

Does long-term proactive agency matter for regional development?

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1 Introduction

There is a burgeoning literature on the role of agency for regional development (e.g. Dawley 2014; Grillitsch 2017; Grillitsch and Sotarauta 2019; Sotarauta and Beer 2017; Steen 2016; Uyarra et al. 2017). This literature aims to address what several scholars have identified as a black box in economic geography and regional studies, namely the micro-level processes that push for, work against, or react to changes (Asheim, Grillitsch, and Trippel 2016; Boschma 2017; Uyarra et al. 2017). The particular novelty of this paper is the focus on the time horizon of agency, which we link to the exploration and exploitation trade off in regional development and the recent literature on new industrial path development. By doing so, we theoretically connect micro- and macro-level causes of regional development.

The role of agency is particularly important in times when the need for changes to historically developed economic, social and institutional structures becomes apparent. The need for change becomes obvious in the wake of crises, which may be of economic, financial, ecological, or social nature. Crisis times are often critical junctures where various developments are in general possible, with difficulties to predict the outcome. What is going to happen in the future depends on the sequence and timing of actions and events in a path-dependent manner. During critical junctures new paths emerge, which then develop rigidities due to self-reinforcing processes (Pierson 2004). While outcomes are uncertain in critical junctures, and therefore often seen as random, a focus on agency may help to understand why certain actions were taken during critical junctures with

what effects and how this explains, at least partially, why certain paths emerged and not others during a critical juncture (Grillitsch, Rekers, and Sotarauta 2019).

In this paper, we study the role of agency in a labour market region in Sunnmøre, in western Norway, which is known for its globally leading cluster in the maritime industry. We selected the case study region because it went through two crises and a remarkable growth in between. From 1999 to 2004, the regional maritime industry struggled with a slow demand causing substantial job losses. In 2004/2005 an extraordinary growth phase started related to the high demand for offshore vessels for the oil and gas industry that lasted till the drop in oil prices in 2014. This led to a crisis with a magnitude unheard of by regional private and public actors despite their experience with several cycles of growth and decline of the maritime industry in the last decades.

Even though the demand for offshore vessels undoubtedly created the market opportunity for the exceptional growth of the regional maritime industry, our study unveils that long-term innovation processes and strategic investments in firms as well as regional assets preceding the growth phase were an essential ingredient for the subsequent success. We show that these long-term investments were not a direct reaction to some external shocks. Rather they resulted from the long-term perspective and strategic approach of certain individuals and groups of individuals who took risks to develop and explore not yet realised potentials.

These agents were empowered because of financial resources from previous company sales and strong competences due to sustained investments in innovation. Furthermore, these agents showed a commitment to invest in the

region as opposed to for instance the stock market. This played an important role in keeping and augmenting resources and innovation capabilities in the region, especially during crisis time. Regional actors have frequently used the term “patriot capital” for the willingness to reinvest in the region.

Our analysis zooms in on three types of change agency with distinct theoretical roots, which have proven to be of importance in a variety of empirical studies separately and in combination (Grillitsch and Sotarauta 2019; Jolly, Grillitsch, and Hansen 2019; MacKinnon et al. 2019). These three types of agency refer to Schumpeterian innovative entrepreneurship, institutional entrepreneurship, and place-based leadership. Maybe not surprising for a region with a strong entrepreneurial culture (Asheim, Grillitsch, and Trippl 2017), the most powerful agency was exercised by industry players and resulted in some new-to-the world innovations with strong effects on the development of the region and the industry globally.

However, our study traces efforts of such industry players to create a strong cluster and region several decades back, resonating with the story of Feldman, Francis, and Bercovitz (2005) about entrepreneurs “creating a cluster while building a firm”. We observed strategic and long-term oriented place-based leadership that was concerned with enlarging the local labour market, building human capabilities, completing regional value chains, strengthening the support infrastructure for innovation and entrepreneurship, as well as establishing a strong and united voice for lobbying. Long-term institutional entrepreneurship reframed how regional higher-educational institutes engaged and supported

innovation processes in the region, substantially enhancing the scientific, analytical knowledge base.

We contrast long-term strategic agency with a focus on innovation with short-term agency with a focus on entrepreneurship or rationalisation. This temporal perspective matches closely the relationships between exploration and exploitation in organizational learning that March (1991) put forward in his seminal article but could be extended to a broader set of actors relevant for regional development. At the firm level, short-term agency relates to picking the fruits of the offshore vessel boom with the consequence that resources were occupied with one market segment and that firms built up high fixed costs, making the transition to other market segments and product groups in the crisis after 2014 very difficult. Short-term agency, however, also relates to the rationalisation as response to the crisis. Firms needed to quickly cut costs and sacked many workers.

While the exceptional boom and consequent deep crisis triggered short-term agency, which was largely reactive in nature, it appears that even in these phases long-term strategic agency determines the fate of the region. Long-term strategic agency in our case was pro-active. This means it was not triggered by necessities of external forces. During the boom, we found some agents who invested in new technologies and product diversification, which was important later in dampening the effects of the crisis. During the crisis, leading business players emphasized that they followed a two-way strategy, cutting costs in the short-run and investing in new markets for the long-run, which is showed in a doubling of research and development expenditures during the crisis (Research Council of

Norway 2018). While (as typical for critical junctures) it cannot be predicted if these long-term investments during this second crisis will pay-off, it is the only way for high-cost economies like Norway, implying a high-road strategy of innovation as opposed to the downward spiral of cost competition (Milberg and Houston 2005).

Considering the above, it is problematic that we witnessed a shift in policy attention from the long- to the short-term. Partly, this can be explained by the crisis in 2014 and the need to quickly adapt and react to it. Partly, it relates, however, to the adoption of a certain model for policy intervention that provides a framework to support entrepreneurship. The focus of this framework lies on quick marketability of entrepreneurial ideas in the short-run being at odds with the long-term strategic perspective of innovation activities that underpinned past success.

