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Applying the entrepreneurial ecosystem concept to regional entrepreneurship policy analysis – a critique

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by

Jonathan Potter and Helen Lawton Smith¹

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¹ Jonathan Potter, OECD and Helen Lawton Smith, Birkbeck, University of London

This chapter applies the Stam (2015) entrepreneurial ecosystems concept to analysing policy levers for improving regional economic and innovation performance in five case regions, three in Poland and two in the UK. It uses primary and secondary data from the two countries to identify barriers and enablers for entrepreneurship and how these vary between regions. It also considers what methods can provide information on ecosystem quality and the strengths and weaknesses of the qualitative and quantitative approaches adopted.

It finds that the entrepreneurial ecosystems concept is a useful empirically- and theoretically-informed framework to assess the influences on entrepreneurship at regional level. However, it highlights four issues that have not been well addressed by the framework. These are the role of anchor organisations; sector variations in ecosystem conditions; a lack of attention to equality, diversity and inclusion, and possible difficulties in disentangling which elements of the ecosystem drive system performance, hence it may be hard to identify and test a key policy lever.

Key words: entrepreneurial ecosystems, regional entrepreneurship policy, Poland, UK, regions

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1. Introduction

The level of productive entrepreneurship varies substantially between regions within countries. Start-up rates are of the order of three times greater in high-performing regions than poor-performing regions across a range of high-income countries (Fritsch and Storey, 2014). Regional shares of scale-ups in the business population also vary strongly. For example, across regions, the share of scale-ups in employment in all non-micro SMEs ranges from 10% to 17% in Italy, 8% to 13% in Spain, and 8% to 14% in Portugal (OECD, 2021a). These disparities highlight that entrepreneurship is in many ways a regional phenomenon, enabled and hindered by multiple, inter-related factors within regions. The entrepreneurial ecosystems concept offers a potential empirically- and theoretically-informed framework to assess the influences on entrepreneurship at regional level and for identifying potential policy levers for improving performance. This chapter reports on an application of the concept across five case study regions in two countries – the United Kingdom and Poland – focusing on the policy insights it provides and its usefulness as a policy development tool.

Spigel and Stam (2018, p. 407) define an entrepreneurial ecosystem as “a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory”. Similarly, Brown and Mason (2017) define entrepreneurial ecosystems as the

local environments that nurture and support start-ups and scale-ups. They see them as having four components (see also OECD, 2020):

- Entrepreneurial actors, which provide incubation, acceleration, coaching and mentoring services to entrepreneurs;
- Entrepreneurial resource providers, which support entrepreneurship with financial resources (banks, angels etc.), and knowledge and collaboration opportunities (e.g. large firms and higher education institutions);
- Entrepreneurial connectors, which foster linkages in the ecosystem (e.g. professional associations, business brokers); and
- An entrepreneurial orientation, which includes an entrepreneurial culture.

Following this logic, the entrepreneurial ecosystems concept examines the regional conditions affecting the availability of knowledge, talent and finance and other resources for productive and ambitious entrepreneurs, the extent to which local culture is supportive of productive entrepreneurship, and the extent to which there is a supportive formal and informal institutional environment.² It also contains a strong emphasis on networks for entrepreneurs, including connections between entrepreneurs and local large firm operations, universities, research organisations, business services providers, established SMEs, and public agencies, in line with a more general increase in the importance attributed to networks in economic development and innovation processes (Huggins and Thompson, 2021).

In applying the entrepreneurial ecosystems framework to regional case study analysis, the chapter seeks to address the following key questions:

- What are the barriers and enablers to entrepreneurship in each case study region and how do they vary between regions?
- What is the current role of regional-level policy interventions in supporting entrepreneurship development in the regions and what further policy interventions could be considered?
- To what extent is the entrepreneurial ecosystems framework a good one for identifying the entrepreneurship policy interventions needed at regional level?
- What methods can provide information on ecosystem quality, and what are the relative strengths and weaknesses of the qualitative and quantitative approaches?

2. The conceptual framework applied

The entrepreneurial ecosystems research literature identifies multiple influences on entrepreneurship that entrepreneurship policy measures at regional level would not pick up if

² The entrepreneurial ecosystems focus is on productive entrepreneurship, i.e. the creation and growth of businesses with job creation and innovation potential (OECD, 2020; Baumol, 1990), or ambitious entrepreneurs. This seeks to avoid the problem of policy targeting very small, non-employer start-ups with limited economic benefits (Acs et al., 2016).

targeted directly at specific start-ups or scale-ups (e.g. seed capital or business advisory services) rather than the broader ecosystem.

For example, networks connect entrepreneurs to a wide range of knowledge, markets, finance and other resources (Fernandes and Ferreira, 2021). Culture is an influence on entrepreneurship which may persist in the long term (Fritsch and Wyrwich, 2017; Fritsch and Storey, 2014). Leadership can be important for identifying and co-ordinating responses to ecosystem weak links (Feldman, 2014) and providing network hubs (Feldman and Zoller, 2012), with experienced and serial entrepreneurs potentially playing a fundamental role (Breznitz and Zhang, 2019; Vedula and Kim, 2019; Mason and Brown, 2014). Access to finance is often seen to be crucial (Kerr and Nanda, 2009), as is availability of talent (Acs and Armington, 2004; Qian, Acs and Stough, 2013) and knowledge (Audretsch and Lehmann, 2005). By bringing together these and other influences, the entrepreneurial ecosystem concept is an example of a systems approach to analysing regional policy contexts, which can be used for a comprehensive analysis recognising interconnectedness and wider structural factors.

To operationalise the concept, Stam's (2015) framework was employed, as set out in Figure 1. This shows 10 entrepreneurial ecosystem elements, broken down into access to resources factors and institutional conditions. The resources factors cover connectivity infrastructure (e.g. access by road, rail, airports), business support services (e.g. advice and consultancy to entrepreneurs), knowledge (e.g. research results from public and private organizations), finance (supply of finance for entrepreneurial projects preferably provided by investors with entrepreneurial knowledge), demand (purchasing power and sophisticated customers to enable demand for new products and services), talent and skills (diverse and skilled workers and people with entrepreneurial competences), and leadership (a set of visible entrepreneurial leaders who are committed to the region and provide direction and role models).

The institutional conditions cover formal institutions (including business regulation), culture (the degree to which entrepreneurship is valued), and networks affecting knowledge exchange and skills development (the amount of collaboration among entrepreneurs providing information flows and enabling an effective distribution of knowledge, labour and capital). These elements, and the interactions among them, are seen to affect the generation and development of innovative start-ups, scale-ups and entrepreneurial employees in existing firms. There is empirical evidence across a wide range of entrepreneurship research for the effects of all these ecosystem elements on productive entrepreneurship, either at national or sub-national level.

