Clusters and clustering policy: a guide for regional and local policy makers
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1 About this guide

The Committee of the Regions (CoR) has mandated inno Germany AG to prepare a guide for regional and local policy makers on clusters and cluster policy, i.e. a guide providing straightforward insights on why and how to design, plan, implement and evaluate cluster policy.

Context of the guide

“Competitive clusters help cities, regions and countries to meet the socio-economic challenges of globalisation. Therefore, they are an ingredient of territorial competitiveness.

Policies in support of clusters are carried out more and more frequently at the national and regional / local level. Some initiatives are also being implemented at the EU level (…).

Studies and empirical evidence, while showing that clusters can play a competitive role in global value chains, also show that clusters, once being successful, may decline. As far as cluster policies are concerned, empirical findings and anecdotal evidence seem to point at mixed outcomes.” (CoR 2008: 2).

Objectives of the guide

“[…] the CoR is due to adopt an Opinion on Clusters and clustering policies. The CoR will keep a high level of attention on clusters and clustering policies and will give its contribution to the policy debate on the appropriateness, feasibility and effectiveness of public policies in support of clusters. It also wishes to help regional and local policymakers to exchange experiences and learn lessons from each other through a benchmarking process.

To this purpose, the CoR wishes to provide regional and local policymakers from areas where (real or potential) clusters exist with a state-of-the art tool enabling them to understand their (potential) cluster's market positioning and to decide whether policy support is needed and feasible.” (CoR 2008: 2)

The general objective is to provide a study entitled a regional and local policy-maker's guide to clusters and clustering support. The specific objectives are to review the conceptual and practical issues and problems a regional (local) administrator has to deal with if he / she wishes to design and implement a cluster policy.
Procedure for preparing and writing the guide

inno prepared this guide to regional and local cluster policy during 2009. A thorough analysis of the existing literature on cluster policy has been performed in order to clarify key terms and concepts as well as to develop a set of hypotheses (conceptual grid of statements) and questions that are relevant to policy over the full lifecycle of a cluster, i.e. the planning, implementing, monitoring, evaluation and potential exit of a cluster.

The focus of the literature analysis has been on policy literature. However, due attention has been paid to academic literature on cluster theory, empirical studies of clusters, statistical sources, cluster case studies and cluster management guidebooks.

The literature analysis resulted in a theoretical framework of reference which served as a basis for the interviews with cluster policy makers, cluster practitioners and cluster researchers. The interviews have been highly instrumental in validating / falsifying hypotheses in the conceptual grid. In addition, the interviews have raised new questions as well as providing pragmatic clues and insights to cluster policy. The guide has very much benefited from the experience and competence which the interviewed cluster experts contributed during and after the interviews. Thank you!

The interviewees have been selected primarily due to their outstanding experience and understanding of cluster policy. Other selection criteria include geographical distribution and their respective function in cluster policy (e.g. defining policy, implementing policy, evaluating policy). In addition, we have selected interviewees in a way to ensure that that we received comments from at least three interviewees on each cluster.

In total, 35 interviews (37 interviewees) were carried out over spring and summer 2009 with the following distribution of respondents (cf. annex A.1 Interviewees – overview; p. 117):

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*Table 1: Background of the interviewees*
2 Getting started

This guide is written for you, as a policy maker wondering whether a cluster policy could be beneficial to your territory and if so what it should be like in order to achieve your strategic objectives. This handbook will not fully answer your questions, but it does provide commented experiences of good and less good practice of decision makers in comparable situations to yours. It will thus allow you to answer your questions yourself. Apart from policymakers, cluster managers, cluster researchers and other people interested in clusters will find food for thought in this guidebook.

Obviously, the first question when thinking of cluster policy is: *Can cluster policy help to achieve my political targets (e.g. sustainable competitiveness of my territory)?* Clusters are not an end in themselves, but can be very instrumental in pursuing specific political targets. In annex A.2, the rationale and limitations of cluster policy are presented (p. 117). Looking beyond the widespread acknowledgement that cluster policy is / can be meaningful, this chapter provides answers to the following questions:

- Why are clusters important for regions? (p. 117)
- Why should cluster policy be adopted? (p. 117)
- What are the key challenges of cluster policy? (p. 117)
- What are the main risks of cluster policy? (p. 117)
- Is cluster policy always feasible? (p. 117)

Once you have decided to get started, you need to think of basically three key blocks of cluster policy, namely

- **designing and planning a cluster policy** - assessing the existence of clusters, characterising a cluster, assessing a cluster's market position, assessing the need for a cluster policy, assessing the appropriate policy mix.
  Chapter 3 (p. 7) deals with the design and planning of cluster policy and delivers hands-on answers to the questions:
  - How to assess the existence of clusters (p. 11)
  - How to characterise a cluster (p. 27)
  - How to assess a cluster’s market position (p. 47)
  - How to assess the need for a cluster policy (p. 63)
  - How to assess the appropriate policy mix (p. 75)

- **implementing a cluster policy** – engaging and coordinating private and public actors, establishing cluster organisations, delivering support.
  Chapter 4 (p. 81) deals with the implementation of cluster policy, and provides answers to the following questions:
• monitoring and evaluating cluster policies – including exit strategies.
Chapter 5 (p. 117) deals with the monitoring and evaluation of cluster policy, and delivers hands-on answers to the questions:
  o What is evaluation and what is it good for? (p. 117)
  o How to do an evaluation (p. 117)
  o Technical aspects of cluster evaluation (p. 117)
  o What to do with evaluation results (p. 117)

This handbook dedicates a specific chapter to each building block of cluster policy in which you will find
• a rationale for the relevance of the respective topic,
• a set of questions mostly focussing on how to do things, and
• a discussion of possible approaches to dealing with key challenges.

You can use this handbook to provide you with ideas and inspiration for specific fields of cluster policy when you look for possible answers to specific questions. Please keep in mind though that this handbook is not and cannot be a manual documenting the one correct way to do cluster policy. Also, it is important to keep in mind that cluster policy demands a strategic and holistic approach securing consistency of the individual building blocks. For instance, it is crucial to get started but it is just as crucial to think about an exit from cluster support at the time of getting started. Do you want to exit based upon a cluster’s performance? Then you need to monitor and evaluate performance and impact from the beginning. You also need to decide whether you want to exit in the case of poor performance (as a kind of punishment and if it is determined that taxpayers’ money can be used better otherwise) and/or do you want to exit when the strategic objectives have been achieved (i.e. mission completed)? You are thus warmly invited to read the handbook as a whole as well, where you will find insights but also differing opinions on some issues.

The Australian government has summed up its complex approach to cluster policy in the following idealised process and steps very well:
• “Determine the overall goals and the scope of the policy initiative.

• Initiate discussion on the cluster development process (this may involve regional / national forums or workshops with leaders from the public and private sectors to explain the benefits of clustering and to get key players on board).

• Identify and map existing clusters and location-specific attributes in the economy.

• Strategic prioritisation of efforts by clusters (finite resources will require some strategic decisions to be taken as to which clusters are going to provide the most benefits to Australia. Also not all clusters identified are going to necessarily want or need assistance. Various clusters are going to be in different stages of their life cycle.)

• Clarify the roles of the relevant public, private, and support entities with respect to the individual clusters (in the majority of cases the appropriate level for active government will be at the local or regional level, the national government however may play a supportive and supervisory role).