In section 2, we will elaborate on the theoretical perspective that has guided and informed our research. In particular, it is the interplay between historically developed structures that, according to evolutionary theory cause path-dependencies; external forces affecting the regional industry due to its embeddedness in global production networks and markets; as well as the agency of individuals, groups of individuals and organisations to influence the future paths of regional development. As regards agency, we address in particular the time-dimension and argue that a long-term perspective is essential because in the long-term many of the structural factors, may it be competences, networks, institutions, or patterns of production and consumptions, can be moulded. In other words, in the long-term these structural factors are less rigid than in the

short-term. To affect the structures, however, agency with long-term perspective is needed.

In section 3, we elaborate on our methodological approach, which is embedded in a larger research project that combines quantitative and qualitative methods to identify cases that deviate strongly in their growth performance from what could be expected given their structural preconditions. For this reason, these cases are very interesting in terms of studying the interplay of structure, global forces and agency. This particular case is one that falls in the category of semi-peripheral regions with a long-industrial tradition. Besides the quantitative work, we conducted a comprehensive document analysis, 17 interviews in 2014 and 20 interviews in 2019. In addition, we have conducted one focus group meeting in 2014. This triangulation of secondary data, quantitative data analysis, and interviews in two points in time is a strong foundation for valid findings. In section 4, we present details of the empirical results and in section 5 we discuss the conclusions with a particular attention to theoretical and policy implications.

2 Theoretical framework

2.1 Exploration and exploitation trade-off

Prosperity in the short and long term results from interplay between exploration and exploitation activities. Recent academic and policy debates reflect this insight. Smart specialisation, which is the largest innovation-driven regional policy approach so far, advocates regions to diversify into niches where they can generate superior value (Asheim, Grillitsch, and Trippl 2017; Foray 2017).

Diversification results partly from exploration and exploitation activities driven

by entrepreneurial discovery processes (Foray, David, and Hall 2009) and partly from specialisation in niches, which is about exploiting economic value.

The most important predecessor of this place-based policy approach is the regional innovation systems concept, which differentiates in a knowledge exploration and a knowledge exploitation subsystem (Asheim and Gertler 2005; Asheim, Grillitsch, and Trippel 2016; Asheim, Isaksen, and Trippel 2019; Autio 1998; Cooke 2007). Exploration means in this context the generation of new knowledge through research and development often but not necessarily conducted by universities and public research institutes. Exploitation refers to the process of translating new knowledge into innovations in the form of products, processes, new organisational forms or markets.

There is a trade-off, however, between exploration and exploitation, which March (1991, p. 71) has sharply defined as follows:

“Adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competence. Conversely, systems that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in suboptimal stable equilibria. As a result, maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity.”

March has elaborated this idea for organisations, in particular firms. This idea is valid also for regions. Regional specialisation is essential for the creation of economic value by exploiting certain market or technological opportunities. This is because regional specialisation leads to external effects that increase the productiveness and innovativeness of firms. Firms benefit from the provision of relevant skills through a thick labour market, access to inputs from specialised suppliers, knowledge spillovers, and sharing of infrastructure and resources (Duranton and Puga 2004; Marshall 1920). Furthermore, social and institutional embeddedness of firms create untraded interdependencies that facilitate knowledge exchange and innovation (Gertler 2004; Storper 1995).

With too much exploitation and too little exploration, regions risk negative lock-ins in the event of market or technological change. Grabher (1993) identifies three forms of negative lock-in. Cognitive lock-in refers to an increasingly homogeneous knowledge base and worldview, and myopic search processes (Maskell and Malmberg 2007), making it difficult for regional actors to realise and act on the threats and opportunities of market or technology changes. Functional lock-ins relate to strong endogenous interdependencies in production systems with established value chains impeding the exploration and application of extra regional opportunities and resources. Political-institutional lock-in captures the efforts of elites in different parts of the system to maintain the status quo. Lock-in situations are often not only regional but also constituted through the interdependencies on multiple (national and global) scales (Grillitsch 2015; Hassink 2010; MacKinnon 2012).

Blažek and Kadlec (2019) found a strong relationship between the absolute and relative level of the two subsystems of a regional innovation system and socio-economic and innovation performance in European regions. Generally, in leading regions (i.e. innovation leaders and strong innovators according to the Regional Innovation Scoreboard) the regional innovation system is characterized by well-developed knowledge exploration (public R&D) and knowledge exploitation (private R&D) subsystems, which either showed a balanced structure or a dominance by private R&D, still with both subsystems at a high level. In lagging regions (moderate and modest innovators) the picture is the opposite with low levels of both subsystems and with the public R&D dominating, due to a very low level of private R&D.

The exploration and exploitation trade-off thus exists at the organisational and regional level. This trade-off is inherently linked to a temporal dimension. In the regional innovation systems literature, the temporal dimension so far has mainly received attention as a barrier for university-firm collaborations. The time horizon is longer for basic research than applied research and university-based research has a longer time horizon than the development activities of firms. These different time horizons are an obstacle for university-firm collaborations as well as the combination of exploration and exploitation activities in regional innovation systems. In more general terms, we revert again to March (1991, p. 73) for expressing this dilemma:

“Compared to returns from exploitation, returns from exploration are systematically less certain, more remote in time, and organizationally more distant from the locus of action and adaption. What is good in

the long run is not always good in the short run. What is good at a particular historical moment is not always good at another time. What is good for one part of an organization is not always good for another part. What is good for an organization is not always good for a larger social system of which it is a part.”

