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From smart specialisation to smart experimentation

Building a new theoretical framework for regional policy of the *European Union*

Abstract: The idea of smart specialisation has gained high prominence in the discourse about the regional policy of the *European Union* (EU). In the coming program period from 2014 to 2020 it is expected to be a major pillar of EU structural funds. The notion of smart specialisation incorporates some basic principles of evolutionary economics and centers on the idea of an entrepreneurial discovery process of new trajectories on the regional level. It does not, however, sufficiently take into account the relevance of individual agents, their actions, and their relations with each other in the identification, creation, development, and destruction of technological and economic trajectories. For this, a focus on micro-level dynamics is needed that provides the base for experimentation. Therefore, this paper proposes the new concept of smart experimentation. This notion aims to complement smart specialisation. It is anchored not only in evolutionary economics, but also in relational economic geography.

Keywords: regional policy, structural policy, smart specialisation, clusters, EU structural funds, cohesion policy

JEL codes: O18, O25, O33, R11, R12, R58

Introduction

The idea of smart specialisation[1] is currently gaining prominence in the EU's regional policy discourse. Due to its role in the upcoming new program period of the EU structural policy from 2014 to 2020, this concept will most likely have a considerable impact on the design, governance and conduct of regional policy in many European regions.

The notion of an entrepreneurial process of discovery that is coordinated on the regional level is central to smart specialisation. Rehfeld (2013, 9) calls this idea a transformation of the *Schumpeterian* entrepreneurial discovery process into a regional prioritization process in the domain of innovation strategies.[2] This process supposedly leads to the collaborative identification of existing potential in science and technology which can be used to concentrate the regional economy's resources in promising fields of economic specialization.

The idea of such a discovery process on the regional level, however, confers an entrepreneurial role to a region itself and neglects the potential for a creative experimentation process among entrepreneurial agents on the micro-level. Instead of focusing on coordinated path identification and specialization on the regional level, regional policy should instead encourage micro-level discovery and experimentation processes. Drawing on evolutionary economics, this article suggests a concept of smart experimentation that overcomes the static nature of smart specialisation by focusing on dynamic path development.

The article starts by outlining the idea of smart specialisation and its theoretical foundations. In the following major criticisms are presented that can be waged against smart specialisation as it is currently being discussed in the discourse on future EU regional policy. Then the new notion of smart experimentation is introduced which addresses the fundamental criticisms against smart specialisation. Smart experimentation develops smart specialisation into a more evolutionary and relational concept and aims to close smart specialisation's conceptual gaps. The article illustrates the use of smart specialisation and its present shortcomings with case studies on the use of smart specialisation strategies in European regions.

The idea of smart specialisation

Smart specialisation centers on the idea that regions should concentrate their knowledge investments in certain areas of specialization. This applies not only to economically strong regions, but to weaker ones as well. In weaker regions, smart specialisation is seen as a way to concentrate resources in some areas where a lasting impact on the regional economy can be achieved (Foray/David/Hall 2009). Regional governance is a central aspect of a smart specialisation strategy: "Regional authorities can exploit the smart specialisation logic by undertaking a rigorous self-assessment of a region's knowledge assets, capabilities and competences and the key players between whom knowledge is transferred. This militates against recommending off-the-shelf local economic policy solutions and instead requires a careful analysis of regional knowledge capabilities and research competences" (McCann/Ortega-Argilés 2011, 3).

Such specialization, however, is not meant to be planned or ordered in a hierarchical way. Instead, it should be developed in "an entrepreneurial process of discovery" constituting "a learning process to discover the research and innovation domains in which a region can hope to excel" and in which "entrepreneurial actors are likely to play leading roles in discovering promising areas of future specialization, not least because the needed adaptations to local skills, materials, environmental conditions, and market access conditions are unlikely to be able to draw on codified, publicly shared knowledge, and instead will entail gathering localized information and the formation of social capital assets" (Foray/David/Hall 2009, 2).

This process is supposed to be governed by a public-private partnership model. This is because "the smart specialisation logic, when it is appropriately translated to an explicitly spatial regional context, would appear to be a powerful lens through which policy makers can design and articulate local development policies" (McCann/Ortega-Argilés 2011, 19). The need for public coordination is justified because of a public-good problem. The social value of specialization is perceived to be greater than the rent that an entrepreneur who has discovered promising new trajectories can capture (Foray/David/Hall 2009, 2).

Foray/David/Hall (2009, 3) distinguish between leader regions and follower regions. Leader regions are those who have a strong position in the development of general purpose technologies. Follower regions are those that are supposed to concentrate on developing applications of these technologies. According to Foray/David/Hall (2009), smart specialisation may be used as an instrument to achieve a spatial division of labor between leader and follower regions through specialization on generic technology development and applied product development, respectively.

Smart specialisation can be expected to develop considerable relevance within EU regional policy in the years ahead. It is an important pillar of the EU's competitiveness strategy "Europe 2020" and the "Innovation Union" flagship initiative derived from it (McCann/Ortega-Argilés 2011, 2, 8; Rehfeld 2013, 10 f.). Within the framework of the new period for the EU's cohesion policy from 2014 to 2020, the *European Commission* has proposed making the existence of smart specialisation strategies an "ex-ante conditionality" (Foray/Goddard et al. 2012, 10) for funding on specific thematic objectives of the *European Regional Development Fund* (ERDF): "Every Member States (sic) and region have to have such a well-developed strategy in place, before they can receive EU financial support through the Structural Funds for their planned innovation measures." (Foray/Goddard et al. 2012, 10)

For this reason, Rehfeld (2013, 10 f.) calls smart specialisation a key concept of the ERDF policy. Many regions in the EU already have regional innovation strategies for smart specialisation (RIS3) in place, as the case studies in this paper demonstrate. RIS3 are "integrated, place-based economic transformation agendas" (Foray/Goddard et al. 2012, 9). They are characterized by certain specifics that distinguish them from conventional regional innovation strategies:

"• They focus policy support and investments on key national/regional priorities, challenges and needs for knowledge-based development, including ICT-related measures;

• They build on each country's / region's strengths, competitive advantages and potential for excellence;

• They support technological as well as practice-based innovation and aim to stimulate private sector investment;

- They get stakeholders fully involved and encourage innovation and experimentation;

- They are evidence-based and include sound monitoring and evaluation systems." (Foray/Goddard et al. 2012, 9)

Some of these strategies were either developed several years ago or have evolved over many years. Consequently, these strategies and the basic ideas they build on are often older than smart specialisation discussions. Still, the existing RIS3 are probably only a harbinger of the future policy relevance of smart specialisation once it is applied EU-wide.

An additional fact points to the high relevance of smart specialisation in EU policy making. Considering the tendency for EU regional, technology and development policies to follow similar thematic concepts (and maybe even to converge to a certain degree), smart specialisation might also gain relevance in development cooperation, e. g. through the EU's pre-accession assistance, its neighborhood policy, or the *European Development Fund*, and certainly in the upcoming technology policy "Horizon 2020" and in the "Regions of Knowledge" program (Rehfeld 2013, 4, 11). All of this strongly highlights the relevance that smart specialisation can be expected to enjoy during the coming years.

Theoretical aspects of smart specialisation

Smart specialisation originated as a sectoral approach and has more recently been applied in a regional policy context (McCann/Ortega-Argilés 2011). In this new meaning, as well as its reception in practical regional policy in particular, it is probably less a full-fledged theoretical concept and more a label. In fact, it might be regarded as what Markusen (1999) calls a "fuzzy concept". Still, the notion of smart specialisation fits well among recent trends in economic geography. It incorporates various aspects of evolutionary economics, e. g. the focus on variation and path dependency as well as the notion of related variety (Nelson/Winter 1982; Asheim/Boschma/Cooke 2007; Frenken / van Oort / Verburg 2007; Boschma/Iammarino 2009; McCann / Ortega-Argilés 2011; Bathelt / Glückler 2012). Indeed, the thought that specialization should develop in the course and as a consequence of an entrepreneurial discovery process (Foray/David/Hall 2009) is a highly evolutionary idea.

