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Co-operation between companies and the advisory system in innovations – a comparative analysis of Northern Germany and Western Denmark

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Co-operation between companies and the advisory system in innovations – a comparative analysis of Northern Germany and Western Denmark

Abstract:

Innovations and the capacity to innovate are crucial factors in the development of a firm and its ability to adapt to changes in the external environment. Growing attention has been paid to the mechanisms facilitating innovation in firms, both in large, small and medium-sized enterprises.

As a consequence, attention has been on the role of innovation policy in economic policy in general and regional development in particular. The aim of this paper is to analyze the linkages between the business advisory system's efforts to promote innovation and the innovative activity within the firm with special attention to small and medium sized enterprises. The main aspects addressed deal with entities and relations of the innovative environment. The focal point is the interaction between the analyzed business entity and the external environment as a part of a broader network of innovative relations covering intra-firm as well as extra-firm relations and processes.

The paper will highlight three aspects of the topic:

- In the first part of the paper concepts and policies of innovation are discussed with regard to their ability to influence economic development.
- The second section is dedicated to an introduction to the role of the advisory system in the creation of a regional innovative business environment, and will in particular focus on the comparative analysis of regional systems of innovation in an organizational and structural perspective.
- The next section analyzes the regional system of innovation based on a survey of manufacturing firms and advisory organizations in Western Denmark and Northern Germany. The essential objective of this survey is to identify the potential of, and the crucial obstacles to a proactive regional innovation policy, since previous studies have shown that in particular small firms have difficulties in using the advisory system and the services offered.

Based on this analysis, the study aims at contributing to the ongoing discussion of the role of public support schemes in innovation and technology in a regional and organizational perspective, based on the comparative analysis of regions in two countries.

Key words: Regional system of innovation - Advisory system - Business incubators and science parks - R & D programs

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Paper prepared for workshop on 'Entrepreneurship, networks and innovation' of the 44rd European Congress of the Regional Science Association in Oporto, Portugal, August 2004.

1. Introduction

Innovations and the capacity to innovate are crucial factors in the development of a firm and its ability to adapt to changes in the external environment. Growing attention has been paid to the mechanism facilitating innovation in firms, both in large, small and medium-sized enterprises.

As a consequence, attention has been on the role of innovation policy in economic policy in general and regional development in particular. A recent Danish example is a governmental report entitled 'The competitiveness of regions', in which innovation is considered one of the drivers behind regional economic growth (Copenhagen Economics 2004). The aim of this paper is to analyze the linkages between the business advisory system's efforts to promote innovation and the innovative activity within the firm with special attention to small and medium sized enterprises. The main aspects addressed deal with entities and relations of the innovative environment. The focal point is the interaction between the analysed business entity and the external environment as a part of a broader network of innovative relations covering intra-firm as well as extra-firm relations and processes.

In the initial part of the paper, concepts and policies of innovation are discussed with regard to their ability to influence economic development. The role of the advisory system in the creation of a regional innovative business environment is discussed, and will focus on the comparative aspects of regional systems of innovation in an organizational and structural perspective.

