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From State to Region – and Back?

Northern Innovation Systems under the Norwegian High North Effort

Abstract

Since the Second World War the northern regions of Norway have been among the regions in Europe receiving the highest amount of economic support from the state. This position is based on a strong client position in the Norwegian regional policy. In 2005 the Norwegian Minister of Foreign Affairs proclaimed a new strategy for the high north called ‘The High North Effort’. While the previous northern policy came by due to the need to reduce regional crises, which caused a decrease in population and employment numbers, the new effort was aimed at strengthening the northern position in order to secure the world’s access to energy, cope with climate change and handle the challenges from the new Russian state. The paper discusses the position and role of the established northern innovation system when meeting this new state effort in the north.

The paper is divided into four parts. After describing the development of a regionalised production and innovation system in the north since the 1940s, where the northern regions have moved from being playgrounds for state policy to becoming players in regional and innovation policies, I demonstrate how state actors (again) put pressure on the regional system. In the second part I take the perspective of innovation processes generating and developing the intersection between markets and policies, and emphasise how the new focus on the high north moves the centre of market-policy intersection from the regional policies system and institutions to the global markets. The third part analyses the position of regional enterprises as the new global driving forces enter the north. Finally, I discuss whether actual changes to the global system, which led to the specific High North Effort, could revitalise the regional innovation system.

The paper starts by assuming that innovation processes in the northern areas of Norway during the Norwegian High North Effort changed from being embedded in the public Norwegian innovation and regional policies to entering the global markets. Therefore, the paper contributes to debates on the role of governance, such as processes where friendly regional interaction and the absence of power relations between actors involved act as building blocks in the regional innovation policies when meeting new entering actors. Theoretically, the paper is based mainly on the concept of ‘deterritorialization’ (Beck, 2001) in that I see the High North Effort embedded in processes decoupling economic, political and R&D institutions from territorial borders. These decoupling processes encourage global networks (Bærenholdt and Haldrup, 2006) and transnational companies (TNCs) to enter the north, and to interact with the northern host economies (Dickens, 2007). Moreover, my discussion of innovation processes as embedded in policies or markets is influenced by Hall and Soskice’s (2001) discussion of varieties of capitalism and Polanyi’s (2001) distinctions between economic processes being embedded in markets and those embedded in social systems.

The paper is based on the secondary use of historical analyses of regional policies and development processes in the Norwegian northern areas since the 1940s as well as primary data explaining the position of regional enterprises, regional innovation centres and regional policy institutions when the Norwegian oil company Statoil and its global contractors developed the first offshore gas field in the Barents Sea between 2002 and 2008 (Eikeland, 2009).

The Norwegian High North Effort (NHNE)

On 10 November 2005 the Norwegian Minister of Foreign Affairs, Jonas Gahr Støre, gathered several hundred spectators at the University of Tromsø, which is the only university in northern Norway and is located in its largest town. The spectators were able to hear the Minister speak about the new Norwegian policy addressing the northern areas, and from that moment this effort was the most important priority of the Norwegian policies for foreign affairs. Since 2005 the performances of the Minister has continued, and he has brought applause from fully occupied meeting rooms and audiences through continually giving new presentations in cities of the north over the past five years.

In 2009, when establishing the strategy for the High North Effort, the Norwegian government marketed the new strategy as an *innovation strategy*¹. This paper discusses the Norwegian High North Effort as an example of huge developing efforts implemented as innovation strategies. A northern innovation strategy will contribute to changes in enterprises operating in the north and to changing industrial structures. The paper asks what positions the north Norwegian region or regions, or the regional level, could achieve in a strong region-wide effort similar to that of the new Norwegian campaign in the north. Other examples on similar wide efforts could be a broad common modernisation project as the European strategies for realising the Lisbon treaty or a global effort for reducing the emission of climate gases.

From this point of view the major *challenge* for the NHNE is the relation to the Norwegian innovation and regional policy developed about ten years ago. The last government white paper on Norwegian regional policy says for instance that: ‘*Growth arises from below. These types of endogenous processes have built the foundation for economic benefit and cultural values in Norway*’ (St. Melding no. 25, 2008–2009:8). The NHNE was not a result of endogenous processes. It was not the result of local creativity, but rather of strategies developed by the Ministry of Foreign Affairs when the end of the Cold War, climate change and increasing pressure on natural resources changed the position of the northern areas. NHNE links innovation and industrial development with national security policy. It is not a new type of regional policy targeting the northern peripheries, but is a national strategy and may also be a plan for developing the north. We ask if and how these types of territorial policies involve the actual region addressed. The European Union (EU) bases its policy for growth on the slogan that *territory matters* (ESPON 2006), and says that involving the regional level in national and multinational plans makes a big difference. Without involving the regions, the opportunity to generate a common competitiveness and cohesion decreases. The regions have to be players and not only

¹ The Norwegian government, under the leadership of Prime Minister Jens Stoltenberg, marketed the following of the NHNE in the 2009 green paper *New Building Stones in the North* (“Nye byggesteiner i nord”) as an innovation strategy (chap 4, 25–30). The chief of staff of the office of the prime minister, Karl Eirik Schøtt Pedersen, from Vardø in Finnmark (now minister of co-ordinating the state policies), and the Mayor of Tromsø, Arild Hausberg (representing the Norwegian social democratic party as the government does), both emphasised that a NHNE as an innovation strategy is different to a NHNE as a strategy for improving living conditions in the north. They both argued against the idea that a strong effort on improving health policies in the north should be included in the NHNE. The health sector position was marketed by the Director of the University Hospital in the north in Tromsø in a Norwegian broadcast on 13 March 2009.

playgrounds in broad policies and plans. The difference between territories as players and playgrounds was emphasised by Jonas Gahr Støre in an analysis of the position of the northern regions, which he headed in the period before taking up the role as Minister in the Norwegian government (Brunstad et al., 2004).