• Collect detailed information on each cluster (their markets, competitors, suppliers, customers, vertical and horizontal linkages, technologies, the local economy in terms of its capabilities, governance structures and institutional infrastructure, what stage of the life cycle the cluster is in i.e. latent, embryonic, expanding, and mature).

• Engage key groups and individuals to lead and drive the process.

• Assess and plan direction and targets (what are the issues, problems, challenges, market failures that need to be addressed? What can be achieved quickly what will require a longer-term strategy? Who will action it and how?)

• Co-ordinate the public and private activities including investment / co-investment in public goods (such as specialised infrastructure, training, research and development activity, communications and transport).

• Establish an appropriate cluster organisation to oversee the process.

• Market and disseminate information about the cluster and the locational advantages it offers.

• Continuous evaluation of both the individual cluster and the national policy (initial progress, the outputs, the outcomes, effectiveness has it met its goals, cost-benefit analysis, benchmarking).

• Decide whether to terminate or institutionalise mechanisms that have been successful.”

(McPherson 2001: n.p.)
3 Planning a cluster policy

The planning of cluster policies is the first major block of this guide. It demonstrates the importance of identifying not only existing clusters but also cluster sprouts with significant potential. Beyond providing guidance on how to assess the existence of clusters and how to characterise them and assess their market positions, it demonstrates the importance of identifying and involving the right persons – usually leading personalities in the business environment – and of building trust among policy makers and all the cluster players.

This chapter shows how the need for cluster policy can be assessed and how it is affected by the different characteristics and success factors of clusters. Finally it provides an overview on the most common policy measures for cluster development and explores how policy makers can develop an adequate policy mix according to the nature and needs of clusters.

3.1 Assessing the existence of clusters (p. 11)

What are clusters and what are potential clusters (cluster sprouts)? This chapter helps you to understand what distinguishes a cluster from a random collection of organisations and competences.

To perform an initial categorisation, policy makers may fall back on qualitative, quantitative and ideally mixed cluster mapping / measuring methods. Two practical examples demonstrate:

- a more qualitative approach as shown in the case of Clusterland Upper Austria,
- a more quantitative approach as shown in the case of Denmark.

Based on testimonies from cluster experts and policy makers, this chapter shows that there are different ways to conduct the cluster identification process and that policy makers need to consider the prime limiting determinants of the identification strategy: time and resources.

3.2 Characterising a cluster – Organisation and strategy (p. 27)

Characterising clusters helps policy makers to identify different types of clusters and to derive appropriate support measures.

To that end this chapter provides an overview of key cluster dimensions, what they mean for cluster policy and hints on how to measure them. Relevant cluster dimensions are e.g.:
PLANNING A CLUSTER POLICY

- spatial proximity,
- critical mass,
- position in the cluster life cycle,
- dynamics and linkages within the clusters.

Several practical examples are given in this chapter to demonstrate:
- the evolution of clusters through different stages of the life cycle
  o the Paper Province in Värmland, Sweden,
  o CyberForum in the region of Karlsruhe, Germany,
- the potential of strengthening the linkages between cluster actors,
  o the Paper Province in Värmland, Sweden.

3.3 Assessing a cluster’s market position (p. 47)

This chapter outlines the importance for policy makers of assessing a cluster’s market position in order to:
- understand the regional cluster landscape,
- understand the strengths and weaknesses of a cluster compared to competing clusters, and
- finally, derive policy implications for cluster funding.

The guide recommends that policy makers start out with the most common quantitative characteristics of the cluster, such as the turnover volume and growth potential.

In terms of assessing a cluster’s growth potential the guide presents two practical examples:
- Automotive cluster Upper Austria – a cluster defined along a single value chain,
- CyberForum, Karlsruhe, Germany – a cluster dealing with emerging multiple value chains.

The chapter addresses the most common methods used to assess a cluster’s market position:
- analysis of a cluster’s turnover,
- analysis of a cluster’s growth potential, and
- benchmarking of a cluster with competing clusters.

The chapter concludes with possible policy actions in response to different assessment results of a cluster's market position and how the market assessment may or may not feed into cluster funding decisions.
3.4 Assessing the need for cluster policy (p. 63)

This chapter argues for a careful analysis of the development barriers of clusters versus the potential for investment in cluster policy, and for a realistic assessment of whether success factors for cluster development can be sensibly fostered by policy.

The guide presents the following variables affecting cluster policy:
- the characteristics of a cluster,
- its market position, and
- the factor conditions affecting cluster development.

Taking on a policy maker’s perspective, recommendations are presented on how to respond to different cluster characteristics at national, regional or local policy level.

3.5 Assessing the appropriate policy mix (p. 75)

Clusters are influenced by a wide variety of policies that by no means need to be aimed at clusters or called cluster policies. Therefore policy makers need to understand which supporting elements are available in the region and to make them available to each specific area which would need them.

This chapter presents the following questions to be answered to take action towards an appropriate policy mix:
- Is adequate financial support available?
- Is there a willingness among the cluster’s actors to collaborate with policy makers?
- How can traditional policies be aligned with cluster policy?

The guide further recommends adapting the policy mix according to the evolution of a cluster’s lifecycle.
3.1 Assessing the existence of clusters

3.1.1 What are clusters?

There is a wide variety of different definitions of a cluster. As stated by Dr. Lefebvre, Ecole des Mines de Paris “There is no real adequate definition for a cluster. In reality, there are very different types of clusters to be found, involving different types of partners from industry, research, education, policy, (...). The two most famous examples of clusters, Silicon Valley and the Italian districts, are extremely different in their nature and ways of bringing the actors together.” (Interview)

However, most cluster definitions – from the literature as well as from the practitioners interviewed - have the following common traits:

- a geographical concentration of firms interconnected (Porter 1998) by being part of the same industry or the same supply chain, by a common resource or market, by a similar philosophy, by facing similar opportunities and challenges or by collaboration with the same university or research institution;
- a critical mass (Andersson et al. 2004: 28) of actors, resources, competences (in absolute terms - in relation to cluster competitors in other regions - but also in relation to other cluster candidates in the respective region) in order to sustain interaction between the cluster actors in the long term and to attract new members, and
- existing interaction and cooperation of firms (EC 2008b). “These carry marked features of both competition and cooperation.” (Andersson et al. 2004: 28)

Porter sums it up as follows: “A cluster, then, is an alternative way of organising the value chain. Compared with market transactions among dispersed and random buyers and sellers, the proximity of companies and institutions in one location and the repeated exchanges among them - fosters better coordination and trust. (...) A cluster of independent and informally linked companies and institutions represents a robust organisational form that offers advantages in efficiency, effectiveness and flexibility.” (Porter 1998: 79)

These definitions strongly focus on companies, which are at the core of clusters, and their interaction. However, with the increased involvement of policy making and the expansion of the knowledge-based economy, the active presence of actors from higher education, research organisations and policy is increasingly seen as a decisive factor for cluster development. Clusters are understood as regional innovation systems.
Clusters do not pop up overnight, but develop over time. Whereas the above definition describes a full-fledged cluster, there is at least one more stage which is worthwhile having a closer look at: the cluster sprout. The cluster sprout definitely lacks some key defining characteristics: “Existing clusters can be observed. [Observing the] potential for new clusters is extremely difficult, as the example of the many biotechnology clusters all over Europe shows.” (Interview Prof. Müller, BAK Basel)

3.1.2 Why is there a need to assess the existence of clusters?

Before investing public money in cluster policy, policy makers need to acquire a comprehensive understanding of the respective regional cluster landscape. Knowledge on the existence of clusters involves distinguishing between at least three alternatives:

- clusters,
- cluster sprouts,
- no cluster candidate.