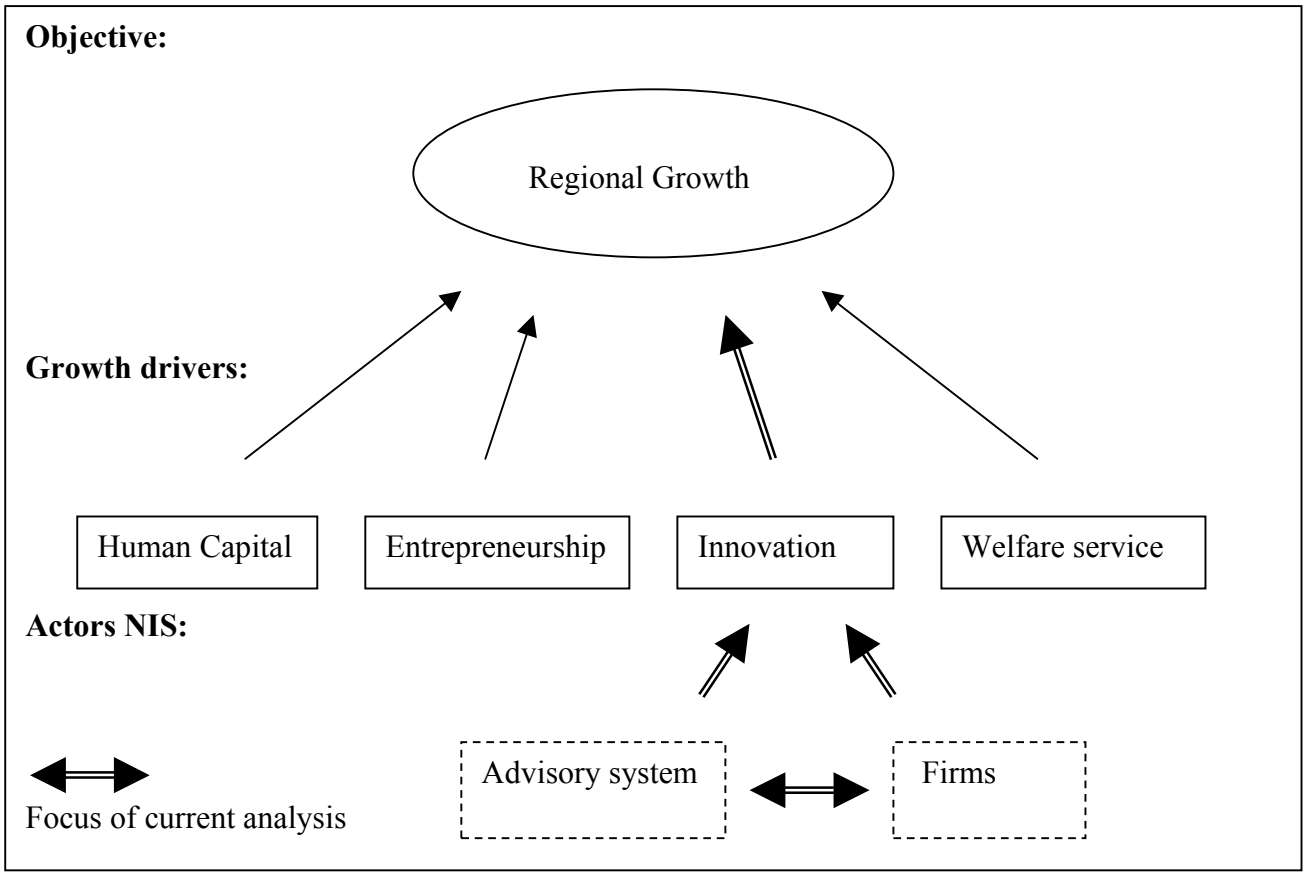
The next section analyzes the regional system of innovation based on a survey of manufacturing firms and advisory organizations in Western Denmark and Northern Germany. The essential objective of this survey is to identify the potential of, and the crucial obstacles to a proactive regional innovation policy, since previous studies have shown that in particular small firms have difficulties in using the advisory system and the services offered.

The final section provides and overview of the main results of the study aiming at contributing to the ongoing discussion of the role of public support schemes in innovation and technology in a regional and organizational perspective, and at sketching the perspectives for future research.

2. Innovation and regional development

Innovation has not only become an important building block in academic studies of regional development, but also in more policy oriented investigations of the factors behind regional development or the lack of development. Regional systems of innovation have become an integrated part of the concepts of national systems of innovation (see Acs & Zarga 2002a). A recent Danish example is a report on regional competitiveness focusing on different parts of Denmark, not necessarily identical with the current administrative regions, the counties. The political importance of this strategy is stressed in the recent Danish White paper on regional policy (The Ministry of the Interior and Health, 2004), that says that innovation is one of four drivers in a regional growth policy, see figure 1 below:

Figure 1 A regional growth model



Source: Modified figure based on The Ministry of the Interior and Health 2004, p28.

The main focus of the current paper is on the drivers behind the innovative activity, i.e. the firms and the advisory system and the relationship between the two, indicated by the arrows in Figure 1, but the system has of course to be seen as a whole. Clusters and local innovation systems are integrated parts of the concept of economic base in a new order, dealing with innovation, regional

growth and in particular the development of a regional knowledge and learning economy[1].

2.1 The concept of innovation

Innovation policy has become an important instrument in regional development policy in many countries, and comparative studies have focused on the differences of the national and regional systems of innovation (Asheim et al 2003) and their impact on regional development and disparities.

In the analysis of innovative behaviour and the targets of innovation policy, a distinction between product and process innovation is useful, not only in the investigation of innovation patterns of firms or industries (see Christensen et al., 1999), but also with regard to an evaluation of innovation as an instrument in regional development policy. Product innovation deals with the process of launching a new product, both technically and in a marketing perspective. Process innovation focuses on the process of production and has usually a broader impact than product innovation on the competencies of a firm[2].