This trade-off between exploitation and exploration, between the short and long run, and the good of the organisations and the regional system becomes even more crucial when interested in the question of structural or transformative change. In a regional economic context, structures refer to the knowledge and skills of individuals, organisational routines, network interdependencies between individuals and organisations, institutional and organisational configurations and complementarities, as well as infrastructural and material conditions (Grillitsch and Rekers 2016). Structures change slowly over time (see e.g. North, 1992). In the short run structures constitute most of the time (except during revolutions) a stable framework for action while, in the long run they will often change fundamentally (Streeck and Thelen 2005). Making this picture more fuzzy and complicated, some structures may change faster (e.g. organisational set-ups) than others (e.g. institutional lay-out).

2.2 Long-term, proactive agency as transformative force

The actions and interactions of many (individuals, groups of individuals, organisations, and groups of organisations) reproduce and/or change structures over time. Even though there has been a preferential treatment of the firm as agent of change in evolutionary economic geography (MacKinnon et al. 2019; Trippel, Grillitsch, and Isaksen 2018), agency in relation to regional structural

change requires a broader perspective because technologies, industries, networks, and institutions co-evolve interdependently (Nelson 1998; Ter Wal and Boschma 2011). Based on an in-depth literature review, Grillitsch and Sotarauta (2019) identify three types of change agency in regional development, namely Schumpeterian innovative entrepreneurship, institutional entrepreneurship, and place-based leadership, which the authors label as Trinity of Change Agency (TCA).

Schumpeterian innovative entrepreneurship is concerned with innovations that break with traditional industrial paths (Grillitsch 2018; Schumpeter 1911).

Institutional entrepreneurship characterizes efforts to introduce new or change existing organizations and institutions (Battilana, Leca, and Boxenbaum 2009; Sotarauta and Mustikkamäki 2015). Place-based leadership is about transforming regions through the coordination and mobilization of multiple actors for goals that go beyond individual interests (Gibney, Copeland, and Murie 2009; Sotarauta and Beer 2017). These three types of change agency often play together constituting what Grillitsch and Sotarauta (2019) call the “Trinity of Change Agents”, and Isaksen et al. (2019) theorize as firm-level and system-level actors and agency.

For instance, Saxenian and Sabel (2008) illustrate how institutional change has created new opportunities for innovative entrepreneurship in the semiconductor industry in Taiwan. MacKinnon et al. (2019) investigate how the interplay of the three types of change agency affect new path creation and find that innovative entrepreneurship led the way in the metropolitan region of Berlin whereas institutional entrepreneurship triggered the other two types of

agency in the specialized industrial region of Pittsburgh. These studies show that agency is context dependent and unfolds its transformative power over time (cf. Giddens 2007:1984).

Studies on agency, understood here as actions and their intended and unintended consequences, underline the temporal dimension (Dawley 2014; Emirbayer and Mische 1998; Grillitsch and Sotarauta 2019; Steen 2016). While conditioned by the past, actors' perceptions and expectations about the future motivates agency. In this vein, Garud, Kumaraswamy, and Karnøe (2010, p. 770) argue that

"[a]ctors mobilize the past not necessarily to repeat or avoid what happened, but, instead, to generate new options. Likewise, people imagine new initiatives for the future which then lead them to mobilize the past in support."

Thus, perceived futures affect agency and thereby the reproduction or change of economic, social and institutional structures. However, little attention has been paid to whether the future horizon is short or long term. Long -term horizon allows agency to have a profound effect on structures (e.g. develop new capabilities, industrial development paths, networks, or institutional configurations) while short-term agency is more limited to the exploitation of existing opportunities.

2.3 New path development as result of agency

The last decade has witnessed a flourishing of work on structural change, economic diversification and new path development in regions (e.g. Bathelt,

Munro, and Spigel 2013; Boschma et al. 2017; Grillitsch, Asheim, and Trippel 2018; Martin and Sunley 2006; Morgan 2016; Neffke et al. 2014; Tanner 2014). Grillitsch, Asheim, and Trippel (2018) link new path development to its sources in terms of spatiality (local vs. non-local) and industry structure (specialisation, related variety, unrelated variety). The sources and forms of new path development give indications about the magnitude of structural change.

More incremental forms of path development such as various forms of upgrading (e.g. climbing global value chains) rely on the knowledge base of the existing field of specialisation but typically require appropriating advanced knowledge from extra-regional actors. Related variety (Frenken and Boschma 2007; Frenken, Van Oort, and Verburg 2007) offers the opportunity for more fundamental structural change through firm diversification into other industries where existing knowledge and resources can create higher value. This form is typically called path branching. The most radical form of structural change, however, rests on unrelated knowledge combinations, which as transformative activities require long-term agency to be accomplished.

Unrelated knowledge combinations offer opportunities for a variety of new path developments. The most radical form is the creation of industries that are new to the world, often based on new scientific knowledge. New-to-the-world industries are random events. More frequently, unrelated knowledge combinations may lead to radical forms of unrelated path diversification, in contrast to the related diversification of path branching, often by the use of Key Enabling Technologies (KET) (Asheim 2019; Grillitsch, Asheim, and Trippel 2018). For instance, unrelated knowledge combinations may be a result of bringing together

analytical (science-based), synthetic (engineering-based), and symbolic (art-based) knowledge (Asheim 2007; Asheim, Grillitsch, and Trippl 2017).

Combinations of these types of knowledge are essential for radical innovations (Manniche 2012; Strambach and Klement 2012; Tödtling and Grillitsch 2014).

An example of unrelated path diversification would be the creation of stylish technical textiles by combining analytical knowledge from nanotechnology with synthetic knowledge from the textile industry, and symbolic knowledge from the fashion industry. Concretely, this was effectuated by a young female, American (originally Russian) entrepreneur, which is a good example of what in the smart specialisation policy approach is called an Entrepreneurial Discovery Process resulting in transformative activities (Asheim, 2019).

