the market (which none of the participating SMEs could have done on their own) through network formation. This could serve as a source of inspiration for innovative management of producer-supplier relations in other traditional industries, linking them up with new business opportunities.

Overall the implementation of the programme has been satisfactory, although it was noted by the evaluators that there is still scope for improved coordination with alternative public and private sources of finance, and increased involvement of research and knowledge institutions. Moreover, it was also suggested that future rounds of would need to have a clear-cut spatial dimension if the currently widening gap between well-off and lagging regions in Denmark is to be reduced.⁴⁷

⁴³ Teknologisk Institut: Evaluering af Mål 2 Programmet i Danmark 2000-2006. Opfølgning på midtvejsevalueringen, Århus 2005, p 34. Job figures as reported by project administrators.

⁴⁴ Direct financial support for investments in private firms played a minor role in the current programme, but even here innovation was a key criteria for selecting projects (Christensen, personal interview).

⁴⁵ Christensen, personal interview.

⁴⁶ Teknologisk Institut: Evaluering af Mål 2 Programmet i Danmark 2000-2006. Opfølgning på midtvejsevalueringen, Århus 2005, cf. Helle Hjortnæs: Recent Structural Fund Developments in Denmark: Autumn/Winter 2004 - Paper for IQ-net, Vaarst: KatPlan, 2005.

⁴⁷ Teknologisk Institut: Evaluering af Mål 2 Programmet i Danmark 2000-2006. Opfølgning på midtvejsevalueringen, Århus 2005, cf. Helle Hjortnæs: Recent Structural Fund Developments in Denmark: Autumn/Winter 2004 - Paper for IQ-net, Vaarst: KatPlan, 2005.

4.3 Conclusions: Structural Funds interventions in favour of innovation and knowledge

Exhibit 7: Main outcomes of innovation and knowledge measures

Programme or measure	Capability	Added value
Objective 2: Regional Development (priority 1)	Soft/hard infrastructure extended	Reinforcement of national priorities, some innovative approaches and institution building, especially in less well-off regions
Objective 2: Business Development (priority 2)	Networks and knowledge transfer extended	

The profile of the Danish Objective 2 programme with regard to innovation and knowledge has been summarised in Exhibit 13, and two points are worth stressing in particular:

- the structure of the programme in terms of priorities/measures integrates innovation and knowledge as an important aspect across policy activities, but evaluations of the existing programme period would seem to suggest that this has not lead to a marginalisation of knowledge-intensive projects and, indeed, that their effects have been significant, and
- in terms of policy priorities this approach is not only in line with both the perceived characteristics of the national innovation system and central government policies, but also development policies as they have been pursued to a greater or lesser extent in regions across Denmark.

The main importance of the current programme would thus primarily seem to be twofold: to reinforce existing national priorities, and – even more important because of the after all limited size of the funding involved – to do this with particular focus on less well-off regions, some of which are not only relative poor in terms of regional earned income per capita (cf. Exhibit 4) but also with regard to knowledge institutions.

5 Regional potential for innovation: A prospective analysis

This section of the report seeks to summarise and draw conclusions from the analysis of the preceding sections, available studies and interviews and focus groups carried out for this study in order to provide an analysis of the regional innovation potential. In doing so, the aim is to provide a framework for orientations in terms of future Structural Fund investments in innovation and knowledge.

5.1 Factors influencing regional innovation potential

As suggested in Section 2, Denmark has maintained its position as an innovative society which manages to maintain high standards of living through network-based learning economy in which inter-regional disparities are fairly limited compared to other EU member states. Although the issue of economic globalisation has tended to dominate political discourse recently – i.e. the threat of manufacturing or even high-level service jobs moving to new member states or even further to the east – this discussion has also acquired a regional dimension because the ongoing local government reform has elevated regional development from an optional to a compulsory activity of the regional tier of governance. In terms of elite politics, regional policy is much more prominent now than in recent decades, and thus plenty of analyses are undertaken and discussions ongoing at the moment.

As noted in Section 2, spatial differences are sufficiently pronounced to support the use of three different types of Danish region as presented in Exhibit 4a. i.e. *urban cores* (Copenhagen and the three largest cities), *manufacturing heartlands* (central parts of Jutland), and *rural peripheries* (lagging peripheral areas). Clearly differences exist also within these groupings: the metropolitan area of Greater Copenhagen is of course in a league of its own as an urban core region, the various parts of the industrial heartlands have different sectoral characteristics,⁴⁸ and position of the rural peripheries vary according to e.g. their distance from urban core areas and the existence of alternative sources of income such as tourism. And all of the five new administrative regions do of course entail areas which belong to two or three of the regional typology.

As illustrated by Exhibit 14, the factors likely to influence future developments with regard to innovation and knowledge economy differ greatly between the three types of areas, and while this could be seen as a challenge in its own right, it is, perhaps, also the point where the relatively limited size of the country becomes a potential asset if strategies can be built around two axes, namely

- in terms of *goals* aiming to address the *specific* problems across heterogeneous regional spaces

⁴⁸ For an extensive overview, see Erhvervsministeriet *et al* Erhvervsredegørelse Jylland-Fyn, København, 2000.

- but at the same time in terms of *means* making sure that possible *synergies* between the various areas are being used.

