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Management Qualification and Dissemination of Knowledge in 'Regional Innovation Systems'. The case of Norway 1917 - 1990s.

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Introduction

Within national borders, great variations between different regions have been observed when it comes to innovation and economic development. The character of regional variations has been explored through dimensions like the existence of different models of industrialisation, cultural variations between regions and through the varying importance of regional innovation systems and learning systems.

In recent theories on regional innovation, globalisation challenges in particular make the innovative capacity of firms and regions of strategic importance.[1] Competitive advantage is claimed to be maintained through innovation based on localised processes.[2] Interactive learning and knowledge flowing smoothly between regional actors is therefore seen as a basic provision for processes of innovation.[3] Political intervention in such processes should aim at the systematic promotion of localised learning economies.[4]

According to Lundvall, the concept of innovation system is broadly taken to include 'all parts and aspects of the economic structure and set up affecting learning as well as searching and exploring - the production system, the marketing system and the system of finance present themselves as subsystems in which learning takes place'.[5] Innovation systems have normally been referred to as national systems, but inspired by the political initiatives towards a Europe of regions and economic success stories of territorially agglomerated clusters of SMEs (e.g. the Third Italy), the way economic policies are reformulated at regional levels has attracted greater interest.[6] In this article the term regional innovation system is borrowed not with the intention to strictly identify, define and discuss the relations between all its parts, but rather to highlight how institutional arrangements designed to promote knowledge flows and management

education in regional territories must be incorporated within a larger system of relations between governmental, legal, institutional and business actors.

Despite a lot of debate about regional innovation systems and localised as opposed to placeless learning, the role of knowledge flows between higher education and business, particularly to managers in executive positions, is not extensively treated in innovation systems analyses.[7] Lundvall, for example, while strongly emphasising the importance of the interplay between business and education in national innovation systems, does not treat this issue at any sufficient level of concreteness. Likewise, in a recent Norwegian study, the role of the education system is depicted in only general terms.[8] A sharper focus on the flows of management knowledge between business and providers of higher education and training is therefore highly warranted.

The purpose of this article is, by using both a wide historical and contemporary material from Norway, to provide a new and more detailed empirical foundation for discussing the role of dissemination of technical, organisational and managerial knowledge within regional innovation systems. Accordingly, we focus on qualification for management in regional innovation systems. The article is grounded on thorough investigations of both central, regional and local archives together with a number of public and semi-public reports and documents. This material is, furthermore, combined with broader survey studies (see table I), and also includes recent studies partly based on in-depth interviews with central actors.

Qualification for management in 'regional innovation systems'

If we broadly accept the idea of regional innovation systems, it is important to differentiate between two facets of such systems. On the one hand, such systems include the activities of national (and sometimes international) institutions and companies. On the other, they include actors and institutions that origin from the regional interaction patterns, or has the region as their primary domain.[9] Our position is that the managers of regional business and institutions are key actors in utilising the links between the national and the regional. They are the actors that have access to both levels. The understanding of the systems of flow of knowledge is therefore of importance if we want to understand the territorial dimension of learning and innovation.[10]

The idea of localised as opposed to placeless learning is related to the idea that innovation is primarily the result of interactive learning processes influenced by local economic structures, values, cultures, institutions and histories. If this is correct, regional innovation

requires that managers and entrepreneurs posess and utilise local, often tacit knowledge, deriving either from practical work experience or from education and training taking place in a regional context. Management education at the national level do not likely incorporate such territorially defined knowledge. Tacit knowledge and interactive learning have been attached to so called associative identity, identity that stems from participation, i.e. that people actually act together in a certain area, activities that are geographically anchored. In this sense, a regional college for example is only *regional* in a deeper meaning if it is associated with activities important *in* and *for* the region. It is therefore not straightforward to disseminate knowledge between small businesses and academic institutions, unless it takes place 'inside' the existing culture, through a *flow of knowledge* between 'partners'. This flow of knowledge depends on the use of 'language', and lecturers and researchers often seem to have other 'language codes' than managers in regional business. For example, managers often have to express themselves in a context-specific code, whereas researchers are trained in using more general abstract codes (context-independent). Accordingly, in order to be able to assist in the application of context-independent abstract economic theories scholars must learn the local context-specific codes. Interactive learning thus depends on the development of arenas where different actors can develop a common language.[11]

It has, however, been emphasised in the literature on regional innovation that regional systems in order to be competitive need to combine local knowledge with knowledge produced at international and national arenas. The inability to combine different kinds of knowledge may create situations where firms are locked in their own constrained world. Thus, the challenge is to create systems that promote the blending of different kinds of knowledge, so that regional systems can produce not only incremental but also radical innovations.[12]

The implication of these ideas of localised learning processes is that regional innovation systems, if viable, incorporate subsystems that enforce both knowledge flows between firms, service producers and R&D institutions, and management education that on the one hand equip managers to seek, understand and implement external ideas and concepts, while on the other crediting local structures, values, histories etc. Despite the implications the ideas of regional innovation systems and localised learning have on ideas of knowledge flows and management, there are few if any studies that combine the focus on management knowledge with more in-depth historical analyses of regional systems of innovation. In the following, we intend to describe and assess to what extent different historical 'models' have facilitated knowledge flows between managers, educational institutions and other knowledge providers since the 1930s.

Three stages of systemic relations

In Norway, the policy of transferring knowledge to regional business has developed through three different periods with its respective systemic traits, for heuristic purposes here treated as different 'systems'. The term 'systemic' is referring to the fact that actors depend on utilising knowledge from different sources when they innovate. Innovative activity is, subsequently, collective and interactive processes. In order to be systemic, however, these learning processes must be attatched to institutions on national or regional level, or at least connected to clusters.[13]

The first system was active from 1917 until 1953, based on the co-operation between small business advisory branches in the regions, *Småindustrikontorer* (SIK), and a semi-public advisory organisation *Statens teknologiske institutt* (STI), which was set up in 1916 in order to facilitate flow of knowledge to businesses by the use of liasons or consultants. The most important feature of the system was its ability to convey knowledge to entrepreneurs.

The second system emerged in 1953, as *Norsk Produktivitetsinstitutt* (the Norwegian Productivity Institute or (NPI)) was created in connection with the Marshall Plan and the productivity drive in Europe. The NPI established close relations to the STI, and promoted dissemination of knowledge to regional networks of companies. Through the involvement of the NPI, the scope of the knowledge dissemination was widened to include international knowledge to a new extent, and the dissemination system was increasingly designed to embrace regional businesses. Through lasting knowledge networks and series of meetings involving experts and local managers, regional arenas emerged which stimulated localised learning. The most striking characteristic of the system was its capability to disseminate knowledge through networking between businesses, and between businesses and knowledge producers.