Blažek and Kadlec (2019) found that the synthetic knowledge base dominates in all European regions, but that analytical and symbolic knowledge also play an important role in innovation leading and strong innovation regions, while these two latter knowledge bases are underdeveloped even in relative terms in moderate and modest innovating regions. This result is consistent with the findings of Grillitsch, Martin, and Srholec (2017), who concluded that synergies are strongest between analytical and symbolic knowledge bases.

In our theoretical thinking, new path development is a result of long term agency whereas historically developed structural preconditions and perceived futures are both shaping agency. The particular novelty of this paper is the focus on the time horizon of agency, which we link to the exploration and exploitation trade off in regional development. By doing so, we address the micro-level processes driving or obstructing change processes, which so far have received too little

attention in the literature (Asheim, Grillitsch, and Trippel 2016; Boschma 2017; Uyarra et al. 2017).

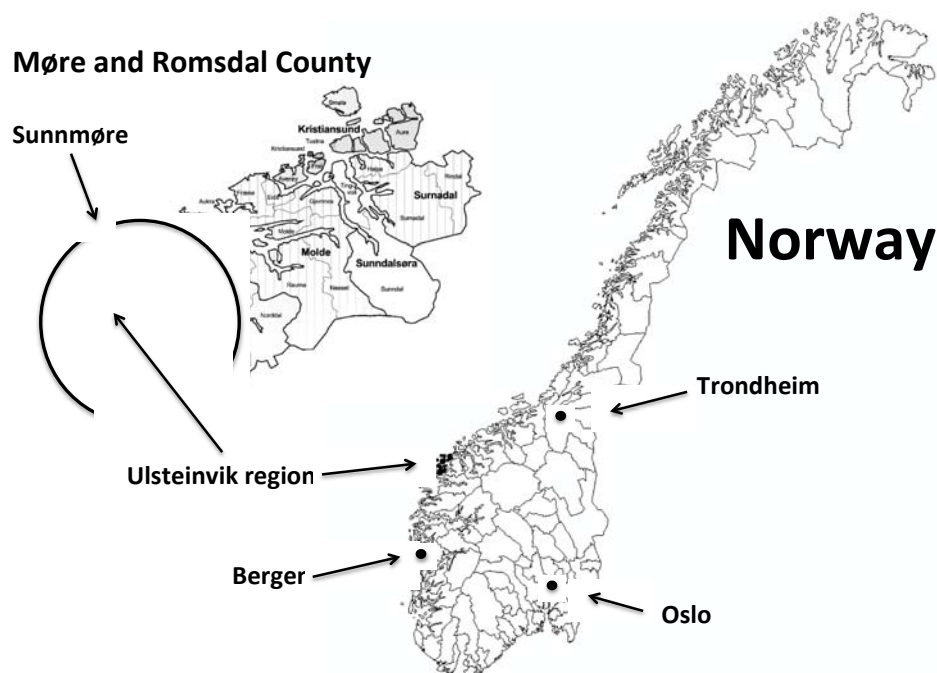
3 Case study, methodology and data

3.1 The maritime industry in Sunnmøre

The case study concerns a labour market region in the coastal islands of Sunnmøre district (Ulsteinvik labor market region), comprised of five municipalities (Ulstein, Hareid, Herøy, Sande, and Vanylven) located in Møre and Romsdal County in the western parts of Norway (Figure 1). It is home to around 28.000 inhabitants, which corresponds to 0.53% of Norway's population. It is close to Ålesund, which is the main knowledge center in Sunnmøre, including the Ålesund Campus of NTNU (Norwegian University of Science and Technology in Trondheim) and an elaborated support structure for innovation and entrepreneurship under the umbrella of ÅKP (Ålesund Knowledge Park). In terms of education, Volda University College plays an important part for the labor market region and is located in an adjacent region on the mainland to the East.

The region has a strong tradition and strength in shipbuilding and fisheries. Industrial development in fisheries is gradual in nature and highly regulated through fishing quotas. The tradition in shipbuilding relates to the closeness to the sea and the strong fishing industry. Operations in rough seas created a sophisticated demand for the maritime industry. Main yards were founded in the first half of the 20th century: Myklebust Verft in 1915, Ulstein Verft in 1917, and Kleven Verft in 1944.

Figure 1: Geographic location of study area



The region has become a global hub for the maritime industry and is known for its strong cluster. The cluster encompasses all parts of the value chain in the maritime industry (shipbuilders, ship-owners, suppliers, etc), and is highly linked at the regional, national, and global scale. Local ship owners and shipbuilders saw opportunities in the offshore service vessel industry in the 1970s and started to design ships based on local experience and expertise. From then on, the maritime industry increasingly focused on the oil and gas market, which has been highly volatile in nature.

