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A Short History of the Norwegian Oil Industry: From Protected National Champions to Internationally Competitive Multinationals

This study explores how Norway, as a latecomer to oil production, was able to develop both effective oil companies and an internationally competitive oil service industry. The article focuses on two rather distinct phases: the protectionist phase, in which a strong focus on local content fostered skilled Norwegian oil companies as well as a national oil service industry, and the phase of liberalization or financialization, where new forms of contact and openness to foreign ownership laid the basis for internationally oriented Norwegian oil companies and oil supply and service firms.

When the Pelegrino offshore oil field in Brazil reached full production capacity in 2012, the Norwegian oil company Statoil claimed to be the largest foreign operator in the promising Brazilian offshore oil arena.[1] From the 1970s to the mid-1990s, the North Sea had represented the cutting edge in offshore technology. It was here that the limits of where it was possible to find and produce petroleum offshore were defined. A few years into the 2000s, Brazil's presalt offshore sector had established a similar position, to some extent shared with deepwater blocks on the outer U.S. continental shelf in the Gulf of Mexico. However, losing the advantage of developing its capacity in the most technologically challenging environment did not represent a period of decline for the Norwegian oil industry. Not only had Norwegian companies managed to conquer all the most advanced parts of the value chain required to find oil and gas on the Norwegian continental shelf, but together with Statoil, Norway's specialized offshore supply firms had

[1] Johann D. Sundberg, "Statoil kjøper seg inn i mulig brasiliansk oljefunn" [Statoil buys into possible Brazilian oil finds], *E24*, 27 Dec. 2012, http://e24.no/boers-og-finans/statoil-asa/statoil-satser-i-brasil/20316635.

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become competitive in many of the most technologically advanced segments of the industry worldwide. In Brazil, with its aspirations of increasing "local content" in its own petroleum sector, the Norwegian oil experience was seen as a model.

Although the "Norwegian oil experience" has a good reputation in many oil-producing states, knowledge is limited as to what this experience is. Different images predominate in different contexts. In the United States, just after the Deepwater Horizon accident, there was great interest in how Norway organized regulatory institutions around safety.[2] Both the financial press and the liberal press have shown great interest in the fact that Norway has the world's largest government-controlled capital fund ($900 billion in March 2014).[3] The Norwegian Petroleum Fund is shown similar interest by the literature on the "resource curse."[4] Others would focus on environmental issues or the fact that Norway has managed to develop an oil sector without destroying the structures of a well-functioning egalitarian society. This article discusses the development of the Norwegian oil industry as such, how the industry was structured, and how it gradually developed the technological capabilities to operate offshore in the harsh conditions of the Norwegian continental shelf and to finally become a competitive player in the international offshore market.

Given that many consider Norway a model, one might try to find a recipe for success in the government's approach to the new industry. Indeed, the Norwegian oil industry has always been deeply influenced by political initiatives and the state. If one contrasts the late 1970s with the 1990s and early 2000s, one can clearly see a movement from an interventionist, protectionist policy to a more open, market-oriented approach. One interpretation might be that this is a confirmation of the old infant industry argument as a rationale for protectionism. At the same time, it might be used to argue that at a certain point of its development the industry needs to remove such scaffolding, or crutches, to capitalize internationally on early national gains. But, as we will show, there was no linear development. The initial Norwegian oil policy did not start with protectionism but with a very open approach. Even in the market-oriented period of the 1990s, the state continued to play a role in protecting and framing the industry, although with other means than were used in the 1970s. A strict Norwegian regulatory

[2] National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling* (Washington, D.C., 2011), 67.

[3] Richard Milne, "Investment: Norway's Nest Egg," *Financial Times*, 19 Aug. 2012; Aditya Chakrabortty, "Dude, Where's My North Sea Oil Money?" *Guardian*, 13 Jan. 2014.

[4] Macartan Humphreys, Jeffrey D. Sachs, and Joseph E. Stiglitz, eds., *Escaping the Resource Curse* (New York, 2007).

approach to safety became embedded in technological standards. Norwegian engineers used to working within these standards had a competitive advantage.

At the same time, the development of Norwegian technological and commercial capabilities in the offshore oil and gas sector cannot be seen independently from the historical roots of the industry and capital formations that already existed in Norway. Both capital from Norwegian shipping circles and the related technological skill in the shipbuilding industry played an important role when Norwegian firms converted themselves to serve the new oil sector. The same was true for the industry around the construction of large power plants and the industry whose existence depended on cheap energy supplies. From the point when a Norwegian oil industry was established, business leaders, innovative engineers and oil workers, as well as the firms, business associations, and unions became agents for change themselves. The main subjects of this article are Norwegian firms, in the form of both oil companies and offshore-related contractor, supply, and service companies.

The Early Years

Like most other European states, Norway enjoyed fantastic economic growth in the postwar years.[5] In 1970, Norway's GDP per capita was

[5] Angus Maddison, *Phases of Capitalist Development* (Oxford, 1989), 177. Given the Norwegian oil sector's importance, there is a broad spectrum of written material describing different parts of Norwegian oil history. However, there are very few studies where economic historians have had full access to government and company archives. The main exception is the project *Norsk Oljehistorie* [Norwegian oil history]. The first volume—Tore Jørgen Hanisch and Gunnar Nerheim, *Fra vantro til overmot?* [From disbelief to arrogance?] (Oslo, 1992)—was written with full access to all relevant government archives and several company archives, and covers the period up to 1978. No one has since had full access to the Ministry of Oil and Energy's archives. The second volume—Gunnar Nerheim, *En gassnasjon blir til* [A gas nation comes into being] (Oslo 1996)—was written with good access to the archive of the state oil company Statoil. I was coauthor with Marie Smith-Solbakken on volume 3, *Blod, svette og olje* [Blood, sweat, and oil] (Oslo, 1997). This volume, covering industrial relations and environmental and safety issues, was written with access to relevant archives. Later, in the early 2000s, a three-volume history of the industrial conglomerate and second largest Norwegian oil company Norsk Hydro was written by historians with good access. The last two volumes take up oil-related themes: Finn Erhard Johannessen, Asle Rønning, and Pål Thonstad Sandvik, *Nasjonal kontroll og intdustriell fornyelse*: *Hydro, 1945–1977* [National control and industrial renewal: Hydro, 1945–1977] (Oslo, 2005); Einar Lie, *Oljerikdommer og internajonal ekpansjon*: *Hydro, 1977–2005* [Oil wealth and international expansion: Hydro, 1977–2005] (Oslo, 2005). There are several relevant academic works in the form of MA and PhD theses as well as several popular presentations of company history made by journalists; some of these will be referenced in this article. There are several older studies of the early Norwegian oil history made by political scientists, most notably, Svein Andersen, *The Struggle over North Sea Oil and Gas: Government Strategies in Denmark, Britain and Norway* (Oxford, 1993) and Øystein Noreng, *The Oil Industry and Government Strategy in the North Sea* (London, 1980).

just below the OECD average. Norway exported raw material–based commodities like fish, pulp, and paper. It also had a growing production of aluminum, PVC, ammonia, ferrosilicon, and other chemical products based on the availability of cheap electricity from the country's large hydroelectric reservoirs. The main driving force in growth after World War II, however, was shipping and the large, associated industrial sector of shipbuilding. With 10.6 percent of the world's fleet measured in gross registered tonnage, Norwegian shipping reached its absolute peak in the mid-1960s.[6] Small, medium-sized, or large shipyards could be found in almost every Norwegian coastal town or village at the time. These yards built everything from what at the time counted as large supertankers to specialized transport ships, both for Norwegian shipowners and for export. Smaller yards specialized in fishing vessels, ferries, and other ships for more local purposes. But in the late 1960s competition from new and larger shipyards in Japan and South Korea became gradually more intense. If it had not been for the new oil sector, the international economic crisis starting in 1973 would probably have hit Norway especially badly.

The possibility of finding oil in the North Sea first became known to Norway when representatives of the American oil company Phillips arrived in Oslo on October 29, 1962, and asked for permission to start exploration in what they expected would become the Norwegian continental shelf. Seven months later, on May 31, 1963, the Norwegian government declared in a cabinet decree, "The ocean floor and the underground of the underwater areas off the coast of the Kingdom of Norway are under Norwegian sovereignty as regards the exploitation and research of natural deposits." The decree followed the same principle that was introduced ten years previously when the U.S. government declared federal jurisdiction over all areas lying more than three miles from its coast, with the Outer Continental Shelf Lands Act of 1953. It took time for Norway to settle border disputes with all five neighboring countries (Britain, Denmark, Greenland, Iceland, and the Soviet Union). Nevertheless, when an agreement between Norway and Britain based on the equidistance principle was signed in 1964, Norwegian authorities could start final preparations for allocating concessions.

The foundation stone of the Norwegian concessions regime was laid by the cabinet decree of April 9, 1965. The regulations had many similarities with the British system established the year before.[7] Unlike offshore drilling in the U.S., where allocations were distributed through auctions,

[6] Torgeir Reve, Terje Lensberg, and Kjell Grønhaug, *Et konkurransedyktig Norge* [A competitive Norway] (Oslo, 1992), 188.

[7] W. G. Carson, *The Other Price of Britain's Oil* (Oxford, 1982), 139; Andersen, *North Sea Oil and Gas*.

in Norway and Britain oil companies had to submit applications in concession rounds. The main financial gain for the governments would come in the form of royalties and taxes after oil was found. Norwegian oil policy at this stage was neither particularly strict towards foreign oil companies nor correspondingly oriented towards supporting participation from local industries. Before the first concession round in 1965, parliament passed exceptional measures, which allowed reduced taxes for oil companies.[8] Royalties were set lower than foreign companies had expected. With these targeted reductions, Norway stood to see a lower government take from the Norwegian sector than Great Britain did in the same period. In case of a major find, where the costs were low in relation to income, the government take could have been a little higher than 50 percent.

The actual civil servants in the first, small Norwegian oil administration acted on the assumption that Norway was competing with other North Sea countries for investment.[9] Given that no oil had yet been found, the overall goal of early Norwegian oil policy was to get the international companies to commit themselves as fully as possible. At the same time, as in most European economies of the period, there was concern about securing access to foreign currency. For these reasons, it was considered important to prevent Norwegian companies from becoming too heavily involved. But this caution was not shared by Norway's most important business leaders at the time. Norway's largest shipowner, Fred Olsen, and the largest Norwegian industrial firm, Norsk Hydro, wanted to acquire a strong position in the promising new industry at once. This elite core of Norwegian business leaders could see the hectic game prior to the first allocations of Norwegian concessions close up.[10] If the foreign interest was so great, why not take part in it from the beginning?

