# Chapter 6

# Entering a Brave New World: Market Entry Assessments Into a Born Global Industry

**Arild Aspelund**
https://orcid.org/0000-0001-7964-0040
*Norwegian University of Science and Technology, Norway*

**Øyvind Bjørgum**
*Norwegian University of Science and Technology, Norway*

**Erik Andreas Saether**
https://orcid.org/0000-0001-7352-0080
*Norwegian University of Science and Technology, Norway*

## ABSTRACT

*This chapter investigates key motivations, drivers, and barriers for firms that are seeking to enter new international supply chains for renewable energy. Offshore wind (OW) is a born global industry with a fully internationalized supply chain from inception. The study adopts a mixed-methods approach by first doing 11 case studies of Norwegian industrial companies entering OW and secondly by conducting an online survey targeting the whole population of Norwegian firms in OW. The study finds that new green industries' distinctive features, managerial motivation, and industry relatedness shape a firm's entry strategies and behavior. Risk and uncertainty, complexity and turbulence, high transaction costs and disadvantages of scale postpone industry entry from established actors. The study finds that environmental motivation tops the list of motivations for managers to enter, but financial motivation is the strongest of perceived market performance. Finally, the study finds that market relatedness is more critical than technological relatedness.*

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## INTRODUCTION

Global energy value chains are in transition. To stay on the course outlined by the Paris Agreement and to limit the global temperature increase to 1.5°C, we need a rapid and extensive transition towards renewable energy (IPCC, 2019). In many parts of the world, renewable energy is currently outcompeting and outgrowing hydrocarbons as the main source of energy. New global value chains based on renewable energy are emerging, and entry into those multi-billion-dollar global supply chains represents significant opportunities for firms that seek new business and are willing to take on the associated risk.

From a scholarly point of view, these new renewable industries are interesting for several reasons. One is related to the fact that they are based on 'green' innovations that arguably outcompete old solutions on costs, and simultaneously contribute to a better society and to a healthier planet. To outcompete and replace old solutions with new and greener solutions is a game we need to master well in the future, if we are to reach the goals set by the Paris Agreement. Another reason to study emerging renewable energy industries is that they are fully internationalized from inception (Bjørgum, Moen, & Madsen, 2013; Løvdal & Aspelund, 2012). This means that any actor - new or old, domestic or foreign – need to fend of international competition for any contract or license in order to succeed in the industry. In addition to fierce international competition, actors also need to deal with typical liabilities of immature markets, such as high levels of risk and uncertainty and market inefficiencies due to high transaction costs.

This chapter investigates key motivations, drivers, and barriers for firms that are seeking to enter international supply chains for renewable energy. More specifically, it investigates how top managers perceive these business opportunities in terms of underlying motivation for industry entry, the role of technological and market relatedness, and relevant emerging market characteristics that shape strategic international market entry behavior into energy supply chains in transition.

The offshore wind (OW) industry is an appropriate case industry to investigate these factors. It is emerging as one of the most competitive energy sources in Europe – outcompeting energy production based on hydrocarbon fuels such as coal, oil and gas. It is an industry that is fully internationalized from inception – a Born Global industry – where all contracts and licenses are subject to international competition. It is also an emerging industry, which is now only reaching its growth phase and where it is possible to investigate how entering firms have dealt with the immature characteristics of the market.

Since one of the main aspects of the study is to look at international entry, it made sense to study Norwegian firms' entry into OW. There is no domestic market for OW in Norway, so all entries from Norwegian companies into OW are inherently international. Furthermore, the Norwegian OW industry is especially interesting to investigate since Norway's economy is largely based on the oil & gas industry, meaning that OW firms must compete with oil & gas companies for financing and support.

This chapter provides theoretical insight into emerging green and renewable global industries by focusing on the Norwegian OW industry. The chapter then goes on to present the methods of the study. Finally, results are presented and discussed in relation to theoretical and practical implications.

## THEORETICAL BACKGROUND

As mentioned previously, if we are to fulfill the goals of the Paris Agreement and keep global warming under 1.5 degrees Celsius, many of the current energy- and resource-demanding supply chains need to be replaced with more sustainable solutions (IPCC, 2019). One of the major culprits for $CO^2$ emissions is the energy sector that accounts for approximately one third of global greenhouse gas emissions (Davis, Caldeira, & Matthews, 2010). It is very unlikely that it is possible to meet the goals of the Paris Agreement without an energy transition to renewables. However, this is challenging.

In general, green innovations face at least two competitive liabilities. The first refers to the phenomenon that Klaus Rennings (2000) labeled as the double externality problem. Rennings observed that eco-innovations, by definition, deliver value in three dimensions. First, they deliver value to nature as they either reduce the use of resources that are taken from nature, or they reduce emissions or pollutions that result from the process of production and consumption. Second, eco-innovations deliver value to human society by taking better care of humans or the environment they are embedded in. Finally, eco-innovations deliver value to the firms that take them to market. The double externality problem states that firms can normally only capture value from the latter, and consequently, income might not be sufficient to offset the costs. Hence, even though an innovation may be able to provide great value for nature and society it might fail to materialize because the innovative firm lacks the financial incentives from the market to see the project through.

The double externality problem is plainly visible in the renewables sector. A transition to renewables would have great value for nature. Especially, because it could potentially reduce climate change and slow loss of biodiversity. Moreover, it would provide significant value to society as health concerns related to pollution could be significantly reduced. Still, the income firms can make from selling renewable energy solutions most often does not offset the costs. Hence, many valuable eco-innovations remain unrealized unless they are state-sponsored or assisted in the marketplace through other types of regulation.

In capital-intensive industries such as OW, the double externality problem is even more pronounced. This is because the only way to become cost-efficient in OW is to build large-scale pilot wind parks and invest heavily in R&D and new and efficient production facilities and infrastructure. Combined with the inherited risk and uncertainty of such a process, it is hard to attract capital from institutional investors.

The latter effect introduces the second competitive liability that faces new renewable energy industries, namely the typical characteristics of new industries. Ever since Thomas S. Kuhn (1962) introduced the theory of scientific revolutions there has been awareness among innovation scholars that industries in early stages have some particular characteristics that mature industries do not have. Some of these characteristics were identified early in the seminal work of Raymond Vernon (1966) on product life cycles. Much has changed since Vernon's work, but research that is more recent confirms the particularities of new industry characteristics, and place these into four categories (Aldrich & Fiol, 1994; Christensen & Raynor, 2013; Forbes & Kirsch, 2011; Klepper & Graddy, 1990; Möller & Svahn, 2009). New industries typically have:

- **High levels of uncertainty and risk**. Some of this risk can be mitigated or probabilities can be calculated based on experience from other similar industries, but often it is pure uncertainty. High levels of risk and uncertainty have certainly been present in OW. Some risk factors, such as operational performance, could be calculated from onshore wind, but other factors such as political support schemes and long-term costs have been truly uncertain.
- **Complexity and turbulence**. Innovation literature, and especially population ecology, has shown that in early phases of industry evolution there are great varieties in technical solutions, business models and contractual arrangements. As competition sets in and dominant designs of technical solutions, business models and contracts are selected, industry turbulence follows (Gustafsson, Jääskeläinen, Maula, & Uotila, 2015). This is also a trait that has been observed in OW (Dedecca,

Hakvoort, & Ortt, 2016). For example, from the industry start in early 2000, when the industry constituted primarily of independent start-ups, until today when OW is predominantly driven by large multinationals.

- **High transaction costs.** Evolutionary economics shows that transaction costs are typically very high in early phases of industry evolution, and that they consistently drop as the industry approaches maturity (Jacobides & Winter, 2005). Again, this is a recognizable trait of the OW industry. In early phases, specialized suppliers for key activities such as sea-bottom surveys, weather data, installation vessels, offshore foundations, etc. were lacking. Transaction costs of identifying actors that could fulfill these roles, selecting technical solutions, agreeing on contracts, and other control mechanisms were high in comparison to similar industries such as offshore oil & gas.
- Finally, new industries typically suffer from competitive liabilities due to **disadvantages of scale and immature/untested solutions.** Arguably, new renewables, such as OW, need to outcompete energy solutions that have been developed and refined over decades and where the accumulated R&D investments have reached extensive levels.