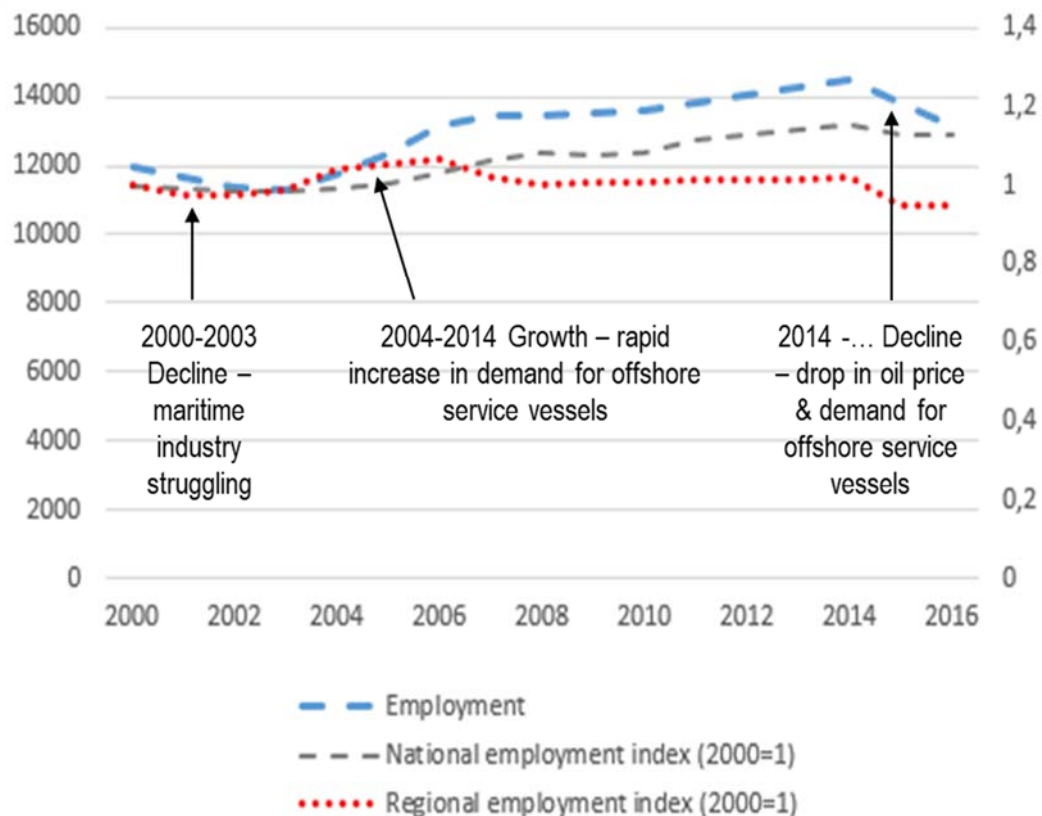
3.2 Methodology, analytical framework, and data

A key concern for this paper is to disentangle the interplay of structure and agency and identify cause-effect relationships. In order to investigate this, we follow the analytical dualism suggested by Archer (1982; 2003). Structure and

agency are considered as distinct analytical entities and the cause-effect relations are unveiled in an investigation over time. In order to identify cases that are potentially interesting in terms of the interplay between structure and agency, we selected regions exhibiting periods of unusual high or low growth in the context of a Nordic research project called Regional Growth Against All Odds (ReGrow).

As shown in Figure 2, our case study region contracted between 2000 and 2003, showed employment growth from 2004 through till 2014, and faced a deep crisis afterwards. These developments are closely linked to the increase in demand for offshore vessels from 2004 onwards, which in turn was a result of the raising oil price. In 2014, this market collapsed completely due to a drop in oil prices. These fluctuations in demand clearly trigger agency in terms of actions aimed at grasping the market opportunity on the one hand and actions aimed at dealing with a collapse of demand on the other.

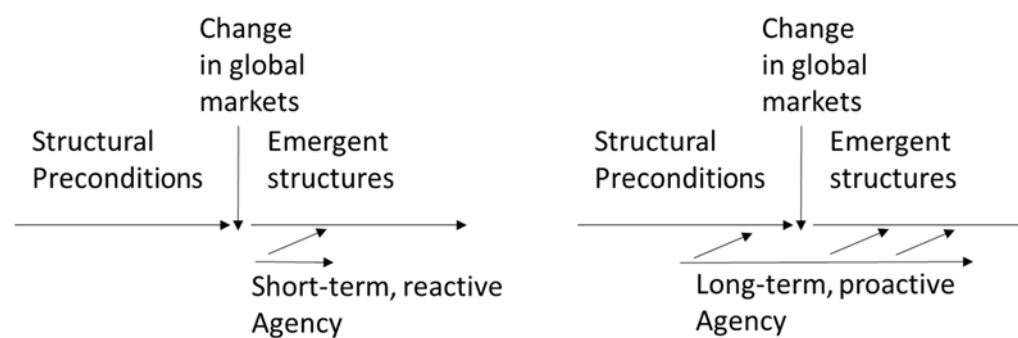
Figure 2: Employment in Coastal Sunnmøre from 2000-2018



Our analytical focus, however, was to understand whether besides these reactive types of agency, we could identify proactive types of agency with a long-term horizon that had a qualitative and transformative effect on the region. This, we hope can answer why regional actors were able to benefit so greatly from the offshore boom and why regional actors may be able to overcome a crisis where market demand collapsed completely. In the analysis, we use the three types of change agency identified in the Trinity of Change Agency (TCA) concept (Grillitsch and Sotarauta 2019), namely innovative entrepreneurship, institutional entrepreneurship, and place-based leadership. We investigate their importance for developing new regional paths.

Analytically, we thus differentiate between short-term, reactive and long-term, proactive agency as shown in Figure 3. Short-term, reactive agency occurs after the change in global market occurs whereas long-term proactive agency started before and lasts longer. Short-term, reactive agency influences emergent structures with quantitative, mechanic adaptation to a raise or decrease in demand. Long-term, proactive agency affects the structural preconditions before the exogenous shock and changes emergent structures qualitatively, i.e. propels new industrial path development.

Figure 3: Analytical framework



After identifying our case study region as extreme case in terms of its decline/growth pattern in the Nordic countries, we conducted an extensive desktop research in order to identify key events and key actors. We validated the desktop findings through a consultation with local, regional, and national actors. Following this exercise, we contacted the identified actors and organized our fieldwork. We conducted in total 37 interviews (17 interviews just at the end of the growth phase in 2014 and 20 interviews in 2019) and a focus group in 2014. We interviewed actors in our case study region, Ålesund, and the Møre and Romsdal County capital Molde. The interviews were semi-structured with an

interview guide that allowed informants to provide their story about the events and involved agency. We closely followed the methodology developed for the ReGrow project, documented in Grillitsch, Rekers, and Sotarauta (2019). We electronically recorded the interviews, discussed, analysed, and documented their main findings right after each interview, and then further documented and analysed the interviews after the field trips. The methodology yielded an immensely rich empirical story about agency in regional development, the findings of which we can only present in a synthesised form in the following section. The presentation of the findings is structured by agency type with reflections how these affected regional development more broadly and new path development specifically.