FIGURE 1 HERE

3. Methodology

The chapter examines five regional case studies, three in Poland – Malopolskie, which includes Krakow (OECD, 2019a), Mazowieckie, which includes Warsaw (OECD, 2019b), and Pomorskie, which includes Gdansk and Gdynia (OECD, 2019c) – and two in the United Kingdom – Cambridgeshire and Peterborough (OECD, 2021b), and Coventry and Warwickshire (OECD,

2019d). The regions were selected in response to a demand from the national and regional government authorities for policy development support. Each case study systematically examined the ecosystem elements in Stam's (2015) framework in terms of whether they represented a weak link in the regional entrepreneurial ecosystem and how policy might be developed to strengthen their contribution to supporting productive entrepreneurship in the region.

The case studies involved the following main areas of work. Firstly, the research exploited secondary data sources to establish empirical indicators to measure the strength of the different entrepreneurial ecosystem elements in the case study regions and benchmark them with others in their country or with similar types of ecosystems in other countries, making use of international data sources where possible, supplemented with national data sources for within-country comparisons.

Secondly, the research involved a series of stakeholder interviews in each region, with entrepreneurs, employers' organizations, training organizations, cluster organizations, business support providers, university leadership, large firms operating locally etc. These interviews were used to discuss the strengths and weaknesses of the regional entrepreneurial ecosystems, drawing on the views of the stakeholders. Approximately 30-40 interviews were held in each region during the period 2017-2019.

Reports were prepared for each case study including the findings, policy recommendations and international inspiring policy practices. Workshops were held in each region to discuss the reports and refine the draft findings and recommendations.

4. Findings on weak links in entrepreneurial ecosystems in case study regions

4.1 Quantitative benchmarking of ecosystems

Table 1 shows the benchmarking of the three Polish case study regions against other regions in the country on the 10 ecosystem elements. The findings indicate that the entrepreneurial ecosystems in the three case study Polish regions are healthier overall than in the other regions. On the overall index, Mazowieckie ranks first, Pomorskie second and Malopolskie third of the 16 regions. However, the scores of the regions are uneven across the different pillars, indicating relative weak links and potential areas for policy intervention:

- Malopolskie's benchmarking scores are relatively weak within Poland on networks (rank 12) and financing (rank 11).
- Mazowieckie's benchmarking scores are relatively weak on networks (rank 16), finance (rank 15) and formal institutions (rank 14).
- Pomorskie's benchmarking scores are relatively good on all elements, but physical infrastructure (rank 8) and networks (rank 8) were weaker than the other elements.

This suggests that policy efforts to strengthen productive entrepreneurship in the regions need to focus on improving institutions in the form of trust in government, networks in terms of

participation in clusters and access to finance in terms of SME access to loans, and physical infrastructure in terms of road, rail and air connectivity.

TABLE 1 HERE

Figure 2 shows a complementary approach to the benchmarking, involving international benchmarking of the Cambridge and Peterborough entrepreneurial ecosystem (proxied by the larger NUTS 2 East Anglia region) with four other regional entrepreneurship ecosystems in the top 10 percent of regional entrepreneurship ecosystem quality in Europe – Berkshire, Buckinghamshire and Oxfordshire, UK; Hovestaden (Greater Copenhagen), Denmark; Stockholm, Sweden; and Oberbayern (Greater Munich), Germany.

The indicators used were:

- Formal institutions: Two composite indicators measuring the overall quality of government and the regulatory framework for entrepreneurship (Quality of Government Survey and the Regional Ecosystem Scoreboard).
- Culture: A composite measure capturing entrepreneurial motivation, cultural and social norms, importance to be innovative and trust in others (Regional Ecosystem Scoreboard).
- Networks: Percentage of SMEs that engage in innovative collaborations as a percentage of all SMEs in the business population (Regional Innovation Scoreboard).
- Physical infrastructure: Four components in which the transportation infrastructure is measured as accessibility by road, accessibility by railway and number of passenger flights and digital infrastructure is measured by the percentage of households with access to internet (Regional Competitiveness Index).
- Finance: Two components measuring availability of venture capital and availability of bank loans for capital investments (Regional Ecosystem Scoreboard).
- Leadership: The number of coordinators on H2020 innovation projects per 1000 inhabitants (CORDIS).
- Talent: Eight components: tertiary education, vocational training, lifelong learning, innovative skills training, entrepreneurship education, technical skills, creative skills, e-skills (OECD Regional Innovation database, OECD Regional Education database, Regional Ecosystem Scoreboard).
- Knowledge: R&D expenditure as % of GDP (OECD Regional Innovation Database).
- Demand: Three components: disposable income per capita, potential market size expressed in regional GDP, potential market size in population (OECD Regional Economy Database; Regional Competitiveness Index).
- Intermediate services: Two components: the percentage of employment in knowledge-intensive market services and the percentage of incubators/accelerators per 1 000 inhabitants (Eurostat and Crunchbase).

FIGURE 2 HERE

The diagnosis shows that East Anglia performs very well with respect to leadership and knowledge, and relatively well with respect to networks. The weak links in the entrepreneurial ecosystem, relative to other top-performing ecosystems, were in:

- Physical infrastructure (transportation and digital infrastructure), reflecting its non-metropolitan status compared to the other regions (three being capital cities or large cities).
- Talent (prevalence of individuals with high levels of human capital), reflecting poor educational attainment in Peterborough and The Fens, rather than in Cambridge.
- Intermediate services (employment in knowledge intensive market services and stock of incubators and accelerators). Even though the Cambridge area has a well-known concentration of technology consultancies (Garnsey and Heffernan 2005) and incubators, East Anglia's overall employment in knowledge intensive services was relatively low.

4.2 Qualitative evidence on ecosystems

Table 2 summarises the main findings from the qualitative evidence on the nature and importance of the weak links in the case study regions.

TABLE 2 HERE

One of the conclusions that can be drawn from Table 2 is that despite differing national contexts and industrial histories across the regions, there are strong similarities in the main ecosystem weak links. Three ecosystem elements were major weak links in every region – culture, leadership and talent. Nonetheless the specific issues involved were often different and the weak links were not always shared across all sub-regions and sectors.