As mentioned above, an assessment would focus on cluster characteristics such as geographic concentration, critical mass, interaction and cooperation between companies and further organisations.

It is imperative to base policy on a sound understanding of the regional cluster landscape. However, the assessment of the regional cluster landscape does not always require intricate measurements and studies. Where possible, policy makers can fall back on already existing information and reputable knowledge providers in the region.

In a nutshell, assessing the existence of clusters will provide policy makers with important information in order to:

- understand the business landscape with its strengths and weaknesses,
- prioritise policy efforts,
- identify the need and opportunity for a cluster policy,
- justify future policy measures and create transparency,
- validate and communicate a political strategy and enhance acceptance of a (funding) decision.

In practice, such a categorisation is far from trivial and provides essential information on the need for, and the extent and future direction of cluster policy.

As a general rule, the level of detail and aggregation of information collected on clusters should closely follow the specific questions to be answered. At the same time, policy makers have to make sure that the knowledge used will be accepted
by the cluster actors and be appropriate to convince external stakeholders (e.g. to convince non-publicly funded actors to invest, fight frustration amongst non-supported cluster candidates).

As a first step, policy makers can use:
- qualitative information derived from their day-to-day business,
- qualitative information from colleagues in other departments,
- statistical data in the public domain, e.g. from industry reports and statistical agencies.

In regions with well-established networks between business and policy, policy makers tend to have more leeway and can be advised to follow a very pragmatic approach of cluster identification. However, while experience with known clusters is important, policy makers should avoid too narrow a focus and watch out for new cluster development and / or potential as well.

The process of developing a cluster policy in Upper Austria serves as an example for a pragmatic approach to cluster identification and implementation:

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**Case study: Upper Austria**

*(Interview W. Winetzhammer, W. Pamminger, G. Pöchhacker-Tröscher)*

The cluster approach in Upper Austria is a good example of the use of qualitative techniques to identify clusters and define policy support.

*W. Winetzhammer* was responsible for economic affairs at state level and launched the cluster policy in Upper Austria during the mid 90s. To implement cluster policy “the strong sectors / industries represented in the State (in terms of export, job market, R&D) were identified (not necessarily those where Upper Austria was strongest, but those with the highest potential). This (pre-)selection process was based on intensive interaction with stakeholders, not on an academic study. The first chosen candidates comprised e.g. automotive, polymers and furniture / wood.”

*W. Pamminger*, CEO of Clusterland Upper Austria describes the process of implementing cluster policy as follows: “In Upper Austria we reduced all cluster mapping activities to a minimum. We asked key players in the region and saved the cost of a consulting company. In my opinion the mapping issue is generally overestimated. Cluster mapping is simply a new business model. (….) The main success factor of our cluster policy was to make a courageous decision - no ifs, ands, or buts.”
The cluster activities in Upper Austria were coordinated by OÖ. Technologie- und Marketinggesellschaft m.b.H. (TMG). G. Pöchhacker-Tröscher, who managed the strategic innovation program of TMG at that time, explains the difficulties of the identification process: “Sometimes it was difficult to define the clusters, because we had to keep in mind the critics of our decision. Instead of the automotive cluster we could have alternatively started a construction industry cluster. But the construction industry lacked critical mass even though it had a good structure, a supply chain and the organisational competencies.”

The governmental side and the cluster management both strongly emphasise the commitment of key stakeholders and the importance of working together. The case shows that the success achieved in Upper Austria very much depends on the standing of the decision makers in the community and the ability of these persons to bring the right people together.

Other regions have followed a similar approach to identifying regional clusters and initiating their cluster policy. Y. Guyon, Chamber of Commerce and Industry of Lyon (CCIL) states that “potential clusters were / are identified by the CCIL itself on the basis of its knowledge of the regional industry and actors in general.” (Interview)

The necessity of more detailed cluster mapping depends on the stock of experimental knowledge and the standing of decision makers in the most relevant business community. An experienced person, well-respected by the local / regional community, meets these conditions without having to engage in additional cluster measurement to ensure trustworthiness.

In case of doubt, cluster mapping is a powerful approach for collecting goal-specific information about the local business environment. Furthermore, cluster mapping can help policy makers to benchmark clusters. In the benchmarking process several clusters are chosen according to the same selection criteria and compared against a set of indicators. While benchmarking is not an obligatory exercise in the cluster mapping process, it can help policy makers to understand the international competitiveness of a regional cluster and to better identify its strengths and weaknesses. For example, benchmarking provides information on the structure and performance of a cluster against others and indicates explanations for systematic differences. (Wessels / Meier zu Köcker 2008: 41) As benchmarking is also a tool to be used in the evaluation and monitoring of clusters, it will be presented in more detail in chapter 5.3.3 (p. 117).
Whilst there is no single best method to identify and measure clusters, there is a wide variety of functional approaches. Each method has specific strengths and weaknesses. The following chapter describes some of the most prominent approaches to measurement and systematically discusses their respective pros and cons.

3.1.3 What methods are there to identify clusters and what do they yield?

In the realm of policy making, demands for information often differ from those in academic research. Also, the choice of methods may follow different rules. The key selection criteria are not necessarily the validity and reliability of the methods. More often, policy makers have to make their choices in the face of heavy budget constraints and the need for extensive stakeholder involvement to strengthen dedication and buy-in to a certain policy.

In the following, the interested policy makers can therefore expect a pragmatic selection guide rather than a methodological treatise. The methods are broadly grouped into quantitative and qualitative approaches. While quantitative methods represent rather top-down instruments to identify clusters, qualitative methods tend to be more bottom-up and suitable for boosting stakeholder involvement during the mapping exercise. The reader will also find a practical case from Denmark illustrating the use of quantitative methods at the end of the quantitative section.

Before selecting a method, policy makers should define the exact informational needs and answer the fundamental question of whether a detailed study is needed. A cluster identification process consumes time and resources and is most appropriate when its results are pivotal for decision making. For instance, a mapping study is not necessary when decision makers have the commitment of the stakeholders and good arguments to persuade opponents to a potential cluster policy.

