Clusters and Entrepreneurship in Emerging Industries

Discussion Paper

Thomas Lämmer-Gamp, Gerd Meier zu Köcker, Thomas Köhler, Kai Pflanz (VDI/VDE IT GmbH), Kin-scö Iszak (Technopolis Group)

June 2016
Table of Contents

1. **Introduction** ........................................................................................................................................................................2

2. **Clusters and entrepreneurship** ...............................................................................................................................................4
   2.1 Current status in Europe ..........................................................................................................................................................6
   2.2 Who can do what to support entrepreneurship in clusters? ..................................................................................................11

3. **Cluster organisations and services to support entrepreneurship** .........................................................................................14
   3.1 Statistical analysis of the service portfolio of cluster organisations ......................................................................................14
   3.2 Cluster organisation services to support entrepreneurship ..................................................................................................17
   3.3 Innovation vouchers as an instrument to promote entrepreneurship ........................................................................................20
   3.4 Supporting social entrepreneurship through cluster organisations ..........................................................................................21

4. **New approaches for regional collaboration between cluster organisations and relevant regional partners** ....................24
   4.1 Good practice from European regions .....................................................................................................................................25
   4.2 Good practice from Massachusetts (USA) ..................................................................................................................................27

5. **Recommendations for policy makers** .......................................................................................................................................30

Annex 1: Good practice examples of cluster organisation services to support entrepreneurship32
European Cluster Observatory in brief ...............................................................................................................................................1
List of tables

Table 1: Actors and their roles and instruments – who can influence the determinants of entrepreneurship? ........................................................................................................................................... 12

Table 2: Support infrastructure for enabling healthcare-related entrepreneurship in Massachusetts . 29

List of figures

Figure 1: Regional hotspots of emerging industries.........................................................................................................................6

Figure 2: Density of high-growth enterprises in the business economy by NUTS level 2 region, 2010 ...8

Figure 3: Enterprise birth rate in the business economy by NUTS level 2 region ............................................... 9

Figure 4: Regions with the best entrepreneurial innovation and business ecosystems ...................... 10

Figure 5: Service profiles of cluster organisations that offer services to promote entrepreneurship (0 = no services in this area → 4 = very large spectrum of different services and large number of services delivered).................................................................................. 15

Figure 6: Importance of services to develop entrepreneurship in the service profile of cluster organisations per industry (0 = no services in this area → 4 = very large spectrum of different services and large number of services delivered) ........................................................................................................ 16

Figure 7: Services provided by cluster organisations to support entrepreneurship by industry and individual service (0 = no services in this area → 4 = very large number of services delivered) ........................... 17

Figure 8: Focus of entrepreneurship services of cluster organisations.................................................................................. 18

Figure 9: Best practice examples of cluster organisations with a fully-fledged service portfolio to promote nascent entrepreneurship ........................................................................................................ 19

Figure 10: Towards new regional cooperation models to better support entrepreneurship .............. 25

Figure 11: The systematic approach and the role of the cluster organisation of Mannheim region to support entrepreneurship and business formation ........................................................................................................ 26
1. Introduction

This discussion paper explores the role of clusters, cluster initiatives, and cluster organisations in the context of facilitating entrepreneurship within emerging industries. For the purpose of this paper, clusters are understood as regional ecosystems of related industries represented through a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, etc. Cluster initiatives are organised efforts to support the competitiveness of a cluster and thus consist of practical actions related to the capacity of these clusters to self-organise and increasingly to pro-actively shape the future of the cluster. They usually follow a bottom-up approach, are implemented through a competitive process, and are often managed by specialised intermediaries, such as cluster organisations. Cluster organisations are the legal entities that support the strengthening of collaboration, networking, and learning in clusters, and act as innovation support providers by providing or channelling specialised and customised business support services to stimulate innovation activities, especially in SMEs. They are usually the actors that facilitate strategic partnering across clusters. Emerging industries can be understood as either new industrial sectors or existing industrial sectors that are evolving or merging into new industries. They are defined as “the establishment of an entirely new industrial value chain, or the radical reconfiguration of an existing one, driven by a disruptive idea (or convergence of ideas), leading to turning these ideas / opportunities into new products / services with higher added value”.^2^ The question of how to stimulate innovation activities through clusters leads directly to the question of how clusters can support entrepreneurship. Entrepreneurship is about the creation of new businesses driven by entrepreneurial activity as a human action in pursuit of the generation of value through the creation or expansion of economic activity, by identifying and exploiting new products, services, or processes for new markets. Human action is performed by entrepreneurs, aka the business owners. Such entrepreneurial activity is different from “ordinary” business activity. It is manifested rather than planned or intended. It also needs to be understood that entrepreneurship is a phenomenon that is not limited to high-tech or internet startups. Entrepreneurship results not only in economic, but can also create social and cultural value, and therefore also concerns social enterprises. Entrepreneurship can take several forms such as necessity-based, mundane, or innovative entrepreneurship, where it is the latter that is the most relevant for the creation of economic growth and the exploitation of the potential of emerging industries. Innovative entrepreneurship is about the development of new products, ser-

---

^1^ European Commission, 2016: Smart Guide to Cluster Policy. How to make better use of clusters for promoting regional industrial modernisation, supporting the growth of SMEs and encouraging smart specialisation, p. 2

^2^ This definition (based on Heffernan & Phaal, 2009) was presented by the European Forum for Clusters in Emerging Industries (2013) in their “Policy Roadmap - Actions for new linkages needed: A policy roadmap for stimulating emerging industries”, which was set up to support the initial extension work of the European Cluster Observatory on emerging industries. The policy roadmap is available at www.clusterobservatory.eu/index.html#!view=aboutobservatory;url=/about-observatory/emerging-industries/.

^3^ See OECD-Eurostat definition of entrepreneurship, e.g. OECD / European Commission, 2015: The missing entrepreneurs 2015. Policies for self-employment and entrepreneurship, p. 18

serves or processes and therefore of particular importance for the development of the ten emerging industries as identified by the European Cluster Observatory. The Entrepreneurship 2020 Action Plan is the Commission’s answer to challenges brought by the gravest economic crisis in the last 50 years. It is a blueprint for action to unleash Europe’s entrepreneurial potential, remove existing obstacles, and revolutionise the culture of entrepreneurship in the EU. It aims to ease the creation of new businesses and to create a much more supportive environment for existing entrepreneurs to thrive and grow. It identified three key action areas, namely entrepreneurial education, removing existing administrative barriers as well as reigniting the culture of entrepreneurship in Europe. This also concerns the development of ecosystems in which entrepreneurship can flourish. Such an ecosystem is, among other things, structured by the access to commercial, as well as physical and service infrastructure. In these areas the economies of the European Union do not excel, as the Global Entrepreneurship Monitor concludes.

This discussion paper puts clusters and in particular cluster initiatives and cluster organisations into the spotlight as they constitute the players in the cluster ecosystem through which such an access can be provided. The European Forum for Clusters in Emerging Industries acknowledged that cluster organisations can play a vital role to facilitate the creation of new value chains in emerging industries, as well as to support entrepreneurship and business formation. Cluster organisations usually act as facilitators that support the strengthening of collaboration, networking and learning in clusters, and act as innovation support providers by providing or channelling specialised and customised business support services to stimulate innovation activities, especially in SMEs. They are usually the actors that facilitate strategic partnering across clusters.

The paper is structured into four main sections:

- Chapter 2 analyses the relationship between clusters and dynamics in entrepreneurship by putting statistical analysis on clusters in emerging industries from the European Cluster Observatory into perspective with statistics on entrepreneurship. The chapter also raises the question which actor should do what in terms of promoting entrepreneurship within clusters.

- Chapter 3 focuses in detail on the role cluster organisations can play in terms of entrepreneurship development. The chapter draws on quantitative and qualitative data provided by the European Secretariat for Cluster Analysis (ESCA) to understand, what kind of services are provided by cluster organisations in this respect. Besides, the chapter looks into lessons learned from recent EC-funded projects in the field of clusters and entrepreneurship and discusses new examples of regional collaboration.

---


8 http://www.emergingindustries.eu/.

9 European Commission, 2016: Smart Guide to Cluster Policy. How to make better use of clusters for promoting regional industrial modernisation, supporting the growth of SMEs and encouraging smart specialisation, p. 2.
Chapter 4 gives a brief insight into new approaches to regional collaboration between cluster organisations and other relevant regional partners, illustrated by examples from Europe and the US.