From a regional development point of view, the extra-firm spin off of the innovative activity are the single most beneficiary aspects, and the main reason to focus on innovation as a driver for regional growth and equalization. In this perspective, process innovation is probably more important due to the broader potential regional impact on the regions level of competence and the knowledge base. In practice, in regions with predominantly small and medium-sized enterprises (SME's), product innovation is often the only applicable form of innovation due to the high costs of introducing new production technology.

2.1 The Policy Environment

The creation of clusters and the nature of regional or national systems of innovation have become a central building block in regional policy, often combining regional instruments with a traditional sector oriented industrial policy. During the eighties and nineties, there was a tied competition for funding between sectoral and regional targets in business development policy in many countries often reinforced by the participation in EU research and development programs (R&D). Particularly in North Western Europe, the sectoral oriented R&D policy was the main beneficiary.

Political signals in Denmark have shifted to some extent since the late 1990s. The first signs were

1. For an overview and an introduction, see Cheshire & Malecki 2004, pp. 256 – 260.
2 . For further elaboration, see Cornett & Freytag 2002. See also Analyseinstitut for Forskning 2003, p. 8.

already visible in the last year of the former social democratic government when it launched new initiatives for Western Denmark, and this has recently been continued by the liberal-conservative government with proposals like a regional assessment for new governmental initiatives, relocation of public agencies and a new growth strategy. A part of this strategy was to support regional development strategies with 20m DKK (approximately 3m EURO) over the next 4 years (Journal of Nordregio, 2002). Growing political attention in Danish business development policy has been given to the importance of supporting the creation of clusters (i.e. the so-called 'Alu-cluster' with one core in the south-western corner of Denmark) and the regional aspects of innovation supporting measures. The importance of these instruments for economic growth and the system required to stimulate innovative activities revitalised the interest in regional clustering as an instrument in business development policy. In this perspective, innovation policy became a tool in regional policy - or to put it in another way, regional policy adapted innovation policy as an integrated part of business development policy. The mushrooming of business incubators, Science Parks and Technology Centers, is the best proof of this tendency.

To what extent this can contribute significantly to the main objective of regional policy - to improve living conditions and equalize disparities within a given area - is of course another question. The strategies used in regional business development policy have changed over time, mostly reflecting the general approach to economic policy. The effect, measured as convergence of economic indicators (i.e. the rate of unemployment or GDP per capita) has despite of some success stories been rather modest in most countries[3] .

The means of regional policy in Denmark as well as in Germany have been altered several times during the last decades. Focus has shifted toward endogenous development, sustainable growth, or innovation oriented strategies. Common for all of them is that they emphasize bottom-up and decentralized approaches[4]. The tendency has impacts on both related policies, i.e. the EU regional policy, and on the balance between public and private sector affairs.

Within the EU, this has been reinforced through the alterations of the EU structural policy toward a more program oriented approach since the reform in the late 1980s emphasizing the regional participation. The reverse side of the coin is, that regions compete, and are tempted to embark on a kind of 'beggar your neighbor' policy competing to offer the best conditions for new or moving industries. The strong and wealthy regions or municipalities can easily out-compete the less well off part of the country with increasing disparities as consequence if the central government - or the EU competition agency - does not takes action. The crucial issue is how to balance the need of funding

3 . A recent assessment for Europe at the turn of the century can be found in Cuadrado-Roura & Parellada (2002).

