1. The role of smart specialization in providing regional strategic support for establishing sustainable start-up incubation ecosystems

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INTRODUCTION

The ecosystem concept is rooted in biology, where it refers to a community of living and non-living components that interact with each other in a complex way (Acs, Stam, Audretsch, & O'Connor, 2017). The concept has been adopted by the sciences of economics and management, where it appears in several related guises, such as innovation ecosystems, business ecosystems, and entrepreneurial ecosystems (Rinkinen, 2016). The notion of a start-up incubation ecosystem, defined as a system of interdependent actors and factors which supports the creation and successful development of start-ups (Novotny, Clausen, Rasmussen, & Wiklund, 2018), is most closely connected to the entrepreneurial ecosystems approach. Since entrepreneurial ecosystems are a “critical tool for creating resilient economies based on entrepreneurial innovation” (Spigel, 2017, p.49), regional authorities are advised to build an underlying support policy for creating and strengthening these ecosystems in the interest of economic development. To understand the role of regional strategic support in establishing sustainable start-up incubation ecosystems, it is logical to draw on observations from both the entrepreneurial ecosystems literature and the literature on ecosystem-based innovation policy.

The ecosystem concept in economics and management theory can be viewed as related to biological ecosystems through the prism of emergence and complexity. Entrepreneurial ecosystems have some of the properties of complex systems as described by complexity theory (Byrne & Callaghan, 2014). According to Byrne and Callaghan (2014, pp. 17–38), complexity rests on a few simple assumptions: (1) complex systems are not designed top-down but are the result of self-organization by many autonomous, interrelated decision-makers; (2) complex systems have emergent properties in the sense that they have the capacity to change in

new directions; (3) in order to do so, complex systems are able to create energy, by increasing the system scale; (4) complex systems are inherently unstable; and (5) openness is an inherent feature of complex systems. Such systems also tend to be dissipative in that they interact with their environments. They are likely to experience a continual inflow and outflow of energy, matter, and information (Virkkala & Mariussen, 2019). Similarly, the entrepreneurial ecosystem concept focuses on a bottom-up approach, emphasizing the leading role of entrepreneurs (Spigel & Harrison, 2018). The system comprises several phases including creation, discovery, and exploitation of knowledge-based entrepreneurial opportunities (Qian, Acs, & Stough, 2013). However, since complex systems are open and unstable, an entrepreneurial ecosystem should be supported by an appropriately designed innovation policy in order to ensure its sustainability. In the present chapter we discuss several types of innovation policy, including smart specialization, and explain how smart specialization strategies can support entrepreneurial and start-up incubation ecosystems.

This chapter is structured as follows. We start by providing a general overview of concepts related to ecosystems in the economics and management literatures and summarizing – briefly, since other chapters in the present volume analyze the same concept in depth – the notion of an entrepreneurial ecosystem. Next we introduce several approaches to innovation policy, focusing primarily on smart specialization and ecosystem-based approaches, and examine how these relate to each other. The chapter concludes with a discussion of implications for policy design.

CO-EXISTING ECOSYSTEMS AT THE REGIONAL LEVEL

There are two general views of the term “ecosystem”: *ecosystem-as-affiliation*, which views ecosystems as “communities of associated actors defined by their networks and platform affiliations”, and *ecosystem-as-structure*, which sees them as “configurations of activity defined by a value proposition” (Adner, 2017, p. 40). In this chapter we adopt the ecosystem-as-structure approach, which defines an ecosystem as “the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize” (p. 42). This definition highlights the value-creating activities that determine how an ecosystem is (or should be) structured rather than placing emphasis on a focal actor and its network of affiliated entities. Therefore, the ecosystem-as-structure perspective is well suited to the context of young firms that are not yet embedded in industry networks but do have value propositions, such as

start-up firms under incubation. We will also argue in this chapter that a modified version of Adner's ecosystem-as-structure approach may be a useful perspective for policymakers to adopt when designing regional innovation policy.