Chapter 5 provides policy recommendations based on the insights developed by this paper.

This paper does not answer all questions and might trigger new ones in relation to the link between clusters, entrepreneurship and emerging industries. It intends to give a fresh impetus to the discussion of whether and how clusters can promote entrepreneurship.

2. Clusters and entrepreneurship

Clusters matter for entrepreneurship. In the past, many studies have shown that there is clear evidence that in the presence of agglomeration economies, the potential for growth is increasing in the level of economic activity.\(^{10}\) Industries located in regions with strong cluster experience show higher growth rates in new business formation and startup employment. Agglomeration in emerging industries, which stretches out across complementary economic units, can have a distinctive impact on entrepreneurship and new business formation. There is also evidence that clusters are associated with greater formation of new establishments of existing firms. Existing firms, including multinationals, are establishments in areas where strong clusters are present.\(^{11}\)

The link between clusters and entrepreneurship is, however, twofold since entrepreneurial culture also influences regional performance and can further strengthen local clustering processes. But it is the entrepreneurial culture of Silicon Valley that allowed it to grow into a global hub for semiconductors, as for instance Saxenian showed when contrasting the regional performance of Boston and Silicon Valley.\(^{12}\)

Besides strong clusters of related industrial activities, diversity also plays an important role since breakthrough innovations often spin from unusual encounters and there are plenty of examples of an entrepreneurial idea flourishing in another location from where the certain activity is originally concentrated. When the industrial cluster is located within a metropolitan area hosting several other clusters this cross-industry potential is more easily to be harnessed.\(^{13}\)

However, it is important to point out that there are many other determinants that drive entrepreneurship in regions, like local demand characteristics, specialised institutions and the structure of regional business and social networks.\(^{14}\)


The rational why entrepreneurship and innovation tends to be concentrated in specific locations is manifold. For instance, clusters are lowering the costs of starting a business, enhancing opportunities for innovations, and enabling better access to a more diverse range of inputs and complementary products\textsuperscript{15}, and also offer a knowledge basis and skills that are linked to higher entrepreneurial rates. The co-location of companies, customers, suppliers and other institutions also increases the perception of innovation opportunities while amplifying the pressure to innovate.\textsuperscript{16} Since entrepreneurs are essential agents of innovation, a strong cluster environment should foster entrepreneurial activity. The presence of a strong cluster environment can reduce barriers to entry and growth and thus become a central driver of entrepreneurial dynamism. A strong cluster environment enhances growth at the regional industry level by facilitating operational efficiency and raising the returns to business expansion.

The example of the Life Science cluster Medicon Valley in Denmark / Sweden reveals the assets of a strong cluster for entrepreneurship and business formation due to high agglomeration and proximity of related actors:

- High density of firms along different Life Science value chains well experienced to collaboration;
- Strong local presence of private venture capital firms, national public seed investors and various incubator facilities that create a favourable capital climate for new business formation;
- The presence of Big Pharma firms and their readiness to cooperate with SME and new businesses creates an innovative milieu for startups and growth of smaller dedicated biotechnology firms;
- High number of leading universities that guarantees a high number of excellent talents, ready to build up their own startup;
- High density of research entities, science parks and their incubators that facilitate the commercialisation of inventions and R&D through new businesses;
- Presence of other entities to support commercialisation of academic research (Technology Transfer Offices) in business and research community.\textsuperscript{17}


\textsuperscript{17} Clusters, Innovation and Entrepreneurship, edited by Jonathan Potter, and Gabriela Miranda; OECD 2009, pp.131-154.
2.1 Current status in Europe

Entrepreneurial activities are of high importance for the development of emerging industries. The establishment of new industry sectors and the reconfiguration of value chains are based on the exploration and exploitation of economic and technological opportunities. Spatial and cross-sectoral patterns of emerging industries have been analysed within the European Cluster Observatory\textsuperscript{18} and regional hotspots were identified. The hotspots of emerging industries activities across Europe fall broadly into three categories: 1) Europe’s traditional centre of economic activity, located in a narrow band from Southern Germany through the Benelux to Southern England; 2) Europe’s innovation leaders in the western and central Baltic Sea Region, stretching from Denmark through Western Sweden and Stockholm towards Southern Finland and Helsinki and 3) Some European urban centres elsewhere, where the benefits of urban density overcome the burden of an otherwise weaker economic context, for instance Berlin and Paris (Figure 1). The regional hotspots of emerging industries are identical with the “Innovation Leaders” as identified by the Regional Innovation Scoreboard.\textsuperscript{19}

![Regional hotspots of emerging industries](image)

**Figure 1: Regional hotspots of emerging industries**

\textit{Source: European Cluster Panorama, p. 14}\textsuperscript{20}


\textsuperscript{20} See footnote 18.
Regional entrepreneurial statistics reveal that also the intensity of entrepreneurial activities is distributed unevenly across European regions. And the patterns, which become visible, are likely to be related to the patterns of the emerging industries. Due to a limited data availability, however, these relations can only be observed for some European countries and mainly on a national level or NUTS\textsuperscript{21}-2 level, as detailed data for NUTS-3 is only in a very few cases available.

Important entrepreneurship indicators, which will be considered in this section, are the birth rate of enterprises and the density of high growth firms as explained below:\textsuperscript{22}

- The birth rate of new enterprises is a key indicator of business dynamism. With the capacity to start up entirely new businesses it reflects a central dimension of entrepreneurship. It can be distinguished between the birth rate of employer\textsuperscript{23} and non-employer firms. The former are economically more relevant and more closely related to the notion of entrepreneurship as a driver of job creation and innovation.\textsuperscript{24}

- High-growth firms (including young high-growth enterprises, also referred to as “gazelles”) are important drivers of job and wealth creation. This indicator addresses the dynamism of the regional or sectoral ecosystem. High growth is measured in terms of employees and is defined as a growth of at least 10 \% growth per annum in their number of employees over a three-year period prior to the reference year. These enterprises had at least 10 employees at the start of the observation period. Understanding these firms better allows policy makers to develop more appropriate approaches to stimulate growth processes of enterprises.

The density of high growth enterprises in European regions is depicted in Figure 2. In several countries the regional hotspots of Figure 1 (15 or more stars) are also regions with an above average density of high-growth enterprises. This pattern can be observed for Finland, the Netherlands, France and Hungary. Unfortunately, there are no regional entrepreneurial statistics available for Germany, UK, Sweden, Norway and Belgium where several other regional hotspots of emerging industries are located. Overall, in regional hotspots of emerging industries the density of high-growth enterprises tends to be higher than in other regions.

Then again, a high density of high-growth firms is not necessarily a robust indicator for the existence of emerging industries in a region. Lithuania and Latvia are exemplary in this respect. In 2013 more than half of all high-growth enterprises in these countries belonged to the sectors construction, wholesale and retail trade and transport. These are sectors which are typically rather less knowledge intensive.\textsuperscript{25} In each case only 3 \% belonged to the ICT-sector and only 3 \% (Latvia) respectively 6 \% (Lith-

\textsuperscript{21} NUTS = Nomenclature des unités territoriales statistiques; http://ec.europa.eu/eurostat/web/nuts/overview.


\textsuperscript{23} Definition according to OECD: An employer enterprise birth refers to the birth of an enterprise with at least one employee. The population of employer enterprise births consists first of “new” enterprise births, i.e. new enterprises reporting at least one employee in the birth year; and second, enterprises that existed before the year under consideration but were then below the threshold of one employee, and that reported one or more employees in the current, i.e. birth, year.


\textsuperscript{25} An activity is classified as knowledge intensive if tertiary educated persons employed represent more than 33\% of the total employment in that activity. For an overview of knowledge intensive sectors see Eurostat indicators
uania) belonged to the business service sector; sectors which are of particular importance for many emerging industries that were identified by the European Cluster Observatory. Countries where several hotspots are located had much higher shares in knowledge-intensive sectors such as ICT and business services. Thus, it appears that a high share in knowledge-intensive sectors is a precondition for the development of different hotspots.

Figure 2: Density of high-growth enterprises in the business economy by NUTS level 2 region, 2010


For an overview of the emerging industries identified by the European Cluster Observatory see European Cluster Panorama (2014) (footnote 18).