The four factors above represent liabilities of most new industries, which represent barriers to entry for any firm. In addition to these, OW can be categorized as a Born Global industry (Aspelund, Azari, Aglen, & Graff, 2017; Løvdal & Aspelund, 2012). New entrants to Born Global industries face an additional set of challenges because internationalization happens in earlier phases of industry evolution than suggested in the product life cycle models (Vernon, 1966, 1979). This means that firms must deal with the complexities of international trade, including handling cultural and political risk in a market setting which is unknown. This study seeks to investigate how firms overcome these liabilities.

Given the inherent liabilities of green and new industries, it is also of primary interest to understand the motivations for entering them. Motivation is what drives us to voluntary actions that are goal directed (Latham & Pinder, 2005). It helps to determine direction (what to do), effort (how hard to do it), and persistence (how long to do it) (Mitchell, 1982). As such, motivation is often studied because it can help to predict behavior and outcomes associated with behavior. A common element of motivation theories is that motivation can be separated into intrinsic and extrinsic types of motivation (Porter & Lawler, 1968; Ryan & Deci, 2000, 2017; Vroom, 1964). Intrinsic motivation means that motivation stems from interest, enjoyment and satisfaction inherent in the activities themselves, while extrinsic motivation requires that actions are taken to achieve some separable consequences that can result from the actions (Gagné & Deci, 2005).

This study, which deals with the motivation for firms to enter a green industry, is primarily interested in extrinsic types of motivations as these are most easily attributed to the organizational level. A relevant framework to investigate this is found in Bansal and Roth (2000), which provides a motivation framework for companies' environmental initiatives that includes three primary motives for companies who pursue green initiatives - environmental motivation, competitiveness (i.e., financial) motivation, and legitimacy motivation. These categories reflect the primary reasons that firms desire to be in environmentally-friendly business activities, including financial reasons like competitive advantage and long-term profitability (financial motivation), social and ecological reasons stemming from a care for the environment (environmental motivation), and obligation, image-related, and stakeholder reasons associated with regulations, norms, values, or beliefs (legitimacy motivation). Of these categories of motivation, environmental and financial motivation are proactive strategies while legitimacy is more of a reactive or imitative strategy since it involves companies' efforts to comply with norms and regulations. Furthermore, these three types of motivation are predicted to have various outcomes, such as higher profits (financial motivation), survival (legitimacy motivation), and employee morale (environmental motivation). This study seeks to investigate firms' primary motivations for entering OW, and their potential associations with perceived market performance.

To enter a new industry is not only a matter of motivation, but also a strategic assessment of how existing resources can be leveraged in a new market and what new resources and capabilities need to be developed in order to become competitive. These questions are frequently discussed in the strategic management literature that deals with diversification. According to Ansoff (1957) diversification is *"a simultaneous departure from the present product line and the present market structure"*. This means that firms enter an unfamiliar market or industry with a new or modified product or service, which represent a growth strategy with high risk.

Related diversification is when existing and new business units share certain key characteristics (Helfat & Eisenhardt, 2004), which gives potential for synergistic benefits as critical resources can be shared among business units (Barney, 1991). Several studies have shown that related diversification leads to better firm performance than doing business in only one industry or diversifying into unrelated industries (see e.g. Palich, Cardinal, & Miller, 2000), even if it means accepting higher levels of risk. However, the ability to turn diversification into profits is dependent of how related the new industry is. Hence, to what extent are the diversifying firms able to leverage existing market and technological resources and capabilities in the new industry?

Relatedness can be defined between firms or industries, but from a firm perspective, it is most useful to address relatedness between business units (Pehrsson, 2006). Resources, such as knowledge, skills and technologies, are commonly used as a basis for explaining how related a firm's business units are. If resources are somewhat related, then bundling processes, marketing effects, products and so on can create mutually reinforcing effects between different units of a firm (Barney, 1991). Hence, many firms make diversification decisions based on what resources they possess and the importance of these resources in the new market. Furthermore, Lieberman et. al. (2017), found that related diversification leads to lower transaction costs, which again lowers entry and exit barriers. Hence, an additional benefit is then that firms diversifying into related industries more easily can readjust or reallocate their resources if one of the businesses or industries are struggling.

Related diversification can arise at different points along a firm's value chain, potentially creating synergy effects, related to different resource bases such as marketing, sales, product and technology. This implies that relatedness is a multidimensional concept (Pehrsson, 2006) and a valid measure of relatedness should capture synergy potentials in both technological activities and market associated activities (Nocker, Bowen, Stadler, & Matzler, 2016).

In summary, previous research has found that there are at least two major market specific challenges related to new renewable industry entry. The first is the double externality problem, which is a general challenge in all new 'green' industries, and the second is related to market characteristics associated with Born Global industries. In addition, previous research has found that motivation and relatedness influence the strategic assessment of new market entry. This study analyses how these market specific challenges, motivation and relatedness influence market assessment and strategic behavior of firms that seek entry into a renewable Born Global industry.

## METHODS

### Norwegian Offshore Wind Industry

In order to study market entry into emerging industries the energy sector was chosen because it is under transition in order to fulfil future requirements for a sustainable energy mix. As part of this process, new industries based on renewables are emerging that can contribute to those goals. Within renewables, offshore wind (OW) is rising as one of the new key energy sources in Europe and elsewhere. The OW industry has taken this position over the time span of little more than a decade. According to WindEurope – an association for the industry – costs per installed capacity fell by almost 50 percent between 2015 and 2018, which has contributed to its competitiveness.

Certainly, the cost of power production varies with natural conditions, but the cost reductions that happened in this time period leaves OW as one of the most competitive in Europe when located near to where there is access to relatively shallow waters and wind. Consequently, the International Energy Agency (IEA) predicts that OW will be the dominant source of power production in Europe by 2042.

The OW industry has been created by resource and knowledge input from multiple countries and with fully internationalized supply chains from the start (Bjørgum et al., 2013). Hence, it is a Born Global industry (Løvdal & Aspelund, 2010, 2012). This study investigates the underlying rationale for market entry into OW from Norwegian firms or international firms that operate in OW from Norway. The focus on Norwegian companies is justified due to the lack of a home market for OW in Norway. The Norwegian government has so far not supported OW licenses as the country has ample access to cheap hydropower, suitable locations for onshore wind, and few locations with shallow waters fit for OW. Hence, all entries into OW from Norwegian firms are international, and Norwegian firms cannot use OW specific resources to gain contracts abroad. What Norway does have though, is an internationally competitive energy sector (hydropower and offshore petroleum) with a competence profile that fits OW. Hence, many firms, both new and established, seek entry into OW for growth in new markets where they can leverage current energy and maritime expertise.

### Case Studies

The study adopted a mixed methods approach. First, a total of 11 case studies were conducted on Norwegian industrial companies that had entered the industry. To select relevant case companies, we used the 4C Offshore Database (www.4coffshore.com) to identify all Norwegian companies that had activities in the OW industry at the time of the interviews. Furthermore, we wanted a mix of both new and established firms, and a mix in terms of size and time of entry into the OW industry. Table 1 below provides a short description of the case companies. Since some of the information may be sensitive in terms of competition, the firms have been anonymized. The case studies were performed in 2017 in two waves. The first wave predominantly focused on market entry issues and characteristics of emerging international industries. The second wave of case studies predominantly focused on issues related to diversification, relatedness and leverage of existing resources and capabilities. Both waves included questions related to motivation for entry. All cases were built from interviews with top management and archival data analysis from public online sources.