- *Entrepreneurial culture.* Lack of an entrepreneurial culture was particularly an issue in Poland and parts of the two United Kingdom regions that have been more dominated by large firm or agricultural activity. Universities can play a key role in building entrepreneurial mindsets through entrepreneurship education and supporting graduates in start-ups (Breznitz and Zhang, 2019). Examples of this were found in all regions. However, more could be done in terms of connecting graduate entrepreneurs to sources of advice and finance and in broadening the support to non-business and technology subjects. Furthermore, cultural changes are needed beyond university students to encourage more of the adult population outside of formal education to become entrepreneurs.
- *Leadership.* In the case of the Polish regions, there is strong public sector leadership of the ecosystems through regional government initiatives, including through the development and management of EU regional operational programmes. However, weaknesses of this leadership included a lack of stakeholder involvement from the private sector and a lack of a rich economic intelligence and evaluation culture. In the case of the two United Kingdom regions, issues were that the strong private sector leadership of the Cambridge cluster did not extend to the parts of the region covered by Peterborough and The Fens, limited resources for the Local Enterprise Partnership in Coventry and Warwickshire and non-aligned geographies of different policy organizations in that region.

- *Talent.* An important aspect of this is skills shortages including in digital and technical skills and soft skills. A common issue was that insufficient account is taken of business needs in vocational training provision

Other ecosystem weak links important in the majority of regions were networks, finance, knowledge and intermediate services.

- *Networks.* A key problem in each of the Polish regions was a lack of social capital and trust which affected the willingness of entrepreneurs to collaborate. A lack of incentives and traditions for networking among universities and large firms was also found, which limited the ability to build trust among players. In Cambridgeshire and Peterborough, although there were very strong private sector networks, this tended to be limited to firms and organizations in the immediate vicinity of the core Cambridge cluster, excluding potential partners in other parts of the region.
- *Finance.* Access to finance was a common issue to most of regions, especially a lack of early-stage equity, in particular through venture capital and business angels. While the public sector is active in finance provision for entrepreneurship in all the regions, there appear still to be gaps.
- *Knowledge.* Access to knowledge resources for start-ups and scale-ups comes out as more of a problem for the regional entrepreneurial ecosystems in Poland as compared to the United Kingdom regions. There were constraints in the Polish regions in particular on commercializing university research and building partnerships between universities and industry.
- *Intermediate services.* In Coventry and Warwickshire, start-ups found it difficult to afford the support of Warwick Manufacturing Group and Warwick University's Manufacturing Technology Centre. Awareness of the various public support programmes in the region was often lacking. There was strong public business support in the Polish regions, but constraints included insufficient advice and mentoring for innovative start-ups and scale-ups in Malopolskie and Mazowieckie and lack of co-ordination of public business support in Mazowieckie.
- *Physical infrastructure.* This was an issue only in the United Kingdom regions. In the case of Cambridge, the expansion of the cluster had led to traffic congestion and housing cost pressures which constrained further growth. In Coventry and Warwickshire, it was a lack of small premises with high performing broadband in Leamington Spa (digital spa) to accommodate the rising number of gaming industry start-ups that was a problem.

The qualitative analysis also revealed two ecosystem elements that were seen as unproblematic by the stakeholders, although they were highlighted as important in the quantitative benchmarking exercise – namely market demand and formal institutions. This could suggest that regulatory issues in general are not in fact major weak links at regional level and that perhaps demand seen as overall purchasing power is not so significant, perhaps reflecting the tendency of innovative start-ups and scale-ups to export regionally.

5. Findings on the role of policy in entrepreneurial ecosystems

5.1 Pre-existing entrepreneurship policy in the ecosystems

This section examines how regional-level policy interventions have been influential in supporting the entrepreneurial ecosystems in the case study regions. This includes the role of the regional and local government authorities in designing entrepreneurship policy interventions that meet local needs, working in co-ordination with national governments.

Entrepreneurship policy set-up in the Polish regions

In Poland, regionally-tailored measures for entrepreneurship support are carried out by the offices of the elected regional governments, with a strong financial contribution provided by the European Union (EU) through the European Structural and Investment Funds. Each regional government authority develops and implements a Regional Operational Programme, which sets out the key economic development measures that will be taken with EU support. The regions have also developed Research and Innovation Smart Specialization Strategies setting out the key strategic sectors and activities for EU-supported research and innovation policy expenditures, based on an Entrepreneurial Discovery Process engaging stakeholders from business, research and government. These actions emphasize joint R&D and innovation projects involving various businesses and universities in the regions. In addition, the national government is responsible for a National Operational Programme with a range of entrepreneurship support measures, including a range of enterprise finance, advice and innovation support measures implemented by the Polish Agency for Enterprise Development in particular.

Key entrepreneurship support measures already in place in the three Polish regions at the time of the case study work were in five broad areas. These were public finance initiatives (including regional venture funds), networking, skills training, innovation infrastructure (physical including incubators and science parks and mentoring and advice) and regulatory changes (including start-up regulations and locational tax incentives).

The policy infrastructure also includes cluster organizations in each of the regions (whose establishment was originally triggered by public funding although they had not recently received significant public funds). They have been important as focal points for the development of industry collaborations and for business and research sector input to the regional smart specialization strategies. The regions also operate investment promotion offices aimed at attraction of foreign direct investment.

Policy set-up in the United Kingdom regions

The policy arrangements for the two UK case study regions are somewhat different. They are based on a generally more centralized approach to policy in the United Kingdom, where the central government plays a relatively strong role in economic development support, and a more limited role of EU funding (which was a smaller share of GDP prior to Brexit and has now ceased). There are 38 Local Enterprise Partnerships (LEPs) that lead business development and entrepreneurship policy in England. This is Coventry and Warwickshire LEP in one case, but in Cambridgeshire and Peterborough the LEP function is played by the Cambridgeshire and Peterborough Mayoral

Combined Authority (CPCA), which was created in 2017 through a voluntary agreement between the region's existing local government authorities, with responsibilities for transport and economic development, acting as a unitary local authority with a directly elected mayor.

Coventry and Warwickshire LEP and CPCA play critical roles in developing economic intelligence and using it to channel public funding to address the needs of local business. They are key linking organizations for local business, universities and government, helping co-ordinate, prioritize and stimulate action. They produce an economic development strategy, industrial strategy and skills strategy for their regions, drawing on stakeholder input including the business members of the LEP Board and the CPCA Business Board members. They play a key role in accessing central government funding pots and steering the spending to local priorities, for example through bids to the Local Growth Fund and negotiated Growth Deals.

Key entrepreneurship policy measures in place in the two UK regions at the time of the case studies while similar in some respects to Poland differ in others. For example, access to finance measures were common, as were incubators and science parks (although the UK has more sophisticated accelerators specializing in leading edge technologies), tax incentives and entrepreneurship education in universities. Where they differ is in public procurement for innovation policy and a broader range of services and greater involvement of non-public providers in the regional business support one-stop shops (the Growth Hubs in the UK and Polish Agency for Enterprise Development supported centres in Poland).