Own calculations, based on Eurostat (online data code: bd_9pm_r2).
The birth rate of enterprises is very much influenced by national framework conditions, industrial trends, and business cultures. In statistical terms, differences between European countries are typically larger than within the countries (Figure 3). Relations between the location of regional hotspots of emerging industries and the overall birth rate of firms are hardly identifiable. The overall birth rate is also very much influenced by founding activities in sectors with typically low productivity and non-employer firms.

Figure 3: Enterprise birth rate in the business economy by NUTS level 2 region


A further insight into the relationship between clusters and entrepreneurship is given by the analysis of regional entrepreneurial conditions. The Regional Ecosystem Scoreboard prepared by the European
Cluster Observatory\textsuperscript{28} has identified the quality of conditions in the regional ecosystem that can foster or eventually hinder the creation of dynamic cross-sectoral collaboration spaces for innovation and entrepreneurship revealing both enabling and constraining mechanisms. The indicator framework of the Regional Ecosystem Scoreboard allows calculating a composite index that captures the overall quality of the regional entrepreneurial and innovation ecosystem and gives an insight about the regional conditions compared across the European Union. The results show (see Figure 4) that the regions ranking in the top 10 \% of all regions are to be found in the UK, the Netherlands, Finland, Sweden, Denmark, Estonia, Belgium, and Luxemburg. They include almost most of the regions in the UK and the Netherlands, the Nordic capital cities, such as Helsinki, Copenhagen and Stockholm together with Tallinn, Luxemburg, and Paris. In the top 20 \% we find several German, French, Swedish and Austrian regions. With middle scores we find regions in Czech Republic, Hungary, Italy, Poland, Portugal and Spain. The least favourable ecosystems belong to Bulgarian, Greek and Romanian regions.

**Figure 4: Regions with the best entrepreneurial innovation and business ecosystems**

![Regions with the best entrepreneurial innovation and business ecosystems](image)

\textit{Source: European Cluster Observatory, 2016: Regional Ecosystem Scoreboard – Summary Report, p. 3}

Except for Ireland, all regions that are home to a strong hotspot of emerging industries (20 or more stars) are among the top 10 \%- or top 20 \%-regions, which shows that strong clusters and strong en-

entrepreneurship patterns are related. However, there are also regions among the top 10 %- or top 20 %-regions that are not home to a hotspot of emerging industries (for instance in the United Kingdom except for the Greater London Area), but which feature an ecosystem that promotes entrepreneurship. In these cases entrepreneurship supports rather the development of “traditional” and not of emerging industries.

2.2 Who can do what to support entrepreneurship in clusters?

Successful development of entrepreneurship within a cluster depends on both government policy intervention and existing framework conditions as well as on the initiative of industry and academia. There is, of course, a close connection as policy interventions create the incentives for industry to act. From the perspective of a modern cluster policy regulatory and programme intervention should aim for the nurturing of a favourable business ecosystem for innovation and entrepreneurship, in which new winners can emerge and thus support the development of new value chains and emerging industries. In this understanding cluster policy is a framework policy that includes different policies, regulatory and programme interventions to open the way for the bottom-up dynamics that can be observed in clusters.29 Ideally, such an integrated approach is coordinated among relevant government departments and agencies as well as policy levels (European, national, regional and local).30 While policy intervention is without any doubt important, there is also a responsibility that industry has to assume. The role of government is only to create the framework conditions under which an industry can develop. Actions towards this development have to be identified and taken by the industry either through individual companies or cluster organisations that act as innovation support providers by providing or channelling specialised and customised business support services.

The OECD-Eurostat Entrepreneurship Indicator Programme suggested a framework of determinants that decide on the development of entrepreneurship. For each determinant responsible actors can be identified who can play a particular role to influence the determinant. By this, an answer can be given to the following questions: 1) What can cluster policy makers on different levels (national, regional or local) do? and 2) What can cluster organisation, either on their own or in cooperation with other actors, as industry-driven initiatives contribute?

Table 1 presents an analysis of principal responsibilities to allow for a general mapping of responsibilities and instruments which can influence the determinants of entrepreneurship.

---

29 European Commission, 2016: Smart guide to cluster policy. How to make better use of clusters for promoting regional industrial modernization, supporting the growth of SMEs and encouraging smart specialisation, p. 2.

Table 1: Actors and their roles and instruments – who can influence the determinants of entrepreneurship?31

<table>
<thead>
<tr>
<th>Determinants</th>
<th>Who?</th>
<th>Role?</th>
<th>Instruments?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulatory framework</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative burdens for entry</td>
<td>Government32</td>
<td>Regulator</td>
<td>Regulation</td>
</tr>
<tr>
<td>Administrative burdens for growth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bankruptcy regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety, health and environmental regulations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour market regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Court and legal framework</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social and health security</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income taxes: wealth / bequest taxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business and capital taxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Market conditions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-trust law</td>
<td>Government</td>
<td>Regulator</td>
<td>Regulation</td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td>Procurement</td>
<td>Preferential treatment</td>
</tr>
<tr>
<td>Public procurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to the domestic market</td>
<td>Cluster organisation</td>
<td>Facilitator and enabler</td>
<td>Distribution of information (e.g. through market analysis), networking and facilitation of access to business and R&amp;D partners</td>
</tr>
<tr>
<td>Access to foreign markets (internationalisation)</td>
<td>Government</td>
<td>Programmes</td>
<td>Government funding for internationalisation projects (e.g. fair participation, R&amp;D / business development projects or Strategic Cluster Partnerships)</td>
</tr>
<tr>
<td><strong>Access to finance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to debt financing</td>
<td>Cluster organisation</td>
<td>Facilitator and enabler</td>
<td>Distribution of information (e.g. about investment schemes and investment opportunities), networking and facilitation of contacts to investors as well as coaching of entrepreneurs</td>
</tr>
<tr>
<td>Business angels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venture capital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to other types of equity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

31 For the determinants please see Framework of the OECD-Eurostat Entrepreneurship Indicators Programme (EIP) (OECD, 2015: Entrepreneurship at a glance 2015, p. 13.

32 The table refers broadly to government. Which government level (national, regional or local) is actually responsible for actions depends on the constitutional framework of the country.
| Knowledge creation and diffusion | R&D investment | Government and cluster organisation | • Government: programmes  
• Cluster organisation: facilitator | • Government: investment  
• Cluster organisation: project development |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>University / industry interface</td>
<td>Cluster organisation: facilitator and enabler</td>
<td>Facilitation of contacts, matchmaking, project development, support with the acquisition of funding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technological cooperation between firms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technology diffusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Broadband access</td>
<td>Government</td>
<td>Regulator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Regulation, financial incentives</td>
</tr>
</tbody>
</table>

| Entrepreneurial capabilities    | Training and experience of entrepreneurs | Cluster organisation: facilitator and enabler | • Trainings and seminars, co-development of curricula and study courses with academic and vocational training institutions |
|                                 | Business and entrepreneurship education (skills) |                                    | |
|                                 | Entrepreneurship infrastructure           | Government                          | Programmes                                 |
|                                 | Immigration                              | Government                          | Regulator                                  |
|                                 | Entrepreneurship education (mindset)      | Government                          | Regulator                                  |

| Culture                         | Entrepreneurship education (mindset)       | Government                          | Regulator                                  |
|                                 | E. g. school curricula                     |                                     |                                          |

This principal analysis shows with regard to the majority of determinants that the government, in its capacity as a regulator and provider of (financial) incentives through programmes, is the key actor. The role of the cluster organisation, however, is to be the facilitator and enabler for more “operational” determinants such as access to domestic and international markets, access to finance, knowledge creation and diffusion, and developing entrepreneurial capabilities through training. This division of responsibilities confirms the argument above that government creates the framework under which other actors can act.

Cluster organisations are not the sole provider of entrepreneurship services. There are many other actors in a cluster that offer services in these fields, e. g. regional development agencies, incubators, technology centres, science parks or educational institutions. Cluster organisations therefore need to coordinate their service portfolios with the actors’ offers and should provide services only if they do not exist or are complementary to already existing ones. But whether a cluster organisation offers such services depends also on whether it has been correspondingly mandated by its stakeholders. The following chapters on services by cluster organisations (chapter 3.1 and 3.2) and regional cooperation models (chapter 4) provide more insights into these issues.
3. Cluster organisations and services to support entrepreneurship

Cluster organisations are important institutions within a cluster as they act as innovation support providers. They represent “networks, which never encompass the entire cluster, but only selected actors along a given value chain - managed by a cluster organisation - [who] cooperate thematically with each other towards a common goal, such as to work on joint research and development activities for new products and services or in order to develop new markets for their products and services. They are thus only one component in the regional economic structure ‘clusters’, which is characterised by specific structural and macroeconomic conditions.”