The third system emerged after 1987, as the Government decided that the County authorities should take over the local branches of the STI and be responsible for developing the regional flow of knowledge. The STI was, accordingly, dissolved, and a county driven organisation was set up in its place. This move was motivated by a new knowledge- based paradigm for innovation and economic development in the Norwegian industrial- and regional policy, gaining strength from the beginning of the 1980s. It emphasised the interaction *inside* the region between business and new academic institutions, Regional Colleges (RCs), set up in the regions from the 1970s. Furthermore, regional businesses were exposed to a growing number of governmental development programmes, partly aimed at strengthening the interaction between regional partners. The most important feature of the new system was, accordingly, dissemination of knowledge through public intervention programmes.

However, the networking tradition of the previous phase was now challenged, and we argue that the new system did not meet the expectations of vitalising the regional dissemination system. Instead of strengthening existing regional arenas for local managers, the innovation system has become more intransparent. Furthermore, the RCs failed in graduating students from the regions to functions of top management in regional business, and despite many efforts, ambitions to integrate formal education into the dissemination network yielded only poor results. The RCs developed into academic institutions whereas the dissemination network was impaired when key institutions like NPI and STI were either dissolved or structurally disintegrated.

Much of the illustrative empirical material is taken from the Møre and Romsdal region in West Norway. The region is rich on historical evidences that have been utilised in research on the productivity drive in post-war Norway and the dissemination of internationally and nationally produced knowledge to and inside the region.[14] The region, moreover, has been described historically as a successful example of a regional system of innovation, although current research tends to downplay its innovative character.[15]

(Map in here)

The Møre and Romsdal region (see map) occupied only a pheripheral position during the industrial breakthrough in Norway around 1900. However, from the 1920s, small-scale manufacturing industry (especially furniture, textile, and small shipyards) developed rapidly. When the Norwegian heavy industry in the 1920s and 1930s suffered from crises, this new small-scale industry developed well, and contributed to restructuring the Norwegian manufacturing industry, which changed dramatically from being dominated by an export oriented industry to a small-scale industry producing for the domestic market. While 27.2 per cent of all employees in manufacturing industry in Norway worked in small companies with less than 50 employees in 1930, 41.9 per cent worked in such small companies in 1948. Møre and Romsdal county became one of the centres of this new small-scale industry. While the more heavily industrialised parts of Southern and Eastern Norway experienced a dramatic period of downsizing and deindustrialisation from the mid-1970s, the manufacturing industry in Møre and Romsdal kept its position. During the period from 1967 to 1975 Norwegian shipyards in general became more specialised and larger. As a consequence, several shipyards lost their flexibility and did not manage to adjust to new products during the years of crises from the mid-1970s. The shipbuilding industry in Møre and Romsdal, however, specialised in building small

ships and in repairing old ships. In this way, the district combined growth with an old flexible production form. During the period of crises from the mid-1970s, these shipyards adjusted better to the new market situation than was the case in other parts of Norway. As a result, Møre and Romsdal strengthened its position as a centre of shipbuilding in Norway during the 1980s and 1990s. Furthermore, while the number of employees within the manufacturing industry in Norway in total decreased with 17 per cent from 1970 to 1990, the decline amounted to only two per cent in Møre and Romsdal.[16]

Knowledge dissemination and entrepreneurship, 1917 –1953

The inter-war period represented a leap forward for business establishments in Norway. The number of enterprises grew by 37 per cent from 1930-1937. The pivotal role of 'know-how' disseminated through co-operative relations between actors has been underlined as the basis of this transformation.[17]

One important institution in this respect, was the small business advisory branches, *Småindustrikontorer* (SIK). The first one was established in Kristiansund in the sub-region Nordmøre in the county of Møre and Romsdal, in 1926. The Kristiansund branch alone assisted in setting up 62 firms until 1932. It received and answered around 6.000 letters in 1931 from different parts of the country. In 1930 six branches of SIK were set up in Norway, while altogether 21 were established until 1935.[18]

The establishing of SIK- branches was the result of joint efforts by business, professions and voluntary organisations, all aiming at creating new employment opportunities. The economic crises in the 1920s and 1930s furthered 'know-how' networking on the regional level. The assistance of the SIKs imporved the ability of businesses to take advantage of decentralised production located close to raw material resources and cheap labour, and simultaneously to centralise marketing and sales functions, thus enhancing the possibility to monitor market trends and suggest utilisation of new technology and new products. These mechanisms in many cases laid the basis for developing high- technology small businesses within the furniture industry.

The STI was set up in 1916. To a larger extent than the SIKs, the purpose of the STI was to transfer knowledge from the national to the regional level. The co-operation between the STI and the SIKs promoted a gradual technological and financial development of firms. The combination of low wages and investments in technology turned out to be a dynamic element in expanding the businesses. The SIKs were created on the initiative of local business firms, organisations and local authorities, while the government played an active part in setting up and

financing the STI. The main characteristic of the STI's work in the 1930s seems to be the effective building up of *bi-lateral* relations between business and knowledge producers through courseworks and advisory services.

In the post-war period the STI came to be considered 'an important element in the industrial policy towards the SMEs'.[19] These ambitions materialised especially in the 1960s, first in the creation of a comprehensive *coursework* adapted to the SMEs needs, second in *contracts* with enterprises in implementing long term planning, economic analyses, technological and organisational development, production process analyses and automation, materials handling and productivity, and third in engaging in *projects* and *R&D related activities* designed to facilitate application of know-how to the SMEs needs as well as the general conveyance of actual knowledge.[20]

Internationalisation and regionalisation of knowledge dissemination, 1953 - 1987

In order to depict the systemic character of this period, we need to briefly outline some formative processes prior to the establishing of the NPI in 1953, taking place within the framework of the STI.

The regional expansion of the STI

The STI expanded its activity after the war, also in the department dealing with the furniture and wood processing industry. In 1961 the STI set up a one year part time coursework for leaders in this industry. Apart from different kinds of courseworks, the direct business councel activity was the most comprehensive, including for example advice in long term planning.[21]

Another department organised business, labour and work management relations. Before the war, the department organised courses in production organisation and labour management that attracted great interest and attendance. In 1948, courses in Training Within Industry for Supervisors (TWI), largely American and British influenced, became popular.[22] The need for this kind of know-how was in the ship-building industry in particular. Management courses at different levels were at the core of this training, which included topics like co-operative relations, work instructions, how to create and manage discussions on the shop-floor level, work methods, continuing co-operation process development and development of training programmes. The *rationalisation* office within the department created new courses in work organisation and production process management from the 1930s.[23] In 1948 this office was made an own department. The American inspired Method-Time-Measurement (MTM) system was introduced

in 1952, a technique combining frequence studies, factory planning, production planning and statistical quality control. The STI also set up a *business administration and economics* department in 1958, partly funded by the NPI. In 1963 this department promoted shorter courses in management for smaller businesses, and in 1965 a number of courses in business administration and economics, accounting, financing, investment prognoses, taxation regulations, profitability assessment, office organisation and marketing were introduced.

