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Rushing to Reginn:
The evolution of a semi-
institutional approach

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Introduction

Background

The past decade has shown a significant change in the way economic development in the industrialized world is perceived to take place. The −90's has been the decade where information and knowledge has been brought into the heart of industrial change, innovation and economic development. Earlier attention to the role of various production factors in a neo-classic economic sense has changed to a focus on the very processes by which these factors enter into complex, evolutionary processes. The role of research and development, innovation, and competence in the business world are seen to become ever more important, linking the knowledge production and use with the higher pace of industrial change, product development and innovation in a broad sense.

As larger firms are perceived as not being the engine of employment, small and medium-sized firms have entered the policy arena as the class of firms promising economic growth and employment. This also means that the policy attention to SME's and their role and contributions to the economy has changed. SME-related policies have to an increasing extent brought in elements of new insights from research, and not only in a national context. The single market in Europe, including its recent reforms, both opens up new opportunities for business life, as well as representing new forms of pressure. As SMEs are a broad and highly inconsistent class of firms, policy development that seeks to take their needs into consideration has become an ever difficult task, leading to a great need for policy learning and exchange of "best practice" across nations.

This has been the general background for the SMEPOL-project, a multi-national research project initiated under the EU's 4th framework programme. More precisely, the project is funded under Targetted Socio-economic Research Programme

(TSER)[1], and seeks to explore and analyse the characteristica of "best practice" innovation policy aiming at SMEs. The project "will evaluate existing programmes and policies of promoting innovation activity in different types of SMEs in different sectors and regionas in seven countries in order to identify best practice policy" (Technical annex to SMEPOL contract). To be more precise, the SMEPOL project seeks to assess to what degrees recent policy developments have taken on board recent knowledge developments in this area, and to assess the effectiveness and efficiencies of the programmes selected, so as to create a wide and thorough basis for policy learning across nations.

This paper has received valuable comments from Bjørn Terje Asheim, Arne Isaksen and Thor-Egil Braadland in the STEP-group.

SMEPOL
The paper represents one particular study in the Norwegian context. The innovation-oriented SME policies selected within the SMEPOL, consist of TEFT, a program to enhance SME's use of the R&D infrastructure, NT, a programme to enhance innovation in northern Norway, and RUSH, a programme initiated to improve relations between state colleges and business life in selected counties in Norway. This paper explores the RUSH programme and its development into a wider institutional approach called REGINN.

All programmes to be studied will be "benchmarked" according to the same set of basic questions. These are derived from some common stock of knowledge on how innovation takes place in industrialized economies (further elaborated below). However, each programme has its own history and set of peculiarities, which means that the present paper on RUSH is obviously adapted to this programme. But all in all, this study gives attention to the following key issues:

- External consistency of the programme;
- Internal consistency of the programme, in particular the relations between objectives and means;

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[1] Cofunded with the Norwegian Ministry for Regional Affairs

- Effectiveness of the programme;
- Results and impact.

These four dimensions of analysis will help estimate the appropriateness of RUSH as well as help provide a comparative basis for the SMEPOL itself.

Innovation theory and policy[2]

Innovation policy finds itself increasingly at the centre of policies for enhancing economic development in general and SMEs in particular. Innovation is seen as the focal policy area in times of major restructuring of the world wide economy, globalisation being the process that gives rise to reexaminations of the appropriateness of various policies and instruments. The globalized economy "leaks", a fact which represents major problems for nation states in their processes of prioritization and policy formulation. Innovation policy has received increased attention since it aims at improving endogenous capabilities while restricting the propensity of leakage so typical of other forms of economic policy (in particular Keynsian ones).

However, innovation itself, or rather how we understand this process, has undergone significant changes during the past 10-15 years, a fact that lies at the heart of the SMEPOL project. This revised understanding gives rise to changing policies, but the understanding, formulated as various innovation theories, is not uniform, nor does it represent easy transformations to policy.

The new understanding has one key platform, the denial of the linear model as the one and only proper model representing innovation processes in the economy. Rather, innovation should be seen as recursive or circular, linking different activities and resources in complex processes to

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[2] From Remøe (1998)

generate outcomes that are themselves input to further innovation processes. Dosi gives the following definition:

> "In an essential sense, innovation concerns the search for, and the discovery, experimentation, development, imitation, and adoption of new products, new production processes and new organisational set-ups" (Dosi 1988:22).

Dosi underlines two facets of innovation; uncertainty and cumulativeness. The circular or multilink nature of the innovation processes tells us that innovation can hardly be planned, but is victim of unpredictability and multiple causation. Further, innovation takes place within certain modes of asking questions, i.e. of learning, leading to innovation processes being formed into trajectories of cumulating knowledge. Innovation is increasingly seen as a social process, based on interactions between different persons, institutions and firms. Hence, innovation takes place within a systemic mode, even within systems of innovation which are essentially institutional set-ups characterstic for given territories. However, the systemic orientation towards innovation is not per se territorial, as can be derived from one important contribution to the recent understanding of innovation processes, the Maastricht Memorandum, in which the systemic model is summarized as follows (Soete and Arundel 1993):

1.   multidirectional links at the the same point in time between the stages of technical changes;
2.   cumulative processes over time can lead to lock-in and feed-back effects;
3.   technical change is dependent on knowledge and the assimilation of information through learning;
4.   the details of the development path and diffusion process for each innovation are unique;
5.   technical change is an interdependent and systemic process.

Any territorial implication is not explicit, but may be linked to all the above points via the concept of "proximity". A key question in this paper, is therefore whether the systemic or evolutionary approach to innovation implies a proximity variable. Or in other words, whether "proper" innovation policy towards SMEs needs to rest on some notion of a regional system in which proximity facilitates interaction and learning vital for innovation outcomes. Before returning to this issue, a further examination of the important changes that have taken place during the last couple of decades may cast further light on the issue. Lundvall and Barras refer to these changes in identifying four trends:

a)   Acceleration: The rate of technical change has sped up dramatically. Product life cycles are significantly shorter.

b)   Interfirm collaboration and industrial networks: Sources of innovation are multiple, making firms more dependant on inputs which they cannot master inhouse.

c)   Functional integration and networking inside firms: This refers to a lesser degree of compartmentalization and intrafirm networking within essentially medium sized and larger firms.

d)   Collaboration with knowledge production centres: The advancement of science becomes ever more important to the innovation process, implying also an increasing degree of specialization in the knowledge production, and firms will often have to rely on more than one such centre (Lundvall and Barras 1997:24).

Such trends point to the importance of proximity, which has implications for a regional systemic outlook on innovation policy. But on the other hand, globalization points to the need of linking up to the international sources and nodes of knowledge production and learning. In the global village, proximity may be achieved "virtually" through contractual relations between partners in some common system of complementary inter-

ests. Even SMEs may need to transcend their regional setting and link up internationally through developing new relations or surfing on old ones.

Even though territorial systems are important, the translation of national systems of innovation into regional ones is not free of problems. This operation implies a strenghtening of geographical proximity not necessesarily inherent in the general evolutionary or systemic approach. The institutional linkages gain another quality, which has been thoroughly discussed by Storper (1992, 1995), with the wider political-economic context as a key variable. Untraded interdependencies have a significant economic value, similar to the idea of contractual relations. Regionally oriented innovation policies need to provide an often unrecognized public good: that of capacities for collective action.

Policies to support SMEs are often implicitly linked to the regional level, suggesting that SME-specific policy is regional policy. This link also exist in the rationale for the SMEPOL project. A key component of regional innovation policies is the support system or better, the infrastructure aimed at providing support and services to the client system. The reference to the regional level is usually done without much qualifying criteria. What is exactly a region in these terms? And how should a region be understood in the contexts of the nation states? It is not clear whether the regional level in this case should be understood as the county level, the meso level in Norway which is administratively and politically organized to produce collective action. And added to this is the question of infrastructure: How much infrastructure should be available regionally to support capabilities and development, and how much should be restricted to the national level? And if the national level to some extent organizes into a regionalized system, how should this be assessed relative to the notion of a regional infrastructure linked to the regional level of interactions, policy making and interfirm relationships? As we shall show in this paper, these questions are not easy to dissolve. However, we need to keep this link at

arms' length, allowing for an understanding of appropriate SME-policy buildt on the evolutionary and systemic approach, but without implying the regional dimension. It is necessary to distinguish between the qualities of single policies or programs and the need to retain a regional dimension in the overall policy framework.

This is, however, also linked to the question of the need to pay sufficient attention to the demand side, in this case the needs and "modus operandi" of the firms themselves. Innovation takes place in the form of continous improvements, but often limited by the weakness to engage in the management of external relations. This weakness leads to a propensity to avoid a functional search behaviour to exploit solutions and ideas outside the firm. Additionally, the lessons of the past, which has demonstrated the need to avoid supply side and technology push programs for this category of firms (see e.g. Remøe 1989), lead to the need for a firm specific stimulation of searching and learning, and raising the technological capacity of the firm.

In sum, appropriate innovation policies based on the lessons available in the 90's, need to reflect the demand side, the processes of searching and learning, and building capacities for technological development and exploitation of external sources of technology and knowledge. An additional dimension is whether the program in question takes into account the building of regional capacities for collective action and infrastructure, or whether it rests on other initiatives, through coordination or otherwise, to produce the territorial linkages and context in which the SMEs find themselves. Last, but not least, the institutional approach of innovation systems implies a broad systemic orientation, allowing for programme design comprising mulitple system components and the relations between them. A limitid focus on one single component would deviate from the stock of knowledge developed so far.

RUSH and the research design

RUSH is a program initiated in 1994 and implemented in 1995. The idea is to develop an organizational model that could provide the rgeionally based state colleges in Norway with the means to interact with the business community and thus improve their institutional role in the innovation system. The objective is two-fold: The program aims at stimulating the college staff to enter into contract and development work for industry and to strenghten the colleges' relations to industry. Second, the idea is to enhance indirectly the development of the business community and the value added production. RUSH represents funding only to the colleges' efforts to change their way of behaviour, projects that are contracted for industry are to be funded elsewhere.

RUSH is an experimental programme, lasting 4 years, and covering only 4 colleges. Thus, the programme was at the outset open-ended, and the REGINN programme, initiated in 1997, can be seen as taking over the mandate of RUSH by covering a broader institutional and regional approach, specifically aimed at enhancing the institutional set-up in selected regions and its interrelationships with clusters or milieus of industrial firms. This paper, therefore, takes developmental approach, and seeks to assess the evolution of RUSH into REGINN as a learning process.

Given this, our main hypthesis is rather straight forward: RUSH was developed on a too limited basis, lending attention to a single component in the innovation system. This does not mean that RUSH was falsely constructed, only that new information for the policy makers gave incentives to improve it. This process, we hypothesise, was initiated with particular inputs to the policy learning process.

The research design will center around the four main variables described above. Due attention will be given to the policy context of the institutions in question, the state colleges, and other regional instruments at that time. Further, the context and policy agenda changed, and this gives this paper the challenge of studying policy dynamism: Compared to the study of TEFT (Remøe 1998), more consideration will be given to this policy development throughout the programme period.

Initiating RUSH

The context of knowledge based policy[3]

The sources of policy formulation for industrial and innovation policy are found in the 1970's. As was the case in most, if not all, industrialized countries, the continued growth during the past decades came to a halt in the mid-80's. Although a visible problem was related to the OPEC-induced oil shock, it soon translated into a wider recognition of the need for industrial change. These were not problems of fluctuating business cycles, but represented deeper structural problems (Mjøset 1986). Traditional markets for industrial goods became saturated, and new growth was envisaged in new technologies and advanced services. By the end of the 70's most industrialized countries acknowledged the need to invest more in reseach and development, and a technology based industrial policy combined with deregulation and a more delibated market approach became the widely accepted medicine (Arbo 1993).

Most countries chose their own route in this period, depending on their own economic and political context. The Norwegian approach, based in increasing degrees of freedom from the emerging oil revenues, was to enforce a keynesian demand oriented policy in the period of 1974-78. This had particular inflationary results, and the competitive position of Norway deteriorated. The political turnaround came by the end of the decade, based on the appearantly reduced effectiveness of keynesian policies in small, open economies at that time. A structural policy approach was developed, giving priority to the competitive sectors of the economy, its technological vitalization and increased focus on knowledge based industrial development. By the beginning of the –80's, a new developmental paradigm settled, paving the way for new initiatives in the field of research and technology policy (Arbo 1993:11).

The emerging market approach and policies for deregulating economic structures implied that the international conditions for policy development converged: The continued integration and liberalization between states in the global economy led to increased copying or imitation of policies between them. And the liberal economic context gave neo-classical arguments authority in formulating the policies for a more technology based economic development. These are basically elements in a market failure approach to policy:

- Appropriation of investments in knowledge and R&D is difficult due to externalities, and this leads to incentive problems;
- Similarly, failures in the capital markets were seen as crucial, causing even profitable projects to lack funding;
- High transaction costs in diffusing technologies and innovations imply economic losses;
- Other countries are increasingly involved in R&D, and this dictates to some degree the policy agenda for a small, open economy (Streeck 1989, Hervik, Berge and Wicksteed 1992, cited in Arbo 1993).