Before going into greater detail, the following table allows a quick glance at the methods at hand, indicating where to obtain relevant data, what advantages and limitations exist and when to apply the respective method. The methods are not restricted to the purpose of cluster mapping, but can also be employed in cluster evaluation (see also chapter 5.3, p. 117).
<table>
<thead>
<tr>
<th>Method</th>
<th>Data sources</th>
<th>Advantages / Limitations</th>
<th>Application area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantitative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Localisation quotients</td>
<td>Employment data</td>
<td>Easy to use / Orientation on administrative borders and traditional industries</td>
<td>Identification, Evaluation</td>
</tr>
<tr>
<td>Ripley’s K-method</td>
<td>Distances between locations of all companies</td>
<td>Identification without setting borders and / Pre-selection of industries</td>
<td>Identification</td>
</tr>
<tr>
<td>Export data</td>
<td>Input-output data</td>
<td>Identification of the national relevance of the industry / Disaggregated data rarely available</td>
<td>Identification, Market position, Evaluation</td>
</tr>
<tr>
<td>Input-output method</td>
<td>Input-output data, surveys</td>
<td>Quality of interaction / Absence of co-location, data availability</td>
<td>Identification</td>
</tr>
<tr>
<td>Network analysis</td>
<td>Various quantitative sources, survey</td>
<td>Quality of interaction / Data availability</td>
<td>Identification, Characterising, Evaluation</td>
</tr>
<tr>
<td><strong>Qualitative</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interviews</td>
<td>Regional opinion leaders</td>
<td>Possible information about the regional economy, persons with more information, identification of business concentrations, small and potential clusters, information about competitiveness and ideas for action plans / Subjective, selection bias</td>
<td>Identification, Characterising, Implementation</td>
</tr>
<tr>
<td>Focus groups</td>
<td>All relevant actors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snowball method</td>
<td>Experts</td>
<td></td>
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</table>

*Table 2: Advantages and limitations of different mapping methods*

In practice, data accessibility and the possibility of using the mapping results in further steps of the cluster process will strongly influence the efficiency of the respective method.
3.1.3.1 What quantitative cluster mapping methods are there?

In general, quantitative methods to identify (and to characterise) clusters involve available statistics and can be applied without the direct involvement of the cluster actors. These identification tools can be characterised as *top-down*.

A selection of quantitative methods used for cluster mapping includes:

<table>
<thead>
<tr>
<th>Method</th>
<th>Explanation</th>
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</thead>
<tbody>
<tr>
<td><em>Spatial concentration</em></td>
<td>Koschatzky / Lo recommend that “… the first step in each cluster identification is to determine a spatial concentration.” (Koschatzky / Lo 2007: 7).</td>
</tr>
<tr>
<td><em>Localisation quotients</em></td>
<td><em>Localisation quotients</em> are a popular indicator for cluster existence (European Cluster Observatory, dti). For example, the quotient compares an industry's share of total employment in a given region to the industry’s total employment share of the whole geographical area. If there is an agglomeration of an industry within a country, the location quotient has to lie significantly above one. The dti (2001) defines a localisation quotient above 1.25 as a necessary criterion for clusters. This means that the employment within that industry in the region lies 25 % above the national average. An alternative localisation quotient is based on turnover data for registered companies. The advantage of this method is that data is easily available from EUROSTAT, or national or regional statistical sources. On the other hand, localisation quotients are based on data sources oriented towards traditional industries and are highly dependent on the choice of borders. The difficulty is that some clusters might only be identified at a small geographic scale, while others require a larger geographic scale (Andersen et al. 2006).</td>
</tr>
<tr>
<td><em>Ripley’s K-method</em></td>
<td><em>Ripley’s K-method</em> is a rather technical approach to identifying clusters, circumventing the problem of choosing borders and the size of the region a priori. The method is based on the data of all distances between the locations of all companies in each industry. Comparing the geographical concentration with a benchmark distribution points out industries which are concentrated within the region. These industries can be considered as globally oriented. By opti</td>
</tr>
</tbody>
</table>
mising the distances between companies, the method identifies systematic co-locational patterns of companies in the pre-selected industry. (Andersen et al. 2006: 17) This new geographical method is not yet widely applied in cluster mapping. A problematic feature is the potential difficulty of obtaining detailed location data.

| **Export data** | *Export data* can sometimes be used to identify clusters, but more often they are used to assess the global relevance of an industry. As identification criteria for global industries, the national share of a commodity can be compared to the average national share of exports, the world market share or the export growth. Because export data is usually only available on a national level the method is rarely used for cluster identification. The dti (2001) used the export data method to measure the global competitive performance of an industry. |
| **Graph analysis** | *Graph analysis*, founded in graph theory, identifies cliques and other network linkages between firms or industry groups. These methods give a more detailed picture of the cluster but are associated with higher costs. To yield valuable information, highly disaggregated data and interaction matrices from surveys are needed (DeBresson / Hu 1999). |
| **Input-output method** | The *input-output method* indicates the interactions between companies and the strength of these interactions. In a first step, industries are grouped based on export data or by focusing on the largest transactions, in relative terms, between industries. In a second step, the patterns of clustering are found by graph analysis. The weaknesses of the method are the absence of co-location as a criterion and the difficulty of getting input-output data at sub-national level (Andersen et al. 2006 and Kiese 2008). For that reason, input-output analysis is difficult to perform at a regional level. |
| **Network analysis** | Rather than focusing on the interaction between industries, *network analysis* concentrates on the interaction between the different actors. In addition to trade or innovation-based input-output tables, surveys and other qualitative sources are used to identify the relationships. The data is analysed by matrices or graphical network analysis. The quality of interlinking can be assessed by analysing the concentration, |
the structural cohesion or the centralisation of the network. The usage of surveys for data collection allows a cluster mapping that includes the interactions with universities and other institutions. The disadvantages of this method are the high costs, the high dependence on the response rate and the constitution of the sample (Kiese / Schätzl 2008).

Table 3: Explanation of quantitative mapping methods

The major advantage of quantitative methods is that they can deliver “hard” facts to justify policy measures and are more appropriate for benchmarking clusters against others.

One limitation of quantitative approaches is that they do not readily capture developing or niche clusters. This makes the methods more appropriate for a reactive cluster policy approach in order to foster existing, mature and declining clusters. Also, quantitative cluster mapping methods can be technically demanding and are highly dependent on data availability. Policy makers have to be aware of the methodological drawbacks and be careful when interpreting the results.

The following example illustrates the systematic use of quantitative methods for identifying and selecting clusters at national level:

Case study Denmark
Denmark used a quantitative approach to measure clusters (nationwide) in order to decide about policy support.
The strength of the agro-industrial complex in Denmark was discovered by analysing input-output tables. In this case, the possibility of comparison and the objectivity of the results outweighed the disadvantage of not capturing most relations and dynamics. A specific Danish advantage of applying the input-output-method is the relatively disaggregated input-output tables, including 130 sectors at that time. (Drejer et al. 1999)

Jørgen Rosted, FORA explains the cluster identification in Denmark:
“Since the mid 80s we have worked with these statistical clusters and have definitions and discussions at analytical level, but in order to have a cluster policy in the way they have it in Finland, Sweden, Canada, etc. we used this as a priority. 15 years ago, we had to make some investments in ICT and every university wanted to have an ICT department and every small region wanted to have an ICT cluster, which the government should support. This was of course not possible and we had to make a choice. When we advised the government on
how to pick the universities to invest in, we used this data – and in case one area was too small but for political reasons it was necessary to give them some money, then we agreed on that, telling the government that they should come up with plans about who is doing research, who is driving the initiatives, etc. In making these decisions and advising the government in this direction, we also gathered information about where industry is located. And we also did that for biotechnology – when it was all the rage, 15 years ago.” *(Interview)*

### 3.1.3.2 What qualitative methods of measuring are there?

Qualitative cluster measurement is a more *bottom-up* approach for cluster identification as it involves mainly primary research. Qualitative methods usually build on expert knowledge and opinion.

