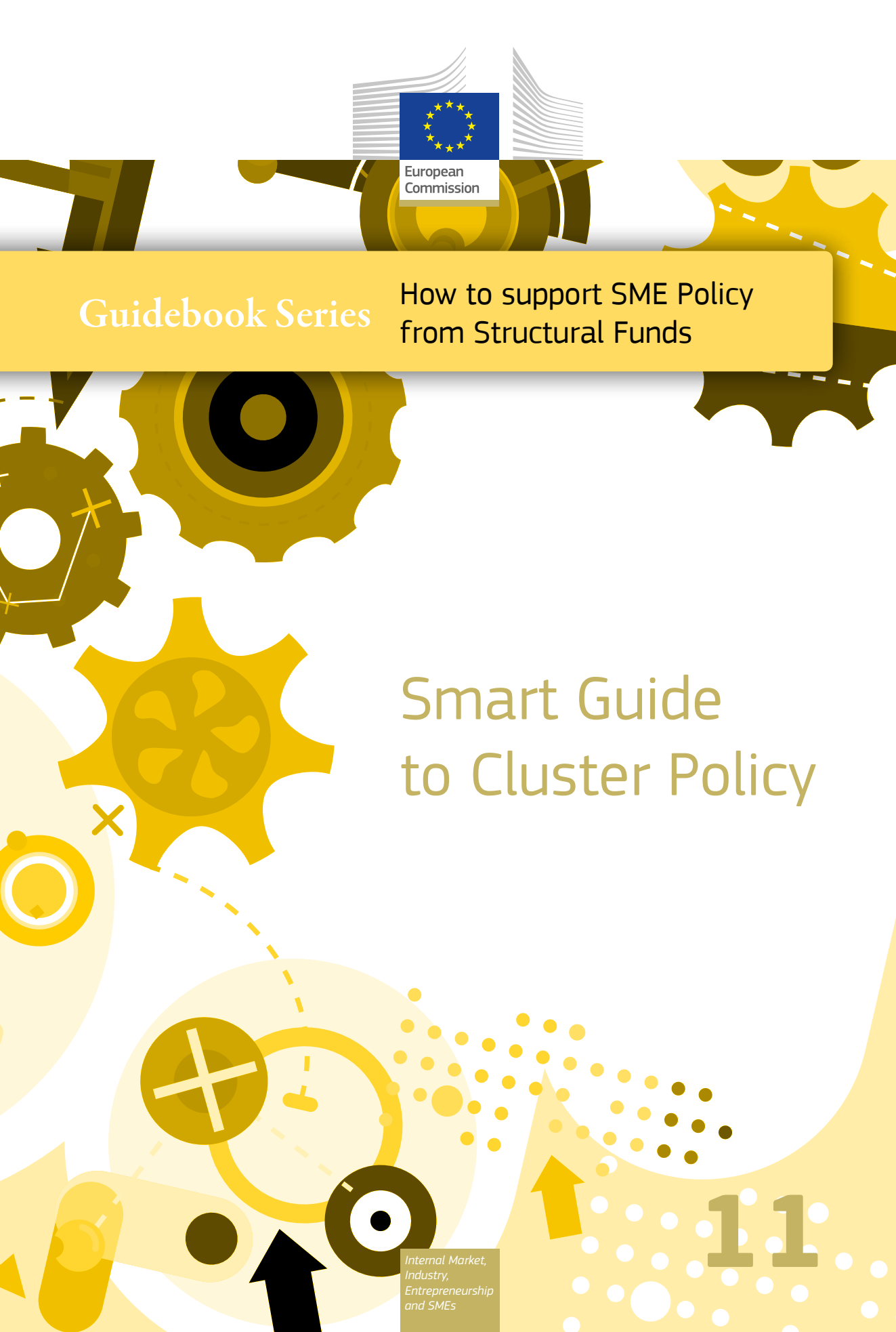

Guidebook Series

How to support SME Policy from Structural Funds

Smart Guide to Cluster Policy

11

Internal Market, Industry, Entrepreneurship and SMEs

Guidebook Series

How to support SME Policy from Structural Funds

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

This guidebook has been produced by the Clusters, Social Economy and Entrepreneurship unit of the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs in cooperation with the Smart and Sustainable Growth unit of the Directorate-General for Regional and Urban Policy. It was prepared by Kincsö Izsak (Technopolis Group), Christian Ketels (Centre for Strategy and Competitiveness, Stockholm School of Economics), Gerd Meier zu Köcker (VDI/VDE-IT GmbH) and Thomas Lämmer-Gamp (VDI/VDE-IT GmbH) as part of the service contract for the European Cluster Observatory under guidance from European Commission officials. However, the views expressed in this document do not necessarily represent the opinion of the European Commission.

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Foreword

Accelerating structural change and innovation uptake in industry is at the forefront of Europe's growth agenda. Public and private investment needs to be more strategic, smarter and better focused.

To achieve this, Europe's regions must provide entrepreneurs with a favourable business environment and support appropriate to their particular needs. This is why cluster policies and smart specialisation strategies are at the heart of delivering the EU's growth strategy, as they help to take the geographical and thematic context into account in order to boost jobs, SME growth and investment.

Smart specialisation strategies are key elements of a new, more result-oriented Cohesion Policy focusing on growth through innovation, which is now being implemented. It helps regions at different stages of development to focus on their strengths, to position themselves in global value chains and to team up to build strategic partnerships across Europe with other regions that have complementary strength in similar priority areas.

Clusters and cluster policies can facilitate this process and help to maximise the impact of the EUR 121 billion of European Structural and Investment Funds allocated to investment in research and innovation guided by smart specialisation strategies. The implementation of these strategies promises to trigger industrial modernisation processes and create more productive, diversified and resilient economies. It should in particular contribute to providing small and medium-sized enterprises – the backbone of the EU economy – with better support and investment opportunities.

The aim of this Smart Guide to Cluster Policy is to highlight the benefits of an integrated approach to cluster policies and smart specialisation and to discuss the opportunities and challenges for cluster policies in this context. It offers practical examples and a toolbox with new ideas for the transition towards modern cluster policies.

We hope that many national and regional policy-makers will be inspired to adapt and modernise their economic development policies in order to realise their full potential to create economic growth and new, sustainable jobs.

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1 Introduction

Stimulating smarter, more strategic and more focused public investment that leverages more private and public initiative and investment is at the forefront of Europe's jobs, growth and investment agenda. In order for policy in this area to achieve its impact, priorities need to be set according to the geographical and thematic context of the investment. Therefore, cluster policies and smart specialisation strategies have become central to the implementation of Europe's growth strategy.

This growth strategy demands comprehensive efforts to mobilise resources in order to accelerate innovation and industrial transformation. Regions are a driving force in this, as favourable place-based business conditions are helping to incentivise actors in the real economy, notably small and medium-sized enterprises (SMEs). Clusters are a powerful tool for reaching out to groups of specialised SMEs and related innovation actors, and for increasing their competitiveness.

The full potential of clusters is unlocked when policies and SME support measures are in place that can structure the co-creation process and thus direct public and private investment towards smart specialisation. This requires not only linking up the main players in the regional ecosystem and involving a wide range of stakeholders, but also overcoming sectoral, regional and departmental silos. Regions that succeed in achieving this and that are able to tackle the economic complexity of the process through clusters will usually be those that subsequently benefit from economic resilience and higher employment growth.

The objective of this Smart Guide to Cluster Policy is to promote the transition towards modern cluster policies by looking at what type of environment can be created and what institutions and support tools can be put in place in order to create growth opportunities and address the challenges likely to be faced. The guide offers practical help by outlining some of the misunderstandings related to the concept of clusters and offering insights from experiences with cluster policy. While it includes many examples that can serve as an inspiration for the development and implementation of cluster policies and programmes, it will

neither cover all forms of cluster policies nor all aspects of smart specialisation strategies that could be supported. It should be seen as a practical toolbox with new ideas and material.

The guide is addressed to policy-makers at all levels interested in using clusters as a tool to facilitate regional structural change through industrial innovation policies and smart specialisation strategies, and in particular to those from the managing authorities for European Structural and Investment Funds. It should be of interest to policy-makers from any country or region, irrespective of their specific industrial structure and level of competitiveness.

The guide complements the 'Guide to Research and Innovation Strategies for Smart Specialisation',[1] the report 'The role of clusters in smart specialisation strategies'[2] and the available reports published by the European Cluster Observatory, notably its 'European Cluster Panorama', 'European Cluster Trends', 'Cluster programmes in Europe' and 'Cluster Collaboration and Business Support Tools to Facilitate Entrepreneurship, Cross-sectoral Collaboration and Growth'. It also serves as background information to the self-assessment tool for a 'European Stress Test for Cluster Policy'.[3]

1 European Commission, Directorate-General for Regional and Urban Policy, 2012, prepared by Dominique Foray *et al.*, guide available at: http://ec.europa.eu/regional_policy/sources/docgener/presenta/smart_specialisation/smart_ris3_2012.pdf.

2 European Commission, Directorate-General for Research and Innovation, 2013, report available at http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/clusters_smart_spec2013.pdf.

3 The reports are available and the self-assessment tool will be made available on the web pages of the European Cluster Observatory at http://ec.europa.eu/growth/smes/cluster/observatory/.

2 Setting the scene for modern cluster policy

2.1 Some clarifications to start with…

Clusters cannot be understood as fitting into the narrow sectoral view that most industrial policies have, but should be considered as regional ecosystems of related industries and competences featuring a broad array of inter-industry interdependencies.[4] They are defined as groups of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills. Clusters are referred to both as a concept and a real economic phenomenon, such as the Silicon Valley, the effects of which, such as employment concentration, can be measured – as is done by the cluster mapping of the European Cluster Observatory.[5]

Cluster policies, on the other hand, are an expression of political commitment, composed of a set of specific government policy inter–ventions that aim to strengthen existing clusters and/or facilitate the emergence of new ones. They are to be seen as a framework policy that opens the way for the bottom-up dynamics seen in clusters and cluster initiatives. This is different from the approach taken by traditional industrial policies, which try (and most often fail) to create or back winners. Instead, **modern cluster policies** aim to put in place a favourable business ecosystem for innovation and entrepreneurship in which new winners can emerge and thus support the development of new industrial value chains and **'emerging industries'** (see Box 1 below). This thus implies more than merely supporting networking activities and setting up cluster organisations that manage networking and provide support services to SMEs. It means that specialisation strategies need to be placed in a broader context and anchored in a policy framework that goes beyond a sectoral, geographical and departmental 'policy-silo pattern'. Modern cluster policies thus follow a systemic approach that combines different policies, programmes and instruments.

4 Delgado, Mercedes/Porter, Michael E./Stern, Scott, 2013: Defining Clusters of Related Industries, Working Paper 20375 of the National Bureau of Economic Research. Available at: www.nber.org/papers/w20375.

5 For more information on definitions and cluster mapping, see the European Commission's Staff Working Document SEC(2008) 2637 'The concept of clusters and cluster policies and their role for competitiveness and innovation: Main statistical results and lessons learned', including its glossary, available at http://bookshop.europa.eu/en/the-concept-of-clusters-and-cluster-policies-and-their-role-for-competitiveness-and-innovation-pbNBNA23591/.

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 SME intermediaries, such as cluster organisations.

Cluster organisations are the legal entities that support the strengthening of collaboration, networking and learning in innovation clusters and act as innovation support providers by providing or channelling specialised and customised business support services to stimulate innovation activities, especially in SMEs.[6] They are usually the actors that facilitate strategic partnering across clusters.

Box 1: Emerging industries

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'.[7] They are most often driven by key enabling technologies such as advanced manufacturing, new business models such as innovative service concepts (i.e. service innovation), and by societal challenges such as climate change and sustainability demands that industry must address as a matter of survival. In its European Cluster Panorama,[8] the European Cluster Observatory has identified ten emerging industries by means of a data-driven analytical process that focused on the identification of strong and weak linkages across economic activities. Many emerging industries, such as creative industries, mobile and mobility industries and eco-innovative industries, have in common that they grow out of existing industries and hence cut across different, traditionally defined sectors, thus building new industrial landscapes and value chains that encompass cross-sectoral competences and linkages. As emerging industries are often characterised by high growth rates and market potential, they hold the key to future competitiveness and prosperity.

The systemic and strategic vision needed for modern cluster policy can be provided by the concept of **smart specialisation** (see Box 2 below) whereby a region undergoes an entrepreneurial search and discovery process to find out what it does best, its competitive advantages and related innovation opportunities, and works towards developing joint roadmaps and aligning investment agendas. The role of government in this context is that of an enabler that provides incentives and encourages entrepreneurs and other organisations such as universities and research institutes to become involved in identifying the regions' specialisations.[9] It is crucial that priorities are set and supported through a targeted investment agenda linked to these emerging specialisations. In addition, an effective monitoring system needs to be put in place that evaluates and assesses the effectiveness of government support, in order to make sure that limited public funds are directed to where they can add most value, in terms of creating jobs and growth and supporting industrial transformation.[10]

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6 Annex 1 to the EU 'Framework for State aid for research and development and innovation' (Commission Communication 2014/C 198/01) lists eligible costs for aid for the operation of innovation clusters. This gives a more detailed picture of the typical related activities that a cluster organisation may undertake. These include '(a) animation of the cluster to facilitate collaboration, information sharing and the provision or channelling of specialised and customised business support services; (b) marketing of the cluster to increase participation of new undertakings or organisations and to increase visibility; (c) management of the cluster's facilities; and (d) organisation of training programmes, workshop and conferences to support knowledge sharing and networking and transnational cooperation.' The full reference text can be found at http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0627(01)&from=EN.

7 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 http://www.emergingindustries.eu/policy-roadmap.aspx and http://www.clusterobservatory.eu/index.html#!view=aboutobservatory;url=/about-observatory/emerging-industries/.

8 http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/cluster-mapping/cluster-panorama/.

9 Coffano, Monica/Foray, Dominique, 2014: The Centrality of Entrepreneurial Discovery in Building and Implementing a Smart Specialisation Strategy, Scienze Regionali, Vol. 13/1, pp. 33-50.

10 Foray, Dominique: Smart Specialisation. Opportunities and Challenges for Regional Innovation Policy, Routledge, Abingdon (UK) and New York (NY), 2015.

Box 2: Smart specialisation

Smart specialisation is an important concept for better and more targeted innovation policy. It developed as a result of analysis that found that research and innovation efforts in Europe are often too fragmented and subcritical, and tend to duplicate one another too much. Smart specialisation was included in post-2013 Cohesion Policy as an '*ex ante* conditionality for European Structural and Investment Fund support'. This meant that all EU Member States and regions had to develop National and Regional Research and Innovation Strategies for Smart Specialisation (RIS3 strategies). These strategies set out the agendas for integrated, place-based economic transformation that would guide Member States' and regions' innovation-related investment. They:

- focus policy support and investment on key national/regional priorities, challenges and needs for knowledge-based development;
- build on each country/region's strengths, competitive advantages and potential for excellence;
- support technological as well as practice-based innovation and aim to stimulate private sector investment;
- get stakeholders fully involved and encourage all forms of innovation and experimentation; and
- are evidence-based and include sound monitoring and evaluation systems.

Methodological guidance for policy-makers and implementing bodies on how to prepare for and design, draft and implement a National or Regional Research and Innovation Strategy for Smart Specialisation (RIS3) is provided by the Guide to Research and Innovation Strategies for Smart Specialisation, available from the Smart Specialisation Platform at: http://s3platform.jrc.ec.europa.eu/-/guide-on-research-and-innovation-strategies-for-smart-specialisation-ris3-guide-

Clusters are important both as the building blocks of designing smart specialisation strategies and as a means for implementing these strategies. The evaluation of the previous European Regional Development Fund and Cohesion Fund programming period has, for example, shown that the promotion of networking through clusters has been 'among the most successful instruments' for supporting innovation in SMEs and nurturing their development, even if instruments of this type represented only a small proportion of those introduced during the programming period.[11] Both cluster policies and smart specialisation strategies are important tools for generating growth in the EU by unlocking new business opportunities for SMEs in new value chains and creating synergies through interregional cooperation.

2.2 Clusters – what they are and what makes them successful?

Clusters are the concentration of economic activities in groups of related industries in a specific location that are connected through multiple linkages and spill-overs. Although this description may seem very academic, the ideas behind clusters are principles that entrepreneurs have long been aware off:

Critical mass matters: the more companies there are in a certain set of industries, the more likely it is that higher levels of productivity and innovation will be achieved. This is partly due to specialisation. If there is a large local market, companies can focus more on being very good at a specific narrow activity, and employees can focus more on acquiring very specialised skills.