Exhibit 14: Factors influencing innovation potential by type of region

Region / group of regions	Main factors influencing future innovation potential
Urban cores	<ul style="list-style-type: none"> • level of public R&D • attraction /retention of knowledge workers
Manufacturing heartlands	<ul style="list-style-type: none"> • sectoral structure • dynamic business culture • access to knowledge-based networks
Rural peripheries	<ul style="list-style-type: none"> • adjustment of sectoral structure • improved business culture • better access to knowledge-based networks

The high-tech and knowledge-intensive sectors such as IT and biotechnology concentrated in the core urban areas are in other words facing the challenge of sufficient public investment in R&D and socio-cultural amenities, while traditional manufacturing areas depend on their continued ability to innovative on the basis of the Danish network-based model, and the rural peripheries with smaller firms in more traditional sectors, including primary production and tourism, face the challenge of access to knowledge-based networks outside the regions themselves. The concentration of specialised R&D in urban core areas, and indeed the fact that graduates are produced here too, would clearly seem to perpetuate the advantage of the core regions vis-à-vis other parts of the country in terms of human and social capital, but in practice this is to some extent ameliorated by the after European standards relatively limited geographical size of Denmark through commuting of key knowledge workers and access of non-core firms to advanced support services within reasonable travel distance.

5.2 A prospective SWOT appraisal of regional innovation potential

This section will undertake a prospective SWOT appraisal of the two non-core type of regions, leaving out the urban cores on the basis of the reasoning that the challenges primarily fall outside the traditional field of operation of regional policy in Denmark in general and the use of the Structural Funds in particular, and instead seeing the latter primarily as providers of specialised services, as shown below. With public R&D being the responsibility of a different central government department (and of a size where the expected level of EU support is unlikely to make much difference), and attraction/attention of knowledge workers and the ‘creative class’ being handled by general welfare policies and city branding, it seems to be sensible to concentrate analytical efforts where, both spatially and in terms of policy targets, the Structural Funds may continue to make a difference. In practice this means that two ‘prospective’ SWOT tables will be presented below – one for the manufacturing heartlands and one for the rural peripheries – although this does of course not imply that the potential for innovation in the urban core areas is more limited or, indeed, that these core areas will not play an important part in future Structural Funds programming in Denmark.

In the ‘prospective’ SWOT tables each cell in the matrix attempt to classify specific factors of economic, sectoral, research or human resource potential according to whether they offer high to low potential, and this results in the following profiles of the manufacturing heartlands and the rural peripheries.

Manufacturing heartlands	Opportunities	Threats
Strengths	<ul style="list-style-type: none"> • dynamic business culture • flexible labour market • network-based innovation • competitive firms in traditional sectors 	<ul style="list-style-type: none"> • future limits to organisational advantages in markets for standardised goods
Weaknesses	<ul style="list-style-type: none"> • closeness to knowledge institutions not fully utilised by SMEs 	<ul style="list-style-type: none"> • relatively slow sectoral change

Rural peripheries	Opportunities	Threats
Strengths	<ul style="list-style-type: none"> • revitalisation of traditional sectors for niche markets • some potential for attraction of ‘life-style’ settlers and micro-businesses 	<ul style="list-style-type: none"> • dependence on distribution capacity for access to national/international markets
Weaknesses	<ul style="list-style-type: none"> • closeness to knowledge institutions underutilised by SMEs 	<ul style="list-style-type: none"> • risk of depopulation • dominance of traditional (and to some extent seasonal) sectors

While the manufacturing heartlands come across as being in a fairly strong position – given Denmark’s overall performance in innovation league tables like TrendChart this is hardly surprising – the need to maintain the momentum is also evident, both in terms of maintaining existing strengths, by alleviating existing weaknesses with regard to the interaction between especially SMEs and knowledge institutions, and with regard to countering threats to those traditional industries operating in markets for standardised goods where price competition dominates and the position of Danish firms has hitherto been secured by means of efficient organisation of the production process.

Contrary to this the picture painted of the rural peripheries would seem less encouraging, with uncertain moves into new high-value markets in e.g. food and tourism, geographical distance being seen – despite the smallness of the country compared to other member states – as a barrier both to attraction of incoming ‘settlers’, the use of core-area services by existing firms, and the limited range of facilities making it difficult to hold on to young people once they have started further education.

Given the geographical proximity of the two types of regions – and their limited physical distance to core urban areas – the key challenges for maintaining Denmark’s position with regard to innovation and knowledge would seem to be concerned with widening and deepening the reach of the current model by including more actors in the networked approach to market-oriented innovation.

5.3 Conclusions: Regional innovation potential

The high-tech and knowledge-intensive sectors such as IT and biotechnology are concentrated in the core urban areas of Denmark. Although they are facing the challenge of sufficient public investment in R&D and socio-cultural amenities, they demonstrate high potential to innovative in high-tech and service oriented sectors. Overall, the manufacturing heartlands are in a fairly strong position. The innovation potential of the traditional manufacturing areas depends on their continued ability to innovative on the basis of the Danish network-based model. More specifically, there are significant possibilities to increase the number of innovative firms operating in manufacturing sectors. For the rural peripheries, which rely on the use of natural resource (farming, fishing, nature-based tourism), the innovation potential is in enhancing the access to knowledge-based networks outside the regions themselves with the view to revitalise their traditional sectors.

In short, the policy recommendations following from the preceding analysis can be summarised under two headings.

Policy headline 1: Regionally differentiated policies are essential

- Given the different regional profiles identified above, and the fact that the economic geography of knowledge does not follow administrative borders, the onus will be on both central government and, not least, the new RGFs to ensure that differing needs are accommodated within the new institutional set-up.

Policy headline 2: Stretching the reach of innovative networking

- Both inter-firm as well as public-private network are integrated parts of the 'Danish model', and continued public policy support for this mode of operation must entail the ambition of stretching the geographical reach further beyond the urban core areas and deepening the knowledge content through a closer integration of basic research institutions in innovative networks.

6 Future priorities for Structural Fund support for innovation and knowledge: Options for intervention

The future priorities for Structural Funds support for innovation and knowledge has been discussed with key actors and persons close to the policy-making process on the background of a draft version of the present report. Given the fairly high degree of correspondence between the characteristics of the Danish innovation system and the approach hitherto adopted in Danish regional policy in general and the Structural Funds in particular, it is not particularly surprising that a high degree of consensus would seem to exist with regard to central features of the coming programming period, and furthermore that these views would seem to emphasise a high degree of continuity in terms of policy measures, albeit of course while taking the changing European regulatory framework into account.