Policy areas like industrial policy, regional policy and research policy went through significant changes during the –80's. Like what happended in many countries, increasing trends towards globalisation reduced the effectiveness of keynesian policies, or even policies aimed at selective support for key firms and industries. Industrial restructuring as a new objective was coupled with the perceived need to enhance firms capabilities in ways that did not "leak out". The beginning of the 80's was therefore a period of intense policy planning with several white and green papers produced from the government, and several programmes, a new approach at that time, were initiated, often with a certain experimental bias. The trend in the 80's can be summarized in the following points:

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[3] This section is based on Remøe (1998)

a)   Both the industrial, regional and research policies develop a sharper profile on technology and competence. This goes together with an increasing integration of these and other policy areas. The visible number of political instruments increases. The institutional set-up for regional policies is enhanced. This change towards an endogenously oriented policy, albeit still supply-based, goes together with a process of similar macro-economic policies in Europe and worldwide, giving similar frameworks for firms and governments to develop their strategies.

b)   The period of selective support was over, and instruments were developed in a neutral way vis-a-vis the various industrial branches. Small and medium-sized firms were seen as an important target group, since they were perceived as having problems in capturing the knowledge and know-how needed to compete. The support became less rule-based and more based on the assessment of project quality. A strategic approach was developed, and from the mid-80's a set of action plans was the main tool to enhance key technology areas.

c)   Towards the end of the 80's, a certain critique of the R&D system became visible, pointing to the main technological research institutes' position in the wider system. These received a great part of the funding for industrial research, while to little drizzled down to the receiving end, the SME's. Evaluations of some of the programmes in the mid-80's also underlined the need to develop instruments that were based on the real needs and problems of the SME's. Thus, demand-led policies were developed, giving resources to the firms and less to the institutes, which implied an increase in the relative power of the "client system" in choosing their partners in the R&D system. This demand- or need-oriented policy approach was further improved during the 90's. It is, however, necessary to state that the change from a supply to a demand orientation that took place around 1990 was a combined effect from evaluations and

recruitment of people with an industrial background to the key positions in policy system.

d)   The increased use of programmes throughout the 80's implied a proactive as well as an experimental approach. The long tradition of using social sciences in policy formulation and development generated a platform for policy learning that proved useful for the continued development of a demand oriented, and later innovation system oriented, policy framework.

e)   The approach to increase the competence and technological capacity was developed at the time when programmes and instruments became more directed towards enhancing an infrastructure suitable for satisfying the firms' needs. Networking became the principal mode already in the late 80's, an approach that was further developed and enhanced in the 90's according to the logic of value chains and cluster structures, rather than programme initiated project groups.

f)   The notion of demand orientation and infrastructure also led to increasing coordination between the various policy instruments, the reason being, among others, that the firms themselves needed a clearer framework of policy in which to maneuver.

A point to underline here, is the rather early reorientation of policy. The 80's became the learning ground in the post-keynesian era, and the decade paved the way for a number of initiatives that in their premises, rationale and orientation were based in an interactive, systems oriented mode already around 1990. This happened before the innovation systems approach became the new landmark for policy, and the redirection took place 3-5 years before most other industrial countries.

The regional focus and the regional research foundations
A significant piece of work was done by the so-called Thulin comittee (NOU 1991), whose green paper laid the foundations for a knowledge and innovation orientation

in the industrial policy, implying an integration between this policy area with regional, research and educational policy. The SMEs were given particular attention, and it was duely aknowledgeg that the preconditions for R&D were often too scarce. The industrial structure, consisting even more of small firms than in most European countries, could not provide R&D competence as internal resources in the firms. Rather, it became an imperative to organize the structure of R&D competence to fill the gap between the major, national institutions and the smaller firms. This gap could be filled through exploiting and generating proximity between the supply and the demand side. Various solutions were intitated on this background. A system of regional technical-economic competence centres were initiated on an experimental basis, with temporary support. The work by the Thulin committee, however, also resulted in a wave of interest both from regional (county) authorities as well as from the ministry for regional affairs (today called KRD). As one key result, a system of regional research foundations were established with support from KRD as well as counties and other groups. The main intention was to establish an intermediary system of knowledge institutions in the regions which could carry out applied research for industrial and public clients. Thus, the system itself changed in the 80-s, leading to a more decentralized structure. On the other hand, the universities and colleges were virtually left out in this period.

The regional competence centres did not prove to provide the users with much competence, and the concept were to abandoned or in a few cases reorganized into new initiatives. The regional research foundations were on the one hand seen as an important link in the chain of instruments to support R&D activities in the regions. However, they were given a relatively poor basic funding, state and regional funding seldom reaching a higher level than 10-15% of the respective institutions' turnover. Thus the research organizations turned to market behaviour which only in rare instances, were the regional or local conditions were present, led to a role as a technical-industrial centre for the business community. Although these research foundations today can be seen as a success, decentralizing a large share of the R&D activity, they were seen as a failure from the point of view of the original intention.

The White Paper on regional policy published in 1993 (St.meld.nr.33), however, brings this into a wider framework. Based on an acceptance that knowledge is a key

factor for the future industrial development, a tight coherence between the national strategies for enhancing competence and the regional politicial efforts. A key objective for the regional policy is "to contribute to increased accessability and improved exploitation of national instruments". This is more precisely referred to in the two objectives:

> "- To secure that inititatives within the national research, educational and development policy *are accessible* for the business in all regions. This means that sufficient adaptation to the characteristics of the various counties and regions is taken when the national policy is formulated and implemented.
> - To improve the regional businesses' opportunities to exploit the total knowledge stock available".

This does not mean that every region should be self sufficient on knowledge based services:

> "… the information and knowledge flow between actors on the international, national, regional and even local arenas is the very condition for industrial renewal, also in rural areas. This is a key element behind the implementation of "Norgesnettet" (Norwegian Educational Network), which implies that universities and colleges to a greater degree specializes in areas where they have a competitive advantage. The rural and regional policy will support the governmental work on developing the Norwegian Educational Network"
> (ibid:60).

The universities and colleges were seen as underexploited as instruments for economic development. The early 90's had brought the university system to the forefront of technological and industrial development, and new institutional models were seen as necessary to exploit the stock of knowledge that these institutions represented. New technological areas like bio-technology, information technology etc. required new and tighter relationships between the supply and demand side (Gulbrandsen 1995). The regional focus still present in the policy agenda also made the state colleges a target for public innovation policy. Before we enter into details, it is

necessary to describe the context of state college policy and reforms that went paral-
lell with the coming of the RUSH-programme.

In sum, it is fair to say that the innovation policy has evolved since the early –80s in
a problematic way: The early –80s brought a certain regionalization of the R&D sys-
tem, with regional research foundations and competence centres. The late –80s con-
tained a shift towards national programmes. The –90s has led to a further
regionalization of the college structure (see next section), an integration of the
regional structure into the national system, and a development of a number of smaller
national programmes with infrastructural objectives. The general hypothesis coming
out of this, is that the evolution taking place is not that of a coherent innovation
system, but that of a fragmented system representing increasing coordination
problems.

State colleges: A centralized system being reformed
The Norwegian system of higher education can be divided in three: four universities,
nine research colleges, and up until 1994 nearly 200 regional colleges. The overall
policy in the post war era had 4 objectives (Skoie 1988):

i)   Quantitative growth of students, graduates and research;
ii)   Democratization of accessability to higher education;
iii)   Development of a rich and flexible organization for higher education;
iv)   Location of higher education as an instrument within the policy for regional
       development.

Throughout the –60s, -70s and -80s, this led to a formidable growth of the system. A
key reform took place in the early –70s, when all colleges providing professional
education where reorganized and upgraded into a system of regional colleges. In the
–80s, this system had grown into a complex structure of colleges with no clear na-
tional policy guiding it. A Number of studies and White Papers where published in
the –80s with the aim of helping a reorganization of both the educational and re-
search system. The regional colleges were in 1994 reorganized into 26, with regional
borads for higher education providing the intermediate mode of governance.

This means that the current regional colleges are made up of various schools and studies with different cultures, histories and profiles (Arbo 1997). They received also a mandate to improve the quality of their education, including an increased pressure to engage in R&D. This reinforced the earlier conclusion that the regional colleges where part of a national system for R&D (St.meld. nr 35, 1975-76). Skoie (1988) refers to this as an "academic drift", blurring the distinction between the universities and the regional colleges, the latter taking more use of traditional university means of organizing R&D, fund research, plan studies etc (Arbo 1997).

The very foundation for these changes where laid down through the so-called Hernes committee, responsible for the major green paper in this period, where the very system of higher education was reconsidered (NOU 1988: 28). The reorganization was to achieve a better use of the societies resources within an overalll national policy framework, resulting in the idea of "Norgesnettet", or the Norwegian Educational Network referred to above. The division of labor envisaged in this network, had two aims: First, to give the universities a distinctive role as responsible for basic research and graduate education. Second, to develop a clearer role for the regional system, which should be responsible for useroriented, applied research in a regional context.

Although such a distinction was made a cornerstone of the reform of 1994, the system of meritocracy was aligned, giving the regional system more or less the same professional categorization of positions, career prospects, and inherent incentive structure. However, one difference was eventually made, making a distinction between the universities and research colleges on the one hand, and the regional colleges on the other: The latter could or should not retain any right for the individual academic for R&D activity as part of their position. This was a subject of work plans to be approved by the management of the colleges.

This seems like a full decentralization to the benefit of the regional colleges. However, the ministry retained a high degree of control, in the name of a need for coordination and to implement a national policy. The degrees of freedom for local college management and boards, were far more limited than they appeared to be.

One aspect of this can be seen in the legal reform in sector: The great number of studies, green and white papers etc culminated in a common act for all universities, research colleges and other state colleges, finally implemented in May 1995. The act institutionalized the central government's control over the total sector, in the name of national coordination. Although the colleges, and their boards, were given the mandate to organize the activities (including R&D) in the colleges, the level of centralization was consistently high. This was clearly demonstrated through "the guidelines for cooperation between universities and research colleges and public and private foundations or companies", issued 26 August 1993. These guidelines were very restrictive in nature, posing severe limitations on even traditional patterns of cooperation that existed to that point. Another case was the revision of the memorandum about regulations for payments for contracted activities at the universities and colleges of 4 March 1996. A particular point was the the rule 2.5, where it was stated that clients should normally pay in advance, a rule that the state never applies when taking the role as a client. Although these regulations are developed in the ministry's division for universities and colleges, and not in the division for research, they underline the restrictive and centralizing nature of the ministry's governance in this sector.

A key motivation for the ministry behind this development, was to avoid letting the private sector getting access to public infrastructure in a way that might imply subsidy. Although this motivation may be reasonable, the way the policy was implemented, it gave the ongoing activities for cooperation with especially the regional research foundations a hard blow. The two systems, the state colleges and the research foundations, were seen by many as in great need to develop into a coherent system operating on a regional level. Any fruitful development of the relations between these two in any given region could therefore be termed "contrary to expectations."[4]

The period after the reform has two interesting aspects. First, the colleges were mandated to increase their level of external funding, e.g. from research councils or business sources. This went hand in hand with a relative reduction of funds from the ministry to the colleges (and the rest of the system). The colleges that did not manage to

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[4] The author was during that time director of one of these research foundations, feeling the increasing difficulty of achieving constructive cooperative models with the neighbouring college.

increase their external funding, would soon feel the tightening grip of scarce re-
sources. But the ministry, as referred to above, was very restrictive as to which prac-
tical solutions the colleges could choose, especially any links with the system of re-
gional research foundations (the research colleges and universities met the same pro-
blems where they sought a tighter relationship with a research foundation).

Second, industrially oriented research was given priority in the early and mid –80s,
not least because Norway at that time had entered a serious recession, resulting in a
high level of unemployment. Industrial R&D was increasingly seen as an important
input to the process of industrial renewal and economic growth:

> ”Norwegian industry today is altogether to much made up of industries sensi-
> tie to business cycles. In addition, we produce to little of profiable products
> for high growth markets. Todays’ welfare is therefore highly vulnerable. The
> government wants to see an industry of greater variety with a larger potential
> for growth and adaptable vis-a-vis business cycles. This means that Norway
> not only must improve the existing industrial basis. We must additionally de-
> velop new industries, and this especially implies R&D intensive industry. It is
> a grave fact that we are not able to keep up with our competing nations in de-
> veloping knowledge based industry” (St.meld.nr 28 (1988-89) (White Paper
> on research).

The state colleges were underexploited in this context, and as the regional system of
R&D by many was seen as ineffective in providing the practical knowledge base for
the local industry, release of the state colleges knowledge stock became one of many
approaches to an increased knowledge based industry. This included most of the tra-
ditional innovation policyinstruments at hand, but also an increased attention to the
educational services that could be delivered from these colleges. The increasing pri-
ority given to the business-oriented, post-graduate education was evident in the
White Paper on industrial development (St.meld.nr.53 (1988-89):

> ”It is more difficult to achieve a rational organization of post-graduate educa-
> tion than for ordinary studies. This is, among other things, caused by short
> term studies, a large number of courses, that the activity is more temporary,

the market is variable and that the responsibility is divided on many actors. (…) Concerning the contact between the industry and the educational expertise, the both parties must take the initiative. It is especially positive if educational services could be developed and organized that will ease the accessability for the smaller and rurally based firms to the necessary post-graduate training capacity. This supply must be developed to meet the need for interdisciplinary competence".