11 *Ex post* evaluation of Cohesion Policy Programmes 2007-2013 financed by the European Regional Development Fund and the Cohesion Fund, WP2 support to SMEs, increasing research and innovation in SMEs and SME development, No 2014CE16BAT002.

It is also partly due to competitive pressure. If there is more competition among peers for customers, employees and ideas, each of them has to work harder to develop unique products and services that stand out in the market. This puts pressure on companies, which can be challenging, but it makes them more likely to succeed in national and global competition.

Related industries matter: companies need to engage with suppliers, service providers, and other partners from a range of related industries in order to be successful. As companies have focused more on specific 'core competencies', their reliance on such partners in related activities has only increased.

Clusters reflect this increasingly cross-industry nature of value chains and innovation systems. Much of the dynamism they generate is related to economies of scope, i.e. benefiting from related industries and at the same time spurring growth in employment in these industries.

Location matters: companies can and need to work with partners in many locations to access the technologies and supplies they need from the best possible sources. But local partners play a unique role: the type of interaction that companies can achieve with local partners is much richer. And markets, especially for skilled labour, are by their nature local. Companies therefore need to be present to tap into the local talent base.

Linkages matter: while many of the benefits from proximity with companies in related fields occur 'automatically', companies can do better if they create an environment that supports active collaboration. For this collaboration to take place, companies have to overcome a collective action-problem that often exists in clusters: why should I help create a platform for collaboration if the benefits of doing so accrue to others and depend on their actions? One important task for the government and also for other 'anchor' institutions with sufficient credibility and power to mobilise companies is to help address these problems and allow mutually beneficial collaboration to emerge.

Clusters are in the vast majority of cases not 'created': they emerge, because different locations provide different types of opportunities for specific companies to invest, succeed, and grow. Clusters are the result of a cumulative process, where the success of one company paves the way for others to follow. Such processes take a long time, and are inherently unpredictable. Cluster evolution is a natural process, but it is not automatically a successful one.

In most cases, success depends on creating specific qualities of a business environment that give a location a unique and lasting advantage. By helping to create these qualities, governments can have a significant influence on the emergence and growth of a cluster. The challenge is to invest in creating the kind of qualities that meet a market need: many locations across Europe have invested in airports or universities, while only a few have been able to make these investments a key asset in competing for economic activities. Often, the difference has been that successful regions have been able to integrate the investment into a broader set of qualities that made their location attractive for a specific cluster (see Box 3).

Box 3: Example for a successful cluster: 'Aviation Valley' (Dolina Lotnicza) in south-eastern Poland

South-eastern Poland is home to an aviation cluster that provides a good example how critical mass, related industries, location and linkages matter for the development of a strong regional economy. Being among the largest aviation clusters worldwide, the cluster has a long industry tradition that started in the 1930s with the production of aircraft engines. In the following decades, more and more companies were set up. The growth of the industry was accompanied by a diversification, brought by the production of helicopters, spare parts for passenger aircrafts and fighter jets.

Although hit hard by a deep recession in the 1990s following the collapse of the socialist economic order, the industry did not crash. Instead, new private companies were created that served as suppliers or service providers for the large state-owned manufacturers, which were gradually privatised in subsequent years. A close collaboration between businesses, academia and government led to a regional cooperation strategy amongst industry stakeholders to maintain and further develop the cluster. As a result, 'Aviation Valley' emerged, a cluster that is today home to more than 125 related companies and institutions with more than 20 000 employees in the aerospace industry. Scientific research centres and educational and training facilities are also represented.

Since 2003, the cluster has been managed by the Aviation Valley Association. The reasons for setting up the Aviation Valley Association were first of all to develop a low-cost supply chain building on the SME base in the region and to create favourable conditions for the aerospace business. The promotion of research, technology development and innovation has also been a focus of the cluster, as it is advanced technologies that allow firms to participate in the biggest international aircraft programmes and ensure competitiveness in the long term.

Learn more about 'Aviation Valley' at https://www.youtube.com/watch?feature=player_embedded&v=GvFM4vmhgec and http://www.dolinalotnicza.pl/.

2.3 What should clusters not be confused with?

Practitioners often struggle with the confusing terminology used by experts promoting (or criticising) cluster-based approaches to economic development. This section clarifies some of these terms.

Clusters are not synonymous with cluster initiatives. While the former refers to the concept that describes the real economic phenomenon of concentrations of economic activities such as Silicon Valley or the City, London's financial district, the latter describes an initiative or political effort to create, maintain, or upgrade an economic stronghold or cluster. Cluster initiatives can help a cluster to reach higher levels of performance, for example by strengthening linkages or facilitating collective action to improve the cluster-specific business environment. And cluster initiatives are one of the main channels through which cluster policy can engage with a cluster. Importantly, there is also significant emerging evidence that cluster initiatives are much more likely to generate an economic impact if the underlying cluster is strong.[12] The increasing recognition of the role of cluster initiatives in improving the performance of a cluster and the importance of supporting industrial transformation by means of cross-sectoral linkages brings with it the new challenge of catalysing the role of cluster initiatives in identifying and implementing new opportunities in cross-sectoral value chains.

Clusters are not synonymous with specialisation. While clusters reflect the specialisation of locations in specific economic activities, they capture two important additional aspects. First, clusters reflect specialisation in *groups of related industries*, not just one narrow activity.

12 Ketels, C., S. Protsiv (2013), Clusters and the New Growth Path for Europe, WWWforEurope Working Paper, WIFO, Vienna.

Much of the dynamism of clusters derives from these 'economies of scope' rather than static 'economies of scale'. Clusters are thus much more a reflection of cross-industry linkages and 'related diversification' than of narrow specialisation. Second, clusters reflect the dynamic interaction between a large number of firms. Specialisation through the presence of one large firm or plant does not constitute a cluster.

Clusters and cluster initiatives are not merely networks. Clusters are geographic concentrations of firms active in related fields. Some of the linkages that exist between these firms and that contribute to the dynamism of the cluster result from the firms being in networks; others, such as access to a common labour market, do not. Networks, especially if they are formalised through an organisation, are more similar to cluster initiatives. But cluster initiatives not only connect firms, they organise joint actions among them and provide services to firms in the cluster. Networks, conversely, are not bound to any particular geographical location in the way cluster initiatives are. They are often a 'closed shop' of firms and other institutions that collaborate on a specific project or in a narrow field.[13]

Clusters and cluster initiatives are an important part of innovation eco-systems. Innovation eco-systems are similar to clusters, but do not have the same focus on specific sets of related industries. They tend to encompass all activities in a given location that are connected to innovation. In practice, this perspective can easily lead to a focus on research-driven innovation and the linkages between academia and business. It lacks the specificity of a distinct cluster, and often tends to have more of a supply-driven rather than a market-driven perspective.

2.4 What is the economic relevance of clusters and cluster policy?

Research in the area of clusters has over the last decade and a half become much more quantitatively oriented. 'Cluster-mapping' initiatives such as the European Cluster Observatory and similar projects in the US and other countries have created a transparent, data-rich foundation on the basis of which to evaluate the economic size and impact of clusters. Increasing attention has also been given to the need to evaluate and demonstrate the impact that cluster policies and programmes can have. This section discusses some of the key facts that have emerged in relation to Europe.

2.4.1 Clusters matters

Economic activities that are located in clusters account for about 39 % of European jobs and 55 % of European wages.[14] The cluster mapping methodology classifies industries as either 'traded', i.e. industries based in agglomerations in specific locations that also serve other markets, or 'local', i.e. industries that are dispersed and present everywhere as they mainly serve local markets – such as local retail and other services. Local industries are therefore not considered by the cluster mapping methodology as they are viewed neither as being exposed to direct competition across regions nor as tending to cluster together. Clusters are groups of related 'traded' industries, connected through multiple types of local linkages. Both types of industries are important for the health of the European economy. But they play different roles and are exposed to different types of dynamics.

Traded industries located in clusters are the **innovation and growth drivers** of an economy. They account for more than 87 % of all patents,[15] report much higher productivity, wages, and productivity growth,[16] and their growth potential is not limited by the size of any local market. Local industries in turn are the basis of a large and growing proportion of employment. Activities with relatively limited productivity growth such as healthcare, retail, and other local services account for a large part of the aggregate job creation in the overall economy. Their productivity performance

13 For a more in-depth discussion of the similarities and differences between networks, clusters, and cluster initiatives, see the European Competitiveness Report 2012, European Commission: Brussels.

14 According to the most recent European Cluster Observatory data.

15 This figure refers to US data. The concordance of patent classes with industries used in the US for this analysis is not available in Europe. Source: Delgado M., M. Porter, S. Stern (2014), Clusters, convergence, and economic performance, Research Policy. Available at: www.sciencedirect.com/science/article/pii/S0048733314001048.

16 Both in Europe (average wage EUR 27 600 in traded vs EUR 19 500 in local industries, according to the European Cluster Observatory) and in US, e.g. Porter, M. (2003). The Economic Performance of Regions, Regional Studies, available at: www.tandfonline.com/doi/abs/10.1080/0034340032000108688?journalCode=cres20#.VSuBXVwTHzI.

means that they have a significant impact on local prices and thus on living standards.

Europe is home to some 2 500 strong clusters,[17] i.e. statistically defined regional concentrations of related traded industries **that achieve above average performance for employees, firms, and regions.** Cluster effects become visible when the presence of related industries in a specific location reaches critical mass. Roughly 45 % of all employment in traded industries is located in strong clusters. Employees in strong clusters earn on average 11 % higher wages than their colleagues in the same industries but located outside of clusters. This reflects the higher productivity that companies can achieve in clusters. Strong clusters have reported job growth of 0.2 % annually in the post-crisis period (2008-2014), while traded industries outside of strong clusters have lost 1.7 % on average. Research in the US has shown that new business formation is higher in strong clusters, and that new firms are more likely to succeed and grow if located in strong clusters.[18] Finally, regions that have a higher proportion of their employment in strong clusters register higher overall levels of prosperity.[19]

The presence of clusters also shapes locations' **opportunities for structural change**, a key priority of many smart specialisation strategies. Recent academic research has provided evidence that locations diversify via a process of related diversification, i.e. new activities emerge in new fields that are related to existing fields in which a location is already strong.[20] The European Cluster Panorama draws on this thinking to identify emerging industries as fields of related traded industries that go beyond an individual cluster. Locations can use this data to evaluate in which of these emerging industries they have the best opportunities for growth given their existing cluster portfolio.[21]

The research undertaken over the last few decades has provided increasingly robust evidence that clusters are an important feature of modern economies. It also points strongly to a positive link between the presence of clusters and the economic performance of the companies in these clusters and the regions in which they are located.

2.4.2 Cluster policies matter

The argument for cluster policy must, however, move beyond these observations. Clusters emerge in a market-driven process, reflecting the decisions taken by companies as to their location and differences in success across locations. Cluster policy is motivated by the recognition that this market process is subject to market failures and is strongly affected by policy choices.[22]

Governments are already active in many of these areas. The motivation to organise these policies around clusters is that such an approach offers benefits in terms of effectiveness. Relative to firm-level interventions, i.e. supporting activities undertaken by individual companies, cluster-level actions can create greater leverage and reach a larger number of firms. Relative to industry-level interventions, action taken by a cluster avoids many of the distortions relating to suppliers along the value chain that otherwise often emerge. And relative to economy-wide policies, cluster-level action can be better targeted at the specific issues faced by companies in a set of related industries, thus increasing the effectiveness and reducing wasted effort. Clusters and cluster initiatives will need to play an important role in system innovations, in particular in the transition to the circular economy, but also

17 This and further figures in this paragraph are according to the most recent European Cluster Observatory data.

18 See Delgado M., M. Porter, S. Stern (2013), Clusters and entrepreneurship, Journal of Economic Geography, available at: http://joeg.oxfordjournals.org/content/early/2010/05/28/jeg.lbq010.abstract.

19 For Europe see Ketels, C., S. Protsiv (2013), Clusters and the New Growth Path for Europe, WWWforEurope Working Paper, WIFO, Vienna, for US see Delgado M., M. Porter, S. Stern (2014), Clusters, convergence, and economic performance, Research Policy. Available at: http://www.sciencedirect.com/science/article/pii/S0048733314001048. The work on economic complexity further highlights that prosperous regions have a richer set of strong clusters, and tend to be specialised in clusters that themselves have multiple linkages to other clusters. See Hausmann, R., C.A. Hidalgo, S. Bustos, M. Coscia, A. Simoes, M.A. Yildirim (2014) The Atlas of Economic Complexity: Mapping Paths to Prosperity. MIT, available at: https://atlas.media.mit.edu/atlas.

20 Neffke, F., M. Henning, R. Boschma (2011) How Do Regions Diversify over Time? Industry Relatedness and the Development of New Growth Paths in Regions, Economic Geography, available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1944-8287.2011.01121.x/abstract.

21 European Cluster Panorama (2014), European Commission: Brussels, available at http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/cluster-mapping/cluster-panorama/index_en.htm

22 Market failures are ultimately related to the numerous economic effects related to so-called externalities that exist in clusters. Experts refer to collective action problems (which can hinder the emergence of collaboration even if it would be mutually beneficial), externalities (which can lead to insufficient levels of investment in innovation activities subject to knowledge spill-overs), and externalities and path dependency (which can lead to insufficient levels of investment in activities that create future opportunities for the wider regional economy, which is a key issue in relation to the entrepreneurial discovery process in the smart specialisation process).

in any other industrial transformations that radically change business models and the organisation of value chains.

Many Member States have national/ regional policies and programmes in support of clusters. A survey of the European Cluster Observatory in 2008, for example, identified 69 national cluster programmes and 88 regional cluster programmes. Some countries have a long experience of 20 years in supporting cluster efforts, while others started only recently. Differences can also be seen in the amount of public financial support allocated to cluster policy and related programmes and initiatives. An updated survey carried out in 2015 by the European Cluster Observatory[23] identified 16 national cluster programmes in 15 EU countries, with other countries being in the process of revising their national cluster policies and programmes and a small number not having cluster policies as such in place at national level.

Some of the recent **evaluations of national cluster programmes**, for example, of the French Programme 'Competitiveness clusters' (*Pôles de compétitiveté*)[24] (2012) and the German 'Leading Edge Cluster Competition'[25] (2014) suggest that not only are clusters beneficial, but also that investment from cluster policy and public support for clusters pays off. The 2012 evaluation of the French national initiative 'Competitiveness clusters', implemented between 2006 and 2009[26] found, for example, that the 'Competitiveness clusters' initiative gave a significant boost to R&D investment (EUR 2.5 billion of public support saw almost 1 500 projects launched and generated more than EUR 6.5 billion of R&D expenditure), increased collaboration between industry and research considerably and benefited SMEs (as 80% of the 9 700 firms covered by the initiative were SMEs, which also received over 50 % of the funding allocated by the Competitiveness Cluster Fund). More than six out of ten firms created jobs thanks to the 'Competitiveness clusters' and 84 % maintained jobs. In addition, at least 1 000 patents and 200 start-ups were created.

The 2014 evaluation of the German 'Leading Edge Cluster Competition' also documented the positive effects of the cluster measure on the availability of resources and the improvements it led to in the quantity and quality of human capital in the selected clusters. The initiative also had a significant effect on the density and size of networks and led to increased cooperation between SMEs and large businesses. Slight positive effects on product and process innovation could also already be observed. The cluster measure was praised by the Expert Commission for Research and Innovation (EFI) in their 2015 report on Germany's research, innovation and technological performance.[27]

Both evaluations confirm that these two programmes are good examples of cluster programmes and that they provide various examples of best practice for cluster programme development and implementation. Policy-makers and programme agencies are increasingly focusing on using evaluations of cluster programmes as a way of to improve the effectiveness and efficiency of the support provided. More needs to be done though to share experiences and practices on how to structure an evaluation and what can be learned from it.

In parallel, **research and information on cluster initiatives and cluster organi–sations** is also being advanced. The inventory of cluster organisations at the European Cluster Collaboration Platform is being made more systematic in order to allow better matching. This platform is being strengthened in order to help implement forward-looking strategies and promote more European Strategic Cluster Partnerships, as a way of unlocking the growth potential by strengthening cross-regional collaboration and creating synergies in the implementation of smart specialisation strategies.