Regional experts such as industrial leaders, public officials, researcher etc. can for example be asked to:

- identify clusters,
- evaluate the importance of clusters or cluster initiatives in a region / country,
- give their view on local and regional networks, regional supply chains and regional core competencies,
- assess the ties between universities, businesses and the government by using survey techniques such as *interviews, questionnaires, focus groups, Delphi* or the *snowball method*. The use of these methods can generate valuable information and provide a deeper understanding about the key competencies of a cluster, its contours, and its interconnections to other networks. These methods are also more likely to include universities and other institutions constituting a cluster. Such qualitative information helps to identify challenges for future growth and to develop a cluster strategy (e.g. a shared vision).

The following table gives an overview of those techniques:

<table>
<thead>
<tr>
<th>Method</th>
<th>Explanation</th>
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<tbody>
<tr>
<td><strong>Interviews</strong></td>
<td>The netwin guide for cluster development (netwin 2002) recommends <strong>interviewing</strong> regional opinion leaders to obtain an overview of the regional economy and information about persons with more information about the main business concentrations. The method can be used to identify small and potential clusters and to collect information about the competitiveness and develop first ideas for an action plan.</td>
</tr>
<tr>
<td><strong>Questionnaires</strong></td>
<td></td>
</tr>
</tbody>
</table>
Focus groups

Cluster Navigators Ltd (2001: 16) emphasise group discussions and cluster workshops as successful tools for cluster identification. These kinds of discussions and workshops pull together “more than 100 people from across the community”, bringing together the Economic Development Agency with local bank managers, journalists, logistic companies and others. The variety of actors involved help to reveal in-depth information and are particularly suited to identifying niche clusters.

Snowball method

A special case of asking experts is the Snowball method. The sample selection of this method relies on the knowledge of questioned experts about further key informants. After experts are asked about clustering in a region they are asked about reference key actors of certain clusters and about experts who (should) know more about the cluster. The questioned persons are asked if they see themselves as belonging to a certain cluster, sub-cluster, etc. The “snowball” stops when no new references to other key informants can be given. The advantage of the method is that clusters and their connection to other clusters can be revealed. (Andersen et al. 2006)

The main advantage of qualitative methods is that they provide more detailed contextual information than quantitative methods. Thus, qualitative methods are better suited in the process of identifying emerging clusters, niche clusters and philosophy-based agglomerations.

The drawback of qualitative methods as compared to quantitative ones includes the lack of standardisation and difficulty of comparing the findings across regions. Another problem is that it is easy “to overestimate the accuracy of strongly held opinions among key stakeholders and to forget the multitude of potential biases affecting each expert’s views, as well as each expert’s limited field of experience within the broader economy.” (Bergmann / Feser 1999: n.p.)

A good approach is therefore to use a mix of qualitative and quantitative methods.
3.1.3.3 **Combining qualitative and quantitative approaches**

A policy maker has to bear in mind that there is no such thing as THE best method. As depicted above, quantitative and qualitative methods alike have their particular strengths and shortcomings and answer different questions.

In the following, we display several examples from practical approaches suggested in the cluster literature or applied by our interview partners:

Koschatzky / Lo recommend a combination of an analysis of regional statistical data together with interviewing experts and actors involved (see table below, Koschatzky / Lo 2007: 11):

"**Regional statistical analysis**

to calculate
- concentration measures (e.g. absolute concentration, localisation coefficient)
- innovation indicators (input coefficients in the form of R&D expenditures and R&D personnel, throughput/output coefficients in the form of regional patent profiles)

**Expert survey**

about
- reconstructing/ understanding information and communication channels
- reconstruction of value-added chains (classification of categories of industrial branch systematics, e.g. NACE)

**Interviewing cluster actors (enterprises, universities, research institutions, intermediaries, financial institutions, educational institutions)**

to collect data on
- product and performance spectrum
- forms of cooperation
- institutional integration
- formal transaction relationships (economic exchange relationships to suppliers, customers, cooperation partners/ competitors)
- informal communication relationships (contact networks, personal exchanges)"

| Table 5: Quantitative and qualitative approaches for cluster analyses (Koschatzky / Lo 2007: 11) |

In the following, some examples illustrate how the identification of clusters can be done by pragmatically combining qualitative and quantitative methods:
M. Clara, UNIDO has observed that “generally, the selection process relies greatly on the use of qualitative information, since this can be more easily gathered. A good starting point is represented by interviews and focus group discussions with national and regional representatives of the country, who can usually provide valid indications concerning where clusters are located. This process can take something like a month.

In a few countries, especially larger ones with a high number of clusters, the exercise could be complemented by the use of quantitative information.

To this respect, national industrial statistics and population census will provide valuable information on industry-based employment and output broken down by province or region, both of which are common proxies for the presence of industrial agglomerations. At this stage, it can be helpful to acquire and cross-check quantitative information from different sources. Some of the institutions that will be able to provide data are the following:

- business membership organisations or sectoral organisations such as industry associations, chambers of commerce, etc.;
- databases storing information on economic regions (e.g. Mercosur, Central America etc.);
- multilateral development organisations, UNIDO but also Interamerican Development Bank, Asian Development Bank, UNDP etc.;
- academic sources.

At this point, with the range of potential clusters singled out, the actual selection process will start. This is conducted in a participatory fashion based on interviews and meetings with local stakeholders. The process may be supported by an induction seminar in which the cluster development approach is presented and the participants are stimulated to apply the selection criteria to their country or region. In this or other cases, it is recommendable to rely on the support of an expert / facilitator.” (Interview)

Interview Y. Guyon, CCIL
“Thanks to the company register it is possible to assess, up to a certain point, the weight of a potential cluster in terms of companies present in the region.

In a second step, it is necessary to assess whether the value chain is fully or at least significantly covered by the regional actors. If not, actions might be undertaken in order to attract missing parts as far as possible.

It is also necessary to identify a leader for the cluster, usually a manager from the industrial sector considered. This person needs to have a high recognition among the other actors and to bring in personal commitment to the initiative.”
Interview M. Dermastia, Anteja

The mapping study is a very good start: they focus on a statistical assessment on what is going on in a region (but can be also done at a national level). The purpose is to obtain an overall picture of the types and geographic concentration of existing and potential clusters in the region, and to develop a benchmark of relevant activities implemented by existing clusters’ representative bodies for the provision of competitive added values to the associated companies. Policy makers could better set priorities for the country, private businesses could more easily find concentrations of quality and innovation, and local leaders could better understand their local or regional economy and better design their policies on economic development. But such a map only results in agglomeration. This means that it does not help policy makers understand whether networks are involved or who is doing what, etc. How to design the study is a different story, but it is also important to be on-the-spot and “discover” the networks: to identify linkages, relations, networks between industries and between industries, R&D institutions and the support environment, i.e. to identify the product/service systems and patterns in the value chain between companies and industries. A link could be a flow of goods between a supplier and a customer, a flow of information between companies, a flow of information between companies and research institutions, universities etc, a flow of information between companies and various educational institutions, and any other flow of information that affects a company’s competitive position.