The first Norwegian allocation round, in 1965, comprised seventy-nine blocks. This was the largest round ever on the Norwegian shelf. Almost all of the major international oil companies took part. Of the blocks that were allocated, Norwegian companies were represented in only twenty-nine, and these were modest minority shares. By contrast, in the first concession round on the neighboring British continental shelf, with the established major BP in a leading role, British companies

[8] Om skattlegging av undersjøiske petroleumsforekomster [About taxation of subsea petroleum resources], Besl. O. [Law] no. 129 (1964–65).

[9] Helge Ryggvik, "Norsk oljevirksomhet mellom det nasjonale og det internasjonale: En studie av selskapsstruktur og internasjonalisering" [Norwegian oil industry between the national and the international: A study of business structure and internationalization] (PhD diss., University of Oslo, 2000), 76.

[10] The best known of these were Johan B. Holte and Torvild Aakvaag, director and future director of Norsk Hydro, respectively, and the shipowner Frederick Olsen.

were represented in 283 of the total (somewhat smaller) 346 blocks allocated. When drilling started in Norway, foreign firms dominated in a similar manner. The American drilling company Odeco played a particularly important role. The company's semisubmersible rig, *Ocean Traveler*, lived up to its name when it crossed the Atlantic under its own power before arriving in Norway. However, the rig was badly damaged during a storm and had to be repaired at a shipyard in Stavanger. This was the first encounter with oil technology for Norwegian shipyard experts. When a new rig, *Ocean Viking*, was ordered from Odeco the same year, its basic structure was to be built at the Fred Olsen–owned Aker Shipyard in Oslo. Of course, all the drilling equipment came from the United States. However, the initiative was an opportunity for Norwegians to watch and learn.

A State Oil Company and a New Industry

As early as the first drilling season in 1966, it was established that the Norwegian continental shelf contained hydrocarbons. The course of history changed three years later when Phillips, in the autumn of 1969, struck oil far down in the southwestern corner of the Norwegian shelf. A few months into 1970, it was confirmed that the Ekofisk field was a real giant (534 million Sm^3 of oil, 158 billion Sm^3 of gas).[11] It soon became clear that there could be much more oil and gas further north, both on the Norwegian and the British side of the newly established border in the middle of the North Sea.

Contrary to the restraint on Norwegian participation in the first concession round, there was now an immediate agreement among politicians that Norwegian participation in the new industry was important. The center-right government that had held power before the new Labour government tried to create the conditions for Norsk Hydro to become the dominant Norwegian national oil company. Norsk Hydro was a conglomerate, originally established by foreign capital to develop industry related to Norwegian hydropower. From October 1970 shares were bought secretly to secure more than 50 percent for the state. But when Labour Party politician Finn Lied, with his young second-in-command Arve Johnsen, took over the Ministry of Industry in March 1971 they soon started to work towards the establishment of a new state-owned oil company. They secured an important political platform for this soon after, when the parliament's extended industrial committee

[11] Norwegian Oil Directorate, *Facts 2010* (Oslo, 2010), 90. All reserve estimates in brackets are from this publication. One Sm^3 of oil is equal to 6.29 barrels.

outlined a general direction for Norwegian oil policy.[12] The committee stated that there was a need for a state oil company and that "a new industrial sector should be developed, based on petroleum."[13]

The young Arve Johnsen had been sales chief of Norsk Hydro's aluminum branch before he took up his political position. Both Johnsen and Lied had strong links to Jens C. Hauge, the former leader of the Norwegian resistance during World War II. Hauge was a leading industrialist in the period after the war, still working in the background.[14] If they all agreed on the need to create a completely new, 100 percent state-owned, operational oil company, it was because in their view it would be too difficult to direct Hydro. Changing the company's ownership was not in itself enough to change the industrial dynamics, loyalties, and culture that were embedded in it.

On June 14, 1972, the Norwegian parliament agreed to the creation of a state-owned oil company. Two months later, after getting a "no" result in the referendum on Norwegian membership in the EEC (now EU), the Labour Party left government. But support for the newly outlined oil policy had not changed in parliament. Some weeks later, Arve Johnsen became director of the new company, Statoil. Jens C. Hauge became Statoil's first chairman of the board (1972–74). He was followed by Finn Lied in the same position two years later (1974–84). This trio controlled oil policy for many years. It helped that the pro-Statoil Labour Party came back to power after the election in September 1973, ruling with the support of a leftist socialist party for the next eight years.

When in winter 1973 the new company was given the telling name Statoil (state oil), it might have sounded somewhat like an ideological statement. However, even though the leadership in the company had a social democratic background, state ownership was not a goal in itself for the central actors. During the political process outside the company in the 1970s, several political goals were added to the list of what was expected of Statoil, such as controlling the pace of extraction, making sure that Norwegian labor and safety standards were generally accepted in the industry, and ensuring that extraction took place in an environmentally defensible way. Nevertheless, the cornerstones of Statoil's activities under Arve Johnsen were first and foremost to develop strong

[12] Innstilling fra den forsterkede industrikomite om undersøkelser etter og utvinning av undersjøiske petroleumforekomster på den norske kontinentalsokkel [Recommendations from the amplified industry committee on exploration for and exploitation of petroleum resources on the Norwegian Continental Shelf], Innst- S. [Recommendation to the parliament] no. 294 (1970–71). The committee's recommendations were later to be named Norwegian oil policy's "ten commandments."

[13] Ibid.

[14] Olav Njølstad, *Jens Chr. Hauge—Fullt og helt* [Jens Chr. Hauge—without reservations] (Oslo, 2008).

technological capabilities in the new sector. To achieve this, Johnsen and his allies were determined that Statoil should become an operator and—in the same way as the very largest oil companies—secure positions at each stage of the oil process, from upstream exploration and production to refining, the chemical industry, and the sale of oil products. Statoil should at the same time support the establishment of a strong national, private supply/contractor/service industry related to activities on the Norwegian continental shelf.

Statoil's First Years

Starting from scratch, it took time to develop Statoil into a really skilled operative company. As long as Statoil did not generate its own income and was dependent on political goodwill, the company was in a vulnerable position. Even though there was a general agreement that Statoil should be given the means to become an oil company in its own right, all new concession rounds became crucial events for the company. As long as Statoil lacked the necessary competence, foreign oil companies could find oil and develop petroleum fields at a lower cost than Statoil. At the same time, Statoil continued to compete with Norsk Hydro and the private Saga for political preference in concession rounds. Saga's ownership was dominated by important players in Norwegian shipping circles.

A key aim in Statoil's first year was to ensure control of strategic pipelines. The cabinet decree and the contract that created the legal basis for Phillips's development of the Ekofisk field did not state explicitly where any future pipelines should be laid nor who should own and control them. Arve Johnsen assumed, quite rightly, that the Ekofisk pipelines, placed in the southwestern corner of the continental shelf, would become significant as a trunk pipeline network for possible oil fields further north. Initially, Phillips had partial support from officials in the Ministry of Industry for the position that Ekofisk's owners should own and operate all pipelines from the field. Negotiations in 1973 ended with the establishment of a dedicated pipeline company that in practice was owned and controlled by Statoil, with 50 percent of the shares—something that in turn opened the way for Statoil to take over operations at a later point.[15]

The second strategic clarification during Statoil's first year was about control of very promising blocks bordering the Brent field on the British side. When Esso and Shell had contacted the Ministry of Industry in an attempt to secure these blocks, the minister, Lied, had the process

[15] Arve Johnsen, *Statoil-år: Utfordringen* [The Statoil years: The challenge] (Oslo, 1988), 36.

stopped.[16] In early 1973 Esso and Shell tried again. Johnsen, who had had access to the companies' application while in the Ministry a year earlier, understood what was at stake and did his utmost to ensure that Statoil got the blocks. He initially proposed that Statoil should have 100 percent ownership, but even Lied did not support him in this. Many in the Ministry feared that too high a share for Statoil would scare foreign companies away and therefore delay the drilling process and the development of any possible finds. Nevertheless, the outcome was that Statoil received a controlling ownership share of 50 percent. Esso, Shell, and Conoco received shares of 10 percent each. Mobil, which was to be the operator in the first instance, received an ownership share of 15 percent. The last 5 percent was divided among several other companies, including the private Norwegian company Saga. The companies' satisfaction grew a year later when Statfjord was shown to be one of the world's largest oil fields, similar in size to the Ekofisk field.

A central part of the agreement with Mobil, which was given the role of operator at Statfjord, was that Statoil was to take over as operator in the course of a ten-year period. Statoil was to be Mobil's apprentice. It soon became clear that Statoil's 50 percent ownership of the field was essential to making sure that Mobil kept to the original deal. Mobil saw its role as operator in one of the world's largest and most challenging fields as strategically important. Hence, under Alex Massad's leadership the company started a campaign to maintain its operatorship. Mobil appealed to Norwegian politicians on the grounds that Statoil was not skilled enough to take over the operatorship. It was entirely clear to Johnsen that only by building up the necessary technological know-how could Statoil stand up to Mobil's strategy. When the Gullfaks (360 million Sm^3 of oil) field was found in 1978, Statoil got a development track independent of Mobil. Here, Statoil used Exxon as a "technological assistant," but was itself formally the operator. Statoil initially held 91 percent ownership.

Early Norwegian Successes

When it came to Norway's ability to develop the skill and capacity to build and operate the facilities that could function under the harsh conditions of the North Sea, the Norwegian supply industry would soon become just as important as Statoil, if not more so. While all three Norwegian oil companies had to rely on preferential positions in concession rounds, it took only a few months from when the size of the Ekofisk field

[16] Hanisch and Nerheim, *Fra vantro til overmot*, 184.

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became known in 1970 until several Norwegian shipping companies threw themselves into the market for semisubmersible drilling rigs, without any strong state support. Indeed, many of these initiatives were international in their orientation. Of course, now that oil had been found in the North Sea, the risk of investing in offshore activities was reduced. Nevertheless, the initiative was successful.

The Olsen-owned Aker group played a particular, important role on the construction side. Learning from its work on the Odeco rig *Ocean Viking* in the late 1960s, Aker constructed its own semisubmersible rig concept. The first Aker H3 rig was built at a newly established shipyard in Verdal, inside the Trondheim fjord. In February 1974, Aker had orders for building twenty-five rigs, eleven of them on license from other groups, several in other countries. The majority of Aker's semisubmersibles were bought by Norwegian shipowners. In addition to the Norwegian H3 Norwegian shipowners placed orders for different kinds of rig concepts in several European shipyards. Soon the Norwegian shipowners had the capacity to dominate the rig market on both the Norwegian and British continental shelves.