The new, integrated colleges, state owned, but regional in location, were seen as an important instrument in this respect, both because they were expected to increase their R&D activity, because they were engaged in professional education and training at the level appropriate for many regional firms, and because external funding was supposed to increase as a share of the total revenue for the colleges. But it must be added that to bring in colleges in these ambitions, as became more concrete with RUSH, was a new approach, which also underlined the wider knowledge orientation in the industrial and innovation policies.

All in all, the early –90s represented a period where new initiatives were seen as needed, and where R&D and the educational institutions were seen as a necessary ingrediant to the renewal of the industrial structure. At this time, reference was not made to "innovation systems", but attention was given to improving individual institutions's role and functionability as providers of knowledge to the business community. However, as stated above, the organizational solutions were not evident, and the colleges themselves needed an external pressure to take on this challenge on top of vast complexities that the college reform represented.

The regional resources of state colleges
The argument that the colleges represented resources that were underexploited from a business community point of view, is quite valid when regarding the basic numbers.[5] In 1995 a total of 156 000 students were enrolled in the higher education system, of whom 73 000 (47) were enrolled at the state colleges. They had 3 900 professional staff, of whom 170 were full professors or college professors (the latter a spe-

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[5] This section draws extensively on Arbo (1997:13-16)

cial invention of the –80s), 1200 assoiate and assistant professors, and more than 2 300 lecturers and an additional 1000 college teachers.

The state colleges represented ca 8% of the total R&D expenses of the total university and college sector in Norway. The breakdown in table 1 shows, however that the R&D activity in the colleges is highly concentrated on what we call non-industrial areas.

Table 1:   R&D expenses and man-years relative to area and type of institution

	State colleges		Universities/research colleges	
Area	R&D ex-penses (mill.NOK)	R&D-man ye-ars	R&D expenses (mill NOK)	R&D man-years
Humanities	36.3 (12 %)	63 (13%)	395.2 (12%)	721 (10%)
Social science	140.8 (48%)	245 (48%)	596,3 (18%)	1131 (18%)
Nat.sciences	28.7 (10%)	41 (8%)	930.1 (27%)	1791 (28%)
Technology	47.0 (16%)	88 (17%)	346.9 (10%)	688 (11%)
Medicin	32.6 (11%)	53 (11%)	897.2 (26%)	1721 (27%)
Agr. & fish. + vet. Med/techn	8.9 (3%)	16 (3%)	220.1 (7%)	397 (6%9
Total	294.3 (100%)	506 (100%)	3385.8 (100%)	6449 (100%)

While the R&D efforts in the universities and research colleges are reasonably distributed across the areas, the state colleges are far more concentrated in social sciences. However, the colleges score high in technological areas. Most of this activity is funded by the basic budgets of the colleges (84%). But although the system of state colleges shows a great knowledge reserve, the table points to another fact: To little of the colleges' professional resources is channeled into external R&D activity. The colleges are mainly educational institutions, and the R&D activitiy, as it is measured, has the primary aim of providing the quality assurance and development of the educational activity. But recent policy aims at changing this, RUSH being one case in point.

RUSH AS A PROGRAMME

The Steinbeis legacy and the initiation of RUSH

The RUSH programme was initiated in 1994. The context presented in the above chapter, illustrates the reasons behind this. In short, Arbo (1997:47) refers to four main reasons why the particular idea came up in discussions that the Norwegian Industrial Association initiated with the Research Council of Norway: First, there was a general consensus that the research council should increase its efforts to enhance the technology transfer to and build-up of small and medium sized businesses. Recent activities in this field, like aiming at improving the technological and strategic capacity of firms in the BUNT programme, were seen as positive, and consistent with the prevailing need for innovation oriented policies rather than R&D policies vis-a-vis this group of firms. Second, it was obvious that the research council had very limited contact with the sector of state colleges, providing only a tiny fraction of R&D funding. The research council was traditionally an institution for the universities, research colleges, the large sector of research institutes, and industry. The state colleges was seen as an underexploited source for local and regional economic development. Third, a certain frustration existed concerning the regional research foundations, a system that was originally set up to provide a regional nexus for R&D for industrial users, but that in general drifted to become research organizations in the traditional national R&D system. By activating the colleges, new models for regional innovation could be developed.

The frustration concerning the regional research foundations was linked to a notion of a system failure: The system of technology transfer and decentralized R&D that had been buildt up mainly in the –80s, had to some extent failed. It therefore became legitimate to open up for learning from lessons abroad, and the Steinbeis system in Germany was at this time brought into the preliminary activities for RUSH. Ove Aanensen, former director of Agder Research Foundation, had for some time worked as a Norwegian industrial attachee in Stuttgart, and had taken quite an interest in this model.

The Steinbeis model for technology transfer is a tradition from Baden-Würtemberg, and represents a network of 220 transfer centres. These are essentially technical colleges at the same educational level as the Norwegian state colleges:

> "The concept comprises the exploitation of the existing infrastructure like teaching staff and equipment to provide the business community with consulting servives, research and development, continous and post-gradutate training, international technology transfer and project assessment. Each centre is an independent commercial unit, headed by a qualified staff with minimum five years of industrial experience. The Steinbeis foundation had in 1994 3 300 employees. More than 15 000 projects were concluded during that year" (Arbo 1997:47-48, based on Report 1994, Steinbeis Foundation for Economic Promotion).

Germany did not have a comprehensive system of independent R&D institutions like Norway. Rather, their system is based on fewer institutions in relative terms, but the ones they have are more integrated in the overall industrial traditions and policy. The Steinbeis system is one example, the Fraunhofer system of R&D institutes is another. The integrated and long term nature of the German model is not something that could be brought easily into the scattered industrial base and more experimental and temporary nature of Norwegian policy. Hence, the system had to be translated.

A programme committee was established in June 1994[6] . The commitee was made up of representatives from the research council, the industrial association, three main ministries, the state's agency for industrial development (SND), two technological institutions, and the college of Østfold, one of the state colleges. The proceedings concluded with the idea of an experimental project in 2-4 counties with a minimum level of industrial base and colleges with an industrially relevant curriculum, and a minimum interest for a project of this kind.

The support of the ministry of Research and Education was seen as necessary, and a subsequent meeting was held at their premises in August. The ministry's concluded

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[6] This section is based on Arbo's (1997) mid-term evaluation of RUSH.

with a positive attitude, as long as the colleges were paid market rates for the services, and as long as the activities were run by the colleges themselves and according to the regulations given by the ministry, mentioning in particular the rules and regulations for cooperation with other private or public firms or institutions as described earlier (from the memo of the meeting, dated 8.8.94). The ministry itself proposed the colleges of Østfold, Agder, Telemark and Narvik. The latter was later abandoned due to the institutional and policyrelated characteristics of northern Norway. The college of Vestfold was chosen instead, mainly because there was no regional research foundation in this county, contrary to the other three. The next official meeting in the planning committee was to take place 24.8.94, to which the ministry was duely invited (a first meeting had already been held 28.6.94).

The research council organized seperate meetings with the chosen colleges in the middle of August, i.e. all took place before the upcoming planning meeting. The idea was to pave the ground for applications from these colleges that could later be discussed in the programme committee. The applications were supposed to demonstrate how the region would exploit the college's competence in the development of the region, essentially linked to problemsolving and testing and testing, but also development work.

The meetings created a platform of common understanding, and represented an important baseline for the programme.[7] One particular reason was the reference to the positive meeting that had been held a few days before with the minstry for research and education, giving authority to the colleges move into RUSH). The conditions turned out to be especially interesting in Vestfold, since the research council and the industrial association already had engaged in a cooperative project with the college. The aim was to develop a new concept for the teaching activities in which the business community is drawn closer to the college in defining tasks and related issues. The concept was called PBL, or Problem Based Learning, in which the teaching is based upon the real problems of industry. The college had already been in touch with the University of Ålborg, Denmark, where the model has been a success. It is worthwhile to cite the following statement in the memorandum: "The college of

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[7] The following is based on the memorandum from these meetings, dated 24.8.94.

Vestfold is free to let this project be integrated in their application". The research council and the programme committee thus had prepared ideas on what they wanted to see in the applications.

The programme committee meeting of 24.8.94 dealt with the recent processes with the ministry of research and education as well as the meetings with the colleges. Of the many issues that were discussed, special reference may be made to the statement "that quality assurance would have to be an important part of the objective, but that, on the other hand, one should not burden the new college boards with too much new and industrial since this would be unknown terrain to most of them" (memorandum from the committee meeting, dated 31.8.94).

The process proceeded to the foreseen "kick-off" meeting 16.9.94, with all involved parties, both funding ministries and agencies, the selected colleges, and others. This meeting developed further the consensual basis for the initiative (memorandum from the kick-off meeting dated 4.10.94), and it was communicated as an innovation policy incentive that Norwegian industry was not particularly innovative (16% of the firms have products younger than 3 years in their portfolio). During the discussion, the key institutions like colleges, the research council, and the ministry for research and education made prepared statements, the latter stressing again the need to comply with the existing rules and regulations, but also pointing to the existing degrees of freedom and the recent policy statements to improve the colleges position and usefulness vis-a-vis industry. The meeting also covered information about other programmes amd initiatives for SMEs, implying that the idea of market rates for the services offered by the colleges did not exclude funding from other parts of the support system, only that the funds available in the RUSH programme should not cover any costs in contracted projects.

In sum, the initiative from the programme committee was well received, taking place parallell to the reform of the college system into 26 state colleges. Although the workload associated with the reform was great, the initiative could also help shape new profile of the colleges.All the four colleges had contacts with the industry, but in an ad hoc manner, not organized and mainly left to individual teachers. The implication of this was that positive results could be obtained for the business community, stu-

students, teachers and the wider region if the supply of competence and infrastructure could be better organized. Although the work load due to the college reform was large, the timing was seen as good, in so far as the college system was being shaped, and external pressures could be useful in the process of institutional change.

Some preconditions and key issues were highlighted, some of which were contradictory. It was stated that the services from the colleges should be delivered at market rates, but on the other hand, the college infrastructure should be "freely" available for the business community. This, it is stated, will together with geographical proximity, lead to competitive advantages. No consideration is made at this point about the proper basis for this advantages, and who would benefit from them. Further, an improved incentive system system was seen as necessary, including use of working time, payments, and the system of meritocracy for this kind of work. Any local solutions in this area would have to be accepted by the "owner" of the colleges, the division of universities and colleges in the ministry, and we may add here that this would prove a crucial test of the degrees of freedom for the colleges vis-a-vis the centralized fashion of state control.

The relationsship to the regional research foundations that existed in three of the counties, were given particular consideration. Telemark had two, and these were both already engaged in the same sort of activities as the RUSH initiative. The challenge in this case was perceived as improving the relationsship between the research foundation and the college. The same was true in Agder, where the college was large, with 6000 students and 500 professional staff, a system more than15 times greater than the professional resources of the research foundation. Although the practical co-operation between the two had been limited, the research foundation had a long track record of contacts with industry. The memo concluded that a joint solution would be preferable. In Østfold, the college had very little industrial contact, the same being true vis-a-vis the research foundation STØ. The latter, however, had worked up a profile of practical development work for the local industry, a fact that was not dealt with in the memorandum. Vestfold had in this sense an open agenda to develop their own solutions.

Specific reference was made to the need for regional coordination of policy instruments. The colleges were supposed to clarify their relative position vis-a-vis other support systems, including both initiatives run by the research council as well as others. The financial solution for the programme was envisaged to fund 50% of the colleges costs to develop their organization, the rest should be derived from internal resources and priorities. Any project or service delivered to industrial clients would have to be funded by these or co-funded through some other programme were the firms were eligible.

Objectives and goals

The programme memorandum was finalized in November 1994, and accepted formally by the doard of the Industry and Energy division in the research council on the 13.12.94. This took place almost in parallell with the processes in the four selected colleges, which developed their applications in the same period. We return to the contents and diversity of these applications below.

The programme memorandum was based on the general idea to generate "additionality" in the colleges, i.e. to contribute to improved business relations beyond what the colleges would engage in anyway. The rationale for RUSH was linked to the idea that results from research and development should be made available and used in industry on a widest possible basis. This "knowledge stock" argument was frame within the need to diffuse knowledge to industry, and is therefore based on the need for a knowledge oriented industrial renewal, although the frame of reference in the preliminary work and the memorandum itself, is clearly a "linear" model of technology diffusion. On the other hand, the institutional focus on organizational change and adaption picks up essential elements of recent trends in innovation policy. RUSH is born between periods; with elements of the linear tradition as well as of orientation to learning and institutions.