In addition, compared with the Polish regions, there is a greater range of broader private sector and non-governmental initiatives for economic development in the two UK regions, although there is a varying mix of public, private and non-government support in all of the ecosystems. These non-public initiatives include local network and cluster organizations (such as One Nucleus and the Cambridge Network in Cambridge and Coventry and Warwickshire Chamber of Commerce), university entrepreneurship training and support (such as the Institute of Applied Entrepreneurship of Coventry University), business advice (such as Coventry and Warwickshire First), business angel networks (such as Cambridge Business Angels), knowledge transfer and skills development support (such as the Warwick Manufacturing Group), and science and technology parks (such as the St John's Innovation Centre and Trinity Science Park, Cambridge, and the MIRA Technology Park in Coventry and Warwickshire). These are non-government led initiatives, sometimes with a degree of public funding included to incentivize certain activities.

In all five case study regions there is therefore a comprehensive package of policy support for entrepreneurship. The research sought to identify how these policies could be modified or complemented in order to help address the key ecosystem weak links highlighted above.

5.2 Further policy developments needed in the ecosystems

Table 3 summarizes the key recommendations made in the report for strengthening the case study of regional entrepreneurial ecosystems.

TABLE 3 HERE

6. How appropriate is the entrepreneurial ecosystems framework for regional entrepreneurship policy development?

This section assesses the extent to which the entrepreneurial ecosystems framework adopted for the analysis, based on Stam (2015), has been useful for policy development. It starts with some overall observations on strengths and weaknesses of the framework for the analysis, including the methodological issue of reconciling quantitative and qualitative analysis. It then examines two issues that have not been well addressed by the framework, namely the role of anchor organizations and sector variations in ecosystem conditions by sector. It then covers some further issues.

6.1 Strengths of the framework

The entrepreneurial ecosystems framework has proven to have three major strengths for guiding the policy analysis:

- *A holistic view.* The framework is based on a recognition that entrepreneurship is affected by multiple environmental influences rather than by an entrepreneur acting alone. Entrepreneurship policies traditionally target the start-up enterprise itself, for example with an offer of finance or advice to specific firms or entrepreneurs, whereas the entrepreneurial ecosystems framework seeks to understand a range of broader influences affecting entrepreneurs and start-ups generally in terms of available resources and institutional conditions such as a culture of entrepreneurship.
- *A regional view.* The framework takes account of the impact of regional business environment conditions on entrepreneurship. Entrepreneurship policies are frequently designed at national level using a single mix of policy interventions across a country, whereas the entrepreneurial ecosystems framework instead points to the need for regionally-tailored policies aimed at addressing the weak links in any given region.
- *A network view.* The framework emphasises the importance of networks and connections across different actors within a region, for example linkages between entrepreneurs and universities and large firms, or finance providers and business advice providers, as well as the role of cluster organisations or other business-driven strategic partnerships in helping generate an entrepreneurship-oriented economic development vision for a place.

Because of these features, an assessment based on the ten entrepreneurial ecosystem elements has proved useful for undertaking a comprehensive assessment of the factors affecting the performance of productive start-ups and scale-ups in the case study regions. Using the framework leads to a broader and more systematic consideration of the issues that may be important compared with non-theoretically informed investigations focused on direct start-up and scale-up support.

6.2 Weaknesses of the framework, including the quantitative benchmarking

The use of the framework in the case study areas, however, threw up six specific weaknesses, largely related to the quantitative benchmarking, that raise important methodological issues:

- *Proxy measures.* The quantitative benchmarking of the regions often uses proxy measures that may not correspond very well to the real concepts the elements purport to measure. For example, in Poland, leadership was proxied by EU Operational Programme fund value and number of research units per 100 000 population. This does not pick up well the idea presented in the literature of visible successful and serial entrepreneurs committed to the region. Similarly, the Cambridgeshire and Peterborough study highlighted the importance of entrepreneurs as “deal makers”. They were important in financing ventures, in creating networks, in lobbying for the ecosystem with national and regional government and in making various public goods investments. This may be closer to the concept of leadership in the entrepreneurial ecosystems literature than the proxies used in the quantitative benchmarking. However, quantitative data are difficult to come by on a multi-region basis to benchmark this.
- *Non-corresponding geographical boundaries.* The geographical areas used for the benchmarking in the UK did not correspond well to the administrative areas of the bodies responsible for policy. This reflects the creation of local policy bodies (the Coventry and Warwickshire LEP and the CPCA) which do not correspond to pre-established NUTS 2 or 3 areas. More disaggregated benchmarking data were not available. This could lead to some misleading conclusions. For example, East Anglia performed weakly with respect to talent, which is perhaps remarkable for a region that contains the leading Cambridge high-tech cluster but can be explained in part by other East Anglia sub-regions with very low shares of population with tertiary education.
- *The effect of proximity to other regions.* The benchmarking is based on data for conditions within each regional entrepreneurial ecosystem. However, this does not take account of access to resources in neighbouring regions, which can compensate for a lack of resources inside the benchmarked territory. For example, Cambridgeshire and Peterborough may benefit from proximity to London’s very high-performing entrepreneurial ecosystem, including access to the London finance and talent pools and London’s high regional connectivity, such as its international airports.
- *Varying sub-region conditions.* Three case studies pointed up important differences in entrepreneurial ecosystems conditions within case study regions, which are averaged out by the quantitative benchmarking. The issue of diversity within the regions is clear in the differences between less space- and talent-constrained conditions in rural Warwickshire compared with urban Coventry and by strong core-periphery differences in entrepreneurship and innovation activities and industrial sectors between Warsaw city and its rural periphery in the case of Mazowieckie. There was also clear diversity in knowledge, talent, networks and other supporting conditions between the core Cambridge cluster in and around the City of Cambridge and the weaker all-round conditions in The Fens and Peterborough sub-regions. These differences call for differences in policy approaches within the regions, which are not highlighted by the quantitative benchmarking.
- *Validity of benchmark areas.* The scores provided from the quantitative benchmarking are relative to other regions. This has to be taken into account, in that a pure benchmarking of

this kind would not pick up cases where all benchmarked regions are weak or strong on the same elements. Instead, it focuses attention on where there are differences between regions, although this can be important where regions are in competition with each other.