This can obviously not be done at a national level. Usually regions do their “mapping exercise” by themselves. But it is important that the statistics and research studies are consistent, otherwise it is only a nice paper with no use. In a second stage, the cluster potential must be assessed – and this is not easy. After that, benchmarking can be done, which can help identifying potential missing links, measures, actors, etc. Then you can start working. This is what clusters are all about. The strategy should be prepared, the policy tools to use, etc. But it is mostly important to find the right people who really believe in the clustering “cause”.

I started working on clustering in Slovenia in 1999 and there was no governmental money for these actions. So I just went around and visited companies to have people on board – and those people did trust me and we worked together for three years and finally got money from the government. It is all about charisma and energy. This is all you need to start clustering initiatives (because usually there is no money available to start a cluster).
3.1.4 Summary

There are different ways for policy makers to conduct the cluster identification process. Policy makers need to consider the prime limiting determinants of the identification strategy: time and resources.

*M. Clara, UNIDO (Interview)* characterises well-designed cluster selection processes as mainly “shared” and “grounded”:

- **Shared** implies that selection-making is not a unilateral process, but rather the result of a participatory practice that secures the involvement of relevant national and regional actors (e.g. ministries of industry and the economy, chambers of commerce, business associations and trade unions, development agencies). How many actors will be included in the selection process is essentially a strategic decision that depends on the time and resources available. While an inclusive process is desirable, a high number of participants implies greater time costs.
- **Grounded** means that the decision-making process will have to be based upon clear and agreed criteria.”

This ensures that the selection process is transparent and that selection can be justified at any point in time.

Depending on the context, there is not always a need to engage in intricate measurements of clusters. A mapping study is not necessary, if decision makers have the commitment of the actors and good arguments to convince critics. However, a mapping study can enhance transparency. *Dr Pantalos, DG Enterprise* states: “Mapping activities are typically outsourced and performed in order to generate knowledge and transparency rather than a fundament for funding decisions” (*Interview*). For mapping the cluster landscape, measurements can be made by qualitative and or quantitative means. Ideally, both methods should be combined.

In a more informal cluster identification process, the main success factors are the *commitment* of the cluster actors to the decision makers and the *transparency* of the process. To secure the commitment, the cluster actors should be involved in the process. As emphasised by practitioners, one major challenge for policy makers is not only to identify the clusters but “to find the right people who really believe in the clustering cause” (*Interview M. Dermastia, Anteja*) and “to identify a leader for the cluster, usually a manager from the industrial sector” (*Interview Y. Guyon, CCIL*).
3.2 Characterising a cluster – Organisation and strategy

3.2.1 Why clusters should be characterised

From the perspective of a policy maker, characterising clusters is necessary in order to distinguish the different types of clusters in the relevant area and to infer appropriate support measures.

More specifically, the characteristics of regional clusters affect policy decisions such as:

- the definition of criteria for selecting clusters to be supported,
- the decision about the appropriateness of policy support at all (i.e. some minimum critical mass is required),
- the design of specific support measures and definition of eligibility criteria for the clusters’ use of support money, and
- the overall cluster policy strategy (e.g. cluster portfolio).

3.2.2 What are policy-relevant characteristics of a cluster?

In the following, we discuss in more detail the most important characteristics of clusters as identified in the literature and in the interviews and how they relate to policy making.

Those characteristics are:

- spatial proximity,
- critical mass (number of actors),
- cluster life cycle,
- nature of cluster actors,
- dynamics and linkages within the cluster:
  - connections between cluster actors,
  - mutual trust,
  - common vision and strategy,
  - institutionalisation, and
  - balance between cooperation and competition.
3.2.3 Spatial proximity - What regional dimension and distance of actors does the cluster have?

Geographical proximity of the actors within a cluster is important for

- lowering transaction costs,
- accessing and sharing information (e.g. geographical proximity enhances the frequency of face-to-face contact and meetings by chance),
- getting specialised supply from factor markets (e.g. labour, capital, technological sources), and
- improving interplay with local customers.

(Andersson et al. 2004: 19)

Clusters somehow develop within “borders” – this helps to create an identity and clusters need a strong identity as well as a strong brand. The latter e.g. provides members with tailwind in their marketing activities, boosts inward investment, etc. In order to develop such a brand, it can be helpful to know where cluster borders are and where they are not, e.g. administrative borders are not helpful in defining a cluster. However, policy makers are in need of a “border concept” as well, in order to understand between which organisations increased interaction should be fostered.

Practical recommendations for the geographical coverage of a cluster vary between a maximum of one hour’s drive (Interviews I. Ffowcs-Williams, Dr Meier zu Köcker, G. Pöchhacker-Tröschler) and between two and three hours’ drive (Interview W. Pamminger). These statements show that the concept of measuring distance in kilometres is being replaced by measuring distance in hours, but the latter makes it more difficult to measure the regional dimension.

In the view of I. Ffowcs-Williams “each cluster member has (could / should have) a different definition of “his” cluster. The cluster does not (necessarily) have an “own” identity (governance structure, vision, membership circle ...). A cluster is a natural occurrence.” (Interview)

Anyhow – clusters will develop and operate within borders and these are needed for identity purposes etc. Clusters that operate across borders are meaningful for several reasons, but for policy makers this might be a problem in terms of providing support (especially in the case of financial support) across borders.

The orientation along traditional administrative borders can hamper the efficiency of cluster policy, because cross-border collaboration can help to reach a critical mass, to complete a value chain, and to enhance the cluster dynamic. But according to A. Richter, State Ministry, Hamburg “[f]unctionally, borders are difficult to draw. In the case of the aviation cluster, Hamburg constitutes the core; Schleswig-Holstein and Mecklenburg-Vorpommern are part of the cluster.
With the States of Bremen and Lower Saxony, there are close collaboration agreements.” *(Interview)*

The case of the light engineering cluster in Suzzara (Province Mantua / Region Lombardy) and Guastalla (Province Reggio Emilia / Region Emilia Romagna) is a good example of missing growth opportunities, because of a lack of cooperation between regions. “These two municipalities are located in two of the most dynamic regions in Europe, which – however – have no joint policies. In this case the request for joint activities in the two regions must be formulated by the companies based in the different regions – as the lack of joint activities would mean missing an important growth occasion!” *(Interview Prof. Russo, University of Modena and Reggio Emilia)*

### 3.2.4 Critical mass - What is the necessary number and size of businesses and other organisations in the cluster?

“Critical mass” is a theoretical construct derived from the necessary mass for continuance of the nuclear chain reaction (Kiese / Schätzl 2008). In relation to clusters, critical mass means the mass necessary in order to have a basis for more and intensive cooperation, to better exploit the innovative potential, to sustainably defend its market position, etc. Critical mass is determined by the number of firms, the number of employees and other local conditions such as regional human capital, the presence of supporting services, and public research institutions (Brenner / Fornahl 2002).

It is widely assumed that the number and size of co-located actors connected by a common field of business, technology, resource, philosophy, etc. will have an influence on the ability of a region to attract specialised services, resources, and suppliers, as well a well-qualified labour force (Regional Technology Strategies 2009). After having reached a “critical mass”, it is assumed that the cluster will grow in a self-augmenting process (Brenner / Fornahl 2002).