Smart specialisation suggests a participatory fundamental perspective. It combines top-down and bottom-up approaches. In its intended use in future EU structural policy, the requirement that regions need a RIS3 to be eligible for certain funding lines of the ERDF represents a top-down stream of the (applied) approach. At the same time, the use of regional agents' energy, creativity and knowledge utilizes bottom-up dynamics (Rehfeld 2013, 9). Therefore, smart specialisation offers a way of ensuring both empowerment of regional and local agents and their ownership of the process. These are important prerequisites for the sustainability and the effectiveness of regional economic strategies in the long term. In this regard, smart specialisation certainly features among regional policy's more modern concepts.

Another characteristic of smart specialisation is that it is essentially growth-oriented. Instead of compensating for weaknesses of regions with structural deficits, it focuses on promoting regional strengths. This principle places smart specialisation in line with the observable long-term reorientation of European structural policy towards an increasing use of growth-oriented instruments (Bathelt/Glückler 2012, 324–328).

Finally, smart specialisation is closely related to the cluster approach that has been intensively used in EU structural policy (and the EU's industrial and research policy) during recent years. While specialization is a broader notion than clustering, clusters can still be (and often are) major pillars of RIS3 (Rehfeld 2013). After all, the *European Commission* (2010, 7) states that clusters "are an important element in smart specialisation strategies. They provide a favourable environment to foster competitiveness and drive innovation. Support for their development needs to be concentrated on areas of comparative advantage" and that the development of RIS3 "aims at concentrating resources on the most promising areas of comparative advantage, e. g. on clusters, existing sectors and cross-sectoral activities, eco-innovation, high value-added markets or specific research areas" (*European Commission* 2010, 11).

The attention and enthusiasm that smart specialisation currently enjoys in EU regional policy does, however, diverge from its theoretical foun-

dations. If smart specialisation is, to some extent, a fuzzy concept, the same can be said even more strongly about its reception in practical policy making. This vagueness leads to weaknesses of the concept as it is currently discussed in the discourse on future EU regional policy.

Strengths and shortcomings of smart specialisation

First, one can ask what is especially new about smart specialisation. While from a theoretical perspective, the integration of central aspects of evolutionary economics and especially of the thought of an entrepreneurial discovery process into regional policy is certainly innovative, this novel aspect of smart specialisation appears somewhat attenuated in the realm of practical policy making. The fact that in some regions RIS3 came into existence long before smart specialisation became fashionable in EU regional policy exemplifies this problem. The following case studies provide examples for the genesis of such long-standing regional innovation strategies or of RIS3 that were developed out of pre-existing cluster strategies. If this were the primary ways of implementing smart specialisation, it would just be another label in EU regional policy.

From a theoretical perspective, however, this does not necessarily need to be the case. Smart specialisation does not need to be a mere continuation of established policies, and it certainly should not be only that. A coherent strategy of smart specialisation can add much to EU regional policy – not the least by combining with those more traditional approaches of regional policy that have applied successfully. Yet, inconsistencies within EU regional policy need to be resolved. While smart specialisation calls for regions to autonomously set their own regional development agendas, EU structural funds in the new program period of 2014–2020 will most likely focus on several politically set priorities derived from the "Europe 2020" strategy. As a measure to implement Europe 2020 in EU regional policy, smart specialisation is confronted with high hopes that it can contribute to achieving the EU's current growth priorities: "The RIS3 approach is relevant to all three priorities of Europe 2020, i. e. smart, sustainable and inclusive growth. First of all, smart specialisation matters for the future of Europe because the development of an economy based on knowledge and innovation remains a fundamental challenge for the EU as a whole. Secondly, smart specialisation is relevant to achieve sustainable growth, as an important innovation effort and considerable investment is required to shift towards a resource-efficient and low-carbon economy, offering opportunities in domestic and global markets. Finally, smart specialisation contributes to inclusive growth between and within regions by strengthening territorial cohesion and by managing structural change, creating economic opportunity and investing in skills development, better jobs and social innovation." (Foray/Goddard et al. 2012, 9)

This orientation toward the priorities set by Europe 2020, along with the conditionality approach the *European Commission* is expected to employ is a strong indicator of the top-down stream of action in future EU regional policy. As long as conditionalities refer to framework conditions, e. g. the requirement that regions develop RIS3, a potentially beneficial combination of top-down effectiveness criteria and bottom-up dynamics could arise. When, in contrast, conditionalities impose sectoral or technological priorities derived from European-level programs like Europe 2020, the scope for regions to let their economies unfold along their own trajectories becomes somewhat limited. Such a tendency would certainly contradict smart specialisation's potential to benefit from idiosyncratic regional strengths.

One remarkable issue about smart specialisation is that it requires "a sound analysis of the regional economy, society, and innovation structure, aiming at assessing both existing assets and prospects for future development" (Foray/Goddard et al. 2012, 19). It is obvious that such an analysis is a critical prerequisite for any policy that builds on regional specialization. If existing or emerging specializations are to be promoted, they have to be identified at the outset of the process (and often at later stages, too). While this is actually true for almost all kinds of regional policy, this principle is often not adhered to. The practical implementation of cluster policy in many regions provides a vivid example for this phenomenon (e. g. Kiese 2008; Wrobel/Kiese 2009; Benner 2012). It remains to be seen if this advice is heeded in the practical implementation of smart specialisation.

In the current discourse on future EU regional policy, smart specialisation exhibits a strong

focus on science, technology and innovation. This orientation unnecessarily narrows the potential of RIS3. Upgrading the competitiveness of industries such as tourism and retail might be promising ways of specialization in regions that are not necessarily connected to "high-tech" innovation. While such industries can still be innovative, they do indeed differ from knowledge-intensive industries and the innovation processes occurring within such industries which often involve at least some degree of systematic research and development. Relevant knowledge constituting highly competitive specializations can also consist of routines and practical knowledge developed and applied outside of academic communities or explicit research and development activities. Some industries outside of "high-tech" areas build their dynamic competitiveness mainly on such sources of innovation. This fact should be taken into account in the design of RIS3, so that competitive upgrading promoted by RIS3 implementation is not confined to industries conducting research and development (R&D). Consequently, the relevance of non-science knowledge is emphasized by Foray/Goddard et al. (2012, 13): "Entrepreneurial knowledge involves much more than science and technology. Rather, it combines and relates this to knowledge of market growth potential, likely competitors and the entire set of input and services required for launching a new business activity."

While a narrow view of innovation is not necessarily an element of the of smart specialisation as a concept (Foray/David/Hall 2009), the high prominence that smart specialisation can be expected to gain in the EU's research policy during the coming years might lead to such a direction which would then need to be balanced by opening it to other regional policy sectors. This opening would call for several different tracks of smart specialisation in EU policy. Generally, regional specialization development should adopt a cross-cutting perspective and should not be limited to the domain of regional policy. Such development ought to be reflected in other policy areas, too, such as education and training which are important to the regional competence base (Foray/David/Hall 2009; Rehfeld 2013, 9). While theoretically it appears straightforward, adopting such a cross-cutting perspective would be difficult to implement, given the EU's limited competence in education and training policies.

Smart specialisation in Nord-Pas de Calais

Nord-Pas de Calais is an old industrialized region in the north of France. Coal mining, textile and steel industries were dominant in the past. During industrialization in the 19th century, the region was one of France's leading industrial areas. When heavy industries in the region went into decline, the region developed new strengths in railway transport, the automotive industry and logistics. However, in recent decades the automotive industry in Nord-Pas de Calais was confronted with difficulties. The region strives to renew its industrial base by entering sectors such as information and communication technologies, health, and environmental technologies. The region's startup scene is dynamic but somewhat lacking a high degree of innovativeness. The region tackled these challenges with the launch of a *Regional Innovation Strategy* in 2009 that now represents its RIS3. The strategy aimed at supporting innovative startups, assisting small and medium-sized industries (SME) in strategy and human capital development, attracting high-tech investment, and improving the region's image. Part of the strategy was the establishment of six cluster initiatives called "pôles d'excellence et de compétitivité" both in established sectors (e. g. in the textile industry with a focus on the development of materials and on design) and in new ones (e. g. in the health sector, connected with the existing nutrition industry). Currently emphasis is put on developing synergies with the neighboring regions of Picardie and Champagne (France) and Wallonia (Belgium). The strategy's implementation was assisted to a considerabe extent by EU structural funds. In particular, the ERDF was supposed to provide 266.7 mio. € for the support of research and development, innovation, and businesses in the program period 2007 to 2013. Other large-scale ERDF funding was planned for other areas such as the environment, climate change and risk prevention, and accessibility. The *European Social Fund* (ESF) supported activities aimed at improving the adaptability of employers and employees to structural change (Ortega-Argilés 2012, 88 ff.).

