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Smart Specialization and the Role of Universities and Science Parks

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Abstract

The concept of Smart Specialization represents a major shift in EU structural policy. It recognizes place-specific qualities and particularly locally embedded knowledge to stimulate innovative economic performance. Although there have been debates about the role of universities as innovation incubator, deliberations about their influence in regional innovation strategies (RIS3) in the context of smart specialization approaches are still under-represented. This paper therefore aims at discussing the potential role of universities and related incubator environments in smart specialization strategies, which is illustrated with the help of a German state, Mecklenburg-Vorpommern.

Keywords

Smart specialization; Universities; Science parks; Incubator environments

1. INTRODUCTION


Even in overall prosperous countries, some regions face structural change due to deindustrialisation and sectoral transformation processes, while others manage to create new development trajectories and are highly innovative. This also applies to the European Union's (EU) economic landscape. In order to adjust and balance economic performance and benefits across all European regions and in order to tackle the problem of structurally weak regions in its Member States, the EU induced cohesion policy measures through specialized funding programmes, which enable national governments or regional administrations to apply for financial aid. Recently,

Smart Specialization has become popular in these EU cohesion policies (Foray, 2015). Smart Specialization is a strategy incorporated in broader regional innovation policies, which consist among others of cluster policies (Uyarra et al., 2017). Moreover, it is part of a broader debate about regional economic development in general and can be seen as an example of so-called place-based regional innovation policies.

In the framework of this broader debate, several reports advocated for a more place-based point of view in terms of regional development strategies. Most notably the World Bank (2009), the European Commission (Barca, 2009) and OECD (2010) reports contributed to a discourse among scholars stemming from different academic fields, such as regional studies, economics and political sciences, which (re)discovered the importance of place-specificity as an explanatory approach for regional economic dynamism and diversification (Barca et al., 2012). While in growth and regional development theories the recognition of space and place was already gaining momentum, Barca et al. (2012) state that its implementation with regard to cohesion policies was still marginalised (p. 135). The above-mentioned reports, therefore, stimulated a

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policy debate, in which turn essentially two main policy approaches emerged, i.e. “place-based”, emphasizing the geographical context determined by its social, cultural, and institutional features and its interconnectedness, versus “spatially-blind” approaches, based on neo-classical equilibrium and ‘one-size-fits-all’ perspectives of economic growth.

Smart specialization is a clear example of place-based regional innovation policies. Drawing on innovation as a key driver for regional economic restructuring the concept advocates local stakeholders to identify and foster endogenous innovative capacities and behavior. The focus thus shifted from a top-down planning approach to an endogenous process of bottom-up entrepreneurial discovery. Context-sensitive approaches have been politically institutionalized by making those entrepreneurial discovery processes a pre-conditionality for regions in order to access EU regional development funding. Regional administrations are required to develop regional innovation strategies (RIS3) with a special focus on entrepreneurial discovery processes. Local stakeholders such as firms, citizens and institutions are expected to actively participate in the process. Universities and related innovation incubator environments, such as science parks, are one example of these institutional stakeholders. Although, there is some literature discussing universities and smart specialization (see for instance Fotakis et al., 2014; Goddard et al., 2013; Kempton et al., 2014; Kempton, 2015; Pinto et al., 2019), it is relatively limited, particularly given the burgeoning more general literature on smart specialization (Fellnhöfer, 2018). This paper therefore aims at discussing the potential role of universities and related incubator environments in smart specialization strategies, which will be illustrated with experiences in a thinly populated German state, Mecklenburg-Vorpommern, in which universities potentially play an important role in fostering innovation and specialization. The next section will further introduce smart specialization, whereas in Section 3, universities and science parks will be discussed in relation to smart specialization. In Section 4 some conclusions will be drawn.

2. SMART SPECIALIZATION

In the wake of a growing body of literature focusing on innovation as a key driver for economic growth (Shearmur et al., 2016), the EU implemented a new strategy to increase the minor Research and Development (R&D) expenditures of its

Member States economies. By strengthening the innovative capabilities and knowledge base of the latter, it aims at augmenting the EU’s overall competitiveness (Avdikos and Charadas, 2014, p. 98). Particularly with regard to economic growth, the Innovation Union-initiative has been set out to establish a more innovation-orientated economic cohesion policy approach.