Moreover, the paper also sees the NHNE as a result of global change related to changes in territorial division of economic and industrial activities in the northern areas, and where the global economy is increasingly characterised by 'deterritorialization' (Beck, 2002). From this point of view, globalisation decouples the territorial ties between economic, political and knowledge institutions. These global processes challenge the perspective on innovation and industrial development, which claims that economic changes arise from territorial agglomerations and clusters or regional innovation systems, where a regional innovation system constitutes several territorial limited subsystems. One of the subsystems is the enterprises and production structure of the region, the other the research and development institutions, i.e. universities, colleges, research institutes, research parks, technology developing centres etc. (Isaksen, 2010). There are also well-grounded reasons for including the public political institutions in one separate subsystem in a regional innovation system. In Norway, Regional Developing Programmes (RDP) set up by the regions and the operations in the regions of the state-owned Innovation Norway (IN) are the main public tools for promoting industrial development. IN has a branch in every Norwegian region or county. The territorial subsystem in the high north is now challenged by transnational networks entering the area (perspectives on mobile networks are discussed and demonstrated for instance by Bærenholdt and Haldrup, 2006), and by the global actors operating in the so-called northern 'host' economies (perspectives on transnational companies operating in regional economies are elaborated by Dicken, 2007). Furthermore, the positions of regional and state political institutions in innovation processes are included from a global perspective. These positions are part of what Hall and Soskice (2001) call 'varieties of capitalism', and what Polyani (2001) argues separates capitalism embedded in respective markets and social systems. The paper asserts that innovation processes in the northern areas of Norway during the NHNE have changed from being embedded in the public Norwegian innovation and regional policies to being embedded in the entering global markets, and this paper contributes to debates on the role of governance, such as processes where new types of interaction and the absence of power relations between actors involved in developing processes meet these efforts. Innovation will emerge if the actors see new connections and opportunities to act in accordance with coordinated and common strategies. As the paper will demonstrate, it is no secret that the author is more than sceptical about territorial-based development from these perspectives.

The paper analyses and discusses the experiences from NHNE in four dimensions. After describing the development of a regionalised production and innovation system in the north since the 1940s, where the northern regions have moved from being playgrounds for state policy to players in regional and innovation policies, it demonstrates how state actors (again) put pressure on the regional system. In the second part the paper takes the perspective on innovation processes of generating and developing the intersection between markets and policies, and emphasises how the new focus on the high north moves the centre of market-policy intersection from the regional policies system and institutions to the global markets. The third part analyses the position of regional enterprises as the new global driving force entering the north. Finally, the paper discusses if new important global changes exemplified by climate policy strategies could revitalise the regional production and innovation system.

The paper is based on experiences from the first period of the NHNE and mainly uses data from a trail research focusing on the territorial impact of the Norwegian global oil and gas company Statoil's

development of the Snøhvit gas field in the Barents Sea (Eikeland et al., 2009). Statoil's development of the Snøhvit field is the most distinct defining moment of the new era in the north. The Norwegian oil company Statoil entered the northern areas and developed strategies for operations in the north. These strategies challenged actors that had been developed or presented in the north for many years. The specific analysis of the paper is part of the so-called research study of the programme 'Measures for research-based regional innovation in Finnmark' (VRI) supported by the regional county administration and the National Research Council of Norway (NRC). One of the objectives of VRI Finnmark was to develop a territorial innovation strategy based on analysis of the experiences obtained by regional enterprises that participated in the Snøhvit project.

The Northern production and innovation system prior to the NHNE

In Norway, the so-called regional responsibility reform of 2002 (St. Melding no. 19, 2001–2002; St. Melding no. 34, 2000–2001) transferred the responsibility for the development and allocation of measures in the regional policy from the Ministry of Local Government and Regional Development to region-based partnerships. Norway therefore introduced a regionalised system in the policies for territorial development, and power was moved from state to region. The regional partnership has become the key position for developing regional strategies, e.g. innovation, in the 2002 reform. The group represents regional public organisations as well as the organisations of employers and employees in the region, and its main task is to develop and implement a programme or a plan for enforcing economic development of the region. The partners are headed by the county municipality of the region, and this group has taken over the functions in Norwegian regional and innovation policies from the Department of Regional Development at the Ministry of Local Government and Regional Development. The reform emphasises the regions' positions as 'players' in regional development processes, mainly by connecting regional institutions of production, higher education and research and public allocation processes as members of the partnership. The reform is therefore based on the idea that the production structure of a region needs to match the capacity of the institutions for higher education and research of the region, and that the region should be able to manage measures and tools, and have sufficient economic capacity and competence to stimulate its enterprises. In addition, the actors representing these organisations should be able to allocate resources for adequate attempts and efforts to be made.

Historically, this regional constellation in Norwegian regional and innovation policy is a new phenomenon, particularly in the north, where region external actors have probably had a more important position in developing processes than in other Norwegian regions. The Norwegian regional policy arising after the Second World War and its tradition is not based on understanding the regions as autonomous actors, but rather as an address for targeting help from the actors outside the regions – most commonly the state. The need for help was a result of a market economy, which forced territorial centralisation and geographical differences. These differences in production values, incomes and settlement changes were, however, understood as a failure. Living conditions should be socially equal as well as geographically distributed, and it is the state's responsibility to harmonise economic and living conditions. Norway's modernisation was based on the nation rather than the regions, as an area for social integration and community.