The regional innovation strategy process in Nord-Pas de Calais highlights the phenomenon that pre-existing strategies (and in this case one that has even been implemented for several years) are re-branded as RIS3. While for an old industrialized region it seems logical to pursue the goal of industrial renewal by supporting new and emerging industries with the means of innovation policy, it is far less clear to discern the notion of smart specialisation in the regional innovation strategy of Nord-Pas de Calais. Specialization through cluster policy is a dominant part of the strategy, but the notion of an entrepreneurial discovery process does not figure prominently. Promoting entrepreneurship is an important prerequisite to the discovery of new technological and commercial trajectories in a region, but building a regional environment conducive to open-minded experimentation is likely to require more generalized policies than those connected with the cluster policy that the region of Nord-Pas de Calais pursues. Emphasizing experimentation and discovery on the one hand and specialization on the other would help to develop comprehensive regional innovation policies that would effectively include the notion of smart specialisation and facilitate the development of genuine RIS3.

Significant criticisms against the very concept of smart specialisation may also be raised. As of now, smart specialisation does not fully incorporate evolutionary economics into regional policy, despite including some basic evolutionary concepts like variation, selection and path dependency. Smart specialisation as it is currently discussed with respect to EU regional policy, suggests that the entrepreneurial discovery process is conceptualized on the regional level but not where it actually takes place, which is the micro-level of individual agents and their relationships with each other. The role that governance plays on the regional level for the entrepreneurial discovery process in the smart specialisation discourse is revealed in the way the process is described by Foray/Goddard et al. (2012, 13): "This process can reveal what a country or region does best in terms of R&D and innovation because entrepreneurial actors are best placed to know or discover what they are good at producing. This typically happens through trial and error and experimentation in new activities. Regions (!) therefore need to pro-actively involve entrepreneurial actors in strategy design and offer more incentives for risk taking."

Entrepreneurs are supposed to participate in the process, but in a collective manner and in centrally governed and regionally organized and institutionalized fora: "An effective appreciation of entrepreneurial dynamic can only be performed if entrepreneurial actors and management and governance bodies responsible of RIS3 engage in direct discussion. A RIS3 should hence provide for a set of consultation and auditing tools, as for instance technology auditing, interviews with cluster management and firms, mixed working groups, setting up of observatories and monitoring organizations." (Foray/Goddard et al. 2012, 21)

RIS3 formulation thus is intended to follow a public-private partnership model: "Innovation users or groups representing demand-side perspectives and consumers, relevant nonprofit organizations representing citizens and workers should all be taken on board of the design process of RIS3. (…) In order to secure that all stakeholders own and share the strategy, governance schemes should allow for 'collaborative leadership', meaning that hierarchies in decision making should be flexible enough in order to let each actor to (sic) have a role and eventually take the lead in specific phases of RIS3 design, according to actors' characteristics, background, and capacities. (…) The governance structure should have a dedicated Steering Group or a Management Team, a Knowledge Leadership Group or Mirror Group, and should also allow for thematic or project-specific working groups." (Foray/Goddard et al. 2012, 22) While pursuing a public-private partnership model is probably a good idea for the way a RIS3 is developed (in contrast to classical, hierarchical methods of pure top-down strategy formulation), it is very doubtful whether this is a viable alternative to markets in organizing entrepreneurial discovery processes of path creation and development.

Coordination by public agents is seen as a "lens" (McCann/Ortega-Argilés 2011, 19) for designing policies for implementing RIS3. This metaphor leads to an important caveat: A lens does not only focus on selected aspects of reality. It also fades others out, even if they might be relevant to the whole picture. An approach that concentrates on a participatory but nevertheless

centrally and publicly governed process toward path discovery poses the danger of precluding (or at least not promoting adequately) possible trajectories apart from those already discerned and pursued by a region's agents. A collaborative entrepreneurial discovery process as envisaged by the elaboration of an RIS3 by stakeholders from within the regional economy favors insiders who already have a say in the pursuit of trajectories, and who might therefore exhibit a tendency to conserve established paths and perceptions. While this effect can be conducive to specialization, it may not always be so for the discovery of totally new paths. In extreme cases, the danger of lock-in looms (Grabher 1993).

If a region is to embark on a discovery process that unleashes entrepreneurial dynamism, it will need to give outsiders a chance to search and experiment. "Outsiders" here refer to those within the region who do not yet have a say in major strategic decision-making processes in the regional economy, e. g. university students or graduates, employees who have not yet arrived in executive functions, or entrepreneurs prior to starting and growing their businesses. Giving a chance to "outsiders" could even refer to encouraging this search and experiment process among immigrants. Further, some regions could stimulate discovery processes by attempting to attract creative individuals. A combined top-down/bottom-up approach can be pursued in a participatory discovery process which is governed on the regional level. This process can involve a large set of stakeholders, but not those that are yet to come up in the future (e. g. future university graduates, spinoffs, entrepreneurs). The approach thus leaves no way of integrating their (future) choices and trajectories into the logic of a region's specialization. Thus, a discovery process governed at the regional level does not sufficiently allow pluralism among a regional economy's agents, which is at the very core of Schumpeterian processes of creative destruction, and thus of path creation and development. This thought was essentially part of the original, sectoral smart specialisation concept, but it seems to have lost its central role upon smart specialisation's transfer into the domain of regional policy. McCann/Ortega-Argilés (2011, 21) indeed acknowledge that "the fact that in the original policy concept it is the entrepreneurs and not the regional policy makers who are assumed to be best equipped for identifying the smart specialisation opportunities therefore also poses an additional policy-design challenge."

Underlying this orientation is the fact that smart specialisation considers the potential of regional policy to influence the regional economy's evolution to be high. It potentially over-estimates the degree of political controllability of evolutionary developments in a market economy. Such evolutionary developments are relational, path-dependent, contingent and contextual processes (Bathelt/Glückler 2012). These characteristics make them much less conducive to central governance than the applied smart specialisation logic implies. Foray/David/Hall (2009, 2) stress that "policy makers should accept that their role in "selecting the right areas for specialization" may be a more modest one than is usually envisaged when support for infant industries and support for technology start-ups are under discussion." This prudence against an overestimation of the impact achievable by public policy certainly seems wise, and equally emphasizes the participatory perspective of smart specialisation involving public and private agents. However, smart specialisation still involves a coordination process for established stakeholders that needs to be governed by public policy. While this can be a useful approach when some structure already exists and is to be further promoted (as is the case in cluster policy, e. g.), the coordination process does not appear suitable for stimulating an open discovery process that will often (and should) lead to new ideas. While the discovery process as part of smart specialisation is supposed to make existing potentials in science and technology visible, this focus may just be too narrow. The knowledge or competence base existing in a region (Rehfeld 2013, 9) will often be far too extensive and complex to review it in its entirety, even via a participatory coordination process involving various regional stakeholders. Identifying possible marketable uses for existing knowledge (which can encompass much more than "only" science and technology) is often a process guided by chance, rather than formal coordination. While coordination fora are surely useful for this purpose, they are certainly not sufficient in achieving an entrepreneurial process of discovering promising uses of existing knowledge that are useful a particular regional context. Discovery likely depends less on coordination on the regional level (Rehfeld 2013, 11) and more on experimentation and trial-and-error loops between agents. This idea of individualized search and discovery processes is closely related to the evolutionary notion of variation. Despite its recognizable roots in evolutionary economics, smart specialisation thus

tends to underestimate the importance of variation, at least on the micro-level (which is arguably where variation occurs in the first place).