However, even if limited to a specific part of the regional ecosystem of a cluster, cluster organisations can unleash the potential of the cluster by providing relevant services to the cluster actors and by cooperating with other networks or actors within the cluster that are either active in the same or other industries (cross-cluster / cross-sectoral collaboration).

The purpose of this chapter is to analyse the service portfolio of cluster organisations in terms of whether they are geared towards the support of entrepreneurship. The analysis is based on statistical data on service portfolio provided by the European Secretariat for Cluster Analysis (ESCA) (chapter 3.1) and a qualitative survey among cluster organisations that have been awarded with the “Silver” or “Gold Label of Cluster Management Excellence” (chapter 3.2).

3.1 Statistical analysis of the service portfolio of cluster organisations

Not all European cluster organisations offer services to their cluster members that aim for the facilitation of entrepreneurship. Out of the 690 cluster organisations that have been benchmarked by the European Secretariat for Cluster Analysis (ESCA) in the period January 1st, 2012 to February 15th, 2016 420 offer a limited number of services to facilitate entrepreneurship, as for instance consulting and coaching entrepreneurs, acquisition of funding and, in a few cases, incubation support. This equals to a percentage of 60.8 %. Almost all of them have also set “development of entrepreneurship” as a strategic priority, but which in all cases is of minor relevance compared to other strategic priorities such R&D activities and matchmaking. Consequently, development of entrepreneurship is not a priority of cluster organisations. In terms of numbers of activities, the main areas serviced by cluster organis-


sation are matchmaking of actors within the cluster and with actors outside the cluster as is the acquisition of public funds for R&D and business development projects (Figure 5).

**Figure 5: Service profiles of cluster organisations that offer services to promote entrepreneurship (0 = no services in this area → 4 = very large spectrum of different services and large number of services delivered)**

There are also differences between technology areas, respectively industrial sectors. Cluster organisations in the sectors of construction / building, health and medical sciences, and aviation and space have a higher profile in terms of services for the development of entrepreneurship than most other sectors. While the figure for the construction industry might be surprising at first sight, its explanation can be found in the fact that many cluster organisations in this field try to promote new energy-efficient and environmental friendly construction techniques. Industrial sectors with the lowest profile in terms of entrepreneurship promotion include energy and environment, production and engineering, and sports / leisure / tourism (Figure 6).
Figure 6: Importance of services to develop entrepreneurship in the service profile of cluster organisations per industry ($0 = \text{no services in this area} \rightarrow 4 = \text{very large spectrum of different services and large number of services delivered}$)

![Bar chart showing importance of services in different industries](image)

When looking at the individual service portfolios of cluster organisations in detail, most of them provide a range of services from consulting and coaching of entrepreneurs to acquisition of financial sources (venture capital, banks, public funds etc.) on behalf of entrepreneurs. Only very few cluster organisations offer services such as incubators, living-labs or others (Figure 7). This is not necessarily a weakness as many cluster organisations cooperate with incubators and living-labs within their cluster net-
work. These institutions are often independent organisations that are formal members of the cluster network. Therefore, the fact, that cluster organisations themselves do not offer this kind of service, does not necessarily mean that such services are not available within the network, but are channeled through the cluster organisation instead of being directly offered.

Figure 7: Services provided by cluster organisations to support entrepreneurship by industry and individual service (0 = no services in this area → 4 = very large number of services delivered)

![Services provided by cluster organisations](image)

Source: Benchmarking data provided by the European Secretariat for Cluster Analysis (n = 420 cluster organisations, median value)

3.2 Cluster organisation services to support entrepreneurship

This chapter presents the results of a survey among 53 cluster organisations that were awarded with either the “Silver Label” or “Gold Label of Cluster Management Excellence” of the European Cluster Excellence Initiative and which offer services to promote entrepreneurship. These cluster organisations, which work in industrial sectors closely related to the emerging industries identified by the European Cluster Observatory, are characterised by very high management standards and a sophisticated approach to cluster development, which is reflected by a well-developed strategy and a service portfolio that aims at the realisation of the cluster’s strategic objective. The cluster organisations were asked to describe whether and which services they provide to their cluster actors to promote entrepreneurship. The range of such services includes individual support for / coaching of entrepreneurs (e. g. business plan development), access to finance (e. g. brokering contacts for entrepreneurs with venture capitalists or assistance in negotiations with banks) as well as the provision of infrastructure (e. g. incubator facilities). Out of this sample 25 cluster organisations responded to the survey and reported that they offer services to promote entrepreneurship.
Among these cluster organisations the focus of support of entrepreneurship through cluster services is on networking (80 percent of cluster organisations do that) and access of financing (72 percent of cluster organisations do that). Besides, business consultancy is part of the service portfolio of many cluster organisations (68 %), while not even half of them include services in the areas of marketing and human resource development. Services to support internationalisation, incubation and technology transfer are only offered by a limited number of cluster organisations (Figure 8).

**Figure 8: Focus of entrepreneurship services of cluster organisations**

![Focus of entrepreneurship services of cluster organisations](image)

*Source: Survey among 53 cluster organisations (multiple answers were possible)*

The survey revealed that all participants offer services to promote entrepreneurship, even though scope and target groups differ from one cluster organisation to another. In principle, one can conclude from the presented examples that the focus is more on supporting established businesses and less on supporting potential and new entrepreneurs, particularly in regard to the different phases of pre-start, startup and acceleration and growth. For instance, infrastructure such as incubators, which is of particular importance to the promotion of startups and young entrepreneurs, is provided only by a very small number of cluster organisations. However, this does not signify that cluster organisations do not try to use this instrument to promote development. Many cluster organisations, this is a finding from cluster management audits conducted by the European Secretariat for Cluster Analysis (ESCA), have established contacts with incubators and therefore signpost potential and young entrepreneurs to relevant bodies.

Thus, there is no need to replicate such a service through a separate service. This points to the fact that cluster organisations provide in most cases only services that are not offered within their regional scope in order to close gaps in the regional “business support infrastructure”. This applies also to the other services to promote entrepreneurship that are presented in the table, but are not offered by all
Cluster organisations or not offered at all. Cluster organisations either signpost potential beneficiaries of such services to relevant players that are not necessarily affiliated with the cluster organisation or they collaborate formally with such service providers. This reflects the role a cluster organisation plays within a cluster: namely as an enabler and facilitator who provides only services in case they are not offered by a more suitable service provider. In this sense, the cluster organisation is embedded in a "regional system of collaboration", which in its entirety of actors fuels the development of the cluster.

When having a particular look on the promotion of potential and young entrepreneurs with regard to the different phases of nascent entrepreneurship the survey revealed that only a limited number of cluster organisations puts dedicated attention to it by offering a corresponding fully-fledged service portfolio.

Figure 9 presents an overview of best practice examples of cluster organisations that promote nascent entrepreneurship in its different phases either through services offered by themselves or in collaboration with other actors within the cluster. In case of these best practice examples, the cluster organisations are guided by a sophisticated cluster strategy that is very focussed on the promotion of a region by concentrating on a specific emerging industry. Annex 1 provides some more details on the entrepreneurship services offered by these cluster organisations.

