COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 17.10.2008
SEC(2008)2637

COMMISSION STAFF WORKING DOCUMENT

ANNEX to the

COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

The concept of clusters and cluster policies and their role for competitiveness and innovation: Main statistical results and lessons learned

{COM(2008) 652}

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INTRODUCTION

The **main objective** of this Working Paper of the Commission Services is to present and further analyse the concept of clusters and to inform about main policy approaches in support of clusters. It accompanies and provides the rationale for the Communication on "Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy".[1]

Clusters are becoming an increasingly popular concept which is reflected in a **growing number of policies and initiatives in support of clusters**. This paper describes the potential role of clusters, cluster policies and cluster initiatives for competitiveness and innovation and the available statistical evidence on this. The purpose of this paper is neither to evaluate the impact of specific individual cluster policies and initiatives in Europe nor to provide an impact assessment of the actions implemented or planned at European level in support of clusters. Instead, it provides factual information on the concept of clusters and its economic impact as well as on current policy approaches in their support.

The statistical findings presented in this paper are mainly based upon results from the cluster mapping project of the **European Cluster Observatory**[2] launched under the European Commission's Europe INNOVA initiative. It further builds on the work performed by the European Cluster Alliance[3] and the INNO-Policy TrendChart[4] under the PRO INNO Europe initiative, the 2006 Innobarometer survey on the role of clusters[5], the Global Cluster Initiative Survey of the Cluster Initiative Greenbook[6], several other publications by the European Commission, OECD publications (1999; 2001; 2005; 2007; 2008), and a great number of academic studies on clusters as well as on case studies.

Furthermore, this document reflects **broad feedback from stakeholders** on clusters and cluster policies, such as from the High Level Advisory Group of experts on clusters[7] that presented in November 2007 the European Cluster Memorandum[8], which was sent to regional governments and innovation agencies across Europe and discussed at the European Presidency Conference on Innovation and Clusters[9] in Stockholm on 22-23 January 2008. In

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2 Information from the European Cluster Observatory is available at http://www.clusterobservatory.eu/ See also the Europe INNOVA / PRO INNO Europe paper N° 5 on "*Innovation Clusters in Europe: A statistical analysis and overview of current policy support*" by the Directorate-General Enterprise and Industry is available at http://www.europe-innova.org/ index.jsp?type=page&cid=8702&lg=en

3 More information on the European Cluster Alliance, and how to join it, is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=223&parentID=0

4 More information on the INNO-Policy TrendChart is available at http://www.proinno-europe.eu/ index.cfm?fuseaction=page.display&topicID=52&parentID=52

5 The *"2006 Innobarometer on cluster's role in facilitating innovation in Europe"* is available at http://www.proinno-europe.eu/admin/uploaded_documents/FL187_Innobarometer_2006.pdf

6 The Cluster Initiative Greenbook by Sölvell, Lindqvist & Ketels (2003) is available at http://www.cluster-research.org/greenbook.htm

7 More information on the High Level Advisory on clusters is available at the Europe INNNOVA website at http://www.europe-innova.org

8 The European Cluster Memorandum is available at http://www.proinno-europe.eu/ NWEV/uploaded_documents/European_Cluster_Memorandum.pdf

9 More information on the conference which was organised jointly by the Swedish government under the Slovenian presidency, with support of the PRO INNO Europe initiative, is available at http://www.VINNOVA.se/innovationandclusters

addition, experience from the PRO INNO Europe and Europe INNOVA initiatives are taking into account.[10]

Chapter 1 provides some basic definitions related to clusters and a further analysis of the concept of clusters. In the broadest sense, clusters can be defined as regional concentrations of specialised companies and institutions connected through multiple linkages. However, other definitions are used as well, depending on the context and purpose of the discussion. In particular, it seems to be important to clearly distinguish between **clusters, cluster policies and cluster initiatives**. Whereas clusters are a real economic phenomenon that can be economically measured, cluster policies are more an expression of political commitment to support existing clusters or the emergence of new clusters. Cluster initiatives are practical actions to strengthen cluster development, which can, but must not necessarily be, based on a formulated cluster policy.

Chapter 2 investigates the role of clusters for the success of firms, especially SMEs, as well as for regional and national growth and innovation. It presents an in-depth analysis of the available statistical findings on the **economic impact** that clusters can have on competitiveness, economic growth, productivity, innovation and employment and thus explains why clusters matter in economic terms.

Chapter 3 provides an overview of **cluster policies** implemented in the regions and Member States in Europe. Cluster policies may take different forms and follow different objectives which make it difficult to clearly categorise them. A full assessment of their impact is not possible at this stage, taking into account the lack of comparable data and the methodological difficulties to measure multiple and long-term effects of horizontal polices. Under this chapter, different approaches towards trans-national cluster cooperation at policy level are presented, together with their first results.

Chapter 4 looks at the role that specific cluster initiatives may play to support the functioning of clusters. The analysis suggests that efficient **cluster organisations** are a key element of successful clusters. This chapter pays particular attention to the rationale for trans-national cooperation between clusters and presents the main results from European initiatives in its support.

Chapter 5 presents the main **policy challenges to be addressed at European level**, taking into account the findings of this document. It describes a number of policy options and their expected impact in view of better coherence between the different policies used in support of clusters in Europe.

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[10] More information on the PRO INNO Europe initiative is available at http://www.proinno-europe.eu/ and on the Europe INNOVA at http://www.europe-innova.org

1. THE CONCEPT OF CLUSTERS AND MAIN DEFINITIONS

Clusters are seen as an important factor for the explanation of the **empirical phenomenon of geographical concentration of economic and innovation activities**. More than one definition of clusters exists, depending on its purpose and the specific context of its use. In many discussions no clear distinction is drawn between clusters as a real economic phenomenon and cluster policies and initiatives which are more of a normative function. The purpose of this chapter is to introduce some basic definitions linked to clusters and to provide an explanation of its underlying concept. Furthermore, it describes different approaches to measure clusters. In this respect, this chapter outlines in particular the methodology used by the European Cluster Observatory, which provided for the first time a comparable cluster mapping across Europe.

1.1. The definition and concept of clusters

Many definitions of clusters exist. Definitions are, by default, context-related and driven by purpose. Whereas from an economic point of view the main purpose is to better understand the drivers of competitiveness and growth, other definitions may follow different objectives, such as providing a legal framework for funding or a reference model for statistical measurement. Whereas definitions aiming at conceptualising clusters are **either descriptive or abstract** in order to capture the broad range of elements characterising clusters, legal definitions are necessarily defined in stricter and more technical terms in order to provide the framework for the application of State Aid rules[11] and other forms of financial support.

> The "**Community Framework for State Aid for Research and Development and Innovation"**[11] defines innovation clusters as "*groupings of independent undertakings — innovative start-ups, small, medium and large undertakings as well as research organisations — operating in a particular sector and region and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination among the undertakings in the cluster*."

In more general terms, clusters can be defined as a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills.[12] A **common element** of most cluster definitions is the aspect of a concentration of one or more sectors within a given region as well as the emphasis on networking and cooperation between companies and institutions.[13]

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11 The definition of the State Aid rules (as presented in the box) is added by the comment that "[p]referably, the Member State should intend to create a proper balance of SMEs and large undertakings in the cluster, to achieve a certain critical mass, notably through specialisation in a certain area of R&D&I and taking into account existing clusters in the Member State and at Community-level." It can be found in section 2.2 on page 10 of the text of the *Community Framework for State Aid for Research and Development and Innovation*, which is published in the Official Journal of the European Union (2006/C 323/01) of 30.12.2006 and available at http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/c_323/c_32320061230en00010026.pdf

12 See the report of the US Council on Competitiveness (2007) *Innovation America - Cluster-Based Strategies for Growing State Economies*, which is available at http://www.nga.org/Files/pdf/0702INNOVATIONCLUSTERS.PDF

13 The aspect of the regional dimension is itself again subject to definition.

Clusters are defined by relationships, not memberships and their spatial boundaries are variable and not necessarily corresponding with political borders. Cluster geography may be defined by the distance and time that people are willing to travel for employment and that employees and owners of companies consider reasonable for meeting and networking. Geography is therefore not a stable concept but influenced by factors such as travel conditions, cultural identity, and personal preferences. New forms of transport and communication, such as the Internet, are also changing the spatial dimensions of a cluster.

An important **difference exists between the empirical phenomenon of clusters, and cluster policies and initiatives aiming at their creation or further development**. In discussions often both terms are used synonymously which may create some confusion. When present, active clusters leave traces that can be statistically captured, e.g. in terms of specialisation or concentration of employment within a particular sector. In contrast, cluster policy is about expressing a focused strategy, setting political priorities and allocating funding in order to promote innovation, regional development or other policy goals. In reality, all combinations between clusters and cluster policies can be found: Clusters spontaneously created without any political support, cluster policies sooner or later resulting in clusters but also cluster policies without a statistically significant impact on cluster formation.

Cluster policies can be defined as specific governmental efforts to support clusters. Such cluster policies may take different forms and follow different objectives, such as industrial and SME policy or research and innovation policy. Cluster policies are in most cases supported and implemented by specific cluster programmes of governments or initiatives. In consequence, **cluster initiatives can be understood as "organised efforts** to increase growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community".[14] As part of this, **cluster organisations often play an important role as service providers for the support of clusters.** Cluster organisations can be defined as the legal entity engineering, steering and managing the clusters, including usually the participation and access to the cluster's premises, facilities and activities.[15]

The **set-up of cluster organisations** or networks is often supported by a clear mandate and public funding from authorities at regional level or more spontaneously initiated within the triangle of universities, incubators and finance, in view to overcome obstacles to cooperation and allow trust building between partners. When mature and successful, cluster organisations tend to raise the majority of their operating costs themselves by membership and service fees, participation fees for training and conferences, sponsoring etc.

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14 See Sölvell, Lindqvist & Ketels (2003). Alternatively, Andersson et al. (2004) define cluster initiatives as "conscious actions taken by various actors to create or strengthen clusters".

15 This definition follows the description concerning aid for innovation clusters that features in the "Community Framework for State Aid for Research and Development and Innovation". See section 5.8 on 'Aid for innovation clusters' of the text of the Community Framework that was published in the Official Journal of the European Union in December 2006 (2006/C 323/01) and that is available at http://eur-lex.europa.eu/LexUriServ/site/en/oj/ 2006/c_323/c_32320061230en00010026.pdf

1.2. The concept and economic rationale of clusters

The concept of clusters is a modern description of the long observed phenomenon of geographical concentration of economic activities, which is widely believed to be an important factor for economic development. **Marshall (1890)** described already in the 19th century the advantages of agglomeration of economic activities in terms of availability of a qualified workforce and specialisation. Similarly, **Schumpeter (1939)** referred to the "swarming" or clustering of industry. The concept of clusters is very broad and comprises different perspectives and aspects covered by other concepts that have been around for a long time. It builds upon traditional location and agglomeration theory and integrated other concepts, such as the concept of "industrial districts", growth poles ("poles de croissance"), new industrial spaces, systems of production, innovative milieux, national or regional **innovation systems**, learning or creative regions, to name a few.

Becattini (1979), an Italian researcher, introduced in 1979 the seminal concept of "industrial districts" for regional policy and territorial development in his article "From industrial sectors to industrial districts". Based on Alfred Marshall's concepts, Becattini raised the issue of the importance of place-based economic development with the notions of external economies that changed the approach to industrial policy. He also stressed the importance of social capital geography, sociology, politics and history in the delineation of innovation policies.

More recently, the concept of clusters has been popularised and implemented by **Porter (1990)** based upon his so-called "diamond model" of competitive advantage.[16] The concentration of economic activities in clusters is viewed as the result of "competitive advantages" of firms in finding new and better ways to compete in an industry and to bring innovation faster to the market.

While different schools of thought stress different factors that determine the growth and working of clusters, the **concept of clusters generally comprises of three important dimensions:**

- First and widely undisputed, **clusters are seen as geographical concentrations** of specialised firms, advanced skills and competences in the labour forces, and supporting institutions which increase knowledge flows and spill-overs as a result of their proximity. This bundling of different strengths of is often referred to as a promising strategy to remain globally competitive. Due to co-location, firms can benefit from general and technology-related agglomeration effects in form of economies of scale and scope that improve their efficiency.[17] Regions compete with each other worldwide in providing the best framework conditions in order to facilitate business growth and to attract investment and a talented workforce.

- Secondly, **clusters serve a functional purpose to provide a range of specialised and customised services** to a specific group of firms, such as the provision of advanced and specialised infrastructure, specific business support services or training and coaching of

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[16] Porter's (1990) *"diamond model"* model highlights the following cornerstones of a system of mutually interdependent determinants that influence the competitive advantage: (production) factor conditions; firm strategy, structure, and rivalry; demand conditions; related and supporting industries; together with government and chance as additional determinants.

[17] See Audretsch & Feldman (1996) and Jaffe, Trajtenberg & Hendersen (1993).

staff. Cluster organisations help to channel, facilitate or provide access to facilities and services, which may include specialised research and test centres, consultancy, training, and so on. In this sense, clusters are a form of "self-organisation" that offers competitive advantages. Clusters facilitate both intense competition and close cooperation, sometimes described as **"co-opetiton"**. Geographical proximity is believed to facilitate the flows of tacit knowledge and the unplanned interactions that are critical parts of the innovation process. This flow relies upon the willingness of firms to inform others about their knowledge, which depends upon the trust established between actors. This in turn can be facilitated through continuous face-to-face contacts, to which efficient cluster organisations contribute by encouraging networking and cooperation.

- Clusters are, thirdly, characterised by a certain dynamic social and organisational element, the **so-called "institutional fix" or social glue** that holds the different interlinked innovation actors – such as universities, businesses and public authorities – together and facilitates intense interaction and cooperation amongst them. Over time, clusters tend to develop a set of idiosyncratic norms, institutions, personal networks, and trust. Dynamic and effective interaction and cooperation in the knowledge triangle of education, research and innovation are crucial for realising competitive advantages in times of increasing complexity of new technologies, products and services as well as of changing requirements for skills and competences.

- The – often unplanned – **intense formal and informal contacts and exchange of business information, know-how, and technical expertise** within clusters can lead to technological spill-overs[18] and the development of new and often unexpected ideas and new creative designs, products, services and business concepts[19] that improve the innovation performance of businesses. While the above mentioned dimension of geographical proximity is seen to facilitate trust and close cooperation between innovation actors within clusters, the access to new knowledge and input from other clusters also needs to be ensured through global pipelines and networks.[20]

1.3. The emergence of clusters

Agglomerations of economic activity in general, and clusters in particular, are general economic phenomena, both in earlier times and in the modern economy. Some prominent **examples of clusters with a global reach** are easily identifiable throughout a range of industries, including financial services (London City, New York), film (Hollywood and "Bollywood"), cars (Detroit, Modena, Toyota City, Wolfsburg, Stuttgart, etc.), watches (Switzerland and Japan), optical equipment (Tokyo), flowers (The Netherlands and Colombia), computer software (Silicon Valley, Bangalore), marine technology (Southwest Norway), mobile telecommunications (Stockholm and Helsinki), wine (Barossa Valley, Rioja, Bordeaux, Southern Chile and parts of California), or biotech, life sciences and medical instruments (Boston's Route 128, BioValley[21], Medicon Valley[22]). Therefore, clusters can be found in many economies around the world, each following its own trajectory and history.

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18 See Audretsch & Feldman (1996) and Jaffe, Trajtenberg & Hendersen (1993).

19 See Florida (2002) and Johannison (1987).

20 See Bathelt, Malmberg & Maskell (2002).

21 The trinational BioValley combines the French-German-Swiss border regions of Alsace, South Baden and northwest Switzerland with iis cities of Strasbourg, Freiburg and Basel. See http://www.biovalley.com

The emergence of a cluster in a particular location can be explained differently. A first type of explanation relates to given **factor advantages**, such as a particular climate, soil, ore deposits, forest resources, transportation routes or ports. The location of wine clusters, forest, pulp and paper clusters and other clusters based on natural resources can often be explained by the geography of production factors. A second type of explanation refers to **historical "accidents"**, such as the location where several successful entrepreneurs start a business and/or a large pool of talent and research activities gather. For clusters to grow and prosper many ingredients are needed, including demand sophistication, factor upgrading and **specialisation**, emerging strategies of competition and cooperation, institutional conditions favouring innovation and change or political actions.[23]

Successful clusters encapsulate all the activities needed to deliver a particular value to customers and they cross the traditional definitions of industries and of manufacturing versus services. They can emerge even where companies' locations are not determined by the location of markets or natural resources. Their specific nature, including their spatial coverage, differs according to technology, market conditions, and other factors that influence the geographic extent and relative strength of linkages.

Clusters are not stable over time but change continuously. One example for such evolutionary process is the Humber seafood cluster in the UK, which transformed from a commodity producer within an increasingly competitive global frozen seafood industry to a leading value-added fresh/chilled fish hub serving Europe.[24] While it remained a maritime cluster, the competitive advantage and R&D focus moved away from a focus on fishing and processing technology to global logistics as well as from being centred around the port to being linked to the airport. Another example is the Marche Music Cluster in Italy, which transformed from traditional accordion production to the production of electronic home appliances.[25] Key actors with a non-local horizon and non-local networking are highlighted as two important factors for the successful upgrading of this cluster. There are many more examples of this type suggesting that successful clusters have to continuously reinvent themselves.

Given the emphasis on networking, some countries may be in a more advantageous position due to their tendency to engage more intensively in networking. The 2006 Innobarometer on clusters[26] finds for instance that networking is most popular in the Nordic region comprising Finland, Sweden, Denmark and Norway, from which the majority of cluster companies actively participate at least in two business networks and around 90% take part in at least one such network. In contrast, many cluster firms from the Czech Republic, Italy, Hungary, Slovakia, Belgium, Portugal and Slovenia – ranging from 51% down to 39% – stayed away from active participation in networks.

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22 The Medicon Valley includes the regions of Greater Copenhagen and Zealand in Denmark and the Øresund region in Sweeden with the cities of Lund and Malmö. See http://www.mva.org

23 See Porter (1990).

24 See case study Nr. 27 of the summary report on "Case studies of clustering efforts in Europe: Analysis of their potential for promoting innovation and competitiveness" drafted by the consultancy Competitiveness.com (2008) under the Europe INNOVA Cluster Mapping Project, available at the website of the European Cluster Observatory at http://www.clusterobservatory.eu/index.php?id=68

25 See Tappi (2005).

26 See European Commission (2006e). The *'2006 Innobarometer on cluster's role in facilitating innovation in Europe'* is available at http://www.proinno-europe.eu/admin/uploaded_documents/FL187_Innobarometer_2006.pdf

The **continuous success of clusters depends on their capability to change and to adapt**. The high degree of specialisation associated with clusters bears the risk of greater vulnerability to market shocks if a region's portfolio of clusters is too concentrated, which makes it difficult for a region to adjust timely to market changes. Openness and international cooperation work against these risks. Besides that, a higher agglomeration of economic activities is likely to cause over time agglomeration disadvantages in terms of increasing factor costs (labour, real estate) or traffic congestions, which may at some point outweigh the advantages of clusters. Finally, the potential benefits of clusters may lead to the pitfall of regions aiming to create clusters from scratch especially in promising growth sectors, without consideration of regional strength or a necessary critical mass in a global context, however defined.

For these reasons, clusters are not stable and cluster policies not always successful. Numerous case studies have been carried out to better understand the **success factors of clusters**. For example, a study of Brenner & Mühlig (2007) analyses 159 local industrial clusters with respect to 35 different local conditions and processes that may lead to the emergence of clusters.[27] The study distinguishes three types of success factors for the emergence of clusters, namely the "prerequisites" for the development of clusters, the "triggering events" and actions that launch the process of making use of the cluster development potential and "self-augmenting processes" such as so-called Marshallian externalities or localisation economies which cause the activity in an industry and a region to increase further once a critical mass has been reached.

The results of this study suggest that the most important **"prerequisites" for the emergence of clusters** are qualified labour (as mentioned to be important in 105 out of the 159 cases) and strong networks between actors. With respect to networks, great differences of importance can be observed, representing for many clusters an "important" factor (in a total of 78 case studies) but for others a less important one (as mentioned being unimportant in 37 cases). The existence of renowned universities and public research centres is another prerequisite frequently mentioned as being of importance (70). Thereafter follow tradition and historical preconditions (66), industrial structure (61) and local policies, latter of which is mentioned in over a third (56) of the case studies as being important.

Concerning the **"triggering events",** the founding of a leading firm (62), special policy measures (53) and historical events such as wars (52) are the three most frequently mentioned important factors which represent a mix of chance and good policies. Among the **"self-augmenting processes"**, the accumulation of human capital (116), the cooperation among firms (87) and the choice of co-location with other firms (83) are the three most important factors identified as important by the majority of the case studies. It should be pointed out that intra-industrial and inter-industrial spill-overs as well as buyer-supplier relations partly overlap with the cooperation factor which therefore seems to be important as well. Another interesting result of this study is that **policy measures are considered to be of high importance** and that its importance even increased over time.

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[27] Brenner & Mühlig's (2007) meta-study analyses 159 local industrial clusters classified under 183 publication according to whether each of the 35 different local conditions and processes is mentioned as an important factor causing the emergence of the cluster in the respective case studies. Each case study is classified as either mentioning the individual factor as "important", "unimportant" or as giving "no information".

1.4. Identification and measurement of clusters

Clusters are complex constructs of different dimensions that make it difficult to analyse and statistically capture them adequately. There are basically **two different approaches** on how to identify clusters, each with its particular advantages and disadvantages. The first and most popular approach are case studies that provide in-depth qualitative information made available through desk research and interviews with local experts. The second main approach concerns the various quantitative techniques that rely on more sophisticated economic modelling and are based on statistical methods that aim to identify clusters indirectly by measuring the revealed effects assumed to be observable when a cluster is present.

Hundreds of **case studies** exist and they are well-documenting the history, activities and impact of clusters on regional development, employment and innovation. For instance, the European Cluster Observatory has published 25 case studies of cluster across Europe (see Figure 1), together with a summary report and policy conclusions.[28] Further case studies were prepared and co-financed under the European Union's Cohesion Policy to facilitate policy learning at regional level.[29] For instance, a study "Analysing ERDF co-financed innovative projects" presents a comparative analysis of six case studies of cluster-related project. This study also finds that 12 of the 60 ERDF projects analysed (representing 7%) address "clusters and business networks" as a key objective.[30] Further seven case studies of special types of clusters are included in a report on "regional research intensive clusters and science parks" published under the "Regions of Knowledge" initiative[31]. Moreover, a number of OECD publications on clusters (1999, 2001, 2005, 2007, 2008) published detailed case-studies of clusters. The Competitiveness Institute (TCI) also provides a Cluster Initiative Database[32] that lists details of more than 170 cluster initiatives.

Most case studies provide qualitative information about the emergence and strengths and weaknesses of a particular cluster. This may allow identifying its main success factors and fields of activity. However, **each case study tells its own story** and results are hardly comparable. The main lessons to be learned from the large number of available case studies are those presented in the previous chapter. Quite often, no clear distinction is drawn between clusters as empirical factors and cluster initiatives aiming at creating or fostering clusters. This can be explained by the fact that case studies often serve the purpose to prepare for or to follow-up policy actions. In this sense, they represent an interesting source for mutual policy learning.

The holistic case study approach can provide in-depth qualitative information that allows describing in some detail the essence of crucial cluster linkages, processes and interactions

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28 The case studies compiled by the European Cluster Observatory are available at http://www.clusterobservatory.eu/index.php?id=68, together with the summary report on "Case studies of clustering efforts in Europe: Analysis of their potential for promoting innovation and competitiveness" drafted by the consultancy Competitiveness.com (2008).

