

SNF Working Paper No. 02/08

**LOCAL CONTENT DEVELOPMENT
- experiences from oil and gas activities
in Norway**

by

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SNF-project No. 1285:
Ghana – Olje for utvikling

The project is funded by Norwegian Agency for Development Cooperation (NORAD)

INSTITUTE FOR RESEARCH IN ECONOMICS AND BUSINESS ADMINISTRATION
BERGEN, FEBRUARY 2008
ISSN 1503-2140

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FOREWORD

This working paper is prepared to provide some written documentation on the experience from Norway in developing domestically based industrial competence in connection with upstream oil and gas activities. Norway has been quite successful in this respect, and other countries discovering oil and gas resources, are curious to learn how this has been achieved. Most recently, an oil discovery was made outside Ghana. In order to come up with a policy to ensure that these natural resources may benefit the whole Ghanaian society, Ghanaian authorities has set up a conference addressing these issues drawing on the experience and lessons drawn from other countries. This conference is followed by a work shop, where local content development is discussed in one session. Norway is one of the petroleum provinces from which lessons are to be drawn. Norwegian Agency for Development Cooperation (NORAD) has provided the financial support to have this working paper written. I am grateful to Per Hagen and Willy Olsen who have read and commented on an earlier draft of this paper.

Bergen, February 2008

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LOCAL CONTENT DEVELOPMENT: - experiences from oil and gas activities in Norway

1 Upstream oil and gas in Norway – the story in brief

Exploration for oil and gas offshore Norway started in the mid-1960s, and the first field came on-stream in 1971. For the last 20 years Norway has been a major producer of oil and gas on the world scene. Oil production stayed at roughly 3.0 million barrels per day in the first years of the new century. However, oil production has peaked and was 2.8 million barrels a day in 2006, while natural gas production is increasing¹.

As there had never been any onshore oil and gas activities, Norway lacked the specific industrial capabilities and competence to operate the business on its own when offshore exploration for oil and gas started. Thus, when it all began almost all activities related to upstream oil and gas in Norway were run by the international oil companies and their home grown supply chains.

However, commercial discoveries of oil and gas and the investments made to exploit these resources gradually attracted the interest of domestic business, whereas Norwegian authorities increasingly appreciated the participation of local industry. Thus, while oil and gas activities expanded in Norway, industrial competence and capabilities to operate in the oil industry, were developed locally. This is what we refer to as “local content development”.

Today, Norway possesses one fully operating Norwegian based oil company, StatoilHydro, with documented operational skills at a high level from the Norwegian Continental Shelf. StatoilHydro is a giant on the domestic scene, and is currently producing 1.9 million barrels of petroleum a day, which means it ranks among the larger in the world². Nevertheless, StatoilHydro specializes in offshore petroleum activities, and is the largest operator on the world scene in this area. Currently, StatoilHydro is present in almost 40 countries and has on

¹ Ministry of Oil and Energy *Fact sheet 2007* (in Norwegian).

² Table 3 in Robert Pirog *The Role of National Oil Companies in the International Oil Market*, CSR report for the Congress, August 21, 2007 ranks the 10 largest producers of petroleum in the world, and according to this table no. 10 produces only slightly more than StatoilHydro.

stream operations in 8 outside Norway³. 85 % of the company's production, however, is from operations in Norway. The resource base of StatoilHydro also is still predominantly in Norway, as 68 per cent of the company's proven resources are on the Norwegian shelf. It is, however, the strategic goal of the company to become a global player, and to increase its revenues from upstream activities in foreign petroleum provinces significantly in the years to come.

Furthermore, local industrial competence has been developed in Norway to serve offshore oil and gas activities with goods and services on a rather broad basis. Currently, local content to serve the demand from operating petroleum activities in Norway is quite high. When it comes to investments for developing new petroleum fields, local content is generally in the level of 50-60% (measured by value added), while it is more like 80% when it comes to maintenance and operations.