*Table 1. Description of case companies*

| Company | General description | Role in OW |
|---|---|---|
| A | Large offshore oil service company with considerable activity in the North Sea | Entered OW in 2010 and has been growing consistently. Currently holding orders for billions of NOK in OW |
| B | Large specialized OW company established in 2008 with primarily international sales. | Specializes on installation and maintenance |
| C | Small maritime service company with world-wide operations | Entered OW in 2016 predominantly to exploit over-capacity of equipment due to the downturn in the oil sector |
| D | Small specialized OW company established in 2004. Based on technology from the offshore oil sector. | Delivers substructure concepts. First OW contract in 2006. |
| E | Small specialized OW company established in 2007. Based on technology from the offshore oil sector. | Delivers substructure concepts. First OW contract in 2015. |
| F | Medium-sized ship design and ship builder company with international activities. | Delivers ship design and ships targeting OW installation and maintenance. Started to follow OW in 2009 but entered in 2014. |
| G | Large global energy company with primary activities in offshore petroleum | Entered OW in 2005 and has since become one of the globally leading project developers and owners. |
| H | Medium-sized Norwegian engineering company with a broad range of services globally. Heavily embedded in the offshore petroleum sector. | Entered OW in 2016, predominantly delivering IT and monitoring solutions. |
| I | Medium-sized analytics and forecast provider. Global operations. | Entered OW in 2007 and has been responsible for many OW analytics and forecast projects |
| J | Large engineering and manufacturing company with international operations. Long time exposure for both offshore petroleum and hydropower sectors. | Entered OW in 2007. Mainly designing and manufacturing substructures for OW. |
| K | Large foreign controlled multinational engineering and manufacturing company. Delivers infrastructure for all power sectors | Entered OW in 2001 and has since become one of the leading suppliers in OW. |

## Survey

Second, an online survey was conducted targeting the whole population of Norwegian firms that were active in OW. Companies were identified from previous studies of the industry (Hansen & Steen, 2015; Steen & Hansen, 2014), from the 4C Offshore Database (www.4coffshore.com) and from the member list of the Norwegian energy industry association (www.norwep.com). The output from these three data sources was merged and double entries removed. Furthermore, bankrupt or dissolved companies, state-owned enterprises, non-profit organizations, universities, municipalities, and research institutes were removed since the study only focused on active for-profit companies.

Additionally, since only companies with sales of tangible services and products and a specific focus on the offshore wind industry (at home and/or abroad) were of interest, then regional electricity companies/grid owners were also removed. Finally, in consultation with several industry experts, 11 firms were added because they had not been originally included on the company list. These were typically firms that had entered OW very recently. The selection procedure resulted in 163 companies in total.

The research group developed a questionnaire that was tested with a focus group of practitioners to make sure that the questions were comprehensible and answerable. The survey was written in Norwegian and included questions related to the firms' current engagement in OW, risk assessments and investment criteria for the OW industry, diversification and relatedness to activities in other industries, engagement with governmental support schemes, and perceived market performance.

Over a 3-month period, (February 1 to May 1 in 2018), the 163 identified Norwegian offshore wind companies were given the opportunity to respond to the online survey. The 10-page online questionnaire was sent to a representative contact (i.e., CEOs or managers who had enough knowledge to respond to the survey questions on behalf of their company) in each of the companies using the survey software program Select Survey. Individual respondents and their respective companies were guaranteed confidentiality, and they were also ensured that collected survey data would only be presented and/or published in aggregate form to prevent the possibility of individual identification. Over the 3-month time period, companies were followed-up by phone and email to increase the response rate. Ultimately, we received 97 usable survey responses out of a possible 163, resulting in a response rate of 60 percent. Based on visual inspection of sample characteristics and a comparison of respondents to non-respondents, there were no clear differences present. Moreover, with a high response rate and no obvious sources of selection bias, it is reasonable to assume that the sample is a good representation of the total population of Norwegian firms in the OW industry.

The sample comprises a diverse range of firms with differences in core businesses, firm size and age, and engagement in OW. The sample includes 13 companies that define OW as their core business. 22 companies defined the maritime sector as their core business, 32 oil & gas, and 12 consulting or engineering. In addition, there were 18 firms that fell outside the predefined categories. These firms typically identified themselves within manufacturing, onshore renewables, energy, or environment solutions. This means that most firms in the sample have most of their activities outside OW. More specifically, 86 of the 97 companies deliver products or services outside of the OW industry, and only 15 firms had more than 25 full-time equivalents specific to OW. When it comes to ownership, 56 of the companies were fully Norwegian owned, 25 were Norwegian controlled multinational companies (MNCs) and 16 were foreign controlled MNCs.

The sample also represents a broad range of different suppliers to OW. Figure 1 shows the variety of products and services that are offered from the Norwegian firms in the sample.

Most responding firms (51) were established before 2000, a total of 25 firms were established between 2000 to 2009, and the remaining 21 firms from 2010 and after. This means that the sample mostly consists of well-established firms. This is in contrast to a very early study of offshore renewables, which found that in 2005, firms in the industry almost exclusively consisted of new independent start-ups (Løvdal & Aspelund, 2012). Obviously, as the industry has matured, larger companies have moved in to take positions.

Figure 2 shows the revenues from the OW sector, while Figure 3 below shows the distribution of firm size. These figures illustrate that most of the firms in the sample are small and medium sized enterprises (SMEs) and only 20 firms are classified as large firms (more than 250 employees). Regarding revenues, the data shows that for many firms, income from OW is quite limited. In 2017, most firms in this sample had less than 5 percent of total revenues from OW and only 11 firms had more than NOK 100 million (equivalent to about 10 million EUR) from OW. This shows that for most firms, OW is currently only a side business with limited financial effect.

*Figure 1. Products or services to OW*

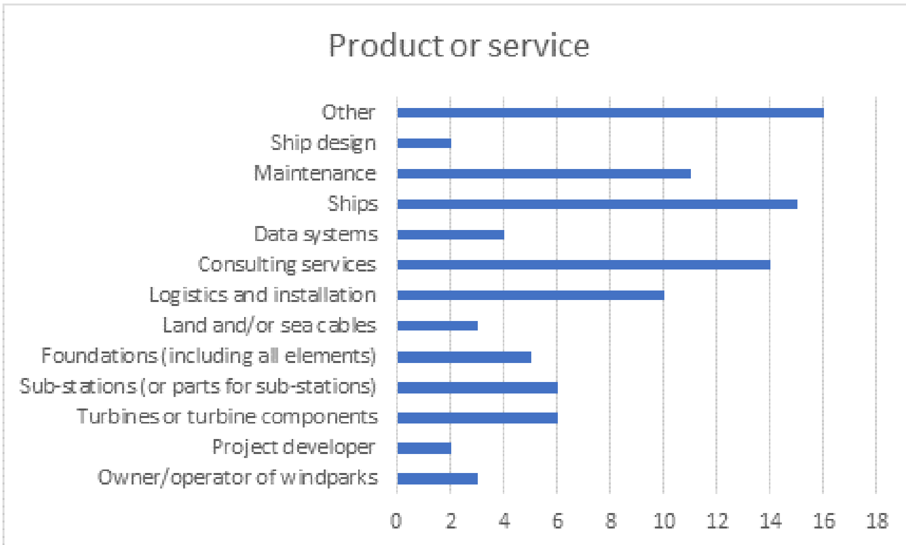
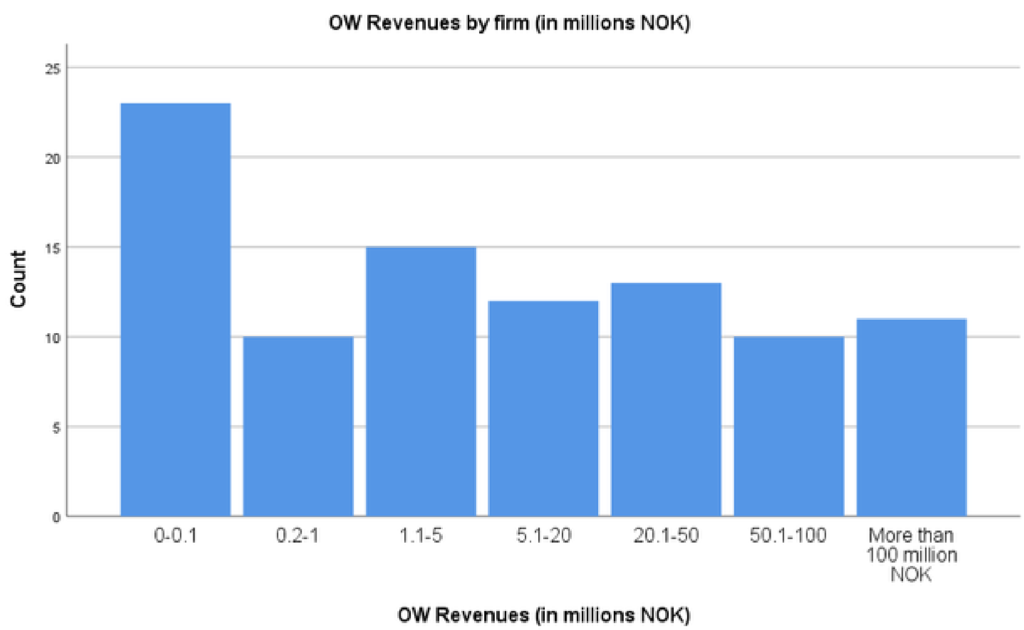
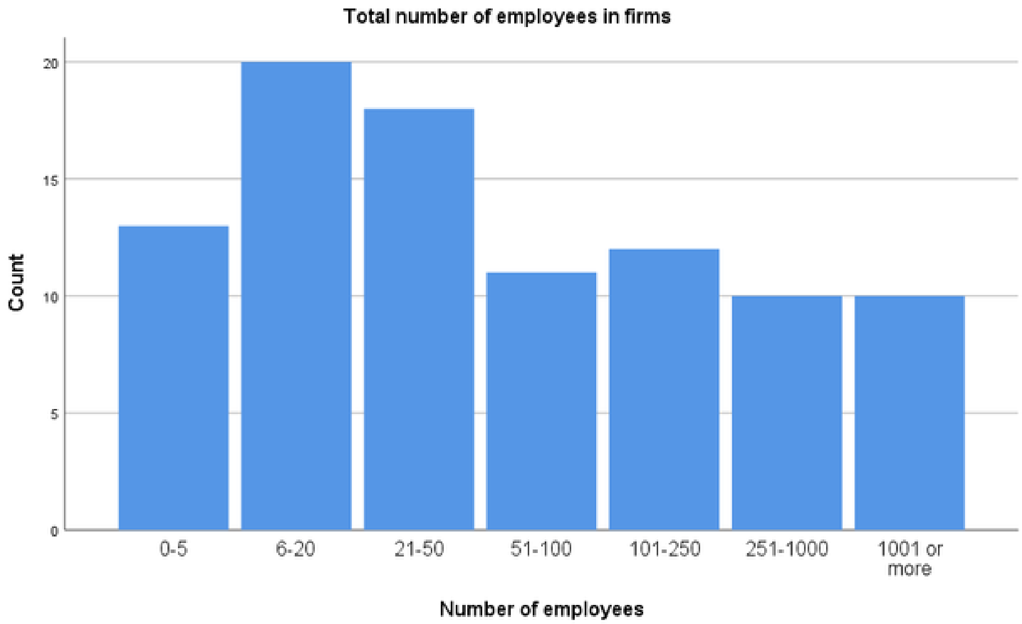