23 European Cluster Observatory (2015) Cluster programmes in Europe, available at http://ec.europa.eu/DocsRoom/documents/12925.
24 Erdyn/Technopolis/Bearing Point, 2012: Etude portant sur l'évaluation des Pôles de compétitiveté, available at http://competitivite.gouv.fr/documents/commun/Politique_des_poles/2eme_phase_2009-2011/evaluation/rapport-evaluation-2012-%20complet.pdf.
25 Rheinisch-Westfälisches Institut für Wirtschaftsforschung, 2014: Begleitende Evaluierung des Förderinstruments „Spitzencluster-Wettbewerb des BMBF, available at http://www.isg-institut.de/begleitende-evaluierung-des-foerderinstruments-spitzencluster-wettbewerb-des-bmbf/
26 Etude portant sur l'évaluation des Pôles de compétitivité, June 2012, http://competitivite.gouv.fr/documents/commun/Politique_des_poles/2eme_phase_2009-2011/evaluation/rapport-evaluation-2012-%20complet.pdf.
27 http://www.e-fi.de/fileadmin/Gutachten_2015/EFI_Gutachten_2015.pdf.

2.4.3 Learnings from the experience so far

Over the last decade, Europe has become a global leader in the use of cluster-based economic development tools. A large number of cluster initiatives have been created, supported by a wide range of government programmes.[28] Spending on these programmes has reached meaningful levels: a recent Swedish assessment, for example, found national annual spending on cluster initiatives to be in excess of EUR 50 million.[29] But the level of investment still remains low if compared with the overall spending in the respective policy fields (innovation, SMEs, etc.). Programme structures and operating models differ significantly between locations. Some focus on funding the administration of the cluster initiative and networking activities. Others concentrate on specific activities, for example channelling research and innovation funding through clusters or promoting internationalisation of SMEs, but require cluster initiatives to be set up as entities that are eligible for public support.

The overall experience with these programmes has been positive: Many individual evaluations find positive effects, and the vast majority of participants in these programmes, including firms, report having benefited from their involvement. There have also been an increasing number of studies demonstrating that firms taking part in such programmes are doing better on a range of performance indicators than are their peers that have decided to stay outside. A key benefit for regions has often been the strengthening of local linkages and social capital. Regions report that action at cluster level has helped them to become much better organised in terms of collaborative efforts, with cluster initiatives, for example, helping to strengthen links between research and businesses.

Box 4: Cluster programmes in Europe – moving towards supporting mature clusters and emerging industries

A recent benchmarking of cluster programmes in Europe revealed there to be a huge variety of cluster programmes in terms of design, strategies and instruments.[30] Common to all programmes is their focus on increasing the competitiveness of the national or regional economy, an overall objective of all cluster programmes from the very beginning. But, in recent years, a shift towards supporting mature clusters and developing emerging industries can be observed, in particular for national cluster programmes but increasingly also for regional cluster programmes. Another important recent change is the concentration of the different programmes on existing mature cluster organisations that should be further developed and used as a vehicle for cluster development. Only a limited number of programmes, mainly being implemented at regional level, support the creation of new cluster organisations. There is a huge difference between the programmes in terms of budget, but more interesting is that while cluster programmes still use grant funding to support cluster organisations, more and more programmes also include in their programmes a technical assistance component for training and coaching cluster organisations.

The variety of experiences reported with cluster initiatives and programmes show that, while clusters can be a powerful tool for regional development, SME support and industrial modernisation, they are not a magic solution. They cannot create attractive places to work, live and invest in without existing competences, or if the ingredients for a favourable business environment are lacking.

Clusters and cluster policies do not offer an instant solution that will work in all circumstances. There are examples of 'wishful-thinking' policies that tried to 'create' clusters without the presence of favourable framework conditions, existing capacities or critical assets in place to build on, and which have rarely led to success. Even if these ingredients are present and the policy is well targeted, successful

28 For an overview of many such programmes, see DASTI/VDI/VDE/BMWI (2012), Clusters are Individuals Vol. II, DASTI: Copenhagen, available at www.vdivde-it.de/publications/studies/clusters-are-individuals-2013-new-findings-from-the-european-cluster-management-and-cluster-program-benchmarking.

29 The Swedish Cluster Policy (in Swedish), Assessment for the Association of Swedish Industry (Svensk Näringsliv), Sweco: 2013, available at http://www.svensktnaringsliv.se/migration_catalog/den-svenska-klusterpolitiken-sweco_575050.html.

30 European Cluster Observatory (2015) Cluster Programmes in Europe (2015), available at http://ec.europa.eu/DocsRoom/documents/12925.

transformation through cluster policy cannot be achieved overnight. There needs to be recognition that it can take time – sometimes five or ten years – before good cluster policy shows its full effects, and it is usually after the end of an electoral period.

Good cluster policy requires strategic, consistent and concentrated efforts that are evidence-based and not constrained by vested interests. But when these conditions are met and the cluster policy focuses on promoting cross-sectoral collaboration and value-chain linkages, it can help industrial transformation processes and be an important tool for designing and implementing smart specialisation strategies.

Cluster policies still come in all shapes and sizes. As there is no one-size-fits-all cluster model and as 'best practice' doesn't exist, each region must find its own way to build competitive advantages based on its local strengths and assets combined with inspiration from global networks and trends.

Regional structural change and industrial transformation often only happens when actors are challenged and solutions are needed to solve particular problems. And, in fact, many regions already practice what others may consider impossible. The challenge is to reproduce these success stories and positive experiences as widely as possible and to make use of them to develop effective regional policies while taking all specific local and regional particularities into account.

At present, all EU regions have developed a first generation of smart specialisation strategies, in the context of European Cohesion Policy and the Innovation Union Flagship Initiative.[31] Cluster initiatives and organisations will play an important role in the governance of the continuous entrepreneurial discovery process and the implementation process. Given the climate of tight public resources, all regions are now under pressure to demonstrate the effectiveness of their investments in cluster programmes and projects and to have these embedded in well-developed and appropriately focused smart specialisation strategies.

Sharing experiences is therefore vital to avoid **common pitfalls for cluster initiatives and programmes**, such as the following:

- Cluster programmes at different levels of government (EU, macro-regional, national, regional, and local) are often **uncoordinated and pursued in parallel**. Cluster initiatives can provide a way of leveraging support from different parts of government as part of an integrated strategy. Instead, they too often get pulled in different directions by the priorities and operational requirements of different funders.
- Cluster programmes are often **disconnected from other, more traditional policies** that have similar objectives in terms of, e.g. making SMEs more competitive, internationalisation, innovation and entrepreneurship. Cluster initiatives can offer a more efficient means of organising and delivering these policies. Instead, they are too often created as another silo of government-funded activities operating in isolation.
- Cluster programmes are often **narrowly focused on networking**. Cluster initiatives can provide a unique platform for identifying and pursuing activities that are strategically critical for the competitiveness of the cluster. Instead, they are often focused on providing opportunities to meet without a transparent and funded structure to then pursue specific activities.
- Cluster programmes often **spread support too thinly**, with critical mass lacking in both the cluster and the activities. Cluster initiatives can help a location to focus on specific areas of strength or potential. The selection of this area needs, however, to be constantly reviewed and open to market feedback. Instead, there is too often a tendency to fund everyone with some nominal amount and avoid cutting of funding for those that do not generate meaningful traction. Moreover, poorly performing cluster initiatives often continue to be financed, although tough choices have to be made and it is important to decide whether to continue or to stop financing certain initiatives.

31 Innovation Union Flagship Initiative 2010, (http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication-brochure_en.pdf), see Annex on self-assessment of national innovation strategies: 'Design and implementation of research and innovation policies is steered at the highest political level and based on a multi-annual strategy. Policies and instruments are targeted at exploiting current or emerging national/regional strengths within an EU context ('smart specialisation')', p. 35.

- Cluster programmes have often **lacked the 'entrepreneurial discovery' aspect** of encouraging growth in related fields, a key aspect of the smart specialisation approach. Many were either focused on building on existing strengths or pursued new fields in which the respective region had little capacity to compete. While the former did work, these programmes risked creating a lock-in and did little to encourage necessary structural change. And while the latter type of programme did aim to achieve structural change, they did so in a way that was ineffective and driven by 'wishful thinking'.
- Cluster programmes were often designed with little regard for **the specific locational context** in which they were to be applied. This turned out to be particular problematic in regions at lower levels of economic development. These regions lacked the institutional capacity (both in government and in the private sector) required by programmes copied from more advanced regions. They would also have required a different set of activities, given the obstacles faced by their companies to becoming more competitive.

These observations provide a good basis for a set of principles defining how successful cluster programmes should be organised. The principles have also been inspired by the debate on smart specialisation:

- ***Where to focus funding:*** two categories of clusters stand out. First, all locations have a group of clusters in which they are relatively more specialised. These existing clusters tend to be major drivers of value creation already, even if their growth opportunities are perceived as limited. Cluster policies have a high likelihood of having a meaningful impact in these situations, affecting significant numbers of firms and other institutions.

  Second, all locations also need to look for new economic activities that can drive growth and over time become the core pillars of value creation. Which one of these will ultimately be successful is unknown, but it is dangerous to focus blindly on industries that are perceived as growing across all locations. Instead, the focus should be on those activities where general growth opportunities exist *and* the location can, due to its current activities, bring specific relevant assets and capabilities to bear, diversifying towards higher-value-added activities.

  'Strengthening the strengths' is the often-cited underlying principle of cluster policies and sometimes misunderstood as meaning that sectoral specialisations have to be chosen on which funding is to be concentrated. This view is too short sighted. Cluster policies should, in particular, identify and focus on exploiting the linkages between mutually reinforcing specialisation areas across sectors, addressing the competitive position in emerging and changing global value chains.

  In addition, the overall impact is only possible to achieve if bottlenecks in the wider regional ecosystem are addressed. In simple terms, cluster policy is like baking a cake. You need to look at the crucial ingredients and make sure to stock up on those that are missing. If you only have half the quantity of eggs needed, you can only bake half the cake.

- ***How to provide the funding***: the starting point is to shift the focus from individual firms in a single industry to groups of firms that offer potential for smart specialisation in a relevant set of related industries. This reduces market distortions, increases their leverage, and strengthens collaboration across the cluster while at the same time focusing on new combinations of activities that could form part of a cluster in the future. Funding should be provided for specific, in particular new and innovative, activities rather than for the management of the cluster initiative alone. Where cluster management is being funded, there should be a clear 'exit-strategy', in line with the EU state aid framework (see Box 3 below).

Where appropriate, cluster organisations should be used as channels for policy implementation, and should be integrated into the broader set of activities in that specific policy field, in particular when delivering smart specialisation strategies. The activities to be supported need to be specifically designed to meet the cluster's needs, not simply copied from elsewhere. Therefore, strategic cluster roadmaps need to be developed by the cluster partners.

Box 3: EU state aid rules and cluster support

Following an amendment of the EU state aid rules for aid measures by Member States in support of research, development and innovation in summer 2014, state aid for clusters is now covered under the General Block Exemption Regulation (GBER)[32]. The legal framework provides clear guidance for Member States for drafting their funding regulations for cluster support.

The EU 'Framework for State aid for research and development and innovation' (Commission Communication 2014/C 198/01) in Section 1.3(s) defines 'innovation clusters' as 'structures or organised groups of independent parties (such as innovative start-ups, small, medium and large enterprises, as well as research and knowledge dissemination organisations, non-for-profit organisations and other related economic actors) designed to stimulate innovative activity by promoting sharing of facilities and exchange of knowledge and expertise and by contributing effectively to knowledge transfer, networking, information dissemination and collaboration among the undertakings and other organisations in the cluster'.

Under the new framework, state aid for innovation clusters can be granted if its aim is to tackle market failures linked to coordination problems hampering the development of clusters or limiting the interaction and knowledge flow within clusters. State aid can either support investment in open and shared infrastructure for innovation clusters, or support the operation of clusters, so that collaboration, networking and learning is strengthened.[33]

- ***New approaches for making better use of the results of innovation in clusters:*** research-driven cluster initiatives were sometimes found to be less successful in commercialising their research and supporting the creation of new innovative companies. A lesson learned has been to better integrate research/innovation projects funded through the cluster initiative with market development activities and with customers and private or public users, especially via 'living labs'. More strategic interregional cluster cooperation that matches available solutions and demands also with actors from other clusters can further help in promoting commercialisation and accelerating innovation uptake. This should not be understood to relate only to radical innovation that is new to the world, but also covers value-chain innovation, where an existing innovation is brought to a new field of application and triggers change.
- **Aligning cluster programmes with the realities of a specific cluster and location**: clusters differ in their profile and needs, both across and within cluster categories, such as the automotive industry, medical devices or tourism. Locations, too, differ widely in their size, profile, and stage of economic development. While the general economic principles apply across all clusters and regions, how measures can be effectively implemented is highly dependent on the specific context.
- **Monitoring and evaluation is key:** for a successful cluster policy, it is essential to include periodic monitoring exercises and evaluations at various intervals and to plan these from the very start of the initiative. The limited nature of public funds means that it is important to monitor if the cluster policy is effective or not and to take corrective action based on the results of the evaluations. This monitoring is an

32 COMMISSION REGULATION (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty.

33 See also the clarifications on cluster organisations in section 2.1, notably Footnote 6.

instrument to formalise the commitments made in the implementation roadmap. Policy-makers have to make tough choices as to which competitiveness clusters to support, to continue supporting or even in certain cases to stop supporting.

These common mistakes and policy learnings have been brought together in the following simplified list of eight guiding principles (see Box 4) to be followed when taking action. The principles also draw on the discussions, stories and reflections from the recent GROW your REGIOn conference jointly organised by the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, and Directorate-General for Regional and Urban Policy (see Box 5).

Box 4: Do's and Don'ts of modern cluster policy

Don'ts	***Do's***
Support individual specialised firms	*Support new activities, in particular those being undertaken by groups or networks of related industries*
Create clusters from scratch (i.e. implementing 'wishful thinking' of policy-makers)	*Facilitate the growth of clusters by building upon existing strengths (i.e. implementing evidence-based policy by building upon a comparative analysis of regional strengths and 'entrepreneurial discovery')*
Fund large numbers of widely varied clusters	*Fund strategic cluster initiatives that focus on promoting the strengths, linkages and emerging competences and which are in line with the aims of national/regional smart specialisation strategies*
Follow growth trends without reflection	*Capitalise upon regional competences to diversify into new activity areas and to develop emerging industries*
Follow a narrow sectoral cluster approach	*Follow a systemic cluster approach focusing on related industries by capturing cross-sectoral linkages*
Develop and implement cluster policy in isolation from other policy areas	*Adopt an inclusive and participatory cluster approach (i.e. involving businesses, investors, academics and policy-makers, and making links with related policy themes such as R&D, innovation, entrepreneurship, access to finance, SME internationalisation etc.)*
Support cluster initiatives that are only inward looking	*Support cluster initiatives that have an international perspective on the positioning of the cluster in international value chains*
Focus exclusively on strengthening regional partnerships	*Build regional partnerships as a basis for joining European Strategic Cluster Partnerships*

Box 5: GROW your REGIOn conference – a joint approach to delivering smart specialisation and economic transformation through clusters

The European Commission's Directorate-General for Regional Policy (REGIO) and the Directorate-General for Internal Market, Industry, Entrepreneurship, and SMEs (GROW) have decided to work more closely together with the aim of mutually reinforcing smart specialisation strategies and cluster policies. At the recent joint GROW your REGIOn conference held on 27-28 April 2015, their representatives expressed the ambition to follow a joint approach, in order to help Member States and regions to make strategic use of clusters a means of implementing and further developing smart specialisation strategies.

The **GROW your REGIOn conference** in Brussels brought together regional policy-makers and businesses. The aim was to find solutions that would help boost growth through innovation, collaboration and the breaking down of sectoral and regional silos. More than 350 participants had the chance to share their experiences of cluster practices in their regions, learn about novel ways of implementing smart specialisation, and explore new cluster partnerships for joint activities. Discussions and deliberations confirmed the need to develop a new approach to cluster development, by means of policy and programmes. In connection with this, it was highlighted that greater participative involvement on the part of industry is needed for the design and implementation of smart specialisation strategies.

The main outcomes of these discussions were the following:

1. Clusters are essential, but to be effective they need the right framework of funding, commitment, and support for smart specialisation.
2. It is essential to move from an accidental to a systemic approach in order to help winners emerge. This requires thinking outside the box and creating an open space for cross-fertilisation to take place.
3. Building trust is critical for cooperation and involves focusing on strengths, adding value and connecting the right people.
4. Visualisation is needed to demonstrate a long-term vision by moving from the abstract to the concrete and from the past to the present to the future.
5. Smart specialisation needs to be broken down into concrete opportunities, as is reflected in the emphasis on niche and value-chain development. This involves a region identifying its own advantages, and becoming the starting point for internationalisation and strategic partnering efforts.