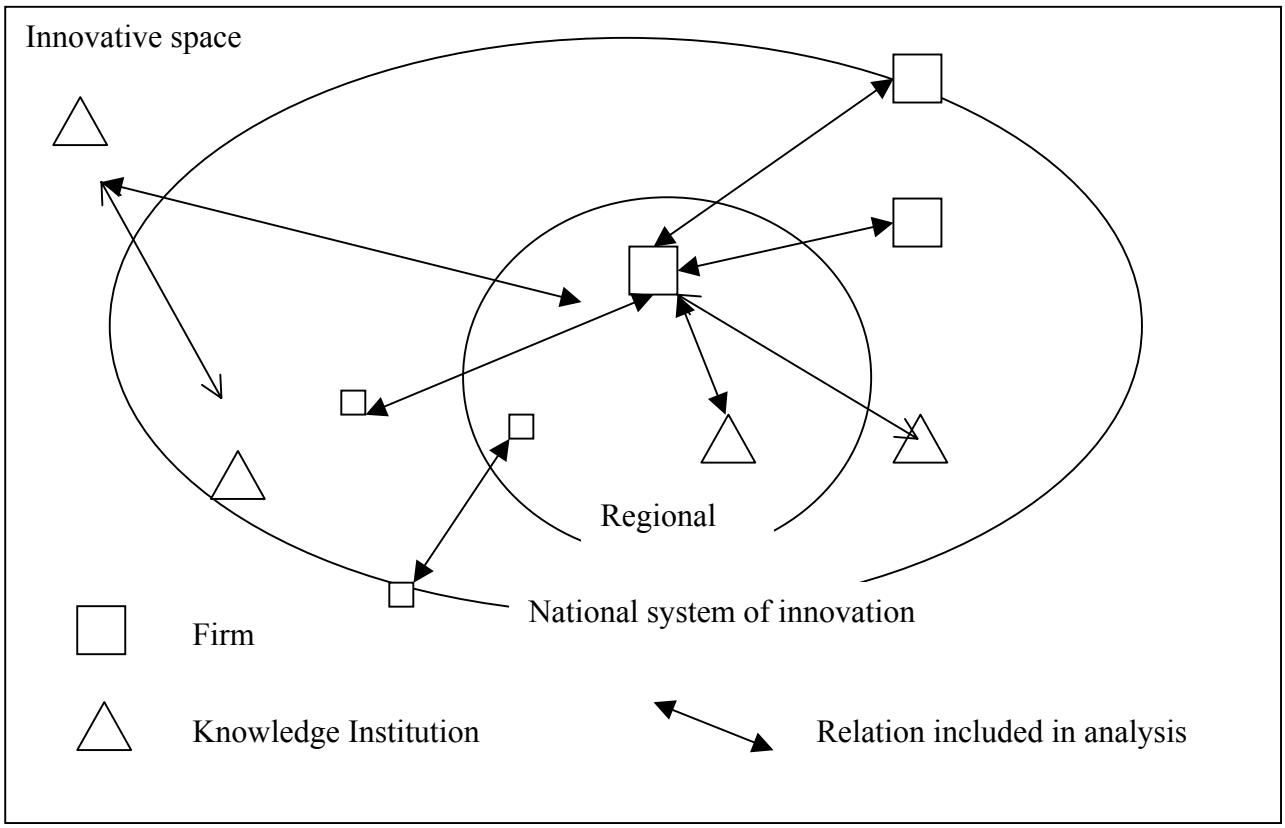
4 . As 'side payment', central governments in many countries used this shift as an excuse to transfer the responsibility for regional development funding to regional authorities.

(from national sources) and the bottom-up strategies within the region with the constrains set by multinational (EU) and global (WTO) constraints on business subsidies. A beneficial consequence of this shift toward a proactive regional business development policy is that regional authorities has become aware that a successful policy has to be holistic and integrate all aspects of the local or regional economy, including universities, R&D institutions, and technological advisory agencies, etc. A proactive strategy should work as a mediator and integrate the local actors (see Steiner 2002, p. 17f).

3. Innovation support and innovative behavior – survey results from Western Denmark and Northern Germany

One of the purposes of this study is to analyse the importance of the organizational set-up of the different types of national systems of innovation. From a principal point of view, a regional system of innovation has to be investigated within their specific national system of innovation and the linkages to firms and other actors outside the regional and national context, see Figure 2 below[5].

Figure 2 Innovative Space: Actors and relations



Source: Here quoted from Cornett 2003.

5 . For an assessment of the Danish innovation policy environment and the stimulating policy in praxis, see Cornett 2003.

Currently, the set-up of the Danish business support system is undergoing reforms partly due to regional initiative, i.e. the reorganisation of Sønderjyllands Erhvervsservice (SJEC) including the integration of the former state-operated Technological Information Centres (TIC) and the more policy oriented creation of URS, a development Board for Southern Jutland[6]. More important for the future of the regional business development policy is the ongoing discussion of a reform of local and regional government in Denmark. Until very recently, the expected outcome was to reduce the number of regions to 4 or 5, and only give them the responsibility for the health-care system. In this model the responsibility for regional policy were located at the national level, and local business development policy at the municipalities. The latest, not concluded negotiations in the Danish parliament seems to keep some regional policy and labour market policy responsibilities on the regional level.