*Figure 2. Firms' revenue distribution from OW*




In terms of time of entry, only two firms had sales in OW before 2000, while 35 entered OW between 2000-2009, the remaining 45 firms between 2010-2017. In terms of number of employees, 22 firms had fewer than 10 employees, 32 firms had 10-50 employees, 29 companies with 51-500 employees, and the biggest 14 companies had more than 500 employees. Finally, revenues in OW-related business was responsible for less than 1 million NOK in 31 firms, and more than 100 million NOK in 11 firms, while the remaining firms fell somewhere in between.

*Figure 3. Firm size (number of employees)*




## Survey Measures and Analysis

Survey measures were developed from a combination of interview data, prior theory, and previously validated scales. The following measures were taken by the survey: *motivation* (environmental, financial, and legitimacy), *relatedness* (technological and market), *risk* (government, market, partner, ability, and cultural), and *perceived market performance*. In relation to previous literature, the three *motivation* measures were based on Bansal & Roth's (2000) motivations for firms going green, while the two *relatedness* measures were adapted from Pehrsson's (2006) work on business relatedness. Furthermore, the *risk* measures were adapted from work by Duncan (1972), Miller (1993), and Werner, Brouthers, and Brouthers (1996) on international uncertainty and risk. Finally, a 4-item *perceived market performance* measure was employed and based on market performance as conceptualized by Dess and Robinson Jr (1984). The measures used 5-point unipolar response scales, from 1 = "Do not agree" to 5 = "Completely agree" for the motivation, relatedness, and perceived performance measures, and from 1 = "No risk" to 5 = "Very high risk" for the risk measures.

Principal components analysis was conducted to determine component loadings for the items measuring motivation, relatedness, risk, and performance items. In addition, Cronbach's alphas were assessed to indicate the reliabilities of the measures. All measures with their respective reliabilities and loadings are reported in the Survey Measures table (Table A1) of the appendix.

To analyze some of the relationships between the survey measures, a simple Pearson's correlation analysis was conducted. Ultimately, the empirical findings below are based on triangulation analysis of the various data sources.

## RESULTS

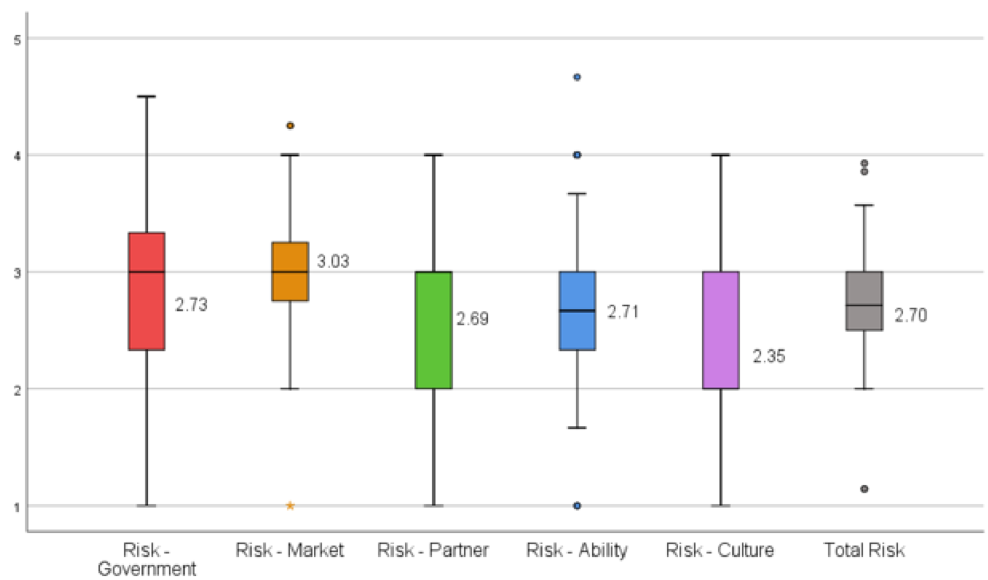
In analyzing the new market characteristics and their influence on strategic entry behavior, the study predominantly relies on the quantitative data and managers' market assessment. Interviews showed that managers perceived new market characteristics much in line with the literature presented above and that these assessments influence actual strategic firm entry behavior.

For example, managers reported high levels of **risk and uncertainty** related to the new market. These risk assessments were not only related to technological solutions, or the ability to win contracts, but also political risk as wind park developments require licenses, and often subsidies, from the state. As company A stated:

*With subsidies comes political incentives. Change of government and political processes affect the execution of projects and project horizons.*

The survey data provides an overall representation of managers' risk assessments of the OW industry (see Figure 4). As in the qualitative data, the survey finds political and market risk to be of highest concern.

*Figure 4. Risk assessment in of the OW industry*




High levels of perceived political risk also showed direct influence on events and strategic behavior. For example, Company E, stated that it negatively influenced their ability to find venture capital, and Company F argued that political risk had delayed their entry into OW with several years. The relatively high levels of risk and uncertainty triggered various risk reducing strategies. First, entering firms were reluctant to make acquisitions and used entry modes that required low levels of financial investments (typical export). The rationale was not to expose the firm to too much financial risk. Company K explained:

*We reduced risk by entering the OW industry incrementally, using existing organizational units and using existing resources.*

Second, firms sought collaboration with other industrial firms to share and reduce risk. Finally, most firms sought a cautious stepwise entry, or even delaying entry for years, until major risk concerns were settled.

Entering firms experienced high levels of **complexity and turbulence** in comparison to other industries they had operated in before. Complexity predominantly stemmed from two sources – either because of long sales cycles, or due to complicated contract negotiations. As Company A stated:

*The contracts in the OW industry can be completely different. There is no industry standard, compared to oil and gas.*

Turbulence predominantly occurred in the form of rapidly changing customer preferences for technical solutions and new actors with new concepts and business models. During interviews, many examples of this were mentioned, but the most frequent topics were the rapid adoption of bigger turbines and the rapid shift to a dominant design for monopiles. The first OW parks from 1991 were installed with 0.45 MW turbines (65-meter height). In 2013, the largest turbines were 3.6 MW (82-meter height), while the largest currently under testing in 2019 is the 12 MW Haliade-X turbines that reaches 260 meters above sea level. This rapid change in size of turbines have obvious consequences for the operational lifetime of installation and service vessels (Companies B, C and F). Vessels designed to install 82-meter 3.6 MW turbines cannot be used to install 260-meter 12 MW turbines.