The memo states that it is important that the smaller, regional firms "can make use of an infrastructure comprising both the necessary competence in addition to geogarphical proximity." Further, smaller firms received only a tiny share of funds from the rsearch council, and RUSH represented an attempt to change this pattern. At the

same time, and this is the common ideology concerning this sector of firms, they represented "a considerable potential for growth and employment". The state colleges were one target institution in the process to activate the stock of knowledge for these firms.

The programme's objective is taken from the memo:

> "… to design and run a concept for contract activities vis-a-vis the regional industry as a means to enhance knowledge transfer from the college to small and medium sized firms. Initially, this programme will cover the colleges of Østfold, Telemark, Vestfold and Agder. Based on lessons to be drawn from these, similar initiatives towards other colleges will be considered" (page 1).

This paragraph illustrates the experimental nature of the programme. The selcetion of the four colleges partly confirms this in the sense that a certain variety was achieved from which controlled learning could take place. In this sense, the formulation above of "a concept" is somewhat lacking in precision, since the programme was designed to develop and test several models developed from regional contexts.

The market baseline was given due consideration, undelining the "commercial" principle of the programme, which is to say to deliver services at market rates. The role of the research council was limited to help achieve the institutional or infrastructural change planned in each college, and no funding would be available for the industry itself. A key reference was made about the lasting nature of this activity:

> "An important objective of the programme is to establish the new approach as a lasting, integrated part of the colleges' business. It is necessary to define the relationships to the regional research foundations and the public support system" (page 2).

Further goals and target definitions were to be related to each college's project plans in the forthcoming applications. But the time horizon was to establich the regionally adapted models as an ongoing concern within 4 years, and that the business commu-

nity makes use of the services provided through these models. The project applications were to develop goals and targets on:

- Commercial issues (external goals vis-a-vis the local firms);
- Infrastructure (internal goals to enhance commercial one.

In an additional memo on "guidelines for goalsetting"[8] these were further develop to include a list of relevant indicators for the colleges to use in their planning process:

Infrastructure:
- Integration of an industrial strategy in the college's plans;
- Establish a cooperative body with the business community (and others) to co-ordinate and improve the relations;
- Appoint a project manager and establish an organization and budgets;
- Relations with the business community as an item on the college board meeting agenda xxx time a year;
- Increase the number staff with an industrial background;
- Increase the number of student thesis based on work for industry;
- Improve incentives to encourage staff to become industrially oriented;
- This means i.e. dealing with issues like reallocation of time, payments, mertiable activities;
- Develop teaching and incentives to increase project cooperation and contracts from industry, monitor number of participants, etc;
- Number of students who chose industrially relevant studies;
- Registration of attitudinal changes in the college as well as in industry.

Commercialization:
- Number of contracts/projects;
- Increase in number of contracts/projects;
- Development of number of business relations;
- Contracted sales volume;

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[8] RUSH: Grunnlag for fastsettelse av mål.

- Increase in this volume;
- Number of students taking jobs in the regional industry;
- Increase in this number;
- Industry's own engagement in innovation and development;
- Increase in this engagement.

The tasks to be accomplished was formulated with a dual attention to both industry as the receiving end of commercial services and the colleges as the producing end (Programme memorandum):

> The R&D tasks for the programme shall be carried out by the scientific staff with reference to the individual firms' needs for the college's competence and available resources.

> The financial means from the research council shall support:

> - necessary internal resources to organize and develop the college's service to small and medium sized firms in the region
> - marketing and information about the services
> - internal support functions like equipment (not scientific9 to implement the programme
> - programme management" (page 2).

The target groups were directly related to the dual goal system; the industry and the colleges. The former was limited to small and medium sized firms with little or no R&D competence. But, it is said, more advanced firms may also be made a target group "dependent on the competence of the college and the needs of the firms". The latter was defined to be the best qualified staff, and to stimulate these to offer their services and knowledge to the programme. In addition, students were seen as an important group, limited to the students in their graduation years.

The implementation of RUSH implied the testing of the various models during the life time of the programme, and that a further diffusion to other colleges would be considered after a period of two years.

The funding of RUSH came, as has become almost a norm in such cases, from the ministry of industry and ministry of regional affairs, providing the means of the research council, 12 mill NOK each in total. The ministry of research and education participated through the internal resources of the participating colleges, deemed to be 50% of the total costs, implying a cost level in total of 24 mill NOK.

RUSH became institutionally based in the research council division for industry and energy, linked to several efforts to enhance technology transfer. Later, this activity was reorganized into a "programme for technololy transfer" consisting of several interlinked initiatives. Each project at college level was run by a seperate committee.

Four models: The regional shaping of RUSH

RUSH was to be an experimental programme over 4 years to design and learn from the effectiveness of the approaches the colleges had chosen, and subsequently decide on whether to diffuse these models and lessons on a wider basis. The preparatory work so far did not contain any experimental design in a real sense: There was no reference made to comparative studies or any other rigorous approch to facilitate a legitimate learning process. It was later, however, in line with the recent tradition in the research council, carried out a mid-term evaluation (Arbo 1997, which is referred to repeatedly in this study).

Although some commonality had been communicated, i.e. goalsetting and indicators to be used, the points of departure for each of the colleges were very diverse. Thus, it may have been somewhat surprising that the applications from the four turned out to be relatively similar (Arbo 1997). This reflected also the fact that the four were part of the same centralized system operating under the same national university and college act. The applications reflected the initiative from the research council, the rationale for RUSH in each case, a description of objectives, goals and targets, quality assurance, implementation plan and funding, all according to the principles communicated to them from the research council. However, the way they adhered to the description of infrastructure and commercial objectives differed, especially to the degree they operationalized these into quantitative indicators. And more important, the way the models differed in practice based on informal choice, relations and processes, should prove to differ even more.

With some minor modifications, the four applications were all accepted. All four colleges used considerable time for internal proceedings. And despite the fact that there was a high degree of commonality in the goalsetting, and that all four belonged to the same state system, the four developed into different models relative to situation present i the region[9] .

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[9] Based on Arbo (1997) and interviews conducted in each college/region.

Østfold

The model in Østfold was that of an office under the college umbrella, aimed at tar-
getting the market and linking market opportunities to college resources. However,
RUSH has been headed by a project manager recruited from the college's department
for social science and foreign language. During the two first years, this project was
less integrated in the college than during the next stage, when RUSH turned more
into a matrix organization, combining a link between the project and the college or-
ganization. The college's internal structure has delivered project managers and staff
to RUSH, and the college's management, including the departement manageres, is
represented in the steering committee.

Initially, some proactive activity was done vis-a-vis the industry, but with less suc-
cess than wanted. The firms were not willing to give priority to the time needed, and
expected also co-funding from RUSH in case of any projects. This led to an attempt
to initiate interest among the college staff , and over time valuable lessons were made
on how to engage the college vis-a-vis industry. Further, and this shows the regional
context in Østfold's RUSH-programme, the main activity was guided into the stream
of other support systems and programmes. Østfold was traditionally an industrial
county, but having considerable problems with the structural change that became ur-
gent from the late –80s. The Norwegian government channeled 120 mill NOK into
three structural change related programmes. Local and regional actors were supposed
to join with a similar amount. This created a vast market for projects of various
kinds, of which the college itself as well as the regional research foundation were
heavily engaged. The initial period was therefore an important one in terms of mar-
keting and generating awareness

The regional research foundation (StØ) was at that time distinctly separated from the
college, growing in staff and turnover, not least due to the large "programme market"
in the county. Therefore, StØ's problems were not financial ones, but related to
growth with a qualified staff. Thus, there was no direct competition between the two,
only for qualified staff, clients and programme funds (but not for the same projects).
With the large programme market, and StØ busy in their R&D activity, many RUSH
projects were initially carried out by external consultants, but generated by the
RUSH initiative. Later, following increased attention from the college's manage-

ment, the staffe became more actively involved. In addition, the contacts with external partners in industry and knowledge institutions developed. This underlines the unreleased potential for collaboration between the college and StØ, which, similar to the same settings in other regions, has been difficult to achieve.

Even so, several projects drew on staff from these two institutions, and some of the projects led to improved communication channels with significant businesses and institutions. However, the relative high industry profile from the research foundation led RUSH into new attempts to become more integrated in the college. The years of 1996-97 were mostly consumed for internal processes and attempts to integrate RUSH better to the college's three departements. The common ideal, the RUSH activity as a combined solution drawing on common resources for specific projects, has so far not been implementable. RUSH has therefore consentrated on training and education projects, leaving R&D to the research foundation. The college has recently tried to pull RUSH closer to the college, and more broadly across the college activities, not only covering the engineering and technology section, and as this in in line with the general intention of RUSH, irt does not contribute to a more coherent structure of the knowledge infrastructure in the county.

In all, the RUSH activity in Østfold has produced the following lessons[10]:

- The staff's will to engage in externally funded contract activity is a greater hindrance than its competence to do it;
- The ministerial regulations represent an obstacle to externelly funded activity, but not to the extent often presented;
- The bureaucratic decision making structure at the college does make it poorly equipped for professional and flexible relations with the business community;
- The Business community has poor knowledge of the marketable competence in the college, and the college has gained much in presenting itself as a part of

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[10] From a statement from RUSH Forum on the evaluation report conducted by Arbo (1997).

the knowledge infrastructure towards the business community through the RUSH-project.

Vestfold

Before the college reform there was some external activities vis-a-vis the business community, in particular through student exchanges and projects. Some activities were carried out for the shipping companies, due to a certain concentration of this industry in the region and the departmenent of shipping had a turnover of ca 500 000,- NOK yearly. Before RUSH was initiated, there had been an increasing attention to the need for a "business plan" to further stimulate such activity. Still, without a particular pressure, this plan was in the planning stage. Therefore, RUSH was luckily well timed, and the college, still in a major restructuring during the reform, established an internal group for the RUSH application, supported by a reference group with key external people.

The business community was not primarily interested in pushing the contract activities in the college, but more the quality and scope of the college's resources as such.

The college of Vestfold hence chose its own path. The project manager was supported by managers for contracted activities in all the three departements of maritime education, engineering and natural sciences and social sciences. These three gave priority to internal motivation among the staff, external contacts etc, while the project manager devoted time to organising the support systems for the RUSH activity as a whole. The strategic plan for the college, implemented in 1996, was followed by a detailed business plan for RUSH. RUSH became integrated in the three key departements, anchored in the college's management, and external contacts led to several contracts for private and public clients. Throughout the early stages of RUSH, the level of externally funded projects rose steadily in all three departements. The local firms engaged in cooperative networks on an industry wide basis. RUSH today is the sales organization for all contracted activities, concentrating mainly on training, specific activities vis-a-vis the shipping industry, student projects and tests in the materials lab. In addition, there are other activities and contacts vis-a-vis the business community, such as cooperation in developing training courses and curricula.

The three key departements had very different traditions from before the reform. Thus, the development of a system for compensation and benefits became cumbersome. But the college management invested heavily in solving these issues, perceiving the ministerial regulations as unnecessarily strict and square-minded, but stretching the degrees of freedom that existed nonetheless. The solution was linked to the system of "work plans" mandatory in all colleges. In this way, formal negotiations were avoided, and the negotiation process became integrated in the day-to-day management of the special agreement for scientific and professional staff at the state colleges. The work plans are actively used to defined externally funded activities, and hence integrate RUSH activities in the staff's ordinary position. On the other hand, if extra time is necessary, the staff is paid on an hourly basis according to a special agreement for "extra hours" (thus avoiding part-time positions).

The compensation and benefits accruing to the staff, are divided in two: First, some get extra paid according to the afore mentioned scheme. Second, they may cover expences for professional activities and upgrading from the surplus of the RUSH activity. This system needs a careful balancing of the informal agreement vis-a-vis the staff that the one engaged in RUSH are the ones to get the benefits, against the rules laid down in the public audit system that these resources are relevant for all and to be decided by the board. Strict adherence to the formal rules is close to impossible, but the system in Vestfold does not allow significant financial benefits to those involved, a fact that is in line with the cautious approach of giving priority to the ordinary college activity of education.

No regional research foundation existed in Vestfold, and this seems to be significant for the relative success of RUSH in this county. Parts of the industrial base had already been through structural changes, had become more R&D oriented than in the past. The initiative from the college in promoting RUSH was received positively by the business community, and the college's engagement in more long-term, strategic work on innovation and industrial policy for the county and industrial partners can be seen partly as a result from the RUSH-project.

The lesson from Vestfold is that RUSH has been a significant development of organization and routines that would not have taken place with the current momentum without RUSH. The system developed for the three key departements will be extended to the other two, thus penetrating all contract activities for the whole college. Organizationally as well as financially, the RUSH programme has had a significant degree of additionality, although the latter success is somewhat exaggerated though including turnover that existed independent of RUSH.

Telemark

In Telemark, the college was itself scattered into many smaller sites. The regional research foundation was already well established, and consisted of three separate institutions, two of them with an industrial profile. As elsewhere, some tensions existed between these two categories, the research foundations typically being vulnerable and suspicious towards any marketorientation from the state college, fearing an encroachment in their market. Before RUSH, the industrially related activity had been only individually based with nor systematic approch from the college's side. The exception was student projects for industrial firms, and to some extent consultancy services for the tourism industry.