How can this early success for Norwegian shipowners and yards be explained? Why did British industrialists or established offshore yards connected to offshore activities in the Gulf of Mexico not dominate this market? Since drilling in the British sector of the North Sea had gone on for a somewhat longer period, British companies had the advantage of being a bit ahead of the Norwegians. One could view the hard-earned Norwegian knowledge of how to cope with harsh North Sea weather conditions as a case of classical comparative advantage. In a still open, rapidly growing market, Norwegians won where they had skills that could be converted relatively easily to the maritime side of offshore oil activities. Of course, British and American firms also had maritime skills, but it appears that they wound up dominating more advanced parts of the offshore market. However, Norwegian historian Gunnar Nerheim has argued that the financial system developed in and around the Norwegian shipping industry may have been the main reason for the very fast conquest of the semisubmersible rig market.[17] In the Gulf of Mexico, rigs were not financed before a drilling contract with one of the oil companies was secured, while Norwegian shipowners were used to ordering ships based on speculation, hoping that the business cycle was moving in the right direction.

The second early Norwegian success story is related to the special strand of Norwegian industry specializing in construction of large dam projects. In this case, engineering and construction expertise was

[17] Ibid., 233.

the driving force. These were technological solutions looking for a problem. From 1960 to 1972, new dam projects increased Norway's production of electricity from 30 TWh to 67 TWh, making Norway self-sufficient.[18] The hydropower plants were owned and controlled by the state and local municipalities. The dams, however, were often built by large private entrepreneurs, who acquired substantial skills in large concrete construction.

The use of concrete as a major building material offshore started when Phillips decided that it needed a large storage tank for its early production on the Ekofisk field. For Phillips, using concrete instead of steel was simply a good idea that happened to satisfy Norwegian interests at the same time.[19] Learning from its experience of building the tank, a Norwegian building entrepreneur, together with Aker, started to work on a concept where concrete was used for platform legs. In June 1973, the group made a deal with Mobil for construction of a concrete platform structure for the 118-meter-deep Beryl field on the British continental shelf. With the English name Norwegian Contractors (NC), the company started to export technology before it got its first contract on the Norwegian continental shelf. The structure for Beryl A was installed in July 1975. At this time NC was working on finishing two even larger concrete structures for the 140-meter-deep British Brent field. Such success continued on the Norwegian shelf, with each new construction larger than the last.

A Need for Protectionism?

Neither concrete platform structures nor the shipowners' contributions in the rig market could be defined as core oil technology. Even if the construction of the H3 rig and the pace at which a new fleet of semisubmersible rigs was financed and constructed were impressive, the technology needed to find and produce oil and gas offshore was still mostly in the hands of American firms. All drilling equipment on board these rigs was produced and installed by American experts. Furthermore, it was American drilling entrepreneurs like Santa Fe, Rowan Companies, and Zapata that ran the drilling operations proper when the semisubmersible rigs were used.[20] Having these and other firms on their installations, the Norwegians could start the learning process, from maritime-oriented semisubmersible rig owners to fully competent offshore drillers. It took years before this was achieved.

[18] Official Statistics of Norway, *Historisk Statistikk* [Historical statistics] (Oslo, 1994), 401.
[19] Hanisch and Nerheim, *Fra vantro til overmot*, 203.
[20] Carl-Axel Janicke, *Oljeboring til havs: Historien om en ny norsk næring* [Offshore oil drilling: The story of a new Norwegian industry] (Oslo, 1984), 39.

At the same time, even if the large concrete structures were impressive in size, neither the Ekofisk tank nor large platform legs were advanced when compared to the technology needed to operate a production installation offshore. The majority of contracts during the construction phase on Ekofisk went abroad; in 1975, local content for all offshore activities was measured at 28 percent.[21] Some in the industry used the expression "metal bashing" as a negative term for a primitive part of the industry that large foreign companies would happily leave to local companies.[22] Indeed, a large part of the Norwegian local content was "cement bashing." Using wheelbarrows and muscle power to place cement at the right place between complicated structures of armoring steel, the work did not demand much special skill.

Moreover, the early export successes of the Norwegians were achieved in the period prior to 1974, which was characterized not only by rather open markets but also by lack of capacity in both Norway and Britain. The British economy entered a crisis of high unemployment in the winter of 1974, and with the incoming Labour government under Harold Wilson, industrial policy became more protectionist. NC could complete its ongoing projects, but from 1976, NC worked only for the Norwegian market.

In Norway one could find elements of a protectionist drive before the 1974 crisis. Concerns of the two largest shipbuilding groups, Aker and Kværner, were instrumental when in 1972 the government stated in a royal decree, "In cases where Norwegian commodities and services are competitive, in quality, service, delivery time and price, these are to be used."[23] Despite the Ministry of Industry's insistence that what was to be known as §54 was not protectionist, most parties involved knew that if the government wanted to use the paragraph actively, it offered an opening for the government to force operators to increase Norwegian participation. Norwegian shipowners saw the paragraph as an immediate threat both to their international shipping activities and to their recent successful breakthrough in the semisubmersible drilling rig market.

The shipowners had been a bastion of economic liberalism in Norwegian society since the early nineteenth century. Within the state apparatus they were supported by the Ministry of Trade. The opposition to §54 was so strong the Minister of Industry had to state that supply ships and drilling rigs would be exempted from it. The paragraph

[21] Petroleumsundersøkelser nord for 62. Breddegrad [Petroleum exploration north of 62nd latitude], white paper no. 57 (1978–1979).

[22] C. Paul Hallwood, *Transaction Cost and Trade between Multinational Corporations: A Study of Offshore Oil Production* (Boston, 1990), 73.

[23] Royal decree of 8 Dec. 1972, §54.

remained inactive in the first two years, but when crisis hit the shipbuilding industry in 1974, Aker, Kværner, and other shipyards around the coast increased their efforts to secure a more active protectionist policy from the government. This time the Norwegian industrialists could point to similar measures underway in Britain. Soon the British offshore market became more or less closed to Norwegian companies. British firms were, with some exceptions, locked out from the Norwegian continental shelf in the same manner.

However, both in Britain and Norway the major obstacles for developing supremacy in the core oil technologies were American firms, not their neighbors on the other side of the North Sea. Hence the question of how to increase local involvement remained a serious concern both for politicians and civil servants and for the industry itself. The important point of the Ministry's regulations was that a regime was established under which companies had to systematically declare the proportion of Norwegian involvement in relevant projects.[24] The carrot and stick of the system were future concession allocations. As long as prospects for major new finds on the Norwegian shelf existed, this was very effective.

When the fourth concession round was announced in 1978, great weight was placed on the desire to achieve a Norwegianization of activity in the allocation.[25] Of course, a significant Norwegian proportion of allocations was in itself a significant contribution to Norwegianization. The message to foreign firms taking part in the fourth and subsequent rounds was clear: companies that made a good contribution to the Norwegianization of the industry would benefit. From the start Norway had operated a system with specific working agreements for each individual company that received an allocation. Now requirements as to how the companies should relate to Norwegian contractors were written into the working framework. Norwegianization was not only formulated as the goal of securing contracts for a shipyard industry in trouble; Norwegian skill was to be developed within all technological sectors of the oil industry.[26] Furthermore, it was seen as important that the greatest possible proportion of the relevant research be performed in Norway. Only oil companies that were willing to shoulder at least 50 percent of all research and training related to the development of fields would win concessions.

[24] Petroleumslov med forskrifter [Petroleum law and regulations], NOU [Official Norwegian report] no. 43 (1979).

[25] Om virksomheten på den norske kontinentalsokkel [About activities on the Norwegian Continental Shelf], white paper no. 53 (1979–1980).

[26] Ibid.

With Help from Statoil

In this politicized system, the relevant ministries, the Norwegian Petroleum Directorate, and the parliament all became important arenas for companies wanting to promote their interests. Nevertheless, ambitious Norwegian supply firms soon discovered that the most decisive player that could ensure them more profitable and more technologically challenging contracts was Statoil. By sitting in the decisive license groups, Statoil had vital hands-on knowledge of important decisions on technological choices and contract policy.

During the pioneering development of the Ekofisk and Frigg fields (1971–1977), Norwegian companies had lacked capital, been too small, had not enough skill, and perhaps lacked the right connections to play an important role in the more technologically advanced part of the development. The construction of a small city of platforms on the 60-meter-deep Ekofisk had of course been a major achievement. Moreover, building the three giant platforms on the 150-meter-deep Statfjord field (1975–1984) was the largest industrial project ever undertaken in Norway. Together with the almost parallel development of the Gullfaks field (1980–1988), it was to become both Statoil's and the Norwegian supply industry's main apprenticeship. At the same time, the projects represented a gradual maturation and to some degree a standardization of the industry. This made it even more important for Norwegian companies to succeed.

At Statfjord, with Mobil as the operator, Statoil neither could nor would intervene every time a Norwegian contractor complained, despite its 50 percent ownership. However, for the Norwegian companies that eventually got contracts on these large projects, the experience was decisive for their future. Partly as a result of pressure from Arve Johnsen and Statoil, the American, Halliburton-controlled Brown & Root formed a joint venture with Aker (BrownAker). This meant that engineers and skilled workers from several of Aker's shipyards were involved when the platform deck was produced.

In one important instance Statoil and Arve Johnsen actively intervened to create a private Norwegian company.[27] Five years after the Ekofisk find, there was still no Norwegian engineering company with the skill and the size necessary to take on such a challenging project. The engineering contract for Statfjord A was initially given to the British engineering company Matthew Hall. After a chaotic building process, the general opinion, both inside Mobil and among the

[27] Sveinung Engeland, "Ingeniørfabrikk på norsk: Oppbygginga av norsk petroleumsrelatert engineeringkompetanse" [The Norwegian engineering factory: The development of petroleum-related engineering skills in Norway] (PhD diss., University of Oslo, 1995).

Norwegians involved, was that Matthew Hall also lacked the necessary skills. Johnsen and his team realized that it was essential to establish a Norwegian engineering firm large enough to meet the challenges ahead. The companies that carried out engineering tasks (a key area of know-how in itself) set tight parameters for choosing contractors.

At this point, one option would have been to give the engineering contract to Aker or Kværner, the two largest Norwegian construction firms. Both companies had increased their engineering capacity substantially in the years after the Ekofisk find. This was certainly the option preferred by the companies themselves. Seen from Statoil's perspective, however, it would be much easier to relate to a new company. Together with his main allies, Johnsen was pulling the strings when the engineering firm Norwegian Petroleum Consultants (NPC) was founded in 1977.

At the core of NPC was a merger of different, smaller firms. At the same time, Aker and Kværner were more or less forced to give up part of their engineering capacity to the new company. The establishment of NPC was based on the assumption that the new company would actually get a large contract. Here Statoil delivered, as expected. Mobil was wary of giving the engineering contract to an inexperienced company once again. So, when NPC got the engineering contract at the large production platform Statfjord B, it was on the basis that it would operate in a joint venture association with Brown & Root's engineering department. However, on Statfjord C, NPC got the contract alone.