This was also a model for regional development and changes in buildings on the ambitious understanding of a state's opportunity and responsibility to harmonise differences. The major strategy of the Norwegian state was to stimulate economic activity in territories where the production level was low. The state supported investments, newly established enterprises and infrastructure and development of growth poles outside well-established cities. The economic problems in the north after the Second World War were huge, but the first state involvement in the north was strong. The state

started to participate directly in industrialisation and industry increase, and built up the industry during state ownership and covered economic loss in the state-owned fisheries' processing companies (FINOTRO), the state mining in Kirkenes, the iron mining and production in Mo i Rana and the coal mining on the Svalbard Islands. Moreover, the Norwegian state gave a high level of economic support to private entrepreneurs such as the Swedish/Norwegian food freezing company FINDUS in Hammerfest and to several oil processing plants from Herring and Capelin. These strategies built further on the ability to mobilise labour from the region for employment in the new state industry, and therefore the industrialisation led to territorial centralisation processes. One well-known example is the Swedish/Norwegian company FINDUS developing a large-scale fish processing unit in Hammerfest, which was based on building industrial capacity by moving small-scale fisheries in the small outlying fishing villages to a big apartment building in the new growing town of Hammerfest. The now world-known 'Horseshoe' apartment house was built in 1965. The new labour class in the north should not only work at the assembly lines in the new factories, but should also live in a modern city. The first phase (1950–1960s) of the economic development of the north was based on developing the interaction between external companies (many of them state owned), state policies and state measures.

Of course, the direct effort from the state in order to change the production structure in the north also caused problems. The state industry policy was criticised for encouraging ineffective enterprises and a low level of contact between the enterprises and product markets (Hansen and Selstad, 1999; Eikeland, 2004; Robertsen and Eikeland, 2010). Instead, the enterprises addressed their contacts to the state and the state institutions in order to improve the economic benefit. Examples demonstrated previously were that the state established 14 export organisations in fisheries during the first few years after the Second World War ended: UNISTOCK was a monopolist on export of dried cod, UNIDOS had the same position in salt fish export and FRIONOR on frozen fresh fish fillets. However, FRIONOR's monopoly ended in 1968 when enterprises in the north established an alternative export organisation called Nordic Group as a revolt against FRIONOR because it had ignored the American frozen fish markets.

Due to these conditions, the state industry building phase after 30–40 years changed to a new phase where the state ended its direct involvement in the enterprises. Instead, by carrying out comprehensive surveys, the state addressed the population's living conditions in the north and mobilised the communes for improving welfare. The results were both rapid and dramatic. In the northernmost county of Finnmark in 1975, the activities in education, health and social welfare were below those in an average Norwegian commune. In 1990 welfare activities in the same municipalities were 30 per cent higher than the average (Fulsås, 2000).

In the same period the state developed a system for distributing high-level education, thereby addressing the need for capacity building in the new welfare sector of the north. The focus on the northern industry worker of the 1960s was substituted by the welfare worker in the 1980s. These workers needed education and had to be 'certified' by the new colleges and universities, and therefore the need for building new educational institutions in the north arose. The new University of Tromsø and the regional colleges are state institutions, but are governed by separate boards. Thus, during the development of the regional university and colleges, the first connection between regional working life and higher education was established.

Moreover, in this welfare state, or welfare communes, there was extended regional industrial development. The industrial policies changed from addressing large state- and private-owned enterprises to small enterprises and entrepreneurs. The specific addressing of women demonstrated a new focus on groups that had been invisible in the big industry plant era. The Minister of Local

Government and Regional Development grounded the regionalisation of the innovation and regional policies from 2003 (confirmed above) by arguing that measures addressing entrepreneurs and small innovation enterprises should be developed and implemented closely with already existing enterprises and entrepreneurs. This phase of developing of the innovation policies got an answer in changes in the territorial knowledge institutions. The regional colleges started providing separate courses on entrepreneurship, tourism, culture and art, Sámi handicraft (duodji) and developing new types of natural resources and species in small-scale business. In this phase, a territorial system based on interaction between the three types of institution or subsystem emerged: entrepreneurs and enterprises strongly embedded in the north, many representing economic dynamics in households rather than enterprises; a region-based education system at secondary and higher level; and a regionalised policy system for innovation and regional development.

Revision of the state's position during NHNE

The Norwegian policy on innovation and regional development has now reached the third phase characterised in the section above, confirmed in the white paper (St. Melding no. 25, 2009), stressing the locally based growth capacity. The starting point for discussing the NHNE as an innovation strategy is that this effort challenges the position of the region in this third phase and pulls discussions on regional development in the north into a new fourth phase. NHNE marks the (re)entering of the external actors to the north, both transnational companies and state organisations. The aim is now for the external actors not to develop new national sectors and industries in northern areas, as was the situation when the frozen fisheries processing was established in the 1960s, but to strengthen the already strong national activities by moving them to the north and extending their scope. Another difference is that the external actors, among them the state interact with a regional democratic selected institution, with its major task being to develop the territory. The previous Norwegian regional institution which operated until 1975 was based on bringing together the mayors of the municipalities for coordinating demands addressing the state, but it had no function in the Norwegian government system. The democratic position on a regional level in Norway was strengthened by the 'responsibility reform of 2002' (confirmed above) and of the public administration and government reform of 2010 (Ot. prp. no. 10, 2008–2009).