29 Several case studies of cluster initiatives that were launched under the regional programmes of innovative actions are available at http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/studies_en.cfm?nmenu=5

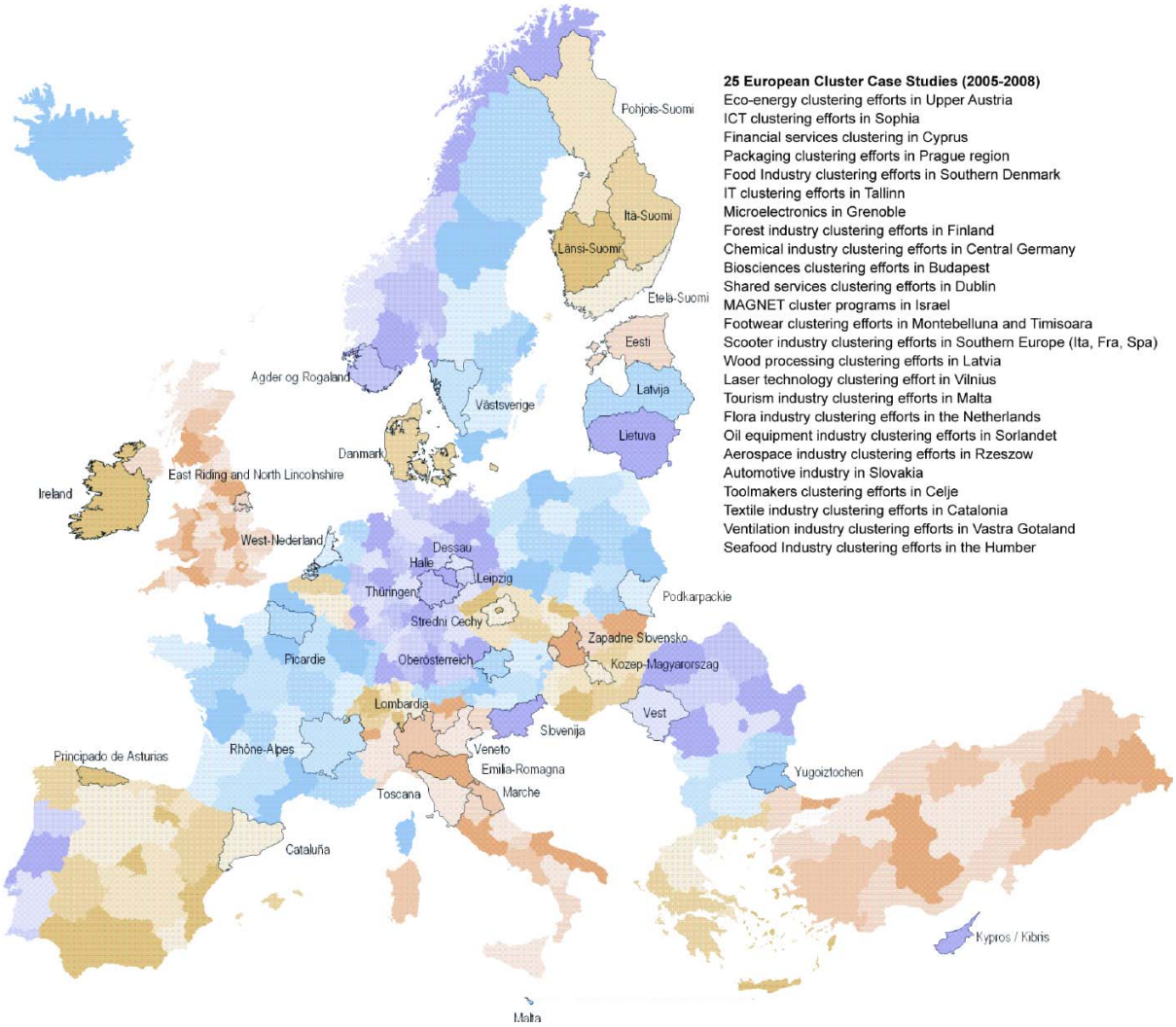
30 See Technopolis (2008). The study is available at http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/innovative_projects_fin.pdf

31 See Saublens et al. (2008)

32 The Cluster Initiatives Database of The Competitiveness Institute (TCI) is available at http://www.competitiveness.org/cid

between innovation actors as well as other important factors for the emergence and working of a particular cluster. The drawback is that this methodology is based on interviews with local experts that are very time-intensive to undertake and to analyse. As dynamics change over time, the results of such methodology may become quickly outdated. Individual anecdotal evidence is always case-specific, which makes it difficult to compare different case studies of clusters and which does not allow drawing general conclusions easily. Therefore, the case study approach is often used to complement statistical analysis.

Figure 1: Overview of case studies of clusters by the European Cluster Observatory



Source: Competitiveness.com (2008), Europe INNOVA Cluster Mapping Project draft report.[28]

The second main approach of identifying clusters concerns the various **quantitative techniques** that rely on more sophisticated economic modelling and are based on statistical methods. The approach followed by the European Cluster Observatory is based on measuring indirectly the revealed effects of co-locations of businesses that are assumed to be observable when a cluster is present, such as concentrated employment rates or higher productivity. Other quantitative cluster mapping techniques exist but are not providing continuously updated data covering all Member States. In this respect a choice had to be made for the European Cluster Observatory on the methodology to be followed.

Cluster mapping is a potentially powerful tool that can help identify, on a statistical basis, the existing, growing, declining and emerging industry clusters in a given geographical area. It therefore offers the possibility to build cluster policies based on well-identified industrial strengths and weaknesses in a region. A cluster mapping study by Sforzi (1990) identified, for instance, 61 industrial districts in Italy representing 5.4 % of all jobs in Italy, and 8.6 % of all manufacturing jobs.[33] Comprehensive **cluster mapping** has also been applied by the US Cluster Mapping Project using a methodology developed by the Institute for Strategy and Competitiveness of the Harvard Business School.[34] The European Cluster Observatory, which was established in September 2006 under Europe INNOVA, customised and further developed this methodology according to the European codification system and to suit European data availability and quality. It delivered the first results in June 2007, which provided a first insight of regional clusters in 38 sectors, located in 32 countries.[35]

The **European Cluster Observatory** provides, for the first time, a quantitative analysis of European clusters based on a fully comparable and consistent methodology across all EU countries. It identifies clusters based on regional employment data that are collected mainly from EUROSTAT and national or regional statistical sources. The approach to cluster mapping used is deliberately **based on the measurement of the revealed effects that linkages and spill-overs have on the location decisions of companies**, not on a direct measurement of such dynamic interactions between the driving forces of a cluster. This has raised some misunderstandings as the statistical results are not always easy to interpret, in particular as they do not necessarily correspond with cluster initiatives aiming at creating or further developing clusters.

The amount and quality of knowledge circulating and spilling over between firms located in a cluster is dependent upon the cluster's size, the degree to which it is specialised and the extent to which the locality (the region) is geared towards and focused upon production in the relevant industries comprising the cluster. These **three factors, size, specialisation and focus**, can be chosen to analyse whether the cluster has reached 'specialised critical mass' to develop positive spill-overs and linkages. The European Cluster Observatory defines the extent to which clusters have achieved this specialised critical mass, by employing measures of these three factors as described below, and assigning each cluster 0, 1, 2 or 3 "stars" depending on how many of the below criteria are met.[36]

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33 See also OECD (2007) and Isaksen & Hauge (2002).

34 For more on information see http://data.isc.hbs.edu/isc/index.jsp and Porter (2003).

35 The 38 traded *cluster sectors* are Aerospace, Instruments, Apparel, Automotive, Building Fixtures, Business Services, Chemical, Communications, Food, Agricultural, Distribution, Education, Entertainment, Heavy Machinery, Finance, Fishing, Footwear, Forest, Furniture, Construction, Hospitality, IT, Jewellery, Leather, Lighting, Constr. Materials, Medical, Metal, Oil and Gas, Biopharma, Plastics, Power, Production Tech., Publishing, Sporting, Textiles, Tobacco, and Transportation. Local sectors – such as local retail and other local services – that mainly serve local markets are not considered because they are neither viewed as being exposed to direct competition across regions nor as tending to "cluster together". They account for nearly 57% of total employment in Europe. The 32 *countries* in the analysis comprise the EU-27 and the five countries of Iceland, Israel, Norway, Switzerland and Turkey. A description of the different cluster concepts and the statistical methodology applied can be found at http://www.clusterobservatory.eu

36 If the number of employees in a cluster is less than 1,000 persons, the cluster is not given any stars to prevent the appearance of very small insignificant clusters.

- **Size**: if employment reaches a sufficient share of total European employment, notably if a cluster is in the top 10% of all regions in Europe within the same cluster category in terms of the number of employees;

- **Specialisation**: if a region is more specialised in a specific cluster category than the overall economy across all regions, notably if a cluster category in a region has a specialisation quotient of 2 or more;[37]

- **Focus**: if a cluster accounts for a larger share of a region's overall employment, notably if a cluster is in the top 10% of clusters within the same category which account for the largest proportion of their region's total employment

The statistical mapping of regional clusters based on an analysis of employment data by the European Cluster Observatory identified **more than 2000 regional clusters in Europe.** On the basis of assigning one star for each of the following criteria size, specialisation and focus of employment within a region, 155 regional clusters register three stars (8%), 524 regional clusters two stars (26%), and 1338 one star (66%). Figure 2 provides an overview.[38]

Figure 2: Cluster presence in Europe – Results from the European Cluster Observatory

	Number of regional cluster	Percentage of total of regional clusters	Percentage of total of potential areas
3 star clusters	**155**	7.68 %	1.58%
2 star clusters	**524**	25.98%	5.34%
1 star clusters	**1338**	66.34%	13.65%
Total number of regional clusters (1-3 stars)	2017	100%	20.57%
Total number of potential [39] areas of cluster development	9804	n.a.	100%

[37] The localisation quotient is calculated as the industry's share of total employment in a given region to the industry's share of total employment in all countries considered in the analysis. A localisation quotient equal to 1 means that the given region is not specialized in the given industry. A localisation quotient equal to 2 means that the given industry is represented by a 100% bigger share of employment in the given region than the industry's share of employment on the level of all regions. This indicates that the region is specialized in the industry. Further information can be found for instance at: http://www.nordicinnovation.net/_img/cluster_benchmarking_project_final_report.pdf

[38] The cluster portfolio strengths of each of the 32 analysed countries are summarised in the Annex of the European Commission's (2007b) Europe INNOVA / PRO INNO Europe paper N° 5 on "Innovation Clusters in Europe" available at http://www.europe-innova.org/ index.jsp?type=page&cid=8702&lg=en

[39] The total number of potential areas of cluster development is calculated by multiplying the 258 regions analysed at NUTS 2 level (within the EU-27 countries, Iceland, Israel, Norway, Switzerland and Turkey) by the number of 38 cluster categories applied, which excludes sectors that mainly serve local markets.

It is important to stress that the identified clusters represent regional **agglomeration effects based on employment data**. If other indicators (which are currently not available) would be applied, a different picture may emerge. Furthermore, it is worthwhile noting that the number and weight of the measured clusters is not stable over time. For example, between 2001 and 2004 a "three star" cluster in Poland newly emerged whereas such a top cluster in Hungary disappeared. Even greater changes could be observed for "one star" and "two star" clusters, which may be either the effect of changing market conditions or successful cluster policies.[40]

This quantitative approach has the clear advantage that it allows **comparability between different countries and over time**. Furthermore, the statistical data obtained by such an approach can be related to other statistical indicators, thus offering new insights into economic realities and dynamics by further correlation analysis. Even if such results need to be interpreted with caution as they do not reveal causalities they may nevertheless contribute to a better understanding of the economic importance of clusters. Although statistical cluster mapping should not be confused with an impact assessment of cluster policies, the impact of such policies should ultimately result in effects that can be identified and measured by statistical cluster mapping, in particular if (in future) more and better statistical indicators are made available for further analysis.

The key advantage of an approach that is deliberately based on the **measurement of the revealed effects of clusters** – and not on a direct measurement of dynamic interactions between the driving forces of a cluster – is that of simplicity. It is not necessary for such an approach to measure all different types of interactions, such as input-output relations, knowledge spill-overs, etc., quantify them and then compare their absolute weight relative to other factors that influence locations decisions, like wages and transportation costs. This approach is based on the assumption that if the interactions are meaningful, they should reveal themselves in the actual geographical patterns of economic activity. However, this remains an assumption and there is no proof that such linkages may also exist in reality.

The main weakness of the quantitative approach of statistical cluster mapping is that it does not allow attributing the observed cluster performance to its underlying factors. Furthermore, such an approach builds on an implicit definition of clusters based on the **concept of co-location of industries**, as well as on conventions for the categorisation of data, such as for the thresholds used for the definition of the relative strengths of clusters. In this context, a slightly different methodology has recently been followed for the identification of clusters located in the Baltic Sea Region, with the view to better reflect the specific market realities in this region.[41] It remains a challenge to verify the needs for such modifications at larger European scale.

It has to be noted that the above described **3-star cluster classification system measures the relative but not the absolute strength of clusters**. It only allows for an identification of the relative strength of industrial agglomerations and is not measuring the absolute strength of clusters in Europe. A comparison between the allocation of stars and employment for the

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40 See Ketels & Sölvell (2006). The report of the Cluster Mapping project of Europe INNOVA on "Innovation Clusters in the 10 New Member States of the European Union" is available at http://www.europe-innova.org/servlet/Doc?cid=7752&lg=EN

41 See Copenhagen Economics (2007) *Internal Summary Report WP4*, BSR InnoNet, Draft Version, October 2007. More information about the Baltic Sea Region Innovation Network (BSR INNO-Net) at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=65&parentID=65.

automotive sector shows, for example, that a number of important regional clusters in terms of employment are not amongst the 3-star regions (see highlighted area in Figure 3).[42] This may be explained by the sector mix in the specific region. The existence of many strong sectors in a given region, for instance, necessarily limits the score for specialisation and focus following the current methodology of the 3-star system.

Figure 3: Comparison of the evaluation of automotive cluster strength by the European Cluster Observatory between stars and employment

Evaluation of automotive cluster strength: **3-stars**		Evaluation of automotive cluster strength: **Employment**	
Regional Cluster	***Employment***	***Regional Cluster***	***Employment***
Stuttgart, DE	136 353	Stuttgart, DE	136 353
Piemonte (Turin), IT	85 915	Piemonte (Turin), IT	85 915
Oberbayern (München), DE	82 339	Oberbayern (München), DE	82 339
Braunschweig, DE	79 997	Braunschweig, DE	79 997
Dogu Marmara (Bursa), TR	44 901	Cataluña (Barcelona), ES	74 086
Västverige (Gothenburg), SE	42 832	Île de France (Paris), FR	61 351
Karlsruhe, DE	40 694	Lombardia (Milan), IT	51 631
Niederbayern (Landshut), DE	37 960	Vlaams Gewest (Antwerp), BE	46 084
West Midlands (Birmingham), UK	37 913	Dogu Marmara (Bursa), TR	44 901
Sud – Muntenia (Ploiesti), RO	32 935	Västverige (Gothenburg), SE	42 832
Severovychod (Hradec Králové), CZ	31 578	Karlsruhe, DE	40 694
Stredni Cechy (Prague Surr), CZ	29 511	Niederbayern (Landshut), DE	37 960
Castilla y León (Valladolid), ES	27 136	West Midlands (Birmingham), UK	37 913

Source: European Cluster Observatory

Another problem is the **limited availability of statistical data** which often prevents to define and measure clusters in a suitable manner. First, the regional level – NUTS 2 – at which European data is available, is based on administrative boundaries that may not reflect

[42] These four highlighted regional clusters (Cataluña, Île de France, Lombardia and Vlaams Gewest) are all evaluated as 1-star.regional clusters by the European Cluster Observatory.

economic interactions.[43] NUTS 2 regions differ significantly in geographic and population size.[44] Second, the industry level statistical classification of economic activities – 4-digit NACE – at which European data is available, is not granular enough to go beyond traditional sectors and reflect the full richness of clusters as groupings of economic activities from different sectors.[45] Third, the only indicator that is available in Europe across all regions and industries is employment.[46] This problem of data quality and availability obliges to reach a second-best compromise on which selected indicators to choose at European level.

Another constraint is that the current industrial classification systems, whether NAICS (US) or NACE (Europe) do not sufficiently reflect the **emergence of new industries**, such as biotechnology. If the basic statistical data is not available, more refined cluster sectors cannot be defined neither. One challenge in this respect is to match and link the different statistical registers as well as to identify the different NACE activities (4-digit level) that should be comprised under specific cluster activities.[47] The boundaries between different sectors are constantly changing and this is not always reflected by the available statistical data. For example, it may be that some clusters do not reach the overall threshold applied for a 3-star cluster even though they are well known as strong clusters in their sector. This is for instance the case of the regions of Toulouse and Hamburg in which strong aerospace clusters (both have a location quotient of about 13 in their cluster category) exist but the number of employees in this cluster sector is relatively small and therefore their share in the relevant regional economy falls short of the threshold applied for a 3-star cluster.[48]

For these reasons, the **approach used by the European Cluster Observatory needs to be continuously further developed and refined**. The most important challenge is to verify whether the assumed patterns of co-location across individual industries sufficiently reflect European realities, taking into account recent technological developments and new cross-sectoral patterns. To this end, the analysis needs to be further improved, by considering further statistical indicators and qualitative information. It seems to be a reasonable approach to cross-check the results from the European Cluster Observatory with other available statistical analysis, such as from the Regional Innovation Scoreboard[49] or on European R&D

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43 More information on the Nomenclature of Territorial Units for Statistics (NUTS) is available at http://ec.europa.eu/eurostat/ramon/nuts/home_regions_en.html

44 Some NUTS 2 regions, e.g. Denmark, represent nations with national policy authorities while others, e.g. the German region around Stuttgart ("Regierungsbezirk Stuttgart"), represent sub-national regions with local authorities. Data at higher granularity – NUTS 3 and higher – is not generally available. In the US, economic areas have been defined by the government based on economic linkages, in particular commuting patterns.

45 At this level, even the best allocation of industries to clusters results in cluster categories that are relatively similar to traditional industrial groupings and largely fail to capture to mix of service and manufacturing functions typical for clusters. In the US, data on the 5- and 6-digit NAICS level is available, which allows a more sophisticated analysis of cluster relations between different industries.

46 In the US, additional indicators like wages and patents are available, allowing a more in-depths economic analysis of the impact of clusters on innovation and competitiveness.

47 See Nielsen (2007).

48 Such cases could be better identified in the future by combining employment data with value added variables, and this work that could be carried out by the European Cluster Observatory.

49 The 2006 Regional Innovation Scoreboard (RIS) is part of the 2006 European Innovation Scoreboard (EIS), available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=248&parentID=51 . The thematic report on the 2006 RIS is available at http://www.proinno-europe.eu/ScoreBoards/Scoreboard2006/pdf/eis_2006_regional_innovation_scoreboard.pdf

and technological specialisations[50] in the global economy. This would certainly enrich the results and test their robustness. The methodology of the European Cluster Observatory should also have the potential to be further applied to specific sectors by adding additional indicators and using a refined methodology. The first case of this type will be provided under a study mapping maritime clusters, which applies the star methodology of the European Cluster Observatory[51]. As this study will assess maritime clusters beyond their relative strength in regions, it will suggest additional assessment criteria to get a more complete picture of their economic value. This approach should be applied wherever possible in the future with the view to further enriching the cluster mapping database while ensuring the overall consistency of the methodology. The next chapter provides a starting point for this analysis.

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50 Information on data on R&D are available at the ERAWATCH website at http://cordis.europa.eu/erawatch/index.cfm?fuseaction=intService.rdSpecialisation

51 See the Commission Staff Working Document on Maritime Clusters, SEC(2007)1406 from 17.10.2007, available on application at http://ec.europa.eu/transparency/regdoc/recherche.cfm?CL=en

2. THE ECONOMIC IMPACT OF CLUSTERS ON COMPETITIVENESS AND INNOVATION

Clusters are seen as **important drivers of competitiveness and innovation**. This chapter presents the main statistical findings currently available on the economic impact that clusters can have on competitiveness, economic growth and prosperity, productivity, innovation and employment and thus explains why clusters may matter. The analysis of the potential impact of clusters is a field of great academic and political interest and numerous studies have been published in this field. This chapter is mainly based on results of the cluster mapping project of the European Cluster Observatory[52], the 2006 Innobarometer survey on the role of clusters (European Commission, 2006e)[53] and the European Innovation Scoreboard[54].

It has to be admitted that the **economic impact of clusters cannot be easily demonstrated in strict statistical terms**. The problem already starts with a proper identification and measurement of clusters, as discussed in the previous chapter. Case studies may tell more sophisticated stories but do not allow for further analysis based on correlations with other key economic key indicators. The available data provided by the above mentioned sources is only limited but still the best available. Any conclusions on the economic impact of clusters must therefore be treated with great care. Further analysis is still needed to draw stronger conclusions, for example on the question of the relative strengths of clusters in Europe.

2.1. Clusters and innovation performance of firms and regions

From the concept of clusters it may be expected that clusters provide a particularly fertile ground for firms to raise their innovation capacity. **Clusters are well aligned with the modern approach of "open innovation"**[55] that suggests that innovation is not created by isolated organisations but mostly in dynamic environments where competent organisations and skilled labour interact in a constructive and complementary way to assimilate existing knowledge and generate new ideas and products. The concept of clusters is very similar to this concept of "open innovation" which is nowadays broadly accepted. Similarities also exist with the concept of **"triple helix"** that emphasises that innovation depends on the interaction between strong academic research (universities), dynamic entrepreneurship and the availability of risk capital (private sector) as well as on a supportive policy framework (public administrations).[56]

As described in more detail in Chapter 1, **cluster firms benefit from the geographic proximity of other drivers of innovation** which facilitates the flows of tacit knowledge, the presence of a skilled labour as well as unplanned interactions that are critical parts of the innovation process. Cluster firms interact more frequently with research institutions which are located in proximity than other firms and have an easier access to international networks and capital. Furthermore, within dynamic clusters, levels of personal exchanges between firms

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52 More information on the European Cluster Observatory is available at http://www.clusterobservatory.eu/

53 The "*2006 Innobarometer on cluster's role in facilitating innovation in Europe*" is available at http://www.proinno-europe.eu/admin/uploaded_documents/FL187_Innobarometer_2006.pdf

54 The European Innovation Scoreboard is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=5&parentID=51

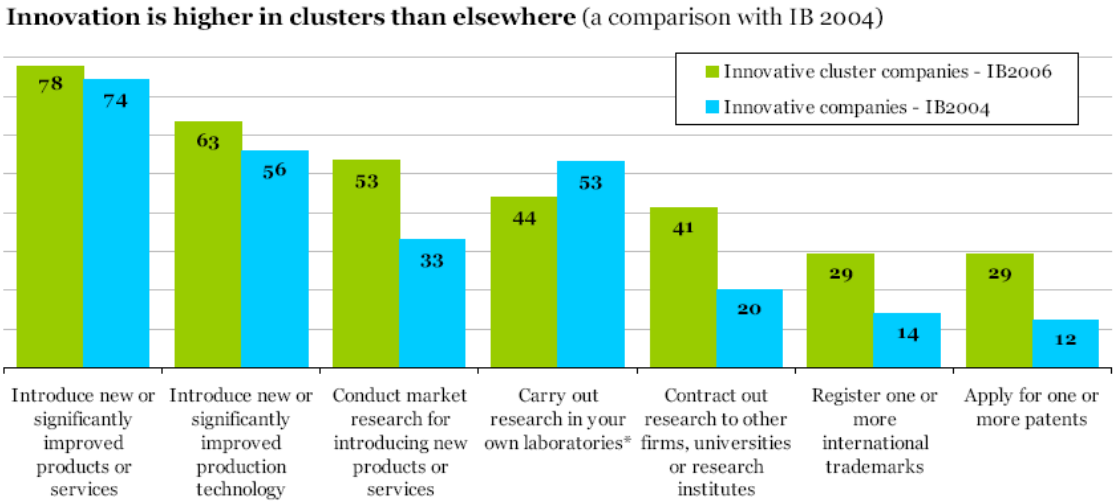
55 See Chesbrough (2003).

56 See Etzkowitz & Leydesdorff (2000).

appear to be higher than in non-clustered locations.[57] This type of **"cross-pollination" of ideas** and innovation has been recognised as one of the main drivers of the success of the Silicon Valley model.[58] Another example is the successful Stockholm ICT cluster which exhibits higher rates of inter-firm labour mobility than the rest of the labour market and higher rates of intra-firm mobility than other comparable private-sector enterprises.[59] Many more case studies suggest that clusters provide competitive advantages for those firms participating in them. The participation of firms in clusters may also be driven by the sheer need to cooperate due to the increasing complexity of innovation nowadays.

The results from the Innobarometer 2004 survey which only interviewed "innovative companies" and of the Innobarometer 2006 which interviewed innovative "companies working in a cluster-like environment" provide further evidence that **cluster firms are more innovative than non-cluster firms** (see Figure 4).[60] 78% of the innovative companies working in a cluster introduced new or significantly improved products compared to the 74% of the 2004 Innobarometer. Similarly, 63% of the innovative cluster companies introduced innovative production technology, compared to the 56% that the Innobarometer found amongst innovative European Union enterprises two years ago. These results suggest that innovation is indeed spurred by clusters.

Figure 4: Comparison between clustered and non-clustered firms



Source: European Commision (2006d) *2006 Innobarometer on cluster's role in facilitating innovation in Europe*

Innovative companies in clusters are also much more likely to conduct market research than innovative companies generally (53% versus 33%). The greatest difference is, however, a direct derivative of operating in a cluster: **innovative cluster companies are more than twice more likely to source out research to other firms, universities or public labs** than

57 See OECD study (2007).

58 See Saxenian (1994).

59 See Power and Lundmark (2004).

60 To allow comparability between the results of the 2004 Innobarometer and the 2006 Innobarometer (IB), only those companies from 2006 cluster-company sample were considered that also at least responded yes to one of the seven activities listed in figure 2 that possibly indicate innovation. Both reports, the "Innobarometer 2004 and the "2006 Innobarometer on cluster's role in facilitating innovation in Europe", are available at http://www.proinno-europe.eu/ index.cfm?fuseaction=page.display&topicID=250&parentID=51

were the average European innovative firms in 2004. This supports the view that clusters are encouraging knowledge sharing which may further stimulate innovation.