Proceeding from this definition of ecosystems, we understand a *start-up incubation ecosystem* as the alignment structure of the multilateral set of partners that need to interact in order to incubate new start-ups. The objective of setting up such an ecosystem is to support the survival of start-ups that have a high growth potential. A successful start-up might go through several supporting stages such as establishment, incubation, acceleration, scaling up, etc. Therefore, start-up incubation ecosystems can be placed under the umbrella of start-up ecosystems, which aim to produce high-growth start-ups. We also propose that start-up ecosystems could be placed under the umbrella of entrepreneurial ecosystems, the objective of which is to produce not only high-growth start-ups but also successful entrepreneurs (Stam, 2015). Entrepreneurial ecosystems are often studied in connection with a specific territory or geography (Spigel, 2017; Cavallo, Ghezzi, & Balocco, 2018), and important regional factors may "interactively influence the creation, discovery and exploitation of entrepreneurial opportunities" (Qian et al., 2013, p. 2). By this argument, start-up incubation ecosystems, as well as start-up ecosystems and entrepreneurial ecosystems in general, are closely connected to a specific region. Regional support thus plays a vital role in determining the success of such ecosystems.

There are other, related types of ecosystems that may co-exist at the regional level with those mentioned here, including business ecosystems and innovation ecosystems. Business ecosystems are built around "platforms that offer solutions to firms" (Rinkinen & Harmaakorpi, 2018, p. 344), and their geographical scope can be global (p. 345). Innovation ecosystems include an economic dimension as well as political and technological dimensions (Rinkinen, 2016), but their geographical scope is restricted to a region or nation. To provide an overview of the ecosystem concepts and clarify how they relate to one another, Figure 1.1 compares the different types of ecosystems. Figure 1.1 views the different systems through the lens of a modified ecosystem-as-structure perspective: while we use the terminology of Adner (2017), the value propositions in the figure do not represent particular products or services but the general potential for value creation of each type of ecosystem. The figure compares the different types of ecosystems according to (i) their degree of *geographical* scale, ranging from regional to global, and (ii) the level of direct value the ecosystem will generate if successful. Rather than being mutually exclusive, different ecosystems can co-exist in the same geographical region, with overlapping actors and activities.

Source: main author.

Figure 1.1 Comparison of co-existing ecosystems in a region

Turning to the relationship between regional strategies and start-up incubation ecosystems, we argue that the creation of successful start-ups can be viewed as a sub-goal connected to the greater goal of the regions, which is sustainable economic growth. Sustainable economic growth does not come only from high-growth start-ups but also from other types of productive entrepreneurship (Baumol, 1990; Stam, 2015). Thus, from the macro-level perspective of regional policy, supporting the establishment of a start-up incubation ecosystem must be part of a more general policy of support for entrepreneurial ecosystems. Consequently, to discuss the logic of regional strategic support for establishing sustainable start-up incubation ecosystems, we will make use of the literature on regional innovation policy as well as the literature on entrepreneurial ecosystems.

ENTREPRENEURIAL ECOSYSTEMS

The concept of an *entrepreneurial ecosystem* is used to describe how the variety of individuals, organizations and institutions influence *entrepreneurial activity* in a particular context (Novotny et al., 2018). There are three main components in this definition: entrepreneurial, ecosystem, and entrepreneurial activity (Stam & Spigel, 2017). The first component, *entrepreneurial*, refers to the opportunity-exploiting characteristic. The second component, *ecosystems*, emphasizes the interdependency between actors, i.e. individuals, organizations, and institutions co-existing in a territorial area characterized by certain geographical features, or shared cultural, environmental or economic ties. The third component, *entrepreneurial activity*, is considered the process in which actors create opportunities for innovation.

Although the entrepreneurial ecosystem literature is derived predominantly from the strategy literature and the regional development literature, it is nevertheless considered distinct from both of these literature streams (Acs et al., 2017). From a regional development perspective, the entrepreneurial ecosystem is related to several approaches such as industrial clusters (Porter, 1998), industrial districts (Marshall, 1920), and regional innovation systems or “RIS” (Stam & Spigel, 2017; Terjesen et al., 2017). From the strategic management literature, entrepreneurial ecosystem research draws on concepts such as business ecosystems (Adner, 2017) and ecosystems surrounding a platform (Evans & Schmalensee, 2016; Parker & Van Alstyne, 2005). However, key features that distinguish entrepreneurial ecosystems from the other ecosystems considered in the literature include: (i) the focus on value creation by individual entrepreneurs; (ii) the existence of high-growth start-ups within a geographical boundary as a