Against this background, Smart Specialisation emerged as a conceptual policy tool to mitigate the R&D gap between the EU, the United States and Japan (McCann and Ortega-Argilés, 2015, p. 1292, see also: Foray, 2015) by enhancing the R&D activities of EU economies. Originally developed by a group “of growth and innovation economists” (Foray, 2014, p. 492) in 2008 and 2009, the concept gained considerable prominence within various fields of research (such as economics, economic geography and political science) as well as among EU authorities and among national and regional administrations. Moreover, it has been taken into consideration among non-EU countries (Foray, 2015, p. 7) in order to mitigate economic crises and to adapt their economies to globalisation dynamics. The concept has also been promoted to be the underlying theoretical rationale of the current EU structural funding period.

The concept emphasizes the turn from a top-down policy focus to a more endogenous entrepreneurial attempt to uncover regional and place-dependent innovation and specialization potential (Foray, 2014). This goes in line with the shift to the above-mentioned place-based approaches.

In order to apply for the EU 2014-2020 structural funding period, all EU regions are required to develop a strategic framework (ex-ante conditions) associated with the Smart Specialisation concept. Or as Piirainen et al. (2016, p. 289) put it:

“All member states [...] 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”.

These strategies aim at “promoting new regional industrial path development, that is, structural change and economic

diversification of regional economies” (Moodysson et al., 2016, p. 2). Although the basic assumptions of the Smart Specialisation concept concerning innovation and specialisation are not new and have been included in various debates on economic growth, the novelty is the so-called entrepreneurial discovery process (EDP), which is the core rationale of the concept. This discovery process advocates a bottom-up procedure conducted by all regional stakeholders (private sector, institutions and administrations) to identify “knowledge-based” (OECD, 2013, p. 11) and place-specific assets of a region. Thus, the focus of specialization and innovation strategies is not restricted to a particular industry sector, but is rather suited to cover a variety of regional assets. The scale of analysis thus is not a region in terms of its administrative boundaries nor an industry sector, nor a single company, but rather a domain. A domain is considered an “economic unit that stretches across several sectors or activities (without covering them entirely), which offer greater possibilities to promote learning and generate knowledge spillovers” by “creating new functional linkages between firms *across* sectors and localities within the regional economy” (Dubois et al., 2017, p. 3, own emphasis).

According to Foray (2015, p. 3) the Smart Specialization prioritization principle is inclusive (all sectors have a potential chance to be identified) and non-neutral (to favour certain technologies, fields, populations of firms). A suitable illustration would be a magnifying glass through which all stakeholders analyze a regional economy and decide to “concentrate resources on the development of *those activities that are likely to effectively transform the existing economic structures through R&D and innovation*” (Foray, 2015, p. 3, original emphasis).

Although Foray (2015) clarifies that specialization in this context must be understood as a method to develop new “specialties, through which regional systems will experience structural changes (diversification)” (p. 15), rather than building up comparative advantages. Moreover, the goal of regional smart specialization strategies is not to “narrow down the development path of a region nor to produce some sort of technological monoculture” (Foray, 2014, p. 492). They are designed to develop new market opportunities by combining already embedded regional competences into new or specialized products.

According to Foray (2015, p. 24), the process is not about the “advent of an innovation” but about the implication and variation of “innovative ideas in a specialised area” that gener-

ates knowledge about the possible future economic values of a certain direction of change. In other words, regional stakeholders are supposed to identify not only general potentials for economic specialization, but also a very specific EDP. According to Camagni and Capello (2013, p. 359), local entrepreneurs are thought to be the “main knowledge and creativity keepers”, this process must be designed endogenously and in a bottom-up manner.