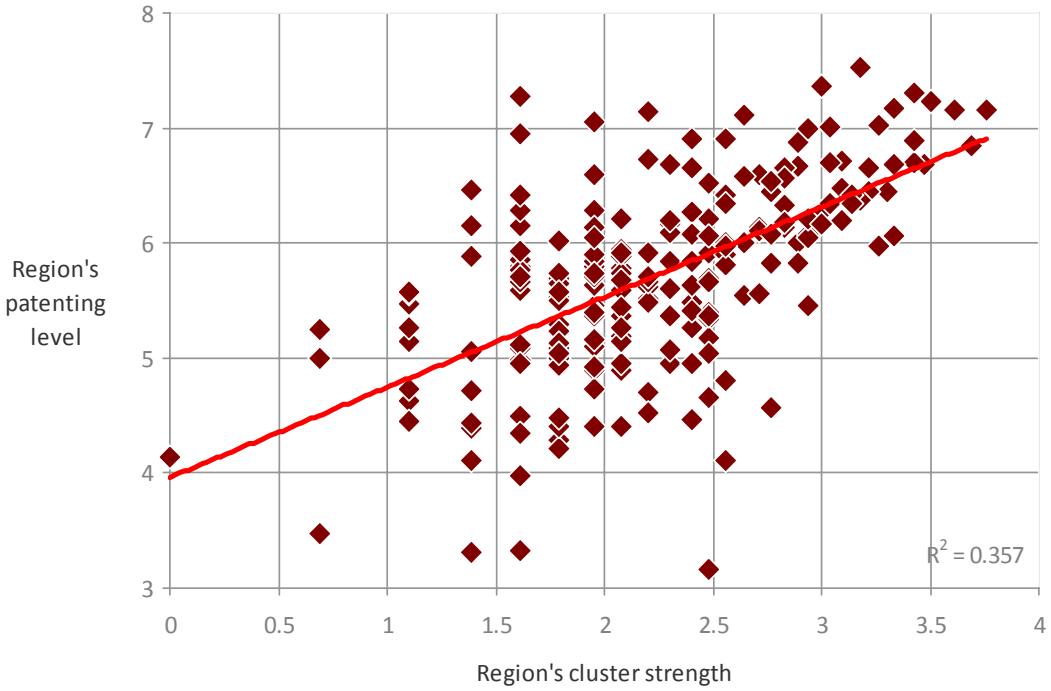
Moreover, **cluster firms patent and trademark their innovations more often** than other innovative companies. While 12% of the innovative companies applied for a patent in 2004, the proportion among innovative companies operating in clusters in 2006 is 29%. The same pattern applies to trademarks where the Innobarometer found 14% of innovative firms registering international trademarks in 2004, whereas 29% of the innovative cluster companies registered at least such trademark in the previous two years.

The 2006 Innobarometer survey also shows that between 66 and 71% of companies active in cluster-like environments in the EU-25 report that they see advantages of being part of a cluster.[61] Moreover, when asked whether they added new services to their customers over the last 5 years, **53% of cluster companies agree that belonging to a cluster facilitated the extension of the scope of their activities**, while 25% disagreed and 20% did not added any new services.

Altogether, there are quite strong indications that clusters foster innovation activities of firms. The **link between clusters and innovation at regional level is more difficult to prove**, due to the statistical problems discussed in the previous chapter which prevent sound correlation analysis. As a first approximation, it has been calculated how the number of patents produced within a specific region are correlated with the strengths of regional clusters as defined by the European Cluster Observatory. It seems that there is a **positive relationship between cluster strengths and regional strengths in patenting**, which is a strong indication for the positive relations between cluster strengths and innovation in general, as patents are a very good proxy for measuring innovation performance.

[61] The score range between 66 and 71% depends on the relevant department in question. As these affirmative scores barely differ between different departments (Marketing, Sales, Procurement/acquisition/supply, R&D, Production and Human resources), the advantages appear to be viewed in a “more holistic way”.

Figure 5 Cluster strength and patenting level in European regions



Source: European Cluster Observatory. ISC/CSC cluster codes 1.0, dataset 20070613

From Figure 5 it can be concluded that all EU regions without clusters (i.e. evenly spread out employment across all sectors) are also characterised by a low level of patent activity. Reversely, all regions with many strong clusters are among top performers with respect to patents.[62] In the group of EU regions with a few ranked clusters, some are performing well and other less well which suggests that the innovation performance of a region can not only be explained by the degree of specialisation, but also involves other aspects of the broader microeconomic business environment, such as labour quality, entrepreneurship, research and education or access to venture capital and advanced infrastructure.

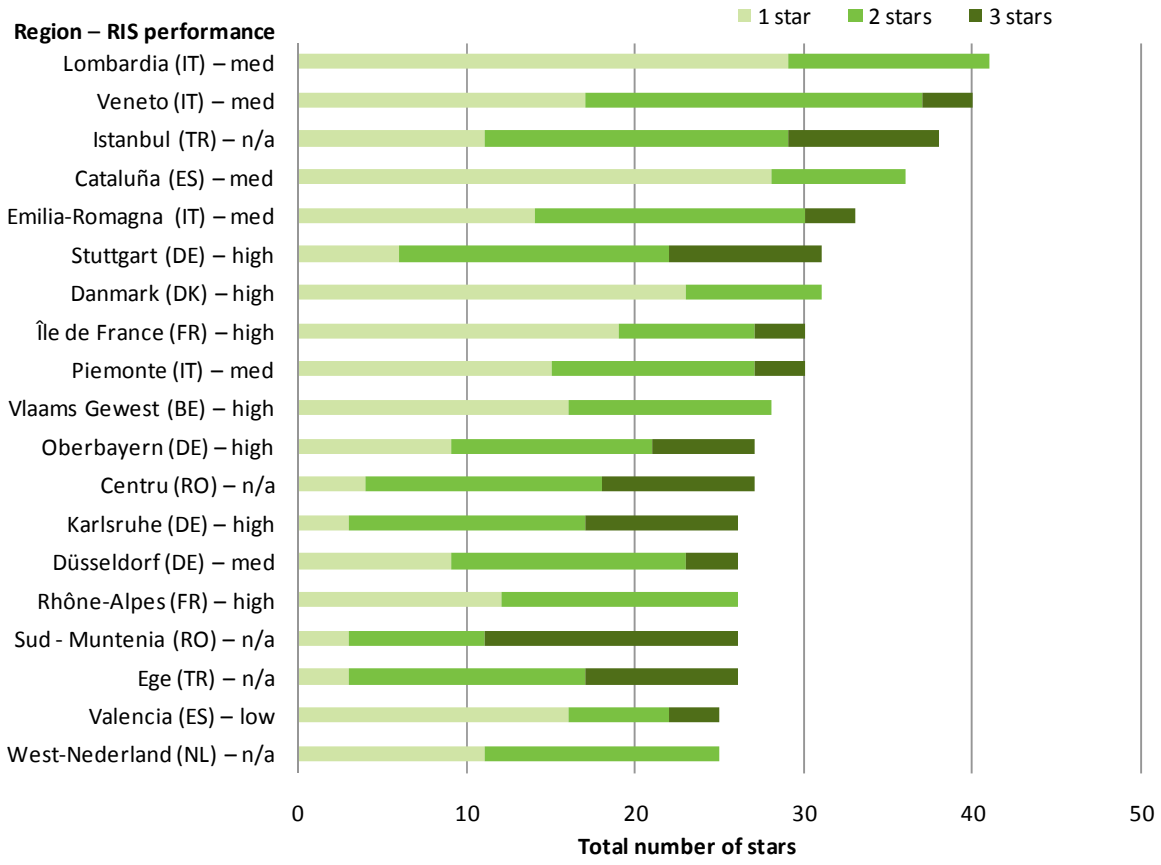
Further evidence suggesting a positive relationship between cluster strength and regional innovation strength is provided by a comparison between cluster performance (as measured by the number of stars for their clusters) and the **best performing innovation regions in Europe** (as measured by the 2006 Regional Innovation Scoreboard[63]). This comparison shows that 7 out of 19 regions **having a strong cluster portfolio** (i.e. the highest total number of stars, equalling 25 stars or more as listed in Figure 6) are among the top third most

62 Many regions with strong clusters that consist of large firms may implicitly produce more patents overall as large firms are generally more likely to produce more patents than SMEs.

63 The 2006 Regional Innovation Scoreboard (RIS) benchmarks 208 European regions on the basis of 7 indicators, including human resources in science and technology, patent applications and employment in medium-high and high-tech manufacturing. The 2006 RIS is part of the 2006 European Innovation Scoreboard (MERIT & JRC, 2007) available at http://www.proinno-europe.eu/ index.cfm?fuseaction=page.display&topicID =5&parentID=51 . The thematic report on the 2006 RIS is available at http://www.proinno-europe.eu/ScoreBoards/Scoreboard2006/pdf/ eis_2006_regional_innovation_scoreboard.pdf

innovative regions (i.e. among the top 33 most innovative regions out of 203 for which data were available). This result suggests that a positive correlation may exist between the strength of regional cluster portfolios and regional innovation performance.

Figure 6: European Regions by Cluster Portfolio Strength



Source: European Cluster Observatory. ISC/CSC cluster codes 1.0, dataset 20070606

However, a more systematic link between clusters and innovation performance is difficult to establish as the **"Regional Innovation Scoreboard"** does not yet deliver information of sufficient detail and reliability, due to missing up-to-date data from many regions. To improve this unsatisfactory situation is still a challenge to be addressed, with the view to better combining the statistical information from different sources.

The results presented so far are also supported by a study of US clusters by Porter (2003), which shows that US regions that have a high proportion of their total workforce located in 'strong' clusters produce a relatively high number of patents.[64]

[64] Porter (2003) applies a slightly different methodology than the European Cluster Observatory in that he uses a broad cluster definition where employment in industries can be double-counted, yet used a 0.8 location quotient (LQ) cut off to counteract the double counting.

Several academic studies have discussed the **relationship between clusters and increased innovation**.[65] For example, Moreno et al. (2006) investigate the presence of innovation clusters in 175 regions of 17 countries in Europe and show that the organisation of innovation is spatially concentrated across regions for all of the 23 investigated manufacturing sectors and that its extent and strength increases over time.[66] This study also suggests that institutional and geographical proximity are two reinforcing features conditioning innovative activity, which provides evidence for the presence of positive effects of the existence of homogenous clusters on innovation.

The **report on "Regional Clusters in Europe"** published by the European Commission (Isaksen & Hauge, 2002)[67] refers to studies for selected sectors that confirm these findings. A study on the European biotechnology industry (Allansdottir et al., 2001), for example, shows that a relatively small number of local clusters have a large majority of European biotechnology firms, public research organisations, and patenting. The top 20 regions that are mainly located in a few countries account for nearly 70% of the biotechnology patents invented in Europe between 1987 and 1996.

2.2. Clusters and specialisation

The cluster mapping analysis of European clusters by the European Cluster Observatory shows that clusters are an important part of the European economic reality. Based on this analysis it can be assumed that roughly **38% of all European employees work in enterprises that are part of a cluster**. In some regions, this share goes up to over 50% while in others it is only about 25%, thus suggesting different specialisation patterns in Europe. About one fifth (21%) of these employees are employed in regions that are more than twice as specialised in a particular cluster category as the average region.

There is an even bigger divergence in the geographic concentration of employment between the different cluster categories across Europe. While on average 32% of employment in a cluster category is more than twice as specialised in a particular cluster category**, individual cluster categories differ significantly in the level of employment concentration**, ranging from a share of below 10% to over 70%.[68] Employment in cluster categories with a relatively small overall number of employees, like footwear and aerospace, is concentrated in a few clusters that account for far more than 50% of all European employment in their category. On the other hand, employment in construction or education as sectors with much larger absolute employment numbers are much more dispersed across Europe.

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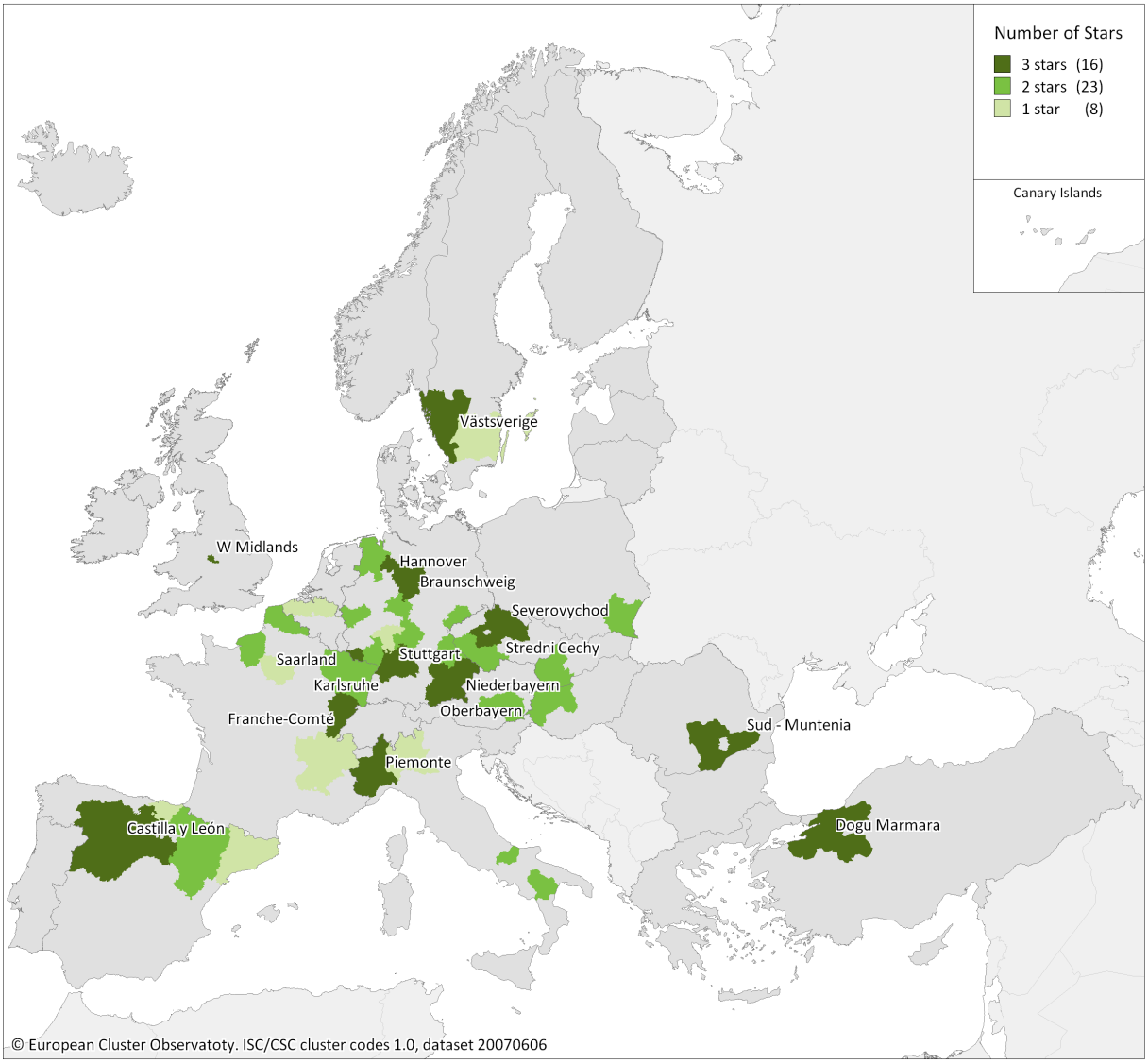
65 For an overview, see for instance Moreno et al. (2006), pp. 1236-1238.

66 The analysis by Moreno et al. (2006) is based on a databank set up by CRENoS on regional patenting at the European Patent Office classified by ISIC sectors (23 manufacturing sectors), which considers 175 regions of 17 countries in Europe over two periods, 1994-1996 and 199-2001.

67 The report (Isaksen & Hauge, 2002) published under the Observatory of European SMEs framework (Report 2002 / No. 3) is available at http://ec.europa.eu/enterprise/library/lib-entrepreneurship/series_observatory.htm

68 See Figure 3 on page 11 of the Europe INNOVA / PRO INNO Europe paper N° 5 on *'Innovation Clusters in Europe: A statistical analysis and overview of current policy support'* by the Directorate-General Enterprise and Industry, which is available at http://www.europe-innova.org/ index.jsp?type=page&cid=8702&lg=en

Figure 7: Leading European Automotive Clusters



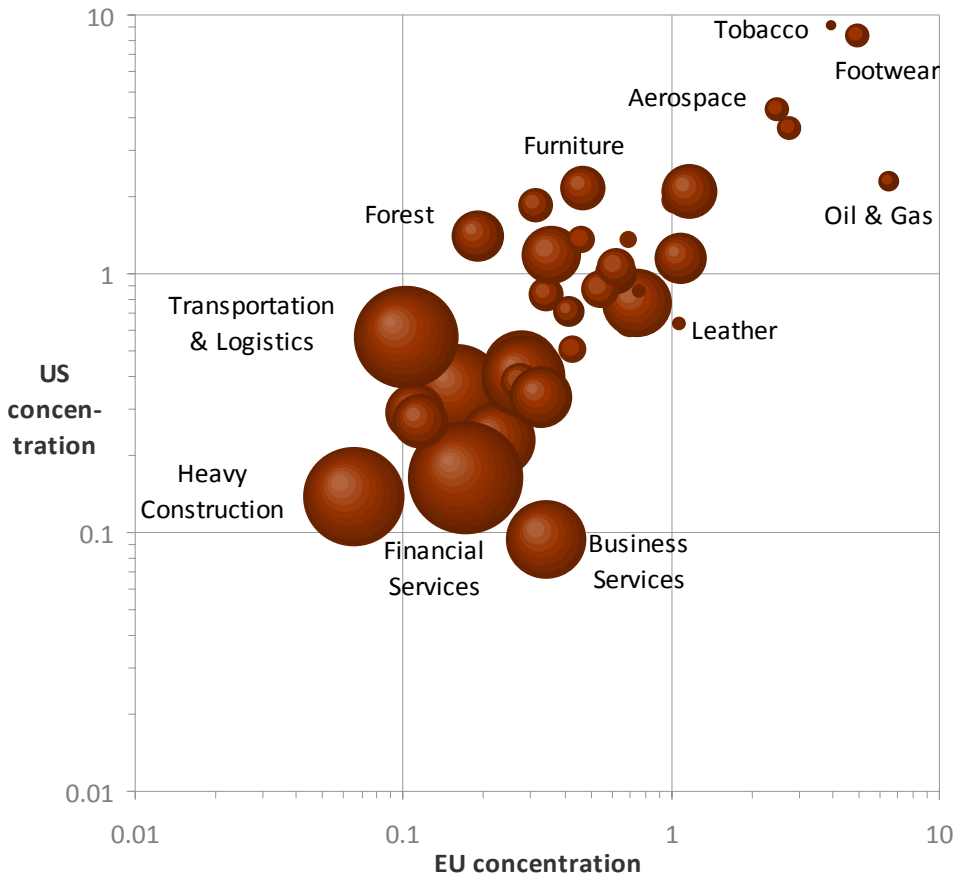
Source: European Cluster Observatory. ISC/CSC cluster codes 1.0, dataset 20070606

Automotive is an example of a cluster category in which Europe shows clear regional specialisation. **Automotive clusters –** including cars, buses and truck assembly, engines and other components – are an area where Europe is among the strongest regions in the world. This success builds on a network of 39 statistically identified regional clusters (see Figure 7) that meet two or three of the cut-off values (i.e. stars)[69] as discussed above and account for more than 50% of all European employment in the category. These regional clusters are interlinked by international value chain strategies of manufacturers and suppliers, which can capitalise on the differentiation of local cluster conditions.

69 According to the earlier described methodology (see chapter 1), 16 regional cluster were assigned 3 stars and 23 regional clusters were attributed 2 stars, while there an additional 8 regional clusters assigned 1 star out of a total of 259 regions.

A comparison made by the European Cluster Observatory on the differences of cluster strength between Europe and the US using a comparable cluster mapping methodology and data suggests that the **average region in Europe is less concentrated than the average region in the U.S.** (see Figure 8). Out of the 38 cluster categories analysed, 32 are more geographically concentrated in the U.S. compared to Europe. This suggests that the degree of specialisation in Europe is less strong than in the US.

Figure 8: Regional concentration of European clusters compared to the US



Source: European Cluster Observatory. ISC/CSC cluster codes 1.0, dataset 20070613 [70]

Overall, the data analysed by the European Cluster Observatory shows that **Europe lags on average behind the United States in terms of cluster strength** (as defined in terms of industrial agglomeration), both from a regional and industry perspective.[71] European regions tend to have a smaller share of employment in strong clusters, i.e. regional clusters in which a region is more than twice as specialised as the average region (see Figure 9). For the average region, **Europe's share of employment in strong clusters is a quarter lower than in the**

[70] The measurement of concentration uses a standard measures to asses disproportionality in distributions that takes into account how employment is distributed within every region.

[71] For this comparison, the same methodology and cut-off points that the European Cluster Observatory uses for the European data is also used for US data.

United States. For the median region, the gap is even larger and about a third. While the most specialised European regions even have a slightly higher employment share than their U.S. peers, the differences get larger among the less specialised regions where Europe lags behind.

Figure 9: Employment share of strong clusters (LQ>2) across regions

European Regions	
Most specialised region:	74%
Average region:	21%
Median region:	18%
Least specialised region:	0%

U.S. Regions	
Most specialised region:	70%
Average region:	28%
Median region:	27%
Least specialised region:	0%

Source: European Cluster Observatory (2007).

This leads to the question of why these differences across cluster categories exist. A possible explanation could be that **market integration is still relatively weak in Europe**. In this sense, differences in regional specialisation between Europe and the US may be explained by Europe's legacy of national borders, which remain an important physical, legal and mental barrier reducing the relative importance of cluster effects as a driver of location choices. Observed patterns of geographic activity in Europe are thus likely to provide a mix of cluster and legacy effects, providing less accurate information on interactions between specific industries.

The **differences between co-location patterns in Europe and the US** are therefore likely to reflect the remaining barriers to cross-regional competition in Europe as there is little reason to believe that the underlying technical and economic drivers of interactions should be systematically different. The revealed effects of clusters should be strongest, if the location choices of companies are not biased by barriers to trade and investment across regions. An integrated large economy with the lowest level of such barriers, such as the US, may thus be an environment which displays cluster effects more clearly. A better understanding of the specific co-location pattern in Europe and their evolution over time remains a challenge to be further addressed.