The maneuvers around the establishment of NPC revealed a contradictory relationship between Statoil and private Norwegian supply firms. These underlying contradictions were to come up in different forms in the years to come. On one side, Norwegian suppliers were dependent on Statoil using its ownership power inside the license groups to promote local content. One the other side, it was in not only Statoil's but also the nation's interest to make sure that that no supply firm acquired monopolistic control. In that case, private investors could use this position to extract super profits or oil rent that would otherwise have become taxes for the common good. At the same time Aker and Kværner could suspect with some justification that Statoil's contract policy was motivated not only by the state oil company's role as a national strategist, but also by the company's self-interest. Here Statoil gradually fell into the same role as other oil companies large enough to have the power to determine market conditions for contractors. By hiring contractors instead of developing the relevant capacities in-house, an oil company could reduce risk and cost. However, if a supplier acquired monopolistic control of certain kinds of technology, it also increased its power vis-à-vis the oil company.

Mobil's representative in Norway was working hard to convince Johnsen that it was not in Statoil's interest for Aker to become too dominant on the construction side.[28] It came as a shock to many to learn in autumn 1977 that the construction contract for Statoil B was given to a Kværner yard in Stavanger, not the Aker yard at Stord, south of Bergen.[29] This was Mobil's decision, but everyone knew it was sanctioned by Statoil. Statoil had thus signaled that it was not willing to give a free pass to any given Norwegian company. Statoil wanted to support the development of a national industry, but it also wanted competition. In Aker the defeat was felt so strongly that one of the employees responsible for the company's bid committed suicide.[30]

"Strategic Heights"

Arve Johnsen became known for using rather pompous expressions. One of these—"We must conquer the strategic heights"—has been frequently quoted, and it sums up the strategy behind Statoil's development in its early years. By "strategic heights" he meant becoming a fully integrated oil company, with activities from drilling and production upstream to refineries and gas stations downstream. The economics of horizontal and vertical integration and differentiation so well described by Alfred Chandler can be used as a theoretical concept to understand how Norwegian oil companies tried to internalize different phases in the value chain.[31] The relationship between oil companies and their contractors can in a similar way be analyzed by using transaction cost theory.[32]

However, for Johnsen the fully integrated oil company was a model he was striving to achieve at any cost, rather than the optimal structure based on an analysis of the challenges facing Statoil. He knew the classic story of Rockefeller and the development of Standard Oil very well from his time as a student in the U.S. in the early 1960s.[33] Now he wanted

[28] Nerheim, *En gassnasjon blir til*.

[29] Gunnar Nerheim, Lars Gaute Jøssang, and Bjørn S. Utne, *I vekst og forandring, Rosenberg Verft 100 år, 1896–1996* [In growth and change: One hundred years of Rosenberg shipyard, 1896–1996] (Stavanger, 1995), 393; Knut Groven and Jan Heiret, *I stål og olje: Historia om jern- og metallarbeidarene på Stord* [In steel and oil: The story of the iron and metal workers at Stord] (Stord, 1996).

[30] Håkon Larvik, *Statfjord: Nordsjøens største oljefelt* [Statfjord: The North Sea's largest oil field] (Stavanger, 1997).

[31] Alfred D. Chandler Jr., *Strategy and Structure: Chapters in the History of the American Industrial Enterprise* (Cambridge, Mass., 1962), *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977), and *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, Mass., 1990).

[32] Oliver E. Williamson, *Markets and Hierarchies: Analysis and Antitrust Implications* (New York, 1975); Hallwood, *Transaction Cost and Trade*.

[33] Arve Johnsen, interview by the author, 6 Feb. 2008.

Statoil to copy the structure of Standard's modern descendants. But even if Johnsen never lost sight of the goal of becoming a fully integrated oil company, Statoil's downstream maneuvering increasingly came out as tactical positioning in order to secure the most important goal: lucrative allocations in future concession rounds.

For the other two Norwegian oil companies, Norsk Hydro and Saga, this kind of opportunistic, strategic maneuvering downstream was even more apparent. In the end it was the oil sector's rent character that more than anything else determined the industry's structure. All three Norwegian companies depended on political goodwill. When Norsk Hydro together with BP became involved in the development of a large refinery at Mongstad, north of Bergen, in the early 1970s, the main motive was to strengthen the company's position in upcoming concession rounds.

Moreover, the rationale behind the structuring of Norwegian oil companies became more complicated when the authorities, through the Ministry of Industry, on several occasions orchestrated initiatives and ownership relations downstream. With one fully state-owned company, one semiprivate company, and one private company, all political parties had secured their preferred actor. However, with the hectic activity that was taking place in the Norwegian sector in the 1970s, it was impossible for all three to develop both operative capacity offshore and downstream activities onshore at the same time. Hence, major decisions influencing structure were often products of a political compromise rather than solutions growing naturally out of the industry.

In 1974 Statoil and Saga, as part of a political compromise orchestrated by the Ministry of Industry, joined with Hydro as owners at the Mongstad refinery by acquiring BP shares. Statoil wanted initially to have either its own new refinery or 100 percent ownership in the Mongstad plant, but joint ownership was better than leaving the position in refining to the two other Norwegian companies alone. Especially for Saga, without income from any of the oil fields, investment in a refinery without any real prospect of large profits was a substantial risk. Nevertheless, by considering the company as one of three Norwegian "oil companies," the Ministry was making an indirect promise for future allocations of oil fields. In this situation, Saga's otherwise liberally oriented owners played a game that depended on Norwegian protectionism to succeed.

For similar reasons, around the same time all three Norwegian companies became owners in a petrochemical plant at Rafnes, south of Oslo. Hydro was to operate an ethylene plant, while Saga was to operate a polyolefin plant. Polyolefin was far outside the shipping world's starting know-how, and Saga nearly bankrupted itself through its involvement. The company survived because the shipping milieu continued to pour

in capital in the hope that the government would eventually give it a lucrative allocation. In 1983 it succeeded when the company received first a substantial ownership and later the operatorship of what was to become the Snorre field. At this time Norsk Hydro was about to develop an operative organization for the large oil field Oseberg (producing from December 1988). The upshot was that Hydro and Saga left the refining and newly initiated petrochemical industries, while Statoil took over Mongstad and the petrochemical activities alone. Hydro and Saga could thus concentrate on their owners' initial interest.

The same political games and economic positioning shaped the development of Norwegian outlets for gasoline and other oil products. Industrial politicians had developed a compromise under which Statoil, Norsk Hydro, and Saga were to sell gasoline and oil products jointly under the name Norol. None of the three companies was satisfied with the arrangement. In 1978, Statoil bought out Hydro's and Saga's shares in Norol. However, due to political constraints, it was only in 1991 that Statoil could sell petrol under its own name in Norway. At this point Saga became a pure crude oil company, while Hydro gradually withdrew from retail.

The strangest effect of this kind of "political" strategic-positioning game on Norsk Hydro and Saga in the 1970s was several early adventures in the international upstream arena. The two companies became involved in a series of oil prospects in Guatemala, Benin, the United Arab Emirates, Sicily (Italy), and the American states of Mississippi and Colorado. Coming into these projects with no real skill and without the protective support they had hoped to get when operating in Norway, it should be no surprise that the projects all ended with heavy losses. The best the Norwegian companies could hope for was to acquire some technological competence in the process; however, this was quickly lost. Those Norwegians who gained skills could get more interesting jobs with Statoil and other foreign companies working on the Norwegian shelf. Again, when the two companies eventually got hold of operatorships on the Norwegian continental shelf, the international projects were quickly abandoned.

"Wing Clipping"

The Norwegian transition in 1981 from many years of social democratic government to Conservative Party government under Kåre Willoch followed an international trend. However, Willoch's center-right government did not change the attitude to foreign investment in the oil sector. The political pressure for Norwegianization continued. The main oil policy change in the first half of the 1980s was the so-called

"wing clipping" of Statoil. In his autobiography, covering his time as prime minister up to 1986, Willoch describes Statoil as a state within the state.[34] It was hardly a secret that, from Willoch's perspective, it was Johnsen who personified this illegitimate state power. The means by which Statoil's power was restricted was partly to strengthen the influence of the semistate company Norsk Hydro and partly to strip Statoil of comprehensive ownership rights and establish direct state ownership of several of the most productive fields. With the establishment of the state's direct financial interest (SDFI) in 1984 after a political compromise between the major blocs in the parliament, the state was managing oil reserves of a size about three times greater than Statoil's.[35]

Arve Johnsen survived as head of Statoil throughout Willoch's term as prime minister. It was no accident, though, that it was budget overruns on an extension project at the Mongstad refinery that forced Johnsen to leave Statoil in 1988. However, Willoch's major legacy, SDFI, proved to be a successful, if little-known, part of Norwegian oil policy. SDFI was an effective instrument for collecting resource rent for the nation. Its ownership shares were especially concentrated in fields where it was expected that income would be particularly high. In 2001, SDFI was institutionalized as the state holding company Petoro. Its headquarters were moved from the Ministry of Oil and Energy to a somewhat larger organization in the oil town of Stavanger. In 2013 Petoro was still Norway's largest oil company measured in reserves and production (6 million barrels per day), but still without operative capacity.

End of Protectionism?

The major shift towards a more market-based and less protectionist oil policy came under the Gro Harlem Brundtland–led social democratic government from 1986. Many factors contributed to this shift. With relatively high oil prices and good prospects of making finds, foreign companies had long remained willing to stretch themselves in order to gain access to the Norwegian continental shelf, despite being restricted to minority shares and a limited number of operatorships. But there was a shift in the mid-1980s, when optimism about the possibility of making large new finds turned to pessimism. The perception spread that many of the areas seen as having a high probability of large finds had been allocated. This influenced the willingness of foreign companies to invest as well as that of Norwegian companies to take risks. The immediate event

[34] Kåre Willoch, *Statsminister* [Prime Minister] (Oslo, 1990), 287.
[35] The white paper covering this was presented on April 27, 1984 (no. 73 [1983–1984]).

that provoked change towards a more open oil policy was the collapse of oil prices in 1986.

With oil prices below ten dollars, the issue of the future of foreign oil companies on the Norwegian shelf was highlighted. In autumn 1986, the new Labour government got the parliamentary green light for significant tax reductions for foreign companies.[36] From 1987 a rule that foreign companies should "carry" the state's expenses for the exploration phase was abolished.[37] The eleventh concession round, allocated in April 1987, was a clear signal that Norwegian authorities still wanted the presence of foreign companies on the Norwegian shelf. Norwegian interests continued to receive a share of over 50 percent of ownership —but foreign companies became operators on eight of twenty-two blocks allocated. In the following rounds, foreign companies received an even larger share.