Similar developments were observed for substructure concepts (Company D and E). In the early phases of OW there was real competition between various substructure solutions such as jackets, gravity-based solutions and monopiles. Ultimately, monopiles emerged as the dominant design and it currently dominates the market. These challenges also triggered strategic responses from entering firms, but different responses from established and new firms. Established firms developed flexibility by entering into various types of partnerships and by developing a portfolio of solutions dependent on customer requirements. Company I was the firm that was clearest on such portfolio thinking. As a supplier of analytics and forecasts, they participate in a range of tenders all the time, and each contract has its own specifications. Hence, they needed to be flexible:

*One out of five, or maybe one out of ten are successful.*

New firms could also seek collaboration, but typically not develop portfolios of solutions as firm specific resources were tied to the technologies that formed the basis for their startup. Nor could new firms delay entry to see whether dominant designs emerged, as they would simply run out of cash without the opportunity to test whether their own solutions are competitive. Rather, they opted to run strict risk management routines to avoid risk whenever possible. As Company D argued:

*For small firms, entry timing is not a decision. If you have an idea you start working with it and take it from there. (…) OW industry projects carry great risk, which implies that one must focus on risk assessment in every step.*

The early phases of OW development was hampered by **high transaction costs**. During the interviews, several sources for high transaction costs emerged, but the main sources were high search costs, monitoring costs, negotiation and contract costs, and high costs of financing. Search cost were predominantly related to identifying customers and partners in an industry where actors and their industry specific capabilities were unknown. Negotiation, contract and monitoring cost arose from lack of standardized contracts, and that contract standards from related industries such as offshore petroleum or energy could not be adopted directly. Finally, significant transaction cost arose due to high financial costs. In the early phases of industry evolution, institutional investors were reluctant to finance large-scale offshore wind farms due to limited historical financial data. The result was very high costs of capital for any actor that sought entry. As Company F reflected:

*You can probably get a shipyard for free. I mean, there is an extreme overcapacity. But you'll never get a bank to build a [offshore wind] ship there.*

Once again, established actors frequently used a late entry strategy. They simply waited until the financial institutions were eager and ensured enough. The firm that was most deliberate about their late entry strategy was Company F:

*We saw that a first-mover position would just drain us of equity and unnecessary resources" … "We value the importance of waiting; it has saved us millions of kroner. Having established premise providers is crucial, and entry in 2014 was early enough.*

Other established actors sought collaboration with partners they had worked with previously in the offshore oil & gas industry. The strategy of using existing partners was an effective mitigation strategy to reduce search, negotiation, contract and monitoring costs. For the new, and OW specific firms, this strategy was not an option. Their preferred option was to become a part of larger industrial groups with long-term ambitions in the OW industry and get venture capital from them. This happened with all the new firms in the case study sample. For the firms that were unable to attract such funding, it probably meant bankruptcy. When comparing the survey sample for this study with the global survey executed by Løvdal and Aspelund in 2005 (see Løvdal & Aspelund, 2012), Company D is the only firm that appears in both samples. Hence, survival rates from the early stages of industry formation among the independent startups are very low. As Company J notes:

*The whole industry is full of tragic stories.*

Finally, new industries are generally associated with **disadvantages of scale and immature/untested** products. Obviously, the OW industry has experienced a significant technological development over the past decades. This technological development has predominantly resulted in larger turbines (see Figure 5), but also wind parks with greater number of turbines. In the early phases of industry evolution, OW suffered significant liabilities of scale to other types of power production, but with the current size of turbines and parks, scale has rather become an advantage for OW. Apart from practical challenges with increasing size of turbines, the interviewees did not mention specific technological challenges related to immaturity of solutions. Several did mention though, that it was in their interest to create economies of scale so that cost levels could come down further and make the industry free of subsidies. In that case, political risk could be removed from the equation and industry growth and profitability would become more predictable. Company C put it this way:

*During the past few years, the OW industry has reached cost levels that was not expected until 2020. Soon subsidies are not a factor anymore. It is beneficial not to be dependent on political changes.*

The industry's focus on scale to bring down costs has a direct implication for the population of firms in the industry. OW is a capital-intensive industry, and the current development of the industry is driven by capital-rich actors from the energy, engineering and offshore oil & gas sectors. Very few of the small entrepreneurial firms from the 2005 global survey are still in operation, which is an indication that the quest for economies of scale has shifted competitive advantage to large resource-rich actors. Company D noted:

*It's hard to stick out as a small firm in the OWI, especially with the rapid growth of the OW farms.*

*Figure 5. Development of offshore wind turbines (IEA, Technology Roadmap – Wind Energy 2013, www.iea.org)*

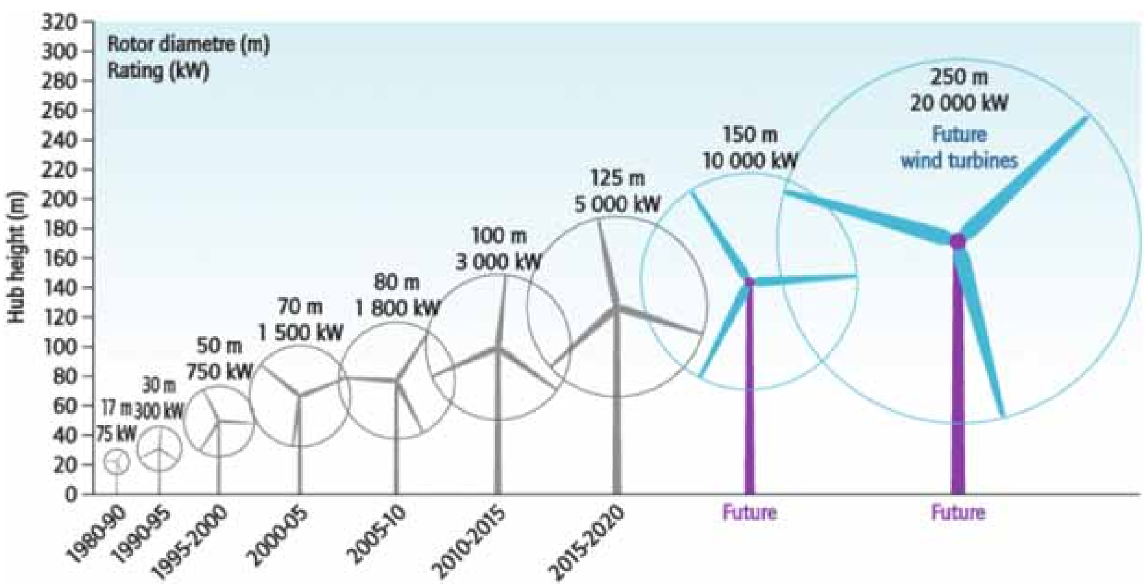


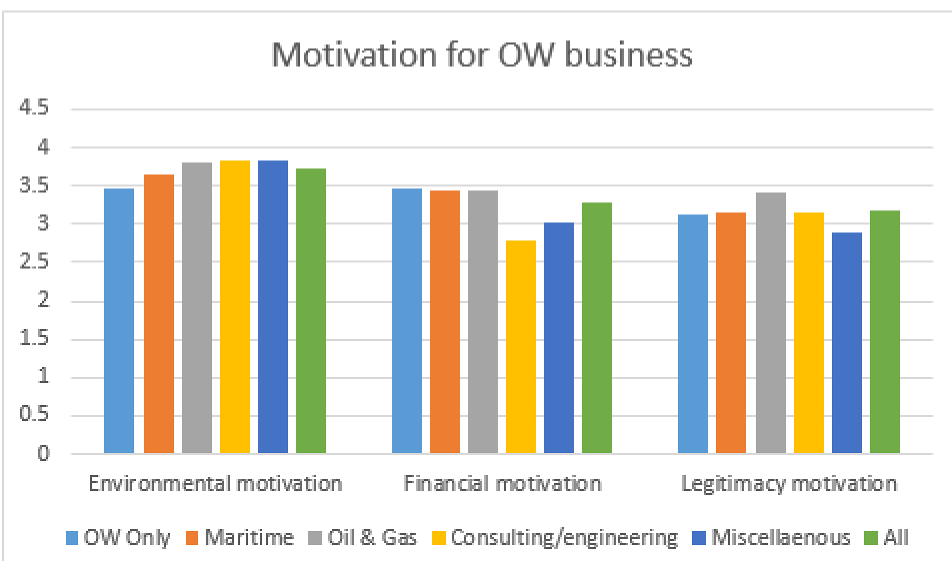

Table 2 summarizes the findings related to new industry characteristics, how these characteristics are manifested in the OW industry, and how these characteristics are directly related to strategic market entry behavior of firms.