Figure 9: Best practice examples of cluster organisations with a fully-fledged service portfolio to promote nascent entrepreneurship

Cluster organisations that cover all phases through corresponding services either offered by themselves or in close cooperation with other relevant actors (best practice examples):

- BioTechMed Cluster Mazovia (Poland), http://btm-mazowsze.pl (Biopharmaceuticals)
- CAP Digital (France), www.capdigital.com (Digital industries)
- Corallia (Greece), www.corallia.org (different emerging industries)
- Cyber Forum (Germany), www.cyberforum.de (Digital industries)
- GCE NODE (Norway), www.gce-node.no (Blue growth industry)
- it's owl – Intelligent Technology Systems (Germany), www.its-owl.de (Production and engineering, digital industries)
3.3 Innovation vouchers as an instrument to promote entrepreneurship

In recent years, innovation vouchers have become quite popular to promote entrepreneurship. More and more clusters in emerging industries have successfully used this funding instrument. One example is the IN2LifeSciences project, a cross-cluster collaboration covering Belgium, Denmark, France, Germany, and the Netherlands supported under INTERREG. There are a number of policies, programmes and activities at EU level which support clusters in the emerging industries through voucher and related support schemes such as the support of “cluster facilitated projects for new industrial value chains” under Horizon 2020. Another example, where such experiences has already been gathered, refers to the projects supported under the European Commissions support for ‘Clusters and Entrepreneurship in support of Emerging Industries’ under the Competitiveness and Innovation Framework Programme (CIP). These six projects, from Belgium (Nano4Health), France (Health2Care), Germany (C3-Saxony), the United Kingdom (LOTONO), Spain (Innosmart), and Slovenia (Poly4EmI), aim for the promotion of emerging industries in different sectors. A key focus of these projects is to enhance entrepreneurial support activities through voucher schemes, service incubation or SME internationalisation linked with cluster collaboration and networking activities. All project consortia have been working successfully with innovation vouchers to promote entrepreneurship.

However, other tools and schemes to support entrepreneurship have been successfully applied in the context of the projects. For instance, the Poly4EmI project successfully tested a bunch of new policy analytical tools to better and more tailor-made support entrepreneurship in emerging industries (Stress Test, Policy Benchmarking, Value Chain Mapping). InnoSmart implemented a platform where interested partners from industry and academia can meet and facilitate project ideas across sectors and value chains. C3-Saxony, Nano4Health and Poly4EmI implemented innovation arenas resulting in new project ideas and inventions.

In all projects these project ideas and inventions were presented to the innovation voucher scheme, which was supposed to allow the beneficiaries to purchase services that are required for the implementation or facilitation of their planned project ideas and would in essence build a bridge between the conceptual work and the upcoming entrepreneurial activity. Each of the projects supported eventually 25 entrepreneurs through a grant, e.g. through EUR 5,000.00 in the context of the C-3 Saxony project that could be used for a whole range of activities including specialist advice, feasibility studies, tests and material analysis, IPR consulting including analysis of existing IPRs, certification and standardisation, market studies, legal advices, in particular with regard to EU and non-German law, marketing (e.g., preparation of a booth, CI, press releases), business cooperation / access to networks (including

---

35 For further details on the project see www.in2lifesciences.eu.
partner searches), internationalisation services (including translation) and logistics or participation in European projects. The entrepreneurial activities, that are going to be further developed under this scheme, are in their vast majority promising. All of these projects linked these activities with cross-cluster collaboration, e. g. in the case of Nano4Health to develop personalised health care applications as a new industrial sector by integrating nanotechnologies and biotechnologies as main key enabling technologies.

While innovation vouchers are a promising instrument, as these initiatives demonstrate, the role of the cluster organisations involved was to bring the right actors together, set up trust areas and an innovation arena, where entrepreneurs can meet and innovate. Furthermore, the cluster organisation, as neutral facilitator, organised the section process of those ideas that received public financial support through such schemes. Cluster organisations in all these six projects have been proven to be able to initiate such complex cross-sectoral projects to generate ideas within clusters as well as coordinating the implementation of funding schemes, like the voucher scheme.

3.4 Supporting social entrepreneurship through cluster organisations

The European Commission defined a social enterprise as “an operator in the social economy whose main objective is to have a social impact rather than to make a profit for their owners or shareholders. It operates by providing goods and services for the market in an entrepreneurial and innovative fashion and uses its profits primarily to achieve social objectives. It is managed in an open and responsible manner and, in particular, involves employees, consumers and stakeholders affected by its commercial activities”. In this respect, a social enterprise does not differ in terms of its activities from “regular enterprises”, but in terms of the principles by which it is operated.

Social enterprises play an important role both in terms of providing goods and services for the market in an entrepreneurial and innovative fashion, but uses its profits primarily to achieve social objectives. By accounting for for 6.53% of total employment in the EU-27 they represent a significant element of the economy. In their innovation processes they are driven by the very same triggers as “regular” enterprises; namely “increase range and / or quality of products / services”, “financial sustainability and market expansion”, “pressure from competitors”, and “process improvements”. These triggers are completed by the driver for “social and environmental effects” which reflects the pursuance of the objective of having a social impact. Also barriers for innovation are the same as in “regular” enterprises,

39 For more information about these projects see for example the presentations of the supported consortia C3-Saxony at http://www.c3-saxony.eu/project-ideas/project-ideas.html or Inno-Smart at http://www.innosmart.eu/participants-projects.

40 Communication from the Commission to the European Parliament, the Council, the European and Social Committee and the Committee of the Regions, 2011: Social Business Initiative - Creating a favourable climate for social enterprises, key stakeholders in the social economy and innovation, COM(2011) 682 final, p. 2.

41 OECD, 2013: Job creation through the social economy and social entrepreneurship, p. 16.

namely “costs”, “regulation” or “market conditions”. Particular challenges exist with regard to financing, as there is a lack of venture capital and follow-up financing to bridge the “valley of death”. In some areas also exists a culture of distrust among stakeholders, which prevents cooperation as a key prerequisite for innovation. This applies in particular to the health and care sector, where welfare organisations perceive social entrepreneurs as competitors and social entrepreneurs perceive them as being opposed to innovation. A lack of “market places” for good ideas and financiers hampers also the development of the social economy, not only because ideas and money do not find each other, but also because good business models are not visible for imitators – something that is a key driver of an economy. An observation from Portugal illustrates this: “The lack of many examples of social enterprises can be considered as a key barrier to the development of the field, because emerging social entrepreneurs find it hard to anchor themselves in the learning from other examples.”

In the light of these particular drivers and barriers for innovation one can conclude that cluster organisations are appropriate instruments to provide solutions that support the development of social entrepreneurs. Cluster organisations, as can be seen from the analysis above (chapter 3), offer services in the field of networking, access to finance and business consultancy that address several of these challenges, but without a specific focus on social entrepreneurship. For the support of social enterprises through cluster organisations this does mean that there are no particular special services required as the promotion of R&D activities and business development follow the same logic as in “regular enterprises”. However, the support of social enterprises through cluster management services needs to take specific characteristics into account in order to be successful:

- First, cluster organisations need to communicate with social entrepreneurs most probably in a language or through an organisational set-up that is in line with the mind-set of social entrepreneurs that in many cases is characterised by principles such as solidarity, reciprocity, equality, participation in decision making, and ownership.
- Second, social enterprises often raise funds from specific sources that are typical for the social economy. This includes, for example, venture philanthropy as a specific type of venture capital, foundations, individual investors, ethical or social markets or crowdfunding. Each of these financial sources requires a sound knowledge of its individual conditions on the part of the cluster management. The analysis of the benchmarking data and the results of the much more detailed audits of the Gold-labelled European cluster organisations suggest that the support of social enterprises through cluster organisations in this respect is yet underdeveloped.

---

46 See in this respect OECD, 2013: Job creation through the social economy and social entrepreneurship, p. 16.
47 For an overview of the cluster organisation please see http://www.cluster-analysis.org/gold-label-new.
Cluster organisations should only set up incubators, living labs or similar instruments that are geared towards the social economy as “cluster service” if there is a specific need for such a service within its scope of activity. There are already a number of promising individual actors and initiatives in this field cluster organisations can team up with. As an example may serve the European Network of Incubators for Social Innovation (BENISI).\(^{48}\) BENISI, funded under the EU’s 7\(^{th}\) Framework Programme, is a consortium of 13 organisations from 7 countries that aims for building a Europe-wide network of networks of incubators for social innovation. But cluster organisations should seek cooperation with these incubators if they see a win-win-situation for both the cluster actors and the social entrepreneurs through collaboration. Such a collaboration could be promoted through policy instruments such as the French Pôle territorial de coopération économique (PTCE). PTCE bring together groups of stakeholders from government, industry and research and academia to develop strategies for the promotion of the social economy as a sustainable provider of employment in a specific region.\(^{49}\)

Cluster organisations are not the key instrument to further develop the social economy as the social economy is yet underdeveloped in terms of “clustering”. However, cluster organisations are an important instrument in a regional system of collaboration that aims for the development of the social economy in a specific region. Such a regional system of collaboration can either focus on specific segments of the social economy such as the already mentioned health and care sector, but also reach out to other sectors. In this respect, it is important to have a broader understanding of the social economy that should not be narrow by being restricted to social services etc., but follow a wider approach that puts the idea of achieving social objectives also in the context of “traditional industrial sectors” such as manufacturing, food or retail.