However, this new openness was not only a defensive response to lower prices but also a reflection of the feeling of Norwegian strength. The results of many years of Norwegianization policy could now be seen. In December 1986, Statoil started production from the Gullfaks field. Within the following two-year period, Statoil took over the three giant platforms on the Statfjord field from Mobil. Then production started from a second giant Gullfaks platform. In December 1988, Norsk Hydro started production from the Oseberg field. Simultaneously, the third Norwegian oil company (Saga) received the necessary clarifications to enable it to develop an operating organization on the Snorre field (250 million Sm^3 of oil). Norwegian companies had become by far the largest employers on the Norwegian shelf. On the offshore supply and service company side, a more positive perception spread that the industry had created a Norwegian rootedness that would not deteriorate immediately in the face of greater competition.

The actual dismantling of the formal protectionist barriers around the Norwegian supply industry was strongly connected to Norway's approach to the development of the EU's internal market. In 1989, Norway and the other European members of EFTA agreed to undertake a common negotiation process with the EU. The goal was to become a part of the EU's internal market, but without the precondition of direct EU membership. Parallel to the negotiations, there was a far-reaching process of adapting Norwegian regulations to the demands that were expected to come once the internal market finally came into force. Central

[36] Endring I lov av 13. juli 1975 nr. 35 om skattlegging av undersjøiske petroleumsforekomster M. v. [Changes in law of 13 July 1975 nr. 35 on taxation of petroleum resources] Ot. prp. [Bill] no. 3 (1986–1987), 79.

[37] Enkelte spørsmål I petroleumsbeskatningen [Some questions about taxation of petroleum], white paper no. 41 (1986–1987).

elements of the petroleum law, which had been adopted in a new form in 1985, were changed.[38] While Norway had previously been able to demand that foreign companies set up Norwegian daughter companies, it was now sufficient for a company to be registered in the European Economic Area (EEA). Workers with citizenship in any country in the EU and EEA would now be employable on Norwegian platforms under the same conditions as Norwegian workers. A paragraph requiring companies to account for the cooperation they intended to implement with Norwegian contractors was abolished. Furthermore, the Norwegian state's right to demand that oil and gas be brought to land in Norway was weakened. In effect from January 1994, when the EEA agreement came into force, the controversial text that had originated from §54 of the royal decree from 1972 was abolished. A special regime associated with the so-called technological agreements, where foreign companies had to place a certain amount of their research related to field development projects in Norway, was now overturned.

No More Help from Statoil?

Seen from the Norwegian supply industry, however, a gradual shift in Statoil's willingness to actively support Norwegian companies was more important than the dismantling of formal protectionism. By becoming the dominant operator, Statoil was in a position to more or less dictate the structure of the supply industry by its contract policy.

During the 1980s the two former shipbuilding groups Aker and Kværner remained the dominant suppliers of large production installations on the Norwegian continental shelf. Despite the existence of the original Statoil-promoted engineering firm, NPC, both Aker and Kværner gradually increased their capacity for more advanced engineering. Soon both companies were able to take on engineering, procurement, and construction (EPC) contracts. In the end NPC became a part of Aker. On the drilling side, the Norwegian shipowners gradually developed their capacity, from merely owning semisubmersible rigs to fully mastering all the drilling equipment.[39] At the same time, Norwegian firms were drawn into the construction process of this more advanced equipment. A consolidation process took place where companies like Smedvig, Aker Drilling, and Odfjell took over a large part of the market, often due to large contracts on fields where Statoil used its

[38] Endringer i energilovgivningen som følge av EØS-avtalen [Changes in energy related laws as a consequence of the EEA agreement], Bill no. 82 (1991–1992).

[39] Hanisch and Nerheim, *Fra vantro til overmot*, 235.

ownership control to promote Norwegian alternatives. The same was true for the growing field of subsea services.

Statoil's more market-oriented relations towards its suppliers can be seen in the company's relationship to diving.[40] After several initiatives in the 1970s, the only Norwegian diving company of any size was Stolt Nielsen Seaway.[41] Seaway's development had much in common with that of the drilling companies in the sense that the initial initiative and capital came from a shipowner, in this case Jacob Stolt Nielsen from Haugesund. When the company got a large, challenging deep-diving contract on Statfjord, and later on the related large gas pipeline-laying project from the field, Norwegian protectionism and a supportive Statoil certainly played a role.[42]

Seaway's main problem was that Norwegian regulations made it expensive compared with foreign competitors. In 1990 the company's relationship with Statoil ended in a row that wound up as a scandal for both. After Seaway had an important contract at Statfjord renewed, a foreign journalist at a business magazine discovered that a large group of Statoil employees in central positions had become partial owners of the vessel that was to be used.[43] When the story become known in the Norwegian press, the main narrative was that Norvik, who had been leader of Statoil for only two years, was now cleaning up after the special political relationship that existed between Statoil and Norwegian contractors prior to 1988, during Arve Johnsen's time as CEO. Seaway kept the contract, but when it expired in 1993, Statoil and Norsk Hydro decided for safety reasons to replace all diving with the use of remote operated vessels (ROVs). Most Norwegian divers became redundant. The diving company Seaway survived, although as a technologically advanced subsea service firm in a much more internationalized structure.

[40] Kristin Øye Gjerde and Helge Ryggvik, *On the Edge, under Water: Offshore Diving in Norway*. Translated by Rolf E. Gooderham. Stavanger, 2014. Originally published as *Nordsjødykkerne* (Stavanger, 2009).

[41] Ibid.

[42] Ibid., 182. The advanced industrial saturation diving then being performed on the Norwegian continental shelf relied on strong efforts to promote Norwegian research in diving and subsea activities; the Norwegian Underwater Technology Centre (NUTEC) and the several state-sponsored research programs were important. When Norwegian companies tried to compete with French, American, and to some degree British diving firms in the 1970s, these companies' exclusive access to military-sponsored research was a substantial advantage. During the 1980s, the U.S. marine diving tables had become common knowledge in the entire industry. The problem for divers was that when diving companies made their own versions of these tables they tended to shorten the decompression time, thereby increasing the possibility of "the bends," or diving sickness.

[43] "Noble Intentions Evolve into Bid Scandal!" *European Offshore Petroleum Newsletter* 15, no. 2 (1990).

Globalization

The Norwegian oil industry in the early 1990s was very much a part of the globalization process given so much attention in business literature and other business-oriented media at that time.[44] Insofar as companies were themselves increasingly becoming a commodity through mergers and acquisitions, Norwegian offshore supply and service firms became both candidates for international purchases and platforms for international growth.

When Norwegian-owned firms like Aker, Kværner, Seaway, Smedvig, and the seismic firm PGS expanded internationally in the 1990s, their main strategy was buying up local firms with some record of winning contracts in relevant markets. In hindsight, it is clear that the influx of foreign firms into Norway was strongest in the most technologically advanced subsector of the industry. From the late 1980s and into the 1990s these were clearly different technologies, related to the fact that activities in the Norwegian oil sector increasingly relied on advanced subsea installations. These installations in turn had to be operated and maintained from similarly advanced service firms.

One of the foreign companies that established a position in the Norwegian offshore sector by buying local firms was the Swedish-Swiss ABB.[45] From its traditional background in electronics and cables, ABB was soon transformed into an oil contractor specializing in subsea offshore installations. There were some fears that ABB would concentrate its core activities elsewhere and use its position in Norway mainly to get contracts. However, at least in the first years, the company relied heavily on Norwegian expertise. The Norwegian part of the firm became for a period responsible for ABB's growth in the offshore market globally.

A similar case was the development of a large advanced offshore cluster in and around a former weapons factory in the mining town of Kongsberg, an inland town far away from traditional maritime industrial clusters. The state-owned weapons company at Kongsberg had for years relied on advanced research and therefore was able to recruit some of Norway's best-educated engineers. When Kongsberg Våpen got its first offshore-related contract in 1974, it certainly helped that Jens C. Hauge played a central role on the boards of both Kongsberg Våpen and Statoil. Kongsberg Våpen was to produce wellheads on license from the American firm Cooper Cameron. Later Kongsberg went over

[44] Robert Reich, *The Work of Nations: Preparing Ourselves for Twenty-First Century Capitalism* (New York, 1991); Kenichi Ohmae, *The Borderless World* (New York, 1990).

[45] Sverre A. Christensen and Harald Rinde, *Nasjonale Utlendinger: ABB i Norge, 1880–2010* [National foreigners: ABB in Norway, 1880–2010] (Oslo, 2010).

to producing based on a license agreement with the American firm Food, Machinery, Chemicals (FMC). When Kongsberg Våpen was hit by a serious crisis in 1987, all civilian production was hived off. The offshore part, which was named Kongsberg Offshore, was taken over by the German multinational electronics giant Siemens. Under Siemens's ownership the technological capabilities of the Norwegian engineers at Kongsberg increased further. When the German company nonetheless decided to sell Kongsberg Offshore in 1993, the earlier American license-holder FMC came in as owner.[46] In 1994, the now American-owned Kongsberg Offshore got a major EPC contract with its old ally Statoil. The company was to develop standardized, modular underwater systems that could be used on as many fields as possible. With such a wide-ranging and relatively long-term contract, Kongsberg was able to exploit economies of scale. In 1995 Mobil also joined the same contract. Later, Shell and Elf did the same. The relationship with these overseas companies became a springboard for international growth. Kongsberg now held the main responsibility for product development and supply of underwater installations within FMC.

There were also firms that lost their "Norwegianness" in the globalization process. Towards the end of the 1980s, the Aker-controlled drilling company Aker Drilling had achieved a market share of about 60 percent of all production drilling in the Norwegian sector. In 1990, Aker Drilling was split from its mother company. Immediately afterwards, Aker Drilling bought up a somewhat smaller rig company in the British sector; this company's name (Transocean) was suitable for international expansion. Through buyouts, mergers, and reorganizations, the company built itself up through the 1990s to become a significant drilling firm in all international offshore markets. In 1996, the company was bought by a group of American owners. This was a hostile buyout, but the figure offered was so large that the temptation proved too much for its Norwegian owners. Later, Transocean was registered as a Swiss company. A company made up partly of units that were initially nurtured as part of Norwegian protectionism had thus ended up as a global, nationless entity.

The new global orientation of the Norwegian oil industry first became widely known to the public when Statoil's CEO, Harald Norvik, announced in August 1990 that Statoil was to join BP in a comprehensive strategic alliance.[47] The aim was to establish the alliance as a key player alongside the genuinely large oil companies, with ownership shares, production, and operatorship on every continent. After a time,

[46] Kongsberg Offshore a.s., *Årsberetning* [Annual report] (1993), 4.

