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Regional foresight and dynamics of smart specialization: A typology of regional diversification patterns

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ABSTRACT

The concept of smart specialization has attracted great interest and has been adopted widely in European regional and innovation policy. Foresight is an important part of creating smart specialization strategies. However, both the smart specialization concept and foresight have been criticized for lacking an empirical and theoretical foundation that can help guide their application in practice. This paper contributes to the theoretical foundation of smart specialization and regional foresight by drawing on the field of economic geography and elaborating a typology for patterns of smart specialization. We highlight that there are different paths to reaching smart specialization within the same industrial domain. The empirical research focuses on the offshore wind service sector in four regions around the North Sea. The findings corroborate a typology that offers four distinct patterns—diversification, transition, radical foundation, and modernization—all of which can enable the creation of new industrial activities where regions enter an emerging industry based on fundamentally different starting points.

1. Introduction

The concept of smart specialization has come to play a major role in supporting the Europe 2020 jobs and growth agenda. All member states and regions that aspire to receive funding through the EU Cohesion and Structural Funds for the current programming period (2014–2020) are required to develop third-generation Research and Innovation Strategies (RIS3), called 'Research and Innovation Strategies for Smart Specialization'. The RIS3 framework represents the most recent wave of thinking in regional development; the novelty lies in the smart specialization, i.e., the requirement to build on each country and region's strengths, competitive advantages and potential for excellence.

The importance of foresight in smart specialization is established in the RIS3 Guide, which advocates foresight during the development of smart specialization strategies (Foray et al., 2012). Foresight, or future-oriented technology analysis (FTA), has developed in parallel with the development of regional policy ideas. Foresight generally draws from the various traditions of future studies with a pragmatic intent to inform policy making (Martin, 2010; Miles, 2010; Miles, 2008; Miles et al., 2008). Foresight, specifically in the regional policy context, is defined as a systematic, participatory, multidisciplinary, intelligence gathering, and medium-to-long-term vision-building process to capture existing expert intelligence to make it accessible for present decision making, aimed at uncovering possible future paths, and opening them up for debate (e.g., Foray et al., 2012; Hanssen et al., 2009). The evolution and adoption of foresight coincide with the rise of research on and subsequent diffusion of the innovation systems concept (Cariola and Rolfo, 2004). As Martin and Johnston (1999) concisely put it, foresight is, among other things, aimed to 'wire up' an innovation system, meaning that foresight can facilitate setting priorities for research, development and innovation, illuminate available technological options and constraints, and develop new connections among actors. In the context of smart specialization, foresight exercises can be useful in developing RIS3 because they can help identify trends, discontinuities, current constrains, emerging technologies and future opportunities in promising areas of strategic research, thus helping to set research and development agendas (Amanatidou and Guy, 2008; Harper and Georghiou, 2005; Paliokaitė et al., 2015; Piirainen et al., 2016; Rappert, 1999).

Under the umbrella of foresight, the two most relevant sub-literatures are regional and sectoral foresight. Of these two, regional foresight is predominately attached to policy-making processes and is thus increasingly less concerned with accurate anticipation of the future or forecasting and is more used as an objective setting, negotiation and commitment process (Cariola and Rolfo, 2004; Dufva et al., 2015; Hanssen et al., 2009). Technically, these processes might be characterized as generally normative foresight, backcasting, roadmapping, or visionary processes, or, with a more critical outlook, planning processes under the veneer of

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foresight. While regional foresight is conducted from a regional perspective, it may include perspectives on innovation systems that have had a large influence in the infancy of foresight research (c.f. Martin and Johnston, 1999; Martin, 2010; Martin, 1995; Miles, 2010). The most specific articulation of this focus is sectoral or innovations system foresight, where the focus is explicitly on anticipating the development and growth of an industry or sector, often with the view of proposing actions to remove 'systems failures' that impede that development (Alkemade et al., 2007; Andersen and Andersen, 2014; Dufva et al., 2015; Weber et al., 2009). Thus, innovation systems analysis has recently been (re-) established in foresight, especially in innovation systems foresight (Andersen and Andersen, 2014), as a basis for understanding the challenges and change dynamics for innovation in a given context (Alkemade et al., 2007; Andersen and Andersen, 2014; Breukers et al., 2014; Keller et al., 2014).

Foresight exercises in regional smart specialization processes have been useful in identifying trends, discontinuities, emerging technologies and future opportunities in promising areas of strategic research (Paliokaitė et al., 2015), but while foresight as such is an established practice, several challenges remain in theory and practice. A key issue for research in foresight is the lack of a sound theory and use thereof (Hideg, 2007; Piirainen and Gonzalez, 2015; Öner, 2010). A related challenge in practice is heavy reliance on participatory processes that greatly depend on the initial set-up of participants and their perceptions. This is highlighted by the fact that six of the top ten foresight methods are based on the solicitation of expert views and opinions (literature reviews, panels, workshops, brainstorming, interviews, and the Delphi method) (Popper, 2008).