The *regional work* of the STI was increasingly formalised and *organisationally* structured through the 1950s and 1960s. The STI set up a number of regional branches and in 1964 a national office was designed to monitor and manage them. Business advisory services and courseworks as well as conferences for SME managers were central activities.[24]

While the activity in 1950 comprised 100 courses for over 1.000 attendants, in 1967, 6.000 participants attended 400 courses altogether.[25] In carrying out its work, the STI employed a network of business and labour institutions, universities, technical schools and vocational schools, research institutions and branch organisations. Especially concerning the development of SMEs, its ambition was to construct a knowledge and information dissemination system. [26] In the early 1960s, the national authorities put great emphasis on expanding the business advisory services and urged the establishing of new regional branches.[27] According to the STI, several 'stages' had to be facilitated in the transfer of knowledge. First, the companies needed capacity to collect information on new research achievements. Second, they needed competence to decide on its applicability. The third stage was deciding on implementation. The STI stressed that a qualified dissemination *system* was required and was paramount to improve business innovativeness and competitiveness. In Great Britain, according to the STI, it had been estimated that *system failures*, i.e. shortcomings in the dissemination of knowledge, equated ten per cent out of the total investment in research and development, while in the USA it had been estimated a loss of 200 mill. dollars in 1961 within the electro-technical industry only, due to such system failure. The STI subsequently concluded that the systematical dissemination of knowledge was a crucial factor in economic growth. [28]

Accordingly, a two-fold challenge had to be met. First, institutions that could present new results in a way that companies were able to understand were highly required. Second, companies needed tools that enabled them to evaluate the applicability of knowledge. A major challenge, therefore, was to establish a far better system, labelled an information and knowledge '*dissemination chain'*. In this chain, national documentation centres should connect vertically to branch institutes or regional and local information institutions. Horisontally, conferences should facilitate the dissemination of the expertise found within the institutions, because so much

depended on transforming and infusing formal knowledge with the more informal, local and tacit expertise. [29]

In the beginning of the 1960s, several authorities indeed worked towards expanding business advisory services in the regions. A public report published in 1962 on the request of the Department of Industry advocated the need to use SME consultants in the regions. In responding to the report, the STI underlined the need to co-ordinate this activity with the STI, local technical schools, small business offices and branch organisations. [30]

In 1962 the STI sought to establish three new regional business councelors in Ålesund, Stavanger in South-Western part of Norway, and Skien in East Norway. One reason for expanding the work in these regions was that the STI 'in recent years has tried to meet an increasing demand for advisory services especially in these regions.' The form of expansion was not at all without importance, however. Local milieus should play an important part in expanding the *infrastructure* of business advisory services. Hence it was stressed that the regional advisors needed to operate in collaboration with local technical know-how, and preferably conduct the work from an office located near by or at a technical school. The STI advocated the principle that the location of advisory services should be based on *industrial districts*, (*næringsdistrikter)*, rather than according to formal county administrative boarders. In general, there was reason to believe, that 'the local net of contacts must be emphasised in particular, and the regional work must be related to local traditions and industrial districts established over time'. [31] In this way, the system was based on existing regional learning networks.

In the 1960s, the STI had established work-shops for managers of smaller businesses, *bedriftslederskoler*. These schools were directed towards specific industries, like the furniture industry and the automobile service sector. [32] Since 1963, moreover, a management workshop for craft and smaller businesses had been running as a pilot project. By 1967, it was included in the formal education system for vocational training under the Ministry of Church and Education, substituting the fourth year of the apprenticeship school. However, both the authorities and the STI realised a need for developing a more advanced management education for this sector as a part of STI's domain. [33] In general there was a substantial demand drive for industry specific courses which the STI sought to meet. For example courses in business administration were held all over the country in 1967 on the request of the engineering industry.[34]

Participation was a key word in the activities of the STI. The coursework often required the active role of the participants. Many courses were based on discussing actual cases or problems found in the participating firms. For instance, this method was important in the rationalisation effort, like courses in production techniques and work simplification and

standardisation, including topics like product analyses, process analyses and method analyses. By the end of the coursework, it was required that each participating manager was able to 'implement' or 'translate' the knowledge by suggesting improvements of current practices within his business.[35] This method clearly required a great deal of trust between the participants and the STI. The STI in this way acted as a *pro-active* element in the regional dissemination of know-how.[36]

The collaboration between STI and NPI.

NPI, in collaboration with the STI opened up channels for the transfer of international trends and know-how to the national innovation system, and through the regional branches, also to the regions. During the 1950s, for example, a number of American consultants visited the regions. At the national level the NPI in 1964 entered a co-operative agreement with The Foundation for Research on Human Behaviour, at Ann Arbor, Michigan. Academic institutions like this one seemed to have been important to the Norwegian productivity effort.[37] The NPI- representatives also studied business practises in Germany, Schwitzerland, Holland and England. Also the European Productivity Agency (EPA) was an important connection to international knowledge producing institutions.[38]

Both horisontally and vertically the STI and the NPI jointly established channels for regional dissemination of knowledge. The NPI made substantial efforts to develop co-operation through networks between SMEs within subjects like accounting and marketing. [39] An important initiative was to establish local productivity offices in districts dominated by small firms. In 1959, one of the offices in Møre and Romsdal for example, enjoyed the membership of 15 different organisations, representing almost all industries, craft related industries and wholesale trade in the subregion. All in all, our sources illustrate that the NPI was supported with enthusiasm by a variety of businesses and organisations.[40]

A cornerstone in the STI/NPI activity was a series of meetings involving the managers and middle managers of firms together with external consultants or lecturers and professors from the *Norges Handelshøyskole* (NHH, the Norwegian School for Economics and Business Administration in Bergen) called '*bedriftsledersamlinge*r'. The implementation of the meetings was parallelled by a wide range of different kinds of management courses. These were normally overbooked by top managers eager to learn. They covered a range of subjects like accounting, general management, and business administration (sale, marketing, market analysis). Also, through a 1-2 months long process firms were investigated and improvements in functional as well as general management techniques were suggested. Since the work was conceived of as successful

[41], it encouraged the NPI to plan the setting up of local branches in Østfold, Sørlandet, Rogaland and Trøndelag. A substantial number of single company analysis was carried out until 1965. During 1966 the work was expanded by introducing a method of systematic 'learning from each other'. Managerial teams from different enterprises visited and studied each others firms, and the visits were followed up by conferences that facilitated discussions between businesses. [42]

From the evidence presented it can be concluded that an effective knowledge dissemination system had been established at regional level by the late 1960s. Vertically, the STI and the NPI connected their activities to a number of educational institutions at national and regional levels. Horizontally, the management conferences, the meetings, the firm diagnoses, the sub-contracting programs, the networking between firms and the courseworks, made it possible to spread information and new knowledge of innovations to regional firms. Both the NPI and the STI took care to adapt their approaches to management and management training and education to already established learning processes in the regional innovation systems. Thus, they facilitated the flow of information between actors. The system also promoted an active interaction between the national and the regional systems of innovation.

According to the concepts outlined in the above theoretical introduction, the growing activity within the productivity movement depended not only on the general ability to translate and transfer know-how to national and regional contexts, but also on the ability to establish viable transfer channels, mechanisms and processes, in other words *arenas* for the flow of knowledge. Essentially, the system promoted qualification for management of regional business, as it was based on business to business networking and interaction between knowledge providers and businesses.