4 Findings

4.1 Schumpeterian Innovative Entrepreneurship

Innovative entrepreneurship has played a central role in shaping the regional trajectory in the coastal islands of Sunnmøre region. We find cases of innovative entrepreneurship in all periods of investigation and in small and medium sized enterprises (SME) as well as multinational cooperations (MNC). The SMEs are “hidden champions”, i.e. firms that are hardly known to the general public but occupy leading positions in certain market niches globally (Bessant 2019; Simon 1996, 2009). Hidden champions are survivors and the main reason for their survival is that they innovate in a strategic manner with a long-term perspective. The agency of hidden champions has shaped the region by occupying strong positions in global production networks, signaling what is possible to other

regional actors, creating a demand for specialized inputs and labor, and maybe most importantly, leading industrial change.

One of these hidden champions is Ulstein group, founded in 1917. With the UT ship design developed in the 70ies, Ulstein set a new standard for offshore vessels and became a world market leader in this segment with approx. 3000 employees. In 1999, Vickers bought Ulstein group and shortly after sold it to Rolls-Royce Marines. Vickers was not very interested in the yard, which remained in the ownership of the Ulstein family. Despite slow demand and negative outlook for the shipbuilding industry, strategic investments in innovation were made in the new Ulstein group leading to the X-Bow design (Figure 3) launched in 2005, which became a symbol for innovation in Norway and has received numerous national- and international innovation awards. The Ulstein group launched its next big innovation approximately 10 years later with the X-Stern design.

Figure 3: X-Bow Design



Source: Corporate Website: www.ulstein.com

Olympic shipping, founded in 1996 with roots in the fishery business, had successfully built up a fleet of offshore service vessels early in the period of steep growth. However, instead of being stuck in primarily riding the growth wave, Olympic shipping started to focus on new technological possibilities such as deep sea drilling services and a stronger focus on renewables such as offshore wind services already in 2011. This became a key factor when it came to their abilities to survive the deep crisis starting in 2014, reorganize and renew their activities, and achieve financial restructuring.

Jets, founded in 1986, is a spin-off from Ivak with an improved, patented design for vacuum pump toilets. They started by selling in the maritime industry but moved into new markets. Nowadays, only 50% of Jets sales are in the maritime sector. The move to land based business opportunities started with cabin houses. In the 1990s, Jets initiated a long-term project involving various universities and partners abroad, aiming at developing a closed, nature based sewage system, known as Ecomotive. In order to create a market for this new technology with strong environmental benefits, the firm has proactively engaged in lobbying and networking at the national and European scale in order to influence change in regulations (innovative combined with institutional entrepreneurship).

One of the consequences of the take-over of the “old” Ulstein Group by Vickers and then Rolls-Royce Marines was an increasing effort in long-term industry driven research and development (R&D) activities. Rolls-Royce Marines entertained global competence centers and to this end has developed a model and standard contracts. Using this template, Rolls-Royce Marines established a long-term and institutionalized collaboration with NTNU and SINTEF (one of the

largest applied research organizations in Europe) in Trondheim. While Rolls-Royce enabled the formation of such a center due to experience with similar set-ups around the world, the highly formalized nature and detailed contractual arrangements also constituted an obstacle as it conflicted with the more trust-based business practices in Norway. According to our interviews, the long-term science collaboration enabled the development of tools that in turn played an important role in product development and maintaining Rolls-Royce Marines' position as global leader in propulsion systems.

The effects of sustained, long-term and proactive innovation efforts as exercised by for example Ulstein Group, Olympic Shipping, Jets, or Rolls-Royce Marines are fundamental for regional development. The investment by Vickers and then Rolls-Royce was the result of the unique competences of Ulstein Group in developing world-leading ship designs. This investment led to an inflow of capital as well as a reorientation to more science-based activities. The continued investment in innovation by the new Ulstein Group facilitated their competitiveness and their abilities to move into new markets, as compared to low-cost competition destroying most of European shipyards. Olympic Shipping started diversifying during the boom, which saved their neck in the deep crisis after 2014. By moving into new markets early on and new product development, Jets reduced its dependency on maritime and continues to thrive. Without such acts of innovative entrepreneurship, the region would look very differently today. Hence, in terms of industrial path development, innovative entrepreneurship promoted path upgrading and to some extent path

diversification. Arguably, the region would have benefited from more path diversification à la Jets.

4.2 Place-based leadership

We find sustained place-based leadership with a long-term perspective, which shaped the region in many ways. Place-based leadership in our case was about having, sharing and mobilizing for a long-term vision about the region. This concerned physical infrastructure in terms of, for instance, enhancing connectivity in the landscape scattered by fjords and mountains, the knowledge infrastructure concerning among others education and innovation support, as well as regional coordination and lobbying at the national and international scale. In addition, it refers to securing funding for collective activities.

Place-based leadership is closely interwoven with Schumpeterian innovative entrepreneurship in our case. This can be traced to the beginnings of the maritime cluster. The founder of Ulstein yard was also mayor of the municipality of Ulsteinvik. His son, Idar Ulstein, and other influential business leader worked closely together to strengthen the cluster internally by establishing MAFOSS in 1968, a local organization with the aim to provide training and lobbying for the regional maritime industry. These efforts reaching back many decades created a favorable environment for place-leadership in our observation period.