- *Relevance or nature of some of the ecosystem elements.* The case studies also draw attention to whether some of the ecosystem elements in the Stam (2015) framework are of central relevance to entrepreneurship development in a region or if somewhat different conceptions might be more useful. Three issues are highlighted. The first is that it might make more sense to think of demand as sophisticated customers in a regional ecosystem (e.g. large firms, or government innovation procurement), on the lines of the Porter (1990) demand conditions determinant of the competitive advantage of nations, rather than as a simple measure of demand as regional GDP. Second, the connectivity important to entrepreneurs may be more closely linked to cultural issues than pure physical infrastructure as measured by the number of kilometers of road and rail in a region. The academic discussion of ecosystems tends to focus in particular on the importance of connectivity in terms of interactions among agents within a region. Third, the case studies suggest that it may be more relevant to consider leadership as ‘policy capacity’ to design a regional entrepreneurship policy using intelligence about the region and stakeholder engagement, rather than as “entrepreneurial firms committed to the region” as per the Stam (2015) concept.

These issues also highlight the importance of considering the methodological issue of the degree of correspondence between the ecosystem weak links highlighted by the quantitative benchmarking and as compared with those brought out by the qualitative evidence in the regional cases. The quantitative benchmarking focused attention on networks, finance, formal institutions and physical infrastructure. These issues were to some extent confirmed by qualitative evidence. However, the stakeholder interviews did not generally point to the latter two areas as major overall weak links, i.e. formal institutions (regulations) or physical infrastructure, barring the transport and housing constraints in the Cambridge cluster. At the same time, the qualitative evidence picked up a number of additional issues that were not identified in the quantitative benchmarking, namely in the areas of culture, leadership, talent, knowledge and intermediate services.

Moreover, the qualitative evidence provides much more detail to support policy development than the quantitative benchmarking. This suggests that the quantitative method is a rather blunt tool for identifying the policy issues and potential responses. The qualitative assessments were better at addressing nuances and providing detail. It may therefore make more sense to base policy assessment largely on the qualitative aspect of the analysis rather than place too much emphasis on the quantitative component of the work. On the other hand, because they do not rely to the same extent on verifiable factual information the qualitative assessments risk being biased or blind to some issues.

6.3 Accounting for anchor organizations and sector differences

The regional case studies highlight two issues that are under-developed in the Stam (2015) framework, namely the role of anchor organizations and sectoral variations in ecosystems.

Anchor organizations

The entrepreneurship and innovation literature often highlights anchor organizations as being integral to the success of many regional entrepreneurial ecosystems. They provide, for example, research-based knowledge, spin-off enterprises, talented company founders and skilled workers, facilities and support to start-ups (such as incubation or entrepreneurial finance), and ecosystem leadership and networking (e.g. Tsouri and Pegoretti, 2020, Assimakopoulos et al., 2022). Anchor organizations are generally higher education institutions (Lehmann et al., 2020; Feldman, Siegel and Wright, 2019), large firms (Spigel and Vinodrai, 2020; Spigel, 2017; Colombelli, Paolucci, and Ughetto, 2017) or public research laboratories (Arora et al., 2019).

In two of the regional case studies, one or two key anchor organizations played a central role in the functioning of the ecosystem. The most important were the University of Warwick and the large firm Jaguar Land Rover (JLR) in the Coventry and Warwickshire entrepreneurial ecosystem and the University of Cambridge in the Cambridgeshire and Peterborough entrepreneurial ecosystem, variously supporting enterprise formation, skills development and innovation infrastructure.

However, no individual university or collection of universities were playing these anchor roles in the Polish regions. While there was some important research commercialization by universities such as the Krakow University of Technology, the Medical University of Gdansk and Gdansk University of Technology, and Warsaw University of Technology, these universities did not match the scale of engagement in entrepreneurship support or networking of the United Kingdom universities. This partly reflected weak incentives and traditions for university-industry collaboration.

The example of JLR in Coventry and Warwickshire demonstrates the sort of anchor role that a knowledge-intensive, entrepreneurial and embedded large firm can play. In Poland, however, the role of local large firm operations was muted, partly reflecting the lack of knowledge-intensity in the FDI that had been attracted together with lack of networks with regional industry and the public sector.

The importance of anchor organizations in some of the regional ecosystems and not others tends to suggest two things. First, it may be necessary to give more explicit attention to anchor organizations in the entrepreneurial ecosystems framework used for analysis. The Stam (2015) framework does not consider anchor organizations as separate elements but integrates their role across a range of different ecosystem elements. Second, in ecosystems where universities or large firms are not playing the role of anchors, there may be scope for policy to seek to build this role, for example by seeking deliberate public-private partnerships in entrepreneurship support with large firms (e.g. in seed capital funds, incubation, mentoring etc.) or by increasing incentives and support for regional universities to engage in supporting entrepreneurs.

Sector ecosystems

Another important point raised by the qualitative interviews (which was not picked up by the quantitative benchmarking) is that there are some important variations in ecosystem weak links by sector within the regional entrepreneurial ecosystems.

In the case of Coventry and Warwickshire, a key distinction was drawn between entrepreneurial ecosystem conditions in the automotive sector and the digital sector. Both co-exist within the region, but the access to resources and institutional conditions are different as well as the importance of start-ups and scale-ups to industry development.

Similarly, the Cambridgeshire and Peterborough case distinguished between entrepreneurial ecosystem conditions for three largely science-based strategic sectors – life science, ICT and agri-tech – and one largely engineering-based strategic sector – advanced manufacturing and materials – in the region. In the former sectors, key issues concerned the importance of proximity to science-based knowledge sources in the University of Cambridge. In the latter sectors, there was a more dispersed regional ecosystem and the lesser dependence on the University of Cambridge for research-based knowledge. Instead, key weak links were in the areas of upgrading skills and capabilities in SMEs and supporting them to access applied R&D.

Ecosystem conditions also varied by sector in the Polish regions. For example, in Pomorskie, the research identified weak links in the facilitation of university spin-off companies in medical technologies, whereas in the digital sector the emphasis was on addressing weak links with respect to encouraging large firms to become network hubs (reflecting different key knowledge sources and start-up sources in the two sectors). Another issue was raised in Mazowieckie, related to the location of key high-tech sectors in the core of the region (Warsaw city) including electronics, ICT, nanotechnology, biotechnology, photonics and high-technology manufacturing and knowledge-intensive business services, with more traditional sectors in the periphery. There were significant differences in policy priorities for the high tech compared with traditional industries.