6.1 Onwards and upwards? Four challenges for 2007 and beyond

In planning for the next round of European programmes for regional development in Denmark, four challenges need to be addressed in relation to support for innovation and knowledge which reflect built-in tensions that need to be tackled explicitly in order to avoid unforeseen side-effects once policies are beginning to be implemented in a not too distant future. The four challenges reflect general issues regarding regional policy,⁴⁹ and the specific situation in terms of regional development, innovation and institutions that have been laid out in this report.

1. Why?

The current draft versions of programming documents for the 2007-13 period are built around a common rationale for regional policy, namely that in order to tackle the pressures of globalisation it is important that every region maximises its contribution to overall national competitiveness,⁵⁰ in effect making regional policy a regionalised form of industrial policy where the spatial dimension refers to the fact that different instruments will have to be employed in order to reach similar goals in e.g. core urban and peripheral rural areas, and at the same time also suggesting that development will to some extent focus on resourceful areas which will then through various ‘bridge-building’ mechanisms benefit less well-endowed parts of the country.⁵¹

2. Where?

Unlike previous rounds of Structural Funds programming, the question of zoning – if and where support will be targeted spatially – has been delegated to the member states in Denmark’s corner of the EU. The current drafts, in line with previous indications of central government thinking, does not introduce ‘micro-zoning’ but covers the entire

⁴⁹ See e.g. Henrik Halkier: *Institutions, Discourse and Regional Development*. The Scottish Development Agency and the Politics of Regional Policy, PIE Peter Lang, Brussels, 2006 Chapter 3.

⁵⁰ Erhvervs- og Byggestyrelsen: *Regional konkurrenceevne og beskæftigelse i Danmark - Danmarks strategiske dokument*, udkast 29.3.06, pp 7f.

⁵¹ Poulsen & Gregersen, and Christensen, personal interviews.

member state,⁵² and in principle this makes it possible for programmes to tackle development issues in all kinds of localities. In practice territorial issues are, however, included as a horizontal priority (alongside the customary references to gender/ethnicity and environment) which will allow special consideration to be given to e.g. deprived urban or peripheral rural areas.⁵³ The current local government reform has prompted the governing coalition to give political assurances along the lines that areas currently supported by the structural funds will receive at least the same share of European resources in the next programming period,⁵⁴ but as this could be calculated in many different ways, the outcome of this remains unclear and will certainly be subjected to intense political scrutiny in the years to come. As programme administration will be undertaken through the RGFs which will have a strong representation of local authorities, this scrutiny is integrated into the institutional set-up, and as these new partnership bodies will also be involved in managing many other parallel programmes, the possibilities of using e.g. rural development funding to as part of an overall package to address problems in peripheral localities would seem to be at hand - although of course at this stage it still remains to be seen whether in practice the European Commission will accept a programme that is certainly more 'regionalised Lisbon' than regional policy in the traditional explicitly redistributive sense of the word.

3. How?

The draft programming documents are, like the recent 2005 business development, built around the 'four growth drivers' of the OECD – human resources, ICT, entrepreneurialism and knowledge/innovation – and thus a direct link is established from the supra-national level (Lisbon) via national framework legislation to the current proposals for specific development initiatives.⁵⁵ In terms of instruments, Danish regional policy, including the Structural Funds programmes, has since the late 1980s gradually moved away from direct subsidies to individual firms towards a focus on 'framework measures', i.e. forms of support which can be accessed by several or groups of firms, and the coming programming round continues – or perhaps even concludes – this development in that none of the project examples included involve financial subsidies to individual firms.⁵⁶ While this may be still resisted in certain quarters, in North Jutland it is seen more as a useful prompting towards focusing even more systematically on promotion of knowledge-based framework measures also in relation to SMEs, and the eschewing of 'micro-zoning' is seen as a way of making it easier to use the knowledge resources concentrated in major urban areas to support development activities in peripheral localities.⁵⁷ All in all these changes would seem to indicate that the relative importance of knowledge and innovation oriented measures is likely to increase in the coming programming period.

⁵² Cf Henrik Halkier: Denmark: An Overview of Recent Policy Change. Contribution to the 2004 meeting of the EoRPA Consortium, Vaarst: KatPlan 2005.

⁵³ Erhvervs- og Byggestyrelsen: Program for den europæiske regionalfond i Danmark 2007-2013: Innovation og viden, udkast 5.4.06, Silkeborg 2006.

⁵⁴ Poulsen & Gregersen, and Christensen, personal interviews.

⁵⁵ Poulsen & Gregersen, personal interview.

⁵⁶ Erhvervs- og Byggestyrelsen: Program for den europæiske regionalfond i Danmark 2007-2013: Innovation og viden, udkast 5.4.06, Silkeborg 2006. The reduction of the Danish state-aid areas to just 9% in terms of population in itself makes it much more difficult to use financial subsidies as a policy instrument in a more general way (Poulsen & Gregersen, personal interview).

⁵⁷ Poulsen & Gregersen, Christensen, and Gjerding, personal interviews.

4. Who?

The broad contours of the institutional setup for the coming round of Structural Funds programming would seem to be in place, with the main actors being NAEC at the national level and the RGFs at the regional level, with the latter apparently taking over the proactive role in programming and project assessment which has hitherto situated at the regional level in Denmark. At the same time an oft-proclaimed advantage of the new RGFs is that they will be able to integrate a wide range of different regional development programmes, and thus the question of coordination between different sets of actors remains critical. This issue exists not only in a *vertical* form:

- How extensive will central government regulation be, not just with regard to the Structural Funds proper, but also adjoining policy areas such as e.g. rural development? And to what extent will RGFs be able to access resources in the (much better resourced) MSTI part of the Danish innovation system?

but also along *horizontal* lines in two parallel ways:

- Given that the RGFs are funded jointly by central government and local government, how will the prominence of the latter affect their ability to navigate in a policy area where territorial interests and regional competitiveness are not necessarily compatible?
- Will the gradual convergence between MEBI and (at least some) MSTI policies result in synergies rather than overlap and competition?