Given these industry-specific challenges, it is interesting to investigate the motivations of firms for entry into OW. Using Bansal and Roth's (2000) classification to measure motivation to enter (see Figure 6), environmental motivation is on average the strongest motivation for all types of companies, regardless of industry ($M = 3.73$, on a scale from 1 to 5). Second comes financial motivation ($M = 3.29$) and third, legitimation ($M = 3.22$). Thus, firms enter OW through a desire to contribute to a sustainable energy transition, but they also do so in order to make profits. Still, it is remarkable that most managers report that environmental motivation is the strongest motivation to enter a capital-intensive industry such as this. These findings reflect well the interview data as well. Managers that were interviewed reflected on the potential positive environmental impact of the OW industry. However, the strategic decisions always ultimately required a realistic business case.

*Table 2. Industry characteristics, manifestations in OW and firms' strategic response*

| New industry characteristic | Manifestation in OW | Firm strategic response |
|---|---|---|
| Risk and uncertainty | • Political risk associated with licenses and subsidies<br>• General market risk<br>• Lack of institutional/low cost financing | • Delay entry<br>• Incremental/slow market penetration<br>• Extensive inter-firm collaboration and risk sharing |
| Complexity and turbulence | • Long complex sales cycles<br>• Rapidly changing customer demands<br>• Rapid development of new/larger solutions | • Established firms delay entry<br>• Develop flexibility through partnering and portfolios of solutions<br>• New firms must accept risk and focus on risk management |
| High transaction costs | • High costs of search, negotiation, contract and monitoring<br>• High costs of capital | • Delay entry<br>• Extensive use of partners from related industries<br>• New and small firms seek financial investments from large MNEs with long term ambitions |
| Disadvantages of scale and immature/untested products | • Historically, significant disadvantages of scale. Less so at present.<br>• Practical challenges related to larger turbines<br>• Competitiveness switches to larger capital-rich actors | • New and small actors seek to become part of larger concerns to be able to meet requirements of scale |

*Figure 6. Motivation for OW entry for firms from various industries*



Given the result above, one can speculate whether there is a performance liability for firms that enter OW for environmental reasons, towards those who enter for financial or legitimacy reasons. To investigate this, it is possible to look at the relationship between firm motivation to enter OW and perceived firm performance. Market performance is notoriously difficult to measure with objective measures in a new industry because there normally is a time lag between investments and results, so a perceived performance measure was used. Correlation analysis revealed that financial motivation is strongly and positively related to perceived market performance *(.58,* $p < .01$*)*, indicating that firms that are predominantly driven by profits do best. Correlations with perceived market performance for environmental motivation *(.12, ns)* and legitimacy motivation *(.19, ns)* are also positive, but not significant. This may indicate there is a performance liability for environmental motivation, but this relationship needs to be investigated further in future research.

It is interesting to note the development of Company A in relation to motivation for entry. Their main motivation for entering OW was to attract new talent (considered to be a legitimacy motive in this study). They observed that the brightest young engineers would rather work with renewables than oil and gas and therefore they initiated an OW project to investigate opportunities. Today they have a portfolio of projects in OW worth several billion NOK.

Finally, the study investigates the role of relatedness for firms that diversified from other industries into OW. Survey data reveals that Norwegian firms in OW reported higher technological than market relatedness regardless of which industry the firms came from (see Figure 7). This finding indicates that respondents find that the technological solutions they offer in OW are quite similar to those they deliver in other markets, while the market itself is perceived to be quite different. There are also indications that technological challenges were perceived to be easier to overcome in both the survey and interviews. For instance, there are few examples that firms used acquisitions or partner strategies to get access to key technologies they needed to enter OW. On the contrary, most firms reported that they predominantly relied on already existing internal engineering capabilities to develop OW solutions.

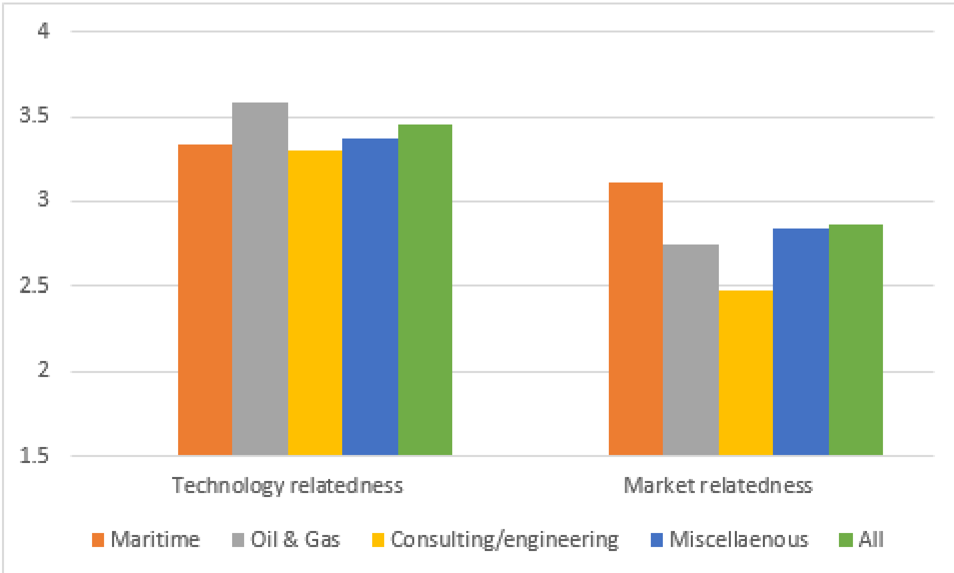
On the other hand, there are several indications from case companies that the immaturity of the market is challenging, for instance the lack of standardized contracts (as mentioned above), which made the value of existing market resources and capabilities that are developed in other industries, hard to leverage in OW. These effects are again strengthened by having to compete in new global markets, as illustrated by company A:

*(..) it is challenging that both customers and competitors are much more global in OW than in our traditional market within oil and gas.*

In these new international markets, the OW firms typically had limited network, low brand awareness and no customer references. Hence, the study concludes that market challenges had more influence on firms' OW market entry behavior than technological challenges. With very few exceptions, the technological solutions that firms needed in order to enter the new industry were developed in-house using existing engineering and technical capabilities. Market resources, on the other hand, predominantly had to be built from scratch.

Further evidence of the importance of market relatedness for OW companies can be seen from the survey results. Comparing the correlation between perceived market performance and market relatedness *(.38,* $p < .01$*)* to the correlation between perceived market performance and technological relatedness *(.11, ns)*, reveals that it is market relatedness that is most closely associated with perceived market perfor-

*Figure 7. Technological and market relatedness*




mance. In other words, although technological relatedness may be more common among the OW firms engaged in multiple industries, it is market relatedness that is crucial in predicting their performance.

## DISCUSSION AND IMPLICATIONS

The present study investigates managerial assessment and strategic market entry behavior in a renewable energy industry that are based on international resource input from inception (Bjørgum et al., 2013). These types of industries are important to understand if we are to follow the development pattern in the Paris Agreement and keep global warming under 1.5 degrees Celsius.

Previous studies have shown that new industries have key characteristics that distinguish them from mature markets (Aldrich & Fiol, 1994; Christensen & Raynor, 2013; Forbes & Kirsch, 2011; Klepper & Graddy, 1990; Möller & Svahn, 2009). In addition, previous research has shown that industries that are based on international supply chains from inception – Born Global industries – also have some distinguishing features (Aspelund et al., 2017; Bjørgum et al., 2013; Løvdal & Aspelund, 2012; Løvdal & Moen, 2013). The present study confirms that these characteristics are present in a new industry like OW, and it contributes to the research by showing how these characteristics trigger specific strategic behavior and shape firm entry strategies.