This high share of local content can partly be explained by the advantage of geographic proximity. However, as of today this strong position is held because the industrial competence of the local supply and service providers to the oil activities has proven truly competitive by international standards. These local supply and service providers has roughly 85,000 man years of work in Norwegian entities (Vatne, 2007), serving the demand from upstream petroleum activities. Measured by employment, petroleum related supply and service providers make up for 3.5 per cent of the total Norwegian economy and 5 per cent of the private sector in Norway. The degree of success in local content development is not, however, measured by domestic employment. Then it is more important that the supply and service providers based in Norway serve markets and operate business almost all over the world. With reference to Heum, Vatne and Kristiansen (2006) their international presence can be documented as follows:

- *Significant share of foreign sales.* In 2005 the supply and service providers based in Norway had 46 per cent of their sales to *companies* operating petroleum activities in other parts of the world than Norway. This share has increased from 29 per cent in 1995.

³ Information on the merged StatoilHydro is collected from the proposition to the Parliament St.prp. no. 60 (2006-2007) *Merging the petroleum activities of Statoil and Hydro* (in Norwegian).

- *International operations are broadly based among the local supply and service providers.* In 2005 almost seven out of ten Norwegian based supply and service providers had at least some sales abroad; in 1995 it was four out of ten.
- *Presence in petroleum regions all over the world.* In 1995 close to 60 per cent of the foreign sales of the Norwegian based supply and service providers was to the nearby UK sector. By 2005 the total value of foreign sales from these companies had more than tripled in current prices. Then the UK sector made up for roughly 20 per cent of these sales, and sales to the petroleum regions of North America, South East Asia and West Africa were of almost the same magnitude.

Altogether this indicates that local content development in connection with upstream oil and gas in Norway has succeeded in building industrial competences and capabilities which is competitive by international standards. This is by some referred to as the success of The Norwegian Model. The Norwegian Model, however, is not one model in the sense that there is one answer as to how institutions, politics and business relations should be organized to guarantee industrial success. In fact, the way Norway has organized the petroleum activities, the political ambitions that have been pursued, and the measures taken to implement policy, are in no way significantly different from what other countries with rich endowments of oil and natural gas have done and attempted. Nevertheless, Norway is still one of few exceptions when it comes to really being successful in this respect.

The remaining part of this paper is discussing factors that we argue are of importance to explain the results related to local content development in Norway. As for the Norwegian experience, we will highlight the following:

- Institutions to promote sound business practices, and to encourage industrial dynamics.
- Industrial policies to enhance domestic capacity in offshore oil and gas, building fully operating oil companies based in Norway, and enhancing the participation and competitiveness of local suppliers.
- The fortune of hosting industrial competence of high international standard, which was relevant for offshore upstream oil and gas.
- Lucky timing, in the build-up phase of local capacity, and in the critical phase when protection needed to be abolished to avoid long-run economic damage.

Some of these factors are of a kind that only rarely may be copied. In particular, Norway benefited from being an industrialized economy before oil and gas was discovered, and time and time again destiny has been on Norway's side. However, the essential base line for success in local content development, for Norway as for any country, is to stay dedicated to the fundamental task, which is to *involve and enhance the domestic knowledge base through arrangements that allow for a dynamic industrial and technological development, that gradually expands domestic competences and capabilities to competitive levels*. In this process, trials and errors are parts of the game, and the obvious pit fall is to keep local industry protected in a way that only will encourage inferior industrial activities.

2 The institutional structure

Formal institutions

Before awarding the first licences in 1965 the Norwegian Parliament had approved the Norwegian Petroleum law. The key principles in the law are still the same today, but the law has undergone changes to adapt to a changing environment. The most important principle is that the Norwegian state, on behalf of the Norwegian society, owns the resources below ground. Norway has the sovereign right and control over the natural resources.

In the early years state participation in the exploration for oil and gas was seen as too risky. The Government did not want to risk public funds in the oil sector. The attitude changed post the Ekofisk discovery, i.e. when the first commercial discovery was made.

The Government recommended a new administrative system after studying international experiences, and the Parliament approved a new structure in June 1972. The new structure was based on the separation of different functional responsibilities;

- policy-making
- technical control and resource management
- commercial participation

Parliament approved the creation of specific organisations for each of the three functional responsibilities:

- A **Ministry of Petroleum and Energy** responsible for the policy-making, for award of licences and for ensuring that proposed field development plans (plans for development and operations) met the Norwegian requirements. All major field development plans are in the end approved by Parliament.
- A **Norwegian Petroleum Directorate** to deal with technical control, regulatory and advisory functions. The Directorate has its own Board, appointed by the Ministry of Petroleum and Energy, and the Directorate reports administratively to the Ministry.
- **Statoil** was founded as a 100 per cent state owned company. In the beginning, Statoil was seen as an instrument in implementing government policies and to take care of the commercial interests on behalf of the government. As Statoil was not the only commercial player on the scene, the company was also conceived as a way to counterbalance the international oil companies operating on Norway's continental shelf. Statoil was established as a limited company. The Minister of Petroleum and Energy formed the general assembly and appointed the members of the Supervisory Board of Statoil. As a limited company, Statoil was not on the Government's budgets. The Board had responsibility for the annual budgets. Statoil, however, had to present to the Minister all plans that could impact the Norwegian economy. The Minister would then approve the plans in an Extraordinary General Assembly meeting⁴.

Basic guidelines

The decision to establish Statoil as a Norwegian based oil company also reflected an industrial ambition. The government wanted industrial competence relevant to offshore oil and gas to be developed in Norway. Building up Statoil was an integral part of this task, as the building up of two other Norwegian based oil companies, Norsk Hydro (which used to be 51% state owned) and Saga (which was 100% privately owned). All three had an internal rivalry to prove to be the best for the Norwegian society, and thus functioned as instruments

⁴ We will return to changes that Statoil has undergone since it was established. The two most important changes took place in 1985 and 2001. In 1985 the state's participation in the petroleum activities through Statoil was split in two, giving Statoil a pure commercial responsibility with no policy tasks on behalf of the government. In 2001, Statoil was changed from a 100 per cent state owned company, to a company quoted on the stock exchange with the state as a dominant owner, but 18.3 per cent of the shares being held by investors in the private sector, mainly foreign investors. Later the private share increased to almost 30 per cent.

to try out different routes when broadening the industrial participation from Norwegian industry⁵.

The ownership position of the state in Norwegian firms has historically served more practical than ideological purposes. Thus, the prevailing principle has been a division of labour between business and government. Business is to be conducted on a commercial basis. Business principles shall govern decisions in the industry, which, of course, have to be made within the framework and regulations set by transparent political decisions. With the exception of Statoil's role, this division of labour has been clear-cut and broadly accepted, meaning that the government has been very reluctant to intervene in micro-decisions made at the business level. This nevertheless happened in the 1970s and early 1980s. Not openly, however, but generally in some disguise. But these interventions did not prove successful in developing the industrial competence that prevails today.

Furthermore, it was important that the concessionary system for handing out licences to oil companies should be open to any qualified oil company, also the foreign. This negotiated concessionary system, through which oil companies are granted exclusive rights to Norway's oil and gas, limited in time and space, is different from a pure financially based auction system, but still includes some aspects of bidding, for instance as to how the oil companies will go about to enhance local content.

The impacts of the institutions for industrial development

The democratic tradition of Norway has been to gather broad political support behind decisions of fundamental and long term consequences. This has also been the case when it comes to the governance structure and the basic guidelines for governing the oil and gas activities, and when these have undergone changes (cfr. the changing role of Statoil). This is of importance for industrial development in general, as rapid and unpredictable policy shifts easily become detrimental for the development of business.

⁵ In 1998, Saga merged with Norsk Hydro. In 2007, the oil activities of Norsk Hydro merged with Statoil, to create StatoilHydro. Thus, today there is only one major Norwegian based oil company, StatoilHydro, in which the Norwegian state holds 67 per cent of the shares.

However, the governance structure and the basic guidelines for governing the oil industry in Norway have also been important for the industrial results that Norway has achieved in more direct ways. Firstly, the broadly shared view of the petroleum resources belonging to the whole society has helped to specify a goal for industrial development, which can serve the society as a whole. Secondly, it has made clear the different roles within government, and between government and business, which put restrictions on what kinds of measures that may be applied in order to reach industrial goals: It should not be sufficient to be a local firm to be awarded a contract. Thirdly, it allowed for competition among oil companies, foreign and Norwegian, and even among the Norwegian, preventing any of them to be the only one to define the national interest. In short, they formed institutions, which gave direction as to the industrial ambition to stretch for, as to the methods that could be chosen to fulfil this task, and as to the dynamics that is required to enhance a growth promoting industrial development.