As smart specialisation can be brought up in the well-known controversy weighing the benefits of specialization against those of diversification (e. g. Glaeser/Kallal et al. 1992; van der Panne 2004; van der Panne / van Beers 2006), it needs to address the notion of related variety (Asheim/Boschma/Cooke 2007; Frenken / van Oort / Verburg 2007; Boschma/Iammarino 2009). Related variety is relevant for smart specialisation as it allows for the technological diversification of regions (McCann/Ortega-Argilés 2011, 16 f.). This concept is important because "if smart specialisation is to be successfully integrated into regional policy it is necessary to develop regional policies which promote technological diversification amongst the most embedded industries which have the relevant scale to generate significant local impacts" (McCann/Ortega-Argilés 2011, 18). Related variety is indeed regarded as a critical factor in the design of RIS3: "The key to successful differentiation is to exploit related variety, which suggests that a regional economy can build its competitive advantage by diversifying its unique, localized know-how into new combinations and innovations which are close or adjacent to it." (Foray/Goddard et al. 2012, 19)

But how can related variety be integrated into the design and implementation of a RIS3 when specialization is defined in a political and collective process? It is hard to imagine the evolution of related variety being agreed upon by major regional stakeholders (or even ordered in a hierarchical way). It seems a more promising approach to let related variety develop independently, i. e. in the entrepreneurial discovery and experimentation processes of individual agents, and enabled by suitable framework conditions in the business environment and R & D policy.

Smart specialisation calls for an organized process of collaborative identification of both knowledge and trajectories. According to the logic behind smart specialisation, the entrepreneurial discovery process needs to be governed on the regional level. The perceived need for collective coordination of the discovery and specialization process unnecessarily narrows the scope for discovery and experimentation. Entrepreneurial discovery does not necessarily take place in collaborative arrangements but also occurs in competitive environments and in non-institutionalized relationships among agents – that is, in a context of social embeddedness (Granovetter 1985). Such contexts for entrepreneurial discovery do not necessarily require central governance and do not appear to figure strongly in smart specialisation as applied to EU regional policy. This means, however, that levers critical for the development of regional technological and economic trajectories are neglected.

Promising opportunities can surely be identified in coordinated processes, but this is not the only – and maybe not even the primary – way. Quite a few prominent inventions have been undertaken by inventors working alone and against considerable resistance from established technology and business communities. Many such changes were undertaken by small groups of innovators who set up their own businesses. Examples for innovations developed in formalized coordination arrangements are much more difficult to find. Ironically, contrary to the basic argument forwarded by Foray/David/Hall (2009), which states that coordinating the entrepreneurial discovery process counters the low degree of appropriability of the social value of innovations by the inventor, formalized coordination actually reduces incentives for inventors to share their ideas about how to use regionalized knowledge. Doing so in a small group of close business partners at the micro-level, e. g. in an entrepreneurial team of founders of the same startup, therefore appears much more conducive to stimulating entrepreneurial creativity and risk-taking. Collective coordination should therefore take place after a certain degree of experimentation on the micro-level has already occurred and when needs and opportunities for policy interventions are more clearly visible.

The conceptualization of the entrepreneurial discovery process as collective coordination symbolizes a general problem with the current smart specialisation discourse: Essentially, this notion of smart specialisation treats regions as agents (i. e. as entrepreneurs) which they are not. Smart specialisation should focus not a region's entrepreneurial discovery process, but a discovery process that unleashes entrepreneurial dynamism in a region. Within such a perspective, a region constitutes an arena for the actions and relationships of the economic and social agents involved in it, instead of being an agent itself (Bathelt/Glückler 2012).

Cluster policy in Berlin-Brandenburg

The Berlin-Brandenburg region is characterized by a weak industrial base but rather strong R & D structure mainly based on public R & D. Knowledge-intensive business services are major drivers for growth in Berlin. The regional innovation policy focuses on promoting of clusters through the *InnoBB* strategy. It continues on the path of cluster promotion pursued since 2005. The strategy aims at developing "future fields" into clusters. By that it is meant that in sectors with a certain critical mass of enterprises and scientific institutions that are related in a value-chain perspective or that share a similar knowledge base, cluster management provides services for knowledge and technology transfer as well as for general networking and for internationalization. Sectors for cluster promotion are life sciences (biotech and medical technologies), energy, information and communication technologies/media/creative industries, optical technologies, and transport system technologies. Cross-cutting areas such as materials, production and automation technologies, clean technologies, and security are to be promoted in all clusters. The *InnoBB* smart specialisation/cluster strategy was adopted in June 2011 by the governments of the two Länder Berlin and Brandenburg. Its implementation was supported through ERDF co-funding. Two venture capital funds were established, one for technology-oriented enterprises and one for creative industries. In addition, a *Technology Coaching Center* was set-up. Already since 2009, there is a technology transfer alliance that encompasses, inter alia, organizations representing enterprises, the *Chamber of Industry and Commerce*, and R & D institutions. It is supposed to encourage enterprises and R & D institutions to collaborate (*Senat von Berlin / Regierung des Landes Brandenburg* 2011; Ortega-Argilés 2012, 48 ff.). The *InnoBB* strategy is to be further elaborated on a strategic level in annual "innovation summits" that enable the participation of regional stakeholders such as policy makers, entrepreneurs, and experts (*Senat von Berlin / Regierung des Landes Brandenburg* 2011; *ZAB Brandenburg* 2013).

While the *InnoBB* strategy contains features of a classical cluster strategy, it is much harder to spot characteristics of the smart specialisation logic. Cluster promotion does indeed fit well into the central idea of smart specialisation because a certain degree of specialization is a defining element of clusters. The notion of an entrepreneurial discovery process on the regional level is, however, not a main thrust of the *InnoBB* strategy. Within the promoted clusters, entrepreneurial search and discovery processes by entrepreneurs and other agents, either individually or in collaboration with each other, can certainly occur. The networking and technology transfer promotion activities implemented in the framework of the *InnoBB* strategy might encourage such micro-level discovery processes. But the cluster approach could limit their openness. While clusters can indeed be a promising tool to further develop established specializations, a smart specialisation strategy that is supposed to encourage wide and open entrepreneurial discovery processes from the very outset, i. e. starting from the regional knowledge base, would need more generic instruments, too. Thus the *InnoBB* strategy can serve as an example of how pragmatically the label of smart specialisation can be used to denominate pre-existing programs (Rehfeld 2013, 11).

Another criticism refers to the distinction between leader and follower regions and the advice given to them on which technologies to concentrate. This distinction symbolizes the problem of the discussed view that considers regions as agents and even as entrepreneurs. General purpose technologies can develop in regions with a strong position in previous and related technologies, but due to chance events and windows of locational opportunity (Storper/Walker 1989), they might also emerge in regions with no previous related technological experience whatsoever. If some agents in a "follower" region happen to undertake radical innovations (which might even have a certain probability due to possible lock-in effects in "leader" regions that can tip the balance towards more incremental forms of innovation), a "follower" region may become a "leader" region in the relevant new technology. It would thus be far more justified to distinguish between technologically leading and following companies, entrepreneurs, or other agents, than between leader and follower regions.