It is not within the scope of this article to assess the effect of this qualification system at company level and establish a causal link between the dissemination system and business performance. Recent research has, however, depicted the essential role of the dissemination sytem at a *networking* level. The furniture industry in Møre and Romsdal experienced a serious crisis in the beginning of the 1980s, lagging behind its Swedish and German competitors, even in the domestic market. Due to networking between managers in the furnriture industry, engaging experts at the STI, and the national and international contacts of the NPI, they were able to get insight into the technological modernisation of their competitors. Furthermore, the networking tradition played a paramount role, as none of the companies could single-handedly mobilise financial resources to implement the technology. Hence, a number of companies joined forces, and a modern production unit was set up in Sykkylven in the sub-region Sunnmøre, which could be utilised by the different companies.[43]

Inclusion of the RCs?

In 1969, the idea of setting up Regional University Colleges (RCs) with a two-year business administration education constituting the cornerstone of the curriculum was formally proposed. Two were established in Møre and Romsdal. During the 1970s, regional businesses expressed expectations that these colleges, primarily to meet a need for management education.[44]

During the 1970s, the NPI had put much effort into strengthening the link between regional business and the RCs.[45] A NPI project was created in 1968 to analyse problems related to forging the links between research and businesses in general. In Møre and Romsdal, the NPI influenced the setting up of a coursework at the Molde College focusing on management development and long term planning. Several comprehensive conferences on management education and training were held at the Molde College in 1972, and local companies were quite well represented at these conferences.'[46] Furthermore, a project on relations between SMEs and local governments was set up in co-operation with the Oppland College in 1979.[47]

In 1972, the NPI established a committee to develop a nation-wide system for management education for SMEs and promote 'a comprehensive regional cooperation between RCs, technical colleges, the STI and NPI, local business organisations and local as well as county authorities.'[48] One obvious advantage was that a regional system would be better prepared to deal with region specific problems in different regions. In the early 1980s, furthermore, two government appointed committees suggested to launch a policy for regional dissemination integrating the advisory institutions and the RCs.[49] A better coordinated system was thought to promote innovation, not the least in the SME.[50] Public support to coordinate the efforts of RCs and business advisory services was recommended.[51] No doubt, the strengthening of the relations in a regional dissemination system was seen as a crucial element in public SME policy and regional policy.[52] These perspectives were adopted by the central authorities through a number of parliamentary documents which emphasised the dissemination issue.[53]

The STI was inteded to be a cornerstone in regional knowledge dissemination systems. The government in this respect focused on the need to increase the transfer of knowledge from research to industry.[54] The ability of the STI to establish a closer link to the RCs and regional technical colleges emerged as a precondition for a strengthened dissemination system.[55] The STI carried on its work, and in fact also developed quite extensive contacts with some of the RCs and the technical colleges, however mainly to shorter management courses and technological issues at the technical colleges. The contacts were frequent also to some industries, in particular the furniture, wood processing and mechanised industries. Some of the regional branches of the STI developed close collaboration with the state governed information services in the local

municipalities, *Statlig industriell informasjonstjeneste. (*INKO*)*.[56] A broad national investigation of the role of 150 knowledge-providers concluded in 1986 that the STI/INKO and the *Norges Tekniske Høgskole* (NTH/SINTEF) were the 'stars' in the knowledge networking, whereas the research institutes at branch level and the RC's appeared to be isolated milieus.[57]

The RCs experienced an academic drift that did not allow for closer contact with the business sector and which placed the RCs primarily as an actor in the national innovation system. The RCs succeeded in their strive to become insiders in the university system. In this process, the national orientation totally overshadowed the initiatives towards regional business.[58] However, as the need to engage the RCs and also regional research institutions, set up in the early 1980's, was constantly reproduced in the regional and industrial policy, one hoped that setting up a new institution under the county authorities in 1987 should be a better instrument for forging this link.

The County-administered dissemination system, 1987 -1998

The end of the 1970s witnessed a shift in industrial, economic and regional policy that effected the regional innovation system. The period up to 1980 has been labelled the *redistribution* policy. It aimed at economic and industrial growth in the less developed regions through re-allocation of resources from the central and more prosperous areas and sectors. It was a policy, it is claimed, of transferring resources *to* the regions. Its focus was mainly larger projects involving larger businesses and higher education. From around 1980, however, much more emphasis was placed on stimulating the local innovative capacity in the regions by mobilising the capabilities *inside* the regions. The role of knowledge dissemination and the interaction between SMEs and the RCs and R&D- institutions was underlined. Establishing a regional infrastructure for *innovation* became a key issue and the SMEs the target for interventions through public intervention programmes.[59] While not disputing the fact that there was a change in industrial and regional policy in the early 1980s, the historical evidences of the dissemination systems in the period 1917-53, and 1953-87, demonstrate that the regional orientation was not at all new, in fact it was carried out *in practice* before the 1980s. The dissemination system in operation until 1987, was, however, incapable of engaging the RCs in the regional innovation system.

In 1987, the responsibility for the knowledge dissemination in the regions was handed over to county authorities, with the intention to improve the flow of knowledge between regional institutions, and to include the RCs in this flow. A new counselling institution, *Møre and Romsdal Bedriftsrådgivning* (MRB) was set up, and the STI was dissolved.

Despite these efforts, a considerable frustration because of lack of coordination within the dissemination system has emerged. And although a number of regional 'competence centres', regional research centres, science parks, technology centres and innovation centres have been set up since the early 1980s, few of them have become active partners in dissemination of knowledge on regional level.[60] As a matter of fact, the regional dissemination and innovation system has increasingly been conceived of as intransparent and programme- focused, and has not facilitated the inclusion of the RCs and regional research institutions into the dissemination system.[61]

Recently, complaints about the intransparency in the regional innovation system have been voiced.[62] The public intervention programmes set up to facilitate the transfer of knowledge to the SME sector, have so far had rather limited success.[63] As previously mentioned, studies argue that for example Møre and Romsdal no longer stands out as an advanced regional innovation system. A comprehensive study of regional innovation structures in Western Norway concludes that two thirds of all companies want assistance in launching new products. About 60 per cent of the companies investigated want support for their national and international marketing efforts, and about the same percentage expressed need for financial support in this respect. Many firms also articulate a need for general management support, although less frequently than for technological and financial support. According to the report, 'The increasing need for general management support results from the fact that the markets in several industries have been globalised and become more demanding. Partly, the companies have difficulties in defining what particular support service they need to cope with these circumstances. Therefore, pro-active awareness raising services and high overall level of transparency in respect to the available services is necessary.'[64]

The vast majority, it is concluded, has no overview of available services. Only 2 per cent of all companies regard their understanding as good, 74 per cent say they have no clue or at best limited insight into which innovation support actor is providing what types of services. Yet, recent evidences from Møre and Romsdal show that over 50 per cent of the companies in the region have costs connected to innovation, especially in testing and launching new products. Such costs are in fact common also in smaller companies, and companies with less than 10 employees spend more than 25 per cent of their innovation costs on R&D-related services. However, firms co-operate more frequently with partners in other regions or nationally than with partners in their own region. There is a very limited interaction with higher education and research institutions in the region.[65]

Moreover, although there is reason to believe that the RCs play a more significant role for the middle management level in public sector and in the service sector, within the educational system so far no management education with a regional 'design' has been established. The fact that regional business managers generally do not graduate from regional colleges, raises the

question of what role these key institutions of the modern dissemination system play in enhancing localised learning and innovation.