Recently it is particularly related variety that is stressed as a concept in relation to smart specialization (Frenken et al., 2007). In this context, Boschma (2015) states that

“(t)here is indeed evidence that related variety appears to be a key ingredient for regions to diversify and develop new growth paths, as new industries tend to branch out of and recombine resources from existing local industries to which they are technologically related. There is a lot of case-study evidence that the long-term capacity of regions to develop new growth paths is depending on the re-configuration and reorientation of existing regional assets.” (p. 738)

The fundamental assumption, therefore, is that due to related variety entrepreneurial discovery translates into structural change (Foray, 2015, p. 29; Frenken et al., 2007; Dubois et al., 2017). The primary mechanism to renew a development path via EDP is to discover new ‘smart’ possibilities. In regions that lack a sufficient degree of related variety, other actors and activities, such as universities or science parks, might compensate for that deficiency.

3. UNIVERSITIES, SCIENCE PARKS AND SMART SPECIALIZATION

3.1 Overview

There is a rich literature on the role of universities in supporting innovation in regional economies in general terms (see for instance, Youtie and Shapira, 2008; Uyarra, 2010; Huggins and Johnston, 2009; Huggins et al., 2008; Cowan and Zinovyeva, 2013; Power and Malmberg, 2008). Moreover, science parks, in the spatial proximity to related to universities, play a role in this context. Particularly the current generation of science parks is potentially important for smart specialization, as

it is, according to Annerstedt (2006), compared to previous generations more specialized and characterised by cluster-oriented interactive innovation, more embedded in the urban environment, and has a wider range of stakeholders.

Recently, an increasing number of scholars have discussed the following potential roles HEIs and science parks could have in the smart specialization strategy (Fotakis et al., 2014; Goddard et al., 2013; Kempton et al., 2014; Kempton, 2015; Pinto et al., 2019; Markkula and Kune, 2015). First, according to the European Commission (2011, p. 2) “Universities can ... play a key role in defining a regional smart specialisation strategy by contributing to a rigorous assessment of the region’s knowledge assets, capabilities and competencies, including those embedded in the university’s own departments as well as local businesses”. Secondly, universities can be among the regional stakeholders identifying and deciding about smart specialization projects to be supported. Thirdly, researchers at universities can be the initiators of EDP projects. Foray (2015) stresses that not only firms are supposed to initiate and lead EDP, but potentially also other innovate actors in regional economies, such as university researchers. Related to this issue, they have a role in supporting spin-offs, also in science parks, which can lead to specialized clusters which, in turn, can form the basis for a smart specialization strategy. Fourthly, their role can be to avoid negative regional path dependence and lock-ins in the regional economy by allowing basic and experimental research (Goddard et al., 2013). Fifthly, the scientific knowledge bases provided might be a source for related variety and diversification in regional industries such as biotechnology. Finally, universities can maintain extra-regional linkages, as academic research is internationally oriented in the first place (Goddard et al., 2013).

Despite their potential positive role, it is conditioned by several factors and potential tensions. For instance, the degree of regional embeddedness affects the role. Moreover, there might be a mismatch between the university’s research excellence and the regional economy’s specialization. Another tension might exist due to the mismatch between the university’s striving for global excellence and good positions in rankings based on objective, generally valid criteria and the specific, context-dependent regional economic needs. Their role and political engagement also very much depends on the financing of universities. In the case of the federal political system of Germany, universities are expected to play a role at the regional level, as they are mainly financed by regional governments.

3.2 Mecklenburg-Vorpommern, Germany, as an illustration

The regional economy of Mecklenburg-Vorpommern in the north-eastern part of Germany is specialized in agriculture, tourism, food and beverage industry, and maritime technology, since it has direct access to the Baltic Sea (MWBT MV, 2014). In addition, it has some activities in the automotive supply industry, mechanical and electrical engineering and construction, as well as in biotechnology and aerospace. The regional economy mainly consists of family-owned SMEs. In the EU’s innovation scoreboard report (2014), Mecklenburg-Vorpommern is categorized as an Innovation Follower (MWBT MV, 2014).