Table 1.1 Comparison between cluster and regional innovation system (RIS) theory and entrepreneurial ecosystem theory

Theme	Cluster and RIS	Entrepreneurial Ecosystem
Role of the state	The state is the lead organizer and a significant investor (top-down)	Entrepreneurs are the primary leaders (bottom-up); the state only supports
Accessing regional resources and benefits	Little differentiation between large firms and small start-ups and new ventures	Focus on solving specific difficulties for start-ups and entrepreneurs
Role of knowledge	Focus on technical and market knowledge	Focus on entrepreneurial knowledge besides technical and market knowledge
Key actors	Large firms, public agencies, universities	Entrepreneurs
Industry	Strengthen knowledge flow and innovation in industries	More focus on underlying technology, less on industry or market

Source: Adapted from Spigel and Harrison, 2018.

key indicator; and (iii) a complex mix of public–private governance (Acs et al., 2017). The second feature is the reason we choose entrepreneurial ecosystems as the theoretical reference point for discussing start-up incubation ecosystems.

These three distinguishing features of entrepreneurial ecosystems have resulted in divergences between entrepreneurial ecosystems theory and regional development theory with respect to five themes: the role of the state; accessing regional resources and benefits; the role of knowledge; key actors; and the role of industry (Spigel & Harrison, 2018). A summary of these differences can be found in Table 1.1.

INNOVATION POLICIES

Innovation policy is “a broad concept that contains research and technology policy and overlaps with industrial, environmental, labor and social policies” (Kuhlmann & Edler, 2003, p. 620). Its goal is to strengthen the competitiveness of an economy and to increase societal welfare through economic success (Kuhlmann & Edler, 2003; Rinkinen, 2016). Innovation policy is a broad category that encompasses different objectives for

innovation. Following Foray (2018, p. 7), we categorize innovation policies into three groups. The first group comprises innovation and industrial policies focusing on creating framework conditions for innovation, such as a favorable institutional environment for developing generic innovation capacities or increasing innovation diversity. The second group refers to innovation policies aimed at increasing the rate of innovation, that is, using public sector interventions to generate growth. The policies in the third group are designed to influence the *direction* of innovation – aiming for a trajectory towards sustainability – by combining relevant and complementary elements selected from various approaches.

Policies in the first two groups, though important, are not well equipped to tackle the unprecedented problems involved in designing and developing “new activities targeting the transformation of economic or technological structure” (Foray, 2018, p. 823), for example addressing a grand challenge such as climate change, or forming a new high-tech sector, or enabling a region to create a new specialty. This chapter places more emphasis on the third group, especially the smart specialization strategy and its role in providing strategic support for entrepreneurial ecosystems. As will be elaborated later, smart specialization, with its focus on regular renewal and adjustment of the particulars of the strategy, is a policy tool with the flexibility required to respond to continuous changes in the economic environment, and also takes regional differences fully into account whereas other policies remain largely undifferentiated regarding regional specificities (Foray, 2018). These characteristics of the policy facilitate the establishment and development of entrepreneurial ecosystems.

Smart Specialization

Background of the concept: The smart specialization approach was an attempt to overcome the weaknesses of an innovation policy focused on macro-level indicators, i.e. the national innovation system approach. Smart specialization takes a multi-level perspective. It connects macro-level analysis with support for micro-level entrepreneurial discoveries, facilitating the creation of start-up firms. The initial work on the smart specialization concept and methodology was carried out between 2008 and 2012 by the Knowledge for Growth group sponsored by the European Commission, which consisted of policymakers, academics, and innovation experts. One outcome was a broad framework, put together in 2009 by Dominique Foray and his colleagues (Foray, David, & Hall, 2009) and developed into a book in 2015 (Foray, 2015), which integrated different innovation theories and innovation policy principles under the smart specialization label. The approach was implemented in a large-scale

European innovation policy experiment in 2011 and officially entered European Union policy in 2015. So far, smart specialization principles and methodologies have been adopted by 18 national governments in the European Union and implemented in 170 regions across the EU and beyond, covering a combined area inhabited by hundreds of millions of people (Smart Specialization Platform, 2019). Even though a rich body of empirical evidence documenting the implementation of smart specialization policies in Europe is rapidly accumulating, Foray, one of the creators of the concept, has conceded that the theoretical base is in a nascent state of development (Foray, 2015, p. 16).

