IGF

INTERGOVERNMENTAL FORUM
on Mining, Minerals, Metals and
Sustainable Development

IGF Guidance For Governments:
Leveraging Local Content Decisions
for Sustainable Development

CASE STUDY

NORWAY: HORIZONTAL LINKAGES

LOCAL CONTEXT AS THE MAIN DRIVER FOR HORIZONTAL LINKAGES

OVERVIEW

LEVEL OF OPERATION:
National

GOVERNMENT ROLE:
Regulator, program facilitator

FOR MORE INFORMATION:
See Statoil; The Government Pension Fund Global (also known as the Oil Fund); Christian Michelsen Research; Sintef

KEY COMMODITIES:
Petroleum, natural gas, iron ore[1]

TOTAL NATURAL RESOURCE RENTS (AS % OF GDP) (2015):
5.4 per cent[2]

NATIONAL EXTRACTIVES COMPANY:
Statoil

UNDP HUMAN DEVELOPMENT INDEX VALUE (2016):
0.949 (Global Rank 1)[3]

This study uses the case of Norway's oil sector to look at the creation of horizontal linkages in the high-tech sector. The Norwegian story is not an obvious example for developing economies. When oil was discovered in the 1960s Norway was already relatively advanced, with high levels of education, democratic consolidation and secure institutions. However, the country was not a rich country by OECD standards, and it had a lower GDP per capita than neighbours Denmark and Sweden. The discovery of oil and the response of the Norwegian government to the discovery have meant that over the past few decades, GDP per capita has increased from 90 per cent of the OECD average to 150 per cent. Today, Norway's oil and gas industry accounts for 26 per cent of GDP and generates roughly 50 per cent of the country's exports.

[1] Central Intelligence Agency (CIA). (2017). *The world factbook*. Washington, DC: CIA. Retrieved from: https://www.cia.gov/library/publications/the-world-factbook/fields/2111.html

[2] World Bank Group. (2017). *Total natural resource rents (% of GDP)*. Washington, DC. Retrieved from https://data.worldbank.org/indicator/NY.GDP.TOTL.RT.ZS

[3] United Nations Development Programme. (2016). *Human Development Reports: Norway*. Geneva, Switzerland. Retrieved from http://hdr.undp.org/en/countries/profiles/NOR

Initially, Norway's transition to an oil-exporting economy implied high capital inflows and a large role for multinationals, since the country lacked the skills and technology necessary to develop its new oil industry. The main innovation from Norway was the founding of the Statoil Oil Company in 1972, with the primary purpose of taking a 50 per cent stake in all allocated production licences. Statoil played a crucial role as parts of Norwegian manufacturing were transformed into an engineering and supply industry with specialized knowledge in the production of deep-sea oil drilling equipment, platforms, pipelines and supply ships. It also played a major role in driving local R&D and skills capabilities.

The main innovation from Norway was the founding of the Statoil Oil Company in 1972.

Another key decision was the creation of a sovereign wealth fund. In the 1970s, the increased revenues were mainly used to pay down government debt, but as demographic concerns rose, a sovereign wealth fund was set up in 1990—the Government Pension Fund Global, also known as the Oil Fund. This was to ensure future generations' pensions and to limit excessive petroleum revenues flowing into the budget, which can be destabilizing due to volatility. The fund is today the world's biggest sovereign wealth fund, hitting a value of USD 1 trillion at the end of 2017 and holding investments in financial instruments in 77 countries and almost 9,000 companies.

DEVELOPING CAPABILITIES THROUGH THE SUPPLY BASE: LOCAL CONTENT POLICIES

Initially, Norway designed policies to stimulate local procurement and value addition. It attached requirements for training of Norwegian nationals and technology transfer to mining licences.[4] Firms were also required to submit a local content plan to the Ministry of Petroleum and Energy for approval before a licence could be granted, and to conclude agreements with the Ministry under which at least 50 per cent of petroleum research and development activities had to be performed in Norway.[5] Oil firms were also required to give preference to Norwegian suppliers but only if they were competitive on price, quality and delivery reliability. This is important since it meant that local firms had incentives to become globally competitive. Clear signals were also sent to multinationals that, if they did not increase their share of Norwegian contractors, they would be punished in future rounds of oil concessions.[6]

While these types of requirements fail in many countries, two factors arguably made them work in Norway: the part ownership of Statoil in the ventures and strong enforcement from government. Before tender selection, oil companies were required to submit the tender schedule and the list of bidders to the Ministry, which had the final authority to change the company selected for the supplier contract. It is also important to note that Norway already had an existing skills base and manufacturing capabilities.