These findings point to differences between research-based sectors, where start-ups and scale-ups are relatively common and key issues involve research-based knowledge generation and exchange, and engineering-based sectors, where start-ups and scale-ups are less common and key issues involve talent development in terms of generating entrepreneurial employees in existing SMEs. Venture capital and entrepreneurship skills may also be more important for the research-based sectors. In addition, it is clear from the case studies that the networks that help drive the connections in ecosystems are often sector specific and that the skills and knowledge bases are often sector specific, and while there can be strengths in networks, skills and knowledge in some sectors in a region, there may be weaknesses in others. In many of the cases cluster management organizations were seen to have a very important potential role to play in the development of specific sectors within the overall regional entrepreneurial ecosystem.

However, a number of factors are common across sectors in the regions, e.g. the need for digital skills across the workforce. Furthermore, there are opportunities for cross-fertilization across sectors, e.g. sharing of knowledge and skills across ‘related variety’ industries. These observations raise the question of whether the best focus for policy-oriented regional entrepreneurship research is the regional entrepreneurial ecosystem or the sectoral entrepreneurial ecosystem, or a nesting of the two.

6.4 Further issues

Two final issues have emerged. The first is lack of attention to equality, diversity and inclusion. A number of population groups face greater barriers in entrepreneurship – women, youth, unemployed, immigrants and others – which is reflected in lower start-up rates and lower business growth rates (OECD/European Commission, 2021). The entrepreneurial ecosystems framework tends to be used to analyse the conditions affecting productive entrepreneurship in general, but ecosystems can vary in the extent to which they are supportive of various disadvantaged and under-represented groups in entrepreneurship (e.g. Kruger and David, 2020). In principle, the concept could be applied to examine specific conditions for specific social groups such as women or youth or people with disabilities (e.g. Lawton Smith and Owalla, 2022). Without adding this angle, the framework misses an opportunity to say more about how policy can promote diversity in entrepreneurship.

The second is that Stam's (2015) framework comprises ten elements. When looking at the elements individually, as has been done in the regional case studies reported here, it can be difficult to disentangle which elements of the ecosystem drive system performance. A corollary is that it may be hard to identify and test a key policy lever.

7. Conclusions

The regional case studies presented in this chapter show that the entrepreneurial ecosystem concept is very useful from an entrepreneurship policy perspective. The framework can guide systematic and holistic assessments of entrepreneurship policy needs at regional level and can help the identification of a range of concrete policy recommendations. One of its strengths is that it helps uncover important non-traditional entrepreneurship policy levers, i.e. policy measures that are aimed at improving the regional environment in which start-ups and scale-ups emerge and grow rather than providing support targeted directly at the start-up or scale-up itself. The policy levers identified may lie across various aspects of institutional conditions and access to resources conditions. For example, the framework shows the importance of factors like networks, knowledge generation and leadership to entrepreneurship development. It also shows that entrepreneurship policy actions need to vary across regions in response to the different nature of the ecosystem weak links experienced in different places.

At the same time, use of the framework has pointed to certain weaknesses. These concern, notably, the accuracy and relevance of the quantitative benchmarking, the apparent limited relevance of some ecosystem elements, the insufficient attention to anchor organizations, the lack of attention to differences across sectors, social groups, and sub-regions, and the difficulty of ascertaining how entrepreneurial ecosystems work as interactive systems.

To some extent, these weaknesses could be addressed by modifications to the framework or how it is employed. The lack of differentiation by sector, sub-region or social group (e.g. women entrepreneurs, youth entrepreneurs etc.) could be addressed by applying the framework, with its 10 ecosystem elements, to each key target sector, social group or sub-region independently. Indeed, a nested analysis could be developed incorporating both an overall analysis for the whole regional ecosystem and a dedicated analysis for key sectors, sub-regions and/or population groups. The problems of the quantitative benchmarking could be addressed by relying more strongly on the

qualitative analysis, for example using the quantitative benchmark results principally to stimulate more detailed and pertinent discussions among stakeholders. Alternatively, efforts could be made to find or develop better nationally and internationally comparable indicators that are closer to the spirit of what the ecosystem's elements seek to measure.

The issue of insufficient attention to anchor organizations could be rectified either by ensuring that these are understood within each ecosystem element they relate to or by creating a new ecosystem element dedicated to the presence and activities of anchor organizations. It is less clear how to assess how the ecosystem elements interact together, although this can clearly be the subject of stakeholder discussions, focused in particular on positive synergies that could be expected from taking certain actions, or negative synergies being experienced by weak links in certain elements.

In conclusion, the entrepreneurial ecosystem concept can be seen as an important guide to policy-oriented research on productive entrepreneurship, but one that is not yet fully established. As this volume indicates, future research and framework refinements can help make it an even stronger framework for this type of policy development work.

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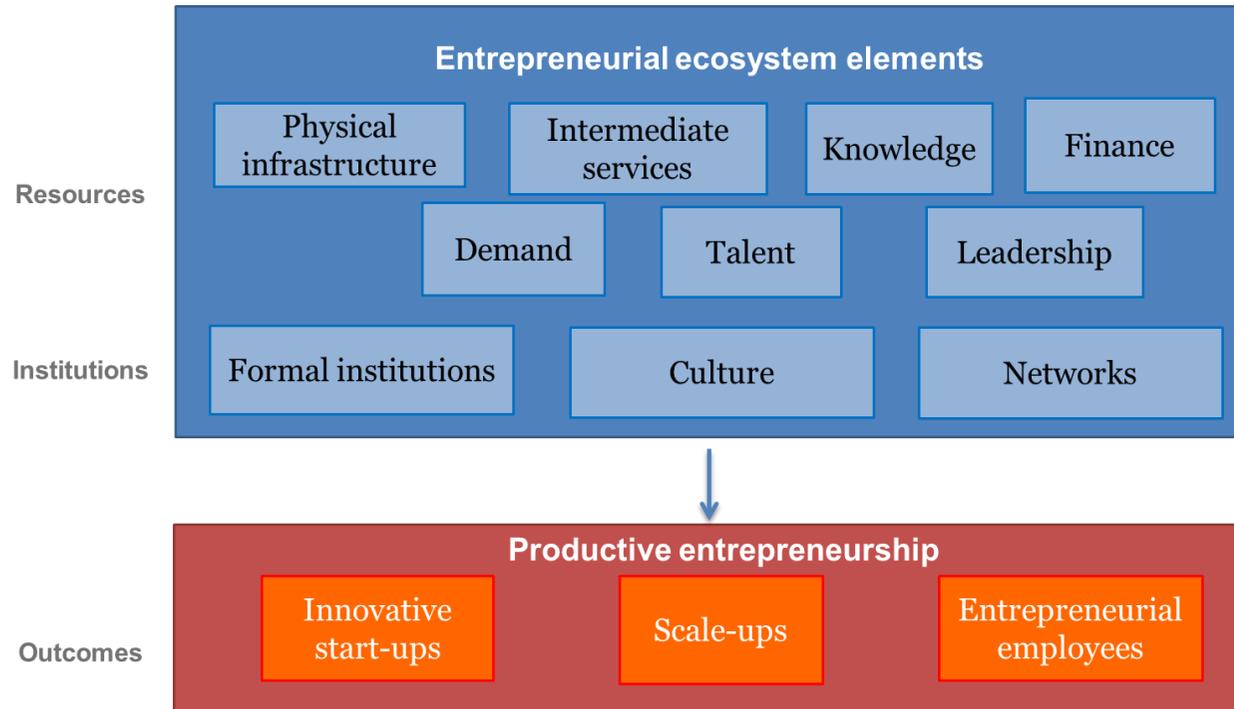
Table 1 Regional entrepreneurship ecosystem benchmarking, Polish regions – index values