Currently the mood among the interviewees tended towards the cautiously optimistic,⁵⁸ but with at least five different RGFs due to start operating in regions with very different economic and institutional geographies, the scope for different development paths would seem to be a very real one indeed.

6.2 Strategic orientations for Structural Fund investments in innovation and knowledge

Key conclusion 1: Focus on knowledge and innovation necessary

In the current condition of increasingly global competition, the importance of knowledge and innovation for a high-wage welfare society like Denmark is obvious, and this requires that efforts are made to mobilise resources throughout the country, not just in the well-off urban cores

Recommendation 1: Increase focus on knowledge and innovation in new programmes

From a European perspective, knowledge and innovation have been relatively important in the current Danish programme, but with the next programme being smaller in financial terms, focusing on key areas which can make a difference will be paramount, and support for widening and deepening the network 'Danish model' would appear to be a good choice with regard to knowledge and innovation policy. As summarised in Exhibit 15, this requires both resourcing of core knowledge

⁵⁸ Poulsen & Gregersen, Christensen, Gjerding, and Thomsen, personal interviews.

institutions to deal with such tasks through intermediate bodies, and support for the use of these institutions by private firms through regional signposting services and employment of graduates in SMEs, as practiced by what used to be the Danish Technology Information Centres and the various Icebreaker (graduates-into-firms) programmes respectively.

Key conclusion 2: Focus on proximity of different economic geographies

It is important to bear the different regional economic geographies in mind when designing programmes, but at the same time the relative proximity between e.g. the urban cores and other types of regions must be employed in a forward-looking manner in order to avoid excessive duplication of services

Recommendation 2: Building bridges requires foundations at both ends

In order to make the most of the proximity of difference that would seem to characterise the regional economic geography of Denmark, the notion of ‘bridge building’, i.e. establishing permanent networks between knowledge institutions in core urban areas and firms outside of these is clearly important. In order to become successfully implemented it must, however, rest on solid ‘foundations’ at both ends: not only must the knowledge institutions be geared to interacting with remote SMEs, but private firms must also be motivated to see this as a major source of beneficial change and have the competences that enable them to profit from such interaction, e.g. through in-house employment of graduates. This is probably most relevant for the manufacturing heartlands adjacent to the urban cores, but given the fairly small distances, the reach could certainly be extended further.

6.3 Operational guidelines to maximising effectiveness of Structural Fund interventions for innovation and knowledge

Key conclusion 3: The institutional divisions of labour within the Danish innovation system are gradually becoming less pronounced

The existence of a division of labour between the business-oriented MEBI and the MSTI oriented toward basic research institutions has been noted, but with recent initiatives both with regard to university governance and e.g. the Regional Technology Centres MSTI institutions are likely to become both more extrovert – something which many of them have been for decades anyway – and more oriented towards interacting with SMEs in more remote locations, while at the same time WEBI-sponsored regional policies have become even more oriented towards innovation.

Recommendation 3: Structural Fund measures will benefit from working across existing institutional divides

Located in the MEBI part of the Danish innovation system, Structural Funds programming can support the increased interaction between knowledge institutions

and private firms outside the urban core areas through bridge-building measures, bearing in mind that the ultimate goal is to make private firms behave differently and that this may in some situations require temporary locational changes also on part of knowledge institutions currently situated in the core urban areas in order to achieve closeness to and the trust of new groups of clients.

Exhibit 15: Summary of recommendations on investment priorities

Region or group of regions	Strategic focus	Priority measures	Indicative financial resources (% of Danish total)
Urban cores	Strengthening capacity of knowledge institutions for inter-regional bridge building	<ul style="list-style-type: none"> • increase capacity of intermediate institutions to operate outside immediate region • sensitise specialist knowledge institutions (universities etc.) to long-distance networking with public and private partners 	10
Manufacturing heartlands	Strengthening capacity of knowledge institutions for networking with public and private partner	<ul style="list-style-type: none"> • increase capacity of intermediate institutions to work with smaller public and private organisations, also outside their own region • increase capacity of intermediate institutions to work with smaller public and private organisations 	15
Rural peripheries	Strengthening capacity of knowledge institutions for networking with public and private partner	<ul style="list-style-type: none"> • increase capacity of intermediate institutions to work with smaller public and private organisations • increase capacity of intermediate institutions to work with smaller public and private organisations 	15
	Support sectoral diversification and renewal	<ul style="list-style-type: none"> • preferential treatment for projects which support innovation and sectoral change in peripheral areas 	

Note: Given the lack of correspondence between the regional typology employed and the administrative borders in the coming programming period, the figures above are not more than ‘guestimates’, based on the assumption that the same absolute figures will be directed towards innovation- and knowledge-oriented measures. This will of course increase the relative role of such measures, as the grand total of European Funding will decrease.

Appendix A Methodological annex

A.1 Quantitative analysis of key knowledge economy indicators

A 1.1 Factor analysis

In order to analyse and describe the knowledge economies at regional level in the EU, the approach adopted was to reduce and condense all relevant statistical information available for a majority of regions. The approach involved firstly reducing the information from a list of selected variables (Table 1) into a small number of factors by means of factor analysis.