3 Industrial policy measures

Industrial ambition

In the early stage of offshore oil and gas activities in Norway, Norwegian authorities were concerned about Norwegian participation, but not very explicit on how to formulate the industrial ambition. The industrial ambition is, however, formulated more explicitly over time. Over the last 10-15 years it has become increasingly clear that the ambition should be *to develop domestic industrial competence that will contribute to national welfare even when the extraction of oil and gas no longer will induce growth in the economy.*

This way of phrasing the industrial ambition means that the industrial competence that were to be developed, should be able to generate value added also when the domestic oil and gas activity will stagnate and decline. In some sense one might say that the ambition is to transform the oil wealth into a broader based industrial wealth. The goal is not short-term employment, which can easily be achieved, but which is a dead end if it is not based on an industrial development that can sustain long-term value. To put it clearly, it is only possible to generate industrial value added capacity that will benefit the society at large if the industrial competence is domestically based and internationally competitive. Thus, it is not sufficient for

local industrial competence development that it is domestically based. It must also (at some time) prove competitive in international markets.

The broad acceptance of this ambition in Norway means that it has been hard (but not really impossible) to gain support to policies that would pervert this intention, as choosing a Norwegian firm simply because of its nationality. It also meant that Norway did not try to develop industrial competence in all areas that is needed to explore for, develop and produce oil and gas. Focus was rather on competence development in areas where Norway already hosted relevant industrial competence of high international standards (see section 4).

Policies and policy instruments to enhance local content

As already indicated, general policies have been quite important in contributing to Norway's success in offshore oil and gas. For instance, the division of labour between business and government, and the organization of the different roles of the state, has allowed politics to be conducted in transparency, and business to be conducted apart from politics. The strong tradition in Norway for not accepting corruption, among civil servants and business people, has further assured this separation of business and politics, while it has supported the task of business to operate efficiently by economic standards. In addition, Norway has generally been quite open to foreign direct investments. Thus, even though foreign ownership has triggered a lot of political discussion, and even political crises, the response has never been to close domestic industrial development for the impulses from foreign firms.

More directly in relation to oil and gas, we have also already mentioned the importance of the policy to develop domestic capacity so that Norwegian based firms could operate as full-scale oil companies. This concerns the establishment of Statoil, and to allow two other Norwegian oil companies to grow. For the industry this meant that knowledge on domestic industrial capacity and competence was present in the different licence groups, as these have been constituted of foreign and Norwegian oil companies. For the society as such, this meant that no company was granted the sole right to define the national interest with regard to the oil business. Thus, it became hard for any of the Norwegian oil companies to pursue their own specific interests in disguise of operating on behalf of the society, because company specific interests differ.

Further, politicians were in principle open to the contribution from foreign firms, while being quite determined to use the opportunity to develop domestic industrial competence. This was partly done by requiring the oil companies to set up fully operating subsidiaries in Norway, where the Norwegian authorities encouraged the recruitment of Norwegians.

As the foreign oil companies brought their international supply chains to Norway, the local manning of their Norwegian subsidiaries meant that there were employees who at least had some previous knowledge on the capabilities of Norwegian firms, even within their organizations. Furthermore, politicians implemented policies, which should open the possibility for domestic firms to break into these supply chains. This meant some protectionist measures, working in favour of Norwegian firms. Foreign firms were not excluded, but measures were enforced to enhance the competitiveness of domestic firms:

- Legally Norway came up with paragraphs and interpretations to ensure that Norwegian companies should have a fair opportunity to participate. This was referred to as § 54, from which it was established that that the Ministry should be informed about the firms listed on the oil company's bidders list before a tender was opened, and that the ministry could require that specific Norwegian firms were included on the list. The Ministry, however, could not exclude foreign firms from the list. The Ministry, further, should be informed about to whom the company wanted to award the job before the contract was signed. The ministry used to have the authority to change this decision. Such rejection of a final choice forwarded by an oil company, only occurred once, in 1982. However, more informally views may have been exchanged in advance, having consequences for the choice that officially was forwarded.
- As part of the concessionary procedure, the oil companies had to come up with plans as to how the local content could be enhanced on a competitive basis. If quality requirements were met, oil companies were well aware of the political ambitions of local content development, and may have adhered to these as the extra costs never really mattered as there was a high tax on the margin, meaning that it was the state that really covered extra costs as these meant that the company had to pay less taxes.
- The government encouraged foreign oil companies to become technical assistants for the Norwegian oil companies, so that the Norwegian oil companies could learn the business from experienced organizations and personnel. Furthermore, joint-

ventures, or cooperative agreements, in engineering was encouraged, allowing Norwegian firms to learn and build industrial capacity in a strategic important area for further industrial involvement. This technology transfer has probably been crucial for the industrial positions that have been achieved.