One example of long-term oriented place-based leadership was the formation and building of local support structure. The Ålesund Knowledge Park (ÅKP) was founded in 1999 and developed over 15-20 years a comprehensive and integrated support system. The local business community was highly engaged in pushing this initiative forward. In 2004, this led to a successful application in the

National Center of Expertise Program, Norwegian Innovation Clusters. Around this time, a new leadership of ÅKP emerged that proactively stimulated university-industry interactions and the creation of a strong and complete local value chain in the maritime industry. These efforts resulted in a successful application in the Global Center of Expertise Program. The cluster GCE Blue Maritime was one of the first two that were awarded this status. During our interviews in 2014, we noticed that GCE Blue Maritime led a strategic discussion about a time after “oil and gas”. While the suddenness and depth of the crisis was still a surprise, this still have helped to prepare local actors for the time to come.

A long-term concern for place-based leaders was the scattered physical landscape. The lobbying for connecting the various islands with the Norwegian mainland to the east started in the 60ies. Leading business representatives and mayors intensified efforts in the 90ies. In 2002, the massive investments in the Eiksundsamband bridge and tunnel system were approved by the Norwegian parliament, and the system opened for traffic in 2008. This greatly increased mobility of local people and businesses within and beyond the region. The labour market became larger and more diverse, access to important services such as the University College in Volde improved, and commuting within different parts of the region fourfolded in the first ten years of the system. Our findings display that place-based leadership played a key role in this process.

Place-based leadership was an important driver for building the maritime cluster, strengthening linkages between actors in the value chain, building university-industry relations, lobbying for interests at the national level, supplying knowledge and competences, shaping the labour market and the

region in physical terms. Informally, place-based leaders provided identity and communicated values, which is where place-based leadership overlapped with institutional entrepreneurship. In that regard the Schumpeterian innovative entrepreneurs played an important signalling role, emphasizing innovation and striving for global leadership. In terms of industry development, place-based leadership mainly promoted path upgrading by promoting the inflow of fresh knowledge and innovation in the maritime industry. However, our findings suggest that little support was provided for path diversification, i.e. firms that were not core in the maritime cluster or aimed at moving out of the maritime industry.

4.3 Institutional entrepreneurship

In our case, institutional entrepreneurship is mainly related to a change in the mode of innovation from engineering-based to science-based. Besides some leading firms pushing in this direction, the Ålesund University College, which was integrated into NTNU in 2016 played an important role in this regard. Traditionally, the university college was conducting applied activities in close collaboration with industry. When a new professor with a strong research profile joined Ålesund University College, the absorption and development of more science-based knowledge increasingly gained in importance. These efforts led to the award of a Centre of Research Driven Innovation (SFI) in 2014, with a focus on demanding maritime operations, such as sub sea operations. Even though the nowadays-called Ålesund Campus of NTNU strengthened the research base, it still connects tightly to industry. For instance, there is a strong demand that Master theses are done in collaboration with industry.

Overall institutional entrepreneurship was less prominent than Schumpeterian innovative entrepreneurship and place-based leadership in the coastal islands of Sunnmøre. Yet, we identified cases where institutional entrepreneurship and Schumpeterian innovative entrepreneurship overlapped. Above, we provided the example of Jets, a firm that has engaged actively in changing regulations at the national and European level in order to create a market for their novel sewage system.

Furthermore, institutional entrepreneurship was important in terms of anchoring analytical, science-based knowledge in the engineering-based maritime industry. Through PhD and Master Thesis projects as well as direct industry collaborations, this contributed to the innovation activities of firms. Potentially, this institutional change can stimulate path diversification or even new path creation, which, however, has not realized yet. However, our findings also indicate that the long-term characteristics of research projects (e.g. PhD research) may not correspond well with the more short-term characteristics of industry when the need to change arises suddenly as it did in 2014/2015 when the crisis emerged. A mismatch between long-term research and short-term industry needs challenge such industry-university collaborations.

4.4 Reactive types of agency with short-term perspective

The proactive types of agency with long-term horizon discussed above have proven essential drivers of transformative change to the regional economy in Sunnmøre. Yet, our findings display that reactive types of agency with short-term horizon have been more frequent and common within the period at focus. A key difference between short-term and long-term agency is that the former followed

changes in global markets while the latter was in place before a change in global markets could be observed. In particular, this relates to measures of exploiting the opportunities in the offshore market as well as to measures to combat the deep crisis after 2014.

One type of short-term agency was the exploitation of opportunities following the vast increase in demand for offshore vessels after 2004. It was an extraordinary market with enormous profit opportunities. Most firms were riding on this boom, keeping busy with fulfilling orders while exploring new opportunities often played a minor role. While much of this can be explained as reaction to market demand, the ability to move first in the offshore market and grow consequently rested also on the collaborative and entrepreneurial culture, as well as a strong cluster that had been built previously. Olympic Shipping and Island Offshore perceived the opportunities early and ordered vessels with Ulstein and Kleven yards. The yards agreed to share the financial risks for the shipbuilding projects, which was an uncommon practice, as we understand from our interviews. Financial resources, strong capabilities, the willingness to take risks, and the belief in a market opportunity shared across several leading actors kicked-off the boom. The building of the first vessels was then perceived as signals raising expectations and triggering followers.

It was problematic, however, that most firms were paying too little attention to exploration in order to prepare for the time after the boom. Firms built up large fixed costs in terms of infrastructure and employment, which, together with a focus on one market segment, made them highly vulnerable to sudden change in demand. Many firms therefore had to pay a high price after the collapse in oil

prices and almost a total drop in demand for offshore oil and gas service vessels in 2014.