Working definitions: Smart specialization is a “dynamic of the development of new specialties that can emerge spontaneously in the economy” (Foray, 2015, p. 37). It can be considered a policy, strategy, approach, or a complex and involving process; any single definition will reduce the meaning of the smart specialization concept. We introduce several working definitions with the aim of providing different perspectives on the term. Smart specialization can refer to:

- An *innovation policy approach* “that aims to boost national and regional innovation, contributing to growth and prosperity by helping and enabling Member States and regions to focus on their strengths” (European Commission, 2016, p. 1).
- A *place-based approach* “characterized by the identification of strategic areas for intervention based both on the analysis of the strengths and potential of the economy and on an Entrepreneurial Discovery Process (EDP) with wide stakeholder involvement” (Gianelle, Kyriakou, Cohen, & Przeor, 2016, p. 10).
- A *process* aimed at “transforming the economic structures of a region or any other geographical unit through the formation and development of new transformative activities” (Foray, 2018, p. 818). Transformative activities are a collection of innovation capacities and actions that can contribute to a certain structural change towards economic and technological growth.

Therefore, smart specialization strategy means “the national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts; a smart specialization strategy may take the form of, or be included in, a national or regional research and innovation (R&I) strategic policy framework” (EU Regulation no. 1303, 2013, p. 338).

Basic mechanism: The basic mechanism for smart specialization is the entrepreneurial discovery process (EDP). The EDP is a collective learning process in which fragments of knowledge from various actors combine to enable a new understanding of the opportunities available to a region. Starting this journey of self-discovery requires a collective actor capable of pulling things together and making sense of the opportunities available to the regional economy in a new way (Virkkala, 2019).

Entrepreneurs continually search for, identify, and evaluate new business opportunities. This process is called entrepreneurial discovery in the business theory literature (Shane, 2003, pp. 4–6). The individual entrepreneur exploits an opportunity and organizes and recombines resources in a novel way. The opportunities an entrepreneur exploits may arise as a result of social, demographic, technological, political, or regulatory change, or in connection with grand challenges like climate change (Shane, 2003).

The EDP is a collaborative process involving a public sector agency, entrepreneurs, and scientists. The public sector actor uses a smart specialization strategy to support innovation activities that have a good fit with the economy. The strategy applies a principle of vertical intervention, “[favoring] some technologies, fields, population of firms” (Foray, 2013, p. 55), justified on the grounds that such intervention can help solve coordination and other collective action problems that would have prevented the private sector from achieving a similar transformation of regional capacities on its own (Foray, 2018; Foray & Rainoldi, 2013, pp. 2–3). The EDP provides a new conceptualization of the entrepreneur, broadening the scope of the term to include “innovative firms, research leaders in higher education institutions, independent inventors and innovators” (Foray, 2015, p. 40). EDP involves a collaborative set of entrepreneurial actors from the business world, science, and government. Through a collective process of self-discovery, the partners of these institutional spheres are supposed to open up an exploitation-biased economy to exploration. The systemic nature of this conceptualization of entrepreneurship contrasts with the traditional literature, which looks at entrepreneurship as opportunity discovery and exploitation by individuals (Shane & Venkataraman, 2000), not a collective effort by a set of actors.

Ecosystem Approach for Innovation Policy

Constant evolutionary change in the economic environment necessitates a policy approach that takes the ecosystem perspective into account (Rinkinen, 2016). While this perspective can draw on a relatively long tradition of theoretical work, its normative aspect – how policymakers can devise an ecosystem-friendly innovation policy in concrete terms – has

been comparatively neglected, especially compared to the smart specialization framework, which has been widely adopted in the real world.

The most prominent characteristic of innovation ecosystems is their complex and self-organizing nature (Rinkinen, 2016), a characteristic that imposes certain limitations on what an ecosystem-based innovation policy can hope to achieve. In particular, it is futile for policymakers to aspire to organize ecosystems according to a predefined blueprint since ecosystems are self-organizing and too complex to be directed from above. Instead, an ecosystem-based innovation policy must be flexible and leave room for the unexpected. Table 1.2 describes the characteristics of such a policy.