Similar to the ongoing Danish reforms of the regional business development framework a discussion has started in Germany. Of certain importance for this study is the proposal to merge the technology supporting organizations (Technologie-Transfer Zentrale, ttz) and the business development agency (Wirtschaftsförderung Schleswig Holstein, WSH). Furthermore, it is planned to merge two foundations for Energy and Technology, renamed 'Innovationsstiftung' (Innovation foundation). The overall aim of this process is, similar to the activities in Western Denmark and Southern Jutland, to improve the regional competitiveness with the objective to attract and keep industries and employment in the area (Nordschleswiger, April 20, 2004). Finally, proposals have been launched to reorganize the system of Chambers of Commerce (Industrie- und Handelskammern) in Schleswig Holstein. On this background it is useful to assess to what extent the business service system and the innovation supports agencies operate in an appropriate way.

3.1 Survey of the advisory system

The remaining part of this section is dedicated to an assessment of the performance and acceptance of the advisory system in Northern Germany and Western Denmark[7]. Before embarking on an analysis of the advisory system it is useful to investigate how the firms use the advisory system. As it can be seen from table 1, approximately one third of the firms in Western Denmark (29,1 %) and Soenderjylland (38,1%) uses the system when engaged in innovative activities.

6 . For details, see URS 2004, and the annual reports of Sønderjyllands Erhvervscenter at www.SJEC.dk. Similar processes of reorganization takes place in most other Danish regions (counties).

7 . For detailed information, see Innovation 2002, Hinz et al. 2004 (forthcoming), Information on the survey details are also available in Cornett & Soerensen 2004.

Table 1 Involvement of Advisory Organizations in innovative activities of the firms (Firm-survey-DK)

Did you use the advisory system?	Sønderjylland N	Western Denmark N	Sønderjylland %	Western Denmark %
Yes	16	102	38,1	29,1
No	26	249	61,9	70,9
Total	42	351	100	100

Source: Innovationsanalyse D - DK 2003 (Firm survey # 58).

The numbers for Germany, see Table 2, are lower, approximately 20% in both areas. Due to the low response rate of the surveys it is not possible to explain the differences fully, but it seems that differences in the sectoral mix and size of the companies is of some importance (for a quantitative statistical analysis, see Cornett & Soerensen 2004).

Table 2 Involvement of Advisory Organizations in innovative activities of the firms (Firm-survey D)

Did you use the advisory system?	Schleswig (PV) N	Northern Germany N	Schleswig (PV) %	Northern Germany %
Yes	4	77	19,0	20,3
No	17	303	81,0	79,7
Total	21	380	100	100

Source: Innovationsanalyse D - DK 2003 (Firm survey # 58).

As mentioned in the introduction to this section, important changes in the institutional set-up of the advisory system have taken place or are planned to be introduced. Table 3 provides a brief overview of the organisational affiliation of the advisory institutions in the survey. The only notable difference between Denmark and Germany is that there are no EU-affiliated organisations in the German survey. More important is that the share of NGO or interest organization related institutions and of private sector advisories seems to be similar on both side of the border[8].

8 The larger coverage in the Danish part of the border region is caused by the fact that we tried to approach as many advisory agencies as possible, and our survey here is based on a list from the TIC and a random sample based on CD-direct. For details, see Hinz et al. 2004, forthcoming.

Table 3 Organizational affiliations of advisory institutions.

Organizational affiliation	Sønderjylland		Western Denmark		Schleswig (PV)		Northern Germany	
	N	%	N	%	N	%		%
EU	5	14,3	5	5,8	0	0,0	0	0,0
Governmental (nat.)0	1	2,8	3	3,5	1	12,5	8	4,7
State	-	-	-	-	1	12,5	18	10,6
County	0	0,0	2	2,3	1	12,5	10	5,9
Municipalities	1	2,8	2	2,3	1	12,5	5	2,9
IO or NGO etc.	7	20,0	26	30,2	1	12,5	31	18,2
Private/misc.	21	60,0	48	55,8	3	37,5	98	57,6
Total	35	100	86	100	5 (8)	100	150 (170)	100

Source: Innovationsanalyse D - DK 2003 (Advisory survey #3).

Note: More than one answer possible.

From an organizational point of view, the most important difference between the Danish and the German survey is that project organizations are more widely used in Denmark, and that regionalization seems more frequently used in Germany, the latter probably due to the fact that Germany is larger, which probably reinforces the use of regional subsidiary companies. Due to the difference of the data regarding the possibility to tick more than one principle in the German survey, differences have to be interpreted with care.