This area is yet still underdeveloped in terms of cluster management, but there is for sure a lot of potential as examples demonstrate. Representative for many other examples is the young coffee-roasting company “Coffee Circle”, which sells high-quality coffee beans sourced from Ethiopian farmers at a fair price, while reinvesting parts of the profits in rural development projects in Africa.\(^{50}\) Through collaboration with manufactures of roasters, logistic companies and retail the company could easily enlarge its business which would create further jobs both in Europe, but also in Ethiopia. Such a collaboration requires a bridge builder who communicates between business and social interests between the “regular” and the social entrepreneur. This is the role a cluster management organisation could assume in a regional system of collaboration that pursues the development of a regional social economy.

---

\(^{48}\) www.benisi.eu.


\(^{50}\) See www.coffeecircle.com.
4. New approaches for regional collaboration between cluster organisations and relevant regional partners

In regional economic development, especially when it comes to support industrial transformation, the highest impact can be reached when there are strong mechanisms for partnerships between the regional authorities, business support agencies, cluster actors and related cluster organisations. Such partnership means much more than just providing financial support for cluster organisations or cluster actors. In fact, it means is an active involvement of the public sector using cluster initiatives and cluster organisations as an active tool to implement regional economic strategies like smart specialisation strategies. This support needs to be sustained over time and responsive to changes in markets and technologies to bring respective regions forward.

It has been shown in the previous chapter that cluster initiatives and especially cluster organisations can contribute to support entrepreneurship and new business formation by tailor-made support services. However, capacities and capabilities of these cluster organisations are limited and most of them focus on the further development of existing businesses. It would be meaningless to believe that mainly cluster organisations can drive entrepreneurship. They only can contribute to a certain extent.

A more efficient, effective, and synergetic use of public policies, investments, and support mechanisms is needed to successfully support entrepreneurship and new business formation. Regional cooperation models motivate all entrepreneurial supporting entities to follow a systematic approach, with clear tasks and objectives for all partners and a dedicated regional leadership. Among such framework conditions, cluster organisations can play an important role. However, within regions there is need for further discussion on how to create such a systemic approach that is coordinated in an efficient and effective way between the relevant actors. Such systemic cooperation should be guided by new principles as presented in Figure 10.
The following sub-chapters present examples from both Europe and the United States which provide inspiration for the development of such new regional cooperation models to support entrepreneurship.

4.1 Good practice from European regions

In the context of the design and implementation of their smart specialisation strategies, some regions made good progress with regard to regional cooperation models and actively involved cluster initiatives in the process of designing and implementing innovation and cluster policy and achieving higher impact on entrepreneurial support and new business formation. Cluster initiatives, that are able to gather and represent the key actors from science and business in dedicated sectors, are becoming instruments of regional economic development policies and less than separately operating primary funding objects.

The region of Skane is a very good example for this as it has actively involved all relevant actors from business, science, politics, and regional economic developers in the cluster policy development process. The regional smart specialisation strategy of Skane is solidly based on the individual strategies of the related cluster initiatives. This assures a high coherence of regional cluster based economic development policies and the related strategies of the respective cluster initiatives. Another good example is the region of Upper Austria, which involves all relevant stakeholders in the formulation of the smart specialisation and cluster programme and to retain existing roles and responsibilities of stakeholders in the implementation phase. The competences of the cluster organisations, Upper Austrian
Council for Research and Technology (RFT) and the large agencies TMG and UAR continue to be employed. The ministry representatives of Upper Austria still act as the principal, while the field of activity committees (in this committee the Business Agency is prominently represented) carry out the strategic development work and representation. Cluster organisations act as the process owner for the field of activity committees, providing the stakeholder with organisational support and facilitating the implementation of measures and topics.

Another good example how regions can leverage their impact on entrepreneurial development and new business formation through new regional cooperation models is the Mannheim Medical Technology Cluster. Startups and young entrepreneurs can significantly benefit from the close cooperation of the regional development agency, the cluster management, incubators, universities and regional policy makers.

Figure 11 displays this integrated approach, in which relevant actors are brought together to avoid a fragmented support environment.

Figure 11: The systematic approach and the role of the cluster organisation of Mannheim region to support entrepreneurship and business formation

The spectrum of startup promotion services and programmes offered and coordinated by the cluster management in close cooperation with related partners is well synchronised and cover all needs of young enterprises. The regional economic development agency facilitates initial investments through the KREATECH funding-scheme to support technology-oriented startup companies in Mannheim.
addition to office space, so called innovation cubes (i-Cubes\textsuperscript{51}) and on-site advice by medical technology experts is offered. In addition, the cluster management was able, in close cooperation with the regional development agency and other entrepreneurial support entities, to secure funding from the medical device research programme „Mannheim Molecular Intervention Environment“ (M2OLIE). It includes a federal government funding of up to EUR 30 million over a period of up to 15 years to facilitate public-private cooperation between academia, startups and industry to develop the "Interventional OR of the Future" for cancer treatment. Finally, the cluster management acquired regional funds to initiate cooperation between startups and entrepreneurs from Mannheim with peers from Boston, Haifa and Suzhou.

Also Flanders can be considered as an excellent example for regional cooperation models to support entrepreneurship. The cluster initiative FlandersBio and the regional development agency Flanders Innovation & Entrepreneurship have implemented, together with other regional actors, a smart approach to support startups at the edge between Biotechnology, Medical Technology and Microsystems, Technology.

4.2 Good practice from Massachusetts (USA)

As an example of a cluster that represents ongoing growth and development of entrepreneurship in technology-based area, the healthcare cluster in Massachusetts (USA) provides interesting observations. The case is made that this cluster has benefitted from entrepreneurship support systems that the cluster itself has helped to generate. It is of interest to identify the role of the cluster organisations, public agencies, universities, and other institutions in supporting entrepreneurial efforts and in providing conditions that serve to enable value creation in this field. Success factors associated with entrepreneurial initiatives are described both as programme initiatives and as natural outcomes of the cluster development itself.

Venture funding of life sciences was of particular importance. The high concentration and rapidly evolving nature of technology-based entrepreneurship in Massachusetts is especially evident in the multi-faceted field of life sciences. The growing flow of venture investment reflects a significant trend in this regard. According to the National Venture Capital Association, the metropolitan statistical area that includes the Boston-Cambridge region in Massachusetts represented over $5.5 billion of venture investments for nearly 350 companies in 2015 alone. Several other cities in the Central and Western regions of the state are also experiencing a continuing growth of startup companies in the life sciences. Each location is putting specific institutional measures in place to capture the innovation momentum and job creation opportunities.

The changing demographic profile of the technology workforce in Massachusetts is another important factor to consider in assessing the conditions for entrepreneurship development. In addition to an observable shift toward younger age groups, the healthcare cluster in Massachusetts has attracted a growing number of highly qualified entrepreneurs from Europe, Asia and other regions of the world. Another critical component of the life sciences entrepreneurial ecosystem in Massachusetts has been the gradual influx of large biopharmaceutical and medical device companies along with the expansion and acquisition of local firms by multinational corporations. The "open innovation" platforms of some of

\textsuperscript{51} Innovation cubes (i-Cube) are standardised hybrid rooms for startup companies suitable for multiple uses such as an office or simultaneously as an electrical engineering lab or mechanical workshop or pilot series production room. It is capable of adapting to changing startup usage requirements over time.
these companies have enabled local entrepreneurial initiatives to become part of the supply chain of locally sourced goods and services. The new market opportunities generated by these large corporations become part of the dynamic and self-sustaining entrepreneurial environment of the healthcare cluster in Massachusetts.

The expanding knowledge base associated with medical sciences and healthcare is providing an essential base for engaging a variety of new disciplines in engineering, materials science, information technology and others. As each of these areas are nurtured by academic and research networks that go well beyond the state of Massachusetts, there is a broad-based demand to create novel applications and provide new opportunities for business creation. Healthcare startup activities in Massachusetts benefit from a self-sustaining innovation and entrepreneurial culture as well as specifically designed programmes and activities put into place by public agencies, academic institutions and private sector firms. These include both individual entities in the life science cluster as well as the cluster organisations themselves.