The new regional level is critical, however, to its opportunity to occupy the position it wants to have in the NHNE. The county municipality of the Finnmark region, the northernmost Norwegian territory, means that the economic resources of the county municipalities provided by the Ministry and Local Government and Regional Development are much lower than the funding that was transferred from the Ministry to the county before the regionalisation reform of 2002. This decrease can be explained by the change in the addresses of the innovation and regional policies. Efforts targeting small-scale production and entrepreneurs with their income basis in household pooling incomes from many sources, also from other sources than from the new small scale industrial activity, need not the same amount of resources that was needed to develop and run big industrial plants. More important is probably that the resources available for the county municipality do not match the expectation addressed at this level for having a key role in NHNE. Moreover, the county municipality assumes that the state increases the budgets for state actors operating in the north. The state organisation developing local areas and buildings collecting enterprises (SIVA) increases its budgets and influence in innovation policies in the north by taking responsibility for industrial gardens ('næringshager'). These gardens constitute the lowest, smallest and the most decentralised units of the Norwegian territorial innovation system.

Another example of changes in influence and capacity in regional innovation policies is the relation between the state organisation Innovation Norway (IN) and the county municipality. While Innovation

Norway in the north receives huge resources from the state in order to be able to put specific effort into important industries such as the marine industries and tourism, the territorial developing actors (the county municipalities) do not have these types of budgets (Eikeland et al., 2009). From this perspective, SIVA as well as IN have become actors competing with the county municipalities and the region-based partnership on strategic positions in innovation policies and processes in NHNE. Furthermore, the Norwegian State House Bank for funding the building of new houses (Husbanken) also has budgets addressing regional development, which the county municipalities cannot match. This means that the State House Bank can practice a more rapid administration and allocation process than the county municipality due to not being included in territorial democratic processes.

The state organisations (re)entering the regions under NHNE have been challenged by the position of the county municipalities and the territorial-based partnerships of the north. The position of the county municipalities and the regional partnerships means that they are undermined in NHNE because the state institutions operating in the north play a stronger role in the regional innovation policies. This also has a democratic impact because the state organisations operating in the regions carry out important processes that are not considered by the regional partnership. Still, the communes tell us that they view the state actor SIVA as being a very vigorous partner during the establishment of the local industry gardens and industrial incubators (more below). This strengthens the traditionally close relationship between the Norwegian state and the communes in the north established during the first industrial building phase and the development of the public welfare sector, and the often more distant relationship with the regional institutions.

While the state has increased the capacity of the state institutions operating in the north, the county municipalities are criticised for lacking the ability to handle growth situations, i.e. planning and preparing for growth compared to coping with crisis. When the territorial planners see different interests and solutions in the big development projects, the critics demand more rapid decisions. The county municipalities in NHNE are under pressure to be responsible for democratic processes and demands from specific territorial interests. Under this tension, the county municipalities have the responsibility of organising regional development with very few resources.

In summary, the development characterised by the interaction of territorial institutions, including production, knowledge and policy measures, slips out of the control of the region when new efforts such as NHNE enter the northern territories. The new phase is instead characterised more by revitalisation than developing and establishing new territorial institutions. In order to meet this new state interest for the north, the three county municipalities have developed different strategies (Eikeland, 2008). The difference between Troms County and the Nordland/Finmark counties is huge. From the position of Troms County, the state still governs, controls and interferes with all cases and sends the bill to the region. The Finmark County knows what to do, but lacks the resources to realise the solutions. From Finmark's point of view, the Lillehammer Winter Olympics in 1994 was a desirable development model; the region takes the initiative and the state pays. In the Nordland county the relationship between the region and the state institutions is sweet harmony. The Nordland region and the state develop the north together.

The territorial innovation policies under NHNE – from policy embedding to market allocation

Since innovation is when changes take place in and among enterprises, it is included in the private sector or private sphere. In Norwegian debates there is also a focus on the need for reforms in the public sector, but the innovation concept has mainly been used for characterising changes in enterprises and the importance of these types of processes, e.g. a region's competitiveness. The debates on the innovation policies have expressed concerns about how public authorities should stimulate and

organise the improvement of innovation processes, and are implicit about whether the public authorities are responsible for innovation in and among enterprises. Historically, the Norwegian state has taken the responsibility for innovation, for example through stimulating the organisations in the labour market to establish central and local agreements on collaboration in innovation processes or for building industrial gardens (see above), knowledge parks ('kunnskapsparker') and research parks ('forskningsparker') in order to stimulate interaction for innovation between enterprises and research and developing institutions, and between enterprises and the institution implementing the innovation policies.

In the NHNE the state's position could be even stronger. The state decides on the allocation of licences allowing investigation of oil and gas resources in the Barents Sea, agrees on the proposals for how oil and gas fields are to be developed and is the major owner of Statoil, which is the most important actor in the NHNE. Therefore, from a background of strong public position in the north, it is possible to have a kind of political governing of innovation processes. For instance, it could be possible that the state-owned Statoil's decision about the type of contract system could be dictated by the Norwegian state (Nilsen, 2008).