- Statoil and the other Norwegian oil companies started, and the foreign oil companies adopted the practice of informing domestic industry on plans and solutions for future field development projects, allowing domestic firms to prepare themselves for jobs that would come. In this way domestic firms benefited relative to foreign firms, as the latter would have shorter time for such preparation.
- Similarly Norway deliberately worked to Norwegianize the domestic oil business (language, contracts, labour relations), built on the well established tri-partite traditions (capital, labour and government). This also worked in favour of domestic firms relative to foreign firms, without jeopardizing economic efficiency. However, it did not allow for the training of Norwegian firms to operate internationally.
- The Norwegian oil companies, and the foreign ones as well, also organized tenders to fit the structure of Norwegian business when this was technically possible and could be justified economically.

In addition, the oil companies were encouraged to enter into R&D projects with Norwegian universities and research institutions. This was part of the local content plan that was discussed when negotiating the concessions, and the oil companies adhered to this request. In this respect it is important to note that Norway in the early 1980s taxed oil and gas extraction on the margin with 85%, meaning that most of the additional costs connected to local content development really was covered by the state as tax revenues were reduced accordingly. High oil prices meant huge profits even if operations were conducted with less than full cost efficiency. Thus, the oil companies were eager to get the cash flow from new discoveries as soon as possible. To avoid the risk of delays, it was not worthwhile to oppose rather reasonable government requests, in particular as the high tax regime did not give the oil companies any strong incentives to be concerned about the additional costs.

Nevertheless, these R&D programs meant that the Norwegian knowledge base with regard to offshore oil and gas was enlarged and deepened. It was enlarged in the sense that universities (and to some extent the whole system of education) were included, and not only business. It

was deepened in the sense that it also included scientific research, and not only development projects. This has probably been important for the ability of the Norwegian business to adjust to new challenges, rising from oil price fluctuations, field development in deeper water, and smaller petroleum fields.

All elements of protection listed in this section were enforced until the mid and late 1980s.

4 The fortune of hosting relevant industrial competence

An important, if not decisive prerequisite for Norway to develop offshore oil and gas related competence to meet international standards without prior industrial experience in this area, was that relevant industrial competence of high international standards was already present in the Norwegian society. With relevant industrial competence we refer to industrial competence that rather easily could be adjusted and extended into offshore oil and gas activities. These competencies were present

- in the shipping industry, among manufacturers of ship equipment and in ship yards, which was important to handle offshore operations
- in the large process facilities of for instance metal production, as oil and gas extraction also is a process industry
- in the mining industry, where the geological competence in particular was relevant for oil and gas mapping and interpretation of seismic data

In all these areas Norway hosted domestic firms that had a high international reputation, which had been competing successfully on the world market for decades. Thus, it is a huge exaggeration to claim that Norway's industrial capabilities and competence in offshore oil and gas have been developed more or less from scratch.

This also meant that schools and universities were already well established with research and educational programs of relevance for maritime activities, energy intensive process industries, metals and materials, and in geology, and that also this part of the domestic knowledge base in Norway rather easily could be extended into the needs of offshore oil and gas. Besides promoting local content development through the participation of local industry, the

government, as already mentioned, also negotiated with the oil companies through the concessionary procedures to enter into research cooperation with universities and applied institutes. In this way, the relevant knowledge base was expanded and, consequently, higher education was given a direction that allowed the oil industry to recruit well educated people with relevant educational background.

It is also important to bear in mind that Norway not only has been fortunate in the sense that the country hosted competitive industrial competence that could be extended to become of great relevance for offshore oil and gas. Norway further benefited from the fact that petroleum activities offshore was not very well developed anywhere in the world. Thus, Norway possessed industrial competence that potentially could benefit offshore petroleum activities worldwide, while there was a window-of-opportunity for technology development, which newcomers could take advantage of. This meant that it was possible to break into well established supply chains because the incumbents did not have technology available that was required to meet the new tasks when the oil industry really moved offshore in rough water and weather conditions.