One aspect of theory use and development in foresight is focusing on theory, as in understanding how and why a given unit of analysis works and leveraging that understanding to anticipate future development paths (Piirainen and Gonzalez, 2015). Following the call for theory use, the contribution of this paper is that it explores the dynamics related to smart specialization to better understand the patterns of change and growth associated with regional dynamics. A key contribution of this paper is that it demonstrates that using empirical data to understand the diversity of regional development can improve the quality of foresight and, hence, lead to (more-) relevant and sound policy recommendations.

A parallel contribution from this paper is to the literature on smart specialization. According to one of the fathers of the smart specialization concept, Dominique Foray, smart specialization is an example of "policy running ahead of theory" (Foray et al., 2011). It has been argued in particular that the smart specialization concept lacks an understanding of regional economics and innovation (Boschma, 2014). For decades, economic geographers have been engaged in studies of the spatial formation of new industrial paths (Boschma and Lambooy, 1999; Hassink, 2010; Martin and Sunley, 2006; Tödtling and Trippl, 2004). These studies have contributed to an understanding of how new industries develop in particular regions based on pre-existing innovative regional capacities (Boschma and Frenken, 2011; Frenken and Boschma, 2007; Tanner, 2016). The aim of this paper is to enhance the conceptualization of smart specialization by linking the findings from evolutionary economic geography with a real-time analysis of diversification processes in four European regions.

This paper explores how different regions have followed different paths and developed similar industrial capacities in the offshore wind servicing (OWS) sector. These paths help illustrate the diversity of smart specialization dynamics. The specific research question for this paper is: What are the specific patterns of regional development underlying smart specialization in the OWS sector? And how can this understanding strengthen the theoretical base of (regional) foresight processes?

First, we carry out a comparative study of smart specialization dynamics in four regions. The results show how these four regions have entered the same industry based on different sets of capabilities, showing that there exist multiple pathways to the same specialist domain. We use the findings to refine a typology of structural transformation (Foray, 2014). We think this typology of structural change can support policy makers when they are tasked with thinking ahead and building smart specialization policies. Second, we discuss the possibilities and pitfalls by using foresight approaches in developing smart specialization policies.

As our empirical case, we explore the offshore wind service (OWS) industry in four countries surrounding the North Sea, through the lens of a Regions of Knowledge project funded by the European Commission. We base our study on patent data collected for each region, classified into multiple technology areas, all relevant for the development of the OWS industry. This project and multiple others are the result of an increased focus within the European Union on strengthening the development of regional industries to spur on economic growth following the recent recession.

The paper is structured as follows: first, we present the concept of smart specialization and its theoretical background and elaborate on the typology of structural change. Section 3 presents the data and the method by which we have carried out the analysis. In Section 4, we present the findings and illustrate the typology of structural changes. In Section 5, we conclude and discuss the implications of the findings for smart specialization policy making.

2. Theoretical background

Evidence is mounting that the lingering problems in the European economy in the early 2010s cannot be reduced solely to the structural problems of the monetary union or the failure in financial markets (Economic Crisis in Europe: Causes, Consequences and Responses, 2009; Overbeek, 2012); they are also due to changes in industrial production and globalization, implying the need for existing industries or sectors to reinvent themselves (Foster et al., 2013; van Ark et al., 2013). The need for structural change is relevant to all European economies, from relatively low-tech economies that need to develop their innovation capabilities to high-tech economies that struggle with international or global competition.

The European Regional Development Policy, or 'Cohesion Policy', has generally been at least a moderate success (McCann and Ortega-Argilés, 2013a). However the architecture, which remained unchanged from the 1980s to the 2010s, is currently undergoing a significant change under the most recent programming period (2014–2020) to strike a balance between an institutional focus and a focus on economic geography (McCann and Ortega-Argilés, 2013a, 2013b). The need for structural change has led to the creation of the smart specialization concept, which essentially seeks to support the European Cohesion target by encouraging regions to identify their relative strengths and leverage them, while avoiding imitation or duplication and head-on competition with other regions (Foray et al., 2011; McCann and Ortega-Argilés, 2013a).

Regional smart specialization is one of the initiatives of the EU2020 strategy, particularly the 'Innovation Union' Flagship Initiative. The concept of smart specialization was put forward by an expert group of academics called Knowledge for Growth (K4G) that was established by the Commissioner for Research, Janez Potočnik, to help reinvigorate the Lisbon Strategy (McCann and Ortega-Argilés, 2013b). The concept was first introduced in 2008 and has rapidly been adopted at the highest level of policy within the EU. It is now one of the key elements of the EU2020 strategy.

Despite the broad adoption and application, according to critics, the concept of smart specialization has been implemented without sufficient theoretical or empirical understanding of the concept (c.f. Boschma, 2014; Foray et al., 2011). Consequently, the current implementation of smart specialization seems to be characterized by wishful thinking and hopes for what the future can bring. One of the specific gaps in the research is insight into the complex institutional coordination failures (Grillitsch,

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