The development of territorial innovation areas or centres is an important part of the Norwegian innovation policy. This policy has been implemented by establishing concrete meeting places where enterprises, research and development organisations and public innovation institutions can allocate loans to and support enterprises or manage specific programmes, e.g. a specific northern Norway programme addressing innovation and technological change launched in 1987, which was managed by the research park of Tromsø (Sørensen, 2010). By using the strong position of the state organisation SIVA the state was able to build and develop such meeting places. Above, we demonstrated that SIVA has strengthened its position in NHNE compared to the regional public institutions as the county municipality, but more importantly it has weakened its position in the regional innovation areas in favour of private actors. These changes of position can be demonstrated by the development of the regional incubators in the north. The incubators select new enterprises for specific protection during their first year of existence and can address newly established enterprises as well as those already established to try out new types of production.

The former can be included in so-called industrial incubators, where the enterprises are allowed to develop new products demanded by the owners. In the northernmost Norwegian county of Finnmark, there are two 'industrial incubators', 'Arctic Innomar' and 'Pro Barents', both of which are located in the city of Hammerfest. 'Arctic Innomar' is at the fish processing plant 'Aker Seafood', which is owned by the Norwegian billionaire Kjell Inge Røkke. Some years ago in the 1960s (see above), Aker bought the plant built by FINDUS (including its trawl licences), then sold the area to the commune and built a new plant outside the city. Arctic Innomar was closed in 2010 due to no business ideas being developed that could be commercialised in the incubator. Pro Barents is embedded in Statoil's activities and located in the 'industrial garden' downtown. My mission is to assume that due to the way in which these industrial incubators are organised, transnational companies such as Statoil and Aibel can secure their opportunity to define and decide what should be a regional innovation, and this privatisation of previous policy-dominated areas governs regional innovation processes in specific ways.

We can observe a similar development in another area of importance for enterprises' participation in oil and gas operations in the north. The supply bases deliver industrial equipment as well as dairy products to oilrigs and production installations operating in the Barents Sea, and the wares are transported offshore by supply ships. These activities have become an important growth sector on land in the northern part of the Norwegian west coast (Arbo et al., 2007). The supply base for activities in

the Barents Sea is located in Hammerfest and owned by a company called 'Polarbase'. It was established in 1984 by local industry actors in close collaboration with the municipality. Some years ago, however, the locally owned company was bought by the west coast global operating company Nor Sea Group and is now owned by Eidesvik Invest at Bømlo Island on the west coast and by the Simon Møkster company in Stavanger. The owners are thus based in the core territory of the Norwegian oil and gas economy. In 2006 Nor Sea Group bought eight supply bases along the Norwegian coast from Stavanger in the south-west to Hammerfest in the north-west.

By buying local bases, transnational companies secure ownership and control over available and developed areas, which can be used for supply bases addressing the operations in the Barents Sea. These land areas also include secure and deep harbours, but these combinations are extremely rare in the north. In a 'core' commune in NHNE as Hammerfest, where the gas pipeline from the Snøhvit field reaches the shore, there are very few available areas for industrial activities, and the owners of Polarbase have secured for their own use the only area where it is possible to develop a base. In the north-east, where areas are manifold, different base alternatives compete regarding who should be selected when the Russian Shtockman field is developed. For instance, in Kirkenes, a city bordering Russia, the Sydvaranger Maritime base is owned by the global logistic actor Felix Tschudi, who competes with a base owned by Polarbase and Nor Sea Group (see above). In another north-eastern city called Vardø, which also has excellent access to the Russian offshore gas fields, the former Norwegian Olympic hero Bjørn Dæhli has secured himself areas well located for operating activities at the Shtockman field. These bases will be an important starting point for the new industrial activities entering the northern areas and will have an impact on the movement of the Norwegian oil and gas industry. These business activities will be developed in the north due to the need for them to be close to the operations in the Barents Sea. By a de facto monopolising of ground ownership, the new owners ensure that all companies that plan to have important positions in the oil and gas activities offshore have to rent buildings and activity areas from the bases. This is probably an important network between the owners of the bases and the suppliers to enable them to respond to offers of deliveries from the operators of the oil and gas fields.

We can also observe several examples of actors who have secured themselves owner positions in base arenas who have also entered other positions in the region. Polarbase (see above) is one of the owners of the industrial incubator, and as an owner and a member of the board of Pro Barents, the owner of Polarbase, the Nor Sea Group from the Norwegian west coast, meets another strong global actor from the southwest which recently entered the north: the Bergen Group. This company is one of the biggest and most important owners of Norwegian shipyards and has ownership of the big Rosenberg Verft yard in Stavanger. Rosenberg Verft and Polarbase meet in Hammerfest in the Statoil incubator Pro Barents. In other words, it represents the west coast, and Stangeland, Eidesvik and Møkster meet on the border of industrial incubator Pro Barents. This meeting takes place in Hammerfest. In Kirkenes, the border town, Bergen Group has become the major owner of the former local investment company Sør-Varanger Invest, which was established by the Norwegian state after the state mining company Sydvaranger was closed. Sør-Varanger Invest has made important investments in the global well-known King Crab industry in the border region (at the fishing village Bugøyenes). As a result of this investment, Bergen Group has joined with the fisheries export company Troika Seafood, which exports the King Crab from Bugøyenes and from the family owned salmon-producing company Villa Group also located on Bugøyenes. The Villa Group also has a strong position in King Crab harvesting, farming and export in the border region of Russia. We could continue evaluating the new networks entering former publicly governed innovation areas, as it is more than simply curiosity that the companies meeting in these innovation areas are embedded in certain families from the Norwegian south-west.