In addition, some of the firms in the relevant industries, and in shipping in particular, were already well known to the international oil companies, as they for decades had operated tankers, which transported their crude oil. Thus, it is easier to enter into business relations with oil companies in a new field when you have established business relations with them in another.

Finally, it should be emphasized that policy to enhance local content development in reality was directed towards such areas where it was reasonable to assume that domestic industrial competences and capabilities could be adjusted and extended to serve the needs of the oil industry on a competitive basis. Norway also hosted other industries that produced goods that definitely could have been of relevance for the oil industry, but which Norway did not try to develop in that direction because it was not expected that it could be done in a way that could be defended by competitive concerns. The most obvious example is steel, which was an important material in platforms and pipe lines. The Norwegian steel industry, however, was not strong by international standards, and the oil industry bought their steel where the demands to quality and price could be met.

5 Lucky timing

...when the interests of major players should be attracted

External incidents, or geo-political factors, have quite remarkably worked in the favour of Norway throughout its oil history. The timing of Norway's oil and gas was extremely perfect for mobilizing what was needed to develop local industrial competence that could become competitive by international standards. During the build up phase of industrial capacity in relation to offshore oil and gas, Norway benefited from:

- The stagflation of the 1970s. The down turn in traditional business cycles meant that domestic industries with relevant industrial competence lost traditional markets. Thus, at a time where Norway needed to mobilize relevant industrial capacity, the most competitive was to a large extent seeking new market opportunities. Their interest was quite naturally attracted by Norway's expanding oil and gas activities.
- The rise of the oil price in the 1970s combined with the exclusion of the large international oil companies from major oil regions in the world, meant that the world's leading oil companies and suppliers of oil related goods and services increasingly wanted to take part in Norway, in particular as Norway proved richer and richer on oil and gas resources. With few alternatives the leading international firms in oil and gas extraction, as well as the leading engineering companies, were willing to accept rather strict terms for participation. A tax regime with 85 per cent government take on the margin reduced the cost element of this policy for the oil companies significantly. Thus, during the build-up phase of offshore oil and gas capacity in Norway, these firms cooperated eagerly in technology transfer.
- Furthermore, in the 1970s, the oil industry lacked proven technology to operate efficiently in offshore upstream oil and gas. This meant that the industry was in search for new ideas, which not necessarily had to come for the incumbents of the industry. This offered a window-of-opportunity for newcomers with new technological ideas. As the industrial experience from shipping, ship design and construction and from ship equipment and material used for such purposes, turned out to be of real relevance, there was a break through for newcomers into the industry.

...when avoiding pitfalls of monopolization and protection

It is well established knowledge that national preferences may reduce national welfare due to the lack of competition. The competitive pressure is obviously reduced if nationality is sufficient to win contracts. Similarly, monopolization in the sense that one company becomes too dominant in a sector also is most likely to reduce national welfare.

In Norway, the state participation in oil and gas through Statoil, could easily have tipped over to become a very dominant Statoil on the Norwegian scene. This did not happen, however, due to political discussions that were triggered partly by the (at that time) two other Norwegian oil companies. They denied Statoil the right to be the only one to define the national interest. Partly the discussion was triggered as a response to concerns internationally regarding competition and welfare, which eventually caused the state to reorganize its participation. Statoil should become an oil company like all the other oil companies, and Statoil's ownership positions to oil and gas fields in Norway were considerably reduced. Instead the state kept government take at a high level by a peculiar arrangement called the state's direct financial involvement, which meant that the state got directly engaged in the oil business financially, but not industrially. In other words, the democratic system itself was able to correct, and hence avoid this pitfall of monopoly, or the dominance of one player, in the mid-1980s.

As of today, by 2007 all the three Norwegian based oil companies have been merged into one, StatoilHydro, which has become an extremely dominant player on the Norwegian scene. This may obviously hold a potential down-side with regard to industrial dynamics connected to the future oil and gas activities in Norway, unless other players are allowed to play a more significant role. Further it is a question if and how this dominant player may affect the democratic discourse in society regarding the industry, as there are really not many other industrial voices that can be heard. And it remains to be seen if this merger, which was initiated to strengthen the international operations of one Norwegian-based oil company, will result in value addition for the Norwegian society, or whether values created on the Norwegian scene in reality are used to allow the company to operate world wide, hopefully for the best of the company, but not necessarily for the society of Norway.