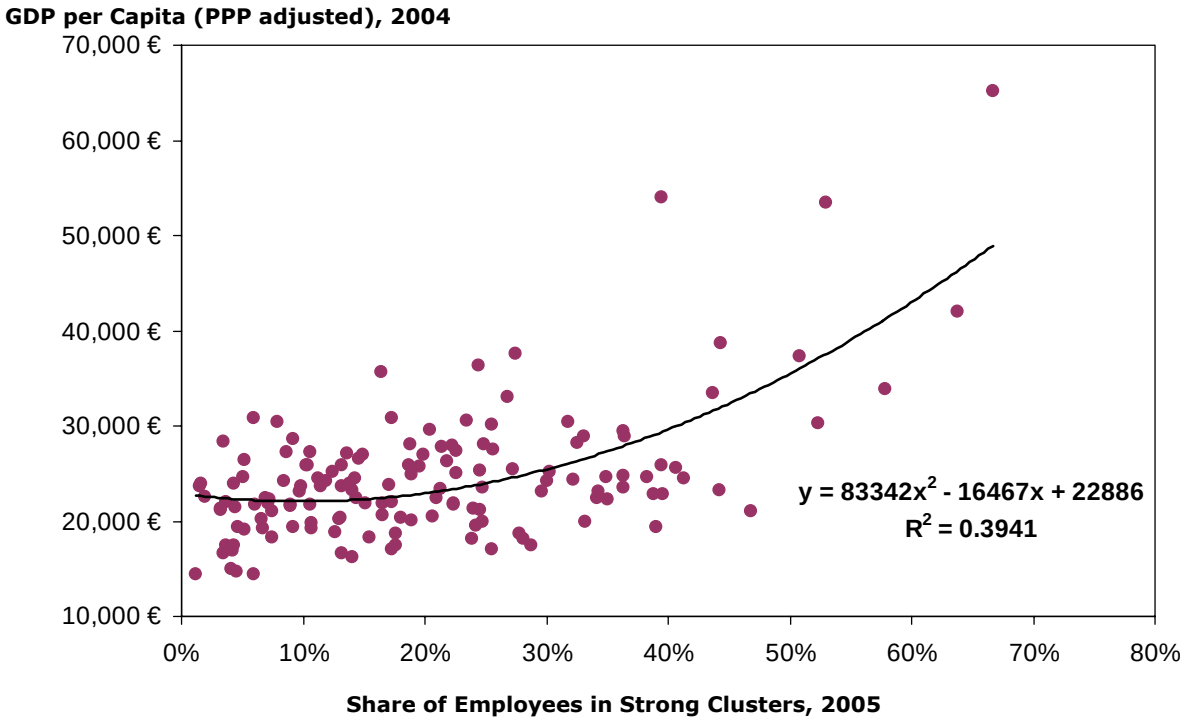
Another explanation may be that **new industries emerge faster in the US than in Europe**. This could be caused by the observed different entrepreneurial cultures that exist in the two regions. The 2007 Eurobarometer Entrepreneurship Survey (European Commission, 2007c) showed that the average American appears to be far more inclined to set up their own business than Europeans. While 61% of Americans would like to become their own boss, only 45% of the Europeans have this wish. Europe's problem in terms of entrepreneurial attitude is mainly attributed to the fear of business failure, bankruptcy and the uncertainty of income are the top fears in the EU, while lack of finance remains to be the main problem.[72]

[72] The results of the Entrepreneurship Survey of the EU (25 Member States), United States, Iceland and Norway of the European Commission's Eurobarometer is available at http://ec.europa.eu/enterprise/enterprise_policy/survey/eurobarometer_intro.htm

2.3. Clusters and economic performance

It can be reasonably assumed that **clusters are among the most relevant microeconomic factors** that influence the levels of prosperity of a region. Clusters and regional specialisation are empirically associated with higher levels of prosperity. The European Cluster Observatory and other cluster mapping efforts – such as the profiling of specialisation patterns across cluster categories (groups of industries that empirically co-locate) in regional economies in Europe, North America, and a few other countries – have provided systematic evidence on these links. Economic **prosperity among the regions of Europe is linked to the degree of cluster strength**. Regions with a higher share of employment in industries that belong to strong clusters[73] are generally more prosperous (see Figure 10). While many factors other than clustering can have an impact on prosperity, the data provides clear evidence that clusters are significantly related to prosperity.

Figure 10: Cluster Strength and Prosperity (EU15)



Source: European Cluster Observatory. ISC/CSC cluster codes 1.0, dataset 20070510

Note: Strong clusters defined by a Localisation Quotient (LQ)>2; NUTS Regions excluding Portugal and Greece. The localisation quotient for a given industry measures the extent to which a region is more specialised in an industry compared to the geographical area in question.

The role of clusters in explaining economic performance of regions has been largely confirmed by other studies, although many are case specific and large scale empirical reviews are extremely rare. **Porter's (2003) study of US clusters**, for instance, shows that US regions that have a high proportion of their total workforce located in "strong" clusters enjoy a higher

[73] Strong clusters are defined by a share of employees in clusters with a location quotient larger than 2.

level of economic development in the form of average wages and employment growth in addition to the earlier mentioned higher patenting.[74] A study of **Danish biopharmaceutical clusters** has confirmed these results, suggesting that an increase of the location quotient (i.e. agglomeration) of one percent would lead to a three percent increase in cluster average wages.[75] With other words, the more specialised a region is the greater the potential for higher wages.

A new study by Wennberg & Lindqvist (2008) covering 4,000 new entrepreneurial firms in knowledge intensive industry sectors in Sweden shows that at the firm level **clustered firms created more jobs, higher tax payments, and higher wages to employees**.[76] In addition to the effect on performance, the study also found strong empirical evidence that being located within a cluster has positive effects on the survival of new firms.[77] The comparative survey of 34 clusters in 17 countries summarised in the report on "Regional Clusters in Europe"[78] also reveals that most of the surveyed clusters are growing in both the number of firms and employees, yet with a bias towards science-based and young clusters. The survey further suggests that regional clusters performing in general better than the national average.

While it can be assumed that clusters come with higher innovativeness, more employment and economic growth especially in the first years of a local cluster's existence, a study by Brenner & Gildner (2006) points out that the **positive relation between local clusters and economic performance may wear off with time**, even though it is still visible, on average, in local clusters that exist for more than 50 years. Importantly, the study highlights that over time "old" clusters seem to still have a positive long-term economic impact on unemployment, income and the local start-up rate only, while a negative impact over time seem to emerge with regards to the involvement of a region in new technologies. This seems to confirm that clusters need to change and adapt to new contexts and challenges. Altogether, there is nevertheless strong evidence that a cluster-based regional economy generates better economic results.

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74 Porter (2003) applies a slightly different methodology than the European Cluster Observatory in that he uses a broad cluster definition where employment in industries can be double-counted, yet used a 0.8 location quotient (LQ) cut off to counteract the double counting.

75 See Copenhagen Economics (2007). .An increase in location quotient of, say, from 1.7 to 1.8 would bring about an increase in average wages for all employees in the specific cluster of three percent on average.

76 The study by Wennberg & Lindqvist (2008) is based on a combined employee-employer database by Statistics Sweden of 4,397 firms started in Sweden between 1993 and 2002, in 23 industries (5-digit SIC-equivalent industry codes) representing the following five sectors: telecom and consumer electronics, financial services, information technologies, medical equipment, and pharmaceuticals and biotech industries. The study is available at http:swoba.hhs.se/hastba/abs/hastba2008_003.htm

77 Based on these results, they recommend that policies for entrepreneurship or cluster initiatives should take into account these differences in development between new firms located in clustered and non-clustered regions. As new firms located in clusters were found to have a larger impact on local economic viability, they support entrepreneurship policy (promoting firm formation through spin –offs or incubators) with a focus on clusters.

78 See Isaksen & Hauge (2002).

3. CLUSTER POLICIES IN EUROPE: CONCEPTS AND MAIN CHARACTERISTICS

In recent years a large number of policy initiatives were launched and implemented in Europe aiming at fostering existing clusters or creating favourable conditions for the formation of new ones. Such efforts may be labelled as cluster policies. Currently, **more than 130 specific national measures in support of clusters** in have been identified in 31 European countries and registered by the INNO-Policy TrendChart[79] in cooperation with the ERAWATCH[80] tool. Almost all EU Member States have now cluster-specific measures or cluster programmes developed at national and/or regional level, suggesting that they are a key element of national and regional strategies in support of innovation.

This chapter describes the concept of cluster policies and provides an **overview about the typology and specific features of cluster policies in Europe** which are developed and applied at national and regional level. It also presents the relevant policy initiatives and instruments that are developed at Community level to complement national and regional efforts in this field, notably with the view to supporting mutual policy learning. Whereas these policy activities will be described in some detail, it is not the purpose of this chapter to evaluate them or to present and assess policy options for better cluster policies.

3.1. Concept and rational of cluster policies in Europe

As explained in Chapter 1, cluster policy can be understood as a wider set of specific government policy interventions aiming at strengthening existing clusters or facilitating the emergence of new ones. Cluster polices may take different forms and follow different ambitions, ranging from framework policies setting general political objectives to specific cluster programmes defining specific measures, allocating funding and organisational responsibilities, and setting specific rules for participation in the programme.

Cluster policies are motivated by different considerations. Examples of successful clusters such as Silicon Valley have raised the political interest in clusters and fuelled the desire to replicate them in other regions. For policy makers, the cluster approach responds to the need to follow a modern, multi-actor and cooperative approach ("triple helix") which favours innovation and helps enterprises to better face global competition.[81] Cluster policies are often driven by the objective to stimulate growth and innovation by addressing proven or assumed market failures[82] that may prevent knowledge and technology spill-overs to take place**,** such as coordination failures[83], information asymmetries[84] and path dependency[85].

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79 More information about the INNO-Policy TrendChart is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=52&parentID=52

80 More information about ERAWATCH is available at http://cordis.europa.eu/erawatch

81 See Etzkowitz & Leydesdorff (2000).

82 See Oxera (2006).

83 *Coordination failures* may arise because individual actors in the cluster do not consider the spillovers they create for others (such as public returns), which can cause an under-provision of activities or investments.

84 *Information asymmetries* may exist concerning necessary information about what steps should be taken to derive maximum overall value. Such information is often is dispersed across many different actors, especially if there is no interactive dialogue and communication between them.

The cluster approach offers policy makers the opportunity to better streamline different policies towards the objective of stimulating growth and innovation, by using synergies between them and engaging in a dialogue with other stakeholders on how to best remove obstacles and barriers for better economic development. It this sense, **cluster policies are a vital element of building strong innovation systems** which are seen as a pre-requisite for growth and jobs. As supported by evidence from the European Innovation Scoreboard there is a strong relation between the overall strength of a national innovation system and the innovation performance. Only if supported by generally favourable framework conditions, innovation can flourish in the best manner. This "horizontal approach" may find its best expression in cluster policies that aim at bringing different policies together and using synergies between them.

While there are certainly examples of good practice in cluster policy, it should be noted that there cannot be a blue print for successful cluster policies or a one-size-fits-all model as the specific industrial and systemic economic strengths and weaknesses in a region need to be taken into account. **Cluster policies reflect where a country or region wishes to position itself in global competition with a mid-term perspective**, building upon existing strengths and mobilising the necessary commitment from all innovation stakeholders to move into the right direction. The main risk related to this approach is that these strategies may not take sufficiently into account the comparative advantage of their region and country in relation to the competitive conditions of other areas. In other words, there remains a risk that strategies are too inward looking and not outward looking.

Cluster policies may be divided into **three different categories**, reflecting the different motivations and policy objectives behind them. The first and most horizontal category concerns "facilitating policies" directed towards creating a favourable microeconomic business environment for growth and innovation that indirectly also stimulate the emergence and dynamics of clusters. A second category comprises "traditional framework policies", such as industry and SMEs policies, research and innovation policies, and regional policy that often use the cluster approach to increase the efficiency of a specific instrument.[86] A third category consists of "development policies" aiming at creating, mobilising or strengthening a particular cluster category resulting specific sectoral cluster initiatives. Strictly speaking, only this policies falling into this category should be labelled as "cluster policies".

According to a survey by the European Cluster Observatory (Oxford Research, 2008)[87], the number of countries adopting cluster policy in the time periods from 1990-1994, 1995-1999, 2000-2004 and since 2005 is fairly equal. **Most countries started to use the concept in the period from 1990-1994** and in the period from 2000-2004. Considering the fact that around half of the countries used cluster policy for the first time in the period from 2000 until today, the policy area is still at an early stage in many countries while maturing slowly in others.[88]

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85 *Path dependency* concerns intertemporal spillovers, which means that past actions have an influence on the current profitability of the actor. Actors in a cluster may ignore future (intertemporal) spillovers because of the time lag in reaping the benefits.

86 See OECD (2007).

87 The report of Oxford Research (2008) entitled "*Cluster policy in Europe – A brief summary of cluster policy in 31 European countries"* is part of the Europe INNOVA Cluster Mapping project and available at the European Cluster Observatory's website at http://www.clusterobservatory.eu/upload/Synthesis_report_cluster_mapping.pdf

88 A forthcoming article by Landabaso & Rosenfeld on "Public Policies for Industrial Districts and Clusters" also concludes that the development of cluster initiatives is still quite recent in the majority of

As it may take 10-15 years before the full impact of cluster policies and programmes may be seen it is therefore still too early to expect a serious assessment of their economic impact.

This survey of the European Cluster Observatory also gives an overview of the **main characteristics of the national and regional cluster programmes**. Concerning the national level, the survey studied a total 69 national cluster programmes within 26 of the 31 countries investigated. As for policy focus, almost half of the national cluster programmes are classified as related to either industrial and enterprise policy and almost half are related to the science and technology. Almost every national cluster programme defines private business as their target group, followed by research and development institutions. A particular focus on SMEs has been identified in 31 out of the 69 national cluster programmes. National cluster programmes that focus on particular lifecycles of clusters tend to focus on emerging and embryonic clusters. However, 36 of the 69 cluster national programmes have no particular focus on clusters in a certain development stage.

The Basque Country Competitiveness Programme: a positive example[89]

The Basque Country Competitiveness programme to support clusters aimed at responding to the general industrial decline in the region (back in the early 1990s) by promoting active co-operation among firms and associated regional innovation institutions. The strategic orientations of the programme were based on the results of a cluster mapping and a government sponsored dialogue among different regional stakeholders. Following this public/private dialogue, the government selected 12 cluster initiatives with an overall annual spending ranging from EUR 2 to 2.4 million per year over the last few years. The selected areas include traditional and high-tech sectors such as automotive, telecommunications, eco-industry, and energy. The cluster initiatives benefited from cooperation with the Basque Technology Network that involved different innovation centres such as ten technology centres, four universities, four sectoral research centres and 14 intermediary innovation organisations. One evaluation, using a European Foundation for Quality Management (EFQM) model, noted positive results especially in terms of increasing co-operation between different innovation actors in the region.

At regional level, the survey also identified a total of 88 regional cluster programmes within 17 out of the 31 European countries under investigation. Among the 84 out of these **regional cluster programmes** for which an overall policy focus was stated, 52 have a regional development focus, 40 an industry and enterprise focus and 30 programmes target the area of science and technology. The dominating target group of regional cluster programmes is businesses. 81 of the 84 programmes fall into this category. Among the remaining groups, there is a fairly equal distribution among research institutions (52 programmes), educational institutions (45 programmes) and public authorities (43 programmes). Based on a holistic perspective, this proves that it is common to have several target groups per programme. The average number of target groups per programme is three. In terms of support, 29 out of the 88 regional cluster programmes offer only finance, 31 only knowledge/network and 25 programmes offer both.

The survey further analyses the sources of financing for national cluster programmes in Europe and estimates that national budgets are the main source of funding for 63% of cluster

European regions. Nevertheless, they also state that these initiatives have in several forms inspired new policy tools that are based on more efficient public-private partnerships and business networking. They advise that these experiments proceed as long as lessons learned (successes and failures) are effectively shared among regions.

89 See OECD (2007).

programmes, while **EU Cohesion Policy is supporting 19% of national cluster programmes in Europe**. Under the Regional Operational Programmes for innovation in the period 2000-2006, community funds have co-financed in particular scientific infrastructures such as science parks and incubators as well as networking activities needed to create links between regional authorities, businesses and universities.

The new European Regional Development Fund Regulation for the period 2007-2013 includes explicit support to business networks, public-private partnerships and clusters.[90] Moreover, the **Community Strategy Guidelines on Cohesion**[91], in line with the Lisbon Strategy, recommends several explicit cluster-related actions under the priority of improving knowledge and innovation for growth.[92] In this context, approximately 86 billion € of Cohesion Policy funds are allocated to innovation in the EU-27, for the period 2007-2013 of which considerable amounts will support cluster initiatives and their infrastructures.

Three examples of Community support to regional cluster initiatives:

Oulu ICT cluster: successful networking

With the stimulation of funding from Cohesion policy, a major effort has been carried out to integrate separate initiatives, actions and programmes in the Oulu region within the framework of the so-called Oulu Growth Agreement. The agreement focuses on five clusters, ICT being one of them. Industry forums that bring together some 150 enterprises are the core feature of the cluster development programmes of the agreement. The Mobile Forum is supporting R&D and business development for mobile products and services and the exploitation of the spearhead initiative "Octopus network", which is an open innovation and testing environment for mobile technologies. Octopus also provides education in mobile technology related fields. Funded by the Structural Funds in 2002–2004, Octopus has partnered with Nokia and some 60 other companies, the City of Oulu and Higher Education Institutions of the region.

In 2005, the volume of R&D expenditure in the Oulu region was € 688 million (i.e. some €3.400 per capita, which presumably is one of the highest figures in the EU). Enterprises account for the majority of these expenditures. The volume of public sector's (incl. VTT) expenditure in R&D is approximately between €30–40 million. Moreover, in 2005, 117 Finnish private equity companies made investments worth of some €35 million to both new and established companies located in Northern Finland.

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90 See in particular Articles 4 and 5 of the "Regulation (EC) No 1080/2006 of the European Parliament and of the Council of 5 July 2006 on the European Regional Development Fund" published in the Official Journal of the European Union on 31.07.2006 (OJ L 210, page 1).

91 See "Council Decision of 6 October 2006 on Community strategic guidelines on cohesion (2006/702/EC)" published in the Official Journal of the European Union on 21.11.2006 (OJ L 291, page 11). The text is available at http://ec.europa.eu/regional_policy/sources/docoffic/2007/osc/index_en.htm

92 This includes the guidelines of "strengthening cooperation among businesses and between businesses and public research / tertiary education institutions, for example, by supporting the creation of regional and trans-regional clusters of excellence"; "making regional RTD innovation and education supply more efficient and accessible to firms, in particular SMEs, for example by establishing poles of excellence, bringing together high technology SMEs around research and technological institutions, or by developing and creating regional clusters around large companies"; and "providing business support services to enable enterprises, and in particular SMEs, to increase competitiveness and to internationalise, in particular by seizing the opportunities created by the internal market" adding that "[b]usiness services should prioritise the exploitation of synergies (for example, technology transfer, science parks, ICT communication centres, incubators and related services, cooperation with clusters) and give more traditional support in the areas of management, marketing, technical support, recruitment, and other professional and commercial services".

The OMNIPACK cluster: A pioneer regional cluster

The Czech OMNIPACK cluster was initiated by a key industrial holding, the PolyPlast company, which also provided co-financing. More than 300 firms and other organisations (such as universities) were contacted during the launch phase of this initiative of which 21 organisations agreed to become part of the new cluster and to participate in the ERDF co-funded project. The impetus for establishment of the cluster came from the association of packaging companies operating mainly in the Královehradecký region, which is the centre of the packaging industry in the Czech Republic. The ERDF co-financed Clusters Measure was seen as an opportunity to speed up and broaden co-operation, and the OMNIPACK cluster project was amongst the first to seek support for this process.

Cambridge high-tech Cluster: Cohesion Policy support is far more than just subsidies[93]

The Cambridge Cluster is one of the world's leading high-technology clusters, home of around 1500 high technology ventures and 40 000 jobs. It emerged in the 1980s around the university and the wide research talent located in the area, under the push of an informal network facilitated by Barclays Bank. Financial support of Cohesion Policy or public national sources would make no difference.
The St John's Innovation Centre played a relevant role in the management of the cluster since the 1990s, which is an important activity for cluster growth. Accredited quality standards in the provision of business support services can strengthen support to clusters. The accreditation of the St.John's Innovation Centre as a Business Innovation Centre (BIC) and its membership in the European Business and Innovation Centres (BIC) Network [94] may have helped in the Centre's contribution to the emergence of the cluster. These regional Centres are, in poor regions, supported by regional Cohesion Policy funds. Their European umbrella organisation, the European Business Network (EBN) was launched with the financial and conceptual support of Cohesion's policy initiative Innovative Actions. Nowadays it is independent from public subsidies.
Currently, EBN manages the "European Community Business and Innovation Centre Trademark" on behalf of the European Commission. This confers on EBN the responsibility for granting, renewing and withdrawing licences under the co-ordination of the European Commission's Directorate-General for Enterprise and Industry.

Although many clusters have emerged spontaneously without a specific policy support, the **role of the public sector in supporting specific cluster-related activities** is considered by many cluster firms as important, as pointed out by the Innobarometer 2006.[95] Over 68% of company managers working in a cluster-like environment agree that public authorities have a fundamental or important role to play to support the cluster, while 13% see a limited role and only 15% say that public authorities have no role to play in supporting their cluster. It is worthwhile noting that some remarkable national differences exist with respect to the perceived role of the public sector in support of clusters which is most strongly welcomed in the South European countries such as Portugal, Spain and Italy, whereas it is less supported in many new Member States.

This survey also juxtaposes the current recognised provision of support instruments with companies' **expectations for improvement in support activities** (see Figure 11). Cluster companies report that they are currently provided most assistance from public authorities in form of traditional support instruments such as by channelling and publishing information as

93 See the report on "'Regional Research Intensive Clusters and Science Parks" (Saublens et al., 2008) published by the European Commission in the framework of the Regions of Knowledge initiative.

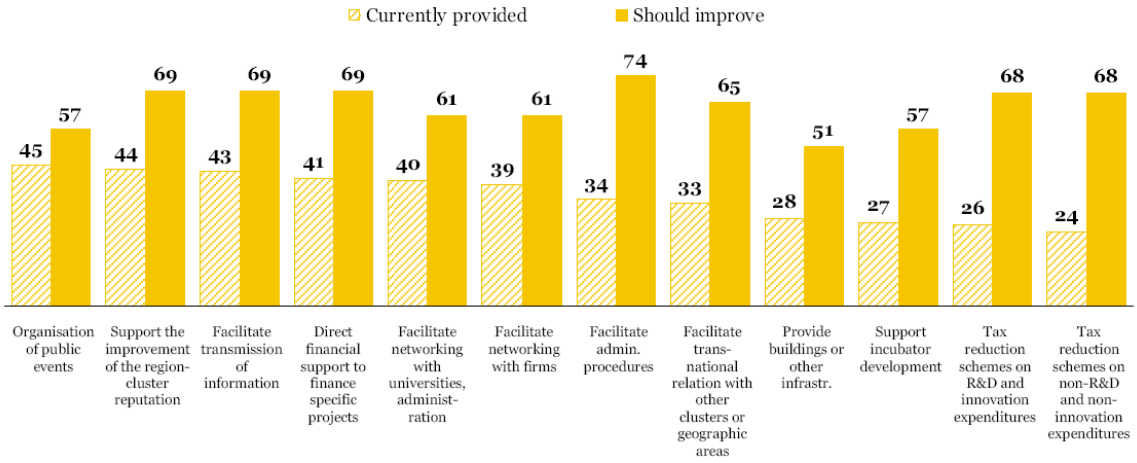
94 For more information about St. John's Innovation Centre see http://www.stjohns.co.uk

95 The 2006 Innobarometer on Clusters (European Commission, 2006e) is available at http://www.proinno-europe.eu/admin/uploaded_documents/FL187_Innobarometer_2006.pdf

well as through actions intended to enhance the reputation of the cluster or region. On the other side, the most important areas where cluster firms desire improvement are support activities for facilitating administrative procedures (reported by 74% of the firms), facilitating information flow, getting more finance for carrying out specific projects, and in improving the branding of their region. The biggest perceived gaps between the current provision and desired better support activities concern tax reductions, the facilitation of administrative procedures and support for trans-national cooperation. Concerning the latter, 65% of the interviewed cluster firms responded that public authorities should improve the support to increase their trans-national relation with other clusters or geographical areas; while only one third of them reported that they are currently receiving support in this domain.

Figure 11: Support activities of public authorities:

Assessment of current levels and desire for improvement



Source: European Commission (2006e) *Innobarometer 2006 on clusters.*

Although the topic of **evaluation of cluster policies and programmes** is important for policy makers in order to assess results and identify improvements, this area is still largely undeveloped. Usually, the indicators for measuring cluster policy impact involve the creation of new firms, growth in output, profits and exports, the number of innovations produced in cooperation, etc. However, such detailed statistical regional and cross-border data is notoriously difficult to collect.

It is difficult to measure the impact of cluster policies and programmes as most of their effects are only indirect and affected by many other factors. This makes it very **difficult to establish clear causal links between cluster policies and programmes and their potential impact**. Moreover, the time horizon renders difficulties since some economic and social benefits materialise only in the long term. As the topic of impact assessment is considered mainly as technical problem, it seldom receives full attention at the highest levels of decision-making. To better address this issue, for example as part of the Lisbon process, still remains a challenge. Besides that, cluster policies and programmes should also be assessed more frequently against the expectations of the stakeholders as there seem to be some gaps between their expectations and the support mechanisms offered by cluster policies and programmes.

3.2. The role of trans-national cooperation at policy and programme level for strengthening clusters

Cluster policies are rightly seen as an **instrument to improve national and regional competitiveness**, which explains why only few of the cluster programmes have an international dimension. This perception of national and regional-centric approaches has recently started to change. Taking into account the effects of globalisation, which strengthens the competition between different locations but offers also new scope for business cooperation along the different value chains, trans-national cluster cooperation appears in a different light. Increasingly, it is recognised that **a country cannot be excellent across the board** and that more specialisation is needed in order to stay competitive.

At the lowest level, **mutual policy learning** is a motive for closer cooperation among those responsible for cluster policies and programmes. Learning from the experience of others, adopting successful practices, avoiding mistakes, and being aware of new challenges and policy trends in this area, helps to advance faster and readjust cluster policies towards new emerging needs and challenges. However, a pre-condition for this type of cluster policy cooperation is that the participants share the same interests. Without further incentives there seems little interest to share experience with those who still have to climb-up the ladder before reaching the same maturity as those who started with cluster policies already many years ago.