Thus the core principles of ecosystem-based innovation policy are as follows (Rinkinen, 2016):

Table 1.2 Characteristics of innovation ecosystems and corresponding elements of ecosystem-based innovation policies

Innovation ecosystem characteristic	Matching elements of ecosystem-based innovation policy
1. Complex and self-organizing	<ul style="list-style-type: none">● Innovation orchestration and facilitation; funding● Leaving room for serendipity; flexible projects to ensure dynamism● Prioritizing the fields from which innovative collisions are expected but without defining what collisions are and who collides
2. Niche development	The flexibility to directly support fields showing potential and growth
3. Find innovation potential from interfaces and unexpected combinations	<ul style="list-style-type: none">● Intentional mixing● Looking for the unknown and unexpected
4. Ecosystem management; peer-to-peer management	Providing platforms for development; fostering ecosystem formation through public procurement
5. Global business ecosystems based on local/regional innovation ecosystems	Access to successful global ecosystems
6. Open innovation; co-creation; users	Quadruple helix cooperation
7. Trial-based; experimental; rapid prototyping in the real world	Experimentation culture; offering platforms; supporting pilots; trials and demo phases; constant feedback mechanisms

Source: Adapted from Rinkinen, 2016.

- Providing funding through public procurement, not through individual projects
- Orchestrating, enabling, and facilitating, rather than steering directly
- Network facilitation, not network management
- Promoting quadruple-helix cooperation rather than triple-helix cooperation
- Experimentation culture, not planning culture.

In fact, the elements in Table 1.2 and the core principles describe the smart specialization approach in a nutshell: a policy for ecosystems should prioritize the field for innovative collisions without predefining it, use public procurement to foster ecosystem formation, and provide platforms for development. Therefore, we argue that smart specialization is a policy tool that is consistent with an ecosystem-based view of the regional economy, specifically, an ecosystem-as-structure perspective, albeit with the highly specific entrepreneurial value propositions of Adner (2017) replaced by policymakers' more aggregated visions of what can be achieved by supporting particular domains at the regional level.

DISCUSSION OF THE SYNERGY BETWEEN ENTREPRENEURIAL ECOSYSTEMS AND SMART SPECIALIZATION

As mentioned in the section on “Entrepreneurial Ecosystems,” entrepreneurial ecosystems have features that cause ecosystem-based innovation policy theory to diverge from regional development theory with respect to five themes: the role of the state; accessing regional resources and benefits; the role of knowledge; key actors; and industry (Table 1.1). Consequently, cluster strategies and regional innovation system (RIS) strategies are not ideally suited to supporting the establishment of entrepreneurial ecosystems. On the other hand, smart specialization, by virtue of bridging the aforementioned gaps, is arguably a more appropriate strategy for building entrepreneurial ecosystems in a territory. Table 1.3 compares the three approaches.

Role of the Public Sector (State-Region)

In the entrepreneurial ecosystem approach, the ecosystems are primarily led by entrepreneurs (Spigel & Harrison, 2018). By contrast, cluster and RIS policies typically focus on policy entrepreneurship, facilitating

Table 1.3 How smart specialization bridges the gaps between entrepreneurial ecosystems and cluster/RIS strategies

Theme	Cluster and RIS	Entrepreneurial ecosystems	Smart specialization
Role of the state	The state is the lead organizer and a significant investor (top-down)	Entrepreneurs are the primary leaders (bottom-up); the state only supports	Entrepreneurs discover new domains of technological and market opportunities; the state decides which domain to prioritize (top-down and bottom-up)
Accessing regional resources and benefits	Little differentiation between large firms and small start-ups and new ventures	Focus on solving specific difficulties for start-ups and entrepreneurs	Focus on developing transformative activities that contribute to new domains of opportunities
Role of knowledge	Focus on technical and market knowledge	Focus on entrepreneurial knowledge (including but not limited to technical and market knowledge)	Focus on creating entrepreneurial knowledge with transformative potential
Key actors	Large firms, public agencies, universities	Entrepreneurs	State and innovation actors (including large firms, entrepreneurs, public agencies, universities)
Industry	Strengthen knowledge flow and innovation in industries	More focus on underlying technology, less on industry or market	More focus on transformative activities and new domains of opportunity, less focus on sector/industry

Source: Adapted from Spigel & Harrison, 2018; smart specialization column added by the authors.

institutional solutions which enable innovations (Isaksen, Kyllingstad, Rypestøl, & Schulze-Krogh, 2019) in which the state plays a dominant role. The smart specialization approach is a combination of top-down and bottom-up approaches, which may help to reduce the power distance between the state and entrepreneurs.