The other dark side regarding the policies that Norway has followed is the risk of losing welfare from too much protection. In the late 1970s and early 1980s, Norway experienced

economic setbacks, in particular in traditional industries, which created a political climate that increasingly worked in favour of preferring Norwegian firms, tending towards self-confident arrogance. This could easily have developed in a bad direction. However, Norway was rescued from making severe mistakes. Today, this risk is not particularly high, with the exception of preferring StatoilHydro in future licences. As for the local supply and service providers, protection has more or less been abandoned. This is not, however, due to deliberate policies. Norway escaped this pitfall due to incidents, which were beyond Norwegian control. The timing was more or less perfect, as these external incidents happened after the preferences towards Statoil and Norwegian firms had allowed them to build the necessary industrial capacity, but before misbehaviour had really been rooted. We refer to

- The fall of the oil price in 1986, which made the oil companies reconsider the industrial costs of operating in Norway. They increasingly argued for open international competition in the different tenders. The change in cash flow from new oil and gas fields that came on-stream, also made the oil companies more open to test and try new technological solutions, which triggered a significant technological development for offshore petroleum operations in Norway.
- European integration with the decision to create a single market in EU, and Norway's participation in EEA, implied that legal regulations preferring Norwegian firms had to be abandoned. Thus, international competition on the Norwegian shelf was fully enforced, and regulation became trustworthy for foreign firms to invest the resources required to come up with bids. As this happened, the infant-industry argument for protecting domestic firms in their capacity build-up phase, no longer had any value.

6 General lessons to be drawn

In retrospect it is fair to say that the corner-stones, or basic lines of thinking, with regard to Norway's industrial development strategy has been:

1. To have clear and widely shared guide lines as to the roles and responsibilities of the different players, building on a principle where a dynamic business community

decides on how industrial activities are to be conducted, within the framework and regulations set by transparent political decisions.

2. To make sure that domestically based firms understand and operate all crucial aspects of the offshore oil industry, by building Norwegian owned oil companies. Statoil was the major, but not the only one.
3. To attract the interest and devoted participation of the best competence available internationally. Foreign firms, i.e. the international oil companies and leading firms in their supply chains, were not excluded.
4. To attract the interest and devoted participation of relevant industrial competence domestically. In certain areas, as in engineering, the domestic firms were encouraged to join forces with the best competence available internationally.
5. To promote technology development and teaching capabilities with regard to offshore oil and gas by encouraging cooperation between the industry and universities.
6. Without any prior knowledge or industrial experience in oil and gas, Norway also had to accept some temporary protection of domestic firms. This was necessary for Norwegian firms to break into the supply chains of the different foreign oil companies. In that way domestic firms got an opportunity to participate in the challenging tasks with regard to offshore oil and gas exploration, field development and oil and gas production, and to learn from cooperating with leading firms internationally, i.e. technology transfer was encouraged. It was decisive, however, that this protection did not become permanent. Domestically based firms must cope with being exposed to real international competition if the industrial strategy is to succeed.

Norway has followed a rather deliberate policy where all these elements have played a role. They are, however, hard to combine. May be more critically, they require true cooperation and engagement from business firms, which neither politicians nor government authorities can decide. One way or another, the contributions from firms have to be in the interest of the firm. In that respect, it is fair to say that Norway has developed its oil and gas industry with time on its side. The timing of when Norway discovered oil and gas, and offshore oil and gas activities escalated, coincided with the needs of domestic industrial competence of high international standards to find new markets, and of the large international oil companies to find promising oil and gas regions where they were welcomed. Thus, the firms found it in their own interest to join forces to realize the political goals of developing offshore oil and gas capacity in Norway that could meet international standards. In that respect, the protection of

domestic infants did not create serious problems, as it was not enforced in any extreme way, and as it (by luck) was abolished when it had served its cause.

Thus, in essence, the key to Norway's industrial success has not been protection, but to arrange for a dynamic industrial and technological development that involves competent actors within the domestic knowledge base and leading international competence. Most of the measures have been enforced in order to enhance the competitiveness of domestic firms relative to foreign firms. They have not been enforced to prefer domestic firms to foreign firms at any cost.

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