Table 4 Principles of organization in the advisory system

Organisationsstruktur	Sønderjylland		Western Denmark		Schleswig (PV)		Northern Germany	
	N	%	N	%	N	%	N	%
Projektorganization	16	45,7	36	41,9	2	22,2	64	21,1
Functional	7	20,0	23	26,7	3	33,3	82	27,0
Regional	1	2,9	5	5,8	3	33,3	70	23,0
According to industry	7	20,0	17	19,8	1	11,1	72	23,7
Misc.	4	11,4	5	5,8	0	0,0	16	5,3
Total	35	100	86	100	5 (9)	100%	145 (304)	100%

Source: Innovationsanalyse D - DK 2003 (Advisory survey #4).

Note: More than one answer possible.

3.2 Further results from the Danish survey

To use innovation as a tool in business development policy in general or more specific in strengthened the competitiveness of regions means that it not is sufficient to make technological advice available. As shown earlier (Christensen et al 1999 & 2003) the crucial issue is to inform the target group about the advisory systems service. Table 5 below shows, that at least this lesson has

been learned. Most advisors seem to be very proactive in their business. The predominant metods used in their external communication are proactive or based on contact mediation, in particular the non-governmental institutions.

Table 5 Results from the Danish Advisory survey: Methods used in external communication to firms:

Organizational affiliation	Reactive		Proactive		Contact mediation		Other types	
	N	%	N	%	N	%		%
EU	0	0,0	4	14,3	1	3,1	0	0,0
Governmental (nat.)0	2	33,3	1	3,6	0	0,0	0	0,0
State	-	-	-	-	-	-	-	-
County	2	33,3	0	0,0	0	0,0	0	0,0
Municipalities	0	0,0	1	3,6	1	3,1	0	0,0
IO or NGO etc.	1	16,7	7	25,0	16	50,0	1	14,3
Misc.	1	16,7	15	53,6	14	43,8	6	85,7
Total	6	100	28	100	32	100	7	100

Source: Innovationsanalyse D - DK 2003 (Advisory surveys #3 & #13).

Note: More than one answer possible.

The channels used in acquisition of new customers are summarized in table 6 below, showing that existing customers for all types of advisory institutions are the most important source, but also suppliers, other consultants, fairs and internet search is of some importance in establishing new customer relations. Indirectly this table contributes to the mapping of the innovative networks sketched in Figure 2, seen from the advisory systems perspective.

Table 6 Results from the Danish Advisory survey: Which channels are used to find new customers?

Organizational affiliation	Existing customers	Suppliers	Private consultants	Public consultants	External investors	Competitors	Internet search	Fairs	Misc.
	N	N	N	N	N	N	N	N	N
EU	4	2	1	1	0	0	2	2	1
Governmental (nat.)	1	0	0	0	0	0	1	0	1
State									
County	1	0	0	0	0	0	0	0	1
Municipalities	0	1	0	0	0	0	0	1	1
IO or NGO etc.	20	6	5	1	2	2	3	9	4
Misc.	35	5	11	5	6	2	13	9	15
Total	61	14	17	7	8	4	19	21	23

Source: Innovationsanalyse D - DK 2003(Advisory surveys #3 & #14).

Note: More than one answer possible.

Table 7 tries to illuminate the same problem from the demand side, providing an overview of how

the customers of the advisory system found their advisers, according to the advisory institutions' self-assessment.

Table 7 Results from the Danish Advisory survey: Through which channels do your customers find you?

Organizational affiliation	References	Clients network	Competitors	Other advisory org.	Internet search	Fairs	Misc.
	N	N	N	N	N	N	N
EU	5	3	1	1	2	2	0
Governmental (nat.)	2	1	0	0	0	0	1
State							
County	1	2	0	0	0	0	0
Municipalities	0	2	1	0	0	0	0
IO or NGO etc.	20	14	1	4	8	8	0
Misc.	36	22	2	14	12	6	9
Total	64	44	5	19	22	16	10

Source: Innovationsanalyse D - DK 2003 (Advisory surveys #3 & #15).

Note: More than one answer possible.

One of the central problems in innovation for a company is to avoid using resources on development activities in an area, where the information is already is available, or to 'innovate' an existing product. For this reason it is important, in particular for small and medium-sized enterprises, to get the right co-operators in the early phases of the process. Table 8 sheds some light on this from the advisory bodies' point of view.

Table 8 Results from the Danish Advisory survey: In which phases of product development is your organization typically involved?