In the smart specialization policy framework adopted by the European Union, EU member states and regions are expected to provide analysis identifying competitive domains (areas of regional vertical specialization) as well as the need for horizontal policies such as supporting digitalization and the adoption of Key Enabling Technologies. The analysis, undertaken in collaboration with various quadruple helix stakeholders, is expected to lead to regional or national strategies including prioritization of public resources in development of these domains, and the establishment of institutional systems of governance for implementation and correction of the strategies.

However, these top-down initiatives only identify opportunities at a general level and are supplemented by a micro-level strategy of implementing EDP. EDP is an experimental search – continuously adjusted and corrected by feedback loops – for new growth opportunities. In this context the role of the public sector is to provide venture capital, evaluate outcomes, provide support for successful cases, terminate experiments that fail, and adjust the strategy (Foray, 2015).

Regional Resources

The entrepreneurial ecosystem approach requires sufficient resources from regional policy institutions to solve specific difficulties for start-up firms and entrepreneurs.

Whereas cluster policies and policies promoting regional systems of innovation tend to regard “all kinds of innovation” as desirable, the smart specialization approach focuses on entrepreneurial discoveries that open new areas of business, either based on existing domains (related variety) or through new path creation (unrelated variety). In the first phase of smart specialization, the focus was on place-based development, using resources available in the region. However, this approach proved to be insufficient to generate growth in lagging regions with weak institutions. Accordingly, the focus is now on combining place-based development with various forms of transnational thematic partnerships and strengthening the regional institutional capacity (Mariussen, Virkkala, Finne, & Aasen, 2018).

Knowledge

In the entrepreneurial ecosystem approach, the most important type of knowledge is entrepreneurial knowledge. The cluster/RIS approach, by contrast, focuses more narrowly on technology and market knowledge. Entrepreneurial knowledge includes these knowledge domains but is not

limited to them; crucially, entrepreneurial knowledge also encompasses knowledge about the entrepreneurship process, i.e. issues such as opportunity identification, business planning, and venture capital financing (Spigel & Harrison, 2018).

The smart specialization approach focuses on generating entrepreneurial knowledge with a transformative potential. It achieves this through a process of combining, converting, and restructuring fragmented knowledge resources. More specifically, smart specialization aspires to combine three forms of knowledge: entrepreneurial insights into market opportunities; expertise on regional strategic orientations; and scientific insights. Such a process of knowledge integration is demanding as it relies heavily on connectivity between triple helix actors which are not always closely aligned (Blažek & Morgan, 2019). However, the involvement of the public sector facilitates knowledge diffusion and spillovers since public sector agencies, unlike private firms, do not have a strong incentive to keep entrepreneurial knowledge to themselves (Foray, 2018). The smart specialization approach, if conscientiously implemented, links directly into start-up formation and industrial upscaling and provides a supporting regional ecology for organizing start-up incubation.

Key Actors

In the entrepreneurial ecosystem approach, the key actors are entrepreneurs. In the cluster/RIS approach, they are public agencies, universities, and large firms. In the smart specialization approach, the key actors are all of the above – public agencies, universities, and all types of firms including start-ups.

EDP is an explorative search for new opportunities, potentially leading to diversification and climbing in value chains within existing domains but also to the identification of new paths based on existing strengths. EDP is not classic economic entrepreneurship. Instead, it is expected to be undertaken through a collaborative effort of public sector actors, entrepreneurs who know the market, and entrepreneurial scientists, each group complementing the strengths of the others (Foray, 2015).

Industry

While the entrepreneurial ecosystem approach focuses on an industry's underlying technologies and the cluster/RIS approach concentrates on strengthening knowledge flows and innovation within an industry, the focus of the smart specialization approach is on opening up new or related

domains of technology and market opportunity – in other words, the same focus as entrepreneurs.