In discussing the startup and innovation environment in Massachusetts, one must also consider the combination of conditions that arise from the evolution of the cluster itself and the deliberately structured programmes and coordinated actions designed to provide entrepreneurial incentives. The following table lists certain success factors that serve to maintain a vibrant community of organisations and individuals that sustain life science entrepreneurship in Massachusetts. Additionally, examples of specific entrepreneurship programmes and public support schemes are offered. It is important to point out the diversity of groups, professions and institutions that comprise the so-called entrepreneurial “ecosystem” in the state.

Federal-level programmes that have represented an important input to entrepreneurial ventures in healthcare and other sectors in Massachusetts include the Small Business Innovation Research programme (SBIR) and the Small Business Technology Transfer (STTR). The financing from this programme is competitively granted in three phases through federal agencies corresponding to the field of interest. In the case of medical technologies and healthcare, said agencies can include the National Institutes of Health (NIH) and others. Each of these agencies has its own SBIR programme intended to assist innovation efforts on the part of small entrepreneurial firms directed at specific technological bottlenecks. The Massachusetts Life Sciences Center provides matching support of up to $500,000 per company that has been awarded Phase II or Post Phase II SBIR grants.

The following points can be categorically stated with regard to the how the components of the medical and healthcare cluster in Massachusetts enables entrepreneurship and benefits from entrepreneurial activities:

- The cluster-related interaction is highly decentralised and there is no central coordination for promoting entrepreneurship in the life sciences.
- The level of activity and differentiation of the entrepreneurial “ecosystem” for life sciences in Massachusetts adapts to market conditions over time.
- The distribution of entrepreneurial support systems for the healthcare cluster in Massachusetts reflects regional competitive advantages and corresponding development policies.

The support infrastructure for enabling healthcare-related entrepreneurship in Massachusetts generally involves the types of entities and activities listed in Table 2.
Table 2: Support infrastructure for enabling healthcare-related entrepreneurship in Massachusetts

<table>
<thead>
<tr>
<th>Type of infrastructure</th>
<th>Massachusetts and US Government</th>
<th>Universities / Hospitals</th>
<th>Business / Corporations</th>
<th>Cluster Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angel Funds and Venture Capital</td>
<td>Early-stage funds for healthcare IT available from MassVentures, a quasi-public agency.</td>
<td>Business plan competitions</td>
<td>Corporate investment in startups of interest to value chain; Flagship Ventures; Third Rock Ventures, others.</td>
<td></td>
</tr>
<tr>
<td>Entrepreneurship Training and Mentoring Programmes</td>
<td>Funding from Massachusetts Life Sciences Center and Massachusetts Technology Collaborative</td>
<td>MIT Venture Mentoring Service.</td>
<td>MassChallenge states that its 835 startups have raised $1.1B in funding; generated $520M in revenue created 6,500 jobs.</td>
<td></td>
</tr>
<tr>
<td>Networks and Networking Programmes</td>
<td>Massachusetts Life Sciences Center Massachusetts Technology Collaborative MassVentures</td>
<td>Mass Technology Transfer Center holds regular events for the purpose of bringing together early stage life science firms and investors.</td>
<td>Supply chain networks. Xconomy</td>
<td>The Mass Biotech Council (MassBio) and the Mass Medical Device Council (MassMEDIC) host conferences and networking opportunities. Peer groups like ‘Women in Bio’ provide support systems for young entrepreneurs.</td>
</tr>
<tr>
<td>Incubators, accelerators and innovation spaces</td>
<td>Mass Life Sciences Center reports no fewer than 23 incubators / accelerators distributed throughout the state. There is also a mushrooming of venture café’s.</td>
<td>Wide variety of models for technology transfer and entrepreneurship training programmes at universities and hospitals in Mass. MIT, Harvard, UMASS Amherst Institute for Applied Life Sciences.</td>
<td>Occasional corporate incubators for potential technology Suppliers. Cambridge Innovation Center Massachusetts Biomedical Initiatives</td>
<td></td>
</tr>
<tr>
<td>Legal assistance, accounting and other professional services</td>
<td>Small Business Administration (SBA) offers assistance of this type.</td>
<td>Technology Licensing Offices at MIT, Boston University Brigham &amp; Women’s Hospital , others.</td>
<td>Seminars at law firms and accounting firms. Supplier discounts for members. Can be important for new startups.</td>
<td></td>
</tr>
</tbody>
</table>
In terms of future challenges, the healthcare reform in the US affects all states. The continuing reform measures of the US healthcare system at the national level through the Affordable Care Act have provided new urgency for cost reduction in the provision of services to patients. Pressures for increasing cost effectiveness will continue to be a challenge to all new entrepreneurial ventures. While the development of therapeutic drugs requires the commitment of heavy financial resources on the part of large established corporations, the open innovation policies on the part of these corporate entities lends itself to the support and occasional acquisition of small and medium startup firms. Such developmental dynamics have played a significant role in the nurturing of entrepreneurship in the life science sector in Massachusetts. Similarly, new ventures in the area of diagnostics and medical devices typically require less capital investment and lead time for regulatory approval than new drug development efforts.

There are additional new technology frontiers resulting from continuing healthcare reform pressures. These include precision medicine, individualised care, anti-biotic resistance, digital monitoring of chronic diseases associated with new demographics (aging population and ethnic minorities). New entrepreneurship opportunities are also expanding in other areas such wearable medical devices, smart textiles, fiber optics, nanotech, genetic modification, robotics and others. The cluster dynamics and the respective life science cluster organisations in Massachusetts will continue to play a key part in maintaining the sustainability of forward-looking entrepreneurship capabilities in the state.

5. Recommendations for policy makers

Unlocking the potential of innovative entrepreneurship concentrated in strong European clusters is essential for renewing the industrial basis of the EU. Recently, there has been an increased policy attention on future oriented trends and innovation in manufacturing industries. Given the importance of the European manufacturing sector, the development of effective support and framework conditions conductive for the development of modern industries has been placed high on the policy agenda. The emphasis is, however, not only on technologies or engineering but an important challenge for both industry and policy-makers is shifting from a process industry to a solution-oriented approach.

Some of the key challenges and also opportunities of entrepreneurs lie in the following:

- Harnessing the potential in new business models and service innovation in order to foster the development of smarter product design methods and shorter production runs;
- Shifting to digital factories, including the digitalisation of production, the establishment of complex production systems, networked manufacturing, and the transformation of factories into ‘factories of the future’;
- Fostering the development of the circular economy and the adoption of green technologies that can improve resource and energy efficiency;
- Joining more international value chains and improve their internationalisation strategies.

In terms of future policy and programme development to address these challenges policy makers should consider the following recommendations:

1. **Use cluster initiatives and cluster organisations to promote smarter and more focused entrepreneurship development**

As cluster initiatives and cluster organisations bring together companies, academia, R&D actors and other innovation actors they are effective facilitators for building new industrial strengths, notably in
emerging industries. Therefore, identify the cluster initiatives and cluster organisations in your region that have the potential to fulfil this role. Engage with them in a dialogue on their contributions to the support of entrepreneurship in your region.

2. Create regional cooperation models around cluster initiatives to support entrepreneurship

Without doubt clusters and cluster initiatives are important and powerful instruments to promote regional economic growth. Yet, most of the cluster organisations do not consider the support of entrepreneurship as a key area of activities. Even if, most of them support established businesses rather than really new business. With regard to the different phases of nascent entrepreneurship – pre-start, startup and acceleration/growth – only a limited number of cluster organisations promote entrepreneurship through a fully-fledged service portfolio. In these cases, the cluster organisations are guided by a sophisticated cluster strategy that is very focused on the promotion of a region by concentrating on a specific emerging industry.

Such strategies should follow the approach for regional collaboration as outlined in this paper. Cluster organisations play an important role, but there are also other actors in the region that provide relevant entrepreneurship infrastructure (such as incubators, science centres or organisations that host business plan competitions). Such a regional collaboration should be based on a systematic approach of all stakeholders that coordinates individual strategies and activities for the benefit of an effective and efficient support environment. It goes without saying that this also requires commitment of all stakeholders and dedicated leadership by a key actor, which can be a cluster organisation.

When engaging in a dialogue with cluster organisations to explore their possible contributions to the support of entrepreneurship in your region, ensure that this includes the joint development of such a strategy for regional cooperation.