When RUSH came on the scene, an internal process of mobilization started. In addition key external actors were organized into a supervisory board, the chairman being the principal of the college. Two of the research foundations were also represented on this board, and the first year was devoted to negotiate agreements with these and with the college staff. The overall result was a turf sharing between the college and the research foundations, while the directors of the two research foundations represented on the board showing clear signs of resistence to RUSH. A particular result was that the college could develop a market for smaller industrial projects, student projects, and training activities, while the larger projects vis-a-vis the business community should continue to be provided by the research foundations. The new agreement between the parties was very explicit on this point

The wide and scattered basis for interest mobilization did not provide the momentum for RUSH, and the RUSH management at the college was not given sufficient room

to move. To increase legitimacy and improve networks and infrastructure, parts of the RUSH financial basis were used to subsidize projects initiated by the college, e.g. market research, development of new educational programmes, enhancement of labs, and to early stages of industrial projects, a way to use RUSH resources that was slightly out of line with their intentions.R

RUSH became linked to two out of five departements, but was organizationally limited to the RUSH office providing administrative support and initial activities for specific projects. The RUSH projects themselves came to be organized and accounted for in the respective departements, with the consequence that only the "expenditure side" of RUSH became visible in the RUSH office, while the revenues were all accounted for in the departements. This will underestimate the size and role played by RUSH in HiT.

The internal negotiations with the staff proved to confirm the weak basis for financial incentives that were perceived to exist. The staff were difficult to mobilize because of the low level of financial opportunities in the concept of RUSH, and the participating staff consisted therefore of a relatively low number of people who repeatedly took, and take, part in RUSH projects. The direct effects of RUSH are thus limited.

RUSH will continue to exist, but will grow to contain all externally funded activities at the college. However, it will remain integrated at the departemental level, albeit extended to those not involved so far. So even if the directs effects of the RUSH programme were limited, the main effects are indirect as RUSH helped reorganize the overall external activity at the college and integrate it with other programs.

Agder
A very different model developed in Agder. This twin county has the largest state college in Norway, and a research foundation that from the very beginning had been highly profiled towards industry. The college had initiated another program to improve the college's activities vis-a-vis industry (SESAM, or centre for cooperation with industry), and RUSH could build upon this, among other things by letting the existing project manager take over RUSH and thus integrate the two. The activities

initiated towards the business community turned out to be succesful, confirming mu-
tual interest and a tradition of cooperation that also included the research foundation.
However, the internal processes turned out to be cumbersome, the staff, as was the
case also in the other colleges, were not positive since they would not increase their
salary or retain any economic compensation[11], and the conclusion was drawn that the
college was not adaptable to the market oriented requirements from RUSH.

The research foundation (AF) became the obvious alternative, a market and project
oriented contract research institute with a well known reputation in the business
community and flexible organizational solutions. AF had its headquarters in Kris-
tiandsand, with the college, and a technical-industrial department in Grimstad, next
to the college's division of technology and engineering. There had up to that time
been considerable financial difficulties with AF's Grimstad departement, and little
support from the college, perceiving that AF's activitiy was isolated from the scien-
tific and professional base in the college. AF was at that time in the process of down-
sizing its departement, and in general looking for improved relations with the col-
lege. The AF management was also attentive to ithe structural challenge of more in-
tegrated solutions in the region, and when the RUSH initiative came, they held meet-
ings with both the research council and the ministry for local government and labor
relations, arguing that the sector based approach would contribute to a disintegration
regionally.[12]

RUSH was established in Grimstad, implicit with the understanding that RUSH was
a technical-industrial activity. The first year, RUSH was run within the college, as a
continuation of SESAM. When this model proved cumbersome, in particular because
it did not facilitate the necessary incentive structure, it became clear that another, and
more "commercial", model was needed.

The initiative from the college to discuss a common solution for RUSH was dis-
cussed reperatedly in the board of the research foundation,[13] and a consensus was rea-

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[11] Contrary to the Steinbeis model, where the staff does retain economic benefits.

[12] Similar frustrations were appearant also in the other regional research foundations.

[13] It should be noted that this author at that time was, and still is, a member of that
board.

reached, implying a reorganization of the technical-industrial activity of the research foundation, which was at that time an economic burden, into a new Center for Technology under the organizational umbrella of the latter, but highly integrated in and drawing resources from the college. The college staff can in this case take part in external contract activities as staff of the research foundation and thus avoid the limitations of college regulations.

The project manager for this new entity was recruited from industry, which gave the center legitimay and networks. A solution had been found that had both support from the college and the research foundation, pulling together the comparative advantages of both. And it was clrarly linked to specific requirements from the college: the combined model with AF should be based firmly on the scientific areas of priority in the college, not on AF's former R&D activity in Grimstad. The combines model became SENTEK, organized as a centre in AF, but drawing on resources in the college.

The early initator of RUSH as such, Ove Aanonsen, was recruited to build the RUSH system. Being a former director of AF, he was also sensitive to the combined needs of the two institutions. Further, he also had insight into the real Steinbeis system, in particular the need for workable financial incentives for the college staff. This was in line with the philosophy of the local dean, who gave more attention to results and mobilizing staff than respecting state regulations. Therefore, a system developed more in line with the Steinbeis model, in which the college staff could retain their share of project revenues through working in the AF umbrella. The dean tries to reduce the teaching burden of the staff active in SENTEK.

This model developed out of informal understanding and agreements locally, based on the idea of meeting common interests. Hence, even if the staff through their national union structure was part and parcel of national level agreements restricting their use of time and ability to earn additional income in outside institutions, the SENTEK model represents an informal agreement to do otherwise. Although SENTEK is not in line with the rules and regulations from the ministry of research and education, it represents potentially an effective organization and incentive system to realize the RUSH intentions as well as a mechanism to integrate the two parts of the innovation system. In particular, the two mother institutions are able to share

the legitimacy and reputation arising from this model. Additionally, it may prove to be a nexus in the regional structure: Recently, the Swedish based Ericsson company opted to move its engineering and R&D activities from the area to Oslo. This created an upheaval where both counties (east and west) joined forces and managed to turn the decision around. The turnaround led to further decisions from other firms and some agglomeration of industrial R&D and innovation activities were clustered in the college and SENTEK area.

The models in perspective

In sum, the four RUSH models are regionally shaped, adapted to the specific conditions in each case. In the Østfold case, the entry costs of a new initiative in the midst of a high level state funded activity and low college interest were relatively high, in so far as the research foundation had already captured "the industrial role" and was well trained to take advantage of the support system. In Vestfold, RUSH was used as a tool for an innovation, a new profile for the college was developed, taking advantage of lack of competitors and thus low entry costs. In Telemark, tension existed between the various interested parties, and a cumbersome process of negotiating a division of labor between the college and the research foundations took place. The result was a marginal role left to the RUSH. In Agder, RUSH came as an external impulse into processes of reorganizing and development of cooperative solutions between the research foundations and the college. The politics for the new integrated model were favourable, and RUSH became a means to integrate two essential parts of the support system. It should also be noted that the politics of the Agder counties in general are in favor of R&D and innovation policy, thus creating a robust system of support for the development of key institutions.

RUSH and the question of consistency

In this section the external and internal consistency is preliminarily assessed. As mentioned, RUSH as a programme has to be seen relative to the design of REGINN to which we will return. We will therefore return to a wider assessment of consistency of the link between the two.

The external consistency of RUSH is a complicated issue. At face value, RUSH is external consistent, measured against the lessons from innovation theory as such. RUSH is a programme that builds upon key elements of innovation theory, like the need to promote institutional change to enhance interactive learning, the need to develop solutions based on the regional context, and to link the different elements of the support system. The objectives, methods and target groups are valid within the framework of recent innovation theory, also the body of theory that emphasises regional systems of innovation. The need to promote proximity between the colleges and the industry is an important element of this, including the idea that both parties are supposed to gain inputs, innovative ideas and impulses for change. One example of this is the need to engage industry in developing the educational programmes, curricula and specific projects and tasks in the colleges.

The RUSH programme can also be seen as externally consistent in the sense that it adds an instrument in the bundle of programmes being promoted from the research council within the context of what was to be called the programme for technology transfer. To release the potential buried in the state colleges was a highly legitimate objective, not least beacuse of the positive lessons brought in with the Steinbeis model. Even if recent innovation theory stresses a systemic view, i.e. the need to focus on the wider system of innovative elements and how they interlink, this does not preclude as rational the attempt to develop a single component of these systems with the specific aim also to improve their relations with surrounding support systems.

There are, however, some considerations concerning the external consistency. The relationsships between RUSH and the role of the state seems problematic. RUSH is not a regional programme, it is part of a decentralized national policy, initiated by national level institutions. The inconsistency between RUSH and the state's centralized control of the operation of the colleges is appearant, leading to tensions and diverse expectations in the processes of building the regional RUSH models. Even as it turned out to be possible to move around some of the tight norms and regulations given by the ministry of research and education, the colleges had to adhere to them, and any innovation in this system was not considered by the ministry. The institu-

tional innovation at the regional level had a hard fight against the non-innovative norms of centralized regulations[14].

The same, to some extent, goes for the relationship with the surrounding support system. This was not particularly considered at the outset, at least not the prevailence of heavy state intervention in Østfold. The regional research foundations, a system that had been set up in the –80s to provide much the same services that RUSH aimed at, had to some extent been squeezed between this formal intention and lacking resources to fullfill them. It is a case in point that while a better coordination and possibly reorganization was foreseen in the relationship between these two, only the colleges became part of the programme. The infrastructural goals was, for all practical purposes, limited to the colleges. The solution in Agder, where RUSH ended up in a collaborative model with the research foundation, ran the risk of being unacceptable to the ministry of research and education, even if it could be seen as the most rational thing to do in a region where the research foundation was a well established part of the system and offered the flexibility that the college could not.

The larger question that arises is the following: What can be expected, and what is the consistency, of a minor experimental programme trying to achieve lasting changes in the relations between the state colleges and surrounding industry, against the governmental norms, state interventions and previously established support system? Or more precisely, what is the functional significance of a programme for institutional innovation when it is contradicted by other activities and regulations from the state itself? Our preliminary answer is that it is very limited, especially as the objective dis not include any changes and reforms in the state regulations governing this sector to allow for decentralization and innovation on the regional level. Regional innovation seems like a contradiction in terms in a highly centralized society as

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[14] The high degree of centralization in Norway may be illustrated by the institution of "fylkesmann" the state's representative in each county. While the county itself, being run by a political assembly, mainly deals with administration of schools and hospitals and other infrastructure, the state's representative has a supervisory role, has resources on key regional areas like agricultural policy, and conveys the influence of the state even beyond the powers of the institution itself: Many of the fylkesmanns staff is under direct authority of the central ministry, leaving the head of the office with a partial authority vis-a-vis the staff.

as Norway. Before we enter into emprical issues, we take the assumption that RUSH was only needed in Vestfold, since this county did nor have any R&D support system and had to evolve out of an innovative college. The Agder model might have been realized anyway, given the conditions, Østfold was overburdened with other money, leaving RUSH with an insignificant role, and Telemark ended in a slightly more rational division of labour between the college and the research foundation, albeit to a high price.

Is RUSH internally consistent?

The issue of internal consistency relates essentially to three aspects: The existence of well defined objectives and goals, consistency between goals and means, and rational criteria for defining target groups.

Given the structure of the programme, the question is not easy to answer. At face value, the objectives and goals are, on a programme level, clearly defined. The double structure of objectives, infrastructure and commercial, are in line with other programmes in the so-called programme for technology transfer in the research council. The formulation of these objectives is provided so as to facilitate a decentralized goal-setting process in the colleges, also under the influence of a common set of ideas for what could be rational objectives. Thus, the overall system of objectives as well as the decentralized process in which the total system of objectives and goals was shaped, complying with the need to decentralize responsibility and initiative, support the argument of consistency.

The relationship between goals and means (the classic condition for rationality) is more difficult. This is mainly so because RUSH itself provides marginal means to fulfill the objectives. Each college receives 1 mill NOK pr year, representing 50% of the costs for the colleges' efforts. The practical means are left to the colleges to put in place. Hence it is critical for the programme's success that the colleges are able to exploit the options available to them.

This raises the question of additionality. If the programme's relative modest means result in achieving the intended results in the colleges's relationship with its envi-

ronment, through helping the exploitation of complementary and "hidden" resources, then the internal consistency is high (this illustrates that internal consistency can not be assessed in isolation from issues related to external consistency). But as such, the consistency is assessed to be low, since success locally rests on a number of dependencies that are not internalized in the programme itself.