Four 'smart cluster stories' were told, which had been selected from 47 applications submitted in response to a call for expression of interest. The stories gave examples of how to achieve smart specialisation through cluster activities in innovative ways. A 'smart cluster world café' gave participants the opportunity to discuss the stories, considering them from different thematic perspectives, such as by identifying turning points, innovative steps, leadership and key people, challenges and opportunities, missing aspects, and transfer potential. Chapter 3.4 of this guide gives further details.

The conference, being organised by the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs and Directorate-General for Regional and Urban Policy, created further momentum for the development of an integrated approach to cluster development, smart specialisation and industrial modernisation. This resulted in the planned joint establishment of the Thematic Smart Specialisation Platform for industrial modernisation and investment and related European Strategic Cluster Partnerships for smart specialisation investments.

For further details on the conference, including the event video, see http://ec.europa.eu/regional_policy/index.cfm/en/conferences/grow_region/ and section 3.4.

3

Modern cluster policy in practice: tools for action

Cluster-based economic development is a comprehensive approach to directing government policies towards creating the foundations for growth and prosperity. The alignment between modern cluster policies and smart specialisation strategies will allow countries and regions to further sharpen their strategic focus in order to drive economic and industrial transformation and competitive advantage in their priority areas. Therefore, the policy approach needs to combine different instruments and tools and both ensure that the country or region is strategically positioned in international value chains and facilitate innovation-driven diversification and the development of future strengths.

Modern cluster policy includes a number of specific policy instruments, in particular the use of cluster initiatives, but takes a much broader perspective on how to design and implement ongoing policies in fields such as innovation, internationalisation, SME support, workforce development and attracting investment. A number of characteristics are particularly important:

First, the objective of economic development policies needs to be increasing competitiveness, where competitiveness is understood as the qualities of a location that enable firms to succeed in national and global markets while supporting a high standard of living for local communities. To achieve this objective, government policies need to focus on the two bases, productivity and innovation, as the key drivers that support both aspects of this ambition. Clusters are an important part of this underlying capability base. A short-term focus on, for example, lowering costs or job creation only, is not sustainable if it is not achieving this through higher productivity.

Second, each location has its unique set of economic opportunities and challenges. Policies need to be aligned with these local conditions, and they need to be delivered in ways that are consistent with the realities of the location. Learning from others is possible in terms of inspiration and at a narrow technical level. But locations need to set policies that work specifically for them. Clusters are an important element of understanding the local economic

base and can play a key role in identifying the entrepreneurial and innovation opportunities for a region and its potential to tap into new and emerging value chains.

Third, the modern economy is characterised by multiple linkages across economic activities. Effective economic development policies recognise and leverage these linkages. They overcome the inefficiencies of policies that rely only on cross-cutting measures affecting all businesses. And they avoid firm- and industry-specific interventions that create a high degree of distortion in markets and value chains. Clusters are a useful level at which to apply government action, because they capture the strongest linkages across industries, as have been revealed in the existing patterns of economic geography. The strongest level of competition exists within clusters and can be further increased by cluster-oriented policies.

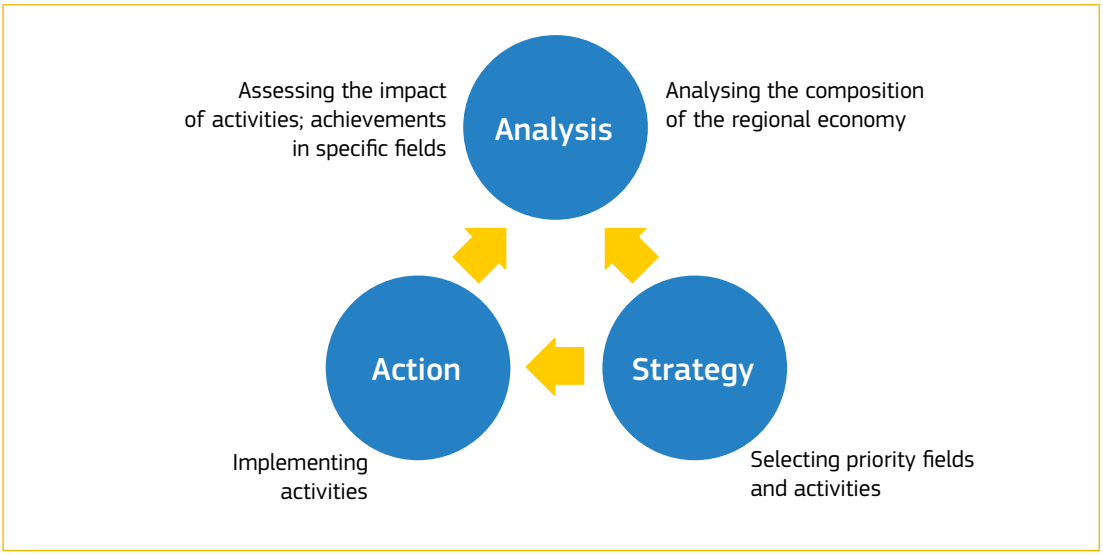
Fourth, modern economic development policies require both competition, and a true partnership and effective collaboration between the private and the public sector and the many relevant institutions that exist in both. The knowledge necessary to make appropriate choices about economic policy priorities is dispersed across these many actors, and collaboration is therefore key for having the full picture. Successful implementation requires the actions of many actors to be aligned, again driven by a dialogue and a common view of the area's objectives. Clusters are important focal points for the relevant public-private dialogue – it is at this level that interests are most aligned, and that the interdependence of choices is the strongest.

The remainder of this section discusses different tools and examples that policy-makers should consider when developing cluster policy and cluster programmes.

3.1 Clusters as a tool throughout the policy process

A cluster-based approach towards economic development uses clusters and cluster data at all stages of the policy process. As a simplification, this process can be described as a cycle (see Figure 1), moving from analysis to strategy to action and then back to analysis.[34] This section discusses the use of clusters within these three broad process steps.

Figure 1: Cluster policy cycle



34 The RIS3 Guide on Smart Specialisation (available at: http://s3platform.jrc.ec.europa.eu/ris3-guide) uses a similar structure, adding some more granularity and, in particular, a section on governance.

3.1.1 Analysis: understanding the regional potential for cluster development

Regional industrial and innovation policies that are to be aligned with the unique conditions in a specific location should be fact-driven. They have to be informed by the analysis of the local economy: its performance, its profiles, and its underlying capabilities and assets. This analysis provides the foundation for designing a strategy, i.e. the choice to be made as to the ambition and value proposition that the location aspires to pursue.

Cluster data play an important role in this analysis: First, cluster data give a useful insight into the relative **composition of the local economy**, differentiating groups of activities that are exposed to different competitive dynamics and subject to different sets of business environment conditions. Cluster mapping shows which areas a region has a competitive advantage in, compared to other areas. Instead of merely giving the size of sectors, which would, for example, show the automotive industry to be strong in many regions, cluster mapping shows the strength of the presence of an industry relative to other regional clusters.

At the broadest level, cluster mapping data differentiate between traded and local industries. With these two parts of a location's economy exposed to structurally different competitive dynamics and offering different types of economic returns, policy-makers can use this data to start fixing the direction of their policies.

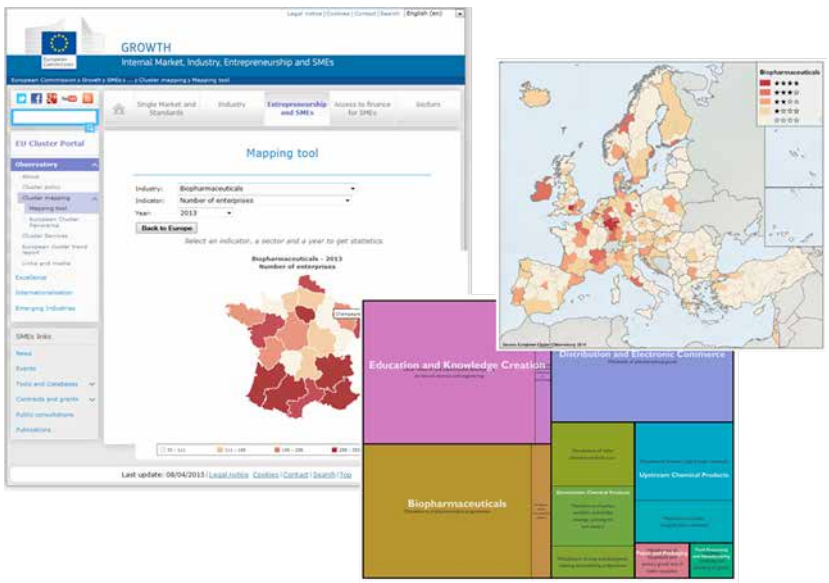
At a more narrow level, cluster mapping data reveal the specific specialisation pattern of a location. They quantify the overall share of traded vs local economic activity. This measure is driven by fundamental forces that drive economies along the process of economic development. It makes sense to compare a specific location's results on this measure with those of peers at a similar stage of prosperity. A low proportion of traded activity might indicate barriers to trade and investment, while a high proportion of traded activity could be related to barriers faced by local industries such as retail.

Cluster mapping, such as is provided by the European Cluster Observatory (see Figure 2), also identifies in which groups of related traded industries a location has a particular strength. The data show that different regions tend to specialise in their unique set of clusters; there are many different ways to generate prosperity. Locations can use this data to study more closely those clusters in which they are strong or growing. And they can identify potential rivals or partners with activities in the same clusters. The identification of appropriate partners to exploit complementarities in smart specialisation is of utmost importance in promoting the creation of European Strategic Cluster Partnerships to support internationalisation measures adopted jointly by cluster organisations and the joint implementation of smart specialisation investments.

For cluster development to be strategic, reviewing the cluster mapping of concentrations of economic activities is, however, not enough. This needs to be complemented by a review of the mapping of cluster organisations with whom to partner with, such as can be performed through the European Cluster Collaboration Platform,[35] and of the mapping of the political priorities set by regions in their smart specialisation strategies, such as can be obtained from the Eye@RIS3 tool of the Smart Specialisation Platform.[36]

35 www.clustercollaboration.eu.
36 http://s3platform.jrc.ec.europa.eu/eye-ris3.

Figure 2: Cluster mapping of the European Cluster Observatory



Second, data from cluster mapping (see Box 6 below) can provide insights into the foundations of a locations' competitiveness. The overall strength of the cluster portfolio, measured by the proportion of the local wage bill generated by employment in clusters that qualify as strong, given their relative size, has been shown in research to be an important factor determining competitiveness.[37]

If a location ranks low on this measure, this can prompt further analysis as to why the market has not been driven towards stronger specialisation. If specialisation levels are high, but performance is low, it may be appropriate to analyse more closely either the quality of the underlying business environment in these strong clusters or the level of collaboration and linkages that have emerged among their companies and other institutions.

A location's specific portfolio of strong clusters can also provide important hints as to the qualities of its business environment. Clusters differ in terms of which aspects of the business environment are most important to them, so the actual specialisation pattern provides insight on the qualities a location is likely to have. Many locations will have strengths in a group of related clusters that draw on a common set of such underlying qualities.

37 Ketels, Protsiv (2013), Clusters and the New Growth Path for Europe, WIFO: Vienna.

Box 6: Cluster mapping from the European Cluster Observatory

Cluster mapping is a key aspect of assessing clusters, as it provides rich fact-based analysis of local competitiveness and the concentration of economic activities. It is based on a sectoral and cross-sectoral statistical analysis of regional data for several key performance indicators. The cluster mapping provided by the European Cluster Observatory puts updated cluster data for Europe, based on the latest cluster definitions, into a broader context of other cluster- and location-specific data relevant for the competitiveness of the clusters.

The European Cluster Observatory's website offers a toolkit that draws on data for the following dimensions:

- specialisation and size measures, which form the core of the existing cluster mapping;
- performance measures based on wages, other productivity indicators and new business formation;
- the regional context, including both the general competitiveness landscape of a region and the presence of related clusters;
- collaboration, as represented by the presence and strength of cluster initiatives and regional social capital; and
- other structural factors such as the structure of firms in clusters.

The results of the cluster mapping will make a crucial contribution to helping decision-makers across Europe to make more effective use of cluster data when designing or reviewing their cluster policies for growth, using a strategy that sets priorities in areas with capacity related to that of existing areas of specialisation. The tool is available at http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/.

A comprehensive diagnosis of a location's competitiveness needs to combine an analysis of clusters with a broader analysis of economic performance, the quality of the business environment, institutional structures, and other aspects that have an impact on the regional economy. The cluster-specific information adds an important element to the analysis, and often increases its relevance to specific firms.

3.1.2 Strategy: setting priorities

When many locations compete for traded industries, locations need to think about which of these activities they want to focus on and what they aim to offer. When resources are limited, both in terms of funding, but often equally importantly in terms of leadership and organisational ability to implement actions, locations need to think about an agenda and roadmap for action that sets priorities. And when the impact of individual policies is dependent on efforts in other policy fields, locations need to think about an overall action plan to create effective 'packages'. All of these factors have led to an increasing interest in the notion of regional economic strategy.

In addition, the existence of 'smart specialisation' strategies has been made a formal requirement for regions to be eligible for EU Structural Funds.[38] Among the important new aspects of such strategies is the focus on setting 'vertical' priorities, i.e. identifying specific 'domains' or areas of activity in which a location has a specific strength or potential and which are likely to transform the existing economic structures through R&D and innovation, and on which the region has therefore decided to focus its economic development activities. It is particularly with respect to vertical priorities that clusters of related industries provide an important opportunity.

Clusters, or more specifically the portfolio of strong clusters a location has, can inform and communicate a location's **value proposition**. The focus on specific clusters implies the

38 Regulation (EU) No 1303/2013 of the European Parliament and of the Council laying down the common provisions and general provisions on the European Structural and Investment Funds.

presence of underlying business environment qualities that are directly relevant to specific companies. This is often much more effective than a traditional focus on generic business environment qualities such as a central location, being 'open for business', etc. Importantly, a strategy should not stop at identifying a set of clusters or cross-cluster domains in which a location is strong or aims to grow; it also needs to formulate what value it offers to companies in these industries. That is an aspect which is too often still missing from regional strategies.

Cluster data can inform the decisions to be made about where to set **vertical priorities**. Most straightforward is the identification of clusters that are currently strong. While these might have limited growth potential, their impact on current prosperity is often high. Policies in these areas will, by design, affect a large number of employees and firms, and there is significant evidence from research that cluster initiatives in such areas are much more likely to be successful than those in fields without current critical mass.

However, simply recycling existing cluster programmes and labelling them as a region's 'smart specialisation' will not do. Their potential and the potential of the companies and institutions that make up the cluster for effectively driving economic transformation in their specific area of activity through R&D and innovation must be confirmed by a process of entrepreneurial discovery (see below).

Also, both for mature and emerging industries, measures in new areas are needed to create opportunities for growth and structural change, something that is particularly important in economically less-developed regions. Here, cluster data can provide important insight into which areas provide the most promising opportunities for a given location.

Previous policies had often focused exclusively on identifying industries that were generally seen as high-growth markets. However, it turned out that many locations were in the past competing for the same new, narrow industries, and weaker regions have often wasted their resources in pursuing activities in which they had no particular competitive advantage.

The cluster approach uses data on the current presence of clusters in a specific location and on the linkages between clusters that were shown by the underlying research to have potential competitive advantage. The central hypothesis is that such 'relatedness' is in many cases a reflection of a competitive advantage in the business environment that provides benefits across clusters. The 2014 European Cluster Panorama[39] produced by the European Cluster Observatory identifies ten specific emerging industries, defined as groups of related clusters and narrow industries connected through some linkages and spill-overs. These definitions can inform locations when they set priorities for opportunities in new clusters to explore.

Further analysis can then compare in greater depth the specific needs of the industries and clusters identified relative to the qualities that the location's business environment offers. In many cases, the existing base offers a platform of initial advantage that needs to be further developed. This type of analysis can then also inform the more specific activities undertaken by target industries.

However, regional policy-makers need to realise that the cluster data can only identify a likely potential. Whether or not a location then manages to attract a significant presence of economic activity in the target industries depends on the market process. This has important implications for the role of 'vertical' priorities in a regional strategy. For emerging industries in particular, the operational priorities set need to be constantly tested against evidence of actual market performance. If industries show the ability to grow, more can be done. If they fail to generate success in the market place, government attention needs to be shifted.

Governments need to facilitate the 'entrepreneurial discovery process' that the smart specialisation framework envisages, in order that industries can explore, experiment with and discover new opportunities, and that the region and country overall can subsequently

39 European Cluster Observatory: European Cluster Panorama (2014), available at http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/cluster-mapping/cluster-panorama/index_en.htm.

become a 'fast follower' of the market signals generated by this process, thus accelerating the industrial transformation in these lead-industries by lifting barriers.