[47] Lin Lerpold, *Reputation by Association: Exploring Alliance Formation and Organizational Identity Adaptation* (Stockholm, 2003).

the activities were concentrated in Vietnam, Azerbaijan, Nigeria, and Angola. The underlying rationale for the alliance was as follows: BP had a large organization and a lot of international experience, but little capital. The company also had to struggle with a bad reputation in the countries in question from its time as a tool of the British Empire. Statoil for its part had a deep purse coming from its advantageous position in the Norwegian sector. As a Norwegian state company, moreover, it had a better reputation in many relevant contexts. The alliance entailed BP training Statoil to be an international oil company.

Parallel to Statoil's international ambitions, the two other Norwegian oil companies underwent a similar transformation and now had an approach much more serious than their more "opportunistic" participation in international prospects in the 1970s. Hydro tried hard to become a player in the newly opened Russian oil scene. It also had substantial activities in countries like Angola and Venezuela. Saga's largest foreign projects were in Iran and Libya, both countries that at the time were untouchable for political reasons for companies that wanted a presence in the U.S oil sector.

A New Kind of Protectionism?

However, despite a strong international focus in the 1990s, both for Norwegian oil service firms and even more for the three Norwegian oil companies, in terms of revenue and investment it was still the market on the Norwegian continental shelf that was most important. Moving gradually into deeper waters in both the North Sea and Norwegian Sea, and to the north in the Barents Sea, with a strict regulation system, the incentive for technological innovation was strong. At the same time low oil prices contributed to a systematizing of contract policy by the oil companies in an effort to improve technological innovation and reduce cost.

The dismantling of formal protectionist barriers and internationalization, however, was not the same thing as the Norwegian state ceasing to support its own industry. Rather, this support was to take very different forms than it had done previously. In Norway, as in many other countries, neoliberal ideas were increasingly influential at the time. Nevertheless, in the Norwegian offshore oil sector, as well as in the British, in the first years of the 1990s it was neither Keynesianism nor neoclassical economics but institutional economics that more than anything else influenced the development of the sector's structure.[48] The

[48] For example, there was the French regulation school (Alain Lipietz, Robert Boyer), transaction cost theory (Oliver Williamson), and various approaches that focused on the preconditions for innovation (Chris Freeman, Benkt Åke Lundvall, Giovanni Dosi, et al.).

American institutional economist Michael Porter attracted particular attention.[49] One of the offshore contractor interest organizations carried out its own "Porter project" in the early 1990s. This was followed by a group of Norwegian economists who tried to use Porter to analyze Norwegian industry.[50] In Porter's so-called diamond model, where he explains a country's or region's success by the interplay between factor conditions (wages, skill, infrastructure), demand conditions, supporting industries, and the competitive situation, it can be hard to separate the important from the trivial and cause from effect. If the theory nevertheless had major appeal in the oil industry in the early 1990s, it was because it described conditions that many leaders recognized.

A common theme for Michael Porter and other contemporary influential authors was precisely that the most effective form of industrial policy was the development of local skill.[51] At the same time the literature enabled specifically Norwegian conditions that had previously been seen as burdensome to be considered advantageous in global markets. Strong trade unions led to high wages for all groups working offshore, from catering staff to process operators.[52] But because of the general egalitarian features of Norwegian society, the wage levels for engineers and top positions were moderate by comparison with other countries. This, in combination with strong environmental and health and safety regulations, created incentives for the development of robust, advanced technological solutions. From the Porter studies onward, the concept of industrial "clusters" became common both within the industry and in various political reports on the conditions for growth of the Norwegian oil industry.

However, a strong focus on technology and international competition did not remove tensions between oil companies and their contractors. With gradually growing development costs and continuing low oil prices, many projects risked becoming unprofitable. Furthermore, internationalization left Norwegian companies more exposed to the competitive conditions in other offshore regions, not least Great Britain. As with the protectionist turn in the 1970s, the main strategic initiative to strengthen the Norwegian oil industries' competitive abilities in the 1990s reflected developments in the British offshore oil sector.

At the end of the 1980s, struggling with low profitability and falling production, the recently privatized BP saw that to achieve substantial cost reduction, far-reaching changes were needed in the way the whole

[49] Michael Porter, *The Competitive Advantage of Nations* (New York, 1990).
[50] Reve, Lensberg, and Grønhaug, *Et konkurransedyktig Norge*.
[51] Reich, *The Work of Nations*, 3.
[52] Ryggvik and Smith-Solbakken, *Blod, svette og olje*, 289.

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British oil industry operated.[53] In the Cost Reduction Initiative for the New Era (CRINE) project, which started in 1992, a key point was to identify forms of contracts that made the interplay between operator and contractor as effective as possible. An important concern was to eliminate the replications that took place when engineers in an operator company had to ensure the quality of work carried out by a contractor. At the same time, all parties had a reciprocal interest in developing common standards so that various technological components could be assembled and exchanged more easily.

Already, technical standards set by the American Petroleum Institute (API) were a direct challenge for the Norwegian oil milieu. Both API standards and possible new British standards would give an advantage to the companies brought up with them. Hence, in September 1993 the Minister for Oil and Energy announced that Norway was to initiate comprehensive collaboration between firms and authorities to reduce costs by developing its own standards (NORSOK).[54] NORSOK published a series of reports in the years that followed identifying substantial cost reductions that were to be achieved by standardization and a more systematic use of long EPC contracts.[55]

We have seen how Statoil developed a clear understanding of the necessity to ensure competition among major contractors early on. However, if contracts were split up among too many units and competition was too intense, contractors could not use the economies of scale made possible by long-term planning, copying previously used effective solutions, exploiting R&D from previous investments, and so on. The other alternative, the use of major long-term contracts, gave contractors a strong negotiating position since their special technological solutions could to some degree make them hard to replace. The solution that was reached was, on the face of it, closest to the latter alternative. The scope of contracts became both larger and longer in time. Hence, a far greater proportion of technological development shifted onto some relatively large contractor companies. But at the same time, forcing these selected companies to use common standards would make it easier to replace one supplier with another. The idea was to maintain significant levels of competition, even if there were only a few contractors in each main area.

[53] Charles Woolfson, John Foster, and Matthias Beck, *Paying for the Piper: Capital and Labour in Britain's Offshore Oil Industry* (London, 1997), 526.

[54] The section on NORSOK is partly based on my doctoral dissertation, "Norsk oljevirksomhet mellom det nasjonale og det internasjonale." See also Ole Andreas Engen, *Rhetoric and Realities: The NORSOK Programme and Technical and Organisational Change in the Norwegian Petroleum Complex* (Bergen, 2002).

[55] "Samarbeid operatører og leverandører" [Cooperation between operators and suppliers], NORSOK report 3 (1995).

Neither the U.S., the British, nor the Norwegian system discriminated with respect to the nationality of the owners of a company receiving a contract. However, there was a clear advantage for locally anchored engineers working on the project. Standardization would thus give an advantage to local subcontractors. Since technical standards had to comply with each country's public regulations, not least health and safety regulations, they would never be completely identical. An important difference between Norway and the other two nations was that representatives of the oil workers' union were part of the committees developing new standards. This new kind of industrial policy with the establishment of standards and organization around clusters could be described, if not as protectionism, then at least as a new form of protection of local industries in an open global economy.

The 1990s represented the final technological breakthrough for the Norwegian oil industry. As part of a "moderate pace" policy, the Norwegian parliament in February 1988 had decided to put a cap of 25 billion Norwegian kroner on all oil-related investment. However, later that year the Norwegian property market collapsed, resulting in a serious banking crisis where several major banks were taken over by the state. The "moderate pace" policy was soon left behind without much debate. Petroleum-related investment grew from 32 billion kroner in 1990 to 79 billion in 1998. This, of course, created a large space for expansion for Norwegian offshore contractors, even in a context of increased international competition. The largest constructions firms, like Aker and Kværner, continued to grow. With an ever larger proportion of engineers, they were able to move into more specialized sectors of the industry. The main new challenge was subsea operations.

Again, as with operations above the surface, underwater installations needed a supply industry that specialized in installations, maintenance, and other supply functions. Companies with such names as Seaway, StoltComex/Acergy, and Subsea 7 had a background as diving firms. Now they appeared as underwater entrepreneurs with large fleets of specialized vessels and advanced ROVs.

Minor Crises and New Growth

The 2000s started with a minor crisis for the Norwegian oil industry. Like the rest of the international oil industry, Norwegian firms were struggling with low prices. Between 1998 and 2002, the industry's revenue fell and then stagnated. Several Norwegian firms broke their backs following overambitious international projects. This was the case for both the second largest supply firm, Kværner, and the oil company Saga. Kværner had paid too much for the British conglomerate Trafalgar

House (shipping, engineering, oil service, and more). Saga made the same mistake when it acquired the formerly American and then Kuwaiti-owned oil company Santa Fe. After some government involvement Kværner ended up as part of Aker, while Saga was divided between Statoil and Norsk Hydro.[56] But even Statoil and Hydro had problems.

Under Harald Norvik's leadership in the 1990s, Statoil was depoliticized. Statoil was considered to be economically efficient in what was originally the company's main task: operating offshore installations in the North Sea. Internationally the situation was more difficult. Soon after the BP-Amoco merger in 1998, the BP-Statoil alliance was dissolved. With the ExxonMobil, ChevronTexaco, ConocoPhillips, and other mergers the following year, the distance between Statoil and the league of the world's largest companies had become even greater. It was this lack of a breakthrough as a major international oil company in the late 1990s that triggered a process that led to new initiatives to privatize the company.[57]

Statoil was finally partially privatized in 2001. The state still held the majority of its shares (67 percent). However, when shares were first traded, the government introduced a clause stating that it would not use its majority ownership to interfere in the company's activities. This was significant. Compared to the partially privatized Brazilian company Petrobras, which continued to play a political role, it was now private shareholders who gave the main steering signals to Statoil.[58] The majority of Statoil's shares were traded on the New York Stock Exchange. In the first three years after privatization, Statoil's share price rose more than those of competing oil companies.[59] The Norwegian state demonstrated that in practice it was leaving Statoil to its own devices. At the same time, the company operated a generous dividends policy vis-à-vis its shareholders. The general increase in oil prices had a positive effect because Statoil's oil production was much larger than its activities downstream. Statoil started a process whereby its downstream positions were gradually sold off. In spite of Johnsen's industrial dream, Statoil had become a "crude long" company.

Nevertheless, in many ways Statoil's main asset was also its main strategic problem. A large proportion of the fields it owned came from

[56] Petter Nore, "Norsk Hydro's Takeover of Saga Petroleum in 1999: A Case Study," *Maktog demokratiutredningens rapportserie* 73 (Aug. 2003).

[57] Eierskap i Statoil og fremtidig forvaltning av SDØE [Statoil's ownership and the future administration of SDFI], Parliamentary proposal no. 36 (2000–2001).