A second motivation is the interest **to jointly develop practical tools and solutions** for pertinent problems related to cluster policies and programmes, such as the search for better methodologies to map clusters, to identify emerging new markets, to better measure cluster performance or to assess the impact of cluster initiatives in order to better monitor evolution of clusters and the efficiency of their cluster initiatives in their territory. The development of such tools can often be done more easily together with other policy makers, taking advantage of the experience that some partners may have on particular areas. Such activities may be developed independently if the involved regions share the same boarders or not.

Thirdly, different countries may have a **joint interest in bundling efforts to build strong clusters or cluster cooperation** in their region, by sharing specialised research infrastructures and testing facilities and facilitate knowledge transfer for cross-border cooperation. This requires developing a long term joint strategy in order to facilitate the development of strong clusters “born global”. This most ambitious type of cluster cooperation may be limited to cross-border cooperation in regions with a strong common cultural identity, such as the Baltic Sea Region or Central Europe.

Although upstream policy cooperation for cluster development is a powerful tool, it seems to be **a rather difficult task** for many policy authorities due the presence of different types of market and cultural barriers. The difference across cross-regions in understanding the benefits of cooperation at policy level is a clear barrier that has an impact on the level of regional commitment for cooperation. In some counties or regions policy makers are sufficiently aware of such benefits, in others not. Bridging this gap would require openness and trust between public authorities and/or private actors which is often missing.

In addition, developing and sustaining trans-national cooperation at policy level requires that governments devote human and financial resources to international projects, whereas there are strong political pressures keeping them for implementing own priorities and plans. Matching

between different expectations and **finding practical ways to implement joint initiatives is in most cases difficult, if not impossible**. Specific reasons which may discourage trans-national cluster cooperation at policy level are related to how cluster policy programmes are designed and implemented in each country and at which level. In many cases, managing cluster programmes may involve in the same country different ministries. Moreover, cluster programmes can be developed in some countries at regional level while in other countries at national level only.

For these reasons, it may be reasonable to conclude that although trans-national cluster cooperation would be highly beneficial it is unlikely to appear spontaneously very often. Most often, such cooperation remains limited to partners of the same region even if the common policy problems at stake could be better solved by wider cooperation. This suggests that **Community instruments facilitating trans-national cluster policy cooperation would offer strong benefits**. Whereas they exist to support mutual policy learning and, to a lesser degree, knowledge sharing in the design of better cluster policies, the strategic dimension of trans-national cluster cooperation still needs to be addressed.

3.3. Community support for transnational cluster cooperation at policy and programme level: First results and future challenges

European initiatives in support of clusters should be, as much as possible, complementary to national and regional efforts, in order to better exploit synergies and to support country-specific priorities. On the other hand, regions and Member States should take maximum advantage of the financial instruments available at Community level to strengthen their clusters and to open them to trans-national cooperation.

The **provision of neutral and comparable information** on clusters and cluster policies developed in the Member States by the European Cluster Observation is a major contribution for promoting mutual policy learning at EU level and to promote a fact-based policy approach towards cluster support. Even if the current methodology to map clusters in Europe does not allow to clearly attribute the strengths of clusters to the underlying factors, cluster mapping helps identifying regional strengths and provides a better overview of who is doing how on what. This may reduce the risk of duplication of efforts, by encouraging regions to invest in cluster areas which are not already overcrowded.

Moreover, the provision of **policy learning platforms** which allow Member States and regions to learn from others in the design of cluster policies is another example of Community support for trans-national cluster policy cooperation. Examples include the Regional Innovation Strategies (RIS)[96] scheme that, since 1994, have helped many catching-up EU regions to upgrade their innovation strategies, the Innovative Actions Programme 2000-2006[97] co-financed by the European Regional Development Fund (ERDF) as well as the new Regions for Economic Change[98] initiative. This new initiative launched under Cohesion

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96 More information on the RIS scheme is available at http://www.innovating-regions.org/network/regionalstrat/index.cfm

97 More information on the Regional Programmes of Innovative Actions is available at http://ec.europa.eu/regional_policy/innovation/intro_en.htm

98 More information on the Regions for Economic Change initiative is available at http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/index_en.cfm?nmenu=1

Policy, aims to leverage the experience of advanced regions to other regions wishing to improve.

The new "**European Territorial Cooperation**"[99] Objective for the 2007-2013 period – with the aim of supporting an integrated territorial development, interregional co-operation and exchange of good practice –, has streamlined its focus on innovation. EUR 2 billion are allocated to innovation in the EU-27 and inter-cluster activities that gather several regions is a relevant part of this.

In support of mutual policy learning, a first generation of pilot projects and networking activities was launched under the **PAXIS initiative** aiming at the identification of "good practice" examples and developing tool boxes for establishing cluster initiatives. As a result, a great number of successful practices have been identified and transferred to other regions in key areas, such as start-up development, innovation financing, technology transfer, incubation and entrepreneurship. The "PAXIS Manual for Innovation Policy makers and practitioners", which describes these practices in detail, can also provide useful guidance for the set-up and management of clusters.[100]

However, most of these pilot projects are facilitating mainly networking among cluster initiatives and do not always reach the political level. Furthermore, they have reached their limits as it appears now to be obvious how to best design and implement new or better cluster policies at regional or national level. There is plenty of **"good practice"** to learn from. The remaining challenge is to consolidate this information and to provide it in a more user-friendly manner. This may however not prevent that such information is rapidly outdated and difficult to replicate. A fundamental challenge is that the design of regional cluster policies is motivated by diverse interests and aspirations. Clearly, **one size does not fit all**. This raises the question of who can best learn what from whom, calling for different configurations in cluster policy learning.

In the further development of the Commission's innovation policy, these aspects of policy learning could be specifically taken into account in pursuit of **"better innovation policy governance"**. Existing guidance material for the set-up of national and regional cluster policies could be further discussed and tested with governmental experts from all levels and maintained over time. The Innovating Regions of Europe[101] (IRE) network may play an important role to further disseminate this information material as well as the European Commission (2007d) publication "Innovative strategies and actions: Results from 15 years of Experimentation" that provides a synthesis of experience from the Innovative actions programmes of the Cohesion policy and guidance as to how innovation and experimentation should be continued in the programming period 2007-13.[102]

Facilitating interregional cooperation is also part of Cohesion policy, which has recently launched a new initiative, **"Regions for Economic Change"**[103] as a further step in the efforts

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99 The "European Territorial Cooperation" replaces and reinforces the former Community Initiative INTERREG.

100 More information on PAXIS is available at http://cordis.europa.eu/paxis/src/home.htm

101 More information on the IRE network is available at http://www.innovating-regions.org/index.cfm

102 The European Commission Working Document (2007e) is available at http://ec.europa.eu/regional_policy/innovation/2007/guide_innovation_en.pdf

103 See European Commission (2006d) Communication COM(2006) 675 final of 8 November 2006.

to enhance its contribution to growth and jobs. This aligns with the modernisation objectives of the Lisbon Agenda and keeps the focus on the need for innovation. Cluster relevant themes included in this initiative include "bringing innovation quickly to the market", "improving the capacity for research and innovation", "improving monitoring of environment and security by and for the regions", "improving knowledge and innovation for growth" and "improving the capacity of regions for research and innovation". This initiative capitalises on experience in the period 2000-2006 under the INTERREG IIIC initiative supporting interregional cooperation and the URBACT network for exchange of best practice between European cities. These two programmes created numerous networks linking regional and local actors throughout Europe. This know-how provides a valuable asset that regional policy can bring to economic development in Europe – in the form of "relationship capital".

As a pilot of the Regions for Economic Change initiative, the "**Clusters Linked Over Europe" (CLOE)** project has brought together 18 partner organisations from 14 regions to cooperate in the development and managing of cluster initiatives.[104] This included mutual learning from staff exchanges as well as the development of detailed regional clusters action and subsequent peer review from other partners and the European Commission. Of importance for the success of the project was the signing of the Memorandum of Understanding for the process of engaging the Managing Authorities of the Operational Programmes of the Structural Funds in order to ensure that good practice ideas are translated in to action.

The EU can be instrumental in fostering trans-national cooperation between cluster policies at policy or programme level. Based on the ERA-Net approach developed under FP6[105], the four "INNO-Nets" on clusters currently funded under the **PRO INNO Europe initiative** follow that approach.[106] Such activities aim at promoting mutual learning, identifying and removing barriers, and jointly developing and testing new policy instruments for SMEs. Two of the networks, which are formed by representatives from national and regional governments and innovation agencies, deal with bringing together the cluster programmes of regions located in a given geographical area, such as the Baltic Sea Region and Central Europe, while the two other initiatives aim at developing joint actions in the area of technology transfer, technology take up, and internationalisation, specifically for SMEs involved in clusters.

These four INNO-Nets established together the **European Cluster Alliance**[107] which is an open platform for policy discussion and development of joint actions and practical tools in the area of cluster policy. The Alliance facilitates cooperation between the partners involved in these initiatives in working on a number of horizontal issues such as cluster management, cluster support funding, and exploitation of cluster mapping results for policy purposes. The Competitiveness Council of December 2006 highlighted that the specific innovation support initiatives under Europe INNOVA and PRO INNO Europe are important elements of the broad-based innovation strategy and explicitly welcomed the Commission's initiative of the European Cluster Alliance at stimulating practical cooperation between regional

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104 More information on the CLOE network is available at http://www.clusterforum.org

105 More information on ERA-Net is available at http://cordis.europa.eu/coordination/era-net.htm

106 More information on the INNO-Nets is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=55&parentID=55

107 More information about the European Cluster Alliance is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=223&parentID=50

governments.[108] This shows that Member States have realised the importance of the trans-national dimension of clusters and the complementary role that the European Commission can play in this regards.

Many of the activities carried out by the currently more than 70 members of the European Cluster Alliance are of direct impact for SMEs. For example, eleven regions from Central and Eastern Europe working together in the CEE-ClusterNetwork[109] signed on 28 November 2007 in Brussels the **CEE Cluster Agreement**, expressing their commitment to transnational cooperation and joint development of common strategies for future innovation and cluster policy.[110] Existing innovation and cluster programmes were analysed and common Quality Guidelines defined that will form the basis for the development of operative Cluster Action Plans and the implementation of 2-3 cross-border pilot actions to the benefit of better support services for SMEs.[111]

The CLUNET project aims to implement concrete **joint pilot projects** regarding cluster innovation and development policies.[112] The project has identified a wide range of policy actors and programmes supporting the most dynamic growing clusters with various policy tools, like SME internationalisation and incubation policies. It has designed a number of concrete pilot cross-border cooperation initiatives which support growth and innovation for example in the field of aerospace industry, environmental business or marine energies.

The INNET project that brings together a consortium of 14 partners representing national and regional innovation public bodies aims to identify areas of common interest between partner organisations and develop joint policy actions to support **trans-national cooperation between innovative SMEs** involved in clusters. As a practical example, this project launched a first joint call for proposals with a budget of 5 Mio € in April 2008 and further calls are expected in 2009.[113] The objective of these calls is to facilitate the creation of business linkages between innovative SMEs for exchanging technical knowledge, developing research projects, and supporting technology transfer activities and mobility staff among them at EU level. A series of information days are organised in each participant country in order to encourage participation of SMEs.

These examples demonstrate that there is indeed scope for and interest in trans-national cluster cooperation at policy level. However, as confirmed by feedback from participants, **generally, this type of cooperation would not take place without financial support from the Commission.** Only through European funding the more advanced administrations are

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108 See Council of the European Union (2006) *Council Conclusions on a broad-based innovation strategy: Strategic priorities for innovation action at EU level*, 2769th Competitiveness Council meeting, Brussels, 4 December 2006, available at http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/intm/92107.pdf

109 More information on the CEE-Cluster Network is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=66&parentID=55

110 The press release on the CEE-Cluster Agreement can be found at http://www.proinno-europe.eu/extranet/NWEV/uploaded_documents/Press-release_CEE_Cluster_Agreement_Signing_Event_071128_Brussels.pdf

111 As an example, the ten operative cluster initiatives and networks in Upper Austria involve some 3,000 companies with a special focus on SMEs.

112 More information about the CLUNET project is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=67&parentID=55

113 Further information about the INNET project and the call for proposals is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=71&parentID=71#

ready to share expertise with those who started more recently with cluster policies and programmes and who have therefore a special interest to learn, in particular in view of a more efficient implementation of regional development strategies.

In many areas, **good progress has been made to prepare for closer cooperation between cluster policies and programmes** from different Member States and regions, such as documented by Memoranda of Understanding and the launch of joint pilot projects. Furthermore, different public administrations are working now more closely together in improving methodologies for cluster mapping and impact assessment. This would not have been achieved without the Community initiatives launched so far.

Still **more progress needs to be done with respect to the removal of practical legal constraints for closer cluster policy cooperation** among different Member States and regions. This would require the development and practical application of new legal instruments for cross-border cooperation, such as the "European Grouping of Territorial Cooperation".[114] More fundamentally, **common visions for future cluster policies are still widely lacking** as there is no upstream policy coordination. This challenge still needs to be addressed.

[114] See Regulation (EC) No 1082/2006 of the European Parliament and of the Council of 5 July 2006, as published in the Official Journal of the European Union L210, p.19 on 31.07.2006, available at http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/newregl0713_en.htm.

4. CLUSTER INITIATIVES AND CLUSTER ORGANISATIONS IN EUROPE

As a result of the cluster policies and programmes launched in recent years, many cluster organisations were newly built up or reinforced. More than **500 cluster organisations are estimated to exist in Europe**, with different tasks and staff support. Managing clusters is emerging as a new profession aiming at providing specific support to firms organised in clusters.

This chapter describes the main role cluster organisations play in support of cluster initiatives. Special emphasis is paid to the facilitation of trans-national cooperation between clusters, which is often seen as necessary to learn from each other and to form partnerships between different cluster organisations in support of their clients.

4.1. Concept and role of cluster organisations

Cluster initiatives are organised efforts to enhance the competitiveness of a cluster within a region, involving private business, public bodies and/or academic institutions within a regional and sectoral system.[115] They can, but must not necessarily be, based on a formulated cluster policy and they usually follow a bottom-up approach and are managed increasingly by specialised institutions, such as cluster organisations. The Global Cluster Initiative Survey 2005 identified **more than 1 400 cluster initiatives around the world**.[116] 40% of the respondents reported that their cluster initiative was initiated in 2001 or later and 72% in 1999 or later, which reflects the increased importance of cluster initiatives as a tool for economic development in recent years.

This survey also gives an overview of the main characteristics of cluster initiatives. It shows that the **majority of cluster initiatives have a narrow geographical focus,** as 50% of cluster initiatives have most of their members within one hour's travel distance. They typically have a broad membership and rarely exclude foreign owned companies, small companies or those as regarded as competitors. Cluster initiatives are more common in some specific sectors such as IT, medical devices, production technology, communication equipments, bio-pharmaceuticals and automotive. Most often, **cluster initiatives are set-up as "public-private-partnerships"** by industry and government, while if solely set up by one party, this is more often initiated by governments then by industry. Only a small number of cluster initiatives were initiated by a university. This strong government involvement is also reflected in the source of financing of cluster initiatives as they are usually financed by governments (54%) and from industry (18%) or equally from both (25%).

It is a common characteristic of most cluster initiatives that **public financial support tends to decrease over time**. While there appears to be a need for public support for the set-up of cluster organisations and networks at an early stage in order to allow for a phase of trust building, public support appears to be replaced over the lifetime of cluster initiatives by increased membership fees, sponsoring and other fees for conference participation, training

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115 See Sölvell, Lindqvist & Ketels (2003). Their Cluster Initiative Greenbook is available at http://www.cluster-research.org/greenbook.htm . Alternatively, Andersson et al. (2004) define cluster initiatives as "conscious actions taken by various actors to create or strengthen clusters".

116 See Ketels, Lindqvist & Sölvell (2006). Information and reports on the results of the Global Cluster Initiative Survey (GCIS) are available at: http://www.cluster-research.org/gcis.htm

and coaching which altogether cover most of the costs of successful cluster initiatives. For instance, the long experience of 11 cluster initiatives established since 1998 under the umbrella of Clusterland Upper Austria[117] clearly confirms this trend towards self-financing as cluster initiatives mature.[118] The new State Aid rules[119] will further support this development, as they explicitly allow investment aid and operating aid for cluster animation only for a limited duration of up to 5 years and, for instance, in a degressive form. However, the explicit sections 5.8 of the State Aid rules on aid for innovation clusters is not exclusive and clusters may benefit from other types of allowed State Aid.

The organisations that manage cluster initiatives may take a variety of forms, including non-profit associations, universities and public agencies. While they mostly emerge from industry-led projects or from government-led programmes, it is nevertheless often a single **"clusterpreneur"** who takes the leadership to initiate the establishment of a cluster organisation which later on is most often taken over by a professional cluster manager.[120]

Cluster organisations are considered as new and highly efficient forms of innovation support providers that provide or channel specialised and customised business support services, especially to SMEs. Cluster organisations can be defined as the legal entity engineering, steering and managing the clusters, including usually the participation and access to the cluster's premises, facilities and activities.[121] A survey led by the European Association of Regional Development Agencies (EURADA) identified **more than 500 cluster organisations in Europe**.

Most of the cluster organisations operate in the EU-15 which are endowed with better infrastructure facilities, better resources, and with a higher number of participating companies as in the new Member States. Particularly, many cluster organisations can be found in countries like France, Italy, the UK or Germany, who were the frontrunners in cluster policies creating the first "industrial districts", "systemes productifs locaux" or competence networks.
In the most advanced economies cluster organisations tend to focus more on innovation services and knowledge creation, while in countries still in transition more emphasis is laid on supply chain development, export promotion or simple networking and training. **In the new Member States the cluster concept is relatively new**, nevertheless there are significant resources allocated to support cluster development from the Structural Funds in the financial period of 2007-2013. In these countries there are therefore **a growing number of cluster**

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117 Information about Clusterland Upper Austria are available at http://www.clusterland.at/index_ENG_HTML.php

118 Presentation given by Werner Pamminger from Clusterland Upper Austria during the roundtables on the Clusters Linked Over Europe (CLOE) network during the European Presidency Conference on Innovation and Clusters held in Stockholm on 22-23 January 2008. For conference documentation see http://www.VINNOVA.se/innovationandclusters.

119 The text of the Community Framework for State Aid for Research and Development and Innovation was published in the *Official Journal of the European Union* (2006/C 323/01) of 30.12.2006 and is available at http://eur-lex.europa.eu/LexUriServ/site/en/oj/ 2006/c_323/c_32320061230en00010026.pdf.

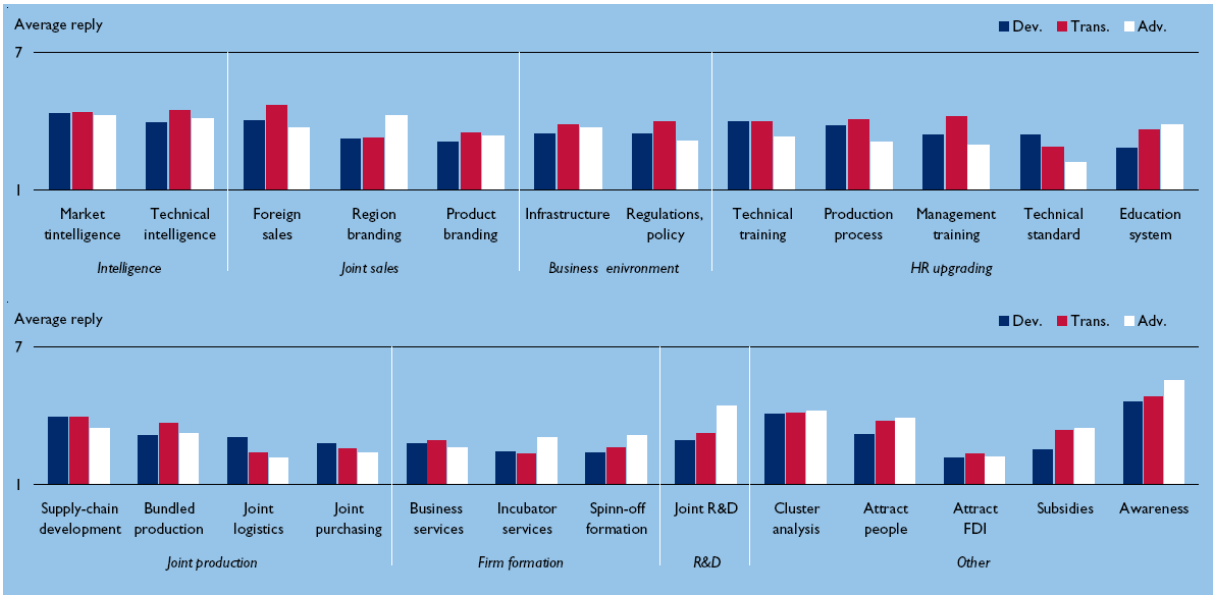
120 See Andersson et al. (2004).

121 This definition follows the description concerning aid for innovation clusters that features in the "Community Framework for State Aid for Research and Development and Innovation". See section 5.8 on 'Aid for innovation clusters' of the text of the Community Framework that was published in the Official Journal of the European Union in December 2006 (2006/C 323/01) and that is available at http://eur-lex.europa.eu/LexUriServ/site/en/oj/ 2006/c_323/c_32320061230en00010026.pdf

organisations which are in an initial stage, providing still limited type of support for enterprises and are in need for developing and raising the quality of their cluster management.

Almost all cluster organisations have access to some organisational resources**,** including a dedicated cluster manager or facilitator – i.e. the individual person that manages the cluster initiative –, an office and a website. Cluster organisation often have **a wide set of activities**, ranging from information provision, commercial cooperation and innovation support, enhancing the business environment, human resources upgrading, business development, to cluster expansion. Correspondingly, the activities of cluster organisations include many different types (see Figure 12) that are explained in more detail below. Amongst these different activities, a study of 34 European cluster organisations identified government relations, training, R&D, joint marketing and regional branding as the most common activities.[122]

Figure 12: Activities performed by cluster initiatives



Source: Ketels; Lindquist & Sölvell (2006) *Cluster Initiatives in Developing and Transition Economies*, 1st ed., May 2006, Center for Strategy and Competitiveness, Stockholm.[123]

Note: Respondent countries were categorised in Developing (Dev.), Transition (Trans.) and Advanced (Adv.) and the reply scale ranged from 1 for 'disagree completely' to 7 for 'agree completely'.

A main task of cluster organisations is the **gathering of market and technical intelligence** and cluster analysis as well as its further dissemination by publishing reports and newsletters. Cluster organisations may also undertake specific **cluster animation activities** that aim to foster cooperation and knowledge sharing by supporting partner searches and identification and contact building. This concerns the networking and linking of competencies within and across different sectors of the specific cluster as well as fostering trans-national relations to other clusters. They support the sharing of information between its members and with other

122 See Isaksen & Hauge (2002).

123 The data are based on a survey of 1400 cluster initiatives, including comprehensive data from 450 cluster initiatives that completed the Global Cluster Initiative Survey (CGIS) 2005. The report is available at http://www.cluster-research.org/devtrareg.htm

partners through organising seminars, workshops and conference with appropriate speakers and creating websites. Part of this, is also to create a dynamic dialogue among industry, the scientific community and government authorities.

Besides that, cluster organisation often organise **training programmes** in order to support the upgrading of human resources. This includes identifying key qualifications and professional competences that are necessary for cluster growth, organising workforce training and management education. Furthermore, it can liaise with other specialised training and education providers in lobbying for an adaption of their curricula. Often **specialised advisory, consultancy and support services** are offered by cluster organisation that may concern assistance in financing and project acquisition, issues of intellectual property rights (IPR) and other support for the internationalisation of cluster firms.

Other activities of cluster organising may include the **facilitation of commercial cooperation** among its members that concern joint purchasing, logistics, production, export promotion and sales. The latter may include developing a common branding of the region and products as part of the marketing of the cluster to attract talent and to recruit new companies to take part in the cluster. Finally and in consequence of joint activities between its members, cluster organisations often are in charge of the management of the cluster's open-access facilities that can include laboratories, testing centres, training centres and other infrastructure facilities.

The type of support activities and structures offered by cluster organisation may also play an important role **in facilitating the further growth of a cluster** as they seem to vary depending upon the development stage of the cluster. According to a report by NetBioCluE (2008) – which is a cluster network project for the biotechnology sector[124] under the Europe INNOVA initiative –, mature clusters tend to have more than four times the number of incubators/science parks than clusters in the initial stage of development. This report also suggests that there is a large need for facilities and networking during the growth and mature stage of biotechnology clusters, while innovation support appears to the most important activities during the initial stage of a cluster.