Compared to other German states, Mecklenburg-Vorpommern is thinly populated, less dense urbanized with diverse natural areas and rather small towns and villages, although, cities like Rostock, Schwerin and Wismar are thriving urban areas. Mecklenburg-Vorpommern is located between the metropolitan regions of Hamburg, Berlin and Stettin (Poland). Even if Mecklenburg-Vorpommern is a rather rural state, it offers a broad variety of Higher Education Institutions (HEIs), such as the seven relatively small universities and universities of applied science, as well as external independent research institutes. The University of Rostock can be considered among the oldest universities of northern Europe offering traditional and interdisciplinary studies in social sciences, nature sciences, law and medicine.

In order to apply for EU structural funding for regional development (2014-2020 period) the regional government conceptualized a regional innovation strategy (RIS3) to meet the ex-ante conditionality for smart specialization that has been approved by the European Commission. In this strategy, the overall concept encompasses three bridging goals that will be applied on six strategic visions for future development that have been identified by an extended EDP. The development trajectories of health/life science, sustainable production techniques and new materials with special focus in mechanical engineering, information and communication, nutrition, energy and climate, as well as mobility will be supported. Measures consist of a) support of R&D and innovative activities of SMEs, b) support of application-oriented science-related infrastructure and c) fostering and accelerating knowledge and technology transfer. The absence of large, R&D active companies as technological gatekeepers, in particular, is considered as a big challenge for the regional economy. This is not to say that SMEs, in general, lack absorptive capacity or cannot effectively participate in global knowledge flows. There is, in fact, much

empirical evidence that SMEs (depending on their fields of exploration) can be highly innovative or even global leaders with consolidated global pipelines (Bathelt et al., 2004). Mecklenburg-Vorpommern also houses R&D-intensive SMEs, but compared to aggregated data at the national level, Mecklenburg-Vorpommern presents considerably lower values of general innovation indicators (MWBT MV, 2014), such as:

- R&D intensity (spending of GDP, assigned staff per 1,000 workforce, 2011),
- R&D infrastructure (public sector R&D assigned staff per 1,000 workforce, public sector R&D assigned staff in % of total R&D assigned staff, 2011),
- Excellence in science (acquired external funding per professorship, 2010),
- R&D cooperation (% of R&D-intensive firms in R&D cooperation with HEIs, 2010),
- Share of product and process innovation per firm in % of total number of firms (2010),
- Share of employed staff in technology intensive sectors in % of total employed staff (2010),
- Patent intensity (applications per 100,000 residents, 2011),
- Establishment of spin-offs and start ups in technology or knowledge intensive sectors per 10,000 residents (2008-2011).

There are two main reasons for these low scores (MWBT MV, 2014). First, the economic structure consists of mostly non-R&D intensive sectors, which in turn leads to low internal R&D budgets for investments and low values in patent intensity. Secondly, the majority of traditional, family-owned businesses has less than 250 employees (81%) and 22% have less than ten with scant capacities for professional R&D activities.

What makes Mecklenburg-Vorpommern in the context of this study interesting is the fact that the majority of R&D assigned staff (1/3 in total) is based at HEIs, such as the Universities of Rostock and Greifswald, and the Universities of Applied Science of Stralsund, Wismar and Neubrandenburg, as well as independent research institutions. This is slightly higher than the German average (2/5), although both values are nearly equal in relative terms (34 R&D assigned staff per 10,000 compared to 39 at the national level). Nevertheless, it shows the very strong focus on R&D activities related to public funding. Bearing in mind the discussion about a changing role of universities to a more entrepreneurial form and additionally a considerably low chance of a radical economic transforma-

tion of Mecklenburg-Vorpommern's structure (firm size) it is particularly promising to analyse the role of universities and science parks as a zone of contact between public and private sectors in the regional innovation strategy. As for smart specialization opportunities, the regional innovation strategy of Mecklenburg-Vorpommern is very much aware of this fact and focuses deliberately on augmenting the connection of institutional and private sector cooperation, as reflected by the strategic aim of strengthening knowledge and technology transfer. The formulated strategic future development trajectories therefore, mirror the research profiles of HEIs very closely. Because of the low level of R&D activities at the firm level, HEIs will be crucial as the main source of knowledge codification and distribution. Additionally, science parks and incubator ecosystems could play a pivotal role in consolidating private and public sector cooperation and in increasing sustainable economic entrepreneurship closely related to the concept of smart specialization. In order to avoid rigid development paths resulting in technologically mono-cultural environments, subsidies need to be applied unprejudiced to support of R&D and innovative activities at SME firm level, but based on regional embedded assets and expertise. This is reflected in Mecklenburg-Vorpommern's strategic goals.