Organizational affiliation	Development of idea	Technical development	Partner search	During negotiations	Decision phase	Marketing of product
	N	N	N	N	N	N
EU	3	1	4	2	2	2
Governmental (nat.)	2	2	1	0	0	1
State						
County	1	0	0	1	1	0
Municipalities	2	2	1	2	2	1
IO or NGO etc.	21	15	10	15	15	11
Misc.	37	28	24	25	29	25
Total	66	48	40	45	49	40

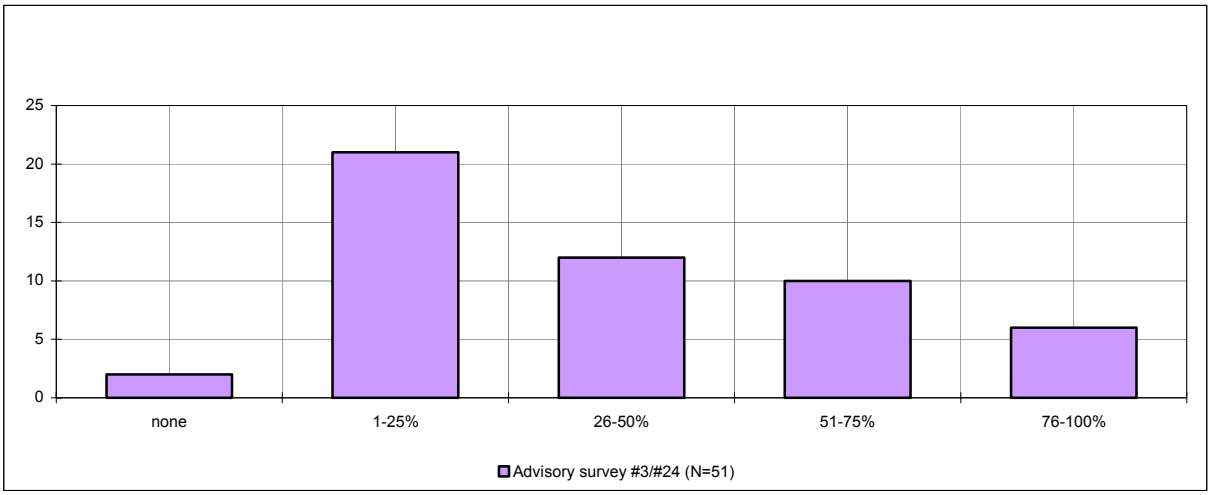
Source: Innovationsanalyse D - DK 2003 (Advisory surveys #3 & #19).

Note: More than one answer possible.

The key issue to address is of course the success-rate of the advisory process. According to Figure

3, the most advisory organisations have at least some positive results. Nevertheless, the largest group of advisers are found in the group with a rather modest rate of successful innovations.

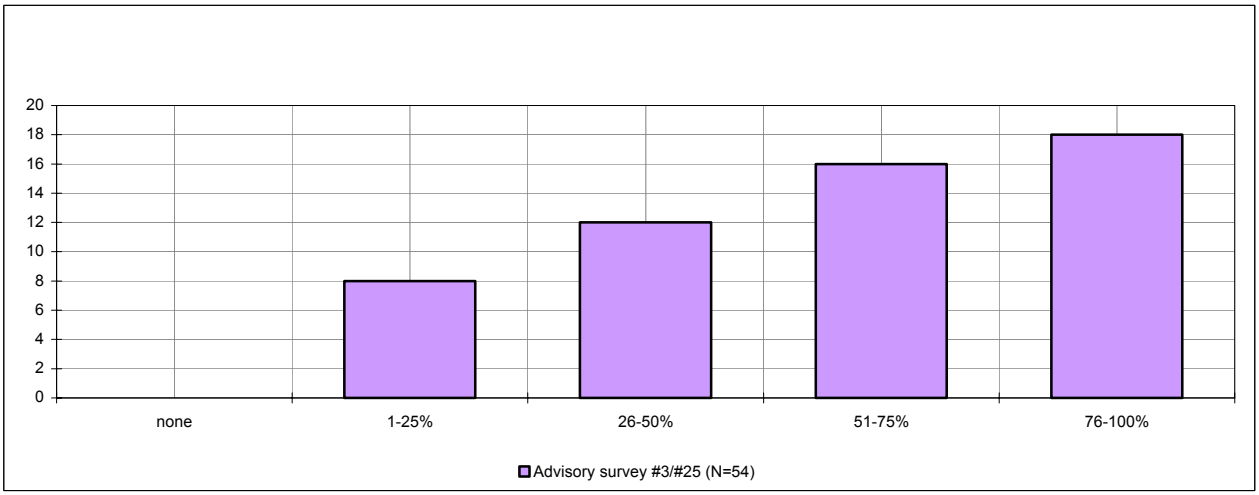
Figure 3 Percentage of co-operations which end up in innovation (advisory survey DK).