(Table 1 in here)

Furthermore, surveys of different Norwegian regions have highlighted the fact that regional businesses increasingly recruit top managers with high formal education from national institutions, mainly graduates from technical universities and business schools. In the case of Møre and Romsdal, for instance, in 1995 84 per cent of top managers recruited between 1986 and 1995 had a higher education, compared to 52 per cent of managers recruited before 1986. Among the managers recruited from 1986 to 1995 with a higher education, only 8 percent had graduated from colleges in the region compared to 9 within the group recriuted before 1986. The same pattern goes for Akershus and Agder (see table I).[66]

Summary and concluding remarks

In this paper we have described the historical development of knowledge dissemination systems in regional Norway. Our point of departure was ideas advocated by recent innovation theorists, particularly the idea that such systems should nurture localised and interactive learning processes rather than impose top-down innovation strategies that are more or less disconnected from the local innovation processes. We have argued that an important implication of this view is that management knowledge is given a substantial local flavour, although the ability to integrate novel externally derived knowledge is important in order to prevent lock-in situations in local learning. The requirement for the construction of regional knowledge dissemination and management qualification systems is therefore their ability to establish knowledge flows in which local and international knowledge is integrated, made sense of and connected to local interactive learning processes.

Our historical account of the development of the subsystems that promoted management education and knowledge dissemination in Norway, resulted in the identification of three historical periods or phases between 1917 and our decade. Each of these periods was characterised if not entirely by different approaches, so at least by different emphasis on diverse approaches to the creation of knowledge flows. In the first period from the 1917 until 1953 institutions like STI and the SIK's provided an extensive flow of knowledge to business entrepreneurs. This flow of knowledge had major impact on the industrial development, especially in the 1930's, but also after 1945. In the second period, following the setting up of

the NPI in 1953, the collaboration between the STI and the NPI gradually developed into agencies that rather effectively sensed and through the use of different methods - consulting, conferences, business meetings and courseworks - answered many of the different demands of regional business. A particular characteristic of the system in this period was the ability to create arenas where practitioners and knowledge providers met to discuss and sometimes solve business problems. The period, however, also witnessed the introduction of a regional system of formal management education and efforts to integrate formal education into the previous system that primarily promoted knowledge flows through more loose or informal dissemination mechanisms. As it turned out, the efforts to have the regional colleges develop and run courses directed towards specific industrial or vocational needs largely failed. A necessary, but not sufficient, explanation for this was the academisation process within the colleges. The combination of assisting local business while at the same time meet academic requirements turned out to be difficult. Another explanation is that the expectations towards the RCs within the regional- and industrial policy in this respect were not founded on concrete institutional analysis, and that the same 'mechanised' approach, merely saying that the flow of knowledge could be facilitated through better coordination between partners, was reproduced almost unchanged. The momentum of the wave of regional college establishments had the effect, however, of shifting the balance between knowledge dissemination and formal management education.

The third and subsequent period was introduced in 1987, as the county authorities was given the responsibility of public dissemination of knowledge within the region. Based on a number of public and semi-public reports, as well as recent research, we conclude that the period was characterised by the primary emphasis on formal education and, in knowledge dissemination terms, the rather weak position and connection between other public service providers. Whereas the relations between managers and service providers in the first two periods stimulated many joint activities, the most recent period is generally characterised by little communication between the allegedly key knowledge actors in the innovation systems, the regional colleges and regional managers. Although much emphasis has been put on innovation issues in the 1980s and 1990s, and innovation having been expected to be promoted through regional infrastructures, the arenas of communication that were created in previous times are now few and restricted. This seems paradoxical against the changes in business managers` backgrounds. Despite the fact that much larger proportions of managers now than before have higher educational backgrounds, the relations to the regional academic institutions are generally weak. This can be explained by the fact that few of the recruits to executive

managerial positions seem to have graduated from the regional colleges. This pose the question of the extent to which the system of regional management education has been able to nurture processes of localised learning and innovation.

Postscript

This article set out to explore the impact of management education on regional development. Drawing on our research on regional changes (Amdam & Bjarnar, 1997), regional culture (Bjarnar, Løseth, & Gammelsæter, 2004) and management education (Amdam (Ed., 1996), we chose to apply literature on regional innovation system as a theoretical framework. This concept was on the rise at the time and we found it relevant for two reasons. First, it offered a dynamic approach to economic geography, which we saw as an invitation to historical studies. Second, it let itself to analyze institutional and cultural explanations to regional development, as a supplement or alternative to economic and political factors.

The article addressed topics that still develop within the business history and regional studies literatures, such as the use of economic geography theories in business history (Amdam, Bjarnar, & Berge, 2020) and cultural explanations to regional development (Amdam, Lunnan, Bjarnar, & Halse, 2020). Regarding qualification for management positions, the article explores the role of formal higher education as well as training and competence enhancing activities that exist outside the formal educational system. However, while trying to systematize the role of formal higher education (see table 1 in the article), a similar exercise was unfortunately not done to categorize and systematize the role of other routes to management positions. The role of these "other ways" to management positions than through formal higher education is still an unexplored research topic (Kipping, Amdam, & McGlade, 2020).

In retrospect, and in light of our own research post the JIH article, we can see that in the phases covered by our article formal and informal institutions were established over time that strengthened the intra-regional flow of knowledge while at the same time being embedded in global knowledge networks that were largely Americanized. The systematic building of regional knowledge networks promoted knowledge sharing among local actors and organizations, and flow of knowledge was institutionalized by commitment to this regional framework (i.e. Scott, 2008, for institutionalization mechanisms).

Besides building on diverse formal qualifications, management qualification and recruitment were processed within this regional frame. Our article relates to several other publications based on empirical data from the same region. Already in the 1960s and 1970s studies show that regional knowledge sharing also underpinned the formation of the successful maritime cluster in the region (Halse, 2014, Halse and Bjarnar, 2014 a, Amdam and Bjarnar, 2015).

Halse (2014) has argued that cluster cultures are strong, however challenged, and recently, Amdam et al (2020) have demonstrated that the regional identity encourages the internationalization of firms. Likewise, Nujen (2018) has shown how localized and intra-regional flows of knowledge propel business development and trigger regional businesses to backshore activities from abroad. We hypothesize that even today management and organizational practices are attached to regions. However, there is a scarcity of research about how regional systems have developed since the 1990s.

We admit that in the face of globalization the picture of regional coherence has become increasingly blurred. In our article in JIH we showed how devolvement of the regional dissemination system to the county level led to regional fragmentation of knowledge flows, and Bjarnar (2000) and Gammelsæter and Bjarnar (2000) further explored this development by addressing how knowledge flows were increasingly structured through the proliferation of short-lived public development programs with the effect of disintegrating the historically developed dissemination system.