3. Analyse the entrepreneurial conditions in your region in detail and implement corrective measures, if required

To stimulate the concentration of entrepreneurial activity a key challenge of policy-makers is to create favourable framework conditions that will positively influence the evolution of regional business ecosystems and facilitate the creation of new enterprises, the survival and growth of business activities. This includes the development of a more entrepreneurial culture, improving knowledge linkages, providing supportive financing and funding conditions, strengthening the social capital and creating demand for innovative products and services. Framework conditions are often industry-specific, where only a set of them are the ones which are instrumental in fostering the development and emergence of a certain type of cluster. For instance, in the evolution of science-based clusters different factors play a decisive role as in the development of clusters composed of small manufacturing firms and again others in new emerging, services-based clusters.

The Regional Ecosystem Scoreboard prepared by the European Cluster Observatory has identified the quality of conditions in the regional ecosystem that can foster or eventually hinder the creation of dynamic cross-sectoral collaboration spaces for innovation and entrepreneurship revealing both enabling and constraining mechanisms. The indicator framework of the Regional Ecosystem Scoreboard allows capturing the overall quality of the regional entrepreneurial and innovation ecosystem and gives an insight about the regional conditions compared across the European Union. Based on this analysis, areas for policy improvement can be identified and corrective measures developed and implemented.
Annex 1: Good practice examples of cluster organisation services to support entrepreneurship

<table>
<thead>
<tr>
<th>Name and country</th>
<th>Industry</th>
<th>Website</th>
</tr>
</thead>
</table>

**Profile of entrepreneurship support service**

A key strategic objective of BTM Cluster Mazovia is the commercialisation of R&D results of Polish universities and hospitals in the field of biotechnology. In order to develop this potential the cluster management introduced in summer 2015 the service “Bridge2Market” (http://btm.lucid.pl/). Through this web platform the cluster management aims to facilitate the process of technology transfer from research units to companies. Following the model of a dating website “Bridge2Market” shall ease the process of finding partners for the commercialisation of projects.

<table>
<thead>
<tr>
<th>Name and country</th>
<th>Industry</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap Digital</td>
<td>Digital Industries</td>
<td><a href="http://www.capdigital.com">www.capdigital.com</a></td>
</tr>
</tbody>
</table>

**Profile of entrepreneurship support service**

As a key service to promote entrepreneurship Cap Digital offers an “Acceleration Programme for Entrepreneurs”. Within this programme the cluster organisation supports startups and young entrepreneurs not only with access to funding, but also coaching and advice with regard to business model development, market validation, scaling up and internationalisation. In the context of the latter they hosted a specific programme to promote French startups in the US, but other countries are also addressed. Entrepreneurs who are supported have to participate in a rigid selection process.

<table>
<thead>
<tr>
<th>Name and country</th>
<th>Industry</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corallia, Greece</td>
<td>Different emerging industries</td>
<td><a href="http://www.corallia.org">http://www.corallia.org</a></td>
</tr>
</tbody>
</table>

**Profile of entrepreneurship support service**

Corallia is the first organisation established in Greece for the management and development of Innovation Clusters, in specific sectors and regions of the country, within which actors operate in a coordinated manner. Corallia implemented series of initiatives to stimulate and promote especially Youth Entrepreneurship, e.g. Educational Trips at highly acknowledged universities worldwide (Stanford, Berkeley, MIT, Georgia Tech), an integrated incubation, acceleration and co-working programme as a corporate social responsibility initiative. The programme can engage young aspiring entrepreneurs from all over Greece who have creative and innovative ideas in any sector of the economy and who have the passion to put their 'idea' into 'action'. Corallia also organises the E-bootcamp Competition with
Stanford, Internships Days, Carpe Diem, Career Days in order to expose students and young entrepreneurs to new horizons and career perspectives. Corallia also facilitates support activities for access to finance.

Also, Corallia offers support for entrepreneurs with networking events, internationalisation events, it-/web-services, business area and exhibition area and telepresence as well as HR-services (career days, career matchmaker platform), public relations support and training events.

<table>
<thead>
<tr>
<th>Name and country</th>
<th>Industry</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>CyberForum e. V., Germany</td>
<td>Digital Industries</td>
<td><a href="http://www.en.cyberforum.de/offering/">http://www.en.cyberforum.de/offering/</a></td>
</tr>
</tbody>
</table>

CyberForum is a large network of high-tech companies that connects businesses, business angels and investors, entrepreneurs, founders, researchers, apprentices, and pupils to accelerate the use of ICT solutions across all industries. As the support of entrepreneurship is key in this regard the cluster organisation offer a broad range of different services individually designed for each of the abovementioned target groups of the cluster: http://www.en.cyberforum.de/offering/.

<table>
<thead>
<tr>
<th>Name and country</th>
<th>Industry</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCE NODE, Norway</td>
<td>Blue Growth Industry</td>
<td><a href="http://gcenode.no/">http://gcenode.no/</a></td>
</tr>
</tbody>
</table>

GCE Node promotes the development of the Norwegian offshore industry. In order to counter negative economic effects in the region due to the falling oil price the cluster organisation has designed a “Cluster development programme” that aims at the exploration and development of new business areas through existing companies (http://gcenode.no/project/704/). In addition, the cluster organisation is involved in the establishment and management of incubators that aim for the commercial exploitation of R&D results of the local universities through the establishment of new companies; people who have lost their jobs in the oil industry are a particular target group of this “Greenhouse programme” (http://gcenode.no/news/a-greenhouse-for-good-ideas-2/).

<table>
<thead>
<tr>
<th>Name and country</th>
<th>Industry</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>It’s OWL – intelligent technology systems, Germany</td>
<td>Production and engineering, Digital Industries</td>
<td><a href="http://www.its-owl.com/home/">www.its-owl.com/home/</a></td>
</tr>
</tbody>
</table>

For the cluster organisation the promotion of entrepreneurship is a key priority and embedded as a main pillar in its strategy to commercialise R&D results that develop from more than 40 high profile R&D projects. Measures to support entrepreneurship include coaching / mentoring, two incubators, pitch events for young entrepreneurs,
seminars on business plan development, patenting, financing etc., special events and workshops for founders, and special conditions for fair participations for young entrepreneurs.
European Cluster Observatory in brief

The European Cluster Observatory is a single access point for statistical information, analysis and mapping of clusters and cluster policy in Europe. It is primarily aimed at European, national, regional and local policy-makers and cluster managers and representatives of SME intermediaries. It is an initiative run by the ‘Clusters, Social Economy and Entrepreneurship’ unit of the European Commission’s Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs and aims to promote the development of more world-class clusters in Europe, notably with a view to promoting competitiveness and entrepreneurship in emerging industries and facilitating SMEs’ access to clusters and internationalisation activities through clusters.

The ultimate objective is to help Member States and regions to design smart specialisation and cluster strategies that will help companies to develop new, globally competitive advantages in emerging industries through clusters, and in this way to strengthen the role of cluster policies in boosting Europe’s industry as part of the Europe 2020 Strategy.

In order to support evidence-based policy-making and partnering, the European Cluster Observatory provides an EU-wide comparative cluster mapping with sectoral and cross-sectoral statistical analysis of the geographical concentration of economic activities and performance. The European Cluster Observatory provides the following services:

- a biannual ‘European Cluster Panorama’ (cluster mapping) providing an update of and extension to the statistical mapping of clusters in Europe, including for ten related sectors (i.e. cross-sectoral) and a correlation analysis with key competitiveness indicators;
- a ‘European Cluster Trends’ report analysing cross-sectoral clustering trends, cluster internationalisation and global mega trends in industrial transformation; identifying common interaction spaces; and providing a forecast for industrial and cluster opportunities;
- a ‘Regional Ecosystem Scoreboard’ setting out strengths and weaknesses of regional and national ecosystems for clusters, and identifying cluster-specific framework conditions for three cross-sectoral collaboration areas;
- a ‘European Stress Test for Cluster Policy’, including a self-assessment tool accompanied by policy guidance for developing cluster policies in support of emerging industries;
- a showcase of modern cluster policy practice, provided in the form of advisory support services to six selected model demonstrator regions. The services offered include expert analysis, regional survey and benchmarking reports, peer review meetings and policy briefings in support of emerging industries. The policy advice also builds on the policy lessons from related initiatives in the area of emerging industries;
- the European Cluster Conferences 2014 and 2016, which bring together Europe’s cluster policy-makers and stakeholders for a high-level cluster policy dialogue and policy learning, and facilitate exchange of information through, e.g. webpages, newsletters and videos.