Table 1. Reduction of the dataset (215 EU-27 regions) into four factors by means of factor analysis

	The 4 factors			
	F1 'Public Knowledge'	F2 'Urban Services'	F3 'Private Technology'	F4 'Learning Families'
Higher education (HRSTE), 2003	.839	.151	.190	.184
Knowledge workers (HRSTC, core), 2003	.831	.164	.267	.327
High-tech services employment, 2003	.575	.367	.428	.323
Public R&D expenditures (HERD+GOVERD), 2002	.543	.431	.275	-.195
Value-added share services, 2002	.323	.869	.002	.121
Value-added share industry, 2002	-.265	-.814	.386	-.061
Employment government administration, 2003	-.217	.745	.124	-.175
Population density, 2002	.380	.402	.043	.038
High and Medium/high-tech manufacturing employment, 2003	-.073	-.331	.873	-.089
Value-added share agriculture, 2002	-.222	-.350	-.672	-.198
Business R&D expenditures, 2002	.335	-.050	.664	.267
S&T workers (HRSTO, occupation), 2003	.560	.178	.589	.382
Population share under 10 years of age, 2001	-.237	.060	-.015	.868
Life-long learning, 2003	.472	-.009	.165	.703
Activity rate females, 2003	.418	-.227	.281	.620

Note: Principal Component Analysis. Rotation Method: Equamax with Kaiser Normalization, a Rotation converged in 9 iterations. Main factor loadings are highlighted in bold. Source: MERIT, based on Eurostat data, mostly referring to 2002 or 2003

Based on the variable with the highest factor loadings we can characterize and interpret the four factors and give them a short symbolic name:

Public Knowledge (F1)

Human resources in Science and Technology (education as well as core) combined with public R&D expenditures and employment in knowledge intensive services is the most important or common factor hidden in the dataset. The most important variables in Public Knowledge are the education and human resource variables (HR S&T education and core). Cities with large universities will rank high on this factor.

One interesting conclusion is that public and private knowledge are two different factors (F1 and F3 respectively), which for instance has implications for policy issues regarding Science-Industry linkages. Public R&D and higher education seems especially related to high-tech services, whereas Business R&D especially serves high- and medium-high-tech manufacturing.

Urban Services (F2)

This second factor contains information on the structure of the economy. It is well known that industrial economies are quite different from services based economies. It is not a matter of development per se, because in the European regions the variety of economic structure is very large and for a large part based on endowments and path dependent developments like the extent to which government administration is located in a region or not. This factor takes into account the differences between an industrial area and a service based area including the public administration services of the government. Another observation is that there are two different 'urban' factors, indicating that academic centres not necessary co-locate with administration centres. What may not be surprising is that the Urban Services factor is not associated with R&D, since R&D is more relevant for innovation in manufacturing than for service industries.

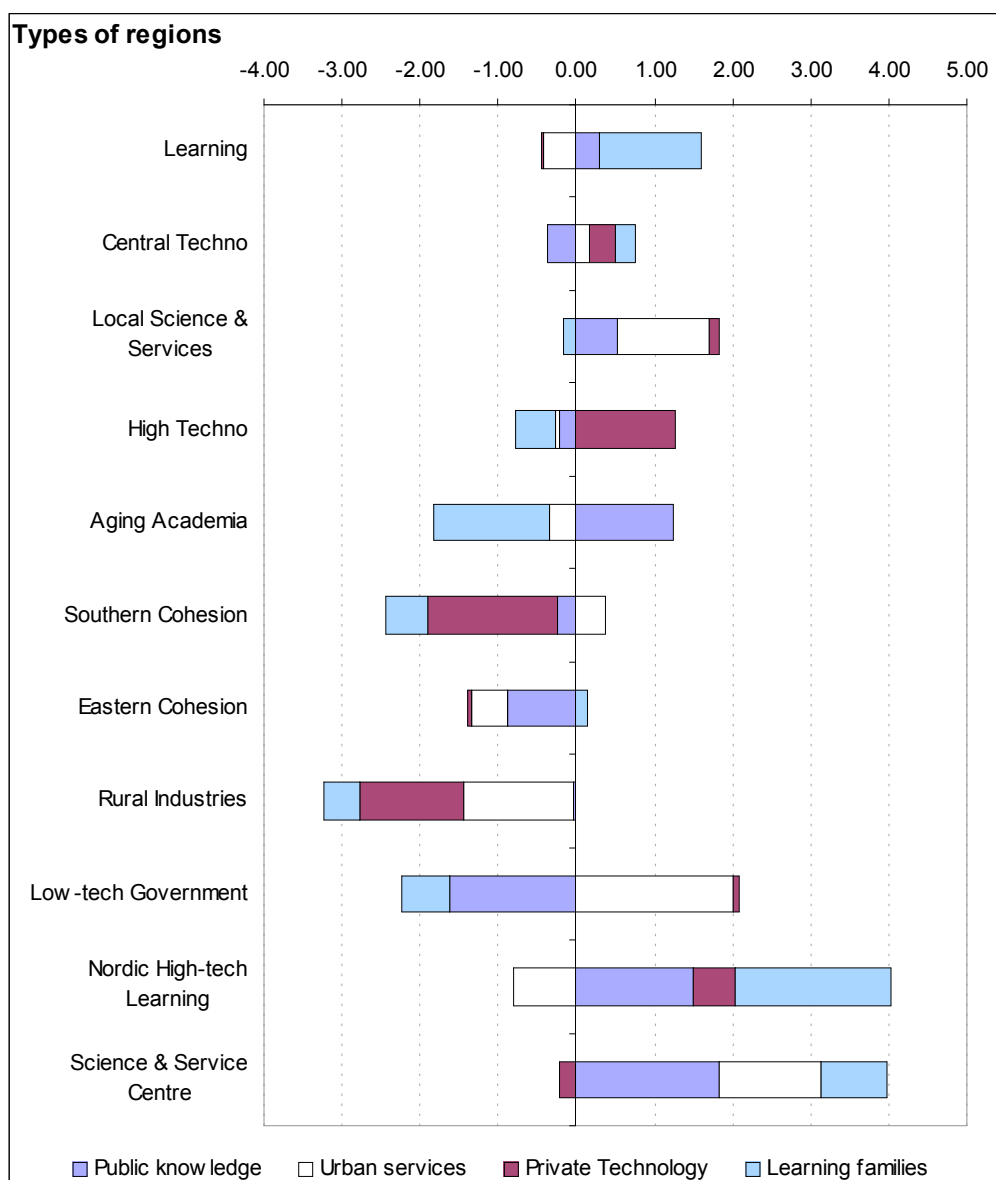
Private Technology (F3)