Overall, it appears that most cluster initiatives organised by cluster organisations have a positive impact on the cluster they serve. The Cluster Initiative Greenbook presents the results of the 2003 Global Cluster Initiative Survey of over 250 cluster initiatives from around the world.[125] According to this survey, **85% of the respondents agreed that a cluster initiative has improved the competitiveness of their cluster**, and 89% agreed that it helped the cluster to grow. A total of 81% of respondents stated that the cluster initiatives have met their goals, while only 4% have been disappointed.

There are a number of **key criteria that determine the success of a cluster initiatives and cluster organisations**. The Cluster Initiative Greenbook groups them around their setting, the objectives and their process. Important aspects for the setting of cluster initiatives and organisation are a strong business environment, trust in government, strong regional government, cluster strength, and being part of a broader strategy. The objectives should have a broad range and be selected on the basis of the cluster's specific needs. Furthermore, a successful process requires a cluster manager with cluster insight, an organisation and

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124 More information on the NetBioCluE project is available at http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=5019&classificationName=NetBioClue&cid=5105

125 See Sölvell, Lindqvist & Ketels (2003).

communication structure of high quality, an office presence, a significant budget, a clear strategy and measurable goals.

Following this study, those cluster initiatives selected through a competition process for receiving government financing perform significantly better in terms of increasing international competitiveness than "top down" initiatives. There was a less visible effect on performance when governments picked the companies to be involved in clusters or when cluster initiatives involved members beyond 1 hour's travel distance. Cluster initiatives only limited to domestic companies performed worse which is a clear indication that openness pays off. The study clearly confirmed that a cluster manager having a broad **network of contacts is one of the most important success factors**. Based on this and further evidence, it can be reasonably concluded that cluster managers play a very important role for the success of a cluster.

Cluster manager need to combine **multiple competencies**, such as being visionary, facilitative, analytical and excelling in networking. A cluster manager typically needs to encourage synergies and build consensus, maintain the balance of achieving short vs. long-term benefits and focus on concrete action plans for specific cluster initiatives. Another role filled by the cluster manager is that of "cluster engineer".[126] This individual takes on the role of broker – coupling firms with firms, firms with universities, government agencies with cluster initiative members on a continuous basis. A successful cluster manager must know how to appreciate options to expand network contacts both within the cluster initiative and externally. It is worth stressing that cluster growth and transformation is dependent on constantly looking outside the cluster initiative for new risks and opportunities.

For these reasons, a **tendency can be observed towards the further professionalisation of cluster organisations and cluster managers**, as they are becoming specialised in some of the most important activities and more and more emphasis is laid on providing a service to enterprises of high quality. This is reflected in the growing demand on behalf of cluster managers, facilitators and regional or national stakeholders supporting cluster initiatives to learn about factors underlying the success of cluster organisations and professional cluster management. A number of initiatives exist already that organise cluster training programmes, for example, so called cluster academies by Clusterland Upper Austria[127], the Barcelona Clusters Summer School[128] or PROCluster® facilitator workshops organised in Finland[129]. There is a further tendency in recognising cluster excellence in aspects of cluster formation and development through the formulation and recognition of best practice as in the case of "Spitzencluster" in Germany.[130]

Cluster initiatives not following this trend towards further specialisation and professionalisation may risk not to seize the full potential of clusters and falling behind in international competition. However, the **awareness for the need to build-up strong cluster**

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126 See Andersson et al. (2004).

127 More information about the Cluster Academy Upper Austria is available at: http://www.proinno-europe.eu/index.cfm?fuseaction=nwev.NewsReader&news=2131&lang=EN&topicID=90&parentID=0

128 More information about the Barcelona Cluster Summer School is available at : http://www.barcelonagse.eu/Barcelona_Clusters_Summer_School.html

129 More information on these workshops can be found at http://www.prodemic.fi/english/index.php?group=00000019&mag_nr=8

130 More information on the Spitzencluster competition is available at http://www.spitzencluster.de/de/468.php

initiatives and organisations is not evenly spread in Europe. First, the initiatives and organisations themselves may not be aware of better practice applied elsewhere due to a lack of trans-national relations and exchange with other cluster initiatives and organisations. Secondly, the quality of cluster management is difficult to asses, especially for firms that are or may wish to become members of cluster initiatives and organisation. There may only be one or few cluster organisations in a given regions that can be compared. Hence, firms are likely to find it hard to evaluate whether the support services are of good quality and whether they justifies the costs of membership and the time necessary to engage in and make use of activities and services offered. There seems to be clear need for more transparency in terms of quality standards of cluster initiatives and cluster organisations in Europe.

Cluster organisations are in many cases also **a front door for clusters to join international networks**, to ensure international recognition and to strengthen the cluster's market position worldwide. Cluster managers are responsible for facilitating transnational cooperation between the innovation actors of different clusters resulting from the fact that linkages between companies, respectively between research institutions and enterprises coming from different countries are rising in importance. Altogether, there are therefore **many good reasons to further support the excellence of cluster initiatives and organisations,** in particular in the new Member States.

4.2. The role of trans-national cooperation between cluster initiatives and cluster organisations for strengthening clusters

During the last few years, many cluster initiatives have become more active in establishing **international links and strategic alliances with other cluster initiatives** in order to better serve the needs of their clients. As businesses internationalise their activities so must the organisations and institutions supporting them. Traditionally, the focus of many cluster initiatives has been on internal activities related to improving the cluster-specific business environment, strengthening the linkages between cluster participants, and upgrading company operations and strategies. More and more, the creation of international linkages between clusters and the cooperation between cluster initiatives is added to the list of tasks to be performed.

Indeed, there is a **strong case for trans-national cooperation** between actors from different clusters and areas. Enabling cooperation both within clusters and internationally between clusters can help increasing the internationalisation of cluster firms and their access to technological excellence which is not available within the often narrow boundaries of a cluster. As cluster organisations serve the needs of their cluster firms, they must offer also services facilitating international contacts and partnerships, which can often be set in motion through cooperation with other cluster organisations. Furthermore, firms need to remain open to new ideas and cluster organisation play an important role so that cluster firms have access to global networks. In this respect, transnational cooperation can be regarded as an appropriate approach to combat the risk of cluster sclerosis from so-called "lock-in" effects.[131]

The **request for better support for trans-national cooperation ranks high on the list of cluster firms** for improved activities. As the results of the 2006 Innobarometer (see Figure 9 above) have shown there is huge gap between the current provision of support activities and

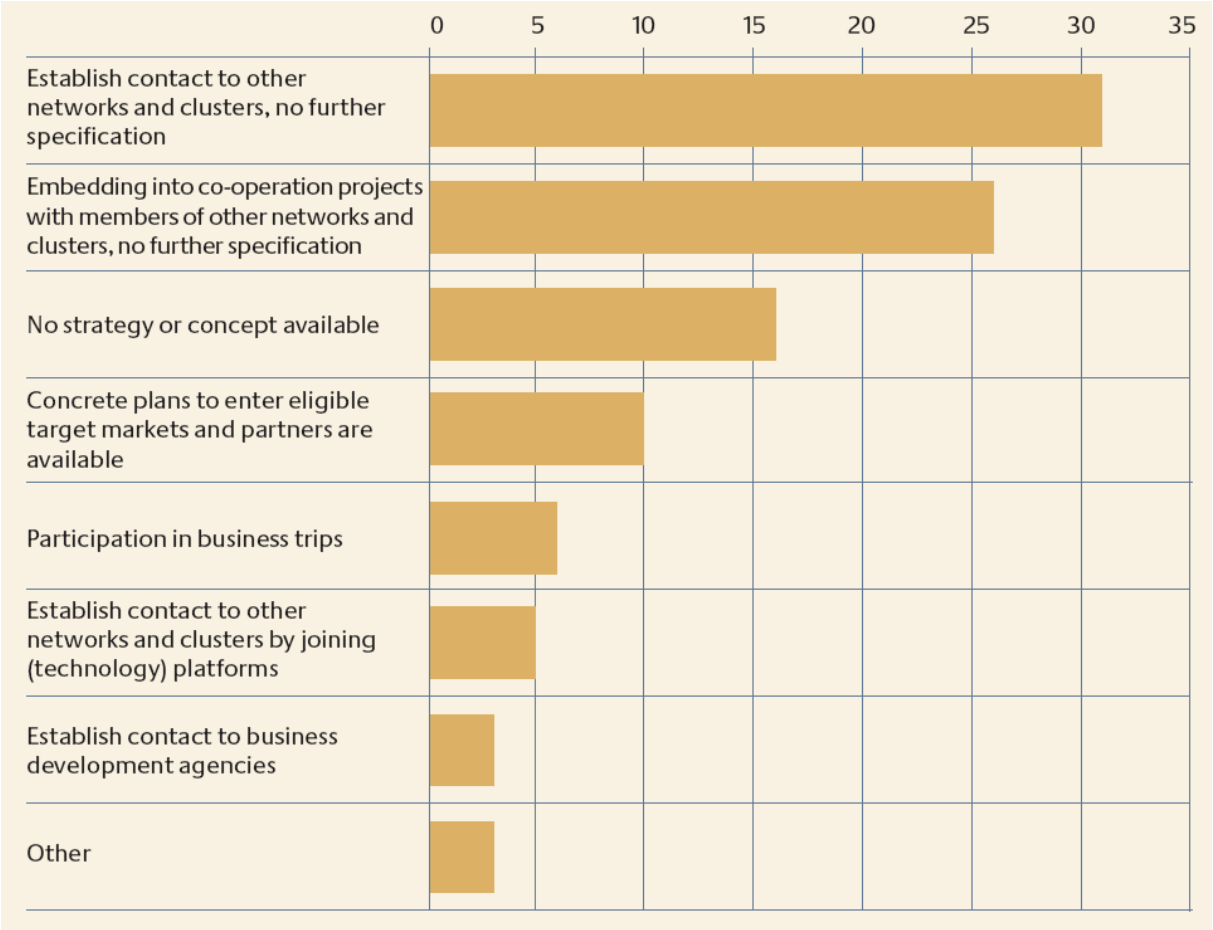
[131] See Grabher (1993).

the desired level of support for trans-national cooperation. Furthermore, the results of a survey among 91 cluster initiatives across Europe about their internationalisation activities conducted by the German Competence Networks (Kompetenznetze, 2007)[132] also showed that only 10% of cluster initiatives or networks actually have concrete plans for internationalisation (see Figure 13 below), which suggests that the current support offered in this respect is insufficient.

In order to respond to this challenge of better trans-national cooperation, some Member States such as Germany and France already actively promote the internationalisation of clusters. However, this approach is far from being generally followed in Europe. At operational level, **trans-national cooperation may take many different forms.** The most common approach is to establish contacts to other networks and clusters. This may comprise the facilitation of the exchange of knowledge and experiences that can take place in the framework of cluster visits and staff exchanges. A step further, partnerships on the joint provision of business support services and on access to cluster facilities such as research and testing centres, and the joint organisation of matchmaking between companies or educational programs open to members of the clusters may be organised. These concrete forms of cluster partnerships are however not yet well advanced in Europe.

[132] The study by Kompetenznetze Deutschland (2007) builds upon a survey of 91 networks form 10 European countries, predominantly from France, Germany and Spain. The study is available at http://www.kompetenznetze.de/service/bestellservice/medien/kurzstudie_internationalisierung.pdf/view

Figure 13: Internationalisation strategies of networks



Source: Kompetenznetze (2007).[133]

The increasing importance of cluster linkages is consistent with changes in the **global economic environment** in which clusters operate. Barriers to trade and investment have been removed and technological change has decreased the costs of transportation and communication. These two trends have created more opportunities for breaking up value chains across locations and increased the competitive pressure to do so if it is an effective way to reduce costs. While in the past the goal of internationalisation efforts was mainly to contribute to higher export revenues, it is now also important to create and sustain competitive advantages through international cooperation. As a result, **clusters become more focused and specialised** on their core competences leading to an increasing integration of clusters into global value chains.

The particular set of conditions in Europe is creating additional pressure to develop linkages between clusters. **National borders continue to separate markets** and limit the effectiveness of competition across regions. Some of these barriers are related to the historical legacy of policy barriers that still affects behaviour even though the policies have been changes. Others are the result of different regulatory regimes that still exist and make it harder for companies

133 Figures are given in per cent and based on 85 network's answers, for which a maximum of two answers was allowed.

to compete with identical strategies in different European countries. Finally, there are also different languages and cultures across countries that are not the result of policy but lead to a natural separation of markets. As a result of these conditions, **cluster specialisation across European regions is less pronounced than in the United States**, a market with a common language and regulatory regime that has been in place for more than 200 years.

The continuous efforts at EU level to enhance the functioning of the internal market and in particular to remove obstacles to free movement of goods, services, capital, people and ideas are instrumental to ensure that the potential for excellent European clusters is not hampered by the existence of national borders. Notwithstanding these efforts, it needs to be recognised that European clusters cannot rely on the natural forces of agglomeration alone to attract capabilities and assets to the same extent as US clusters can. However, **European clusters can compensate some of these comparative disadvantages through creating stronger linkages to other clusters with complementary strengths**. While this may be considered as a second-best response that does not reach the same level of cluster dynamics that are possible when clusters evolve in a market without barriers, it still provides real efficiency gains.

The Kompetenznetze study has identified **four main reasons for the internationalisation of clusters**: the strive for or strengthening of a worldwide leading position, easier access to targeted markets, access to know-how or technologies not available within the own cluster and the exchange of information and experience at an international level.[134] These are strong motivations for opening clusters to international activities.

Linkages between clusters will most often tend to occur naturally, if the efficiency gains they provide can be privately appropriated. **Multinational companies play an important role in this internationalisation process**. Through subsidiaries in different clusters they create linkages that are external to any cluster but internal to the firm. They combine the respective assets and capabilities of regional clusters in their value chain of activities, and can internalise the value this creates in their products and services. Thus, multinational companies become the orchestrators of networks of clusters.

While these private activities will generate some international linkages between clusters, the level of these linkages is likely to be suboptimal. The reason for this is that only a fraction of the benefits from cluster linkages can be internalised by the companies that create them because of positive externalities that exist in clusters. In addition, there are many barriers that inhibit the mobility of companies' activities and the natural emergence of cluster linkages between them. These barriers can comprise four main categories that include behavioral barriers (such as strategies and operational practices), policy-induced barriers (such as different regulatory regimes), natural barriers (such as language and cultural difference), and informational barriers (of various kinds that limit available information about foreign clusters and the assets and capabilities they possess).

A lack of trust between partners and conflicting interests due to partners being competitors were identified as the **main barriers to trans-national cooperation** for cluster initiatives, followed by a lack of financing and a lack of time (see Figure 14). It is interesting to notice that language barriers and geographic distance appear to be rather minor factors that hinder a possible international cooperation.

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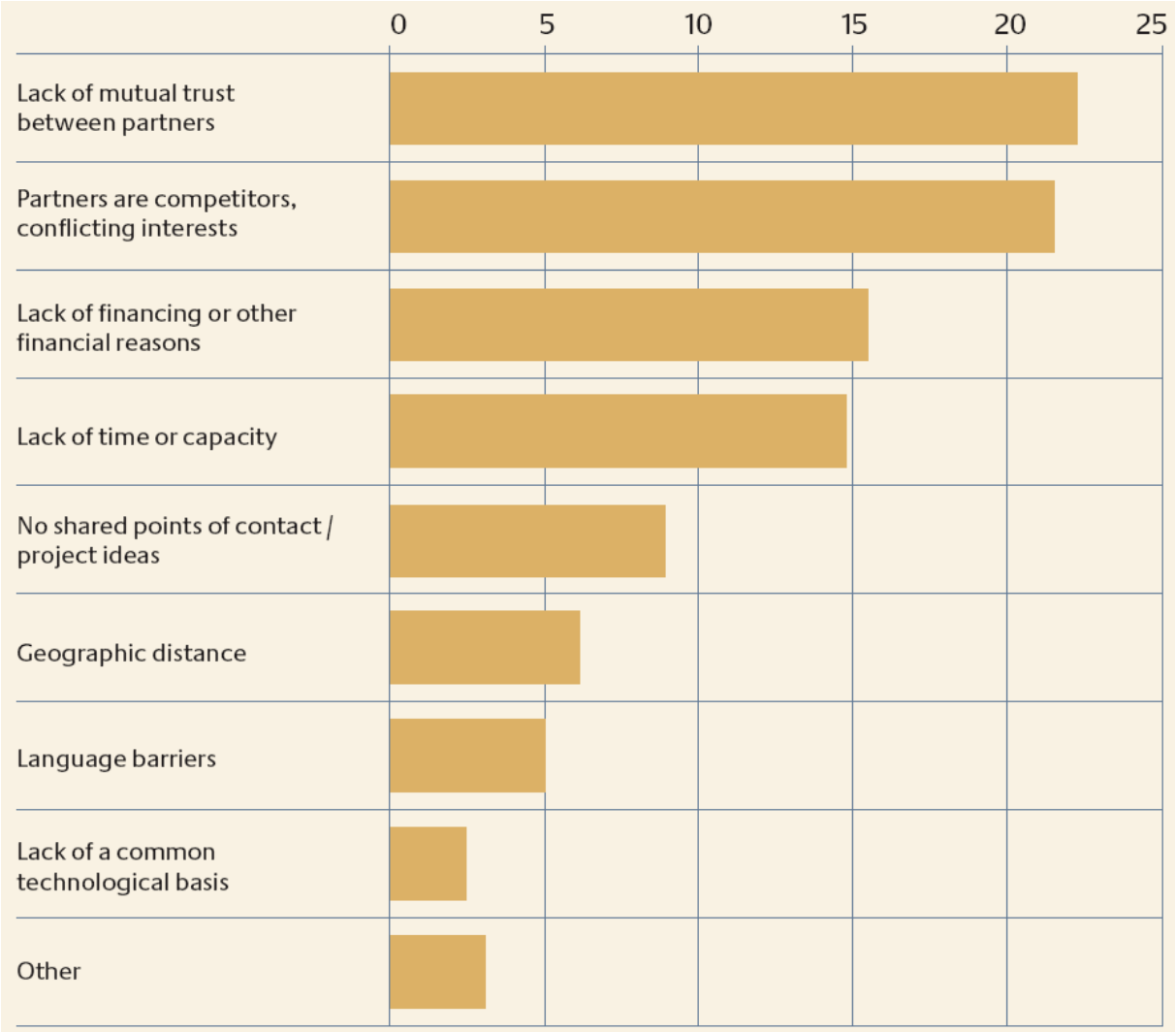
134 These four answers received each between around 14 and 18% while other answers got less than 10% . two answers per 89 networks were possible.

Figure 14: Main barriers hindering a possible co-operation between networks



Source: Kompetenznetze (2007).[135]

Although clusters, cluster firms and cluster organisations compete against each other – in particular those which belong to the same sector of activities –, there are many reasons justifying competition and cooperation at the same time. The analysis conducted so far shows that the advantages of cooperation between clusters are numerous and that **cooperation between clusters facilitates information exchange between them and supports internationalisation strategies**. This is particularly useful for SMEs that do not have the necessary human and financial resources to conduct expensive market analyses and surveys. Cluster cooperation facilitates mutual learning and the exchange of good practice as well as helping joint business opportunities to be explored and the development of common strategies.

135 Figures are given in per cent and based on 84 network's answers from their managers' point of view, for which multiple answers were allowed.

4.3. Community support for transnational cluster cooperation between cluster initiatives and cluster organisations: First results and future challenges

Several complementary Community measures exist to strengthen cluster initiatives more efficiently and to connect clusters better through trans-national cluster cooperation and exchange. Whereas the main responsibility for cluster policy design remains with regional and national policies, the European Commission contributes to strengthening trans-national cooperation between cluster initiatives and cluster organisations in a number of ways.

In order to foster cooperation between clusters in different Member States more efficiently, national and regional support measures need to better take into account the trans-national dimension of clusters. Practical cooperation between clusters is however by no means an easy task as still many barriers exist that hamper joint initiatives and bundling efforts, in particular across borders. The regional cooperation for cluster development can be supported through the **"European Territorial Cooperation"**[136] Objective of the new Cohesion Policy, aiming at an integrated territorial development, interregional co-operation and exchange of good practice. Its antecedent, the INTERREG III community initiative included a number of projects focusing specifically on innovation and fostering new ideas through business clusters. For instance, a project called REGINS used cluster management to encourage business activity between companies in the regions of the four participating partners. As a Regional Framework Operation, which funded diverse initiatives, REGINS involved cooperation that led to the establishment of 28 subprojects. Most of the REGINS subprojects promoted research and development or new technologies, and all of them encouraged interregional cooperation through business clusters.[137]

The **"European Grouping of Territorial Cooperation"**[138] legal instrument, primarily though not exclusively, developed for managing Structural Funds programmes, may also be used to foster cooperation between public authorities or other bodies governed by public law in trans-national support of clusters. This can be used, for instance, for developing and implementing common support services and sharing access to research and testing facilities of cluster initiatives. As a first European Grouping of Territorial Cooperation, the Eurometropole Lille-Kortrijk-Tournai has been created within the cooperation of the local and regional authorities, who have already launched several joint initiatives. In this respect further cooperation agreements have been signed for Euroregion Alpes-Mediterranée, Galicia Norte Portugal, Euroregion Alpe-Adria and Euroregion Pyrne Mediterrane. Furthermore France and Spain have committed to create an EGTC for the Cerdanya joint cross-border hospital.[139]

Cooperation among clusters is also being developed under the EU's Integrated Maritime Policy[140], where the Commission announced its intention to foster networking amongst

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136 The "European Territorial Cooperation" replaces and reinforces the former Community Initiative INTERREG.

137 More information on REGIONS is available at http://www.regins.org/en/index.php

138 See Regulation (EC) No 1082/2006 of the European Parliament and of the Council of 5 July 2006, as published in the Official Journal of the European Union L210, p.19 on 31.07.2006, available at http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/newregl0713_en.htm

139 For more information on these cases, see http://www.cor.europa.eu/pages/EventTemplate.aspx?view=folder&id=acdb7fab-512b-418b-af15-2abb12659e77&sm=acdb7fab-512b-418b-af15-2abb12659e77

140 Communication from the European Commission ("the Blue Paper"), COM(2007) 575 from 10.10.2007, available at http://ec.europa.eu/maritimeaffairs/dev_imp_en.html.

maritime clusters. Building on this, the Commission Staff Working Document on Maritime Clusters[141], announced a study to map and analyse the nature and potential of maritime clusters in Europe. This study, due to deliver results by the end of 2008, will provide a clearer picture of the strength and challenges for maritime clusters in view of the elaboration of any further policy initiatives.[142]

Support is also provided under the European Agricultural Fund for Rural Development (EAFRD) for the promotion of the cooperation between primary producers in agriculture and forestry, the processing industry and/or third parties in the framework of cooperation actions fro the development of new products, processes and technologies in the agriculture, food and forestry sectors. The EAFRD also provides support for business networking in rural areas.[143]

The **"Regions of Knowledge"**[144] initiative, which is now part of the 7th Framework Programme on Research and Development, facilitates networking between regional research-driven clusters composed of regional authorities, enterprises and research entities at European level. The initiative has the objective to strengthen the research potential and competitiveness of EU regions through the definition of research-based strategies for economic development, in particular by encouraging and supporting the development and trans-national networking of regional research-driven clusters. The initiative aims at increasing the level of research investment in Europe as part of the objective of devoting 3% of GDP to research through the definition of joint action plans. During the 6th Framework Programme, a forbearer of the "Regions of Knowledge" initiative launched 32 pilot projects aiming at strengthening the regional research potential through preliminary exercises such as foresight analyses, technological audits, benchmarking and mapping studies and then exchange of best practice and formulation of policy recommendations. For instance, the European Regions Research and Innovation Network (ERRIN)[145] was supported, which contributed to the creation of a platform of more than 200 Brussels-based regional actors in order to facilitate their common work in the field of research and innovation. Another example is the Food Innovations Network Europe (FINE), which seems to have huge potential.[146] Its action programme unites

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141 SEC(2007) 1406 from 17.10.2007, available on application at http://ec.europa.eu/transparency/regdoc/recherche.cfm?CL=en

142 Europe's maritime sector is a world player as figures from the "Optimar" study by Lloys's Fairplay, the 2006 Ecotec study commissioned by the Commission's Directorate-General for Maritime Affairs and Fisheries, the 2006-2007 ESPO report and from the EMF (European Metalworkers' Foundation) show. According to these sources, the European maritime clusters produce in total an estimated vale added of € 111 billion and providing about 5 million jobs across Europe related to sea or using sea resources, including coastal tourism. Some clusters focus on single geographic regions – often around a major port – while others are multi-centred, bringing together expertise and experience from several coastal sites, often across national boundaries, of which many have developed other specialisations. In the shipbuilding sector alone, 1.3 million employees generate together a value added totalling € 70 billion Euro. The importance of maritime clusters will be further illustrated in the upcoming Communication on a future European maritime strategy and in the Communication on Strategic options for European shipping and for the maritime transport system for 2008-2018.