3.1.3 Action: translating strategy into action

A location's action agenda for implementing a regional growth strategy will include a mix of measures with some being cross-cutting and focused on improving the overall business environment and others being cluster-specific and focused on the competitiveness of a specific set of related industries in line with the smart specialisation approach. The latter can be achieved by organising government policies in specific areas around clusters or specific cross-sectoral/cross-cluster domains and through the mobilisation of cluster initiatives for designing and implementing national or regional smart specialisation strategies.

Actions of this type can play an important role in increasing the effectiveness of government policies. As discussed at the start of Section 3, clusters provide a better mix of focus and neutrality than either economy-wide or firm- or industry-specific measures. They differ importantly from the old instruments of industrial policy, which were also directed at specific industries or sectors. The key conceptual test for the appropriateness of any government action that forms part of a cluster-based economic development agenda is its impact on productivity and innovation through smart specialisation. Old-style industrial policies were instead focused on creating scale by making it more profitable for private companies to be active in specific industries. Very often, however, profits were a reflection of market power, not of higher productivity.[40]

Modern cluster policies will focus on areas that have the potential to trigger growth by facilitating cross-sectoral fertilisation and by adding value by bringing together the actions of different actors in the value chain in order to provide new solutions to transformation challenges.

State aid rules play an important role in this context. While they are sometimes seen as restrictive, their focus on avoiding market distortions can be important for ensuring discipline: Selective funding should not be exempt from state aid rules for the sole reason that it is motivated by the ambition to develop a cluster. There should, however, be a careful consideration of cluster programmes' impact on productivity and innovation, and thus ultimately on the nature of rivalry in a specific market. The European Union state aid regulations allow and set certain limits for aid to clusters. See, for example, the General Block Exemption Regulation (Commission Regulation (EU) No 651/2014): 'Aid for innovation clusters aims at tackling market failures linked with coordination problems hampering the development of clusters, or limiting the interactions and knowledge flows within clusters. State aid can either support investment in open and shared infrastructures for innovation clusters, or support the operation of clusters, so that collaboration, networking and learning is enhanced. Operating aid for innovation clusters should, however, only be allowed on a temporary basis for a limited period not exceeding 10 years. The ratio of the total amount of aid granted to the total eligible costs should not exceed 50 % during the period over which the aid is granted.'

40 On the related discussion of the new industrial policy, see Ken Warwick (2013), Beyond Industrial Policy, OECD: Paris.

Box 7: Designing cluster efforts that fit a place

Designing cluster efforts that fit a place

This report outlines some general principles on how to organise cluster-based economic development. Their practical implementation will, however, always need to reflect the specific conditions in the location and the cluster at which the measures are directed. The key idea is that a best practice for one region and cluster is not necessarily a best practice for another region and cluster – sometimes a difficult concept to grasp for European institutions that have achieved many successes through standardisation and benchmarking.

In terms of the location-specific context, the size and the stage of economic development of the area are key aspects to consider. A small country such as Estonia is not well served by the same number of distinct cluster-oriented policies that a large country like Germany uses. In contrast to the cluster programme in Bulgaria or a part of Romania, the Danish cluster programme will have to address very different aspects of improving competitiveness on the one hand, and, on the other hand, will be able to rely on a very different set of private and public institutions and behaviours.

In terms of a cluster-specific context, the maturity of the cluster and the specific character of each cluster category matter. In mature clusters, policies can achieve and demand more. There is a greater benefit to be gained from stable longer-term commitment and an opportunity to make larger investments that pay off. This is the logic behind some of the longer-term programmes such as Vinnvaxt in Sweden. In emerging clusters, there is more of a need to experiment, which requires greater openness to different and incomplete structures, shorter evaluation cycles with clear exits, and less funding for any one single initiative.

3.1.3.1 Organising policies around clusters

Existing government policies can, in many cases, be made significantly more effective by organising them around smart specialisation strategies and clusters. In policy areas such as innovation, internationalisation, workforce skills development and investment attraction, clusters can provide the right focus and leverage to achieve results. This is particularly true for working with SMEs, where their large number makes it difficult to reach them effectively. SMEs connected to specific clusters provide a meaningful and approachable segment that governments can address.

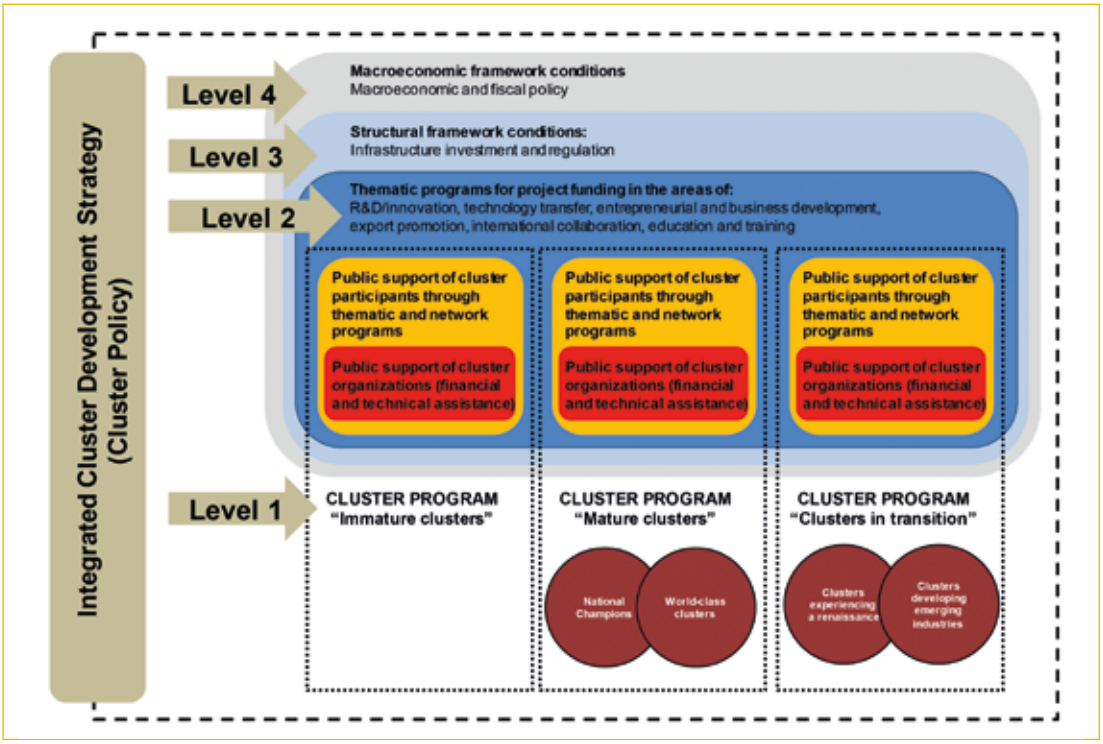
If locations have decided to set certain vertical priorities, such as for particular areas of smart specialisation, this should inform the selection of clusters around which specific policies are structured. Governments have different means to strengthen a cluster: they can invest in improving a cluster-specific dimension of the business environment, they can attract specific companies or activities to a cluster, or they can make eligibility for funding in existing programmes subject to companies and academic institutions being part of specific industries or clusters. These measures should be aligned with the implementation roadmap for the cluster, which will have been fully endorsed by the entrepreneurial discovery process and private sector commitments.

An important issue to keep in mind is therefore the integration of cluster-based measures in a certain policy area into the overall set of programmes and tools that have similar objectives. This has proved to be an operational challenge. Cluster programmes are often run by specific units or agencies, while other activities in the same policy field are run by separate parts of the government.

In order to respond to these challenges, a group of cluster policy-makers and cluster programme owners gathered in 2012 to share their thoughts and experiences. They suggested integrating all ‘cluster-relevant’ policies and programmes into a cluster strategy that

would be developed and implemented jointly by the relevant government departments and agencies.[41] One key element of this proposed strategic approach is that it argues for differentiated support to clusters depending on their level of development (see Figure 3 below).

Figure 3: Integrated cluster development strategy



Source: Christensen/Lämmer-Gamp/Meier zu Köcker, 2012: Let's Make a Perfect Cluster Policy and Cluster Programme. Smart Recommendations for Policy Makers, Berlin/Copenhagen, p. 19.

3.1.3.2 Providing better SME support through cluster organisations and their services

Cluster organisations are organisational platforms set up to increase the competitiveness of a specific cluster.[42] They facilitate collective action within the cluster and provide a way to tap into the tools that government provides at different levels for the cluster. Different organisational structures have emerged to play this role:

- Some countries have created quasi-private cluster organisations in the public sector (the Austrian model). These organisations provide firms in the cluster with 'one-stop' access to all relevant government programmes, and are reliant for their funding on their ability to mobilise private sector activities that provide co-funding.
- Other countries support cluster initiatives in the private sector directly through financial support for a 'cluster secretariat' (the Scandinavian model). The main task of such cluster secretariat or cluster organisation tends to be networking and strengthening linkages within the cluster. Quite often, there are then other programmes that provide funding for specific activities. These programmes differ in terms of whether they are exclusively open to cluster organisations or whether they are open to all organisations, with applications from cluster organisations receiving preferential treatment.
- A third alternative is to make funding for specific actions contingent on the existence of an organisational structure for collaboration in the cluster, with a small

41 Christensen/Lämmer-Gamp/Meier zu Köcker, 2012: Let's make a perfect cluster policy and cluster programme. Smart recommendations for policy-makers, Berlin/Copenhagen, available at http://www.cluster-analysis.org/downloads/Clusters_web_singlepage_06092012.pdf.

42 See more in the Cluster Initiative Greenbook 2.0, available at www.hhs.se/contentassets/f51b706e1d644e9fa6c4d232abd09e63/greenbooksep03.pdf.

proportion of the funding potentially being allocated to coordination (the German and French model in their national programmes). The main objective of these programmes is related to the policy field in which they provide funding, often innovation.

All three of the approaches set out above are feasible approaches to explore. There is no simple ranking among them. They all have their relative strengths and relative weaknesses. Central to the choice of approach is often a trade-off between control and potential impact – more government control tends to lead to more certain, but also much more limited results. Locations need to select the model that best manages this trade-off given the realities of the local economic environment and its clusters (see Box 7: Designing cluster efforts that fit a place). Locations then need to make sure they implement the model consistently, whatever their choice has been.

A new requirement will be the consistency of these cluster policies with the policy framework for developing and supporting the design and implementation of smart specialisation strategies. Some regions are already reviewing their cluster policy in respect of this requirement.[43]

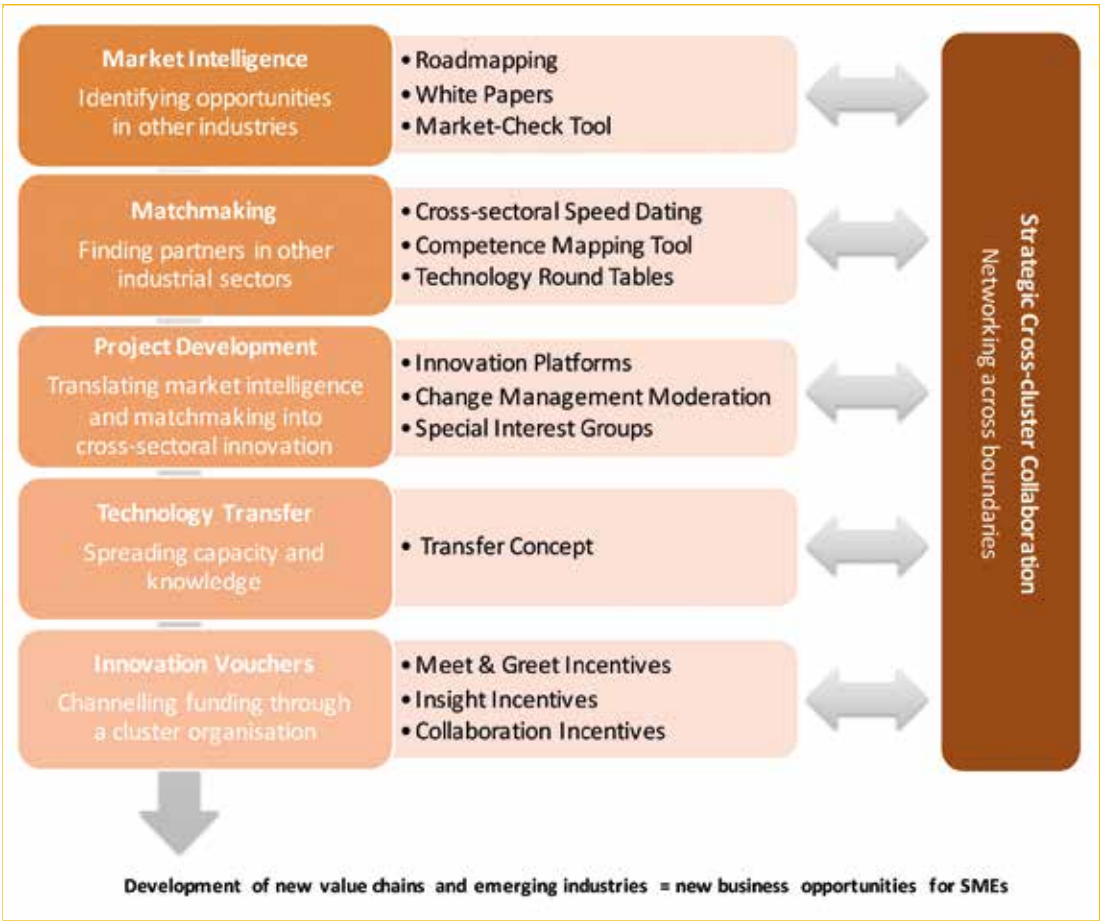
Independently of these developments, cluster organisations are a key instrument for supporting SMEs in tackling industrial transformation and helping emerging industries to develop. The nature of innovations and how they emerge is continuously changing. Cluster organisations can play a decisive role in the development of new industrial value chains. Cluster participants, such as SMEs, can capitalise on cluster services, with a view to remaining competitive in emerging industries or successfully entering new global value chains. Cluster services focusing on cross-sectoral issues can be of even greater importance, as innovations mainly happen at the borders of these industrial sectors.

Analysis of cluster services has identified a number of promising services that are offered by cluster organisations to promote cross-sectoral collaboration and internationalisation. The European Cluster Observatory has published a report that provides further details on these services (Figure 44).[44]

43 See 'Research and Innovation Strategy for the Smart Specialisation of Catalonia (RIS3CAT)' on 'RIS3CAT Communities' in the leading sectors, in http://catalunya2020.gencat.cat/web/.content/85_catalunya_2020/documents/angles/arxius/07_ris3cat_2014_en.pdf.

44 The report 'Cluster Collaboration and Business Support Tools to Facilitate Entrepreneurship, Cross-sectoral Collaboration and Growth' is available at the website of the European Cluster Observatory: http://ec.europa.eu/growth/smes/cluster/observatory/cluster-mapping-services/services/index_en.htm.

Figure 4: Service portfolio for the promotion of cross-sectoral collaboration



There is no doubt that services are a cluster organisation's key instrument for facilitating collaboration between cluster participants and across cluster initiatives. Through their tools and instruments, cluster organisations can trigger a certain behaviour among companies, research institutions, universities and other cluster stakeholders, which does not only have an effect on the individual cluster actors, but also on the cluster in its entirety.