[58] Aldo Musacchio and Sergio G. Lazzarini, *Reinventing State Capitalism: Leviathan in Business, Brazil and Beyond* (Cambridge, Mass., 2014), 183.

[59] "Statoil-aksjen" [Statoil shares], Statoil website, http://www.statoil.com/en/investorcentre/share/pages/sharemonitor.aspx.

the protectionist period when the company had been given substantial ownership in all promising blocks. Hence, while Statoil could show in subsequent years that its profits in relation to capital invested were in the same league as the major international oil companies and far above the average of other Norwegian industries, this was in large part a result of its former privileged position.

The international stock market's main yardstick for oil companies at this point was the reserve replacement ratio. Since production in the Norwegian sector reached its peak around 2001, and Statoil had such a central position here, the company would not be able to maintain a comparable level of profitability without establishing similar situations abroad. Given the increasing competition among international oil companies, this was going to be very difficult. In spite of heavy international investment from the 1990s, the company never managed to secure operative responsibility on a large international oil field. In fact, after the big mergers, Statoil ended up smaller, in relative terms, compared to the megamajors. In 2007 Statoil merged with Norsk Hydro's oil department. As with the privatization, the main rationale behind the merger was to create more firepower for international expansion. The initiative came from Statoil's and Hydro's leadership. However, as with the partial privatization of Statoil, this was a political decision in the sense that it was supported by the ministry and approved by the parliament.

Norwegian Peak Oil and New Actors

In 2001, at its peak, Norway produced 3.4 million barrels of oil per day or 181 million Sm^3 of oil for the year (Figure 1). In the same year only the U.S., Mexico, Russia, Iran, and Saudi Arabia produced more oil than Norway.[60] By 2012, production had fallen to 1.9 million barrels daily. Norway had by then been overtaken by Canada, Brazil, Venezuela, Kuwait, Iraq, Nigeria, and China. Other countries, including Angola, Algeria, and Kazakhstan, were catching up. Falling oil production was made up for by a considerable growth in gas production in the first half of the 2000s. Measured in oil equivalent, total production reached its peak in 2004, at 264 million Sm^3. After this, the combined total also began to decline. Moreover, in order to compensate for falling production and poor rates of finds, the authorities contributed to creating better conditions for both large experienced companies as well as several new players.

In 2003 a new system for allocating "mature" areas—with far less thoroughgoing bureaucratic and political treatment of the applications

[60] BP, *Statistical Review of World Energy, June 2011* (London, 2011), 8.

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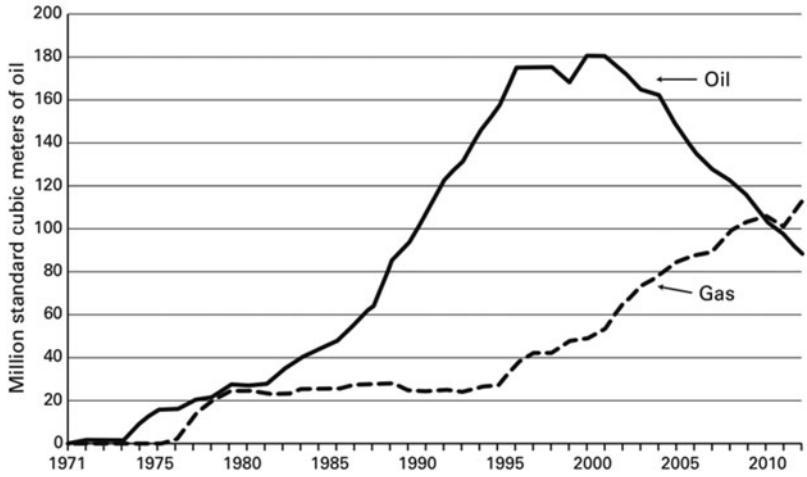

Figure 1. Production of oil and gas from the Norwegian continental shelf, 1971–2012. (Source: Norwegian Petroleum Directorate.)

than ordinary concession rounds—was established: Awards in Predefined Areas (AFA). The Petroleum Directorate now allowed established oil companies and a much larger group of new "prequalified" companies to own and sell shares in the Norwegian sector freely. At the same time, the directorate accepted that a somewhat smaller, but constantly growing, group of companies would be recognized or "qualified" as operators. Perhaps most importantly, in 2004 a reform in the tax regime made it possible for new companies to get the same tax deduction as they would if they already had an income from the Norwegian shelf. The generous deduction rate for exploration was 78 percent. This meant that for every 22 million kroner invested by the new companies, the Norwegian state paid 78 million. An increasing number of companies without substantial income were actually paid by the state. In 2010 alone, the state "refunded" tax in this way for forty companies, paying them a total of around 10 billion Norwegian kroner ($1.7 billion).[61]

The new companies were presented in entrepreneurial language: where large companies were conservative and bureaucratic, the small companies had new ideas, a willingness to use new technological and organizational solutions and other exploration models.[62] In reality they

[61] Oljeskattekontoret [Yearly press briefing from the Norwegian oil tax office], Dec. 2011.
[62] Ministry of Oil and Energy, *Økt utvinning på norsk kontinentalsokkel: En rapport fra utvinningsutvalget* [Increased extraction on the Norwegian continental shelf: A report from the committee on extraction] (Oslo, 2010), 33.

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Table 1
Oil Companies' Production Revenues and Taxable Income in Norway, 2011 (in NOK)*

Company	*Revenue*	*Tax Base*
Statoil Petroleum AS	154,494,843,027	115,442,166,201
Total E&P Norge AS	32,267,288,949	24,028,337,384
ExxonMobil Production Norway Inc.	22,281,749,620	17,379,764,704
ExxonMobil Exploration and Production Norway AS	21,671,913,441	16,257,618,631
ConocoPhillips Skandinavia AS	21,310,460,396	15,900,155,137
Marathon Oil Norge AS	16,605,814,230	12,722,954,434
Eni Norge AS	14,031,689,099	10,252,256,839
A/S Norske Shell	13,594,631,555	10,096,499,343
Solveig Gas Norway AS	2,909,650,726	2,145,350,606
Lundin Norway AS	2,878,356,166	2,063,509,749
DONG E&P Norge AS	2,888,370,084	1,966,790,347
Idemitsu Petroleum Norge AS	1,862,843,349	1,349,061,788
GDF SUEZ E&P Norge AS	4,575,083,928	1,281,023,500
Enterprise Oil Norge AS	1,395,604,854	1,075,758,705
RWE Dea Norge AS	1,397,231,804	755,812,816
Silex Gas Norway AS	675,692,297	602,496,218
Njord Gas Infrastructure AS	375,777,624	568,503,938
Talisman Energy Norge AS	745,687,593	348,003,248
Infragas Norge AS	308,171,863	291,680,749
BP Norge AS	979,608,762	274,290,453
Centrica Energi	367,734,803	264,310,288
Norsea Gas AS	328,809,715	249,798,984
Chevron Norge AS	296,323,722	220,599,824
Core Energy AS	244,415,124	173,789,690
Faroe Petroleum Norge AS	235,093,550	155,444,028
Norpipe Oil AS	91,517,397	59,649,317
Altinex Oil Norway AS	0	0
BG Norge AS	0	0
Centrica Resources (Norge) AS	0	0
Emergy Exploration AS	0	0
Stratum Energy AS	0	0
Talisman Petroleum Norge AS	0	0
Talisman Resources Norge AS	0	0
E&P Holding AS	0	−7,851,744
Hess Norge AS	0	−10,218,032
Petrolia Norway AS	0	−11,719,716
Explora Petroleum AS	0	−14,276,288
Bayerngas Norge AS	0	−18,397,542
4Sea Energy AS	0	−22,381,804
Norske AEDC A/S	0	−26,268,846
Bridge Energy Norge AS	0	−38,242,212

(continued)

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Table 1 (Continued)
Oil Companies' Production Revenues and Taxable Income in Norway, 2011 (in NOK)*

Company	*Revenue*	*Tax Base*
Agora Oil & Gas AS	0	–47,011,999
Lotos Exploration and Production Norge AS	0	–50,029,282
Dana Petroleum Norway AS	0	–77,308,364
Spring Energy Exploration AS	0	–78,657,430
Fortis Petroleum Norway AS	0	–83,272,973
Valiant Petroleum Norge AS	0	–106,225,017
Skagen44 AS	0	–111,444,249
Concedo ASA	0	–120,229,627
Edison International Norway Branch	0	–135,069,340
Skeie Energy AS	0	–153,961,921
Front Exploration AS	0	–172,431,248
Svenska Petroleum Exploration AS	0	–187,815,329
Repsol Exploration Norge AS	0	–225,595,898
PGNiG Norway AS	0	–226,394,221
Nexen Exploration Norge AS	0	–264,438,751
VNG Norge AS	0	–276,485,079
Premier Oil Norge AS	0	–321,712,351
E.ON E&P Norge AS	0	–364,723,493
Suncor Energy Norge AS	0	–366,596,573
Spring Energy Norway AS	0	–457,140,285
Norwegian Energy Company ASA	0	–515,585,382
North Energy ASA	0	–531,140,787
Rocksource ASA	0	–564,003,118
BG Norge Limited	0	–634,769,827
OMV (Norge) AS	0	–635,219,220
Maersk Oil Norway AS	0	–695,300,791
Wintershall Norge AS	0	–740,076,638
Det norske oljeselskap ASA	0	–1,443,140,355

Source: Oljeskattekontoret [Norwegian oil tax office], press release, 30 Nov. 2012.
* Does not include revenues from downstream activities.

could be divided into many subcategories. Some were in fact medium-sized companies with a history in the industry. Others were established European industrial companies that saw the generous tax regime as a possibility to diversify without too much risk. However, the majority of "oil midgets," Norwegian as well as foreign, typically had little or no industrial organization at all. The initiative, the capital, and sometimes the leaders often came from the financial world.

Table 1 identifies all oil companies operating on the Norwegian continental shelf in 2010. The figures show their revenue (first column) and

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how much tax they paid (second column). As can be seen, a large majority of the firms were paid money by the state instead of themselves paying tax.

When in 2007 Statoil merged with Hydro, Norway was left with one totally dominant operator. Just after the merger the new StatoilHydro operated nearly 80 percent of the production of oil and gas in Norway. In 2012 Statoil (now using its old name again) still operated around 70 percent of the Norwegian production. One obvious solution to Statoil's dominance would have been for the government to give more space for experienced foreign companies—as owners as well as operators. Another option was to accept Statoil selling off some of its positions. However, even though Norwegian authorities had abandoned the protectionist policies of the 1970s and 1980s, the possibility of Statoil giving up its historically strong position in favor of foreign companies created several difficult political dilemmas.