The crisis triggered actions aimed at dealing with short-term effects. Firms cut costs and employment. MAFOSS together with ÅKP started a competence-building project in 2014. This included for instance a joint venture with larger firms to keep internship programmes running with financial support. In addition, there were direct and partly successful negotiations at the national scale to grant unemployment benefits and local training for engineers without requiring them to seek jobs nation-wide at the same time as the system otherwise demands by design. ÅKP set up a programme to support entrepreneurship and scale up following the “regional entrepreneurship accelerator programme” (REAP) model developed at MIT.

We found evidence that at least one municipality provided important assistance in securing refinancing of a key firm in the region. A joint initiative of a mayor and business leader was to lobby nationally for receiving support from the Norwegian export bank (GIEK) for the diversification efforts into new market segments such as offshore wind, cruise ships, ferries, and more environmentally friendly solutions such as electric- and hybrid engines. In the aftermath of the crisis, Rolls-Royce Marines indicated a planned withdrawal from the region. Regional stakeholders mobilised support for a take over from the national Kongsberg group, which was believed to play a more proactive role in the regional cluster than a foreign firm.

These activities of firms, support organisations, and municipalities were necessary in order to avoid bankruptcy and keep competences in the region in

the wake of the crisis. In other words, extinguishing fires in a burning house. Still, leading maritime firms, currently still struggling, argued for a double strategy: downscaling in the short-term and investing in new markets for the long-term. This two-way strategy that we identified in the interviews gets support by recent figures of R&D expenditures, which doubled in the crisis years 2015 and 2016 as compared to 2014 (Research Council of Norway 2018). Business leaders realized that long-term investments in innovation and the region were the most important source for sustained success in the past, and therefore most likely to facilitate success in the future as well.

In contrast, it was a surprising to observe a sharp change in rhetoric and focus of the support organisations for innovation and entrepreneurship. In 2014, the discourse and documents (e.g. smart specialisation strategy) emphasized path diversification based on cluster cross fertilization and generic technologies. Several focus areas related and unrelated to the offshore market were identified. The award of the Centre for Research driven Innovation in 2014 held promises to support realising such a strategy. Conversely, in 2019, the rhetoric emphasized quick wins. For instance, we were told that subsea projects with a long-time horizon were put on hold whereas projects that could realise short-term results were promoted. The focus shifted to exploitation, and our findings indicate that the attention of support organisations have drifted away from their role in providing long-term support to the exploration of new opportunities.

5 Conclusions

The aim of this study was to shed light on the role of agency in regional development. Agency stands for the ways and the extent to which individuals, groups of individuals, and organisations shape regional development. We investigated this empirically in coastal Sunnmøre, a semi-peripheral labour market region in Western Norway known for its maritime industry. In the last 20 years, the region has gone through two crises and a remarkable growth phase, linked to fluctuations of the oil price and consequently demand for offshore service vessels.

It is not surprising to find reactions to these fluctuations linked to exploitation during the growth phase and cutting costs, restructuring, and maintenance of skills during the crises. Such reactive, short-term oriented agency led to mechanical adjustments to changes in the business environment, most visible in an increase or reduction of employment.

These mechanical adjustments due to short-term, reactive agency had little to do with the qualitative development of the regional economy, which rested on long-term strategic agency. Long-term strategic agency focussed on building regional and firm-level innovation capabilities, and the construction and exploration of new opportunities. Long-term strategic agency drove new industrial path development while short-term reactive agency propelled the regional economy along existing trajectories.

The Trinity of Change Agency (TCA) concept, encompassing innovative entrepreneurship, institutional entrepreneurship, and place-based leadership

(Grillitsch and Sotarauta 2019), capture the different types of long-term agency observed in our case study region. Innovative entrepreneurship had a strategic orientation as evidenced in literature on “hidden champions” (Bessant 2019; Simon 1996, 2009). Efforts leading to major innovations started before system shocks (e.g. positive or negative price shocks) and continued thereafter. These actions aimed not at incremental innovations with a relative certain outcome (addressing an existing demand) but radical with an uncertain outcome (believing in a potential future market).

Place-based leadership was exercised by a group of individuals across the business community, public administration, higher educational institutes, and support organisations. This led to the identification of common interests articulated in a regional strategy and the development of a support system for innovation and entrepreneurship, which received various national excellence awards. Institutional entrepreneurship, in our case, concerned the re-orientation of higher educational institutes from applied research and development towards research excellence while keeping strong ties with the regional industry.

The key issue for firms and regions is to balance such long-term, strategic and explorative activities with the exploitation of immediate opportunities. In our case, actors in the region struggled hard to find such a balance. Immediate opportunities and pressures, as well as short-term needs and interests incentivized short-term, reactive, exploitative agency. The support structures, in the wake of the crisis following the drop in oil price in 2014, switched their focus on supporting entrepreneurship with a rather short-term horizon. Considering that long-term agency defines the long-term success of regions whereas market

pressures incentivize short-term agency, there is a clear role for policy to stimulate long-term explorative actions in firms but also in the support system.

To what extent can our findings be generalised? We put forward the hypothesis that agency with a long-term, strategic perspective is a key driver for qualitative changes in regional economies regardless the context. This is because long-term agency is a force that changes capabilities, networks, and institutions, and consequently the opportunity space for regional development. Therefore, long-term agency is a force that can break with structural preconditions, which are largely fixed and rigid in the short-run.

The empirical case is an extreme one insofar as a strong specialization in one traditional industry typically leads to lock-in, i.e. high barriers to renewing the regional economy due to high sunk costs, relatively low (formal) education attainment of the work force, strong interdependencies in value chains, and institutions supporting the existing industry. Nevertheless, the power of long-term agency became evident in our empirical work. This implies that in other regions with a lower degree of lock-in (for instance, more diversified urban areas) long-term agency should be at least as powerful a source for change to regional economies as in our case.

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