Of the double objective, the infrastructural is seen as the most important[15]. This means that target groups for the programmes should be defined at the college level, not in the wider industrial and regional environment. The criteria and choice of target groups are therefore also tightly interwoven with, if not the same as, the experimental design of the programme. The baseline for selecting the colleges was the notion of being situated in a region with a minimum of industrial activity and tradition. This main criteria was fulfilled. Further, there should be some contextual variety: different situations when it comes to the regional research foundations, different structures in the support system etc. These considerations seem to be reasonably reflected in the selection. But given the experimental nature of the programme, the criteria for the target groups necessarily feed back into the relationship between objectives and means. And here we find the missing link: There is no strategy for robust comparative research evaluating the developments and results of the four cases along the selected dimensions of target groups. The key ingredient for policy learning, a necessary element in a true experimental design, does not exist clearly formulated at the programme level.

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[15] Interview with programme coordinator in the research council. In the TEFT programme, the business or the commercial objectives were deemed the most important (Remøe 1998)..

Results and effectiveness

Cooperation and marketing

The individual organizational models are discussed elsewhere in the paper. The colleges had diverse conditions for the development of RUSH in each case. A common framework was the programme committee and later the programme for technology transfer in the research council. The research council, being responsible for RUSH, wanted to avoid an uncoordinated developmet of RUSH models in each region. Thus, after the RUSH projects were initiated, a follow-up meeting was organized, and the research council introduced the idea of a coordinative and cooperative body, the RUSH Forum. This was essentially meant to be a learning facility, providing information exchange and coordination of activities and issues of common interest. The research council and other institutions may take part as observers (Arbo 1997:70).

The meetings in RUSH forum have had the following main issues on the agenda:

- Common profile and marketing;
- Payments and accounting issues;
- Contracting issues;
- Target or impact indicators
- Quality assurance of projects.

RUSH Forum also initiated contacts with external institutions, like the Educational council for engineers (Ingenriørutdanningsrådet), and the Association of technology based firms (TBL).

Although the individual colleges entered on different tracks, the RUSH Forum helped reinforce and improve the marketing efforts vis-a-vis the regional industry, and facilitated feedbacks from lessons that the colleges made in their specific setting and activities.

Business and infrastructural indicators

As mentioned, the colleges developed their own set of objectives and targets for their RUSH-activities, based on a common framework suggested by the research council. The individual versions reflected the particular context, but were similar in nature. To ease the monitoring on the programme level, a reporting system was developed in which some key indicators were made common for all colleges involved in RUSH. These indicators were the baseline of the yearly reports from the RUSH-colleges to the RUSH programme committee, and were developed in the above mentiond RUSH Forum.

Admittedly these indicators, presented and discussed below, are crude measures on the total activity in RUSH. To avoid too much detail in this analysis, we will not describe the range of activities in each college, but stick mainly to the common set of reported indicators. However some discussion is provided on each college's profile. The empirical material presented below, is based on the yearly reports. Arbo (1997) has made a preliminary analysis of these in his mid-term evaluation of RUSH (for 1995 and 1996), and the tables below are extended with data from 1997 and also adapted to fit the present purpose better. Thus, the indicators of the development of RUSH are:

- The volume of the RUSH activity;
- The SME profile;
- Mobilization of staff;
- Student projects for firms.

Table 2 shows the volume of the RUSH activity measured in registered industrial contacts, contracts for various services and the economic value in turnover. There might be uncertainties in these data due different registration routines, a problem that we are not able to

Table 2:   The volume of the RUSH activity

	Registered contacts			Number of contracts			Turnover(1000kr))		
	1995	1996	1997	1995	1996	1997	1995	1996	1997
HiØ	-	41	55	3	12	na	0	952	2.772**
HiV	245	260	73*	88	129	98	2.860	5.223	6.895***
HiT	20	68	75*	1	6	13	0	591	710****
HiA	31	33	50	9	8	28	445	297	4.400*****

* Uncertain data; ** This figure covers only RUSH, HiØ has a total externally funded activity of 8 mill NOK in 1997. The figure in the table includes also in-sourced consultants acting as subcontractors; ***Includes all externally funded activities; ****Only RUSH office, RUSH projects are accounted for in the respective departements, total externally funded activities at the college are 10.8 mill NOK in 1997;*****Only SENTEK activities.

solve in this paper. But the table still shows at face value an interesting picture. The college of Vestfold stands out with a far higher level of activity, also measured in turnover. The registered contacts at this college in 1997 is probably due to registration mistakes. The general picture is that all four are showing a positive development, but with different speed and profile. The activity in Agder has a steady progress, but the jump in turnover is probably related to establishment of SENTEK, whereby this new institution pulled together activities from both the research foundation and the college. Thus, this new organization seems to be successful, also taking into account that it is more focused on R&D projects than the other three. The case of Telemark seems to be the most problematic. The low level of contracts does not add upp with the number of contracted services in Arbo (1997), registered with 100. The latter seems to be the total activities including the R&D activities in the research foundations, while these are not counted in the college's volume. At face value, compared to the other three, this college is lagging behind, but the numbers are symptomatic of the division of labor that has been agreed upon in Telemark, leaving the R&D projects to other institutions. On the other hand, the picture in the table is

highly influenced by different measurement routines at the the four colleges. Although we do not know the total numbers for Agder, the three colleges of Østfold, Telemark and Agder have an external profile exceeding that of the RUSH activity itself.

The commercial or business development objective of RUSH was linked to generating services for SMEs in particular. In table 3 the SME profile of the RUSH activities is shown, the SMEs in this case being firms with less than 100 employees. The table reveals that noe of the college are able to generate a consistent SME profile, albeit one should bear in mind that the definition of SME being less than 100 is very restrictive in this case. The large

Table 3: The SME profile of RUSH (% of turnover)

	SME			Larger firms			Other		
	1995	1996	1997	1995	1996	1997	1995	1996	1997
HiØ	0	26	66	55	21	28	45	53	na
HiV*	7	5	2	75	80	66	18	15	32
HiT	Na	41	57	na	59	43	na	na	na
HiA	46	26	27	40	74	73	14	0	0

 *Arbo (1997) reports that the shipping clients are categorized as larger firms even though they are by definition SME.

intervention programmes by the state is clearly part of the picture in Østfold. However, the data shows a significant shift from programme dependency to SME orientation in 1997, a shift that was part of the action programme established to give new momentum to the RUSH activity from that year. For all colleges there is a measurement problem: The data reported does not distinguish between contracts directly for the firms and contracts for other institutions or programmes that are indirectly related to firms. Even so, the profile is rather SME independent, and the college of Vestfold provides an interesting example. Being the college mostly consentrated on training services for the business community, these activities are largely for larger firms.

A key indicator of the infrastructrual objective is the ability to mobilizes college staff into the RUSH projects. Even if the college itself manages to develop better routines, systems incentive systems etc, i.e. develop organizational changes along the objective of RUSH, the "moment of truth" is the degree to which staff is actually mobilized. This is shown in table 4:

Table 4:   Mobilization of college staff (numbers and share)

	1995	1996	1997	Total no. of staff*	% after 3 years	R&D man-years in res. found.
HiØ	9	17	17	217/95**	9/18***	44
HiV	36	41	45	156/75**	29/60***	-
HiT	2	13	23	302/112**	8/21***	62
HiA	13	13	22	398/75**	6/29***	26
Total	60	84	107	1073/357**	10/30***	132

*Professional staff, -96 data, **Professional staff for those departements that are linked to the RUSH programmes; ***Mobilization of staff relative to relevant departements.

The data from 1995 to 1997 show the aggregate development in this period. Again, the college of Vestfold stands out, both in the rapid mobilization of college staff, and the persistent higher number of staff involved. There has been positive trends in the other colleges as well. But the particular position of Vestfold is further confirmed when taking into account the degree of mobilization: close to one third of the staff is mobilized into a wide range of especially training activities for the local industry, while the other are not reaching fully 10%. When correcting for the mobilization from relevant departements, Vestfold is still high, although the others reaches a fair mobilization degree. This picture also shows that a fruitful relationship with the local industry does not have to be based on technical R&D activities, but other ways of knowledge dissemination and cooperation.

We have also included data on the available man-years in the respective regional research foundations. These only confirm that the development in the college of Vest-

fold is to some extent compensating for the lack of another institution for contracted knowledge services in the region. And they also show the large potentional in the colleges to increase their networks with the surrounding industry and other clients, leaving aside the fact that the colleges' main mandate is to run educational programmes for enrolled students.

However, the ability to mobilize students into projects for the local industry is a key indicator of infrastructural adaption. This pattern is shown in table 5, giving the distributed profile

Table 5: Number of student projects for clients

	SME			Larger firms			Other		
	1995	1996	1997	1995	1996	1997	1995	1996	1997
HiØ	-	30	17	-	18	12	-	22	13
HiV	66	41	45	4	39	30	23	33	12
HiT	33	55	na	46	48	Na	29	21	na
HiA	26	18	24	19	27	18	0	0	3

across the earlier categorization. The table shows in general that the student projects are more related to SMEs than the contracted activities by the college staff. There is no other appearant pattern in these data, expect for the possible tendency of the Agder model to stick to business clients and not link this this activity other client groups.

Effectiveness and issues of college-industry cooperation

The overall impact of RUSH must be assessed beyond the crude indicators of the tables above. Already in the programme's mid-term was it evident that the RUSH programme had positive impacts (Arbo 1997:82-83, 1998:7):

- Contract activities and improved profile vis-a-vis the regional industry has entered the agenda and is a recurring item in the management and boards of the colleges;

- The staff has had to relate to this agenda, even if a minority has been mobilized;

- Considerable efforts have been made to improve the colleges' ability to handle contract activities;

- The colleges focus more on developing their range of services and are thus innovating;

- Key lessons have been made concerning the administrative and financial systems at the colleges, giving inputs to clarifying the degrees of freedom that exist within the current system of state regulations and national agreements;

- The colleges have improved their position as an asset in the regional economy, and are able to demonstrate this to improve the support and legitimacy;

- The colleges have tried to improve the coordination with other programmes and support systems, including in two cases repositioning vis-a-vis the regional research foundations.

It is difficult to assess whether these preliminary impacts will lead to firm changes or a consistent evolution of the colleges's role in the respective regions. We will return to such broader issues below. But the lessons from RUSH so far relate to significant and systemic features in and between the system components. Arbo (1998) points to both internal and external obstacles:

- The habits and identity of college staff, seing themselves mainly as teachers for college students. This implies a certain conservatism and scepticism towards external, market based work;

- The work load at the college is itself high, even rising in association with the college reform taking place in parallell with the initiation of RUSH;

- The system of recognition, or meritocracy, is similar to that of the universities, and few "credits" are given to staff performing the kind of work intended in RUSH. The colleges are not allowed, in the context of national regulations, to use economic incentives beyond the existing system of remuneration;

- The decision making system is very complex, and the colleges are subject to fixed routines for planning and executing educational programmes, leaving

little room for the innovation and implementation of extra-curricular activities;

- The lack of an appropriate administrative support system made the RUSH initiative cumbersome to implement. Even the development that has taken place within the RUSH programme does not provide the systems change that was needed;

- The industrial sector has little knowledge of the colleges and what they could offer. This is especially the case in the SMEs;

- The typical SME spend their full time on day-to-day problem solving, making it difficult to initiate the long term strategic work that would spur a demand for the services that the colleges could offer;

- The firms are not willing to pay market prices. Demand seems to require subsidized services which eventually have to be generated through integration with other parts of the support system;

- The specific pattern of specialization among the colleges does not necessarily match the potential demand in the regions;

- The colleges are still amateurs in a competitive market. Confidence and reputation that are a prerequisite for a competitive position, gives other institutions and consulting firms a leading edge.

All this suggests that the regional system, of which the colleges are a part, cannot be changed without some sincere, national level policy intervention. It also seems clear that the colleges are placed in a position where they have tremendous challenges of *negotiation,* both to develop systems and motivations internal in the colleges and in particular within the chain of command from the ministry, as well as with external institutions and potential clients. The emerging models of regional innovation systems, or changes in them, can therefore be seen as dependent on how these negotiations produce certain outcomes. We propose, therefore, a bargaining theoretical view on regional innovation systems, defined as the particular set of negotiated outcomes derived from these processes, a perspective to which we shall return.

Regional models and policy coordination

Seen in isolation, RUSH does have impact, albeit through rather different models and mechanisms in the four cases. However, there are some crucial issues to be discussed that relate to the wider impact of RUSH.

First of all, the institutional strategy behind RUSH needs to be considered. Especially in Vestfold, this strategy can be seen as successful. This may be explained by the low entry costs in this region, stemming from the lack of a regional research foundation which the college would have to relate to. The college of Vestfold could initiate a **strategy of scale**, aiming at paving the way for increasing the level of external activity in the region. The others had more difficult contexts to handle. The system of research foundations, programmes, small and large intervention schemes etc, forced the others into a more cumbersome **strategy of scope**, where the colleges were implicitly given the mandate to improve the level of coordination between the different components of the innovation system. Although this mandate cannot be taken literally, and it was of course never communicated as such vis-a-vis the rest of the system, this part of the objective forced the colleges into a timeconsuming process of negotiating a position for themselves. The three models that arose can all be seen in light of particular relations to the research foundations in each county. Thus, the conclusion so far is that any significant change or improvement in the regional innovation system cannot take place without negotiations among the people and institutions in question. The regional innovation system evolve through successive negotiated outcomes within the straight jacket of a strategy of scope. The college of Vestfold, sticking to a strategy of scale, could limit the negotiations internal to the college.