We can, however, observe regional counter forces to these processes. In Finnmark, this response is strongest in the city of Alta, which is the town with the highest population in this county. While actors from the south-west have entered important positions in Hammerfest and Kirkenes, the regional investment company Origo has taken this position in Alta. The economic basis of Origo is capital accumulated by the energy-producing companies in the Alta region and the North Cape region. Origo collaborates with similar based companies in other parts of northern Norway. As in the cases of Hammerfest and Kirkenes, Origo's relations to other investors are built by common ownership, participation in borders regarding ideas for innovation and institutions and investments. For instance, Origo and the similar Kap North Funding in Bodø in Nordland County launched and entered into the role as owners of the first north Norwegian oil and gas company North Energy, which has its main office in Alta (Karlstrøm and Eikeland, 2010). The connections between Alta and Tromsø were developed by the University of Tromsø's own research institute, the Northern Research Institute (Norut), located in Alta. The Norut-owned innovation company Norinnova (the owner of the research park in Tromsø) is the biggest single owner of Origo (Sørensen, 2010). The Origo system has also included the industrial milieu in the North Cape region, primarily with the local energy production company and by Origo's ownership of the industrial garden in the North Cape commune. The local energy company, Repvåg Kraftlag has accumulated its income from local energy production and deliveries into Origo's investment funds. Origo's involvement in the North Cape region has provided the industrial milieu in Alta a position in the new oil and gas activity of the north. For the moment, this position is strongest in developing a system for oil spill protection in the north, mainly addressing the development of the Eni Norway's Goliat field in the Barents Sea during its ownership of the new north Norwegian company Arctic Protection. The Alta milieu, in collaboration with a new company established by the Sami parliament and the Finnmark municipality (Finnmarkseiendommen – FEFO), which has taken over the ownership of land and inland water resources from the state, has launched and established the company Finnmark Kraft in order to develop production of renewable energy on land. However, when the Alta milieu tried in collaboration with the Statoil-governed industry incubator Pro Barents in Hammerfest to form a north Norwegian supply company inspired by the establishing of North Energy, Arctic Protection and Finnmark Kraft, they did not succeed. The interests of the externally controlled incubator system of Pro Barents and the regional actor Origo were manifold and far too different.

This section therefore demonstrates two processes: the first concerns the probably very low number of actors or families from the south-west region entering important positions in the innovation arenas in the north, and the other demonstrates how territorial-based actors also enter these types of positions by using territorial-accumulated capital. These processes exemplify the impacts for innovation processes in the north due to the fact that the innovation systems in the areas today, more so than previously, can be characterised as self rather than politically organised (Ørstadvik, 2008). This section has debated a situation where global and territorial systems seem to be in opposition, while in the next section I demonstrate how these two systems are connected in the NHNE.

The regional and global innovation and production systems tied up in regional enterprises

I have demonstrated that since the Second World War a territorial system has been developed which connects subsystems of production, higher education and research, and regional and innovation policies on a regional level. This system includes entrepreneurs and small-scale enterprises in the culture industries, for example tourism, handicraft and Sámi handicraft, and enterprises harvesting nature resources. These industries and ways of living were neither included in the large-scale industrialisation in the 1960s nor in the building of the regional welfare sector twenty years later. This system must meet the NHNE, or the NHNE with its global market organisations and revitalised state

actors will operate close to and together with this specific territorial system of innovation and production. The Norwegian state and the transnational enterprises are external because they have no original position in the regional system. Of course, the Norwegian state has also previously operated in the north.

This section demonstrates how regional enterprises have become coupled between the regional context and system where they have been developed and the new entering system of transnational organisation that characterises the NHNE. In this phase of the NHNE are the external entering organisations that have challenged the territorial system's transnational oil and gas enterprises and their trail of supply companies. Entrance into the oil and gas sector is challenging to the regional system of innovation because the north Norwegian supply sector is small (Vatne, 2007) and because a general characteristic of the sector is a low level of interaction with industries in the so-called host economies. Nilsen (2008) has demonstrated, however, that the oil industry during its operation in the north has developed more strategies, but from a general point of view (Hansson and Wicken, 2008), entrance is characterised by the import of technologies, and there is only a minor matching of pattern of population and employment of the region with the operations of the oil and gas sector and a low interaction with other economic sectors. Further, the oil industry contributes to a high level of activity in the public sector and strong national currency, both of which produce high salaries and specific challenges for the export industries. Still, for the moment it is in the oil and gas industry that the basis for new growth and innovation in NHNE is most apparent. On a territorial level, the most important question is what strategic implications the dominance of the oil and gas sector in NHNE has for regional actors.