143 See Council Regulation (EC) No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), OJ L 277, 21.10.2005, pp. 1–40, at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:277:0001:0040:EN:PDF

144 More information about the Regions of Knowledge initiative is available at http://cordis.europa.eu/fp7/capacities/regions-knowledge_en.html

145 More information about ERRIN is available at http://www.errin.eu

146 The example is listed in the accompanying Commission Staff Working Document entitled "RTD, Innovation, Cohesion and Rural Development Policies reinforced Synergies" to the Communication

eight different regions with agrifood clusters in their efforts to join forces to increase innovation by enhancing exchange and collaboration between the stakeholders of the food industry.

In particular, the **Europe INNOVA initiative**[147] has strongly supported trans-national cooperation between clusters at operational level and provided a true learning experience for cluster-related organisations. The so-called Aho Report on "Creating an Innovative Europe"[148] which advocates measures for the creation of lead markets explicitly mentions the Europe INNOVA cluster projects when stressing that "[it] is important to ensure that clusters are defined in terms of the new market and knowledge relationships needed for emerging sectors to thrive" and that "[t]his can be facilitated by opening the clusters to cooperation with and learning from other clusters in the same or other sectors".

Since 2006, Europe INNOVA has provided eleven industrial cluster networks in traditional and high-tech sectors with a learning platform that enabled them to identify, analyse and share good practices in cluster management and to address the challenges emerging from globalisation. The cluster networks cover seven industries (automotive, biotechnology, energy, space, food/drink, ICT/Optics and technical textiles) with a particular focus on strengthening their regional innovation systems and on supporting trans-national cooperation with a view to further accelerate the development of their clusters in a Europe context.

The aim of this action is helping organisations that manage clusters such as cluster organisation **to cooperate with other cluster-related organisations across Europe** to exchange experience, explore opportunities for strategic cooperation between them and to develop joint strategic partnerships to join forces. This is increasingly important in order to complement expertises, and develop joint actions and business support strategies such as sharing research and testing facilities. This can have a direct impact on the efficiency of project partners as well as an indirect impact from projects resulting from "spill-over effects" into other areas.

After two years of work, the coordinators of the cluster networks have reported **very positive results of the cluster collaboration**. As a first step, the establishment of good working relationships and mutual understanding amongst the partners has been instrumental for the success of the knowledge-sharing process set in motion by the cluster networks. Once this had been achieved, the networks have openly shared their experiences and practices on cluster management. The collaborative learning effect was reinforced by the sectoral focus applied to Europe INNOVA helping the networks to find common issues and thereby facilitating the comparison of sector-specific approaches.

The cluster-related organisations indicated that the **key motivations of collaborating across borders** have been to increase international visibility by building the "critical mass" of a cluster; to gain economies of scale; to access and open new markets; to seek complementary

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from the European Commission on "Competitive European Regions through Research and Innovation - A contribution to more growth and more and better jobs", Communication COM (2007) 474 final.

147 More information about the Europe INNOVA initiative is available at http://www.europe-innova.org and about its Cluster Networks at http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=4961&classificationName=Cluster%20Networks&cid=5104

148 See European Commission (2006f). The Aho report is available at http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm

competencies and assets from abroad; and to benchmark cluster management experiences and practices. In this process, study visits and match-making events by cluster companies have been playing an important role. The key outcomes of benchmarking and collaboration between clusters are to be found in increased knowledge and information in order to improve competences of cluster management.

The cluster network for technical textiles INNOTEX for example, organised **learning and cooperation** in the form of a cross-cluster best practice platform. This enhanced collaboration has contributed to joint development and increased competitiveness within each of the participating textiles clusters. The project was, for instance, approached by a UK region for advice on its regional strategy to migrate its textile cluster from clothing textiles to technical textile. The ABC Network has developed several experimental tools for the agro-biotech sector, such as mentoring schemes and pilot actions in intellectual property right protection.

The cluster managers of CENCE have used the project **to adapt cluster management practices**, to improve cluster services and to support emerging clusters in the energy sector. In NetBioCluE, the cluster managers shared their long-term visions and agreed on the policy actions that should be undertaken. The TCAS cluster managers discussed their strategies and issues of mutual interest such as cluster evaluation, technology transfer and the marketing of the cluster organisations and their services to SMEs. At the same time, their meetings represented an excellent opportunity for relatively new cluster managers to benchmark, and adapt their procedures and design joint projects.

A number of cluster networks also **supported the emergence of new cluster organisations**. In Northern Hungary, the CENCE consortium played a vital role in the development of a new Bioenergy Innovation Cluster. The new Hungarian cluster received practical advice and support in structuring and managing the new cluster organisation. It was involved from the beginning in international cooperation. Thanks to these efforts, the cluster has received funding from the Hungarian government for the amount of 5.3 M€.

The automotive cluster networks have also helped to establish new cluster organisations. The BeLCAR consortium works with a motorcycle cluster in Catalunya (Spain), the new cluster initiative “Automotive South-West” in Stuttgart as well as a growing automotive cluster in Romania. In the Polish region Wielkopolska, the development of an automotive cluster has greatly benefitted from the advice provided by the TCAS team. The team helped to draw up an action plan involving international support for cluster formation and triggered a decisive positive commitment from the local players. In this case, the international involvement and experience helped to tip the balance and convinced key players in Wielkopolska to promote regional clustering. The Estonian partner of the INNOTEX network of textile clusters, approached well-established clusters in Leicestershire (UK) and Aragon (Spain) for advice on modernising its cluster strategy with regard to technical textiles. The new strategy emphasises technology transfer to bring the evolving polymer composite cluster in Estonia up to speed with the latest developments and knowledge in protective clothing, electronic textiles and composites.

Most of the Europe INNOVA cluster networks have focused on **mapping and benchmarking competences and clusters in Europe**. The ENOC cluster network for example has used the competence networks of its members to identify key technology organisations specialised in optics and photonics worldwide. The network analysed the activities of 79 clusters and concluded from the analysis that their maturity was in most cases

depending on the successful management of a cluster organisation by a dedicated cluster manager.

In the mClusters network, 22 leading mobile regions have used the methodologies, tools and experience from both the involved cluster organisations and from the network of living labs in Living Labs Europe. They also designed special processes with potential advanced buyers to create showcase projects on a perpetual basis. AFIBIO has benchmarked 14 clusters in the agro-biotech sector and created guidelines for development of the agrofood sector at regional level.

The CASTLE cluster network lead the first cluster analysis on Satellite Navigation applications in Europe and as a result, was able to identify a huge market potential and avenues for developing European lead markets in the field. The network has made substantial efforts to bring technologies such as GALILEO and EGNOS closer to European regions and small companies by developing a roadmap for SatNav applications cluster.

Within the biotech sector, the NetBioCluE cluster network mapped 16 European biotech clusters and their various business models and service concepts. Successful models have been identified and their implementation evaluated by the clusters to be able to provide services based on these models to the companies.

BeLCAR involved new automotive clusters through an open call and developed the "Benchmarking Club" which meets twice a year in a benchmarking forum. During these fora, the six-monthly data of each cluster are analysed and evaluated, based on which, one participant receives an award. The data for the benchmarking are gathered by the cluster management analysing different business areas but also cross-sectoral cooperation. This process supports the cluster companies in their development and helps to create a stronger analytical basis for cooperation. The BeLCAR partner PANAC from Györ (Hungary) operates a 'Benchmarking Club for Suppliers' and is transfering the concept to other automotive regions.

The **many study visits, matchmaking events and workshops** organised by the networks involve a large number of companies, research institutions, policy makers and other relevant organisations. These tailor-made events have allowed for face-to-face meetings with interested parties in other countries and have initiated international cooperation at a very hands-on level.

The following figures are just examples to give a flavour of the harvesting of **spill-over effects** and the number of organisations mobilised during these events: NetBioCluE organised 8 matchmaking events with 500 participants and 1000 face-to-face meetings; TCAS organised 7 cluster visits with 1000 participants of which 300 participants attended the matchmaking events; BeLCAR organised 6 matchmaking events with 220 participants and 600 face-to-face meetings; CENCE organised 24 cooperation workshops and 10 study visits 15 joint innovation projects launched; OMNI-NET organised 15 cluster visits and local thematic seminars with 555 participants. This gives an indication that many SMEs have benefited directly from these projects.

The networks under Europe INNOVA prove that there is scope for more intense trans-national cooperation with a strong sectoral focus. And indeed, for many of the cluster networks the **cooperation under the Europe INNOVA initiative has only been the initial step for deeper partnering**, from which more extensive international collaboration starts and

is further elaborated. Europe INNOVA projects also contributed to sectoral co-operation agreements and joint activities between project participants in other Community programmes. For example, Memoranda of Understanding between clusters in view of better co-ordination of their future activities were signed by participants of several projects.

There are a variety of **"exit strategies" for the Europe INNOVA cluster networks** ranging from formal collaboration structures, through which their joint work will continue after funding ends to informal partnerships, mentoring and joint projects. The CENCE consortium joined efforts with five new clusters to launch a European Energy Cluster Platform. The CASTLE project joined forces with the finance projects INVESat and FinanceSpace to establish the ENCADRE network, joined by 15 satellite clusters from all over Europe, to foster the adoption of satellite downstream navigation applications that use the infrastructures of Galileo and the GMES. Furthermore, partners of the health bio-technology project NetBioCluE concluded co-operation agreements with cross-border regions, which will expand further.

The TCAS and BeLCAR projects in the automotive sector constituted together with projects receiving Structural Funds[149] the "European Automotive Strategy Network" with over 40 European automotive cluster regions that aims at bridging governmental and industry-driven activities in this sector in Europe. NICE is aiming to consolidate the collaboration in a European ICT cluster network and mClusters plans to extend the network to countries and regions outside Europe. INNOTEX wants to leverage the results of the project into business results and continues technology transfer while OMNINET continues with the organisation of match-making events and sharing information on specialised topics. The ABC Network, AFIBIO and NetBioCluE organise their final event together and continue their cooperation through joint projects. The ABC Network is also preparing a roadmap towards the establishment of a major food and agrobio cluster alliance.

Finally, thousands of business contacts have been established and will bear fruit in joint ventures, joint research projects, technology transfer and internationalisation of small and medium-sized enterprises. Based on this broad experience it can be concluded that European support to trans-national cluster cooperation has been very effective and created many spill-over effects that will continue to have a positive effect. They have practically shown scope and means for closer cooperation between cluster initiatives in Europe and thus contributed to the emergence of a **"European Research and Innovation Space"**. However, as indicated in the previous chapter there is still a long way to go from better networking to true partnerships between firms from different clusters. This is a challenge still to be addressed in order to have an even greater impact on the excellence and performance of clusters in Europe.

Another challenge that remains to be addressed more properly refers to the need to further enhance the **professionalisation and excellence of cluster organisations in Europe** and of the support they provide. A project oriented approach has necessarily a limited effect as only few cluster organisations can benefit from direct contacts with other cluster organisations in order to learn from them. Furthermore, the interest of coaching and training those cluster organisations that need such assistance most may not be sufficient, due to the lack of mutual benefits. Therefore more general solutions would have to be found and further promoted, such

[149] The other constituting projects of the European Automotive Strategy Network are NEAC, I-CAR-O and the Network of Automotive Regions.

as the application of the **EFQM Excellence Model**[150] of the European Foundation for Quality Management to cluster management. This would require support from neutral organisations, such as a European Association for Cluster Organisations which has not yet been created. However, there are strong signals that this could be achieved with some initial support from the Commission.

Such an initiative could build upon the experience of the IMQ Net project under the PRO INNO Europe initiative, which represents the Innovation Initiatives Quality Management Network.[151] There appears to be an **increasing demand for special training for cluster managers** as offered by some "Cluster Summer Schools" or "Cluster Academies" at regional level. It would be in the European interest to make such training as widely as possible available in order to improve the excellence of clusters and cluster management across the board.

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150 For more information on the EFQM see http://www.efqm.org

151 More information about the IMQ Net project is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=70&parentID=70

5. TOWARDS BETTER COMPLEMENTARITIES BETWEEN REGIONAL, NATIONAL AND EUROPEAN EFFORTS IN SUPPORT OF CLUSTERS: THE MAIN CHALLENGES AHEAD

To build a more competitive and innovative Europe, the different policies and actions in support of clusters at **regional, national and European level should pull into the same direction** and support each other. Although clusters are predominantly a regional or national phenomenon, the European level can contribute in a number of ways to their success. Support activities at the European level are not about picking the winners but about improving the framework conditions within the knowledge triangle of education, research and business innovation and leveraging the impact of national and regional efforts in support of clusters through mutual policy learning and trans-national cooperation. What is needed as response to the challenges identified in this paper, are **not more but better coordinated policies and initiatives in support of clusters**. The common element should be the promotion of cluster excellence at all levels.

5.1. The needs and scope for better coordination between the different Community instruments in support of clusters

The most important **role of the European Commission** is to complement regional and national cluster policies by further removing barriers to trade and mobility within Europe and thus improving the framework conditions for clusters to emerge and to operate more efficiently. A well functioning **Internal Market** offers the best conditions for more trans-national cooperation higher geographical specialisation and the creation of stronger clusters in Europe.

Many **framework conditions** that are important for clusters are strongly impacted by European policies. It is clearly the Commission's role to support the excellence of clusters by strengthening the knowledge base in Europe and enabling better exploitation of research for innovation, such as through the 7th Framework Programme for Research and Development[152], the new Lead Market Initiative[153] and Cohesion policy programmes[154]. Besides that, the Commission has a specific role to play to stimulate mutual policy learning and trans-national cluster policy cooperation, such through the European Cluster Alliance which was specifically welcomed by the Council.[155]

The Structural Funds, the 7th Framework Programme and the Competitiveness and Innovation Framework Programme (CIP) are the three major Community instruments dealing with the issue of Europe to become a knowledge based economy and each of them includes a

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152 More information about the 7th Framework Programme is available at http://cordis.europa.eu/fp7/home_en.html

153 The European Commission's (2007a) Communication on "A lead market initiative for Europe", COM (2007)860 of 21.12.2007 and further information on the Lead Market Initiative is available at http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm

154 The European Commission's (2007d) Communication "Competitive European Regions through research and innovation", COM(2007) 474 final, is available at http://eur-lex.europa.eu/ LexUriServ/LexUriServ.do?uri=COM:2007:0474:FIN:EN:PDF.

155 See Council of the European Union (2006) *Council Conclusions on a broad-based innovation strategy: Strategic priorities for innovation action at EU level*, 2769th Competitiveness Council meeting, Brussels, 4 December 2006, available at http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/intm/92107.pdf

number of activities in support of clusters from different perspectives. As it is stated in the regulation on the **European Regional Development Fund**, under the Convergence objective, one of the priorities of ERDF is research and technological development (R&TD), innovation and entrepreneurship, including the "improvement of links between SMEs, tertiary education institutions, research institutions and research and technology centres; development of business networks; public-private partnerships and clusters; support for the provision of business and technology services to groups of SMEs; and fostering of entrepreneurship and innovation funding for SMEs through financial engineering instruments". Within the framework of the Convergence and Regional competitiveness and employment objectives, the **European Social Fund** shall also support actions in Member States such as networking activities between higher education institutions, research and technological centres and enterprises. Under the new **"European Territorial Cooperation" Programme**[156], clusters, innovation and SME policies are one of the important priorities.

The decision of the European Parliament and of the Council concerning the **7th Framework Programme** of the European Community for research, technological development and demonstration activities (2007-2013) states that "under the 'Capacities' programme, the innovative capacities of SMEs and their ability to benefit from research should be strengthened and the development of regional research-driven clusters should be supported". In this context the **"Regions of Knowledge" programme** has been particularly designed with the aim to strengthen the research potential of European regions, in particular by encouraging the development of regional research-driven clusters associating universities, research centres, enterprises and regional authorities.[157]

Finally, clusters and cluster organisations play an important role as part of Community policies in support of entrepreneurship and innovation. As explicitly stated in the legal base for the **Competitiveness and Innovation Programme (CIP)**[158], actions in relation to innovation may include "fostering sector-specific innovation, clusters, innovation networks, public-private partnerships and cooperation with relevant international organisations, and the use of innovation management." Under this legal provision, the Europe INNOVA cluster networks were launched which are also aiming at "developing and exploring new types of innovation services" which are tested by cluster organisations.[159] Therefore, the role of the Commission in support of clusters also includes specific measures that aim at promoting innovation in general and SME participation in clusters in particular.

Synergy among these European instruments in support of clusters must be ensured in order to utilize them more efficiently. The **Community Strategic Guidelines for 2007-2013** clearly state that "synergy between Cohesion Policy, the FP7 and the CIP is vital so that research and cohesion policies reinforce each other at regional level by providing national and regional development strategies showing how this will be achieved". A recent study prepared under PRO INNO Europe initiative draws the attention to the fact that there is a risk of overlapping

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156 The "European Territorial Cooperation" Programme replaces and reinforces the former Community Initiative INTERREG.

157 More information on the "Regions of Knowledge" initiative is available at http://cordis.europa.eu/fp7/capacities/regions-knowledge_en.html

158 More information on the CIP is available at http://ec.europa.eu/cip/index_en.htm

159 More information on the Europe INNOVA Cluster Networks is presented in the brochure "Europe INNOVA – Innovation Clusters: The experience of 11 networks" that is available at http://www.europe-innova.org/index.jsp?type=page&cid=10337&lg=en

of interregional networking actions among INTERREG[156], Europe INNOVA, INNO-Nets, ERA-NETs and Regions of Knowledge type of funding, especially in the area of support for policy making. This study is built upon the report "*Synergies between the EU 7th Research Framework Programme, the Competitiveness and Innovation Framework Programme and the Structural Funds*" made on behalf of the European Parliament.[160] To help addressing this problem in the short term, the Commission has published a draft "Practical Guide to EU funding opportunities for research, development and innovation".[161] In the future, a cross cutting identification of existing interregional networks under the mentioned initiatives would certainly help to avoid unnecessary overlaps in this area. Such information could be collected and published by the European Cluster Observatory.

In its Opinion on clusters and cluster policies the **Committee of the Regions** recommends "that the European Commission remedy the fragmented nature of the measures devoted to cluster promotion in the EU, and considers that these should be grouped under one specific line of action to promote clusters and support inter-cluster cooperation."[162] Whereas **a single, structured approach towards clusters** does not appear to be realistic, taking into account the different objectives, legal basis and administrative and budgetary procedures to be followed, it seems necessary and opportune to better coordinate between the different Community instruments in support of clusters.

In order to follow a more coordinated approach in support of clusters, the Commission's services would have to be fully committed to work closely together and to share experience from different Community initiatives, thus responding to the objective to better coordinate in particular between the different activities launched under the Structural Funds, the 7th Framework Programme for Research and Development and the Competitiveness and Innovation Programme. Altogether, these instruments offer **complementary Community support for all stages of cluster policies and initiatives**, ranging from cluster analysis and policy learning to the development and implementation of cluster initiatives (see Figure 15).

Based on the rationale of the different Community instruments it seems to be adjacent that the main **activities in support of policy learning and development** would be streamlined under the PRO INNO Europe initiative, which offers with the European Cluster Alliance[163] the most inclusive platform for better streamlining regional, national and European cluster initiatives in support of cluster excellence in Europe. This would require to involve all relevant Commission's services in the discussions of the European Cluster Alliance and to liaise the different regional cluster networks aiming at mutual policy learning to this work.

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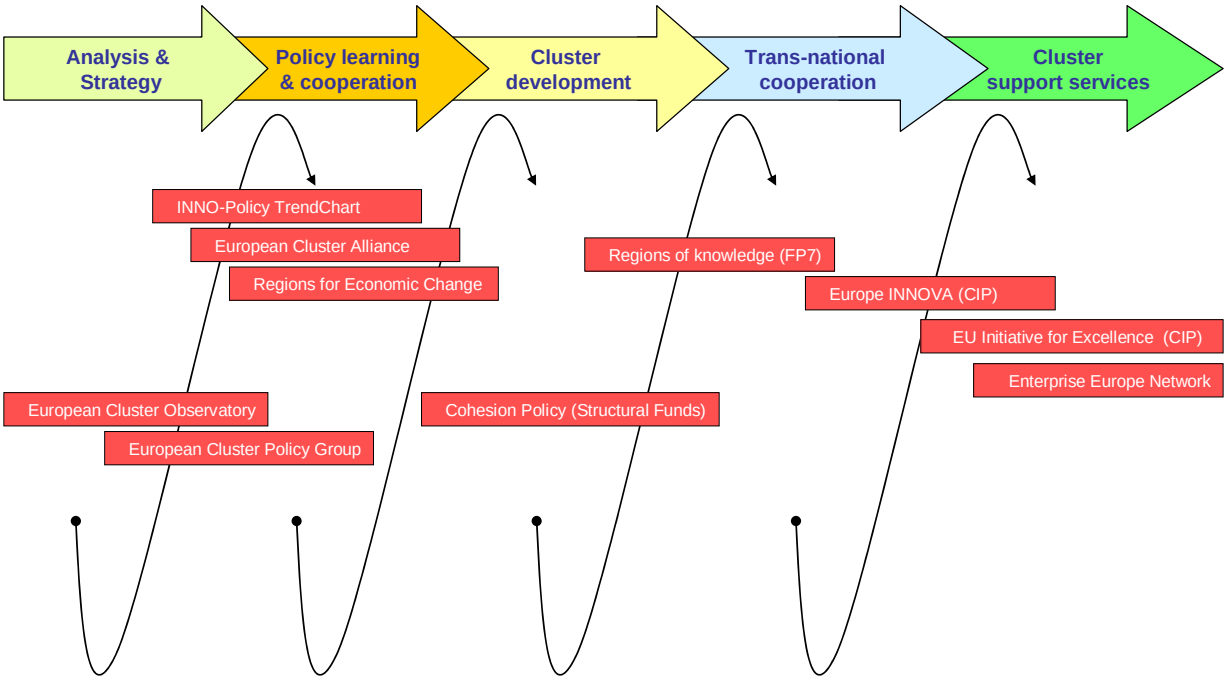
160 The study (Reid et al., 2007) is available at: http://www.europarl.europa.eu/comparl/itre/2007_fp7_study_en.pdf

161 The draft "Practical Guide to EU funding opportunities for research, development and innovation – Synergies in funding opportunities between: 7th Framework Programme for Research, Competitiveness & Innovation Programme, and the Structural Funds" published by the European Commission's Directorate-General for Research (2008) is available at http://cordis.europa.eu/fp7/consultation_en.html

162 See Draft Opinion of the Committee of Regions on Clusters and Cluster Policy, ECOS-IV-024 (CdR 70/2008 rev. 1 EN/o), that was adopted during the Committee of the Regions Plenary Session on 19.06.2008.

163 More information about the European Cluster Alliance, and how to join it, is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=223&parentID=0

Figure 15: Overview of current and planned EU initiatives in support of clusters



The Structural Funds are used by the regions as the main Community instrument to strengthen **regional cluster development and innovation capacity**. These regional efforts are complemented by the Regions of Knowledge initiative that focuses on encouraging stronger links between research and industry, thus bridging between regional research capacities and innovation by learning from each other and stimulating trans-national cooperation in this field. Between both initiatives potential risks of overlaps and duplication exist which requires close coordination between the different Community programmes.

Further downstream, Europe INNOVA focuses primarily on the joint development of new or better tools used by cluster organisations in support of innovative SMEs, thus enhancing better business support services for clusters in Europe. Whereas the Regions of Knowledge initiative aims mainly at supporting regional capacity building, the new Europe INNOVA initiative will facilitate practical cooperation between cluster organisations with the view to developing new or better support services for innovative SMEs. Both initiatives will focus particularly on lead market areas which will add - from different angles - further stimulus to the implementation of the Lead Market Initiative.

Better coordination between the different Community instruments in support of cluster development, trans-national cooperation and cluster management is needed to achieve better synergies between research, regional development and innovation. Stronger bridges among the different instruments must be created to better exploit synergies and strengthen the outcomes of the projects funded under the different programmes.

5.2. New challenges in support of clusters to be addressed at European level

Many Community initiatives contribute to the development of clusters in Europe, based on strategic objectives that have been politically agreed with Member States as part of the different funding mechanisms, such as the Structural Funds, FP7 and CIP. Taking into account the main analytical findings of this paper, the following **challenges** can be identified as a matter of priority:

Challenge Nº 1: To better prioritise Member State's cluster policies towards the needs of world-class clusters in the EU

The Problem: Many cluster policies and initiatives exist at regional and national level. What is still missing is a better prioritisation and a concentration of the different support actions towards the need of creating more world-class clusters in the EU in order to foster regional specialisation and to avoid an unnecessary proliferation of cluster initiatives. For this, no adequate dialogue structures or discussion fora exist yet.