It may be useful at this point to examine the idea of negotiation more closely. In bargaining theory, a key distinction is often made between distributive and integrative bargaining (Lewicki and Litterer 1985; Bazerman et al. 1985). In general, distributive bargaining refers to the win-lose or competitive situation: "The goals of one party and the attainment of those goals are in fundamental and direct conflict with the goals of the other party" (Lewicki and Litterer 1985:76). The resources are, or are defined to be, fixed and limited, and the parties will typically design strategies to maximize his/her shares of the outcome. The situation is one of interdependence, since the position of party cannot be defined without the reference to the other.

In contrast, integrative bargaining "…is the process of identifying a common, shared, or joint goal and developing a process to achieve it" (ibid:102). This will often mean that the parties define the problems at hand as common or shared, and that by collaborating, the "cake to be shared" may increase, and both parties may be better off. This mode of bargaining is often seen as opposite to the distributive, and may in many situations represent a track in which new solutions satisfying the goals of both parties are developed.

In our case, the college of Vestfold avoids the issue, or more precisely, can limit the issue to the internal stage of the college. In Telemark, a typical distributive situation was created, where tensions and positioning resulted in a division of labor to secure the status qou. In Østfold, the implicit process was similar, leaving the RUSH project as a "stand alone" unit chasing external revenues, but to a minor degree drawing on resources from the college. In Agder, we find the case of integrative bargaining, through which both the college and the regional research foundation found common problems and common ground, and developed a new organizational model integrating the goals of both parties. Thus, the strategy of scope will produce different results depending on the nature of the negotiation process. And more importantly, the regional institutional system for innovation develops different structures.

This leads to a further argument. The lessons from the three "negotiating" colleges can be seen as a pattern in which the national level, through a national programme, more or less tries to initiate improved coordination regionally through decentralized actions. Or in other words: The state's objective is implicitly, by decentralization, to improve a system of which the problems are partly stemming from the state level. Given the degree of centralization in Norway, where most of the support system operating regionally is designed nationally, RUSH can be seen as a way for the state to rid itself of responsibility for adding on programmes, institutions and initiatives that over time and in sum produces a sub-optimal system. Inconsistencies that stem from the national level can be solved on the regional level with less political-economic noise. However, this argument only partially holds, since the state is not a single, coherent entity: The RUSH programme itself can also be seen as the sectoral competition between ministries and agencies, some of which are initiating horisontal initia-

tives, but having to challenge the "constant variable" of nationally negotiated outcomes of norms, regulations and laws associated with the educational system. Thus the tension between the national system of innovation and regulation can not fully be solved in the regional political economy and negotiation processes. The ability of the regional level institutions and organizations to enter into integrative negotiations, will to some extent define the degree to which the innovation system can develop into a more coherent framework. If the negotiations are distributive, the colleges will have to innovate "around" the others, resulting in turf sharing and adaption of division of labor.

Diversity, configurations and negotiations

RUSH is producing local adaptions to a variable degree, and represents an input or selective mechanism through which the evolution of the innovation systems takes place over time. The different models coming out the RUSH initiative add on the variations in the regional economies. This relates to the concept of diversity, and this section will discuss some further implications and extentions of the mechanisms through which regional innovation systems appearently evolve.

Diversity in general is supposed to offer positive economic consequences and is tightly linked to the notion of innovation systems (Dosi et al 1988; Metcalfe 1992; Cohendet 1991, 1992). Diversity, however, is mainly an ecological concept, pointing to the basis for selection and retention mechanisms so important for economic competition. Cohendet and Llerena 1997:223-ff) refer to four main types of diversity:

- The diversity of factor endowments lead to different competitive advantages for firms and nations;
- The diversity of products and services available to customers;
- The diversity of behaviours between firms, also resulting in specific firm performances and competitive advantages;
- The technological diversity, related to the competencies and learning processes linked to the idea of technological change as a process of evolutionary change.

Thus, diversity refers essentially to phenomena in the market place, and the ecological metaphor of diversity conveys the notion of competitive processes. Further, diversity is a matter of degree, not of kind, meaning that it is not a structural concept. To exploit the very idea of innovation system, which inherently is linked to the structure between components and the quality of relations between them, we need another concept, also covering other processes than competition and selection. Negotiations, as we have seen, take place between parties of different positions, not with reference to degrees.

The structural connotation of innovation systems requires therefore the concept of *configuration*, a concept that appreciates that processes between parties are influenced by the very position they hold in the system, or the structural reference of this position. Institutional configurations hampers markets as well as define future prospects and opportunities for development, and links the institutional structure of the private sector with that of the public. ”…constraints and opportunities of national and regional economies are cast in with the associated institutional set-up. In a sense this brand of political economy ultimately argues the primacy of the ”political” over the ”economical”” (Kluth and Andersen 1996). While the innovation system approach is generally lacking the appreciation of politics, it seems clear that institutional configurations are important for the structure and performance of innovation systems, making it necessary to view the concept of innovation system essentially as a political-economic concept. Thus, innovation systems are developed in an evolutionary sense, but the socio-economic mechanism can be framed as negotiation and learning, including exerting power, influence and trust. These processes take place within national frameworks, e.g. as national rules and regulations associated with the educational system and governed by the ministry of research and education. A useful concept in this respect has been developed by David Soskice (1991), refering to the National Framework of Incentives and Constraints” (NIFCs), which are of vital importance to how the negotiation processes take place on a regional level. The adaptability of regional innovation systems is therefore highly dependent on these NIFCs, but the regional or local configuration may produce outcomes, e.g. through effective, integrative negotiations, that transcend the configuration envisaged from the national level at the outset.

The quality of configuration, i.e. the quality of relations between the parties in a regional innovation system, cannot not be defined universally. In other words, high quality innovation systems do not possess the same characteristica. The need to find configurations that fit the "*Regional* Framework of Incentives and Constraints" is hence of vital importance, but this is, given the politcal nature of this process, also dependent on the quality of the political system, in this context the nature and abilities of the interest groups and parties to engage in negotiation processes that are essentially integrative, i.e. processes that generate system outcomes that represent key improvements of the way the regional innovation system performs. And this has been highlighted in the case of RUSH, where the extreme models of Vestfold and Agder both represent outcomes of high additionality. Innovation systems are negotiated configurations.

The policy implications of this, and which may define the starting point for REGINN, can be summarized as the following: At one level, more attention should be given to horisontal policy development at the national level. This should aim at clarifying the national framework of incentives and constraints, in particular through inter-agency integrative bargaining. The need to produce horisontal policies to support the evolution of national technology and innovation policies, is strongly argued by Teubal (….). But it could be useful to decompose this into specifiable elements containing strategies for integrative negotiations, overcoming the competitive and particular embeddeddness of ministries and agencies. In other words, the policy should move on from a "single-component" adaptive strategy to a national consensus on the need to change incentives and constratints on the national level at large to lay the foundations for high-performing regional models.

The general aim for policy oriented at the regional level, would be to stimulate the conditions for developing optimal contractual relations through integrative negotiations, contractual relations in this context meaning the mutual relations between parties, including trust, learning and a consensual configuration of the system components. On the one hand, a policy should contain a "multi-component" approach, giving the responsibility for improving configurations and relations to many parties. On the other, a policy should contain elements of a framework for integrative negotiations, in which the parties engage in processes that are regionally embedded and pro-

duce vital additionalities in the configurations at hand. This general implication may be translated into guidelines based on the notion that the evolution of systems are decision making and negotiation processes. The difficulties of reconfiguring institutional settings are very much like the very reasons why integrative negotiations are difficult to initiate: First, the parties have earlier and negative relations. Second, the parties both or all think that only zero-sum games (or distributive bargaining) is possible. And third, the parties have different motives for entering into negotiations.

To conclude this section, initiatives to improve the regional institutions' role and position in the respective innovation system should to a greater extent *structure* the process in which the negotiations take place. The regional institutional setting has a history, and to improve the innovative capability of regional economies, configurations need to be developed that transcend this history.

Enters REGINN

RUSH is essentially a "single-component" systems policy, aiming at improving the role of one particular component in the innovation system, the state colleges. But already during the early stages of the RUSH programme, it became increasingly evident that a broader institutional approach was needed. This was on the one hand rooted in the increasing focus on innovation systems coming from policy oriented research in this area, especially from 1992 and onwords. Thus, the change in the policy research agenda contributed in a certain shift in focus. On the other hand there was a growing concern inside the research council about the appearant lack of coordination of innovation resources on the regional level, especially the poor links between the state colleges and the regional research foundations. The REGINN initiative cannot be seen as an extension of RUSH, but builds on a more complex evolution of a programmatic approach. This legacy will be discussed to provide a broader insight into process leading to REGINN. The policy context for RUSH discussed earlier in the paper is therfore widened to allow for a more specific contextual analysis.

The legacy of regional R&D policy

The increasing attention during the –80s on promoting a regional infrastructure for R&D and economic development led to, as we have discussed earlier, to a system of regional research foundations. At that time the colleges were fragmented as a system, and the knowledge infrastructure was difficult to access from the point of view of the business community. During the –80s, an attempt to increase the coordination of this system was promoted (NOU 1981:30A), called regional competence centres. The main idea was to organize a "one door model" for the business community. The competence centre was the organizational answer to deal with a fragmented and complex system, and the business community could rely on a simple entry into the innovation system. The ministry of local government and labor later admitted that this policy was a complete failure, among other things because it was arranged as a top-down approach and because it presupposed a regional system where the firms' great variety of needs could be satisfied.

This lesson led to a legitimation of initiatives to improve the industry's more active use of national R&D institutions, e.g. through programmes like TEFT. But it also led to new initiatives to improve the regional institutions' relationships with the business community. RUSH can be seen in this light. But other initiatives came. After RUSH had been established, the ministry of local government and labor started a process together with the association of the regional research foundations, FOKUS, to promote a programme for "strategic industrial research". The initiative came from FOKUS itself due to consistent problems in gaining a sufficient level of basic funding. The lack of such funding (in general it was about 10 % of the turnover, the rest being contract research in competition with others on the national scene) represented a draw-back in competitiveness, since the typical national R&D institutions had significantly higher levels.

The strategic industrial research programme (here given the acronym SIRP) in the regional research foundations started in 1993, and it is quite noteworthy that the RUSH initiative that started late 1994-early 1995 paid little attention to this programme. Throughout 1995 to 1997, the period during which both programmes were active, no coordination or bridging was attempted. This is all the more peculiar, since SIRP had a clear infrastructural focus: The white paper on regional policy (St.meld.nr. 33, 1992-93) stated the objectives as:

- To contribute to the easier access for the business community in all regions to the national and regional knowledge infrastructure;
- To contribute to increased exploitation of the knowledge sources by the rurally based firms.

The SIRP was further operationalized in two key objectives:

- To increase the competence at the regional research foundations, especially to build top competence and make this accessible for the business community;
- To help improve the institutions' contact with and usefulness for the local industry.

We will not discuss this programme in detail, but refer to some main issues pointed out in the mid-term evalution (Eriksson 1996). Not all institutions participated in SIRP (a screening process was done), but most of these entered into a cumbersome and time consuming process, leading eventually to a set of institutionally based programmes for industrial research, mainly social science based. The research foundations in both Agder and Telemark participated, Agder with a distinct consulting approach, Telemark with a rather weak approach with few industrial contacts and a difficult relationship with the college. In general, Eriksson gives SIRP support as a programme aimed at redirecting the focus in the foundations, but is also rather critical of the approach many of them chose. Many, however, developed a competence matching the prevailing industrial structure in their region (implying that a greater degree of over all specialization should lead to a national status as a R&D institutions in their respective fields), although with rather variable results vis-a-vis industry in practice.

But like RUSH, SIRP was a single component programme, aiming at improving the resources and role of one part of the knowledge infrastructure. SIRP had no intentions to or particular consequences for an improved structural configuration of the regional innovation system. It's main function was to direct resources to the regional research foundations to alleviate low levels of basic funding and to improve their industrial focus.

The lack of over all coordination was the background for another initiative in late 1994. The research council, in a cross-divisional effort at improved infrastructural coordination started a process to develop a more coherent plan for the knowledge infrastructure:

> "NT, KS, BF, IE and MU (all research divisions) require a study on how the regional research foundations *in interplay with* the technical-industrial research institutes, institutes for agriculture and fisheries, and institutes for social science, can improve their role as instruments for regional economic development through strategic programmes" (Internal memo, strategy division, 12.12.94).

The argument was basically that the total mass of resources for regional economic development was abundant, but that the main problem was the inherent disperse structure, weak links and small institutions. The study, finalized early 1996, referred to both RUSH and the SIRP system, made the following statement:

> ”It is important that the state colleges and the regional research foundations cooperate closely to define areas of collaboration/constellations so that the services to the business community are presented in a coherent and consistent way from the regional research and knowledge system.