This study also contributes to the research on motivation for entering green industries. Bansal and Roth (2000) provided a model for green motivations that was adopted in the survey. It is intriguing to observe that managers' report environmental motivation to be the strongest motivation to enter OW. However, we need to remember that firms' motivations are not mutually exclusive. Even though environmental motivation is highest, the motivation types do not show great differences between them. It is more likely that environmental motivation is a sway argument – meaning that if the economic opportunities were similar, the environmental argument would sway the strategic decision in that direction. Furthermore, this study also contributes by investigating the qualitative motivation arguments that lie beneath the survey responses, and by identifying the relationship between financial motivation and perceived firm performance.

Finally, this study contributes to the study of relatedness in strategic management (Palich et al., 2000) and the differentiated effect of technological versus market relatedness on firm performance (Helfat and Eisenhardt, 2004; Pehrsson, 2006). Few studies have looked at the distinction and relationship between these two concepts (Nocker et al., 2016), and this study finds that technological and market relatedness play different roles in the diversification process. In OW, it is clearly the entering firms' un-relatedness of the market, which has provided most problems, while technological solutions have been found by using predominantly existing internal engineering capabilities. In addition, the technological relatedness was relatively straightforward to identify and assess before firms entered the OW industry, while the difference in market relatedness regarding standard of contracts, competition in global markets and lack of references and brand awareness were not. This can most likely explain why so many of the entering firms still have such a limited activity level in OW.

## Implications for Managers

The major takeaways for managers from this study are related to the awareness of what market characteristics firms are likely to meet when entering globally emerging industries like OW. The interviews show that even experienced market managers were surprised by how different the OW market worked compared to more established markets such as offshore oil & gas. As Company A noted:

*The industry was more immature than initially expected. This applies to the customer base, suppliers and governmental requirements.*

More than just awareness, this study contributes with insight into how different companies – new and established – have dealt with the market-related challenges of the new industry.

## Implications for Policy

The most important implication for policy relates to the technological versus market relatedness debate. There will always be a debate on whether governmental support should support R&D grants to develop technological solutions in renewables, or the support should go to correcting market imperfections. This study suggests the latter. This study finds that the timing and commitment to a new renewable industry is more dependent on assessment of market characteristics than non-availability of technological solutions. Hence, from a firm perspective, support for correcting market imperfections would be more efficient to stimulate rapid and extensive entry into OW. That said, the present study does not quantify this effect. Nor does it account for the effect of historic regulations and governmental support to this sector. Therefore, a more thorough assessment of what would provide the best financial and environmental effect for the government must be left for future research.

On personal reflection, when the study of the OW industry began, the assumption was that it was simply a cost game. In other words, if petroleum prices were high, renewables became more competitive and investments would flow to renewables. This never happened. From the shift of the millennium to 2014, oil prices were high, and renewables attracted very few investments. When oil prices fell in

2014, the petroleum service market became less attractive and industrial capital sought new markets, and ultimately found it in OW. As Company F stated:

*The offshore wind industry was something we phased in as oil and gas pretty much disappeared [after the 2014 oil market crash].*

Hence, it is not a cost game. It is an investment game. As such, policymakers that want to direct investments towards green industries need to make sure that green investments carry comparable risk and reward as investors and businesses can find in brown industries. If that is the case, this research shows that business managers will prefer the environmentally responsible investments option.

### Limitations and Further Research

The present study has some methodological strengths because it employs both a qualitative and quantitative approach. Through case studies representing various positions in the supply chain and a survey covering 60 percent of the total population of Norwegian firms in OW, it provides valuable insight into the dynamics of the industry. The study's generalizability to other countries may be limited since the investigation is focused on Norway, a country that is highly dependent on the oil & gas industry. However, the authors have no reason to suspect that Norwegian companies behave differently than other firms *per se*. Moreover, this study provides a unique and interesting perspective of an extreme case, where most of the firms are affected by the economic state-of-affairs in oil and gas. When oil and gas prices are high globally, there are few other industries that are more financially attractive, and firms thus tend to move in that direction. Hence, to increase generalizability, future research could include studies in other countries.

Another limitation is that the present study only focuses on OW. OW has certain particularities that make it unique when compared to some other new green or global industries. First, it is more capital intensive than most other industries. Hence, the entry barriers in OW are higher than most – e.g., they are higher than the microelectronics design industry as investigated by Aspelund et al. (2017), where input factors were predominantly engineering man hours. In addition, OW is an industry where large structures and offshore locations makes maintenance disproportionally expensive and hazardous. For this reason, OW operators have adopted strict routines for testing, qualification and safety, health, and environment practices. These practices might favor large actors more than small ones. Therefore, it would be prudent to research other new and green industries to investigate these differences.

## CONCLUSION

This study departed from the question of how top managers perceive business opportunities in terms of new market characteristics, underlying motivation, and the role of technological and market relatedness in a new, renewable energy industry. First, the study concludes that OW, as a new emerging global industry, has some characteristics that influence managerial decision-making and firms' entry behavior. Specifically, the paper has shown how aspects of risk and uncertainty, complexity and turbulence, high transaction costs, and disadvantages of scale manifest themselves in the OW industry and directly triggers strategic behavior from entering firms to deal with them. These characteristics can help explain why the development and growth of new green industries are slow and why firms engage in them with caution.

In the early stages of industry evolution, perception of risk, uncertainty and expectations of high transaction costs make established actors postpone market entry, or alternatively, adopt a cautious and incremental approach to entry. New firms, on the other hand, simply need to accept high levels of risk and uncertainty in early stages, in order to leverage first mover advantages and build experience and competitiveness before the large global energy, maritime, and offshore supply companies move in to position themselves in the new industry. However, new firms face another challenge because the same characteristics also limit availability of capital, effectively limiting their ability to grow. Overall, the result is a slow and incremental growth of an industry that we, for sustainability reasons, would prefer to see growing fast.

Regardless of the challenges and uncertainties of OW, companies are still attracted to the business opportunities in the industry. Surprisingly though, financial motivation is not the highest-rated motivation for firms entering OW. Coming first is environmental motivation, which shows that the development of OW is at least partially driven by global citizenship and environmental corporate responsibility. Finally, the study concludes that firms that diversify into OW perceive technology to be more related than the market, and that market relatedness is associated with perceived performance in OW, but technology relatedness is not. In other words, managers perceive market differences to be more challenging than technological obstacles. Thus, from a policy point of perspective, if a rapid and extensive entry into new, global and green industries is desired, then one should focus more on correcting market imperfections than funding pure technological R&D projects.

## REFERENCES

Aldrich, H. E., & Fiol, C. M. (1994). Fools Rush in? The Institutional Context of Industry Creation. *Academy of Management Review*, *19*(4), 645–670. doi:10.5465/amr.1994.9412190214

Ansoff, H. I. (1957). Strategies for diversification. *Harvard Business Review*, *35*(5), 113–124.

Aspelund, A., Azari, M. J., Aglen, A. F., & Graff, S. G. (2017). The birth and development of a born global industry: The case of microelectronics in Norway. *Journal of International Entrepreneurship*, 1–27. doi:10.100710843-017-0206-3

Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal*, *43*(4), 717–736.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120. doi:10.1177/014920639101700108

Bjørgum, Ø., Moen, Ø., & Madsen, T. K. (2013). New ventures in an emerging industry: Access to and use of international resources. *International Journal of Entrepreneurship and Small Business*, *20*(2), 233–253. doi:10.1504/IJESB.2013.056281

Christensen, C., & Raynor, M. (2013). The innovator's solution: Creating and sustaining successful growth. Brighton, Massachusetts: Harvard Business Review Press.