Since the late 1990s, in particular, internationalization changed. While before, regional businesses tried to expand through setting up enterprises abroad, all of a sudden, multinational corporations acquired local firms incorporating them into their international networks (Amdam and Bjarnar, 2015). Bjarnar (2010), based on a number of in-depth interviews with regional leaders, indicated that globalization promoted regional learning but at the same time also knowledge flows through parallel expert networks less attached to the region. Halse and Bjarnar (2014 a) underscored this picture arguing that this phenomenon could be related to tensions between historical modes of customized production and modes of standardized production for global mass markets. The challenge has been to implement both models at the same time since they have implied a more delicate balance between a territorially confined value chain and globally dispersed production (Halse, 2014, Halse and Bjarnar, 2014 a and b). The recent period of recession due to demand cutbacks within the oil and gas supply industries has triggered some focal businesses to enter new markets, for example shifting focus from building oil service ships to produce cruise ships. Such strategies may require know-how residing more than before in networks external to the region. An interesting topic for further research would be, consequently, to what extent business partnerships and supplier networks get less attached than before to regional knowledge sharing.

Our JIH article (2001) together with Amdam and Bjarnar (1997) and Gammelsæter and Bjarnar (2000),were important platforms for later work on management qualification, regional

knowledge flows and the challenges posed by globalization. Actually, seen through contemporary lenses, the JIH study should have been reprised and extended to our time. That would have revealed a more coherent picture of the state of regional systems in the era of globalization. In this respect, researching the change and role of formal and informal institutions and not the least institutionalization of regional and regional – global managerial practices, would have provided another novel contribution to the regional innovation systems literature.

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Table I. Percentage of upper echelon managers in 1995 with higher educational background in three regions.

Region (county)	Recruited before 1986	Recruited 1986 – 1995
Møre and Romsdal	52	84
Akershus	77	98
Agder	33	69

Sources: O. Bjarnar and H. Gammelsæter, *Næringslivslederes utdanning og eierposisjon. En historisk undersøkelse fra Møre og Romsdal*, Research report 9501, 1995, Møre Research Centre, Molde. For Akershus see T.C. Dalby and H. Lian, *Næringslivslederes utdanning og eierposisjon i Akershus*, diplomoppgave, Norwegian School of Management (BI), 1996. For Agder consult T. Kjempekjenn, M. Venemyr and M. L. Mæhlum, *Næringslivslederes utdanning og eierposisjon i Agder*, *diplomoppgave*, Norwegian School of Management (BI), 1996.

Notes

1. Asheim, B.T and A. Isaksen, 'Location, Agglomeration and Innovation: Towards regional Innovation Systems in Norway?', *European Planning Studies*, Vol. 5, No. 3, (1995), p. 301
2. B.-Å. Lundvall (ed): *National Systems of Innovation. Towards a theory of Innovation and Interactive Learning*, (London and New York, 1992). Consult also M. Porter, *The Competitive Advantage of Nations*, (Houndmill, Basingstoke, Hampshire and London, 1990), p. 19
3. Asheim and Isaksen, 'Location, Agglomeration and Innovation', p. 300
4. Ibid
5. Lundvall, *National Systems of Innovation*, p. 12.

6. The character of globalisation, the alleged turn from Fordist modes of production and regulation to flexible specialisation, the factual extent of regional innovation systems, the character, strength and weaknesses of networks related to dynamic processes or lock-in and path-dependency respectively, the required mode of public intervention to promote or sustain such systems, as well as a number of related themes, have all been subjected to a lot of debate. For a few examples see, Asheim and Isaksen, 'Location, Agglomeration and Innovation', pp. 299-330, B.T.Asheim, 'Industrial Districts as 'Learning Regions': a Condition for Prosperity', *European Planning Studies*, Vol. 4, No. 4, (1996), pp. 377-400, B.T. Asheim, 'Flexible specialisation, industrial districts and small firms: a critical appraisal', in H. Erneste and V. Meier (eds); *Regional Development and Contemporary Industrial Response: Extending Flexible Specialisation*, (London, 1992), pp. 45-46, see also in this book B. Jessop, 'Post Fordism and flexible specialisation: incommensurable, contradictory, or just plain different perspectives?' and A.J. Scott and M. Storper, 'Regional development reconsidered', consult furthermore M.J. Piore and C. F. Sabel, *The Second Industrial Divide. Possibilities for Prosperity*, (New York, 1984), P. Hirst and J. Zeitlin, 'Flexible specialisation versus post- Fordism: theory, evidence and policy implications', *Economy and Society*, Vol. 20, No. 1 (February 1991), A. Amin and N. Thrift (eds); *Globalization, Institutions, and Regional Development in Europe*, (Oxford, 1994).
7. Confer especially H. Wiig, 'Innovativ aktivitet og innovasjonssystemer i Møre og Romsdal og Finnmark', in A. Isaksen (ed); *Innovasjoner, næringsutvikling og regionalpolitikk,* (Kristiansand,, 1997), p. 149.
8. Lundvall (ed); *National Systems of Innovation,* and A. Isaksen (ed); *Innovasjoner*, respectively.
9. This distinction is made in different articles in Isaksen (ed): *Innovasjoner,* see for example B.T. Asheim and A. Isaksen, 'Regionale innovasjonssystemer - en teoretisk diskusjon', p. 70
10. The managers positions in dissemination of knowledge is discussed in R.G. Havelock et. al. *Planning for Innovation: A Comparative Study of the Literature on the Dissemination and Utilization of Scientific Knowledge,* (Ann Arbor, University of Michigan, 1969), E.M. Rogers, *Diffusion of Innovations,* (New York, 1995). For a recent overview see O.Bjarnar and M. Kipping; 'The Marshall Plan and the transfer of US management models to Europe: an introductory framework', in M. Kipping and O.Bjarnar (eds): *The Americanisation of European Business. The Marshall Plan and the transfer of US management models*, (London and New York, 1998), pp. 1-18
11. See especially P. Stevrin and Å. Uhlin, *Tillit, kultur och regional utveckling- aspekter på Blekinge som mentalt kulturlandskap,* (Blekinge, 1996).
12. Asheim and Isaksen, 'Regionale innovasjonssystemer', p. 58
13. See especially A. Isaksen , 'Kunnskapsaktører i teoreien om regionale innovasjonssystemer', in H. Gammelsæter (ed): *Innovasjonspolitikk, kunnskapsflyt og regional utvikling*, (Norges forskningsråd, 2000)
14. R.P. Amdam and O. Bjarnar, 'Regional Business Networks and the Diffusion of American Management and Organisational Models to Norway, 1945-65', in *Business History*, Vol. 39, Number 1, (January 1997) and same authors; 'The regional dissemination of American productivity models in Norway in the 1950s and 1960s', in Kipping and Bjarnar (eds); *Americanisation*, pp. 91-113
15. For the historical perspective see for example O. Wicken, *Entreprenørskap i Møre og Romsdal: Et historisk perspektiv*, Step group report 21 (Oslo, 1994), same author, *Norsk fiskeriteknologi- politiske mål i møte med regionale kulturer*, Step group report 17, (Oslo1994). Consult also A. Løset, *Likskap og lagdeling. Fylkeshistorie for Møre og Romsdal 1920-1972*, (Oslo, 1996). For examples of a present more sceptical approach to Møre and Romsdal, see Asheim and Isaksen, 'Location, Agglomeration and Innovation', H. Wiig and M. Wood, *What comprises a regional innovation system*?, Step group report 1/1995, and O. Spilling, 'Industrial reconstruction and the re-emergence of small scale production', in *Industriutvikling og*