> A rational exploitation of the resources at both institutions in collaboration will therefore represent an important challenge. The demands from the ministry of research and education on external funding in the state colleges will easily contradict this” (NFR 1996:11).

The study concluded that the SIRP system should continue, albeit in a broader programme focused at the regional research system (which included both the research foundations and the colleges) and their relationship to the wider national system. It was explicitly stated that a separate establishment of contract organizations in the colleges competeing with the regional research foundations (which RUSH tried to accomplish). In sum, this proposal had a reflected systems perspective highly needed after an increasing fragmentation of the innovation system through non-coordinated programmes.

The proposal was communicated to the ministry of local government and labor in March 1996 by the research council's general manager, stating explicitly the need to integrate RUSH into the proposed programme.

The REGINN programme

Main intentions

The proposed programme was not implemented directly. Instead the ministry decided to fund a new programme for regional innovation called REGINN. The initiative was

based upon the lessons from the SIRP system as well as the growing attention to the need for a more coherent policy for innovation systems. The programme memorandum, adopted in the board of the programme for technology transfer (PTT) 25.6.97, contained the statement that "the programme consentrates on how institutions in the regional innovation system - in particular the regional R&D institutions – can provide resources for the business community more effecticvely in the further development of innovative industrial milieus". The memo was firmly based in recent policy research:

> "International research shows that well-functioning innovation systems – both global, national and regional – play an important role for the competitiveness of industry, for the firms' innovative capabilities, and to maintain employment (reference is here made to Lundwall (1992) and Koschatzky and Kulicke (1994)). The firms' innovation activities demand coordination and dialogue both internal in the firms and external in relation to many other partners and interest groups. This can be other firms – both competitors, suppliers and customers, financial institutions, government and R&D institutions. Innovation processes take place in many ways through internal learning, networks between firms and between firms and the surrounding support system" (Programme memorandum 1991997:2).

Reference was also made to the need for a cross-sectoral focus to reduce the barriers to innovation. In particular "there is a need for increased coordination between regional policy, industrial policy, and research policy with a clear focus on the diverse regional conditions – strengths and weaknesses". We note that no reference is made to educational policy: The state colleges are no integrated part of this approach on a policy level.

Objectives, target groups and instruments
The over all objective was "… to contribute to stimulate and implement innovation activities in the firms which participate in the programme. This is further split in two key objectives in line with the goal structure implemented in the programme for technology transfer in the research council:

Business development: REGINN shall strenghten the building of relationships
                                 and the practical cooperation between regional R&D
                                 institutions and clusters of industry in the region.

Infrastructure: REGINN shall contribute to the establishment of re-
                                 gional arenas, meeting points and prosesses where the
                                 regional R&D institutions to a greater extent cooperate
                                 in networks with others in the regional and national
                                 innovation system.

The target groups were defined primarily as firms and the regional R&D institutions.
The selection of firms could be based on a sectoral principle or on one or more clus-
ters.

REGINN was to be process oriented and rested on two instruments; the two stages of
identification and implementation. The first stage was essentially analysis, paving the
way for implementing selected projects in the next stage. However, REGINN repre-
sented an attempt to build processes and structures "bottom up", inviting the regions
to establish committees for collaboration in promoting the identification of good pro-
jects. The programme memorandum even emphasized the need to select "an enthusi-
astic and integrative committee chairman" and that the project manager should "be
responsible for the regional innovation study and the subsequent application for pro-
ject funding. The project manager ….. shall have a formal basis in one of the R&D
institutions in the region".

Thus, the organizing principle was prescribed, and the success in the prequalifying
stage of the programme was to be heavily dependent on the degree to which the re-
gions stuck to this model.

The stage of implementation consisted of implementing the projects funded out of
the first stage. The main idea was to link the projects to the identified innovation ne-
eds in the respective sector or cluster.

REGINN has explicitly aimed at contributing to improved coordination between all
the existing institutions, instruments and programmes in this general policy area.

This is consistent with the later development in which increasing needs for coordination and coherence are not met by major reforms but adding on new programmes with a coordinating side-objective. This is a major point to which we will return.

The REGINN programme was however implemented in a new way. Due to scarce resources and the import of a "call for proposal" model similar to that of the RIITS programme in EU, all **counties** were invited to a prequalification stage in which a plan for the identification stage was to be the outcome. The county administration was thus selected as the institutions to take on a coordinating role, linking up to the relevant parties in the region, also in collaboration with other, neighbouring counties. As the funding mainly came from the ministry of local government and labor, the approach in the regions was expected to have a clear "rural profile", implying that due consideration would be given to satisfying the criteria of eligibility in the rural and regional policy (essentially avoiding central areas.).

At this point it is necessary to explain the informal translation of REGINNs philosophy from the programme memorandum to implementation. The institutional approach in the early programmes of the –90s had the systemic focus required, albeit often single component based like RUSH. Still, they continued a tradition of "institution building". The implicit philosophy was that innovations or better, innovation systems, could be planned. Regional innovation systems invites the concept of traditional planning, were through adjustments in linkages and structure one may arrive at better performance. In this way institution building is like fine tuning, or social engineering, of the complex structures and interactions. The limited resources devoted to REGINN leads to trying a different approach, where the idea of planning is reduced. The regions are to start in "practice" in which people, organizations and institutions interact and gives both an innovative and institutional result. The system is no longer completely interdependent, but "loosely coupled", and REGINN's task is to initiate processes that select environments and produce results based on the interests and initiatives of regions and people concerned. Coordination is not to take place from above, but through local action. Coordination becomes ecological more than administrative.

The intention was to give REGINN projects to only a restricted number of counties, ca 10 out of 19 at the outset. It was communicated in the prequalifiying round that applicants should take care to select practical projects, i.e. to concentrate on selecting clusters of firms or a sectoral approach and use the idenfying stage to studying the innovation challenges in this cluster, and then select innovation projects for the implementation stage. Hence, those counties which had a minimum level of cooperative relations with industry, R&D institutions etc, would have an advantage. The expected outcome would be that of already strong counties to be selected.

The pattern of selected counties and projects
And this is in general confirmed. The projects to be implemented in the fall of 1998 will be managed by the 7 counties so far succesful. We note first of all that two counties or groups of counties are selected: Rogaland, the county of petroleum and agricultural clusters, and Troms and Finnmark in collaboration, an area in northern Norway which for years has been the target for a bundle of initiatives (see Isaksen on the NT programme). The rest of initiated REGINN projects include three of our RUSH counties (including the twin county of Agder), excluding the county of Østfold which did not succeed.

The projects follows essentially the philosophy of REGINN, giving more wieght and attention to the demand side: All projects are meant to stimulate innovation in selected sectors or groups/clusters of firms in the region, and support have been given to projects where the industry is heavily involved: "The electronic coast" in Vestfold will stimuate innovation and cooperation in the electronics industry, Telemark embarks on two projects, one on product development in the plastics industry and one on environmental issues in the same industry, The Agder counties will stimulate and implement innovation processes in the industry building smaller plastic based boats.

We will not og to far into the details of the REGINN programme. Suffice it to say that the RUSH programme paved the way for participation in REGINN. Both Agder, Telemark and Vestfold were able to build on the results and lessons generated in RUSH to come up with networks and ideas for REGINN. The essentially institu-

tional results coming out of RUSH fitted nicely as preconditions for participation in RUSH.

This pattern of self selection of counties is of some concern since both RUSH and REGINN had a selective approach; RUSH by managerial decision and REGINN by "survival of the fittest". In other words, RUSH became the means through which most of the participants managed to strenghten their competitive advantage vis-a-vis others to join REGINN. This is all the more interesting since RUSH was an experiment, aimed at generating lessons that could be transferred to other colleges. Instead it generates advantages for participating in the next programme that conceives institutional change as something that should precede the activities or be developed through the mechanism of learning from the lessons of practical projects. While REGINN could have been a programme for those disadvantaged in earlier programmes, the result was the opposite.

Discussion and conclusion

It is of course to early to assess the impacts of REGINN, and our intention here has not been so. Instead, the evolution and conception of REGINN som some extent represents an indicator of the relative success of RUSH: Those counties which participated in RUSH, improved their competitive advantage in the competition for REGINN participation.

The results from RUSH indicates the need to design programmes with a high level of contextual or regional sensitivity. The diverse models coming out of RUSH demonstrate the importance of different traditions, cultures and configurations that enter into the processes of systems design. They also point to the key importance of the diversity of "knowledge cultures" that are embedded in the regions and their constituencies: Knowledge cultures represent a framework for how people and organizations ask questions and relate to each other, as well as define trajectories of development in business and political life.[16]

RUSH can, as mentioned, be seen as successful in the sense that it had institutional impacts. But the lessons from RUSH contains a key message: Deficiencies in the knowledge infrastructure cannot be solved only by state level programmes that include some coordination mandate, when the thrust of the state educational works in a rather contradictory way. Although there seems to some flexibility in the way rules and regulations from the ministry of research and education are met by local players, the strict sectoral approach taken by this ministry represents important institutional barriers. The high degree of state centralization in these matters probably stems from the dominance of the welfare state, which across may sectors aim at producing equality in public services vis-a-vis the public. Municipalities and local/regional governments have their roles defined as distributive institutions in the welfare state, rather than developing institutions for the regional level.

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[16] The concept of knowledge cultures was discussed at a seminar in Manchester 17-18 September on "Knowledge as a development factor". The seminar was arranged by EU's DG XVI as a component in the process of "European Spatial Development Perspective", and the concept was raised by Richard Knight.

The increasing fragmentation that result from the added programme initiatives lead to increased coordination needs that the programmes in turn need to address. On the one hand this raises the issue of proper levels of coordination: Should coordination efforts be achieved at the national level where such programmes are initiated and planned, or ot the local level where impacts are supposed to take place? On the other hand, it raises the issue of whether programme and institutional coordination is the appropriate approach to the problem, in so far as institutional reforms may be more effective. Thus, the issue at stake is whether policies and instruments are designed instead of institutional reforms, and whether they may be more effective if they are integrated in their very modus operandi, rather than issued as separate programmes with the associated coordination needs. The implication is that coordination will be better if these policies are integrated at the level of execution, i.e. on some regional level.

We have focussed on the importance of negotiation and development of contractual relations as the key process to develop and change configurations of regional innovation systems. The approach taken by REGINN seems fruitful in this respect, where coordination and/or integration may be reached through the local processes. Hence, *development coalitions* seem to be important structures which can transcend interests and positions into collective action. This "political economy" version of innovation systems could then be seen as an entry to "learning regions", in which key players in the regions and beyond are embedded in territories and institutional settings that represent the foundations for interactive learning (see Asheim 1998, for a discussion). The main point here is that the knowledge society may require new solutions for mobilization of knowledge and for dissemination of knowledge into value added activities. This goes appearently especially for the centralized welfare states like Norway, where standardized solutions deemed necessary from a welfare policy point of view, also represent the cause of a high degree of centralization and a deterioration of what we would call capability for collective, developmental action at the regional level.

This is also in line with the idea that integration is the best form of coordination: Regional agglomerations are of growing importance as a "mode of economic coordination in post-Fordist learning economies" (Asheim and Isaksen 1997; Cooke 1994, cited in Asheim 1998). But for regional players and institutions to engage in interactive learning and integrative negotiation, they need to possess

a minimum degree of independence from central or state authorities. Learning is a localised process, combining economic and non-economic elements. And this leads to a key conclusion in this paper: Regional innovation systems are systems of political economy, and the localised innovation processes cannot be understood without the specific context of the nation state.

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STEP gruppen

STEP-gruppen ble etablert i 1991 for å forsyne beslutningstakere med forskning knyttet til alle sider ved innovasjon og teknologisk endring, med særlig vekt på forholdet mellom innovasjon, økonomisk vekst og de samfunnsmessige omgivelser. Basis for gruppens arbeid er erkjennelsen av at utviklingen innen vitenskap og teknologi er fundamental for økonomisk vekst. Det gjenstår likevel mange uløste problemer omkring hvordan prosessen med vitenskapelig og teknologisk endring forløper, og hvordan denne prosessen får samfunnsmessige og økonomiske konsekvenser. Forståelse av denne prosessen er av stor betydning for utformingen og iverksettelsen av forsknings-, teknologi- og innovasjonspolitikken. Forskningen i STEP-gruppen er derfor sentrert omkring historiske, økonomiske, sosiologiske og organisatoriske spørsmål som er relevante for de brede feltene innovasjonspolitikk og økonomisk vekst.

The STEP-group was established in 1991 to support policy-makers with research on all aspects of innovation and technological change, with particular emphasis on the relationships between innovation, economic growth and the social context. The basis of the group's work is the recognition that science, technology and innovation are fundamental to economic growth; yet there remain many unresolved problems about how the processes of scientific and technological change actually occur, and about how they have social and economic impacts. Resolving such problems is central to the formation and implementation of science, technology and innovation policy. The research of the STEP group centres on historical, economic, social and organisational issues relevant for broad fields of innovation policy and economic growth.