Hence a third alternative was to let some of the new, smaller Norwegian oil companies grow into fully developed oil companies through a combination of mergers and strategic operative responsibilities. Given EU regulations, Norway was no longer allowed to give Norwegian companies preference in the licensing round. Nevertheless, when one of the leading Norwegian investors, Kjell Inge Røkke, acquired a controlling part of the Trondheim-based company Det Norske in 2011, it was generally expected that this company was about to be developed as a second Norwegian-owned operative oil milieu, alongside Statoil. When the large Johan Sverdrup field was discovered by the Swedish company Lundin and Statoil in 2011 (1.6 billion barrels), Det Norske had a substantial ownership proportion, nearly trebling the company's share value. However, by 2014 Det Norske was still small when measured by operative capacity, even compared to the size of Saga in the 1990s.

A Fabulous Growth

While the rate of production on the Norwegian shelf reached its peak around the year 2000, in the period after 2002 the Norwegian oil supply and service sector experienced its most fabulous growth rate ever. In 2009, the Norwegian sector reached a level of investments of 136 billion kroner annually. This represented more than a quadrupling of the investment level in 1990. The growth rate in international markets was even larger for some firms. The data for contractors' own total turnover give a good sense of the growth that occurred. The numbers in Figure 2 go back to 1995, when investments and turnover were already considerably higher than in 1990. The figures show a growth in turnover

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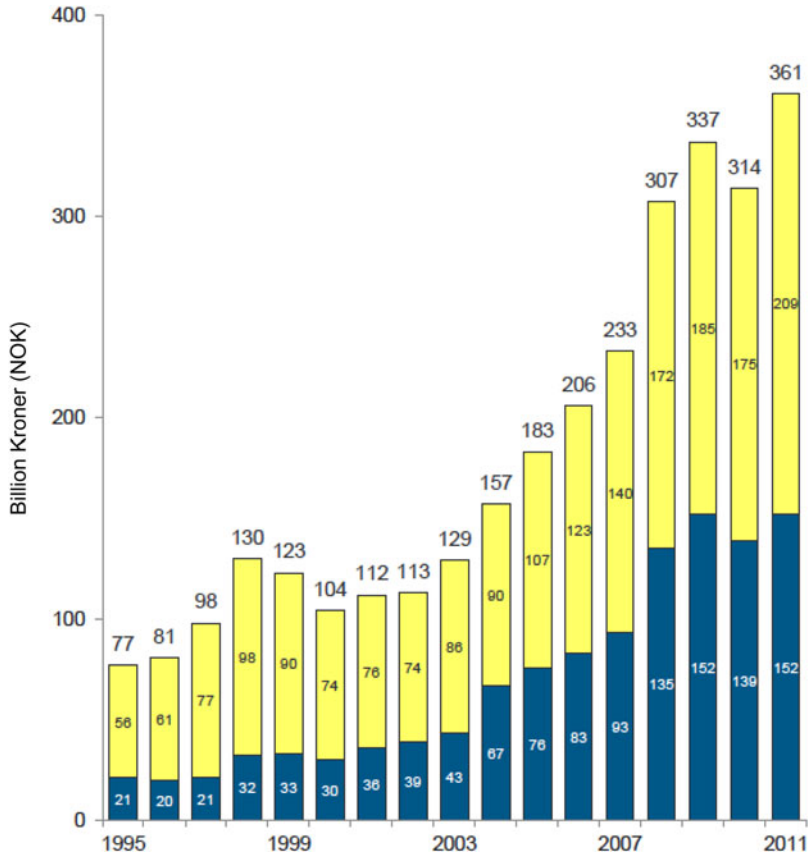

Figure 2. Total turnover of Norwegian contractors, Norway vs. global (in billion NOK). Lighter portion: Norway; darker portion: global. (Source: Rystad Energy.)

from 104 billion kroner in 2000 to 361 billion in 2011, almost a quadrupling of what had been a high level to start with.[63]

[63] Rystad Energy, *Internasjonal omsetning fra norske oljeserviceselskaper: Rapport til Olje- og Energidepartmenentet* [The international turnover from Norwegian oil service companies: A report to the Ministry of Petroleum and Energy] (Oslo, 21 Aug. 2012), 14, http://www.regjeringen.no/upload/OED/Rapporter/Rapport_Rystad-Energy_Internasjonal-omsetning-fra-norske-oljeserviceselskapert.pdf. The figures for the whole period are somewhat higher than the total oil investments. This is due both to the proportion of exports and because a part of turnover is made up of sales between different contractor companies. Hence the same economic activity may be counted several times.

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If investments in the Norwegian continental shelf could grow so strongly despite the fall in production, this was of course largely due to the increase in oil prices. It was also a result of the historical path of development in the Norwegian sector. Growing costs aimed at sustaining falling production can create growth for contractor industries. As one can see, the Norwegian oil service industry's growth in international offshore markets is even stronger than the growth directly related to activities in Norway. This made the largest firms, at least, less dependent on the development on the Norwegian sector. However, this international growth was more connected to the development of the Norwegian sector than it seemed on the surface.

Technologically, different Norwegian oil service companies had conquered all the links in the value chain for offshore petroleum activities during the 1990s. During the growth in the 2000s one could observe strong tendencies towards a higher degree of specialization within the global offshore market. While most platforms and drilling rigs were constructed in Norwegian yards up until the late 1990s, from around 2005 almost all large new installations were constructed in Asian yards, with South Korea as the dominant (but far from the only) contributor. Several new fields were to produce from Floating, Production, Storage, and Offloading (FPSO) vessels. However, when more advanced technology modules were installed at these platforms and vessels at the construction sites, Norwegian firms were often the suppliers. This was to a large degree related to the fact that installations—those bound for offshore activities in Norway and others—had to be built in compliance with the Norwegian NORSOK standards.[64] Norwegian firms now occupied the same position in the value chain that American firms had in the Norwegian offshore market in the 1970s. Korean-produced FPSOs, platforms, and semi-submersible drilling rigs would later operate in Angola, Brazil, and other important offshore oil sites, but a large number were towed to Norway. In other words activities that in the protectionist period had been done inside Norway could now be read as Norwegian export and import.

Conclusion

The conscious decision to develop a strong local oil industry in Norway was a success not only insofar as activities on the Norwegian continental shelf from the 1980s were dominated by companies with major productive capacity based in Norway. When sales of oil and gas are excluded, during the early 2000s the Norwegian offshore service and supply industry became Norway's largest export industry. Of a

[64] INTSOK, *Global Procurement Processes: Phase 1* (Oslo, 2014), 32.

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total of 935 billion kroner in Norwegian exports in 2012, sales of oil and gas accounted for 559 billon.[65] The oil and gas service industry exported a value of 160 billion.[66] If one adds exported refined petroleum products (75 billion), the oil sector constituted 86 percent of total exports.

However, it is difficult for other oil-producing countries to find a recipe for success in the many twists and turns of the Norwegian government's approach to the petroleum sector. With its shipping sector and other established industries sector, Norway had a good starting position. As this article has shown, in the early 1970s several Norwegian companies succeeded in some segments of the industry without any support from the state. Nevertheless, it seems clear that many complex protectionist policies, developed starting from the second half of the 1970s, were essential as the Norwegian offshore industry in subsequent years conquered the entire "value chain ladder" and did have a positive effect. It is not clear, however, which of the many efforts to strengthen Norwegian industry were the most effective. Several government initiatives may seem, at least in hindsight, to have been counterproductive. This applies in particular to the many initiatives in which the three Norwegian oil companies were forced to cooperate in downstream activities like the refining, retail, and petrochemical industries.

It is clear that the Norwegian oil companies could never have succeeded without the preferential position they were given in all concession rounds after Ekofisk was found. It was this preferential position that Statoil especially used as bargaining power when, until the late 1980s, it did its utmost to make sure that Norwegian companies acquired contracts in what were considered key strategic technologies. However, Statoil also made sure that no Norwegian supplier ended up in a position of having a monopoly over a certain technology.

Insofar as the interactions between different oil policies and the industry have been successful, this has often been a question of good timing —and often based on luck rather than conscious planning. Very often, external factors such as oil prices and business cycles have worked to Norway's advantage. It was essential for Norwegian industry that it played a major operative role in the period when the Norwegian shelf, because of its challenging environment, represented the cutting edge of the industry. Independently of conscious initiatives to promote Norwegian industry, Norway in the same period developed a strict safety

[65] Statistics Norway, External trade in goods, 2012, Final figures (Oslo, 24 June 2013), http://www.ssb.no/en/utenriksokonomi/statistikker/muh/aar-endelige/2013-06-24.

[66] Olje- og gass står for mer enn 86 prosent av norsk eksport [Oil and gas constitute more than 86 percent of Norwegian exports], Petro. no. 19. (Aug. 2013), http://www.petro.no/nyheter/bedrifter-og-okonomi/olje–og-gass-star-for-86-prosent-av-norges-eksport/c0efa691-49bb-4bf0-b80f-37f0dfab566a.

regulation system. This gave the Norwegian industry an advantage later, when other offshore regions followed with more strict safety demands.

The Norwegian oil industry was also lucky in that the removal of formal protectionist policies in the early 1990s corresponded with a general international growth in the offshore market, open to international competition. The experience with the opening up of a free flow of foreign capital into the Norwegian-based offshore supply industry does confirm a theme common in much economic literature of the time: the knowledge base among engineers and workers in the industry is an extremely important asset for the place where certain economic activities will be located. However, the Norwegian experience cannot be used as a case to prove that the origin of ownership does not matter. Nor can the Norwegian offshore sector be seen as a case where direct state participation is withering away. In some firms, foreign ownership seems to have strengthened the ability to reach foreign markets; in others, like the company Transocean, major assets disappeared from Norway. While the state reduced its role as an owner when Statoil was partly privatized in 2001, the Norwegian state bought 30 percent of shares in Norway's largest offshore supply company, Aker Solutions, in 2007. This move came as the dominant Norwegian owner, Kjell Inge Røkke, threatened to sell the key technology provider to foreign owners. During the 2000s the 50 percent state-owned Kongsberg Group grew to become a major provider of advanced navigation and remote control equipment, for FPSOs, floating rigs, and subsea installations alike.

And again, it was a blessing for both Norwegian oil companies and supply firms that the peak of Norway's production of oil and gas in the early 2000s corresponded with a major increase in oil prices. In 2012, Statoil was ranked as the world's eleventh largest oil company by revenue. With 66 percent of its production of oil and gas coming from the Norwegian continental shelf, it was still heavily reliant on activities at home.[67] However, the company was active in upcoming projects on all continents. The Pelegrino field offshore from Brazil was one of many projects where Statoil had an operative role. For Statoil as well as for the supply industry, a key question for the future is whether it will be possible to survive in international markets once the learning from challenges in the Norwegian sector becomes more limited.

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[67] Statoil, *Annual Report 2012* , 13, http://www.statoil.com/AnnualReport2012/en/.

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