This factor contains business R&D, occupation in S&T activities, and employment in high- and medium-high-tech manufacturing industries. A countervailing power is the existence of agriculture in the region. One interpretation could be that agricultural land-use goes at the cost of possibilities of production sites. Another interpretation is that agriculture is not an R&D intensive sector.

Learning Families (F4)

The most important variable in this factor is the share of the population below the age of 10. Locations with relatively large shares of children are places that are attractive to start a family. Possibilities for Life Long Learning in a region seems associated with the lively labour participation of the mothers of these youngsters. The Learning Families factor could also be interpreted as an institutional factor indicating a child-, learning- and participation- friendly environment, or even a 'knowledge-society-life-style' based on behavioural norms and values that are beneficial to a knowledge economy.

A 1.2 Description of the 11 types of EU regions



1 Learning

The Learning regions are first of all characterised by the high score on the factor 'Learning Families', and the three main components of this factor: life-long-learning, youth and female activity rate. On the other factors the regions are close to the regional average. Unemployment is on average the lowest compared to the other EU regions. Employment in the government sector is limited. GDP per capita is rather high. The regions are located in Austria, Ireland, the Netherlands, Sweden and the UK. There are many similarities with the Nordic High-tech Learning regions, but the business sector in the Nordic version invest more in R&D.

2 Central Techno

This is a rather large group of regions located mostly in Germany and France with close to average characteristic, but the share of High-tech manufacturing is rather

high. The factor-scores as well as GDP-per head is slightly above the regional average, except for the Public Knowledge factor which is slightly lower.

3 Local Science & Services

This group of regions with diverse nationality consist mainly of capital cities, such as Madrid, Warsaw, Lisbon, Budapest and Athens. These urban area's serve as national centres for business services, government administration, public research institutes and universities. Urban Services and Public knowledge are therefore the strongest factors for this type of region. GDP per capita is on average slightly below the EU25 average, but growing. The low score on life-long-learning is a weakness in most Local Science & Services regions, especially compared to the more wealthy and advanced Science & Service Centres.

4 High Techno

The High Techno regions host many high-tech manufacturing industries. They are mostly located in Germany (e.g. Bayern and Baden-Wurtemberg), some in Italy (e.g. Lombardia and Veneto) and two French regions. This type is very strong in Private Technology and has a high level of GDP per capita. The factors Public Knowledge and especially the Learning Family factor shows a relative weakness, e.g. in life-long-learning. Growth in terms of GDP per capita has been low and unemployment didn't improve much in the previous years.

5 Aging Academia

This group of regions is mostly located in East-Germany and Spain and also includes the capital regions of Bulgaria and Romania. The strength in the Public Knowledge factor is mostly based on the high share of people with tertiary education. The low score on the Learning Family factor is due to little life-long-learning and hosting relatively few children. The unemployment situation has improved, but is still very high.

6 Southern Cohesion

Southern cohesion regions are located in Southern Europe, consisting of many Greek, some Spanish and two Portuguese regions. The low score on the Private Technology factor is striking. There is hardly any high-tech manufacturing nor business R&D. Services is the most important sector, but also agriculture is still a rather large sector. The share of manufacturing industry in value added is very limited. Population density is low, but on average it has been increasing.

7 Eastern Cohesion

Manufacturing industries is the dominant sector, whereas services and agriculture are rather small sectors. This type of region is mostly located in Poland, Czech Republic, Hungary and Slovak Republic. Two Portuguese regions are also included. The Public Knowledge factor is the main weakness of this type of regions. However, the score on the Private Technology factor is close to average, which means that it is much stronger in this respect than the Southern Cohesion regions. Unemployment is high, even compared to Rural Industries and Southern Cohesion regions.

8 Rural Industries

Besides a low per capita GDP, Rural Industries regions have in common a low score on both the factors Urban Services and Private Technology. Population density is

very low. The service sector is often very small. Especially agriculture but also manufacturing industries are relatively large sectors. Besides regions in Bulgaria and Romania and Greece, there is also a more nordic sub-group consisting of Estonia, Lithuania and Itä-Suomi

9 Low-tech Government

This type of region, mostly located in southern Italy is characterised by a very low score on Public Knowledge combined with a high share of employment in the Government sector. Unemployment is severe, on average comparable to Eastern Cohesion regions. GDP per capita is however close to the regional average.

10 Nordic High-tech Learning

The Nordic version of the learning regions are typically strong in the Learning Family factor, but this type also has by far the highest business R&D intensity. In contrast with the popular characterisation of Nordic societies, the size of the government administration is the lowest of all the types. The low score on Urban Services is also due to the low population density. A rather unique feature of this type of regional knowledge economy is the combined strength in both the Public Knowledge and the Private Technology factor.

11 Science & Service Centre

The main characteristics of this urban group of regions are the high scores on the Public Knowledge and Urban Services factors. Population density is very high. This type also has the highest GDP per capita and productivity. The variables that are captured by the factor Learning Families also show a score above the regional average, but disappointing is the relatively low presence of high and medium-high-tech manufacturing and the business R&D intensity.