The external enterprises moving towards the north address two regional actors: regional labour and enterprises with regional owners. The entering enterprises, however, look at the regional-owned enterprises as objects for buying, not as potential collaboration partners. Since the entering global enterprises have key positions in the large developing projects, they look at regional enterprises as an uncertain partner, mainly because these enterprises don't have supplied the oil and gas industry with equipments and services, and because the regional enterprises have no knowledge of established networks in this industry (Eikeland et al., 2010). The labour employed by the regional enterprises is attractive however for the entering enterprises. An important part of the innovation perspective on the NHNE is that the main actors of the NHNE want to base their operations in the north with employees from the north. The result of this is that local labour gains competence and experience in the economic sector, which has an important future impact on NHNE. Our studies demonstrate that the local labour becomes integrated in their new firms, but they also become co-opted (Dahrendorf, 1959). In the concept of 'co-opting' is included not only the idea that regional labour changes employers, but also that it takes over the global enterprises and changes their attitude to seeing local enterprises as uncertain cards, and that moving the entering companies own employees from south to north rather will ensure the fulfilling of large development projects. From this point of view, local recruitment of labour is the best alternative for the new enterprises entering the north, but commuting labour from the south to the north is a better solution than hiring local enterprises. However, these processes also include innovation dimensions: local labour entering companies and networks that have competence are of vital relevance for future activities in the Barents Sea. In the long run, the local population can establish local governed enterprises out of the competence the local labour has obtained from their training in the transnational companies. Despite this, the global enterprises look at the locally owned firms as uncertain cards, while the entering transnational enterprises still see them as objects for buying or for taking over. We can observe many examples of transnational enterprises buying up locally owned enterprises, where the former local companies, due to the networks of the new owners, are included in networks of enterprises based outside the northern territories. In the trail research following regional economic impacts of the development of the gas field at Snøhvit, we demonstrated

that regional enterprises that succeeded in attaining deliveries to the project were, after a while, bought by entering suppliers (Eikeland et al., 2009). Thus by developing a relationship between ‘excellent’ locally owned enterprises and well-established global organisations, the local enterprises were included in global networks during the overtaking. However, as these locally owned enterprises were originally functioning well, including them in global organisations can move the governing of the enterprises from local actors to transnational companies. The overtaking can also have an impact if the new owners develop strategies other than those launched in the overtaking process. One obvious example is when the global actors lose interest in operating in the north and their effort in addressing the northern areas becomes less than was originally planned. The locals, having developed the local enterprises and emphasised the selling of the firms, the most important cause for selling their lifework was that when the enterprises stood alone they did not succeed in making contact with the global suppliers in the early phase of the projects, which meant that they had no access to the areas where the decisions concerning the allocation of the big contracts were taken.

Territorial external companies buying up local employees and enterprises is the most frequent way in which local actors couple themselves with the NHNE. Strictly speaking, the overtaken enterprises are not local, but what is important is that these former local enterprises are the most important connection between the regional production and innovation system and the actors entering the north during the NHNE, enabling former distanced enterprises to come together, and local labour and enterprises to make new contacts and generate new interaction. One impact is that enterprises located in other Norwegian regions, such as the south-west of Norway, are involved in northern territories and make the conditions for operations in these areas. So, the regional production and innovation system breaks out of the regional container or the territorial-based system, and therefore the NHNE is characterised by the deterritorialisation that Beck (2002) assumes characterises the new global systems.

From a historical point of view, there are similarities between the industrialisation of the north after the Second World War and the NHNE. One similarity is the relevant lack of competence in the regional education system, while another is that big enterprises are an important driving force. One difference is that the NHNE addresses people employed in regional presence enterprises rather than household harvesting fisheries and agricultural resources in the outlying districts of the north as in the 1960s. The regional address is instead the second generation of industrial workers in the north, e.g. the descendants of the families who entered the Horseshoe apartment building in Hammerfest. The first generation of industrialisation workers in the north participated in establishing FINDUS in Hammerfest and the state mining in Kirkenes close to the Russian border. The second generation is hired by global suppliers such as Aibel, which has the modification and keep up contract in the Statoil operation of the Snøhvit field. However, while the industry developers in the north in the 1960s had to turn the locals into industrial workers, Aibel has another alternative: the company can move people from abroad direct to the operation fields by using planes from the south of Norway. More than 18,000 Norwegians and 8,000 people from abroad were employed for shorter or longer periods in Hammerfest during the development of the Snøhvit field. Therefore, flying in labour from the south of Norway and from abroad is an important strategy for managing gas projects, mining and also newly built mega fish processing plants. Thus it is not only external enterprises that enter the northern areas under the NHNE, but also thousands of people.

Is there still a chance for the regional innovation policies in global mega projects?

The central point of the NHNE has, until today, been the global need to increase and extend the availability for energy and the northern areas’ opportunity for delivering gas. I have demonstrated that there is only a mode position for the regional system in this phase of the NHNE. Before the NHNE, or since the Second World War, a territorial-based system based on a ‘matching’ territorial production

structure, higher education institutions and regional policies emerged. The system is characterised by the interaction between the subsystems in production, education and policies, as well as by the fact that these subsystems function are developed without contact with each other. The previous characteristics can be called a system of parallel institution, but can also be understood as part of the open characteristics of the regional system. For instance, can research being used in innovation processes in regional enterprises be delivered by knowledge resources in the region as well as from outside the region during enterprises' participation in national and global value chains and knowledge networks, and by changes in ideas and knowledge with suppliers and customers (Isaksen, 2010)? However, during NHNE, this system is under pressure from state actors as well as transnational operations in the north.

A probable result of the pressure will lead to a very pessimistic attitude to the position and the role of the regions in strong efforts initiated from levels over the regions. I will, however, finalise the paper by discussing the opportunities for the regions and policies of the region in relation to the next strong common effort, the climate policies.

From my point of view, it is unbelievable that the Norwegian Minister for Foreign Affairs has not discussed how Norway during the NHNE could contribute to the reduction of the production and emission of climate-changing gases. His perspective is that the high north should adapt to climate change and use it together with climate policies as an advantage in industrial development. In other words, the NHNE is more concerned with developing new opportunities for transport between the east and west of the world than preventing global climate change.