	Formal institutions	Entrepreneurship culture	Physical infrastructure	Demand	Networks	Talent	Finance	New knowledge	Intermediate services	Leadership	Overall
Dolnoslaskie	0.70	1.15	1.14	1.12	0.92	1.08	1.31	1.03	1.19	1.05	10.68
Kujawsko-Pomorskie	1.29	0.91	1.01	0.93	0.86	0.72	0.92	0.84	0.84	0.93	9.26
Lubelskie	0.93	0.80	0.83	0.90	1.52	1.07	0.78	1.01	0.98	0.88	9.69
Lubuskie	1.16	1.07	0.97	0.86	0.87	0.85	0.84	0.81	1.01	0.83	9.26
Lodzkie	0.84	0.96	1.02	1.01	0.96	0.99	1.20	1.04	0.91	0.97	9.91
Małopolskie	1.04	1.11	1.12	1.07	0.87	1.09	0.88	1.39	1.00	1.14	10.71
Mazowieckie	0.80	1.44	1.13	1.56	0.84	1.62	0.79	1.52	1.54	1.56	12.79
Opolskie	1.33	0.75	1.06	0.84	1.08	0.87	1.05	0.79	0.89	0.90	9.56
Podkarpackie	0.83	0.80	0.94	0.90	1.43	0.91	0.94	1.34	0.83	1.10	10.01
Podlaskie	1.19	0.81	0.81	0.93	0.99	1.11	1.01	0.97	0.95	0.84	9.52
Pomorskie	1.17	1.27	1.01	1.00	0.93	1.05	0.98	1.21	1.10	1.00	10.74
Slaskie	0.70	0.89	1.37	1.23	0.93	0.97	0.86	1.01	0.99	1.12	10.08
Swietokrzyskie	0.89	0.86	0.87	0.84	0.98	1.01	1.48	0.86	0.74	0.87	9.40
Warminsko-Mazurskie	1.10	0.85	0.84	0.85	0.84	0.81	0.96	0.87	1.12	0.80	9.02
Wielkopolskie	0.95	1.12	1.02	1.15	0.89	0.95	0.82	1.01	0.73	1.17	9.81
Zachodniopomorskie	1.06	1.20	0.874	0.91	1.08	0.92	1.18	0.83	1.19	0.83	10.08
Data sources:	European Quality of Government Index	New firms per 1000 inhabitants	Motorways km/km ² ; air transport (passengers); railways km/km ²	GDP, population	Share of innovation active industrial enterprises in a formal co-operation	% of population 25-64 years old with tertiary education	Bank credit as % of firm turnover	Share of R&D spend in GDP	% of employment in knowledge-intensive services	EU operational programme fund value; research units per 100 000 population	

Note: On each element, the data have been normalised (the value of the variable minus the mean, divided by the standard variation) and standardised to give scores relative to 1. The overall score is the total of the 10 elements.

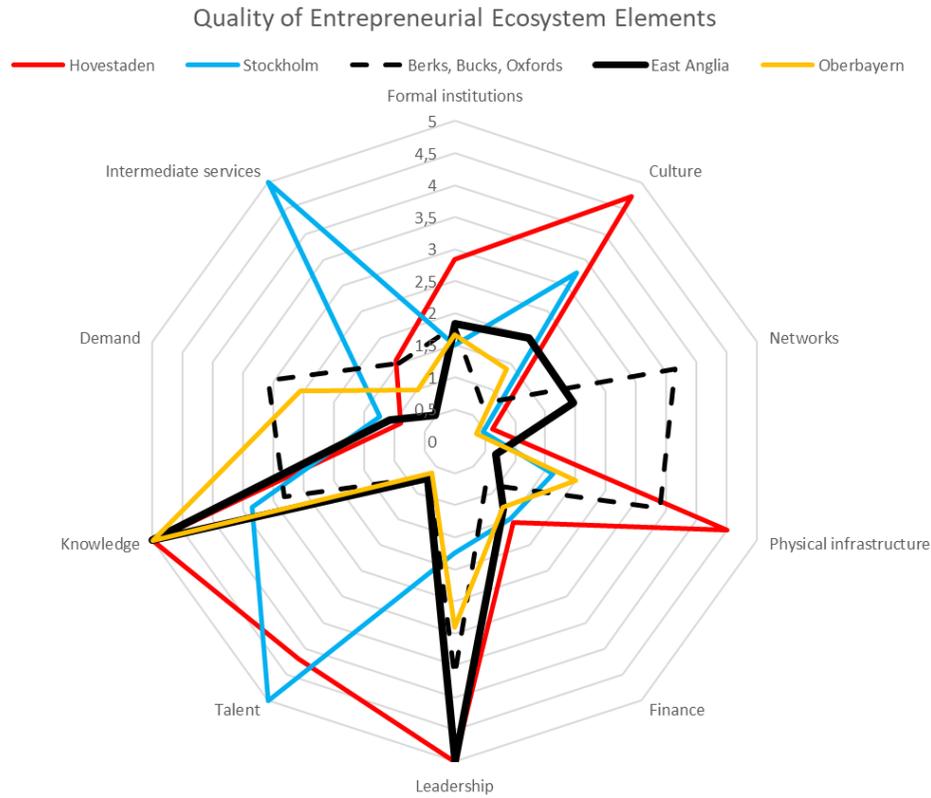
Source: OECD (2019b)

Figure 1 A general schema of entrepreneurial ecosystem influences on productive entrepreneurship



Source: Based on Stam (2015)

figure 2 Benchmarking of Cambridgeshire and Peterborough (East Anglia) with selected other high-performing European entrepreneurial ecosystems



Source: OECD (2021b)