A.2 Qualitative analysis and preparation of country reports

In summary, the country reports were prepared in the following stages:

A first country document was prepared by the core study team in the form of a **template country report**. It contained overall guidance to the country experts and included a number of pre-filled tables, graphs and analysis sections based on information available at EU level.

Next, the core team members and the national experts who were involved in the pilot phase of the project commented completed elements of the templates. Drafted elements and templates were completed and compiled into **first country briefings (draft pilot reports)** by the national experts involved in the pilot phase of the project. These pilot country reports were prepared by experts for Belgium, Greece, Italy, France, and Poland.

Once the five first country briefings were completed, a **final set of guidelines** was prepared by the core team. These guidelines were agreed with the Commission services responsible for this evaluation. Prior to this, all first country briefings were reviewed during the January 2006 and presented to a first meeting of the scientific committee.

The work during the **country analysis phase** included:

- Undertaking a series of key interviews (KI) with policy decision makers;
- Organising a focus group (FG) with key national or regional RDTI stakeholders;
- Collecting additional information and finalising short case studies; and
- Preparing the synthesis notes of these various activities.

The above-mentioned work served as qualitative data and allowed the national experts to compile the draft **country reports**. All reports were subsequently reviewed, checked and finalised by the core team and the consortium members. Once this first check was completed, the core team organised a final peer reading of the document to verify its overall consistency and to ensure a final English language editing of the document. The core team then completed the final editing and layout of the document with a view to publication.

An overall synthesis report of all has been prepared and will be published by the European Commission providing an overview of the issues addressed in each of the 27 country reports produced by the evaluation team.

Appendix B Statistical tables and regional scorecards

B.1 Overall quantitative analysis per region

Cluster	Economic performance				Public knowledge				Urban services			
	Unemployment		GDP per capita growth 1996-2002		High tech services	Higher education	Knowledge workers	Public R&D	Population density	% Value added		Government sector
	2003	2002	2002	2002						industry	services	
EU25	9,2	21170	4,8	4556	3,2	20,7	2003	2002	2002	2002	2002	2003
Regional average	9,4	18882	4,8	3914	2,8	18,9	11,6	0,69	117	27,0	70,9	7,5
Denmark	5,4	25936	4,3	5957	4,5	31,8	10,7	0,49	294	28,9	66,6	7,6
Relative to EU25	170	123	90	131	141	154	20,2	0,78	125	25,5	72,2	5,8
Denmark	5,4	25936	4,3	5957	4,5	31,8	20,2	0,78	125	25,5	72,2	5,8
Copenhagen* (DK001)	5,9	42615			4,5	31,8	20,2	0,78	6089	10,4	89,1	5,8
* København og Frederiksberg Kommuner												
Private technology												
High tech manufacturing	Business R&D		S&T workers		% Value added agriculture		Learning families		Cluster factor scores			
	2003	2002	2003	2002	Lifelong learning	Youth 2001	Female activity rate	Public knowledge	Urban services	Private Technology	Learning families	Per capita GDP
EU25	6,6	1,2	20,7	2,1	8,7	10,8	48,3					
Regional average	6,5	0,8	19,5	4,3	7,1	10,5	47,2					
Denmark	6,1	1,8	30,3	2,4	22,8	12,8	60,1					
Relative to EU25	92,7	141,1	146,1	112,7	260,9	118,5	124,4					
Denmark	6,1	1,8	30,3	2,4	22,8	12,8	60,1	1,8	-0,3	-0,1	2,0	0,9
Copenhagen* (DK001)	6,1	1,8	30,3	0,0	22,8	12,8	60,1	2,6	1,7	-0,6	1,9	
* København og Frederiksberg Kommuner												

B.2 Regional Scorecards Can be found as Exhibit 2 in this report.

Appendix C Categories used for policy-mix analysis

C.1 Classification of policy areas

Policy area	Short description
Improving governance capacities for innovation and knowledge policies	Technical assistance type funding used by public authorities, regional agencies and public-private partnerships in developing and improving policies and strategies in support of innovation and knowledge. This could include past ERDF innovative action programmes as well as support for instance for regional foresight, etc.
Innovation friendly environment;	This category covers a range of actions which seek to improve the overall environment in which enterprises innovate, and notably three sub groups: innovation financing (in terms of establishing financial engineering schemes, etc.); regulatory improvements and innovative approaches to public services and procurement (this category could notably capture certain e-government investments related to provision of services to enterprises) ; Developing human capital for the knowledge economy. This category will be limited to projects in higher education aimed at developing industry orientated courses and post-graduate courses; training of researchers in enterprises or research centres ⁵⁹ ;
Knowledge transfer and technology diffusion to enterprises	Direct or indirect support for knowledge and technology transfer: direct support: aid scheme for utilising technology-related services or for implementing technology transfer projects, notably environmentally friendly technologies and ITC; indirect support: delivered through funding of infrastructure and services of technology parks, innovation centres, university liaison and transfer offices, etc.
Innovation poles and clusters	Direct or indirect support for creation of poles (involving public and non-profit organisations as well as enterprises) and clusters of companies direct support: funding for enterprise level cluster activities, etc. indirect support through funding for regrouping R&D infrastructure in poles, infrastructure for clusters, etc.
Support to creation and growth of innovative enterprises	Direct or indirect support for creation and growth of innovative firms: direct support: specific financial schemes for spin-offs and innovative start-ups, grants to SMEs related to improving innovation management, marketing, industrial design, etc.; indirect support through funding of incubators, training related to entrepreneurship, etc.
Boosting applied research and product development	Funding of “Pre-competitive development” and “Industrial research” projects and related infrastructure. Policy instruments include: aid schemes for single beneficiary or groups of beneficiaries (including IPR protection and exploitation); research infrastructures for non-profit/public organisations and higher education sector directly related to universities.