The industrial structure exerts an important influence on critical mass, because some sectors are profiting more from geographical proximity than other industries (Brenner / Fornahl 2002). “In the automotive industry, probably hundreds of suppliers should be engaged into cluster activities. In highly knowledge intensive sectors like biotech and Pharmaceuticals the following is more crucial than hundreds of SMEs: an active role of the best universities and laboratories, excellent governmental support schemes (like centres of excellence, incubators, technology transfer offices, patent legislation, licensing agreements), VC engagements and the presence of big pharma and excellent hospitals are more crucial
than hundreds of SMEs. However, SMEs with a strong focus on knowledge are part of the cluster “by definition.” (Interview M. Dermastia, Anteja)

As “critical mass” is difficult to measure (Kiese 2008), cluster literature does not yet provide any “exact” figures. There are only approximations based on mathematical approaches taking into account the firm population and factors such as the availability of human capital, services and research institutions. External conditions in this relationship include the market situation, the lifecycle of the respective industry and the strength of the self-reinforcing processes (see e.g. Brenner / Fornahl 2002).

Despite the difficulty of assessing critical mass, the majority of experts tend to agree that in most cases at least around 50 companies are necessary to reach critical mass (CLOE 2006; Interviews: Y. Guyon, S. Bjurulf). According to Prof. Cooke of the Centre for Advanced Studies at Cardiff University “it is not the size (in terms of members) that matters …, but the interaction which constitutes a cluster. This interaction is different from normal market interaction.” (Interview) Y. Guyon, CCIL also states that “becoming too big also presents a risk of losing focus and pertinence of the activities.” He sees 200 as a practical maximum number of firms to be part of a cluster before it loses efficiency due to being too large. (Interview)

In general, policy measures to attract new firms and research institutions are more expensive than the support of existing clusters or the measures mentioned before. Therefore, it is essential to know whether a regional cluster has already reached a critical mass, or if it has the potential to reach this mass.

For regional policy makers, open calls are an approach to identify candidates for cluster support. Good examples include e.g. the cluster competition of the State Ministry of Economics, Transport, and Agriculture in Hesse, Germany (Arndt 2008). On a national level, one possible way to foster potential clusters with a high probability of reaching a critical mass is theme-specific calls (e.g. the Bio-Regio cluster programme from the Federal Ministry of Education and Research in Germany). In most cases, critical mass constitutes a precondition for cluster policy (Interview Dr Meier zu Köcker, Agency Competence Networks Germany). However, a main contribution of cluster policy can be to support the achievement of critical mass in case of sufficient potential.

Possible ways to support the achievement of critical mass comprise e.g.:

- supporting the institutionalisation of the cluster, as effective cluster management can partly “compensate for and reduce the lack of critical mass” (Interview Dr Meier zu Köcker);
• supporting entrepreneurial activities in order to increase the number of new companies entering the cluster; the latter can be enhanced by supporting incubators, technology transfer agencies, technology parks, etc.;
• supporting cooperation with firms, research institutions, or nearby clusters (e.g. cross-border clusters);
• policy strengthening the cluster by giving additional support if a cluster is dominated by a key public organisation (e.g. a public research institution);
• supporting / facilitating the settlement of new firms and research institutions.

3.2.5 Cluster lifecycle

Like products and markets, clusters pass through a sequence of stages: birth, growth, maturity, and decline or renaissance (see illustrated below). It has to be kept in mind though, that such a development does not happen by a natural law, but that policy can exert a major impact on the development (e.g. ensuring that growth actually takes place by removing barriers and preventing decline by specific measures).

![Figure 1: The cluster lifecycle](Sölvell 2009: 22)

The dynamism can be understood as typical combinations of the number of actors, network activity, and market growth:
PLANNING … – CHARACTERISING A CLUSTER

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Birth</th>
<th>Growth</th>
<th>Maturity</th>
<th>Decline</th>
<th>Renaissance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of actors</td>
<td>growing</td>
<td>growing (critical mass)</td>
<td>sinking (critical mass)</td>
<td>sinking</td>
<td>growing</td>
</tr>
<tr>
<td>Network activity</td>
<td>low</td>
<td>growing</td>
<td>intense</td>
<td>sinking</td>
<td>growing</td>
</tr>
<tr>
<td>Market growth</td>
<td>high</td>
<td>high</td>
<td>low</td>
<td>negative</td>
<td>high</td>
</tr>
</tbody>
</table>

Table 6: Typical combinations of characteristics at different stages of the lifecycle

The birth of a cluster is characterised by a rising number of firms, an underdeveloped network, and high market growth. In most cases, the driving forces are the foundation of a leading firm, specific policy measures (e.g. foundation of a cluster initiative), historical events, or specific innovations (Brenner / Mühlig 2007).

A growing cluster has reached a critical mass to grow in a self-augmenting process. Additional cluster members and a cluster management unit (e.g. a technical assistance unit) improve the network and make the cluster more attractive for firms, which in turn supports the attraction of additional resources (e.g. employees, venture capital).

A main trait of mature clusters is a stagnating market. Firms compete primarily in terms of prices and reduction of cost rather than on product differentiation. Efficiency and economies of scales gain importance. These mature clusters are characterised by a sinking number of firms because of mergers and acquisitions and a declining number of new firm entries.

“Ultimately, some clusters go into decline, finally reaching the “museum” stage.” (Sölvell 2008: 17). The reasons for such a decline are:

- “excessive concentration,”
- heavy government involvement saving and subsidizing companies,
- radical technological shifts originating from other locations,
- radical shifts in demand at other locations,
- war and other extreme circumstances.” (Sölvell 2008: 44).

Mature clusters can also undergo a renaissance by regaining new business dynamism, innovativeness and attracting new firms.
Policy makers should be aware of the development stage of a cluster because each phase has specific needs, implying that different policy measures need to be implemented.

Two cases are described below, presenting the evolution of two clusters – the Paper Province and CyberForum – through different stages of the lifecycle.

**Example of Paper Province (Interview M. Williams, cluster manager, Värmland)**

“In the mid 1990s, the challenges for the pulp and paper industry increased. Decreased competitiveness, a need for specialisation, and increased competition all resulted in structural changes within the mature industry. At the same time, companies were experiencing difficulties in attracting skilled labour to the industry. (…) Sune Nilsson, an official at one of the municipalities in Värmland, started to map all of the pulp and paper companies in the region, and their linkages. (...) At an industry gathering, Sune Nilsson later met Clive Voukes, general manager at the Wales Development Agency, and previously at the British Ministry of Enterprise, who had been invited to the conference to talk about clusters. (…) This input lent credence to the idea that the industry’s challenges could be addressed jointly, which in turn encouraged seven companies to come together to form The Paper Province, Värmland’s first cluster initiative, in 1999. The combination of evolutionary and constructive forces had begun. (…) As the Paper Province initiative has grown, it led to increased dialogue and cooperation between industry and other actors in the region, most importantly among various institutes of higher education and research. In 2001, Region Värmland, a public body responsible for promoting regional development, was founded. The general aim of the organisation is to create competitiveness and sustainable growth through initiating, coordinating and supporting regional development. Region Värmland soon identified The Paper Province and other cluster initiatives as important partners, since they represented strong sectors within the region. Region Värmland became one of the partners facilitating linkages between Paper Province and the University of Karlstad. Based on scholarly research, Värmland identified packaging as a potential cluster focus, prompting a project called The Packaging Arena to be established within The Paper Province in 2004. Later, in 2006, The Packaging Arena broadened its scope of activity to also include non-fibre raw materials, with a regional base of firms, launching a new cluster initiative in the process. By closely monitoring the development of the cluster, Region Värmland was able to create a sort of a “Värmland model”. The emerging model was built on a foundation of cooperation between local communities, in-
stitutes of higher education, and firms – represented by cluster initiatives – and focused on four central processes: business development, entrepreneurship, near-industry research and human resources. These constructive processes interact with and influence each other in a complex but fruitful system, leading to improved innovation and growth.”