Smart specialisation in tourism: The Balearic Islands

In 1998, the *Regional Innovation and Technology Transfer Strategy* (RITTS) for the Balearic Islands went into effect, starting a process that led to several plans for science, technology and innovation. This process involved major stakeholders in the regional innovation system, e. g. research centers, innovation and technology centers, enterprises, scientific centers, chambers and associations, and clusters initiatives. The recent science, technology and innovation plan is regarded as the region's RIS3. Its goals follow those of typical regional innovation strategies, e. g. linking the science and technology sector and enterprises and promoting entrepreneurship. It does, however, consider the region's strong competitive position in the tourism industry. With more than ten million tourists per year, the Balearic Islands account for nearly one-fifth of total tourist arrivals in Spain. Tourism accounts for more than 40 % of regional GDP compared with roughly 11 % on the national level. 30 % of regional employment is provided by tourism, as well as more than 80 % of exports and almost 40 % of taxes. The tourism industry is thus seen as a driver of the regional economy that does not pursue research and development itself but utilizes knowledge produced in the science and technology sector. A central element of the RIS3 is to link tourism with other industries, e. g. information and communication technologies, environmental and sea technologies, life sciences, bio health and biotechnology, creative industries, music and media. In these areas, clusters are promoted. The *Balears Tourism Cluster Initiative* created in 2007 provides a network for tourism enterprises, public agents, and research institutions. The *Turistec Cluster* focuses on information and communication technologies relevant for tourism. In addition, between 2007 and 2009, several other clusters were established: IDIMAR for environmental and sea technologies, CLAB for media, BIOBIB for biohealth and biotechnology, and the *Ibiza Music Cluster*. The idea behind this clustering strategy linking tourism and specific technologies is that of related variety (*Govern de les Illes Balears* 2013). The Balearic Islands' RIS3 is an interesting example for how existing regional specializations can be utilized. In contrast to other regions' cluster strategies, the Balearic Islands' clusters clearly focus on their links to the tourism industry. Considering the overwhelming importance of tourism for the region's economy, this approach seems well founded. This can indeed be a way to implement the concept of related variety into regional policy-making practice.

However, an approach focusing on innovation appears to cover only parts of the tourism industry. If the concept of smart specialisation was widened to include entrepreneurial discovery and experimentation processes not directly linked to science, technology and innovation but, for example, to efficiency-enhancing measures and marketing, it might offer more possibilities to promote a large and labor-intensive sector such as tourism. The cluster approach can be used for these other objectives in addition to the goal of stimulating innovation, but there are other regional and tourism policy instruments too that could be used in such a widened smart specialisation strategy. However, it remains to be seen how the process of specialization on tourism-related technologies and competences will be governed and whether an entrepreneurial search and discovery process based on micro-level dynamics ensues that has the potential to develop new fields of related variety in addition to those already promoted with the region's cluster initiatives.

The criticisms presented against the current discourse on smart specialisation are connected to its static orientation. It is basically a static concept that seems to focus on a one-off definition and the subsequent implementation of specialization but accounts neither for time-bound chances and constraints of specialization (e. g. windows of locational opportunity) nor for its development in time. The discovery process that is central to smart specialisation is directed at "discovering" promising ways of specialization rather than developing or experimenting with them. This thinking implies a basic view that pathways towards economic success are already laid out in a region's knowledge or competence base. In a dynamic perspective, however, pursuing promising trajectories linking knowledge and its economic use is often a trial-and-error process in which existing knowledge is used and combined, new knowledge is created, suitable routines are elab-

orated upon, market opportunities are screened, and combinations of knowledge, routines, and markets are tested and continually adapted. Thus, there is probably no one decisive moment of path discovery predetermining a venture's success but rather a multifaceted, evolutionary and often iterative process of path creation and development, i. e. of experimentation. To provide a tool for regions to develop their own sources of economic dynamism, smart specialisation needs to be conceptualized in a way that integrates the relevance of micro-level experimentation.

Smart experimentation: integrating individual search processes into regional policy

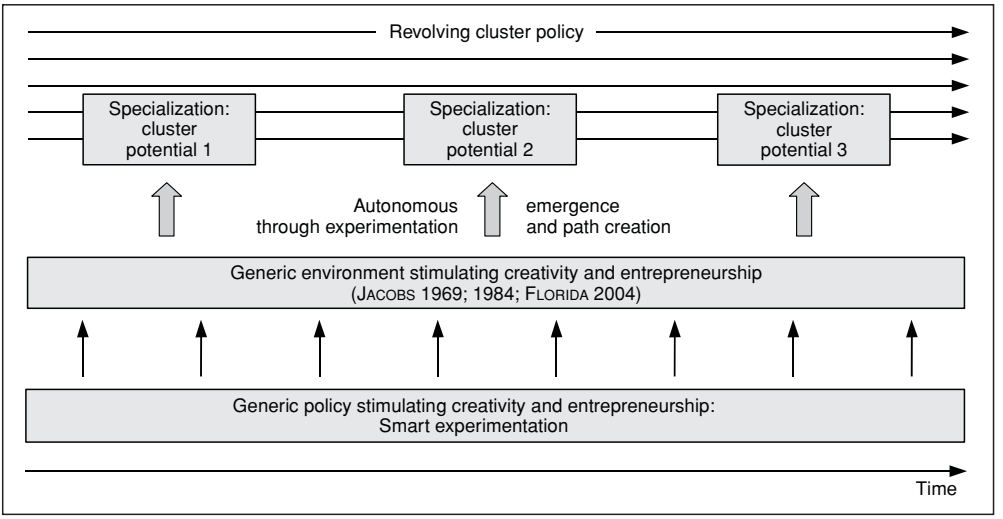
To counter the criticisms mentioned, a more complete integration of evolutionary economics and of the broader perspective of relational thinking into regional policy is needed. Relational economic geography can be characterized by the central notions of path dependency, contextuality and contingency (Bathelt/Glückler 2012). While path dependency is already an evolutionary thought that is implied in the entrepreneurial search process envisaged by smart specialisation, contextuality and contingency suggest that specialization should not (or maybe even cannot) be pre-defined by European or regional policy makers. Rather, regional economic policy should provide a field for experimentation not just for those stakeholders involved in a formal process of RIS3 formulation, but potentially for all agents in the regional economy. This idea leads to the new concept of smart experimentation introduced here.

The reasoning behind smart experimentation is similar to what Altenburg (2011, 56) sees as the main goal of industrial policy, which is that it "encourages search processes". In the context of regional policy, this thought needs to be widened as it is not focused on sectors but on regions. Experimentation puts the focus on individual agents and their relationships with each other, both within the region and beyond, instead of overestimating the power of political agents (policy makers and public administration) to govern and control evolutionary processes in the regional economy. Experimentation leaves space for chance which can be an important driver in path creation, development and destruction, as the emergence of many clusters demonstrates (Benner 2012). Experimentation also lets regions benefit from windows of locational opportunity (Storper/Walker 1989) and from path development in related variety (Asheim/Boschma/Cooke 2007; Frenken / van Oort / Verburg 2007; Boschma/Iammarino 2009). The full potential of related variety can be utilized if and when independent path discovery, pursuit and development by economic agents are all enabled in a policy context that encourages experimentation. This leads to a policy context that builds heavily on variation's relevance on the micro-level.

Promoting entrepreneurship is a central component of smart experimentation. Still, encouraging search and discovery processes involves much more than applying established instruments for entrepreneurship promotion (e. g. coaching, incubators, business planning competitions). Rather, it is about creating a regional context and even a climate for creativity. The latter is defined here in a very broad sense and encompasses all kinds of knowledge creation, combination, absorption, and diffusion, including practical know-how and market knowledge and experimentation. Specializations might arise as part of the experimentation process and can subsequently be promoted with specific strategies, e. g. cluster promotion. In particular, linking experimentation and cluster policy might encourage the relationship between revolving cluster promotion and a generally stimulating environment (Benner 2012, 220 ff.). Following the reasoning of Jacobs (1969; 1984) and Florida (2004), an environment that stimulates creativity is conducive to path creation through experimentation. This principle can lead to the emergence of cluster potentials that can be promoted with a continuous and revolving cluster policy. This approach and the points of departure for cluster policy and a generic policy stimulating creativity, entrepreneurship and experimentation is demonstrated in Fig. 1. Smart experimentation comes into play on the latter aspect. When it is to be implemented in regional policy, smart experimentation can be complemented with conclusions from Florida's (2004) creative capital theory and similar theories of regional creativity (e. g. Asheim 1997).