Results of the pan-European cluster benchmarking programme 'NGPExcellence – Cluster Excellence in the Nordic Countries, Germany and Poland' in 2010-2011 have demonstrated that there is a causal relationship between certain services of a cluster organisation and the R&D and business activities undertaken by SMEs.[45] There are key impact-relevant services that should be offered by all cluster organisations to support the activities being carried out by cluster participants. It is not about an 'either/or' of services, but about offering integrated services for commercialising R&D results, and thus triggering innovation-based economic growth. Cluster management organisations that provide integrated services in this way typically pursue a strategy that addresses the support needs of the cluster participants.[46]

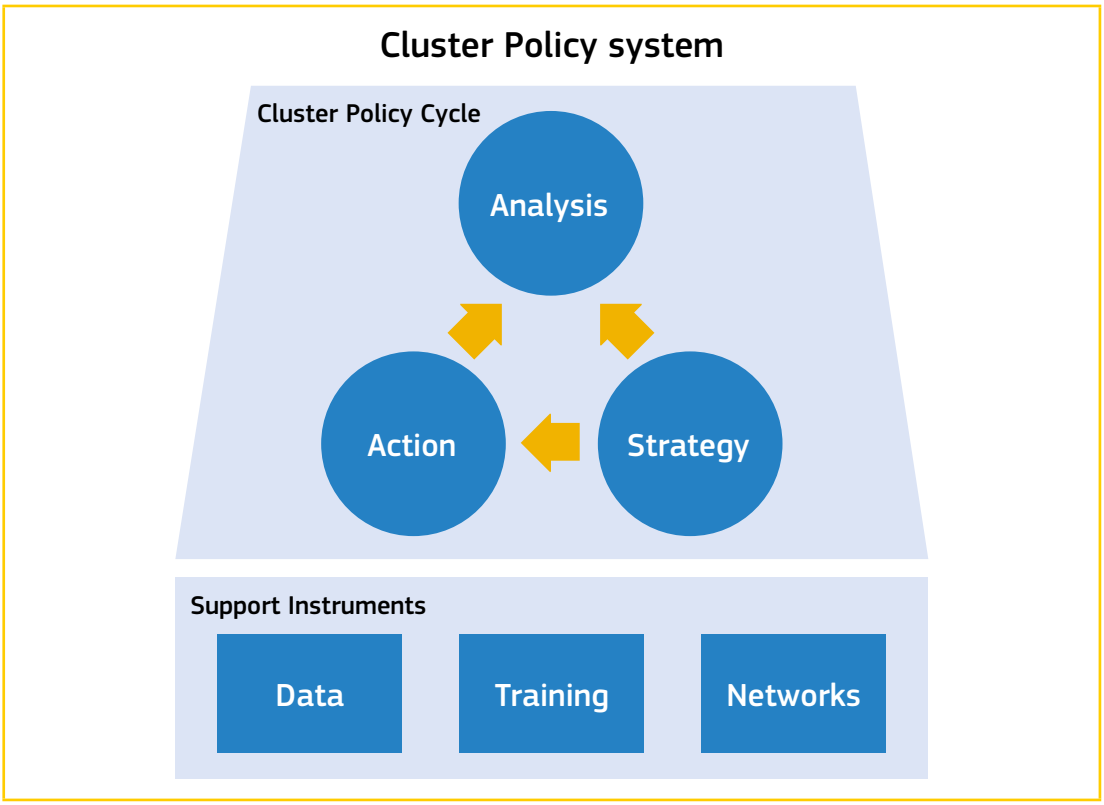
45 Christensen, Thomas Alslev/Lämmer-Gamp, Thomas/Meier zu Köcker, Gerd, 2012: Let's make a perfect cluster policy and cluster programme. Smart recommendations for policy makers, Berlin/Copenhagen, pp. 32-34.

46 For further details on the relevance of strategy for the successful work of a cluster organisation, please see the above-mentioned report 'Cluster Collaboration and Business Support Tools to Facilitate Entrepreneurship, Cross-sectoral Collaboration and Growth', pp. 4-7, available at: http://ec.europa.eu/DocsRoom/documents/9972/attachments/1/translations/en/renditions/native.

3.2 Instruments to support cluster policies and programmes

Effective cluster policies require a support infrastructure to facilitate the cycle of analysis, strategy and action just discussed. In order to fully implement the new strategic orientation of cluster policies as instrument of economic transformation and smart specialisation strategies, further capacity-building will be necessary, including through the Cluster Excellence Programme implemented at EU level under the COSME programme. This section presents some of the key elements that have emerged, focusing on those that can improve the quality of cluster management and provide platforms for learning and collaboration across clusters and regions. The provision of comparable region- and cluster-specific data by the European Cluster Observatory portal was already discussed in the previous section.

Figure 5: Support instruments



3.2.1 Promoting excellent cluster management through cluster benchmarking and training

Excellent cluster management means that a cluster organisation delivers targeted services to the different cluster participants in an effective and efficient way. What sounds simple is in practice much more complicated: a large network containing a huge variety of companies, universities, research institutions and public entities, each having their own interests, needs to be coordinated to reach a common strategic goal for the development of the cluster. This can only be done by a professionally managed organisation.

The Cluster Labelling Scheme developed by the EU-supported **European Cluster Excellence Initiative (ECEI)**[47] provides support for the development of such an organisation. Today, different Member States use the cluster

47 More details can be found at www.clusterexcellence.eu.

management quality-labelling scheme that is implemented by the **European Secretariat for Cluster Analysis.**[48] With Bronze, Silver and Gold there are three different levels of 'cluster management quality'. The assessment of a cluster organisation is carried out by independent cluster experts who have attended special training. There are about 100 experts from nearly all Member States who can carry out the assessments. Over 800 cluster organisations from 40 countries have so far carried out a benchmarking exercise and gone through an assessment. The scheme can be used by policy-makers and programme owners in two ways:

- First, by encouraging cluster management organisations to participate in the scheme (e.g. by providing financial support for the assessment procedure), they can assist cluster organisations in their efforts to develop more efficient and effective institutional structures, processes and services.
- Second, as the label scheme reflects different levels of cluster management excellence, it provides guidance for decisions as to which cluster should be supported by cluster programmes.

Several countries throughout Europe have made this labelling an integral part of their cluster programmes. In Denmark, the national cluster strategy even sets reaching a specific number of labelled cluster organisations as a strategic policy target.[49] At regional level, the government of the federal state Baden-Württemberg serves as an example for the integration of labelling schemes into the regional cluster.[50]

In future, the European Commission intends to support further refinements of this labelling mechanism in order to improve the capacities for international strategy development and partnering in cluster organisations.

The **European Foundation for Cluster Excellence**[51] is a non-profit organisation that promotes excellence in all aspects of cluster-based economic development. It aims to ensure excellence in policy and practice by providing a common platform for professional development, bringing together the best practice and knowledge based on the European approach and experience in cluster development.

The Foundation offers a range of management training programmes based on the methodology developed under the European Commission's European Cluster Excellence Initiative (ECEI). These range from *Competitiveness Schools*, a short introductory programme, run jointly with leading business schools and aimed at senior national, regional and city policy actors, to *Essence of Cluster Excellence Management*, a modular introductory course for cluster policy and management professionals. The flagship *Cluster Excellence Gold Manager* training programme is the most comprehensive training, aimed specifically at cluster-based economic development professionals. Over a six-month period, this programme provides participants with an opportunity to develop cluster growth initiatives in their home regions while following the course.

The European Union actively supports the use of these instruments through its programme Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME).[52] The programme, which is running from 2014 to 2020 with a planned budget of EUR2.3 billion, aims to promote cluster excellence across the EU, for the benefit of European SMEs involved in clusters. A first call for proposals was launched in summer 2014, and a second in February 2016 aimed to strengthen cluster management excellence in the EU as a way of providing more professional business services to European SMEs through clusters, and therefore to contribute to the development of more world-class clusters in Europe.

3.2.2 Collaboration across regional and national boundaries – some examples

Collaboration across regional and national boundaries has proven to be an important means of improving both the effectiveness and efficiency of cluster policies and programmes. Strategic partnerships of this

48 More details can be found at www.cluster-analysis.org.
49 Ministry of Higher Education and Science, 2013: Strategy for Denmark's Cluster Policy, p. 11. Available at http://ufm.dk/en/publications/2013/files-2013/cluster-policy.pdf.
50 For further details, please see http://www.clusterportal-bw.de/en/cluster-policy/cluster-excellence-baden-wuerttemberg/.
51 More details can be found at www.clusterexcellence.org.
52 More details can be found at http://ec.europa.eu/growth/smes/cosme/.

kind are particularly important for the design and implementation of smart specialisation strategies given the need to avoid overlap and competition for the same resources while strengthening and complementing national or regional clusters, allowing greater critical mass to be developed, scaling up regional initiatives into Europe-wide value chains and working towards creating new joint value chains, in particular in emerging areas. These interregional collaborations are the embodiment of the use of smart specialisation as a decentralised coordination principle at the level of the Innovation Union, using the European single market for research and innovation to scale-up fragmented industrial cluster initiatives.

Some examples of recently concluded and ongoing initiatives illustrate the potential of cross-border collaboration:

CLUSTRAT – boosting innovation through new cluster concepts designed to support emerging industries and promote cross-sectoral themes

Financed under the Interreg Programme for Central Europe, the project CLUSTRAT[53] aimed to develop new cluster concepts that promote cross-fertilisation between industries, technologies and services and support the implementation of key enabling technologies. The transnational consortium of 18 partners from Austria, the Czech Republic, Germany, Hungary, Italy, Poland, Slovakia and Slovenia developed a joint strategy on new cluster concepts, with a view to supporting emerging industries and promoting cross-cutting themes in central Europe. The project created a huge number of different results that provide inspiration for cluster development across Europe. Results include, *inter alia*, proposals for joint actions at transnational or macro-regional level, pilot actions, manuals for the implementation of pilot actions and individual reports for the participating countries that summarise the most important project experiences and results for each country. The results are relevant to many other countries in Europe and therefore provide inspiration for both cluster policy-makers and cluster practitioners.

The Vanguard Initiative for New Growth through Smart Specialisation

Launched in November 2013, and progressively gathering together governments from 26 European regions, the Vanguard Initiative is a powerful regional network of policy leaders and ministries. The 'Vanguard Initiative for New Growth by Smart Specialisation'[54] seeks to influence the European policy agenda for growth and jobs, in particular as concerns innovation and industrial policy. Its members advocate the role of regions in giving the bottom-up dynamics of entrepreneurship and innovation in clusters a bigger role in European policies, using smart specialisation as a coordination principle in strategic European priority domains. They want to lead by example by aligning their smart specialisation actions with the objective of stimulating joint investment in the exploitation of entrepreneurial opportunities, in the following ways:

- Matching strategic roadmaps for regional, national and European policy levels, in order to support European priority areas for the future of industry. Vanguard regions are committed to developing joint roadmaps based on entrepreneurial interregional networks created to build critical mass and complementary specialisations in these emerging industries.
- Aligning the strategic investments resulting from these roadmaps in order to open new industrial pathways via projects with European added value, such as demonstrations and pilots in the European priority areas, while not duplicating existing networks. Vanguard regions are committed to aligning their resources with European investment in these focus areas.
- Transforming regional partnerships and clusters with global potential, which have been identified in smart specialisation strategies, into European world-class clusters that can compete globally. Vanguard regions are committed to internationalising their

53 More information is available at www.clustrat.eu.
54 www.s3vanguardinitiative.eu.

cluster initiatives in cross-border and networked European clusters and partnerships by upscaling their activities in areas identified as those where complementarities can be exploited.

The Vanguard Initiative has so far launched three pilot projects (namely efficient and sustainable manufacturing, energy technology applications for harsh environments, and 3D printing), which have involved extensive mapping of value chains in order to narrow down the areas of cooperation that could potentially be suitable for industry involvement. Other pilots in the fields of nanotechnology and the bio-economy are currently being explored. The aim is to have between six and ten collaborative, funded projects under way during 2015-2016.

Peer reviewing regional cluster policies designed to support the development of emerging industries: the example of the Poly4EmI – Polymers for Emerging Industries

The Slovenian project consortium – consisting of the Slovenian Ministry of Education, Science and Sport, the Centre of Excellence for Polymer Materials and Technologies, Slovenia's automotive cluster (GIZ ACS), Slovenia's Chamber of Commerce and Industry (GZS) and the Polymer Competence Centre Leoben GmbH – is funded under the EU's Competitiveness and Innovation Framework Programme and aims to develop a joint platform of regional clusters in order to promote new business-based solutions that are based on the use and transformative power of advanced polymer materials and technologies. In order to learn from other more advanced regions, the project partners organised a policy peer review process with counterparts from the regions of Lower Austria, Flanders in Belgium and Bavaria and Saxony-Anhalt in Germany. All these regions have already successfully started to develop similar industries based on a cluster approach. The exercise identified good practice in each region and resulted in the development of a 'perfect systemic strategy' for the development of bio-based industries.[55]

3.2.3 Supporting the internationalisation of clusters and value-chain linkages: European Cluster Collaboration Platform and European Strategic Cluster Partnerships

As a core element of the EU's support of cluster internationalisation, the **European Cluster Collaboration Platform (ECCP)**[56] facilitates cluster cooperation within the EU and helps clusters access international markets. This allows European cluster organisations to present themselves, exchange experience and search for potential partners for transnational cooperation. The ECCP organises **International Cluster Matchmaking Events** to provide cooperation opportunities for European cluster organisations with partners within and beyond Europe. The matchmaking events can be organised in non-EU markets as well as in Europe, with the aim of bringing together delegations of cluster representatives from Europe and from non-EU countries to promote business opportunities and set up partnerships in strategic fields of mutual interest. Events may also be organised in Europe with European cluster representatives active in different sectors with a view to promoting cross-sectoral cooperation and contributing to the emergence of new value chains in Europe.

European Strategic Cluster Partnerships for going international (ESCP-4I)[57] are supported at EU level by the COSME programme (the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (SMEs)).[58] Its aim is to lead international cluster cooperation in new areas, notably in support of emerging industries. These partnerships encourage clusters from Europe to work together to exploit synergies and develop a joint 'European' strategic vision with a global perspective and common goals

55 www.poly4emi.eu/News/ID/3/Poly4EmI-policy-learning-Arena-launched-September-2014.
56 More details can be found at www.clustercollaboration.eu.
57 As part of the Cluster Internationalisation Programme, European Strategic Cluster Partnerships (ESCP) receive help in developing and implementing joint strategies vis-à-vis non-EU countries. Following a call for expressions of interest, 13 partnerships were selected, which did not receive any funding, and 6 pilot projects were funded. Following a first call for proposals under the COSME programme in 2015, for which 77 applications were received, 15 partnerships were selected to receive funding to support either their preparatory or implementation phase. Another 9 to 12 strong proposals will be allowed to use the ESCP label, but not receive funding. In total, an expected EUR 19 million is available under COSME for this type of actions until 2020. For more information, see www.clustercollaboration.eu/news/eu-commission-launches-24-european-strategic-cluster-partnerships-go-international.
58 More details can be found at https://ec.europa.eu/easme/en/cos-cluster-2014-3-03-cluster-go-international.

with respect to specific non-EU markets. These partnerships will contribute to better supporting European SMEs in global competition in strategic fields.

Further efforts will be launched to promote a similar set up of European Strategic Cluster Partnerships for smart specialisation investments (ESCP-S3), designed to facilitate new collaborations and innovation activities amongst their cluster firms, in particular SMEs, in order to boost investments related to smart specialisation priorities within the EU. A first call for the expression of interest has been launched in May 2016[59] in order to mobilise Cluster Partnerships in parallel to the mobilisation of lead regions under the Thematic Smart Specialisation Platform for industrial modernisation and investment that will be set up jointly by the European Commission's Directorate-General for Regional Policy and the Directorate-General for Internal Market, Industry, Entrepreneurship, and SMEs in June 2016.

Particular attention will be given to mobilising European Strategic Cluster Partnerships among the applicants from the '**Cluster facilitated projects for new industrial value chains**' call for proposals (INNOSUP-1), organised under Horizon 2020, the European Commission's research and innovation funding programme. A total of around EUR 130 million is expected to be available until 2020 to support value-chain innovation undertaken by groups of SMEs. This will be done by promoting cross-regional and cross-sectoral collaboration and making better use of clusters. Applicants are expected to contribute to the implementation of regional smart specialisation strategies and leverage public and or private funding from the European Structural Investment Fund or other public or private investment in support of innovation in SMEs.[60]

3.2.4 Data and knowledge platforms

Cluster policy-makers and cluster managers have several platforms and services at their disposal that offer them data and information in support of a more evidence-based approach to cluster development. Such platforms can be found at regional, national and European/international level. In many cases they provide a knowledge centre function related to clusters, cluster policy and cluster management, for example, by organising courses, seminars and workshops. Support in terms of statistical information, analytics and data is less often a feature and is often delivered in the framework of studies, assessments or specific inquiries commissioned by policy-makers. Below, some of the platforms are listed with a description of the services they offer:

3.2.4.1 National/regional level:

Danish NetMatch is a platform that supports Danish innovation clusters and networks. It implements the national programme 'Cluster Excellence Denmark'. The objective of NetMatch is to provide a number of services such as competence development, internationalisation, branding and networking. This is done by organising seminars, workshops, study visits and information events about international markets. The Cluster Excellence Denmark initiative will support the creation of 'Cluster Labs', where cluster organisations will be able to develop and test new cluster support tools and methods (http://www.netmatch.nu/english.html; http://www.clusterexcellencedenmark.dk).