Source: Innovationsanalyse D - DK 2003.

According to Figure 4, this seems not to affect the level of satisfaction from the customers in a significant way, but a useful advice can – as stressed above – also to avoid costs as regards development of existing products or processes.

Figure 4 Share of customers who use the advisory service again (advisory survey DK)



Source: Innovationsanalyse D - DK 2003.

4. Summary and Perspectives

Innovation policy at the regional level is a complicated task. First of all the relevant innovative environment is not necessarily adjacent in a spatial sense. We are rather dealing with an functional innovative system, with linkages within, but more often outside the region.

On the organizational scene the tendencies are also more or less similar from region to region and at least to some extent also from the one national system of innovation to the other. The results from the current investigation of the supply-side of the advisory system in Northern Germany and Western Denmark are pointing in the same direction.

- Both systems, organizational and political set-ups, are in a process of change or reconsideration
- Organizationally, the regional dimension is of larger importance in Northern Germany (probably due to the size of the country) than in Denmark. Functional concerns are slightly more important in Germany. Project oriented principles are key characteristics of the Danish system.

Both firm surveys confirm previous results that show that the knowledge of the services of the advisory system probably not is dissimilated to a satisfactory extent to the potential costumers. In the German survey only approx. 20% of the firms had involved the advisory system in their innovative activities. In Denmark, the level was slightly higher, approximately one third [9].

With regard to the more specific results from the Danish survey, the most important feature is that the advisory system seems to fulfill its obligation to act as a network initiating agency and mediator in the advisory process. Among other results are:

- The success rate of innovative projects is rather modest according to the results from the advisory survey, but the value of advice is not necessarily only measured by successful innovation, but can also take the form of cost avoiding advice.
- The firms are generally satisfied with their advisories.

Last, but not least, the rather modest quality of the data set does not enable us to come up with more specific results, in particular with regard to the particular regional and cross-border aspects of our project. The latter will at least partly be solved in the next phase of the project, including a number of in-depth interviews with companies and advisory agencies.

9 . For details of the Danish survey, see Cornett 2003 and Cornett & Soerensen 2004.

The project presented in this article aims to contribute to the understanding of the process of implementation of means aiming at the creation of a proactive regional business development concept linking the regional system to the national and global process of innovation.

More specifically, the purpose of the project is to generate new knowledge within the area of innovative systems and in particular the communication to relevant actors and to contribute to the understanding of the drivers behind the structural changes taking place in regions traditionally dominated by manufacturing and traditional private and public service. This is of particular importance since a large part of the survey area - in both countries - are challenged by structural change and decline in their traditional economic base. Among the policy oriented results are:

- Knowledge about the most appropriate way to analyze innovative activities in cooperation between different partners, and the role of the business service system and other sources of knowledge within and outside the region.
- The creation of knowledge about the way advisory systems work and improvements of instruments aiming at the transformation of new knowledge of new processes and products.
- The importance of innovations for regional development in the short as well as the long run.
- Identification of shortcomings in the system of dissimilation of knowledge in a center – periphery context.

Basically, it is needed to bridge the gap between theoretical knowledge about growth and innovations in a spatial context (see Acs & Varga 2002a) and the problems facing a particular geographical area, i.e. Western Denmark and Northern Germany, and to find ways of dissimilating the knowledge available in the advisory system, the universities and technology transfer centers, not only to the larger companies, but also to the small and medium-sized enterprises that are charcteristic for the peripheral parts of Western Denmark and Northern Germany. In the context of the system of innovation, the institutional aspects are of particular importance, as stated by Acs & Varga (2002b, p. 142), in particular with regard to the role of the public sector:

"In the real world, the state and the public sector are rooted in national states, and national borders define their geographical sphere of influence. The focus on national systems reflects the fact that national economies differ regarding the structure of the production system and regarding the institutional setup." (Acs & Varga 2002b, p. 142).

In this perspective, the ongoing reorganization of the regional and functional advisory system in Denmark, as well as the proposals of an overall reform of the regional structure has major importance for the peripheral regions' ability to maintain and develop their economic foundation.

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