*sysselsetting i et regionalt perspektiv. Seminarrapport***,** (Arbeidsliv-Historie-Samfunn, serie B, (Bergen 1993). Consult furthermore H. Wiig; 'Innovativ aktivitet', and P. Heydebreck and E. Arnold; *Regional Innovation Structures in Western Norway*, RITTS report 111 (Regional Innovation and Technlogy Transfer Strategies and Infrastructures), edited by B. Fjellstad, (1997).

16. Andersen, H.W: 'Norsk skipsbyggingsindustri gjennom 100 år', in E. Lange (ed) *Teknologi i virksomhet: Verkstedsindustri i Norge etter 1840*, (Oslo, 1989), Hanisch, T.J and E. Lange: *Veien til velstand*, (Oslo, 1986), *Historisk statistikk 1978*, table 43, Isaksen, A. and O. Spilling: *Regional utvikling og små bedrifter*, (Kristiansand, 1996), see table 5.1 and 5.2), Kamsvåg, J.L.: *Med nål og tråd gjennom 100 år: Bekledningsarbeiderforbundet 1890-1990*, (Oslo, 1990)
17. See E. Lange, 'Småbedrifter og moderne teknologi', in F. Sejersted (ed); *Vekst gjennom krise*, (Oslo, 1982). The reconstruction of the inter-war period is mainly built on Lange.
18. Sources from five of the branches document that at least 15 000 advices were given to businesses in 1931. In 1934 they assisted in setting up hundreds of firms employing 4 000 new workers this year only.
19. NOU 1984: 19 *Statens teknologiske institutt* p. 13
20. Ibid. As late as in the 1980s approximately 70-75% of the STIs regional activity, channeled through regional branches (distriktskontorer), was devoted to economic advisory services, organisational development, planning and marketing. 75% of all its activity involved firms with less than 100 employees.
21. The STI, for example, facilitated an extensive co-operation between the furniture business federation, *Møbelprodusentenes Landsforening*, and the corresponding designers federation, *Interiørarkitektenes Landsforbund*. Besides long term planning, companies wanted assistance on a number of subjects. Producers from Møre and Romsdal were active in this respectand especially a great number of producers from Sunnmøre feature in the sources. For a few examples see National Archives (NA/STI), Boxes 145 (1962) and 170 (1970). This pattern is, accordingly, an example of the dynamics within regional innovation systems themselves.
22. Confer *Statens teknologiske instiutt*, (Oslo, 1967), p. 48
23. In 1947 the department employed its own rationalisation expert, who introduced new courses and consultations in work-time-measurment studies. The political setting is interesting, as one reason for his appointment was an agreement between the national federation of industries, *Norges Industriforbund* and the national labour organisation, *Landsorganisasjonen*, saying that the shop floor stewards, *tillitsmennene*, should gain insight into the production and productivity processes through a politically *neutral* institution. This was a kind of 'neutral' position and role definition the STI consistently throughout the Post-War era strived to maintain, see *Statens teknologiske institutt* (1967) p. 51

24. Although after WW II, the Norwegian government connected the strategy for construction of the welfare state essentially to industrial expansion. At the core of this expansion was promoting the heavy export industries. It is claimed, therefore, that the traditional industries like for example furniture and textile were given less priority. In this sector, the governmental policy mainly aimed at rationalising businesses and thereby promoting the setting up of larger units to achive improved performance in scale and scope. See, for example R.P. Amdam, S. Knutsen and L. Thue; *Bedrift og samfun*, (Bergen-Sandviken, 1997), p. 60, T.J Hanisch and E. Lange, *Veien til velstand*, (Oslo, 1986). But the central authorities also emphasised the development of councelling services for SMEs in the districts, confer *Stm. nr. 6 1959-60 Om utbygging av industrien i distriktene.*

25. *Statens teknologiske institutt* (1967), p. 79
26. Initially this process was coupled to the growing focus on regional development in Norwegian politics. In 1955, the board of the fund for development of Northern Norway, *Nord-Norge-fondet*, encouraged the STI to set up a local branch in Narvik in order to facilitate courses, act as a consultancy and assist the regional planning authorities, *Områdeplanleggingskontorene*. See *Statens teknologiske institutt* (1967). This setting-up resulted in a fast increasing course activity in the area. In 1959, a regional branch emerged in Trøndelag, helped forward by financial input from the regional development program *Trøndelagsplanen*.

27. *Stm. nr. 6 1959-60 Om utbygging av industrien i distriktene*

28. *Statens teknologiske institutt* (1967) p. 83
29. ibid p. 86
30. Ibid pp. 85-90
31. See NA/STI, Box 142, letter to the actual Ministry December 21 1962, and box 143, letter to the Ministry 8 February 1962 from Hans Hauge at the STI
32. Referred to in STI documents were the Siem committee and the Danielsen committee respectively. The Danielsen committee was named after its chair, Rationalisation Director Reidar Danielsen, and was set up in 1959
33. As described in NA/STI, Box 173, letter from the STI, engineer Cornelius Gundersen, to A/S Myrens Mekaniske Verksted, Oslo, January 6 1969