⁵⁹ This is part of the wider area of in-house training, but in the present study only the interventions targeted to researchers or research functions will be analysed.

C.2 Classification of Beneficiaries:

Beneficiaries	Short description
<i>Public sectors</i>	Universities National research institutions and other national and local public bodies (innovation agencies, BIC, Chambers of Commerce, etc..) Public companies
<i>Private sectors</i>	Enterprises Private research centres
<i>Networks</i>	cooperation between research, universities and businesses cooperation between businesses (<i>clusters of SMEs</i>) other forms of cooperation among different actors

C.3 Classification of instruments:

Instruments	Short description
<i>Infrastructures and facilities</i>	Building and equipment for laboratories or facilities for university or research centres, Telecommunication infrastructures, Building and equipment for incubators and parks for innovative enterprises
<i>Aid schemes</i>	Grants and loans for RTDI projects Innovative finance (venture capital, equity finance, special bonds, etc.) for innovative enterprises
<i>Education and training</i>	Graduate and post-graduate University courses Training of researchers

Appendix D Financial and policy measure tables

D.1 Additional financial tables

D 1.1 RTDI plus business (innovation technology) support

Objective	Total cost	Structural Funds			National funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 2	74.142.574,55	32.646.658,91	32.646.658,91	0,00	41.495.915,64	0,00
TOTAL COHESION POLICY						
Objective 2	441.363.171,00	197.000.000,00	140.459.584,00	56.540.416,00	217.688.518,00	26.674.653,00

Categories 181 to 184 plus :

- 152 Environment-friendly technologies, clean and economical energy technologies
- 153 Business organisation advisory service (including internationalisation, exporting and environmental management, purchase of technology)
- 155 Financial engineering
- 162 Environment-friendly technologies, clean and economical energy technologies
- 163 Enterprise advisory service (information, business planning, consultancy services, marketing, management, design, internationalisation, exporting, environmental management, purchase of technology)
- 164 Shared business services (business estates, incubator units, stimulation, promotional services, networking, conferences, trade fairs)
- 165 Financial engineering

D 1.2 Broad innovation and knowledge economy funding

Objective	Total cost	Structural Funds			National funds	
		Total	ERDF	ESF	Public	Private
RTDI INTERVENTIONS						
Objective 2	114.247.773,11	114.247.773,11	49.539.468,82	0,00	49.539.468,82	0,00
TOTAL COHESION POLICY						
Objective 2	441.363.171,00	197.000.000,00	140.459.584,00	56.540.416,00	217.688.518,00	26.674.653,00

This third calculation adds RTDI plus business (innovation & technology) support plus information society. As D.1.1 plus:

- 322 Information and Communication Technology (including security and safe transmission measures)
- 324 Services and applications for SMEs (electronic commerce and transactions, education and training, networking)

D.2 Summary of key policy measures per programme

Main measures in favour of innovation and knowledge

Identified RTDI measure or major project	Focus of intervention (policy areas classification)*	Main Instruments**	Main beneficiaries***
Priority 1.1	Improving governance capacities for innovation and knowledge policies	Infrastructures and facilities	Private sector Public Sector Networks
Priority 1.2	Support to creation and growth of innovative enterprises	Aid schemes	Private sector Networks
Priority 2.1	Innovation friendly environment	Aid schemes	Private sector
Priority 2.2	Support to creation and growth of innovative enterprises	Aid schemes	Private sector Networks

* Classification of RTDI interventions: Improving governance capacities for innovation and knowledge policies; Innovation friendly environment; Knowledge transfer and technology diffusion enterprises; Innovation poles and clusters; Support to creation and growth of innovative enterprises; Boosting applied research and product development (see appendix).

**Classification of instruments: Infrastructures and facilities; Aid schemes; Education and training.

***Classification of Beneficiaries: Public sectors; Private sectors; Networks

Appendix E Case studies

Name of Case (related policy measure or action)
Title of measure/project: Metal Supply Description : Create a transparent market for metal and engineering industries through a digital communication platform. Zone: Objective 2
Brief history and main features
The programme was a multi-fund project supported both by ERDF (public knowledge project) and ESF (Training and Competence development). Financial support was provided for the network to develop a common website (www.metal-supply.com), support managers to develop suitable e-business strategies and modernise their logistic operations, and train staff in the participating firms. There is no known external source of inspiration, the main immediate beneficiaries were the private firms within the network, their managers and staff, but indirectly also the public/private providers of advice.
Main results
The main outcomes have been the creation of the website and the increasing business activities around it, but in addition one new firm with 25 staff has been created which commercialises ideas emanating from the network. A clear measure of success is that today 500 firms from across the country have become paid-up members of the network, and it is thus likely that the initiative will be able to become self-funding and exist also after the end of Structural Funds support.
Reasons of success and conditions for repeatability
The initiative been considered a best practice because it is an example of the introduction of new technology and business practices in traditional industries, which filled a gap in the market (which none of the participating SMEs could have done on their own) through network formation. This could potentially serve as a source of inspiration for innovative management of certain aspects of producer-supplier relations in other traditional industries, linking them up with new business opportunities – but it clearly requires a core of firms with management teams dedicated to pursuing change along these lines.

Appendix F Further reading

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Useful websites

www.ebst.dk

www.nja.dk

www.oem.dk

www.videnskabsministeriet.dk

Appendix G onsulted stakeholders

Name	Position	Organisation
Ulla Christensen	Vice Head of Department	Regional Policy Department, North Jutland County Council, Aalborg
Allan Næs Gjerding	Dean, formerly Director of the North Jutland County Council's Regional Policy Department	Social Science Faculty, Aalborg University
Preben Gregersen	Head of Department	NAEC, Silkeborg
Ebbe Poulsen	Head of Department	NAEC, Silkeborg
Morten Solgaard Thomsen	Special Adviser	MSTI, Copenhagen