Norway became a member state of the European Economic Area in 1994, which required it to update its petroleum law and repeal some of its non-compliant local content provisions. As a

[4] Ramdoo, I. (2016). *Local content policies in mineral-rich countries* (European Centre for Development Policy Management Discussion Paper No. 193). Retrieved from http://ecdpm.org/wp-content/uploads/ECDPM-Discussion-Paper-193-Local-Content-Policies-Mineral-Rich-Countries-2016.pdf

[5] Columbia Centre on Sustainable Investment (CCSI). (2016). *Linkages to the resource sector: The role of companies, government and international development cooperation*. Eschborn: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://ccsi.columbia.edu/files/2016/07/Linkages-to-the-resource-sector-GIZ-CCSI-2016.pdf.pdf

[6] Campbell, B. (2013). *The petro-path not taken: Comparing Norway with Canada and Alberta's management of petroleum wealth*. Ottawa, Canadian Centre for Policy Alternatives. Retrieved from https://www.policyalternatives.ca/publications/reports/petro-path-not-taken

result, there is currently no definition of "local content" in Norwegian law. However, by the time this occurred the upstream industry was globally competitive; R&D networks and skills capabilities were already well-established. Ensuring that the local content policies did not result in stagnant, uneconomic activities and that strong, dynamic capabilities were built were key to preparing these sectors to thrive when protection was removed. The Norwegian oil and gas supplier industry grew fivefold from 1995 to 2009. Today, more than half its earnings are derived from international markets.[7]

DEVELOPING CAPABILITIES THROUGH STATE-OWNED ENTITIES: STATOIL

Statoil was created in 1972 as part of the mechanism to secure the greatest possible share of North Sea oil rent for the Norwegian state. However, officials understood that the only way Statoil could stand up to the power of the multinational oil companies was by building an independent technological capacity. They knew that it would not be possible to secure a high share of the economic rent if it did not have a technologically skilled Statoil in reserve, which could take over if the multinationals were to leave.[8,9] Statoil became more than an operator: it was also involved in all stages of oil production, from upstream exploration, to refining, to petrochemicals and retail.

Statoil gained its capabilities through a partnership with Mobil, which began in 1974 following the discovery of Statfjord, one of the largest oil fields in the North Sea. Statoil—then only two years old—followed and learned Mobil's management practices until taking over its operations in 1986. It took a gradual approach to many of the development criteria, including the creation of skills. Initially, it recruited foreign nationals for top management positions, but this would later be substituted by Norwegians as greater capacities were built.

Statoil played a key role in developing the Norwegian industry. Its investments in technology accelerated the development of the Norwegian supplier sector. It prioritized technology and innovation over short-term profit maximization, which contributed significantly to the development of a high value-added domestic industry in oil services.[10] Statoil, for example, secured agreements to give engineering tasks to start-up Norwegian engineering firms in joint-ventures with American companies. The state-owned company was therefore a key vector of government policy to develop capabilities.

CAPABILITY-LED HORIZONTAL LINKAGES: SKILLS AND R&D SPILLOVERS

The discovery of oil and gas had a major impact on the industrial structure of Norway as well as its system of innovations.[11] Firstly, major industries declined as oil grew in importance, leading to an overall decline in the share of GDP from manufacturing resulting in important regional effects. This is a classic symptom of the "resource curse," (aka "Dutch disease") but it is important to note that it did not necessarily lead to economy-wide negative effects, in part due to the way the process was managed. Secondly, oil also affected the public sector budget as oil tax revenues increased sharply. This made it possible for the Norwegian public sector to expand R&D and higher education, to sustain high levels of regional economic development and to engage in major technology development programs. Finally, oil affected the "learning structure" of the economy: R&D in oil-related activities grew sharply, as did capabilities in the

[7] Ibid.

[8] This was the case in the wake of the OPEC oil price hike when companies threatened to disinvest. Ultimately, the Ministry didn't give in, as it had Statoil in place to take over should companies disinvest (which they eventually chose not to).

[9] Campbell (2013), Id. note 6.

[10] Campbell (2013), Id. note 6.

[11] Smith, K., Espen D., & Nås, S.O. (1996). *The Norwegian National Innovation System. A pilot study of knowledge creation, distribution and use* (STEP Working Paper 17/95). Retrieved from http://www.oecd.org/sti/inno/2373824.pdf

oil-related fields of science and technology, such as seismography, fluid flow dynamics, and fixed and floating offshore structures.[12]

The Norwegian government was able to leverage the concession of oil rights to achieve significant improvements in its skills and R&D base. It instituted technology agreements in the 1970s to encourage foreign oil companies to invest in R&D in Norway. The government required foreign companies to collaborate closely with local universities and required that at least 50 per cent of research conducted by oil companies on developing oil from the Norwegian continental shelf be done domestically. This led to the creation of research centres, such as Sintef, Christian Michelsens Research, and Rogaland Research, which specialized in applied geology, well drilling technology and enhanced oil recovery. This policy contributed to Norway today exporting its offshore service expertise to the rest of the world.[13]

Statoil's investments in technology accelerated the development of the Norwegian supplier sector.