Smart experimentation can provide a basis for regional development that needs to be complemented with specific and adequate policy interventions. Avnimelech/Teubal (2008, 156 f.) distinguish between horizontal and targeted policies, a difference which corresponds to the

Fig. 1: The relationship between revolving cluster policy and smart experimentation



Source: modified from Benner (2012, 221)

distinction made here between generic policies that foster experimentation and policies aimed at promoting (further) specialization (e. g. cluster policy). These latter interventions must correspond to paths that have unfolded in the search and experimentation process, e. g. cluster policy, urban renewal, tourism promotion, or sector-specific innovation strategies. At the basis of this is a generic or horizontal policy that enables evolution and variation (Avnimelech/Teubal 2008, 160). Encouraging experimentation on the micro-level gives a strong and adequate role to competition and compensates the one-sided focus of smart specialisation on organized and governed collaboration. It is individual agents (and particularly entrepreneurs) in an often competitive setting instead of whole regions that experiment to enhance their competitiveness.

Smart experimentation is fundamentally a two-step process. The first step is to encourage wide and open discovery and experimentation by many individual agents through the creation of a regional context that stimulates creativity. The second step is to promote new specializations and trajectories that have emerged during the discovery and experimentation process with well targeted public coordination and support interventions. Thus, smart experimentation is more than smart specialisation: The entrepreneurial experimentation and discovery process on the micro-level that draws on the regionalized knowledge base (defined in a very broad sense and encompassing not just academic knowledge but also practical competencies, market knowledge and creativity in the region) is the first step while the resulting specialization on the regional level comes second. Resulting trajectories that lead to new patterns of specialization on the regional level modify the regionalized knowledge base. In consequence, there is a feedback loop that can lead to cumulative, circular and path-dependent processes of experimentation and specialization, but also to contingent path changes and breaks (Rehfeld 2013, 11).

This two-step process is similar to what Avnimelech/Teubal (2008) describe in their concept of evolutionary targeting which "operates by triggering and enhancing cumulative processes" (Avnimelech/Teubal 2008, 160) and which they describe as a kind of infant-industry policy, albeit a very different one from the conventional "picking winners" approach that is commonly understood by this term: "[Evolutionary targeting] is based on a new, market-friendly and bottom-up view of targeting industries. It operates by enhancing market-led variety and pre-selection through horizontal policies, and accelerating market-led selection and development/reproduction processes through coordination activities, targeted incentives, institutional changes, and other policies." (Avnimelech/Teubal 2008, 160) By multiagent structures

they mean "clusters, sectors, markets, industries, product classes, and other multiagent institutions" (Avnimelech/Teubal 2008, 157). Essentially, regional specializations can be considered as multiagent structures or as patterns constituted by them. Avnimelech/Teubal (2008, 157) hold that often such multiagent structures are the result of evolutionary and path-dependent processes: "Frequently, new multiagent structures result from a process of emergence, which is a cumulative process with positive feedback (…). Often the shift in emphasis from promoting individual agents to promoting multiagent structures also involves a shift from horizontal to targeted programs. Thus an early, horizontal program would focus on stimulating functions like business sector R & D of individual firms rather than stimulating a specific multiagent structure. As experience accumulates, not only in terms of innovation capabilities in the business sector, but also about areas with potential sustainable competitive advantage, opportunities will arise for greater selectivity in the promotion of firms and the targeting of multiagent structures."

Evolutionary targeting thus aims at the emergence of multiagent structures and assigns policy a clear role in enabling the transition from emergence to targeting. While Avnimelech/Teubal (2008, 158) suggest a need for public coordination in the emergence and targeting[3] of such multiagent structures (which is also a central feature of smart specialisation), their reasoning hints at the role of experimentation in the cumulative process of emergence they describe. This notion is exactly what smart experimentation adds to the logic of smart specialisation by enabling broad micro-level discovery and emergence processes through individual experimentation. The interrelationships between the aggregate regional level and the micro-level of individual agents that smart experimentation establishes is shown in Fig. 2.

The contrast between the respective logics of smart experimentation and smart specialisation may be seen when comparing Fig. 2 and Fig. 3. Fig. 3 depicts the logic of smart specialisation as it is currently being discussed in the context of EU regional policy (e. g. Foray/Goddard et al. 2012).

In contrast to smart experimentation, there is no direct link between micro-level dynamics of entrepreneurship and creativity on the one hand and the aggregate regional level on the other. The (partial) bottom-up nature of smart specialisation is characterized by entrepreneur participation (as defined in a wide sense). This participation takes place in collective and institutionalized strategy formulation fora on the regional level. Based on regional economic structure analyses, these fora define regional specializations and agree upon strategies for utilizing and to strengthening specializations. However, the barrier between this collective process and individual path creation, discovery, development and destruction by individual or small groups of entrepreneurs on the micro-level means that these micro-level dynamics do not directly enter the process of regional specialization formation, which is crucial to smart specialisation. The results of micro-level dynamics only become visible indirectly if and when regional economic structure analyses are performed periodically and their results compared over time. Even more importantly, in this logic of smart specialisation, fostering micro-level dynamics is not perceived as a major part of regional policy objectives. Admittedly, entrepreneurship is acknowledged as an important pillar of regional policy: „Given the importance of entrepreneurial experiments and discovery, there is no contradiction between a smart specialisation policy and one to encourage entrepreneurship. On the contrary, these two policies are mutually reinforcing; without strong entrepreneurship, the strategy of smart specialisation will fail because of a deficit in the entrepreneurial knowledge needed to feed and nurture this strategy" (Foray/Goddard et al. 2012, 13).

This important insight is, however, not a central thrust within the smart specialisation logic. Entrepreneurship promotion and smart specialisation are seen as complementary but distinct while, in reality, the successful pursuit of a form of smart specialisation presupposing the utilization of opportunities for path creation, discovery, development and destruction, is hard to imagine without first building upon the strong contribution of micro-level dynamics of individual entrepreneurship. Smart experimentation overcomes this deficit of smart specialisation by establishing a link between the micro-level of individual and relational entrepreneurship and the aggregate regional level.

However, this does not mean that a participatory and collective process of RIS3 formulation (and implementation) in a formalized public-private partnership structure is a bad thing in itself and should be discarded altogether. On the