France Clusters aims to bring together the cluster organisations in France in order to create synergies between its members and promote the exchange of experiences. France Clusters is designed to be a knowledge centre that will encourage innovation and collaboration among its members and contribute to the competitiveness of businesses (http://www.franceclusters.fr/actualite/list/type/france-clusters).

UK Knowledge Transfer Networks: '_connect' is an initiative from the UK's Technology Strategy Board. Its aim is to make open innovation happen through the operation of knowledge transfer networks. '_connect' is primarily an online collaboration tool that offers a virtual platform for businesses, researchers, and other support organisations to develop new projects. Through the platform, businesses

59 http://www.clustercollaboration.eu/news/call-expression-interest-towards-european-strategic-cluster-partnerships

60 The first INNOSUP-1 call in 2015 received 119 proposals at the first stage (requesting a total of EUR 590 million of EU funding), from which 45 full proposals were submitted from the pre-selected applicants (requesting a total of EUR 201 million of EU funding). With the available funding of EUR 24.9 million in 2015, only about five innovation action projects will actually be funded. The available funding for 2016 and 2017 will be EUR 15 million and EUR 18.5 million respectively. For more information, please see https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/6084-innosup-01-2016-2017.html.

can also keep up-to-date with the latest news and technologies relating to a vast array of specialisms from a large range of areas. The website currently has over 90 000 active user profiles and is home to the Knowledge Transfer Network and a wide range of other special interest and networking groups (https://connect.innovateuk.org/knowledge-transfer-networks).

Cambridge Cluster Map is a free-to-access online service created by a consortium led by Cambridge University. The cluster map uses visualisations, reports and directories to paint a vivid picture of the business community that has grown up over the past 40 years. Detailed revenue data enables businesses anywhere in the world to identify fast-rising companies as suppliers or partners. The platform's integration with LinkedIn allows each individual user to discover contacts in Cambridge. Reporting on rates of employee growth helps talented applicants to identify the companies that are taking on new staff at the fastest rate. Cambridge Cluster Map demonstrates how 'big data' techniques can be used to provide sophisticated insight for an entire business community (http://www.camclustermap.com/).

In terms of gathering and analysing industry data, other national and regional authorities have commissioned studies to explore specific aspects of cluster development and cluster trends. Some examples are listed below:

- The Walloon Government commissioned a study on clusters and global value chains in 2013 that collected and analysed industry data and input-output data. The study is available here: http://economie.wallonie.be/content/etude-sur-les-relations-inter-industrielles-en-wallonie-et-le-positionnement-de-la-wallonie.
- A mapping of the Nordic medtech clusters was commissioned by the Swedish Norwegian Cluster Cooperation in 2013. The Swedish Norwegian Cluster Cooperation is financed by Vinnova, Tillväxtverket, and Innovasjon Norge. The study is available here: http://menon.no/a/a-mapping-of-nordic-medtech-clusters-and-financing-a-special-focus-on-norway-and-sweden.
- Orkestra-Basque Institute of Competitiveness is a centre for analysis on territorial competitiveness and it provides research and data, including on cluster policy, to support the Basque Government and the Basque Country cluster associations: http://www.orkestra.deusto.es.

3.2.4.2 European/international level:

European Cluster Observatory: the European Cluster Observatory is a single access point for statistical information, analysis and mapping of clusters and cluster policy in Europe and is primarily aimed at European, national, regional and local policy-makers, cluster managers and representatives of SME intermediaries. It is an initiative of the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (http://ec.europa.eu/growth/smes/cluster/observatory/).

European Enterprise Network: the European Enterprise Network is a key instrument in the EU's strategy to boost growth and jobs. Bringing together around 600 business support organisations from more than 50 countries, it is an important partner for cluster organisations wishing to develop business opportunities in the EU single market, but also for the promotion of SME internationalisation on the global market (http://een.ec.europa.eu/about/about).

KETs Technology Infrastructures: launched by the European Commission in 2014, the platform aims to stimulate innovation in SMEs by identifying the existing KETs Infrastructures across Europe, improving their collaboration and supporting the access of SMEs to the services offered by these infrastructures. The project focuses on the pan-European dimension and on building an inventory of KETs service centres and their specificities. A gap analysis has been performed to analyse the potential mismatch between the demand and the type of equipment, services and training provided by KETs Technology infrastructures at European level (https://ec.europa.eu/growth/

tools-databases/ketsobservatory/kets-ti-inventory/map).

Cluster PoliSEE: Cluster PoliSEE is an initiative funded under the European Territorial Cooperation South Eastern Europe programme. Its objective is to improve the capacity of regional policy-makers to promote cluster development and to develop their smart specialisation strategies. A specific Cluster Policy Learning Platform has been put in place with the aim of creating a competence centre for cluster stakeholders in south-eastern Europe (http://clusterpolisee.eu/).

TCI Network: TCI Network is a global network of organisations and practitioners with extensive expertise in clusters and competitiveness. TCI offers a platform for collaborating in an open, flexible and practical context in order to improve practices in the area of competitiveness, innovation and cluster development. Through its activities, TCI reaches 9 000 practitioners from development agencies, government departments, cluster organisations, academic institutions, companies and multilateral organisations in over 110 countries. Founded in 1998, TCI is a non-profit, non-governmental organisation with a global scope (http://www.tci-network.org/).

The Innovation Policy Platform (IPP): IPP is a joint initiative developed by the OECD and the World Bank. The aim of the platform is to provide policy practitioners around the world with a simple and easy-to-use tool, supporting them in the innovation policy-making process. This is done by facilitating collective learning about innovation policy, both as relates to conceptual and practical aspects, and tailoring this to the needs of developing and developed countries. Although the platform is about innovation policy in general, it also deals with cluster policy specifically (https://innovationpolicyplatform.org/content/cluster-policies?topic-filters=12067).

In addition, policy information platforms relating to regional-level measures can be important complementary resources for developing international cluster strategies, notably the S3 Platform (http://s3platform.jrc.ec.europa.eu/home) and the Regional Innovation Monitor (RIM Plus: https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/), which will be followed up by the action for 'Regional Co-operation Networks for Industrial Renaissance and Modernisation' (RE-CONFIRM).

3.3 Monitoring and evaluation

Given the limited levels of public funds, policy-makers are increasingly frequently posing the question of whether public support – including cluster programmes – has been effective, and to what extent this can be proven by evidence. Policy-makers have to make tough choices as to which competitiveness clusters to support, to continue supporting or even in certain cases to stop supporting.

In the context of innovation strategies for smart specialisation (RIS3), monitoring mechanisms perform three fundamental functions: (1) they provide information about what the strategy achieved and whether implementation is on track, and make this information available to decision-makers; (2) they clarify the logic to the measures taken under the strategy and make this logic understandable to the wider public; and (3) they support the constructive involvement and participation of stakeholders through transparent communication and promote the building of trust. The challenge is to transform monitoring and evaluation from 'external' assessments into a strategic intelligence tool for supporting the discovery process and the implementation and improvement of policies and programmes.

RIS3 monitoring focuses on tracking the developments related to policy interventions within the specific priority areas identified in the strategy. The monitoring mechanism should be able to capture and follow the relevant expected changes that are planned in each RIS3 priority by means of an appropriate choice of result indicators. It should also capture and track the policy results that ought to make the expected changes happen.[61]

There are a range of challenges that have to be overcome when evaluating cluster policies and programmes. First, clusters are very diverse in

61 See: Monitoring Mechanisms for Smart Specialisation Strategies, S3 Policy Brief No 13/2015, S3 Platform (http://s3platform.jrc.ec.europa.eu/home).

terms of their rationale, objectives, maturity, geographical scope and mode of operation, and there is therefore no one single approach to evaluating them. This is also the case because the type of evaluation depends on who is commissioning the evaluation – whether it is policy-led or management-led – and for what purpose – what the evaluation criteria should be. It is also necessary to decide whether to evaluate the broader cluster policy, for example including its impact on employment creation, or to evaluate the results of the narrower cluster initiatives or cluster management organisations by looking at the performance of the cluster members.

Key characteristics of clusters that influence the evaluation design include:

- the type of cluster: e.g. industrial cluster, research-driven cluster, launched through a government policy or without public intervention, mature or emerging cluster;
- geographic scope: e.g. regional, cross-regional (within one country), transnational (in macro regions), international;
- thematic/industrial scope: e.g. narrowly defined cluster, sectoral focus, cross-sectoral or thematic focus; contribution to societal challenges;
- type of public intervention: e.g. supporting networking, channelling research and innovation funding through clusters, conducting training activities, supporting the internationalisation of SMEs, providing support to infrastructure.

At the start of the evaluation, an important step is to see how the cluster and the targeted industry or groups of industries have been defined and spatially delineated. The criteria applied to draw the cluster boundaries are important for assessing correctly the coverage of public intervention. In the context of smart specialisation strategies, the roles of cluster organisations in the design and implementation of these strategies will also be considered.

Another aspect that has to be taken into account is the broader context of cluster policy, as the economic climate, the scientific basis and the regulatory framework conditions (and any changes to them that have taken place over time) can all influence the performance of clusters. There is also a need to consider the interactions between the regional, national and international levels in supporting cluster organisations.

One of the key challenges related to cluster programme evaluations is of course how to attribute the effects and impacts to the programme itself given the highly complex environment in which clusters operate. Whilst it is easy to evaluate the concrete achievements of cluster initiatives, it is much more difficult to assess the impact on socioeconomic conditions. Attributing the observed changes to the cluster programme can be sensitive and it is difficult to determine which effects might have been generated or co-generated by other existing policy instruments. This is even more an issue when the evaluation concerns clusters with a regional scope, but that are supported in national contexts, such as, for example, is the case for the French competitiveness clusters.

The evaluation design offers several options for data collection and analytical techniques, but an important element to include is a comparison of the effects on firms that benefited from cluster support and those that did not.

Box 8: Example – evaluation of the French competitiveness clusters

The French Government decided to continue its innovation support policy *Pôles de compétitivité* for the period from 2013 to 2018, following an evaluation by BearingPoint, Technopolis France and Erdyn of the outcomes at national and cluster level of the second phase (2009-2012) of this major innovation support policy. The *Pôles de compétitivité* policy was launched in 2004 with the aim of improving France's competitiveness, growth and employment through innovation and public-private collaborative R&D projects. This flagship policy marked a turning point in the national industrial policy, and was developed with the aim of giving French research and industry partners the chance to become leaders in their fields, both in France and in other countries.

One key finding from the evaluation of the 2009-2012 policy implementation period was that the objectives for the economic impact of the clusters should be improved in future. The government is taking action on this point, and has emphasised the need for clusters to bring innovations to the market, to create jobs and to focus on exports. The new objectives also state that the clusters must support SMEs more efficiently than they did during the second phase of the policy. They should help SMEs to gain access to funding, to grow, to export and to accelerate their internationalisation. SMEs should also expect clusters to assist them in accessing skills and competencies.

The report highlighted that the objective of involving higher education and vocational training in the clusters hadn't been prioritised, and therefore had not had as beneficial an impact as it might have done. The government has now prioritised the objective of improving links with higher education and vocational training. The study's main conclusions are based on information collected from a wide range of stakeholders in the fields of research, business, training and public administration in France, and from members of the competitiveness clusters, during more than 1 600 face-to- face interviews and an online survey amongst 5 500 respondents.

Source: http://competitivite.gouv.fr/home-903.html (English) and http://competitivite.gouv.fr/politique-des-poles/la-2e-phase-2009-2012-de-la-politique-des-poles-dite-pole-20-478.html

Box 9: Example – evaluation of the Walloon cluster policy

The Walloon institute for evaluation, forecasting and statistics, (*Institut Wallon de l'évaluation, de la prospective et de la statistique*, IWEPS) commissioned an evaluation of the results of the Walloon policy for competitiveness clusters, which had first been implemented in 2005 in this Belgian region. The Walloon competitiveness clusters policy aims to increase the competitiveness of the regional economy through research, innovation and the networking amongst actors. It mobilises businesses, research organisations and training organisations to work together on joint projects. The aim of this evaluation was to inform decisions on the continuation of the policy and to assess on an individual basis whether each cluster should keep its official accreditation. Beyond these specific objectives, the study also contributed to improving overall support for competitiveness in the Walloon economy through innovation. A tailor-made approach has been developed for this evaluation in order to produce a robust assessment of the results achieved by the competitiveness clusters.

The evaluation approach notably included:

- an assessment of each cluster's activity based on a set of triangulated data from online surveys of members and non-members of the clusters and interviews with non-participating companies, followed by an on-site visit with representatives of the ecosystem of the clusters, and supplemented by a set of case studies of projects;
- an evaluation of the Walloon clusters policy based on a detailed review of the literature, followed by interviews with a wide range of actors from the Walloon innovation system, together with an international benchmark exercise of cluster policies;
- the formulation of clear, operational recommendations at the level of the individual cluster and at policy level, together with a monitoring framework that will serve as a point of reference for future assessments.

Source: http://www.technopolis-group.com/?report=evaluation-walloon-competitiveness-clusters

A good example of **continuous monitoring of cluster development in economic terms** is found in Denmark. The Innovation Network Denmark programme and its programme authority, the Danish Agency for Science, Technology and Innovation, offers a very good example of how annual performance statistics and econometric impact studies can be used for monitoring and evaluation purposes. Since 2006, the annual performance of the clusters supported through the programme has been measured using quantitative data, e.g. indicators on number of new services or products, the number of participating companies and research institutions, the number of collaboration projects and the level of use of the services (e.g. matchmaking) offered by the cluster management.[62] The results of the annual performance assessment are not only used to monitor the programme's overall performance, but also to identify specific weaknesses in the clusters, which can then be addressed by means of targeted measures developed by the programme management (e.g. training courses or matchmaking activities). In 2011, the Danish Agency for Science, Technology and Innovation published an impact analysis on the programme for the first time. This econometric analysis, which covered 1 225 companies participating in the supported clusters, showed, to give just one example, that the participation of a company in a cluster increases its capacity to innovate significantly within a short period of time (compared to companies that do not participate in a cluster).[63]

3.4 Inspiration for cluster development – four smart cluster stories from Europe

Four regions presented their smart cluster stories at the GROW your REGIOn conference, jointly hosted by the European Commission's Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs and Directorate-General for Regional and Urban Policy on 27-28 April 2015 in Brussels.[64] Each of the stories illustrates the transformative power of smart specialisation through clusters, and describes how clusters helped to transform regions and drive growth.

3.4.1 Rhône-Alpes: connecting technologies and markets through Silicon Europe and Health2Care

Rhône-Alpes' smart specialisation strategy builds upon the regional industrial ecosystem and is centred around the existing regional clusters and the potential cross-linkages between them. The key challenge for the region has been to connect technologies and application markets that can create value for the regional economy. Cluster development is an integral part of the regional smart specialisation strategies, as demonstrated by two examples from the regional micro- and nanotechnology industry:

62 Danish Agency for Science, Technology and Innovation, 2011: Innovation Network Denmark. Performance Accounts 2011, Innovation: Analyse og evaluierung 08/2011. Available at: http://ufm.dk/en/publications/2011/innovation-network-denmark-performance-accounts-2011.
63 Danish Agency for Science, Technology and Innovation, 2011: The Impacts of Cluster Policy in Denmark. An Impact Study on Behaviour and Economic Effects of Innovation Network Denmark. Available at: http://ufm.dk/en/publications/2011/the-impact-of-cluster-policy-in-denmark.
64 For more information see Box 5 and http://ec.europa.eu/regional_policy/index.cfm/en/conferences/grow_region/.

Micro- and nanotechnologies can contribute to several other economic fields such as healthcare, mobility and energy. Tailored action involving cross-fertilisation between different clusters can transform the technologies into concrete products and services. Minalogic is one of the clusters focusing on micro- and nanoelectronics and software technologies. Building transnational partnerships and supporting internationalisation has long been a priority for the region. This is also why the Silicon Europe project was launched, which brought together the key micro-nano-electronics clusters in Europe, among them Minalogic, and thus facilitated the creation of an industrial partnership covering the entire semiconductor value chain. Each regional ecosystem could contribute its strengths to the transnational collaboration network and exchange resources and ideas.

In addition to the Silicon Europe project, the Health2Care project brings together Minalogic and three other clusters in the area of personalised healthcare. Similar projects have been set up in Flanders and Saxony with Silicon Europe partners DSP Valley and Silicon Saxony. The Region would like to transfer this success story to other regional clusters, in order to develop and structure the European value chain and allow the emergence of new industries.

More information is available about Silicon Europe at www.silicon-europe.eu and about Health2Care at http://en.rhonealpes.fr/1092-health2care.htm.