Although research was initially limited to the laboratory, new capabilities were developed through production. Working closely with research institutes, universities, public procurement agencies, governmental organizations, and other companies allowed smaller firms to be part of strong research networks. The emerging R&D network was not directly related to exploitation of natural resources (e.g., capital equipment), but many of the early companies developed broader technologies which had some use in the oil industry (e.g., telecommunications and satellites) or produced inputs to resource-based industries (e.g., automation systems, detection and communication systems).

Wicken[14] argues that the primary factor in the emergence of Norway's high-tech industries was the buildup and transformation of the oil and gas sector for which high-tech firms served as an enabling sector. The oil and gas sector provided a profitable domestic market for companies (due to its size and regulations) that could assist in solving challenges posed by the natural environment. This is a clear and powerful example of the impact of capability-led horizontal linkages.

Various strands of literature on the economic history of other resource-endowed OECD countries (e.g., the United States or Canada) describe horizontal linkages processes broadly, similar to those of Norway, although they may differ on country specifics, theoretical underpinnings and the role attributed to policy. Many forms of institutions can foster collaboration between resource-based industries and knowledge organizations or enabling sectors, but they all centre around a "deeper determinant"—i.e., the role of an institutional structure for generating and disseminating knowledge. However, the scale and specificities of the reserves in Norway supported the business case for local capabilities. It made sense for the government and firms to invest in the skills and technologies in this market.

Today, Norway has a highly skilled and internationally competitive petroleum-related service and supply industry with strong links to the domestic economy. The development of Statoil and local content policies supported the establishment of local participation in the oil and gas industry. One of the keys to the successful exploitation of Norway's oil and gas resources was the ability of the government to control the pace of development.

[12] Ibid.

[13] CCSI (2016), Id. note 5

[14] Wicken, O. (2009). The layers of national innovation systems: The historical evolution of a national innovation system in Norway. J. Fagerberg, D. C. Mowery, and B. Verspagen (Eds.). *Innovation, path dependency and policy. The Norwegian case*. Oxford: Oxford University Press. 33–60.

A 1974 Ministry of Finance white paper concluded that control over the pace of oil development was essential to ensure that impacts didn't outstrip Norway's adjustment capacity.[15] Initially, the focus was to gain expertise in the oil sector, particularly technological capacity. While this was primarily achieved through Statoil, education institutions also adapted their focus. Once this was achieved, Statoil would become instrumental in creating linkages with the rest of the economy.

From the outset the Norwegian government emphasized the importance of R&D and building local skills. Technology agreements forced cooperation between multinationals and local universities and led to the creation of new research institutes. Ultimately, capabilities obtained through the oil and gas sector supported the emergence of a high-tech sector in Norway.

KEY LESSONS

- The availability and level of skills in the economy determine the absorptive capacity. Without an adequate skills base, horizontal linkages are likely to be limited. Skills and knowledge gaps need to be addressed first or in conjunction with horizontal linkages policies.
- Developing capabilities and linkages requires a long-term approach. Governments should devise policies that are realistic given their context. These policies should evolve given feedback from monitoring and evaluation and from the private sector—and can increase in ambition over time.
- Horizontal linkages can be supported through investments in the National System of Innovation. This intervention seeks to advance skills and knowledge, with a view toward application to related and unrelated sectors. This can include building ties between the mining sector and higher education institutions, which focus on mining-related science and technology, offering R&D and innovation incentives, or directly contributing to R&D programs. Results, however, are not likely to be felt in the short term.
- Local context and the market are main drivers for horizontal linkages. The types and specific conditions of mining required influence the technologies used and the potential for spillovers. The stage of development of the mining sector thus determines the potential for horizontal linkages.

[15] St. Meld. nr. 25 1973-74, Report to the Storting "Petroliumsvirksomhetes plass i det norske samfunn" ("Petroleum activities in Norway's society"). Ministry of Finance: Oslo, Norway. quoted in Campbell (2013), Id. note 6.

IGF

FOR MORE INFORMATION CONTACT

Secretariat@IGFMining.org
1100-220 Laurier Avenue W.
Ottawa, Ontario
K1P 5Z9 Canada

IGFMining.org
@IGFMining **@IGFMining**

Written by Somine Dolo, Martin Odendaal and Guire Togo

Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF). (2018). *Norway: Horizontal linkages—Local context as the main driver for horizontal linkages* (Case Study). IGF Guidance for Governments: Leveraging Local Content Decisions for Sustainable Development. Winnipeg: IISD.

Secretariat hosted by: IISD

Secretariat funded by: Canada