The Action: The establishment of a European Cluster Policy Group, composed of outstanding independent experts from policy authorities, business and academia, would help to identify the best approach to support excellence of clusters in the EU. It could identify the barriers hampering specialisation and propose concrete recommendations for further action, including on a better streamlining of Community instruments in support of clusters. The Group would play an active role in mobilising the necessary political support for a more strategic approach towards clusters and to facilitate discussions with Member States and regions. In order to be effective, the Group would have to liaise as closely as possible with the European Cluster Observatory and the European Cluster Alliance.

The expected impact: The Group would facilitate the policy discussions on how to support the emergence of more world-class clusters in the EU, building upon existing strengths and ensuring better consistency between the different regional and national policies in support of clusters. This would help reorienting cluster policies towards a more efficient allocation of resources, resulting in higher regional specialisation and world-class excellence of clusters. The Group would act as a "trailblazer" for better cluster policies at all levels, by contributing to a better understanding of the success factors and difficulties in the emergence of world-class clusters in the EU. The expected work would increase the awareness about the benefits of excellence in innovation and of upstream cooperation at policy level between Member States in view to strengthening the linkages between existing cluster initiatives and promoting, wherever opportune, the joint design of new cluster initiatives. This would allow avoiding costly duplication and reducing the fragmentation of cluster initiatives in the EU.

Challenge Nº 2: To better provide Member States and regions with neutral and reliable information about clusters

The Problem: The European Cluster Observatory [164] launched in 2006 represents a first and excellent step to creating a more comprehensive picture of clusters in Europe which has also internationally been recognised. Cluster mapping is a difficult and highly sensitive task which

[164] Information from the European Cluster Observatory is available at http://www.clusterobservatory.eu/

requires the continuous search for better methodologies and statistics. More and better indicators need to be used for cluster mapping to allow a more comprehensive and realistic picture. It is still unsatisfactory that the current cluster mapping can only build upon employment statistics. Without giving up the holistic view of the cluster mapping exercise, intense efforts need to be made in order to integrate other indicators and to better analyse the impact of clusters on competitiveness and innovation. Furthermore, more and better information about cluster initiatives and cluster organisations and their activities is needed to facilitate trans-national cooperation.

The Action: The European Cluster Observatory should be continued and further improved towards becoming a full-fledged information service on clusters and cluster initiatives in Europe. As the current contract comes to an end in 2008, it would be desirable to launch a second phase through a call for proposals which takes the above outlined challenges on board. New proposals would be expected to build upon the existing cluster mapping methodology and further improve it by adding additional indicators. Besides statistical information about clusters in Europe and information on cluster case studies, the Observatory should also provide more practical information on cluster organisations, their activities, services and their environment in form of an interactive on-line tool that would particularly address the needs of innovative SMEs to find access to international markets, business partners, research and financing.

The expected impact: The expected impact of this action would be an improved analysis of clusters and cluster initiatives. This would contribute to a better design of cluster policies and their strategic orientations on the basis of more fact-based information. It would further facilitate the impact assessment of cluster policies if further indicators would be integrated and made available European-wide which would also facilitate benchmarking. In addition, innovative SMEs and investors would benefit from such data when searching for enhanced cluster participation.

Challenge Nº 3: More and better practical cooperation at policy level between Member States

The problem: Strengthening upstream cooperation at policy level between Members States is actually the core objective of the European Cluster Alliance.[165] The new challenge of promoting better ways to achieve world-class excellence of clusters in Europe is not explicitly being addressed so far. This would require designing more focused cluster policies and practical instruments in support of this. Furthermore, legal instruments in support of joint cluster policies and initiatives still need to be practically tested. The Member States would benefit from an open policy platform established at EU level by the European Cluster Alliance which would address these issues pertinent for practical cooperation across borders. Strategic discussions on how to better use synergies between different cluster policies would remain rather theoretical as long as no practical solutions for closer trans-national cooperation exist yet.

The action: The proposed action would aim at pursuing the support of the European Cluster Alliance under the condition that the focus of the trans-national cooperation would shift towards the need of creating world-class excellence of clusters in Europe would. The

[165] More information about the European Cluster Alliance, and how to join it, is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=223&parentID=0

European Cluster Alliance – currently involving more than 70 ministries, regional authorities and innovation agencies across Europe – would offer a suitable platform to develop new strategies for the internationalisation of clusters and removing practical barriers for trans-national cooperation between clusters. It would be expected that under this umbrella public authorities responsible for cluster policies and initiatives from different Member States would closely collaborate, aiming at developing and testing practical solutions for more efficient cluster policies in the EU.

The expected action: The work under the new phase of the European Cluster Alliance would result in better cluster policies and more efficient ways to promote excellence of clusters in Europe. It would help creating a common understanding of "state of the art" cluster policies and create closer links and partnerships between different Member States which would also prepare the grounds for a more strategic discussion on cluster policies in the EU, as intended to be initiated and supported by the European Cluster Policy Group. The expected impact could be further enhanced by a liaison of the European Cluster Alliance with cluster networks supported by other Community initiatives, such as with the Regions of Knowledge initiative[166] and the Regions for Economic Change initiative.[167]

Challenge Nº 4: To better integrate innovative SMEs into clusters and the Lead Market Initiative

The Problem: Clusters often benefit from strong support from large innovative companies but at the same time they heavily depend on a large number of innovative SMEs that are ready for radical innovation. Many cluster initiatives and cluster organisations lack a critical mass and strategic orientation to fully exploit their potential. This is partly because many SMEs are not fully integrated in clusters and do not, or not enough, participate in cluster initiatives.

The Europe INNOVA cluster networks have delivered some very good results to facilitate the participation of SMEs in clusters and to foster their cooperation with research and other enterprises.[168] This successful approach could now be used to better exploit the innovation potential of SMEs for the further implementation of the Lead Market Initiative, by specifically encouraging the development of new or better business support mechanism delivered by cluster organisations active in the lead market areas.

The Action: The current cluster networks under Europe INNOVA should not be continued "per se" but be further developed towards an integrated "European Innovation Platforms for Cluster" that bring together cluster organisations in Europe that are active specifically in lead market areas. The objective would be to develop and offer specific support for SMEs to innovate faster and to ease their access to international markets, business partners, research and financing. Cluster organisations would work together at a practical level to jointly develop new or better tools and to implement joint initiatives in support of innovative SME, especially concerning their internationalisation strategies by improving access to markets, capital and knowledge.

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166 More information on the Regions of Knowledge imitative is available at http://cordis.europa.eu/fp7/capacities/regions-knowledge_en.html

167 More information on the Regions for Economic Change is available at http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/index_en.cfm

168 More information about the Europe INNOVA Cluster Networks at http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=4961&classificationName=Cluster%20Networks&cid=5104

The expected impact: Such a "European Innovation Platform for Cluster" would facilitate the participation of SMEs in clusters and offer better support services for SMEs. This would improve the innovation capacity of SMEs and add further dynamics and entrepreneurial spirit to clusters which would also facilitate the further implementation of the Lead Market Initiative.

Challenge Nº 5: To raise the quality of cluster management all over Europe

The Problem: Cluster initiatives and cluster organisations are also a modern instrument for regional policy and economic development. Since cluster organisations play an important role in providing specialised services to enterprises, the level of their quality and professionalism matters. Whereas there is clearly a general tendency towards more professionalism and excellence of cluster organisations this challenge has not yet been fully addressed in all Member States, with the risk that clusters may not exploit their full potential and public support is wasted. The challenge is to improve the excellence of cluster organisations European-wide in order to make more efficient use of available resources and to improve the support to SMEs in the framework of clusters.

The Action: Following a proposal from some Member States, it is proposed to launch a "European Pilot Initiative for Excellence of Cluster Organisations" to create a European label for cluster management excellence, which would promote high quality standards of cluster organisations and would support the further professionalisation of cluster management in Europe. This action requires that a neutral organisation exists which can offer the certification of such a label. Therefore, incentives need to be provided for the establishment of a neutral organisation representing cluster organisations in Europe. Within such a voluntary framework, the European label would be awarded to those cluster organisations who meet the criteria of quality management. In this respect it is proposed to build upon the EFQM Excellence Model of the European Foundation for Quality Management, which sets out indicators such as customer focus, results orientation, and management by processes or partnership development. The European label for cluster management excellence should be complemented by a training scheme for cluster organisations in order to raise their quality and efficiency; furthermore it is proposed to establish a club of cluster managers for mutual learning and inspiration.

The expected impact: The proposed actions would result in a more efficient use of public resources and stronger orientation and professionalisation of cluster organisations in Europe. Respectively, they would contribute to higher quality of cluster management and better services provided to SMEs. The actions are supposed to facilitate mutual learning and reaching excellence, furthermore to create more and better contacts among cluster managers in Europe. They would also raise the recognition of cluster management as a new profession, which is important to attract talented people to this profession and to offer them promising career paths.

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All these measures would complement the efforts of the Member States and their regions in support of clusters in an ideal manner, enhancing their impact and adding a European dimension to them. To be effective, the different Community instruments need to be better aligned towards those implemented at national and regional level. Together, this would create **a more efficient European framework for cluster support**.

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GLOSSARY

1. Definitions related to clusters

Clusters can be defined as a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills.[169] They are a real economic phenomenon that can be economically measured, whereas cluster policies (←) are more an expression of political commitment to support existing clusters or the emergence of new clusters, and cluster initiatives (←) are organised efforts to achieve this.

Cluster categories: See cluster sectors (←).

Cluster cooperation can take different facets. It can mean the cooperation amongst and between cluster firms (←) and other innovation actors located in different clusters. It can also mean the cooperation between policy-makers at programme level or between at operational level

Cluster(ed) firms are companies working in a cluster-like environment.[170]

Cluster initiatives are organised efforts to enhance the competitiveness of a cluster (←), involving private business, public bodies and/or academic institutions within a regional and sectoral system.[171] They are practical actions to strengthen cluster development, which can, but must not necessarily be, based on a formulated cluster policy (←). Cluster initiatives usually follow a bottom-up approach and are managed increasingly by specialised institutions, such as cluster organisations (←).

Cluster managers – or cluster facilitators – are the dedicated individual persons that manage a cluster initiative (←).

Cluster mapping is the indirect identification of clusters (←) in a given geographical area based on statistical methods measuring revealed effects that are assumed to be observable when the real economic phenomenon of a cluster is present, such as concentrated employment rates or higher productivity.[172]

Cluster organisations are the legal entities operating the clusters (←) in charge of managing the participation and access to the cluster's premises, facilities and activities.[173] They are

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169 See the report of the US Council on Competitiveness (2007) *Innovation America - Cluster-Based Strategies for Growing State Economies*, which is available at http://www.nga.org/Files/pdf/0702INNOVATIONCLUSTERS.PDF

170 See the *"2006 Innobarometer on cluster's role in facilitating innovation in Europe"*, available at http://www.proinno-europe.eu/admin/uploaded_documents/FL187_Innobarometer_2006.pdf

171 See Sölvell, Lindqvist & Ketels (2003). Alternatively, Andersson et al. (2004) define cluster initiatives as "conscious actions taken by various actors to create or strengthen clusters".

172 See, for instance, the results and methodology of the European Cluster Observatory (←) at http://www.clusterobservatory.eu/, which provides cluster mapping for 38 cluster sectors or categories (←) for the EU-27 Member States, Iceland, Israel, Norway, Switzerland and Turkey.

173 This definition follows the description concerning aid for innovation clusters that features in the "Community Framework for State Aid for Research and Development and Innovation". See section 5.8 on 'Aid for innovation clusters' of the text of the Community Framework that was published in the

considered as new and highly efficient forms of innovation support providers that provide or channel specialised and customised business support services, especially to SMEs. Cluster organisations are often also in charge of managing cluster initiatives (←).

Cluster policy refers to a wider set of specific government policy interventions aiming at strengthening existing clusters (←) or facilitating the emergence of new ones. Cluster polices may take different forms and follow different objectives, such as industrial and SME policy or research and innovation policy. Cluster policies range from framework policies setting general political objectives to defining measures, allocating funding and organisational responsibilities, and setting specific rules for participation in programmes. Cluster policies are in most cases supported and implemented by specific cluster programmes (←) of governments or cluster initiatives (←).

Cluster policy-maker means the policy-makers responsible for cluster policies (←) – often part of industrial and SME policy, research and innovation policy, or regional policy.

Cluster portfolio is the collection of significant cluster sectors or categories (←) in a given geographical area.

Cluster programmes are specific government programme aiming at strengthening existing clusters or facilitating the emergence of new ones. Cluster programmes comprise specific measures aiming at strengthening existing clusters or facilitating the emergence of new ones. Cluster programmes comprise a certain amount of funding for the measures and/or cluster initiatives (←), a public body or organisation in charge of its implementation and specific rules for participation in programmes.

Cluster sectors – or cluster categories – are those so-called traded cluster industries, which have a choice as to where to locate and serve markets across regions and, consequently, are concentrated geographically.[174] The group of cluster sectors or categories, therefore, does not comprise local sectors – such as local retail and other local services – that mainly serve local markets because they are neither viewed as being exposed to direct competition across regions nor as tending to "cluster together".

2. Description of current and planned EU initiatives in support of clusters

The **Cohesion policy** comprises the financial instruments of the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund with a total budget of around 347 billion Euros.[175] Approximately 86 billion Euro, representing 25%, have been allocated in the current programming period (2007-2013) to research and innovation. Under the "Convergence" Objective (Article 4 of the ERDF Regulation), Member States are allowed to use ERDF funds to co-finance R&D, innovation and entrepreneurship

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Official Journal of the European Union in December 2006 (2006/C 323/01) and that is available at http://eur-lex.europa.eu/LexUriServ/site/en/oj/ 2006/c_323/c_32320061230en00010026.pdf

174 The 38 traded *cluster sectors* identified and applied for the cluster mapping of the European Cluster Observatory (←) are Aerospace, Instruments, Apparel, Automotive, Building Fixtures, Business Services, Chemical, Communications, Food, Agricultural, Distribution, Education, Entertainment, Heavy Machinery, Finance, Fishing, Footwear, Forest, Furniture, Construction, Hospitality, IT, Jewellery, Leather, Lighting, Constr. Materials, Medical, Metal, Oil and Gas, Biopharma, Plastics, Power, Production Tech., Publishing, Sporting, Textiles, Tobacco, and Transportation.

175 For more information about the Cohesion policy 2007-2013 see http://ec.europa.eu/ regional_policy/sources/docoffic/official/regulation/pdf/2007/publications/guide2007_en.pdf

activities through public-private partnerships and clusters. Furthermore, under the "Regional competitiveness and employment" objective (Article 5), ERDF funds can be used to stimulating innovation and entrepreneurship in all sectors of the regional and local economy by supporting business networks and clusters. Trans-national cooperation such as the joint use of research infrastructure and exchange of experience can be supported through the "European Territorial Cooperation" (←).Objective (Article 6).

The **Community Strategic Guidelines on Cohesion** [176] which are consistent with the Lisbon Integrated Guidelines encourage Member States and regions to focus on those areas of investment that help to deliver the National Reform Programmes (NRPs) while taking into account national and regional circumstances. The Guidelines explicitly specify the support to clusters. Investments in building strong clusters are part of the efforts to strengthen regional development in Europe, by better coordinating different policies and thus creating stronger regional and national innovation systems.

The **Enterprise Europe Network**[177] offers support and advice to entrepreneurs and companies across Europe, helping especially SMEs to access innovation networks, to find the right business partners and to inform about EU legislation in order to make the most of opportunities in the EU. This coordinated network is made up of close to 600 local partner organisations in more than 40 countries, including the 27 EU member states, three EU candidate countries (Croatia, the former Yugoslav Republic of Macedonia and Turkey), members of the European Economic Area (EEA) and other participating third countries that combines and builds on the former Innovation Relay Centres (IRC) and Euro Info Centers (EIC). The Network will work more closely with cluster organisations to leverage validated customised services in different EU regions, such as those developed and tested under the European Innovation Platform for Cluster (←) and will inform innovative SMEs about how to participate in clusters.

ERAWATCH provides information on national research policies, structures, programmes and organisations.[178] The aim of this service is to support policy making in the research field in Europe, by facilitating a better knowledge and understanding of national research systems, policies and the environments in which they operate. The INNO-Policy TrendChart (←) provides similar information concerning innovation policy.

The **Europe INNOVA cluster networks** have comprised eleven trans-national sectoral networks of clusters, bringing together more than 200 public and private organisations in eight traditional and high-tech sectors. Since 2006, these networks enabled project partners to identify, analyse and share good practices in cluster management and to address the challenges emerging from globalisation.[179] A number of joint activities aimed at facilitating trans-national cluster cooperation have already been implemented, ranging from cluster visiting schemes and matchmaking events to partnership agreements for the creation of open sectoral business platforms of clusters. The next generation of cluster projects under the

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176 See the Council Decision of 6 October 2006 published on 21.11.2006 (Official Journal L 291/ page 11), which is available at http://ec.europa.eu/regional_policy/sources/docoffic/2007/osc/index_en.htm

177 More information about the Enterprise Europe Network can be found at: http://www.enterprise-europe-network.ec.europa.eu/index_en.htm

178 More information about ERAWATCH is available at http://cordis.europa.eu/erawatch/index.cfm

179 More information about the Europe INNOVA initiative is available at http://www.europe-innova.org and about its Cluster Networks at http://www.europe-innova.org/index.jsp?type=page&lg=en&classificationId=4961&classificationName=Cluster%20Networks&cid=5104

Europe INNOVA initiative will focus on the creation of strategic partnerships between cluster organisations under a "European Innovation Platform for Clusters" (←).

The **European Innovation Platform for Cluster** is a new initiative to be funded under the Competitiveness and Innovation Programme (CIP)[180] that will further develop the successful approach of the previous generation of Europe INNOVA cluster networks (←) towards the creation of strategic partnerships between cluster organisations in Europe active in priority areas, such as those selected under the Lead Market Initiative.[181] The objective of this trans-national cooperation is that cluster organisations work together at a practical level to identify complementarities, share infrastructures and to jointly develop new or better tools and to implement joint initiatives in support of the internationalisation of innovative SMES by improving access to markets, capital and knowledge. A Call for Proposals is expected for autumn 2008 with an estimated budget for the next phase of three partnerships under this Europe INNOVA Platform of 7 million Euros. The tools and instruments developed and tested by these cluster partnerships will be integrated and leveraged, as widely as possible, into the new Enterprise Europe Network (←).

The **European Cluster Alliance** is an open trans-national cooperation platform for cluster policy-makers established under the PRO INNO Europe initiative in 2006, bringing together more than 70 public partners including national and regional authorities and innovation agencies responsible for the design and implementation of cluster policies (←).[182] The Alliance promotes mutual policy learning as well as the development of joint actions and practical tools. It has already undertaken the first steps for fostering practical cluster policy cooperation in Europe. In the new phase starting in 2009, the Alliance will particularly focus on developing better policies for stimulating a greater international orientation of clusters in Europe.

The **European Cluster Memorandum** is a short and concise 8-page political document prepared by a High Level group on clusters in November 2007 outlining an agenda for policy action for promoting European innovation through clusters.[183] It introduces a number of principles for cluster policy in Europe and is addressed to national and regional authorities and innovation agencies which are managing cluster programmes. It was presented at the European Presidency Conference on innovation and clusters (←) in January 2008 in Stockholm and has so far been signed by more than 60 public organisations.

The **European Cluster Observatory** developed in 2006 under the Europe INNOVA initiative offers an online cluster mapping (←) database of statistical clusters in 32 European countries and 38 sectors. In addition to the measuring and identification of regional clusters based on employment data, the European Cluster Observatory's website further provides case studies of cluster policies and other information.[184] It is the intention to further improve the website in 2009 towards a full-fledged information service on clusters and cluster initiatives

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180 More information on the CIP is available at http://ec.europa.eu/cip/index_en.htm

181 The European Commission's (2007a) Communication on "A lead market initiative for Europe", COM (2007)860 of 21.12.2007 and further information on the Lead Market Initiative is available at http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm

182 More information about the European Cluster Alliance, and how to join it, is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=223&parentID=0

183 The European Cluster Memorandum is available at http://www.proinno-europe.eu/NWEV/uploaded_documents/European_Cluster_Memorandum.pdf

184 See the website of the European Cluster Observatory at http://www.clusterobservatory.eu

by providing additional information about cluster organisations, their activities, services and their environment as well as offering match-making facilities in view to facilitate trans-national cooperation across Europe.

The **European Cluster Policy Group** is a new High Level Advisory Group to be established under the PRO INNO Europe initiative with the objective to advice the European Commission on strategic objectives to better facilitate the emergence of more world-class clusters in Europe. The Group will consist of 20 outstanding independent experts from policy authorities, business and academia that will be selected through an open Call for Expressions of Interest. Following consultation with the European Cluster Alliance (←), the Group is expected to steer cluster policy discussions at EU level and to draw recommendations for preparing future policy actions. The Group is expected to be fully operational by early 2009 and to complete its tasks within a period of 18 months.

The **"European Grouping on Territorial Cooperation"**[185] is a legal instrument primarily developed for managing Cohesion Policy (←) programmes which may also be used to foster cooperation between public authorities (or other bodies governed by public bodies law) in the trans-national support of clusters. It can be used for developing and implementing common support services and sharing access to research and testing facilities.

The **European Pilot Initiative for Excellence of Cluster Organisations** is a new initiative to be launched under the Europe INNOVA initiative with the objective to raise the professionalism of cluster organisations (←) in Europe. A quality standard and a European label for excellent cluster organisations will be developed on the basis of the EFQM Excellence Model [186] as well as cluster management training and coaching activities will be organised across Europe for cluster managers (←). The action may lead to the creation of a European Foundation of cluster managers.

The **European Presidency Conferences on Clusters** represent two major events on clusters in 2008. The first European Presidency Conference on innovation and clusters was jointly organised by the Slovenian EU Presidency and the Swedish government in Stockholm in January 2008. The European Cluster Memorandum (←) was presented and discussed at this event with the outcome of a Stockholm Declaration calling upon the European Commission to prepare concerted actions to further support cluster development in Europe. A second European Presidency Conference on clusters will be organised by the French Presidency in Sophia Antipolis on 13-14 November 2008 that will discuss the measures suggested by this Communication as well as their implementation, with a view to prepare an input paper on clusters for discussion at the December 2008 Competitiveness Council.

The **"European Territorial Cooperation"** Objective of the European Regional Development Fund (ERDF) under the new Cohesion Policy (←) – which replaces and reinforces the former Community Initiative INTERREG – can be used to support regional cooperation for cluster development. It aims at integrated territorial development, interregional co-operation and exchange of good practice.

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185 See Regulation (EC) No 1082/2006 of the European Parliament and of the Council of 5 July 2006, as published in the Official Journal of the European Union (L 210/ page 19) on 31.07.2006, available at http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/newregl0713_en.htm

186 Detailed information about the EFQM model of the European Foundation For Quality Management can be found at: http://www.efqm.org/

The **INNO-Policy TrendChart** provides a database, policy briefings and reports that describe and analyse major innovation policy trends at national and regional levels across Europe in an independent way.[187] It aims to contribute to policy assessment and to identify examples of good practice, thus improving the basis for decision making in innovation policy, including cluster policy (←). ERAWATCH (←) provides similar information concerning research policy.

The **Regions for Economic Change (RFEC)** [188] is a new initiative under the "European Territorial Cooperation" Objective (←) designed to help regions gain maximum benefit from the wealth of knowledge, experience and good practice available in other regions, by integrating ideas developed through interregional cooperation (INTERREG IVC) and urban development network (URBACT II) programmes into the region's mainstream Operational Programme for implementing Structural Funds. It aims to address some of the core issues that Europe is facing by the identification of 30 priority themes focused on economic modernisation and the renewed Lisbon agenda and it offers the Commission expertise to a number of networks. The initiative can be used to assist Member States and regions in their efforts to further improve their innovation strategies and cluster policies.

The **Regions of Knowledge**[189] initiative aims to support the development of research-driven clusters and their cooperation at EU level. It will contribute to the development of strategic research agendas by regional public authorities and other stakeholders. Particular emphasis will be put on areas with a clear economic development potential for the regions, such as those identified in the Lead Market Initiative. The initiative is part of the "Capacities" category of the Seventh Research Framework Programme (FP7) with an allocated budget of 126 million Euro for the period 2007-2013. Two Calls for proposals were launched in 2008 with a budget of around 10 million Euro and another Call for proposals will be launched in 2009 with an indicative budget of around 16 million Euro.

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187 More information about the INNO-Policy TrendChart is available at http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=52&parentID=52

188 More information about this initiative can be found at: http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/index_en.cfm

189 Further information about this initiative can be found at: http://cordis.europa.eu/fp7/capacities/regions-knowledge_en.html