In the course of the EDP, all stakeholders have been participating both in the discovery processes and in conceptualizing the regional innovation strategy. Concerning HEIs, in addition to all five major universities, also members of independent research institutes as well as technology centres have been present. HEIs have already been major innovation drivers in Mecklenburg-Vorpommern before the current EU funding period. Previously the regional administration has fostered collaboration of HEIs and private firms by creating special funding programs. Thus, the focus on HEIs is historically rooted. Despite the relatively low scores of private sector innovation indicators, opportunities for smart specialization have been identified by EDPs. Particularly in manufacturing industry, food industry, metal industry, mechanical and electrical engineering, as well as automotive industry, Mecklenburg-Vorpommern has promising specialisations at both firm and HEI level. Moreover, knowledge intensive service industries, mainly health and life science industry as well as ICT industry, have the highest R&D intensity and seem to be thematically proximate to concrete research projects at HEIs. In addition to health and life sciences, HEIs take the strategic lead as an innovation driver in at least two more fields of prioritization, i.e. food industry and sustainable production tech-

nologies and new materials with a special focus on mechanical engineering. Thus, within the RIS3 strategy of Mecklenburg-Vorpommern, HEIs play a very active role in smart specialization in order to get EU structural funding, as nearly 75% of all R&D capacities are bound to HEIs. To sustain the innovation capacities of HEIs, six out of twelve approved measures target science infrastructure, HEIs and incubator environments, such as technology and science parks. The latter are supported to enhance start up activities and spin-offs realizing a critical mass of innovative firms. Mecklenburg-Vorpommern will emphasize in its strategy education and support programs of entrepreneurs related to HEIs.

In sum, the regional innovation strategy of Mecklenburg-Vorpommern relies heavily on universities and research institutions. In their formulated strategic goals for future economic development and innovative entrepreneurship, these HEIs are regarded as one major driving force of smart specialization opportunities. They perform R&D activities in prioritized fields and are the backbone of Mecklenburg-Vorpommern's innovative capacities. Moreover, they are supposed to enhance the lack of R&D activities within Mecklenburg-Vorpommern's SMEs by effectively distributing knowledge into innovative ecosystems, such as related science parks and incubator systems. Furthermore, also in flagship projects and successful business projects, basic research and collaboration conducted by universities has been crucial.

4. CONCLUSIONS

As has been stressed in recent literature, universities and science parks potentially play a role in fostering smart specialization strategies. The latter strategies try to stimulate specialization by supporting entrepreneurial discovery processes that are based on endogenous innovation potential in the regions. Overall, the aim is to support structural change in regional economies by fostering smart specialization. Given the focus on endogenous innovation potential, it recognizes place-specific qualities and particularly locally embedded knowledge. Entrepreneurial discovery processes are not only supposed to be initiated by firms, but also by other regional actors, such as university researchers. As the case of Mecklenburg-Vorpommern showed, particularly in thinly populated regions with limited endogenous potential for starting firm-

led entrepreneurial discovery processes, universities and science parks are important actors in the smart specialization strategy. Moreover, in thinly populated, peripheral regions, universities could potentially also foster extra-regional collaborations and global pipelines, which so far has not been fostered enough through smart specialization strategies (Uyarra et al., 2018). In federal political systems, such as in Germany, where the main financial public funding of universities comes from the regional level, universities can also play an active role in strengthening the badly needed institutional structures for implementing the strategies (Marques and Morgan, 2018). Finally, in other constellations, such as in old industrial areas suffering from negative path dependence and lock-ins, universities might be less influenced by vested interests than political and economic stakeholders in the region (Boschma, 2014; Morgan, 2017; Hassink, 2010).

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