34. Cf. NA/STI, Box 182, Annual Report 1968, preliminary version.
35. NA/STI, Box 174, letter from Hans Hauge, STI to *Møre og Romsdal Fylkesorganisasjon for Håndverk og Industri*, 22 October 1963
36. One of the most busy was Walter H. Channing, who held a number of courses in rationalisation and sales psychology in 1958 in Møre & Romsdal and even acted as a consultant for some of the trading firms. Channing was executive director of the American association of retailers. In 1955 five American experts visited 15 different businesses in the region. It is known that Channing promoted the so called 'self selection' principle, and reconstructing the shops according to this. His visit furthermore led to a lot of local plans of modernisation of buildings and sales techinques.
37. See NA/STI, Box 182, Annual Report 1967, preliminary version.
38. In 1959, for example, Franklin G. Moore, professor of industrial management, and professor of human relations Norman F. Maier, both coming from this university, toured Norway disseminating their research. Some experts from the University of Michigan were also connected to the European Productivity Agency or EPA, like Dr Arnold S. Tannenbaum, a specialist in work psychology and industrial sociology. Moreover, the EPA financed a tour to Oslo and Bergen in 1959 for professor in fincancial research, Wilford John Eiteman, also from Michigan. The NPI established contacts, furthermore, to the British Institute of Management, which each year held conferences for upper echelon managers. The NPI closely monitored conferences held in different European countries.
39. Other American experts missioning Norway in 1959-61 were, for a few examples, R.W. Shepard, University of California, R.K. Yaumnitz, University of Minnesota, Dr. Harry. A. Johnson, Virginia State College. For more details see NA/NPI, Box 649, diverse issues of NPI- nytt.
40. The *network* concept is applied in a broad sense in this paper. The concept of *channel* is likewise complex and connected to the diffusion of innovations. Channels are connecting actors and institutions in a way that messages are communicated between them. See for example Rogers, *Diffusion of Innovations*. For application of these concepts in a regional context, consult Amdam and Bjarnar; 'The Regional Dissemination'.
41. For details see R.P. Amdam and O. Bjarnar; 'Regional Business Networks'.
42. NA/NPI, Box 649, NPI- nytt 25 April 1958
43. For details consult Amdam and Bjarnar, 'The regional dissemination.' In 1962, the NPI realised a need to work more systematically according to a long term plan, especially concerning the actual needs of businesses. Among eleven priorities were increasing efforts to promote implementation of long term planning in companies, develop programs for management education and training, improve education and training in marketing, create a more advanced system for business administration education, stimulate and support the local productivity branches, stimulate research within industrial psychology and industrial sociology and improve dissemination of new information. It was hardly a coincidence that long term planning was given high priority. This was seen as a crucial element in improving the performance of businesses
44. . See Bjarnar, O. 2000, 'Et regionperspektiv på innovasjonspolitikken', forthcoming in H. Gammelsæter (ed) *Innovasjonspolitikk,*
45. It is interesting to notice, that Andreas Bachmann, who later became dean of the college in Molde and the county's chief educational officer, was placed as a central actor in creating the curriculum of the study in business administration, had his previous carriere in the NPI in the Trøndelag region. In 1971, furthermore, the first lecturer in business administration in Molde was appointed as secretary of the NPI branch in Romsdal.
46. NA/NPI, Box 505 - project 979, Samspill distriktshøgskole - lokalsamfunn. (Interaction between colleges and local municipalities)
47. Confer NA/NPI, Box 267, diverse annual reports
48. NA/NPI, Box 529 - project 1091. According to Andreas Bachmann, an experienced officer at the NPI and soon employed as lecturer in business administration at Molde College, the activity of the NPI especially in the Romsdal subregion experienced a serious decline at the time, and the central administration of the NPI saw the contact with the Molde College as a mean to revitalise the local branch
49. NA/NPI Box 479, Management Education, letter to the NPI November 19 1974. The vision that the RCs should develop into instruments for regional development was also expressed by professor Svein M. Kile at the NHH, who in 1972 initiated a program for organisational and managerial development in SMEs in the regions. Kile argued that no adequate *public policy* for transfer and dissemination of knowledge to the SMEs, despite the establishment of the RCs, had been developed on a national basis. He was in particular disappointed with the lack of initiative from the RCs, and their lack of ability to interact with businesses and their organisations in the regions. He launched the idea of a national plan for organisational development in the SME sector. In this plan, the RCs occupied a central position. The colleges should be systematically supported by and connected to a central milieu, comprising among others the STI, the NPI and the Norges Handelshøgskole (NHH). It was, however, essential to expand the work of the colleges and extended network by creating a system of co-operation between the SMEs themselves

50. NOU 1981: 30 A *Offentlig støtte til teknisk industriell forskning* and NOU 1984:19 STI - *Statens teknologiske institutt*
51. Confer NOU 1981: 30 A p. 10
52. Ibid p. 11
53. Ibid p.14-15
54. See *St. meld. nr 22 (1977-78) Små og mellomstore industribedrifter, St.meld. nr. 54 (1980-81) Industripolitiske retningslinjer for de nærmeste år fremover, St. meld. nr 54 (1982-83) Om teknisk-industriell forskning og utvikling, St.prp. nr. 1 (1983-84*). Confer also NOU 1983: 30 A *Thulinutvalgets instilling*, and NOU 1981: 4 *Utdanning for oljevirksomhet.*
55. *St. meld. nr. 54 (1980-81) Industripolitiske retningsliner*
56. NOU 1983: 30 A *Thulinutvalget*
57. Confer NOU 1984: 19, table 4.7, 4.8 and 4.9, pp. 21-23.
58. Johnstad, T, 'En rik flora av aktører for industriell nyskaping', in *Norges Industri* nr. 19, (1987).
59. Consult O. Bjarnar; *Academic Drift and the Market. Some Historical - Institutional Perspectives on the Growth of Private Higher Education in the region of Møre and Romsdal 1970-1986*, (Molde, 1995)
60. See especially Arbo, P, 'Fra industriorientert til kunnskapsorientert modernisering. Om Nord-Norges plass i det moderne kunnskapssamfunnet, in E. O. Eriksen (ed) *Det nye Nord-Norge. Avhengighet og modernisering i nord*., (Bergen, 1996). Confer also A. Isaksen; 'Innovasjoner og politikk- en introduksjon', in Isaksen (ed); *Innovasjoner*, pp. 20-21
61. For an overview see T. Johnstad, 'Kompetanse- og innovasjonssentre i Norge', *Plan & Arbeid* 1 (1986), pp. 3-8. In fact, the only true success story was the collaboration between a number of different institutions in Narvik in Northern Norway.
62. See Heydebreck, Arnold and Fjellheim, *Regional Innovation Structures*. Structural factors may also have influenced the system, for a general overview see A. Skonhoft; 'Industrialisering og deindustrialisering in Norge 1960-1990', in A. Isaksen (ed); I*nnovasjoner*, pp. 112-127. The de-industrialisation of the regions during the 1980s could turn out to be an explanatory factor for the transition of the dissemination system. While the regions witnessed industrial expansion until the mid 1970s, the 1980s stands out as a period of decline in all Norwegian regions. Recent research has claimed that this pattern is common in most OECD countries. Hence, it seems to be the result of in depth structural factors and not necessarily of specific national or regional characteristics or economic policy
63. See for example Nærings- og energidepartementet; *Utfordringen- forskning og innovasjon for ny vekst*, (1996), (Aakvaagutvalget), Nærings- og energidepartementet; *Småbedriftsutvalget* (Hervikutvalget), (1996), and NOU 1996: 23 *Konkurranse, kompetanse og miljø. Næringspolitiske hovedstrategier* (Henriksenutvalget), (1996).
64. For an overview see H. Gammelsæter and O. Bjarnar, *Kunnskapsflyt mellom akademia og regionalt næringsliv- fra retorikk til realitet*, Notat 1 (Molde,1997).
65. Heydebreck, Arnold and Fjellheim, *Regional Innovation Structures*, p. 20
66. H. Wiig, 'Innovativ aktivitet og innovasjonssystemer i Møre og Romsdal og Finnmark', in Isaksen (ed); *Innovasjoner.*
67. In Agder the number of manager with a higher education increased from 33 among managers recruited before 1986 to 69 among manager recruited from 1986 to 1995. Among these 6 percent had graduated from colleges in Agder in the first group compared to 7 percent in the last group.