I will assume that a revitalisation of the regional system during the entering of the climate policies to the north will challenge the national policies on environmental protection. Today, environmental policy strategies in the north are in place to protect the areas for industrial use. From an environmental protecting point of view mining or oil and gas industries will look like peepholes that should make no territorial scars. From this point of view it is a more suitable strategy to use the benefits of selling raw materials from the region to buy climate quotas in the global market than to reduce the production of climate gases. This strategy is argued against in regional debates, despite the region being at the top global position in climate gas pollution due to the way the gas emission from the Snøhvit field is organised.

The main point in the NHNE has been, as already mentioned several times in the paper, the global need for energy (mainly gas) and the northern areas' ability to deliver gas. However, today we can observe that the global markets for gas and the global systems for production of energy are under transition. Well-established ways of producing and selling gas are challenged by the opportunities for extracting the so-called 'non-conventional gas', which is gas from other geological formations and sources than those available in the north. Gas can now be extracted in new ways such as smashing rocks and drilling in a horizontal direction. New ways of disintegration of geological resources allow the extraction of gas from shale, and new drilling technology can access gas resources stored beneath land that, due to environmental characteristics and cultural heritages, are protected against industrial activities. Therefore, new land areas can be classified as gas fields available for extraction, and the demand by huge global markets for gas to be transported, for example LNG, over long distances decreases. Thus gas transported over long distances can be substituted with gas transported over very short distances (see for example Ryssdal, 2010; Ulltveit-Moe, 2010). Probably are also prospects based on field developing close to the shore of the Barents Sea, an important background for the agreement on a common dividing line between Russia and Norway in the Barents Sea. These negotiations have continued for a period of 40 years.

One potential impact is that gas extracted from northern sources will be substituted by gas from fields developed in the neighbourhood of the global gas users. Therefore, the use of the gas resources in the north in the future will have to be different from the original plans for the NHNE. Examples on alternatives to the Norwegian mega export of gas is the use of gas in regional industrial processing as well as for supplements in the exploitation of energy produced from renewable sources such as wind. These alternatives could be based on a lower volume of gas than what the global gas markets demand today. This will again give new opportunities for the development of gas fields, which today have been assessed as being too small for commercial interests by the oil and gas companies. Petoro, the Norwegian state organisation that will secure the maximum benefit from the Norwegian oil and gas resources for the state, has based its new scenarios for different ways of exploiting small gas fields on the Barents Sea (Petoro, 2008). Three out of four possible scenarios include what I will call a new territorial development perspective for the Barents Sea, as they integrate several smaller fields in common development projects. The scenarios have more focus on pipelines stretching in all directions in the sea than on the conditions for transporting gas over long distances by boats or by connecting new pipelines built in the Barents Sea to the existing system of export of gas by pipelines from the North Sea to Europe. The most obvious alternative is still of course to transport the gas from the north by building new pipelines on the sea bed from the north to the south, but a future more challenging perspective is to extend the pipelines from the offshore fields to the shore across the land to new regional users.

One step forward in what I will call regional integration of the organisation of the production in northern areas will be to use the gas brought to shore as an input in regional-based industrial processing. Such uses could be encouraged by, for example, available ore resources, but also changes in the global mining industry and in the markets for minerals. The mineral markets are in strong growth, but are also changing. The major reason for the growth processes is the increasing demands for minerals in the newly industrialised countries in Asia (China and India) and in Latin America (Brazil). The demand growth results in stronger global competition on mineral deliveries. Europe is afraid that the access and deliveries of minerals will be undermined, and that the newly industrialised countries in Asia will implement protectionist strategies in order to secure their own ore resources for use in their country rather than for export (Commission of European Communities, 2008).

Global development is understood to be so alarming in Europe that the EU, in a newly published green paper called the 'Raw Materials Initiative', has formulated very offensive objectives for the area (Commission of European Communities, op cit), arguing that Europe's future need for minerals has to be secured by extracting ore and producing minerals and metals on European land. One important obstacle, however, is the large number of land areas chosen for uses other than industrial production. In this situation, the EU looks to the north (Commission of European Communities op cit., 9–10). By looking to the wide areas in the north, there is opportunity for further integration of territorial-based production and also an innovation system through the 'meeting of gas and ores' (Kolbeinsen and Ødegaard, 2009), where gas is used either as an input for instance in steel production or as energy in mineral processing, based on ore from the northern fields. Today, discussions are held regarding concrete opportunities for using gas from the Snøhvit field in the Barents Sea for processing iron ores from the reopened mining industry in the border regions around the city of Kirkenes, either by transporting iron ore from Kirkenes to Hammerfest, or by transporting gas from Hammerfest to Kirkenes. Both projects will include transport distances in the region that, from a global point of view, will be assessed as short.

From a regional system perspective, the most important factor is that this development gives the region the position of an actor in the climate policy. Regarding the example above, Kolbeinsen and

Ødegaard (op cit.) argue that an impact of using natural gas instead of coke in the production of iron is that the carbon dioxide production during the production of iron is reduced by 75 per cent, which also results in the carbon dioxide being easier to obtain and easier to load. Regardless of whether the example demonstrated above is right or wrong, my mission is to argue that these impacts of climate innovation policies strategies will not only extend the territorial production structure in the north, but also force regional actors to include climate strategies and climate policies in their strategies, because successful common climate policies will demand new types of distribution of global land use where a decreasing need for transport will contribute to more equal allocation of production between the regions. In Norway this summer, we have seen the first examples of the need for the regions to become involved in these policies by trying to extend the central power network from the eastern to the western territories of Norway.

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