Table 2 Main entrepreneurial ecosystem weak links – qualitative analysis

	United Kingdom		Poland		
	Cambridgeshire and Peterborough	Coventry and Warwickshire	Malopolskie	Mazowieckie	Pomorskie
Formal institutions					
Culture	Lack of entrepreneurial mind sets in Peterborough (large firm tradition) and The Fens (agriculture tradition),	Lack of entrepreneurial mind sets in Coventry (large firm tradition).	Lack of entrepreneurial mind sets	Lack of entrepreneurial mind sets	Lack of entrepreneurial mind sets
Networks	Lack of involvement of Peterborough and The Fens firms in the Cambridge cluster networks.		Lack of cohesive networking among stakeholders. Lack of trust amongst entrepreneurs.	Passivity of enterprises towards networking and lack of trust and social capital. Weak cluster organisations. Low knowledge intensity in large firms limiting their potential as ecosystem anchors.	Weak networks across businesses, universities and research organisations. Limited embedding of large firms in the entrepreneurial ecosystem.
Physical infrastructure	Space constraints and congestion in the core Cambridge cluster.	Lack of premises for digital start-ups.			
Finance		Lack of early-stage equity, mezzanine development funds and micro loans.	Lack of funding for start-ups, particularly private equity funds	Lack of seed capital.	Limited early-stage equity financing.
Leadership	Lack of visible ecosystem leadership in Peterborough and The Fens. Need for more effective relationships between public sector and business.	Lack of resources for the leading economic development agency, the Local Enterprise Partnership. Non-aligned geographies of policy	Limited rich evaluation and intelligence on the ecosystem. Limited private sector involvement in policy design.	Limited rich evaluation and intelligence on the ecosystem. Limited private sector involvement in policy design.	Limited rich evaluation and intelligence on the ecosystem. Limited private sector involvement in policy design.

		organisations. Few scale-up entrepreneurs.			
Talent	Skills shortages – data scientists, people with good mix of soft and technical skills; low skills levels in Peterborough and The Fens.	Skills shortages – technical and digital skills. Mismatch between training offer and business needs.	Insufficient entrepreneurship education and support in universities. Insufficient linkage between public training and regional industry specialisations	Shortages of people with strong entrepreneurship skills and digital skills	Shortages of people with strong entrepreneurship skills and digital skills.
Knowledge			Insufficient linkage between public R&D expenditures and regional industry specialisations. Little academic entrepreneurship. Weak commercial level of university technologies.	Lack of university-industry collaboration. Little academic entrepreneurship. Weak commercial level of university technologies.	Limited labour movements between universities and industry. Little academic entrepreneurship. Weak commercial level of university technologies.
Demand					
Intermediate services		High entry costs to firms for key support e.g. Catapult. Lack of awareness of business development services.	Insufficient long-term assistance for innovative start-ups, including advice and mentoring. Lack of co-ordination of public business support.	Lack of co-ordination of public business support. Limited targeting of support on potential scale-up enterprises.	Lack of co-ordination of public business support

Notes: This table summarises the main weak links identified in the case study reports. It does not cover every weakness identified.
Sources: OECD (2019a, 2019b, 2019c, 2019d, 2021b)

Table 3 Summary recommendations for strengthening the entrepreneurial ecosystems

	United Kingdom		Poland		
	Cambridgeshire and Peterborough	Coventry and Warwickshire	Malopolskie	Mazowieckie	Pomorskie
Formal institutions					
Culture	Experiment with a nudging policy to increase education and training participation by disadvantaged people.	Leverage university-led entrepreneurship training initiatives, including funding local entrepreneurship competitions.	Implement entrepreneurship education courses including teachers from industry. Publicise existing local scale-ups.	Attract highly-skilled international migrants.	Develop talent attraction initiatives aimed at potential entrepreneurs including Polish expatriates, international students and international managers.
Networks	Extend the footprint of the Cambridge cluster to enable firms in other sub-regions to access its networks and initiatives		Make better use of the cluster organisations for networking. Organise high level stakeholder meetings to agree objectives for entrepreneurship policy.	Foster confidence building and the development of mutual trust between stakeholders by supporting networking and collaborative projects. Strengthen intermediary organisations as network hubs.	Support large firm open innovation platforms in the region by funding related innovation projects by potential partners. Offer to support large firms with corporate spin-outs.
Physical infrastructure	Develop digital and transport infrastructure and increase urban density.	Plan and develop attractive shared industrial spaces for digital and technology start-ups and explore options for large firms to sponsor incubator space.			
Finance		Add a finance representative to the LEP Board, build local capital funds and networks.	Develop entrepreneurial finance opportunities leveraging private co-investment including business angel finance and crowdfunding.	Use public procurement for innovation to support innovative start-ups and scale-ups.	Consider establishment of a regional equity fund and better connect local firms to international funds. Support start-ups and scale-ups to participate in

			Increase awareness of existing offers.		technology conferences to seek investment opportunities
Leadership	Create a joint venture institution to monitor the ecosystem and strengthen dialogue among stakeholders.	Secure longer-term project funding for the LEP. Ensure a strong role for the LEP in creating a Single Spatial Strategy for the area.	Sustain local networks and clusters and link them to the start-up support system.	Strengthen the entrepreneurial discovery process to prioritise fewer sectors in the smart specialisation strategy.	Support the cluster organisations and cluster leaders to facilitate collective action among companies and universities in the key sectors.
Talent	Develop an institute that provides digital, entrepreneurial and technical training.	Create a stronger training needs and supply mapping, expand support for digital skills, encourage large firms to train more apprentices than they need.	Engage industry, HEIs and regional government in identifying future skill needs.	Promote integration of migrants and women in the labour market in accordance with foreseeable skill shortages.	Offer more entrepreneurship skills development activities in formal education and training. Increase the local supply of digital skills courses.
Knowledge			Create an investment fund for university spin-out enterprises. Increase the match between university research and incubator activities. Encourage universities to identify and protect IP early.	Increase incentives for university engagement with industry at the level of the HEI, department and individual researcher. Provide a range of forums and initiatives to foster collaboration.	Improve incentives for businesses to make use of academic research and strengthen knowledge exchange activities.
Demand					
Intermediate services		Engage more businesses in mentoring.	Create an online register of mentors. Offer leadership training. Offer training of trainers.	Involve large enterprises in supporting accelerators and incubators. Co-ordinate intermediary organisations.	Incentivise managers in large companies to become mentors for start-ups and scale-ups.

Notes: This table seeks summarises the key policy recommendations on entrepreneurial ecosystem development identified in the case study reports in each region. It does not cover every recommendation.

Sources: OECD (2019a, 2019b, 2019c, 2019d, 2021b)