Based on a micro-macro approach that combines micro-level theories of learning through new knowledge creation with evolutionary economic theories of growth (Boschma, 2017; Nguyen & Mariussen, 2019), smart specialization connects the discussion of sustainable start-up incubation ecosystems to a modern theory of growth in the economy. The long-term ambition of smart specialization is to create sustainable macro-level growth in the economy, with EDP as a fundamental engine of growth.

To conclude: The smart specialization approach goes beyond theories of clusters and RIS – which tacitly assume that any kind of innovation creates growth – by emphasizing the importance of EDP.

The starting point of smart specialization is to leverage the current strengths of regions. Its ultimate aim is to transform regional economies by discovering new potential growth domains and supporting the development of these through regional policy. New potential growth domains are found through a collaborative search process involving entrepreneurial actors in a broad sense, including firms, universities, public agents, and NGOs. In this sense, start-ups are important actors capable of embracing the opportunities that exist in a region as a result of the region's specific characteristics and developing new growth domains with the support of the regional smart specialization strategy. Entrepreneurial discoveries leading to growth may emerge through experiments that combine learning across value chains, sectors, and countries. Actors involved in defining or implementing a smart specialization strategy should regularly reexamine and evaluate the priorities of the strategy and the assumptions on which it is based, learning from their own experience as well as from the experience of others, and adjust the policy accordingly.

The ambition of smart specialization is to create regional growth through better ways of using and combining place-based resources and macro-regional networks. A key element in achieving this is improving regional governance and facilitating cooperation among entrepreneurial actors in a broad sense including public sector agencies, universities, and businesses, with the aim of creating and refining the knowledge that can fuel entrepreneurial transformation activities. This is the synergy between smart specialization strategy and the entrepreneurial ecosystems approach, which likewise assumes that the co-existence and interaction of entrepreneurial actors is a driver of economic sustainability. Smart specialization policies, with their experimental nature, enable the conditions for establishing domain priorities in the regions and initiating transformative activities associated with those priorities, ultimately leading to the

evolution of what could be called entrepreneurial ecosystems. The synergy will be discussed further in the next section.

IMPLICATIONS FOR POLICY AND CONTRIBUTION

It is important to understand that deploying smart specialization innovation policy does not mean dismissing other innovation policies such as cluster policy or national innovation system policy. These horizontal policies are essential to building a fundamental framework for strengthening regional innovation capacities and institutions. Policies offering support to a generalized category of activities or actors (e.g. R&D activities, or start-up firms) can be a crucial means of increasing innovation rates. Smart specialization is an additional option that regions may choose to embrace if they have a sufficiently high level of institutional sophistication and commitment to transforming their economic structure towards differentiation and specialization (Foray, 2018).

Implications for Policy

There are several implications for policy design if a smart specialization strategy is adopted to support the development of entrepreneurial ecosystems. As mentioned in the section on “Innovation Policies,” the synergy between smart specialization and entrepreneurial ecosystems lies in the *experimental nature* of smart specialization, which will help enable the conditions for *establishing the domain priorities* in the regions and for *developing transformative activities* associated with those domain priorities (Foray, 2018).

Establishing the domain priorities in the regions refers to the process of exploring new ways of matching specific regional characteristics and innovation capacities with entrepreneurial opportunities in order to identify key domains that have the potential to transform the economic structure of the region. This process should involve intensive interactions between public and private sectors within a robust and transparent policy framework (Foray, 2018). *Developing transformative activities* refers to policies that help create the critical mass of involvement and activity within a prioritized domain that will enable it to produce sustainable economic growth. The priorities and transformative activities should be *experimental*, i.e. gradually and jointly discovered by a diverse set of actors in the regions through EDP. The policy must therefore be flexible and subject to regular evaluation using objective performance indicators and feedback from relevant stakeholders (Feldman, Hadjimichael, Lanahan, & Kemeny, 2016).

For illustration, consider the case of the Nordland region of Norway, which has adopted a smart specialization strategy. The regional government of Nordland has identified three domains to prioritize: seafood, tourism, and the process industry (OECD, 2016). Rather than provide financial support to these industries in an indiscriminate fashion, which would run counter to the ideas of smart specialization, the Nordland government has implemented three *transformative activities* (OECD, 2016, p. 198):

- “Supporting co-operative projects between business and R&D institutions”
- “Brokering education projects within clusters”
- “Supporting competence building in universities and R&D institutes that align with cluster development in the region.”