Fig. 2: Smart experimentation as a two-step process

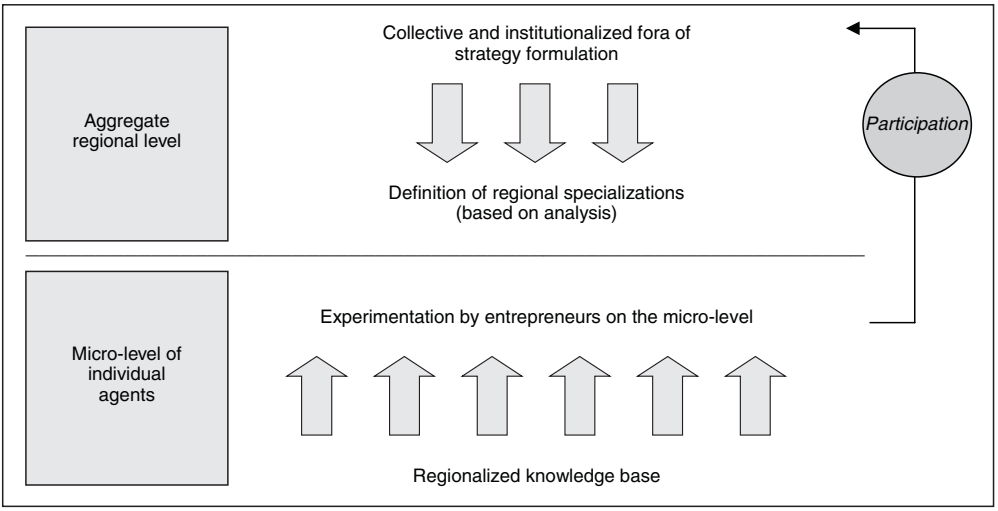


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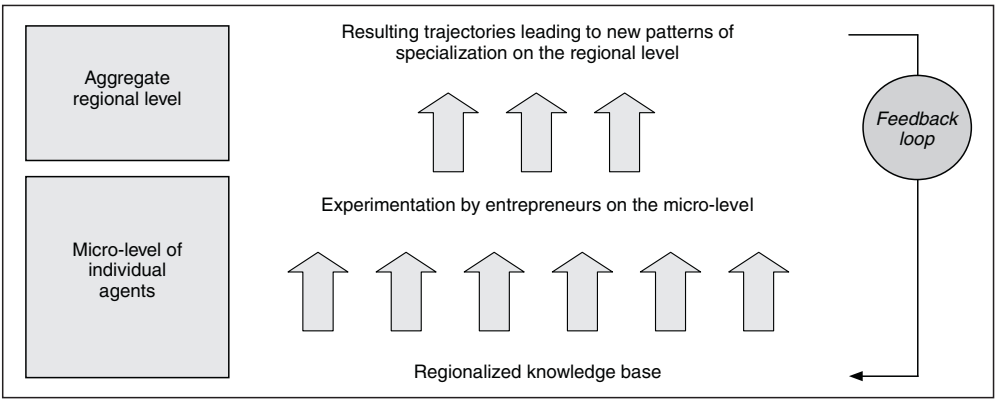
Fig. 3: The smart specialisation logic



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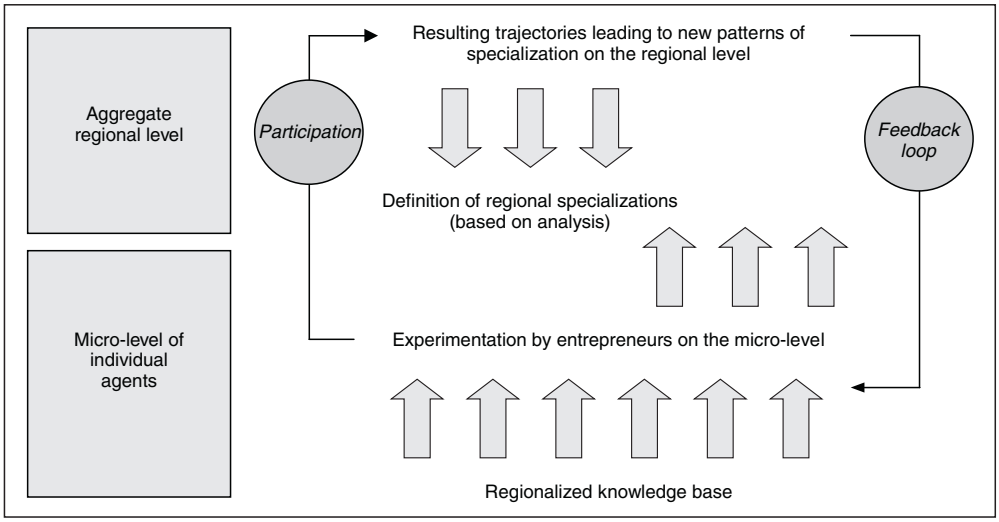
contrary, such a process holds considerable benefits over a hierarchical, top-down and centrally planned policy-making process (which is why it is widely used, for example, in cluster policy). Smart experimentation can be combined with the bottom-up process of strategy formulation inherent to the smart specialisation logic (see Fig. 4). Indeed, this combination is an essential pillar of smart experimentation, too, as it builds on the smart specialisation concept and further refines its logic by adding and integrating micro-level dynamics of entrepreneurship and creativity. Smart experimentation thus shares smart specialisation's participatory perspective. Contrary to the currently dominant logic of smart specialisation, smart experimentation does not allow participatory strategy formulation to play a dominant role in the entrepreneurial discovery process. Instead, smart experimentation perceives that the entrepreneurial discovery process, together with experimentation and trial-and-error, is assumed primarily on the micro-level by individual entrepreneurs and small groups, as well as in their relations with each other. Participatory and collective strategy formulation can only support this pro-

Fig. 4: Combining smart experimentation with participatory RIS3 formulation



Source: own design

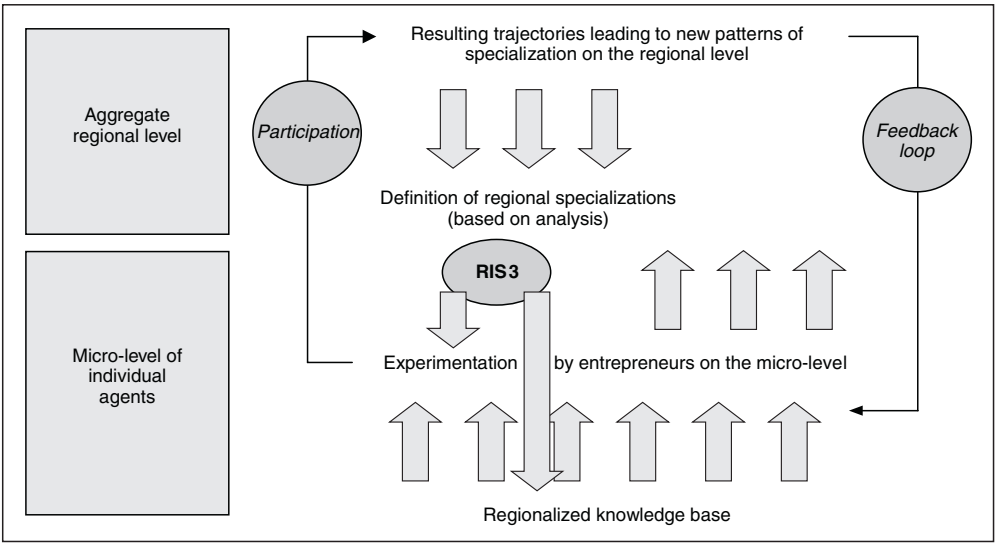
cess by converting the specializations resulting from path discovery, creation, development, and destruction emanating from micro-level experimentation into RIS3 which are founded on the internal dynamics of a regional economy.

This, like the smart specialisation logic, presupposes analyses of the regional economic structure. To apply smart experimentation, instruments for monitoring evolution in and of the regional economy are therefore critical. Analysing the regional economy becomes a regular task. Such analyses should be performed periodically – somewhat in contrast to the one-off nature of analysing that can often be encountered in the process of strategy formulation in practical regional policy and therefore can be expected to be encountered in the practical development of RIS3, considering the fact that they are often conventional regional development strategies or their successors which do not specifically take into account the particularities of the genuine smart specialisation logic.

In addition to the feedback loop of emerging new trajectories on the regional knowledge base, the recognition of regional specializations on the aggregate regional level and the ensuing participatory and collective process of designing a RIS3 can have effects on the regional knowledge base and on micro-level experimentation and entrepreneurship if regional-policy measures devised in the RIS3 are implemented (provided they are effective). After all, this is the essence of regional policy under smart experimentation. Fig. 5 illustrates the complete cycle of smart experimentation and its evolutionary and policy-making dynamics.

The relevance of micro-level dynamics in smart experimentation also counters the danger of placing too strong a focus on high-technology R&D where it is not appropriate. Micro-level search and experimentation processes will take place on the basis of the current technological stage of development that each regional economy and its agents occupy. While efforts to upgrade such groups' knowledge and competence bases can be pursued with political interventions, e. g. in policy domains such as education, training and science, the discovery, creation and development of economic trajectories suitable for a regional economy's current capabilities can take place during the experimentation process. Incorporating micro-level dynamics thus greatly enhances the bottom-up elements of smart specialisation and greatly widens its applicability. For example, smart specialisation becomes even more applicable in development cooperation because it opens up enhanced possibilities for use in a diverse set of institutional contexts and in economies in varying stages of development.