3.4.2 Bavaria: value creation programme and site development programme

The chemical cluster Bavaria *'Chemie-Cluster Bayern'* is a public-private cluster network of more than 260 members from the chemical industry, representing an annual turnover of nearly EUR 90 billion. The cluster has started a 'value creation partnership' programme (VCP) to explore industrial target applications for the member companies along cross-cutting industrial value chains. The VCP programme includes material- and process-based solution providers from about 20 European partner clusters. It is focused on target markets such as the oil and gas sector, steel production, aerospace, shipbuilding and consumer goods. The programme is strongly supported by the European strategic cluster partnership 'Wiintech' and has been implemented in emerging regions worldwide in order to optimise the position of European SME in global value chains.

In order to build up a sustainable cooperation framework, in particular with emerging regions, a site development programme has been set up alongside the VCP, in order to support the creation of new production clusters in non-EU countries through European expertise. The site development programme has proved to be a very powerful tool for accelerating the opening up of market access for European companies in emerging regions and for putting in place an integrated, European investment promotion strategy in non-EU countries by matching innovation solutions and demand along the value chain. The site development programme covers a network of European cluster organisations, operators and stakeholders from industrial sites, and experts in infrastructure development. Together, VCP and the site development programme create a powerful way of supporting global market access for European SMEs, capitalising on European expertise in the sustainable development of industrial production clusters and thus building up new supply and distribution channels for European core industry sectors. *Chemie-Cluster Bayern* is starting to use the site development programme not only for improving links to value chains outside Europe, but also in order to build up a strategic working relationship between industry parks and production clusters in European regions.

More information about the *Chemie-Cluster Bayern*'s value creation partnership and site development programme is available at www.wertschoepfungspakt-chemie.de/en/wpc/.

3.4.3 Veneto region: combining innovative production methods with ancient traditions

The Veneto region's Regional Law No 13 of 30 May 2014 on clusters promotes cooperation between companies via formal networks for the development of common projects on research, development and technology transfer. These networks have been integrated into the regional smart specialisation strategy as one of the pillars of the policy mix strategy.

A network has been set up between a gold-working company and some social cooperatives involved in the breeding of silkworms. This cooperation has led to the restoration and reorganisation of the entire silk lifecycle, from the mulberry plantation to the silk transformation, right through to the creation of precious handcrafted items combining innovative production methods and ancient traditions. As a result, and in line with the specialisation areas of RIS3, silkworm breeding, yarn making and weaving are again being carried out in the regional market. Products are therefore available that meet the expectations of consumers looking for high quality materials produced via a controlled supply chain and completely 'Made in Italy'.

By integrating industrial research, experimental development and process innovation, it is therefore now possible to make yarns (and other biological sub-products) having technical and technological features among the best in the world. Industrial applications of these products can be found in the gold-working sector, in luxury fashion (textiles, clothing and accessories), cosmetics and wellness, pharmaceutical and medical, nutraceutical and other fields. This project therefore represents a successful story of how smart specialisation strategies can promote, through clusters, the efficient and effective use of public investment in R&I whilst delivering breakthrough products, in line with the new Commission's political agenda for jobs, growth and investment.

More information about Veneto region and its smart specialisation strategy is available at www.regione.veneto.it/web/attivita-produttive/Smart-Specialisation-Strategy.

3.4.4 Greece: developing world-class clusters with a long-term perspective

Since the mid-2000s, Corallia, a cluster facilitator organisation in Greece, has been implementing a long-term policy with the aim of developing world-class competitive clusters in knowledge-intensive sectors such as microelectronics, space technologies and applications, gaming and creative technologies. Having identified regional potential in the microelectronics and embedded sector in Greece, Corallia designed and implemented a pilot cluster development scheme, funded by the European Regional Development Fund (2006-2008). It brought together 13 micro-electronics SMEs that shared the characteristics of being knowledge-intensive and export-oriented, and had the vision to create an 'ecosystem' in which innovation would flourish.

The pilot yielded positive results, as demonstrated by the setting up and expansion of the mi-Cluster and the milestones achieved by the SMEs (double-digit growth rates in turnover, employment, exports and patent applications). As a result, measures on a larger scale followed in this sector during the next programming period, with the aim of boosting competitiveness, entrepreneurship and innovation and demonstrating the best-practice approach of a public-private partnership in knowledge-intensive and exports-oriented technology segments. Corallia, acquiring the role of the managing authority, closely monitored this groundbreaking initiative being carried out in Greece and southeast Europe. The cluster members were reported to have had higher growth rates in turnover (+145 %), exports (+108 %), employment (+70 %) and private investment (+269 %), while the mi-Cluster received early recognition at national, EU and global level.

This success served as an example of good practice and influenced policy-makers in Greece to extend their policy on clusters and introduce incentives to cover more emerging sectors where the regions' capacities and strengths are concentrated. As a result, in 2014-2015, the Ministry of Development supported the creation of the gaming and creative technologies and applications cluster and the space technologies and applications Cluster, facilitated by Corallia and launched respectively in 2009 and 2011. Both have already achieved significant results in terms of turnover, private investment and patent applications and are evolving into fully functional innovation and business ecosystems contributing to the Greece's development as a leading region in these sectors.

More information about the Corallia cluster initiative and its clusters is available at www.corallia.org.

3.5 Inspiration from cluster programme examples across Europe

This section presents examples of cluster programmes that go beyond the usual standard of mere financial support for a cluster management organisation, by doing the following:

- offering advice to cluster organisations and cluster actors through cluster agencies (Germany and Denmark);
- providing individual support corresponding to the developmental stage of a cluster (Norway);
- supporting cooperation across borders (the Baltic Sea Region); and
- channelling R&D support through clusters (Flanders).

The examples in these areas illustrate how governments can use clusters as tools to promote industrial development within a region by, for example, providing clusters with tailor-made advice from specialised agencies or by channelling funding to SMEs through clusters. These examples can all be implemented in the framework of EU regulations on the Structural Funds, state aid and public procurement.

3.5.1 Offering advice to cluster organisations and cluster actors through cluster agencies: Germany and Denmark

Previous studies have shown that merely providing funding for cluster management organisations does not always seem to be the most effective way of achieving the goals of sustainable cluster development.[65] In view of these findings, the regional government of Baden-Württemberg is following a new approach by setting up a regional cluster support agency (*ClusterAgentur BW*) which will provide coaching and training for cluster organisations. All cluster organisations within the region of Baden-Württemberg are eligible for this support. Apart from networking and matchmaking, the *ClusterAgentur* provides support and advice to cluster organisations, mainly in the areas of:

- professionalisation of cluster management;
- setting up new innovation support services for cluster firms; and
- going international.

Thus, the *ClusterAgentur BW* will act as an intermediary between the regional government and the cluster organisations. The *ClusterAgentur BW* has been publicly tendered and will be run by a private body, which acts as service provider. The *ClusterAgentur BW* is financed from the EU Structural Funds based on a service contract and will operate for at least for the next three years.

For further information on the cluster policy of the regional government of Baden-Württemberg and its programmes, please see www.clusterportal-bw.de/en/.

This example can also be found in other Member States. Recently, the Danish government established *Cluster Excellence Denmark* as the national support service for clusters and innovative networks in Denmark. The aim of the support function is to professionalise and

65 Lämmer-Gamp, Meier zu Köcker, Christensen: Clusters are Individuals. New Findings from the European Cluster, Management and Cluster Program Benchmarking Danish Ministry of Science, Technology and Innovation, ISBN: 978-87-92776-22-8, Copenhagen/Berlin, 2012, and Christensen, Lämmer-Gamp, Meier zu Köcker, Let's Make a Perfect Cluster Policy and Cluster Programme, Danish Ministry of Science, Technology and Innovation Copenhagen/Berlin, 2012.

secure competence development for clusters and networks in areas such as management, internationalisation and other external relations. This work is closely coordinated with the national strategy for Denmark's cluster policy, which is supervised by a national cluster forum. *Cluster Excellence Denmark* is co-funded by the Danish Agency for Science, Technology and Innovation and the six Danish regional growth forums.

3.5.2 Providing individual support corresponding to the developmental stage of a cluster: Norway

Innovation Norway, SIVA (Norway's Industrial Development Cooperation) and the Research Council of Norway have extensive experience in joint initiatives intended to promote cluster development. Continuing their joint efforts, in 2014, they launched a new phase of cluster support in Norway, taking its already strong cluster strategy to an even higher level. Today, the Norwegian cluster programme consists of three sub-programmes targeting different clusters at different stages of development. The programme targets regional clusters, including clusters in an early phase of collaboration, clusters that have developed a more mature and well-functioning collaboration, clusters whose primary potential lies in a strengthened regional position, and clusters that have enough weight and capacity for growth to act as hubs in national and global innovation networks. The common denominator for all these clusters is that they have prerequisites for collaboration-based growth and the willingness and ability to participate in a joint strategic development process together with the programme owners.

The programme objectives for the different levels are:

1. Arena: helping regional business clusters to boost innovation activities by improving capacity for renewal, based on strengthened collaboration between companies, knowledge communities and public development agencies;
2. Norwegian Centres of Expertise: increased value creation in the cluster, based on collaboration-based innovation and internationalisation processes;
3. Global Centres of Expertise: increased value creation and attractiveness and a better position in global value chains, through strategic collaboration projects between the cluster partners and external partners.

The programme is not only a good example of a differentiated approach to cluster development, but also of the integration of financial support through grant funding and of technical support for cluster organisations provided by expert and advisory services in one single programme.

For a detailed description of the programme, please see www.innovationclusters.no/english/ and www.innovasjonnorge.no/Global/Nyheter/Engelsk%20Programbeskrivelse_versjon%201_2013_06_10_en.pdf

3.5.3 Supporting cooperation across borders; the Baltic Sea Region

Innovation Express is an example of a common European approach to supporting the internationalisation of SMEs through cluster initiatives. It is a joint call for proposals held as part of the Baltic Sea Region (BSR) Stars programme. The BSR Stars programme aims to strengthen competitiveness and economic growth in the Baltic Sea Region. Since 2011, the start-up activities have been financed by the BSR programme run under the territorial Structural Funds. The BSR Stars programme is a framework programme within the EU macro-regional strategy for the period 2010-2020 and the aim is to add financial instruments to the programme to further develop it.

For the 2014 Innovation Express call, national and regional funding agencies from Denmark, Finland, Iceland, Lithuania, Norway and Sweden contributed some EUR 1.5 million to support transnational projects run by cluster organisations. Proposals must aim to benefit SME members and must be developed in consultation with them and driven by their internationalisation needs. Applications must target another cluster initiative or SME

consortium in at least one other country (within the Baltic Sea Region or elsewhere).

In order to support the creation of new partnerships between cluster organisations and to develop ideas for projects, potential applicants came together and paired up project ideas in a Cluster-2-Cluster event held on 18 and 19 September 2014 in Berlin. A total of 235 cluster organisations and other stakeholders from 23 countries attended.

The 2013 Innovation Express call led to 28 new international collaboration projects, involving more than 900 SMEs in the Baltic Sea Region. It attracted 47 applications from cluster organisations and business networks in the six funding partner countries. Of these, 40 have been approved, directly involving 923 SMEs in international innovation collaboration activities.

More information can be found at www.bsrstars.se/project/bsr-innovation-express.

3.5.4 Channelling R&D support through clusters: Flanders and North-West Europe

Cluster organisations are a perfect facilitator and platform, respectively, for the development of R&D and innovation projects. Consequently, this potential has been taken into account in several Member States programmes by entrusting cluster organisations with channelling public money for R&D projects to industry, as they have the best understanding of what cluster actors need.

The **Flemish cluster organisation 'Flander's Food'** is a good example of this approach. In order to further develop the cluster of some 300 companies, universities and research institutions, the cluster management organisation has been entrusted by the Flemish Government with allocating EUR 2 million per year to innovation projects in areas to be identified by the cluster participants without any further guidance from the government. The procedure consists of five main steps:

1. Identification of the main theme of the call for proposals at a brainstorming meeting with industry and through subsequent discussion with R&D institutions and universities.
2. Identification of project opportunities, e.g. how to replace salt in specific meat products, and agreement on a call for proposals.
3. Launch of a pre-call to check whether the identified theme generates interest from a sufficient number of cluster participants.
4. Request for full proposals from consortia consisting of cluster participants (each project consortium must include at least five cluster participants, and the average is 10 project participants). The call for proposals is open to all cluster participants.
5. Evaluation of full proposals on a competitive basis, performed by an international panel of experts.

The projects selected are managed by industry and supported by Flemish R&D institutions and universities. The typical duration of projects is about 2-3 years. Since 2006, more than 30 projects have been implemented. This programme contributes not only to a vibrant culture of collaboration among clusters covering the entire value chain, but also to the identification of new growth potential and new markets. The key to the success of the programme is that the cluster management organisation acts as the funding agency for the cluster participants and that cluster participants have the opportunity to discuss the theme of the call in depth with industry stakeholders.

More information about Flander's Food is available at www.flandersfood.com.

Another good example is the **transnational cluster collaboration In2LifeSciences,** which is supported under the Interreg 4B programme for North-West Europe. In2LifeSciences involves cluster organisations and business development entities from Belgium, Denmark, France, Germany and the Netherlands with the aim of providing SMEs in the health sector (biotech-

nology, pharmaceuticals, medical technology and nutrition for human and animal health) in eight leading life sciences regions in North-West Europe with easy access to a wide range of public and private experts and facilities.

In order to facilitate international collaboration between SMEs and the research sector, the participating cluster organisations have been entrusted with implementing an innovation voucher scheme. There are three types of incentives, awarded through calls for applications, available for SMEs in the eight IN2LifeSciences regions that are looking for innovation support:

1. Meet & Greet incentives: up to EUR 500 for SMEs to travel and meet relevant organisations in other regions;
2. Insight incentives: EUR 4 000 to organise staff exchanges, receive training or contract experts to gather insight (on markets, technology, IPR, etc.);
3. Collaboration incentives: EUR 7 000 for collaboration on an innovative new product or service.

For further details on the IN2LifeSience project, please see www.in2lifesciences.eu/.

4 Conclusion

Clusters and cluster development is a complex area, but not one where it is impossible to succeed. The advocated transition towards modern cluster policies that interact with smart specialisation strategies adds another level of complexity. Yet, this is a very important way to focus activities and develop strategic capacities to boost the potential of clusters in and across regions within international value chains and to accelerate the development of emerging industries in Europe. This guide discusses the challenges policy-makers have to tackle on their way to unlocking the potential of clusters for the benefit of economic development. It describes what makes clusters and cluster initiatives successful and what they should not be confused with. The economic relevance of clusters is explained and the guide illustrates the arguments for cluster policy and introduces practical tools for action and instruments to support cluster policies and programmes, giving a number of examples from existing cluster programmes.

This guide has argued that clusters cannot and should not be developed through stand-alone programmes. Modern cluster policy should follow a systemic approach that integrates different policies and programmes under a joint strategy, as championed by the smart specialisation approach. In this sense, cluster policy is to be seen as a strategic framework policy that goes far beyond merely offering support for networking activities and setting up cluster organisations that manage networking activities among companies. What sounds simple at first, is not. The development of such a systemic and targeted cluster policy requires a joint effort across departmental boundaries to break out of existing 'policy-silo patterns'. Such a systemic approach requires thinking outside the box and an open space for cross-fertilisation in order to find complementarities. It also requires patience, as successful industrial development through cluster policy cannot be achieved overnight, but often requires a decade of strategic and consistent effort. Building trust is critical for success in achieving these aims, as it is essential for motivating the various stakeholders to cooperate. It is important to focus on strengths, adding value and connecting the right people.

Investing in cluster policy is, however, worth the effort. Once in place, smarter, more strategic and more focused public investment will leverage more private and public initiative and investment for the benefit of economic development in Europe. The concept of smart specialisation provides guidance for launching the development of a systemic and strategic vision for regional development. It puts government in the position of the facilitator of a process that brings relevant stakeholders such as industry, academia and policy-makers to the table to develop joint roadmaps for regional economic development.

Although 'traditional industries' will continue to represent an important backbone of the European economy, Europe's competitiveness on the global market will eventually depend on the successful development of 'emerging industries'. Cluster policy should therefore be focused on developing new industrial sectors of this type by encouraging corresponding cross-sectoral collaboration and transforming existing industrial sectors.

This guide hopes to provide both national and regional cluster policy-makers with valuable input and tools to develop modern cluster policies based on a systemic integration of policies and programmes relevant for promoting regional industrial modernisation, supporting the growth of SMEs and encouraging smart specialisation through cluster development.

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.

More information about the European Cluster Observatory is available at the EU cluster portal at: http://ec.europa.eu/growth/smes/cluster/observatory/.

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