Several policy implications are reflected in this example. First, a vision of regional transformation does not necessarily have to focus on high-tech areas of the economy, although it should facilitate the adoption of relevant advanced technological solutions by potential users in the prioritized domains. Second, the policy should aim to develop specialized human capital and capabilities before, or at least in parallel with, increasing demand for R&D within the priority domains. Third, the public sector agency should support knowledge diffusion in the domains in order to mitigate the problem of private sector actors tending to keep information private. Fourth, the policy should not be based on any preconceived notions of how the domains ought to evolve but should instead facilitate a process of collective learning aimed at enabling entrepreneurs to define the new economic structure of the region in a bottom-up fashion.

Contribution

In this chapter we have discussed the role of smart specialization in providing regional strategic support for the establishment of sustainable start-up incubation ecosystems. We did so in three steps. First we introduced the ecosystem concept in economics and management. We then turned to innovation policy, discussing two approaches to innovation policy in particular: smart specialization, which has been widely implemented in practice but is relatively loosely grounded in theory, and the ecosystem-based approach, which rests on a relatively strong theoretical base but has not been developed into a practitioner-friendly framework. Finally we compared these two approaches and argued that smart specialization essentially *is* an ecosystem-based approach – or at least consistent with ecosystem-based

approaches in most respects – while retaining some elements of traditional innovation policy, and that it therefore “bridges the gap” between the traditional and ecosystem-based views of innovation. This finding has practical significance. Smart specialization is currently being implemented on a large scale in the European Union, imbuing the concept with empirical substance and facilitating its adoption by policymakers elsewhere. Although smart specialization is not the be-all and end-all of innovation policy, we argue that it is currently the most useful answer to the question of how ecosystem-based notions of innovation policy can be implemented.

In the context of supporting entrepreneurial ecosystems at the regional level through smart specialization, lending support to *start-up incubation* ecosystems is a small but vital component. It is small because, by definition, only firms at the earliest stage of their lifecycle can be in a state of incubation, and thus only a small minority of entrepreneurial actors (recall that smart specialization takes an expansive view of this term) will belong to a start-up incubation ecosystem at any given time. Yet it is also vital because smart specialization has a strong focus on new entrepreneurial opportunities, and start-ups are designed to seize those.

The contribution of the present chapter to the entrepreneurship literature is three-fold. First and foremost, to the best of our knowledge this chapter is the first attempt in the academic literature to examine explicitly how smart specialization is connected to entrepreneurship theories, offering in the process a new conceptualization of entrepreneurship as a collective (rather than individual) effort to discover opportunities.

Second, this chapter addresses the question of how the sustainability of entrepreneurial ecosystems can be ensured, raised by Cavallo et al. (2018), who draw special attention in this context to the distinction between “natural” and “artificial” governance mechanisms. To the extent that smart specialization can promote sustainable entrepreneurial ecosystems (an idea to which we are sympathetic), our conclusion is that a combination of top-down (“artificial”) and bottom-up (“natural”) mechanisms is called for. Indeed the notion that the two should be combined is absolutely essential to smart specialization.

Third, in extension of the above, we explain how policymakers can intervene in order to facilitate and enable (as opposed to regulate) the “natural” drivers of dynamism in entrepreneurial ecosystems. In a nutshell, our answer is that policymakers should implement a smart specialization strategy. That is to say, they should encourage an entrepreneurial discovery process involving the public sector and academia in addition to private entrepreneurs, identify domains to prioritize as an outcome of this process, support transformative activities within those domains, and so on, as described at length in this chapter and elsewhere.

Some aspects of smart specialization leave room for interpretation, and one might argue with some justification that the concept is more of an idealized vision loosely based on a miscellany of theories than a rigorous theoretical framework in its own right. Yet the undeniable political and economic reality of smart specialization makes it urgent and imperative for scholars to engage with the concept. We hope the present chapter will inspire more research on the theoretical underpinnings of smart specialization and the linkages between smart specialization and entrepreneurship theory in particular.

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