Fig. 5: The evolution and policy cycle of smart experimentation



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Towards path-creating regional policies

Notwithstanding the above-mentioned criticisms, smart specialisation can certainly be a strong and beneficial notion for regional policy. Its evolutionary orientation and explicit acknowledgment that regional specializations develop in the course of entrepreneurial search processes constitutes a major step towards a regional policy that incorporates insights from evolutionary economics. Smart specialisation does, however, neglect micro-level dynamics and relational aspects of contingency and contextuality. Combining smart specialisation with such micro-level discovery and experimentation processes would acknowledge that a region is an arena for creative and entrepreneurial action and interaction on the micro- (and meso-) level, with specialization being the result of such a continuous, path-dependent, contingent and contextual experimentation processes driven by entrepreneurs, other agents and groups of agents in both their own actions and their relationships with each other. Such a strategy of smart experimentation would widen opportunities for path creation and make room for a potentially wide range of resulting regional specializations. Such specializations could then provide regions with new possibilities for the discovery and creation of idiosyncratic trajectories, and thus contribute to the development of new and specific sources of regional competitiveness and prosperity.

Notes

1 This article follows US spelling. However, since EU literature uses the spelling "smart specialisation", it is adopted here for this particular term.

2 „Zugespitzt wird gehofft, dass es gelingt, das Schumpetersche unternehmerische Entdeckungsverfahren in einen regionalen innovationsstrategischen Priorisierungsprozess zu transformieren." (Rehfeld 2013, 9)

3 Targeting is a more activist notion than supporting and promoting specialization. While targeting is about "building multiagent structures" (Avnimelech/Teubal 2008, 160), promoting specialization is about further developing and enhancing (at least to some degree) existing ones. Considering the imperfect information that policy makers have at their disposal (as well as other potential sources of government failure), such a more careful approach appears sensible. Still, the basic arguments of Avnimelech/Teubal (2008) considering the two-step process of emergence and targeting/promotion of specialization hold true for both approaches.

References

Altenburg, T. (2011): Industrial policy in developing countries: Overview and lessons from seven country cases. Bonn. (Deutsches Institut für Entwicklungspolitik – DIE Discussion Paper 4/2011, Internet: http://www.die-gdi.de/uploads/media/DP_4.2011.pdf, 25. 3. 2014..

Asheim, B. T. / Boschma, R. A. / Cooke, P. (2007): Constructing regional advantage: platform policies based on related variety and differentiated knowledge bases. Internet: http://econ.geo.uu.nl/boschma/artashboscooke2.pdf, 12. 7. 2013.

Asheim, B.T. (1997): "Learning regions" in a globalised economy: Towards a new competitive advantage of industrial districts? In: Taylor, M. / Conti, S. (Eds.): Interdependent and uneven development: Global-local perspectives. Aldershot, 143–176.

Avnimelech, G. / Teubal, M. (2008): Evolutionary targeting. In: Journal of Evolutionary Economics, 18, 151–166.

Bathelt, H. / Glückler, J. (2012): Wirtschaftsgeographie. Ökonomische Beziehungen in räumlicher Perspektive. Stuttgart (3rd ed.).

Benner, M. (2012): Clusterpolitik. Wege zur Verknüpfung von Theorie und politischer Umsetzung. Münster.

Boschma, R.A. / Iammarino, S. (2009): Related variety, trade linkages, and regional growth in Italy. In: Economic Geography, 85, 289–311.

European Commission (Ed.) (2010): Communication of the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions: Regional Policy contributing to smart growth in Europe 2020. COM(2010) 553 final. Internet: http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/smart_growth/comm2010_553_en.pdf, 5.8.2013.

Florida, R.L. (2004): The rise of the creative class – and how it's transforming work, leisure, community and everyday life. New York.

Foray, D. / David, P.A. / Hall, B. (2009): Smart specialisation – the concept. In: Knowledge Economists Policy Brief no. 9. Internet: http://ec.europa.eu/invest-in-research/pdf/download_en/kfg_policy_brief_no9.pdf, 21.5.2013).

Foray, D. / Goddard, J. / Goenaga Beldarrain, X. / Landabaso, M. / McCann, P. / Morgan, K. / Nauwelaers, C. / Ortega-Argilés, R. (2012): Guide to research and innovation strategies for smart specialisation (RIS 3). Internet: http://s3platform.jrc.ec.europa.eu/en/c/document_library/get_file?uuid=e50397e3-f2b1-4086-8608-7b86e69e8553, 28.7.2013.

Frenken, K. / van Oort, F. / Verburg, T. (2007): Related variety, unrelated variety and regional economic growth. In: Regional Studies, 41, 685–697.

Glaeser, E.L. / Kallal, H.D.K. / Scheinkman, J.A. / Shleifer, A. (1992): Growth in cities. In: Journal of Political Economy, 100, 1126–1152.

Govern de les Illes Balears (Ed.) (2013): Illes Balears: Towards a RIS3 strategy. Presentation at the Peer Review Seminar, Palma de Mallorca, February 7th and 8th, 2013. Internet: http://s3platform.jrc.ec.europa.eu/documents/10157/62973/PresentacionRIS3Balears_PeerReview%2003.pdf, 22.5.2013.

Grabher, G. (1993): The weakness of strong ties. The lock-in of regional development in the Ruhr area. In: Grabher, G. (Ed.): The embedded firm. On the socioeconomics of industrial networks. London / New York, 255–277.

Granovetter, M. (1985): Economic action and social structure. The problem of embeddedness. In: American Journal of Sociology, 91, 481–510.

Jacobs, J. (1969): The economy of cities. New York.

Jacobs, J. (1984): Cities and the wealth of nations. Principles of economic life. New York.

Kiese, M. (2008): Clusterpolitik in Deutschland: Ein wirtschaftsgeographischer Vergleich aus institutioneller und politisch-ökonomischer Perspektive. Hannover.

Markusen, A. (1999): Fuzzy concepts, scanty evidence, policy distance. The case for rigour and policy relevance in critical regional studies. In: Regional Studies, (33)9, 869–884.

McCann, P. / Ortega-Argilés, R. (2011): Smart specialisation, regional growth and applications to EU cohesion policy. Groningen. (Economic Geography Working Paper 2011, Faculty of Spatial Sciences, University of Groningen, Internet: http://ipts.jrc.ec.europa.eu/docs/s3_mccann_ortega.pdf, 21.5.2013).

Nelson, R.R. / Winter, S.G. (1982): An evolutionary theory of economic change. Cambridge, MA.

Ortega-Argilés, R. (2012): Economic transformation strategies. Smart specialisation case studies. Internet: http://s3platform.jrc.ec.europa.eu/c/document_library/get_file?uuid=1f05532a-9ab5-4324-8eeb-4acb7b72e17f&groupId=10157, 22.5.2013.

van der Panne, G. (2004): Agglomeration externalities. Marshall versus Jacobs. In: Journal of Evolutionary Economics, 14, 593–604.

van der Panne, G. / van Beers, C. (2006): On the Marshall–Jacobs controversy: It takes two to tango. Aalborg / Frederiksberg. (DRUID Working Paper No. 06-23; Internet: http://www3.druid.dk/wp/20060023.pdf, 22.1.2010).

Rehfeld, D. (2013): Clusterpolitik, intelligente Spezialisierung, soziale Innovationen – neue Impulse in der Innovationspolitik. Gelsenkirchen u.a. (IAT Forschung Aktuell 04/2013).

Senat von Berlin / Regierung des Landes Brandenburg (Hrsg.) (2011): Gemeinsame Innovationsstrategie der Länder Berlin und Brandenburg (innoBB). Internet: http://www.berlin.de/imperia/md/content/sen-wirtschaft/inno/strategie.pdf?start&ts=1316166027&file=strategie.pdf, 24.5.2013.

Storper, M. / Walker, R. (1989): The capitalist imperative. Territory, technology, and industrial growth. New York / Oxford.

Wrobel, M. / Kiese, M. (2009): Aus den Augen, aus dem Sinn? Zum Verhältnis von Clustertheorie und Clusterpraxis. In: Häußling, R. (Hrsg.): Grenzen von Netzwerken. Wiesbaden, 155–182.

ZAB Brandenburg (Ed.) (2013): Innovationsgipfel der Länder Berlin und Brandenburg. Internet: http://www.innobb.de/de/Innovationsgipfel-Berlin-Brandenburg, 24.5.2013.