Davis, S. J., Caldeira, K., & Matthews, H. D. (2010). Future CO2 Emissions and Climate Change from Existing Energy Infrastructure. *Science*, *329*(5997), 1330–1333. doi:10.1126cience.1188566 PMID:20829483

Dedecca, J. G., Hakvoort, R. A., & Ortt, J. R. (2016). Market strategies for offshore wind in Europe: A development and diffusion perspective. *Renewable & Sustainable Energy Reviews*, *66*, 286–296. doi:10.1016/j.rser.2016.08.007

Dess, G. G., & Robinson, R. B. Jr. (1984). Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit. *Strategic Management Journal*, *5*(3), 265–273. doi:10.1002mj.4250050306

Duncan, R. B. (1972). Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, *17*(3), 313–327. doi:10.2307/2392145

Forbes, D. P., & Kirsch, D. A. (2011). The study of emerging industries: Recognizing and responding to some central problems. *Journal of Business Venturing*, *26*(5), 589–602. doi:10.1016/j.jbusvent.2010.01.004

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, *26*(4), 331–362. doi:10.1002/job.322

Gustafsson, R., Jääskeläinen, M., Maula, M., & Uotila, J. (2015). (Forthcoming). Emergence of Industries: A Review and Future Directions. *International Journal of Management Reviews*. Advance online publication. doi:10.1111/ijmr.12057

Hansen, G. H., & Steen, M. (2015). Offshore oil and gas firms' involvement in offshore wind: Technological frames and undercurrents. *Environmental Innovation and Societal Transitions*, *17*, 1–14. doi:10.1016/j.eist.2015.05.001

Helfat, C. E., & Eisenhardt, K. M. (2004). Inter-temporal economies of scope, organizational modularity, and the dynamics of diversification. *Strategic Management Journal*, *25*(13), 1217–1232. doi:10.1002mj.427

Jacobides, M. G., & Winter, S. G. (2005). The co-evolution of capabilities and transaction costs: Explaining the institutional structure of production. *Strategic Management Journal*, *26*(5), 395–413. doi:10.1002mj.460

Klepper, S., & Graddy, E. (1990). The evolution of new industries and the determinants of market structure. *The RAND Journal of Economics*, 27–44.

Kuhn, T. S. (1962). The structure of scientiðc revolutions. Academic Press.

Latham, G. P., & Pinder, C. C. (2005). Work motivation theory and research at the dawn of the twenty-first century. *Annual Review of Psychology*, *56*, 485–516. doi:10.1146/annurev.psych.55.090902.142105

Lieberman, M. B., Lee, G. K., & Folta, T. B. (2017). Entry, exit, and the potential for resource redeployment. *Strategic Management Journal*, *38*(3), 526–544.

Løvdal, N., & Aspelund, A. (2010). International Entrepreneurship in the Offshore Renewable Energy Industry. In R. Wüstenhagen & R. Wuebker (Eds.), Energy Entrepreneurship. Cheltenham: Edward Elgar Publishers.

Løvdal, N., & Aspelund, A. (2012). Characteristics of Born Global Industries - The Birth of Offshore Renewables. In Handbook of Research on Born Globals (pp. 285–309). Cheltenham: Edward Elgar Publishing.

Løvdal, N., & Moen, O. (2013). International Before Commercial: Investigating the Pre-Commercial Phase of International New Ventures. *Journal of Technology Management & Innovation*, *8*(2), 21–34.

Miller, K. D. (1993). Industry and country effects on managers' perceptions of environmental uncertainties. *Journal of International Business Studies*, *24*(4), 693–714.

Mitchell, T. R. (1982). Motivation: New directions for theory, research, and practice. *Academy of Management Review*, *7*(1), 80–88.

Möller, K., & Svahn, S. (2009). How to influence the birth of new business fields—Network perspective. *Industrial Marketing Management*, *38*(4), 450–458.

Nocker, E., Bowen, H. P., Stadler, C., & Matzler, K. (2016). Capturing relatedness: Comprehensive measures based on secondary data. *British Journal of Management*, *27*(1), 197–213.

Palich, L. E., Cardinal, L. B., & Miller, C. C. (2000). Curvilinearity in the diversification–performance linkage: An examination of over three decades of research. *Strategic Management Journal*, *21*(2), 155–174.

Pehrsson, A. (2006). Business relatedness and performance: A study of managerial perceptions. *Strategic Management Journal*, *27*(3), 265–282.

Porter, L. W., & Lawler, E. E. (1968). Managerial attitudes and performance. Cheltenham: Edward Edgar Publishing.

Rennings, K. (2000). Redefining innovation—Eco-innovation research and the contribution from ecological economics. *Ecological Economics*, *32*(2), 319–332.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, *55*(1), 68–78.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Steen, M., & Hansen, G. H. (2014). Same Sea, Different Ponds: Cross-Sectorial Knowledge Spillovers in the North Sea. *European Planning Studies*, *22*(10), 2030–2049. doi:10.1080/09654313.2013.814622

Vernon, R. (1966). International Investment and International Trade in the Product Cycle. *The Quarterly Journal of Economics*, *80*, 190–207.

Vernon, R. (1979). The Product Cycle Hypothesis in a new International Environment. *Oxford Bulletin of Economics and Statistics, Special Issue*, *41*(4), 255–267.

Vroom, V. H. (1964). *Work and Motivation*. Hoboken, NJ: Wiley.

Werner, S., Brouthers, L. E., & Brouthers, K. D. (1996). International risk and perceived environmental uncertainty: The dimensionality and internal consistency of Miller's measure. *Journal of International Business Studies*, *27*(3), 571–587.

# APPENDIX

*Table A1. Survey measures*

| Survey measures | Reliability | Loadings |
|---|---|---|
| ***Our company is, or wants to be in OW because …*** | | |
| **Environmental motivation** | α = 0.861 | |
| … it is important for us to contribute to a better climate. | | .835 |
| … OW is good for the environment. | | .940 |
| … OW is an energy source that contributes to a better future for all. | | .887 |
| **Financial (competitiveness) motivation** | α = 0.682 | |
| … the OW industry offers good financial opportunities. | | .808 |
| … it gives us competitive advantage. | | .752 |
| … the OW industry can give our company long-term profitability. | | .788 |
| **Legitimacy motivation** | α = 0.751 | |
| … being in the OW industry makes us a more attractive company to job applicants. | | .892 |
| … it has a positive effect on our company's image. | | .929 |
| … some of our external stakeholders (e.g., customers, partners, etc.) wanted it. | | .636 |
| ***How much do you agree with the following statements?*** | | |
| **Technological relatedness** | α = 0.821 | |
| Technology that we use in OW is similar to that which we use in other business areas. | | .762 |
| Product/service design we use in OW is similar to that which we use in other business areas. | | .841 |
| Pricing and cost pressures in OW are similar to that which we experience in other business areas. | | .719 |
| Product/service development is similar to that which we use in other business areas. | | .595 |
| Production processes are similar to those we use in other business areas. | | .840 |
| Requirements of employees' competence in OW are similar to other business areas. | | .656 |
| **Market relatedness** | α = 0.843 | |
| Customers' quality demands in OW are similar to other business areas. | | .461 |
| Recognition of our brand is similar in OW as in other business areas. | | .736 |
| Sales and bid processes in OW are similar to other business areas. | | .831 |
| Contracts (wording and development) in OW are similar to other business areas. | | .830 |
| We use may of the same customer relationships in OW as in other business areas. | | .730 |
| We use many of the same suppliers in OW as in other business areas. | | .666 |
| The degree of standardization is similar in OW as in other business areas. | | .753 |
| **Perceived market performance** | α = 0.936 | |
| We consider our OW venture to be a success. | | .874 |
| We are satisfied with the progression of our market share. | | .954 |
| We are satisfied with our sales development in OW. | | .955 |
| We are satisfied with the profitability of our OW. | | .877 |

*continues on following page*

*Table A1. Continued*

| Survey measures | Reliability | Loadings |
|---|---|---|
| ***How low or high would your company rate risk related to ...*** | | |
| **Government risk** | α = 0.719 | |
| … significant changes in tax, tariff, and/or subsidy policies? | | .831 |
| … prioritization of local suppliers; rules for local content in foreign markets? | | .727 |
| … poor access to financing? | | .841 |
| **Market risk** | α =0.618 | |
| … large variation in demand? | | .550 |
| … introduction of superior technology? | | .717 |
| … increased offering of substitute or complementary products? | | .727 |
| … aggressive price competition? | | .728 |
| **Partner risk** | α = 0.778 | |
| … high costs related to finding good and qualified business partners? | | .905 |
| … high costs related to finding good and qualified suppliers? | | .905 |
| **Ability risk** | α = 0.793 | |
| … your ability to meet new demands for products and services? | | .857 |
| … your ability to develop your own competitive technical solutions? | | .899 |
| … your ability to win contracts? | | .765 |
| **Culture risk** | α = 0.812 | |
| … business problems due to large cultural differences? | | .917 |
| … business problems due to large difference in demands for health, environment, safety, and ethics? | | .917 |

The motivation, relatedness, and perceived performance questions were answered on a 5-point unipolar scale from 1 - "Do not agree" to 5 – "Completely agree", while the risk questions were answered on a 5-point unipolar scale from 1 – "No risk" to 5 – "Very high risk".