Example of CyberForum (Interview D. Hermanns, cluster manager, CyberForum, R. Eichhorn and S. Buhl, EDD, City of Karlsruhe)

Background: ICT – the specific assets of the region Karlsruhe
The region of Karlsruhe presents significant assets in the field of information and communication technologies, both from a business and from a scientific perspective. The region of Karlsruhe has stood out for its cluster formation with regard to information technology for years. A great number of university and non-university research institutions as well as a structure of medium-sized businesses with approximately 3,600 IT companies, among them a sizeable number of young, growing companies, account collectively for that. Versatile and established networks exist as a basis for an intensive exchange of thoughts and experiences as well as for trustful cooperation in jointly-operated projects. Karlsruhe is one of the three most important IT clusters in Europe according to the European Cluster Observatory.

Short Flashback – Development bottom-ups of the early 80s
There have been many meetings since the early 80s, especially between companies - bilateral or in small groups - which primarily served for experience exchange. Initial cooperation was also established. Numerous long lasting, very trustful instances of cooperation, which still shape the CyberForum, were created at that time.

Foundation of the association CyberForum e.V. in 1997
In 1997, a public-private partnership of companies, the Karlsruhe Chamber of Commerce and Industry (CCI), communes, universities, research centres and private sponsors was founded in the form of the non-profit association CyberForum e.V..

The collective objective was and still is – within the TIMES sectors (telecommunication, information technology, media, entertainment, security) – raising the potential for company foundations and enabling or assisting young founders to start in self-employment, facilitate networking of existing companies through information sharing, communication and cooperation.
The scope of the services to the members rapidly encompassed the following components: consulting of founders, seminars and workshops, InfoMarkt (information events), coaching programme, trainee programme, Newsletter and website (www.cyberforum.de), CyberKongress (conference) and Cyber-Champion (an award for young companies in the network).

CyberForum rapidly developed into a network proactively fostering the exchange of information among companies in the TIMES sector. Since its inception numerous members have been gained. They come – both at that time and today – from companies, start-ups, universities, higher education organisations, research centres, cities and private persons.

**CyberForum today – need targeted offer for growing high-tech companies**

By now, the CyberForum has evolved significantly: A member’s survey from the middle of 2006 made it clear that they were in need of support, especially with prevailing bottleneck issues in their company’s development. It was the beginning for the systematic targeting of the services provided to the specific needs of the companies throughout the different phases of their existence.

**The success of CyberForum**

The CyberForum has emerged from a start-up network to a high-tech entrepreneur network. The strategic developments initiated in 2006 have led to an increased attractiveness of the services and events; and the number of members has significantly increased – to about 750 today. The success of CyberForum is reflected by its consistently growing network as well as the cooperation and partnerships it has generated. Among them are new “sub-networks” such as the initiatives MobileRegion Karlsruhe or the Karlsruher IT-Sicherheitsinitiative (IT Security initiative Karlsruhe).

**Support from local and regional policy**

The city council of Karlsruhe has been involved in the CyberForum since its foundation in 1997 as a member of the public-private partnership.

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**3.2.6 What is the nature of cluster members?**

Prof. Sölvell from the Stockholm School of Economics describes the change of the cluster concept over time: “Traditionally, clusters were more or less exclusively defined by employment agglomeration in related sectors. (…) The cluster concept has become broader covering all three triple helix dimensions.” *(Interview)*
“The Cluster Initiative Greenbook argues that four main categories of actors – companies, governments, the research community and financial institutions – are vital and normally present in a cluster and active in a cluster initiative” (Andersson et al. 2004: 24).

Typical actors in successful clusters are
- companies (e.g. SMEs, MNEs),
- research institutions (e.g. universities, laboratories, colleges, etc.),
- financial institutions (e.g. VC, banks, private equity firms, etc.), and
- public actors (national, regional and local policy).

Further important actors are organisations, formal or informal, which promote interest in the cluster initiative among the actors involved. Examples of such organisations are formal cluster organisations, chambers of commerce, NGOs, media for regional branding etc. (Sölvell 2009: 17). “Companies are core to clusters” (J. M. Esteban, Co-ordinator of Cluster Policy at the Department of Industry, Trade and Tourism of the Basque Government, Interview); research institutions, technology transfer agencies and incubators are important to secure the innovativeness and thus the competitiveness of the region.

For policy makers it is important to know whether the relevant actors are present in the local industrial agglomerations to decide about policy support. If key types of actors are missing, policy makers have to gauge whether and / or how to support a cluster.

National cluster policies do often have a focus on science and innovation promotion (Sölvell et al. 2003). This cluster policy approach pays more attention to the “importance of innovation as a means of trying the emergence and sustainability of agglomerations.” (Sölvell 2009: 15). To maximise knowledge externalities of clusters, this policy particularly emphasises the presence of actors from all triple helix dimensions (Interviews: J. Oswald, J. M. Esteban, Dr. Pantalos, Dr. Marklund, J.-D. Malo). The decision on providing public support for a cluster - or cluster sprout - is often based on a minimum degree of institutionalisation, and the presence of research institutions (e.g. Pôles de Compétitivité in France, VINNVÄXT in Sweden).

Local policy makers can strengthen their clusters by enhancing the variety of actors as well as by stimulating cooperation with nearby regions. An effective way is to “encourage and support cross-border collaboration (e.g. in the Rhein-Neckar-Region, Germany)” (J. Oswald, Ministry Baden-Württemberg, Interview). There are also examples of regional cluster competitions targeting the innovativeness of clusters (e.g. cluster competition in Baden-Württemberg in Germany).
Even though less favoured regions often lack strong research universities, most of them have post-secondary institutions. These research institutions are often driven by the needs of the local economy and less by world-class research. Policy can support clusters in these regions by adding the relevance of research for the regional economy and the commercial potential as review criteria and by shifting more research funds to institutions in less favoured regions (Rosenfeld 2002). Typically, local cluster policy means support of SMEs, networking, and marketing measures by investment in cluster organisations, technology transfer agencies, and economic development agencies.

In summary, a good knowledge of the variety of actors in a cluster is important in determining
- the regional scope of cluster policy,
- the target of policy support (e.g. institutionalisation, research), and
- the level of support (local, regional, nation, EU).

3.2.7 What are the dynamics and linkages within the clusters?

3.2.7.1 What are the connections between cluster actors?

Cluster actors are connected to each other in multiple ways. They can be connected in functional terms such as belonging to the same value chain or focus on a common technology.

One possible way to characterise the functional structure in clusters follows the lines of Jacobs / de Man (1996), who differentiate between the following dimensions, which are illustrated below:
- sharing the same market or supply (horizontal dimension),
- being part of the same value chain (vertical dimension),
- certain inter-sectoral capabilities (lateral dimension),
- a common technology (technological dimension), and
- a central actor (focal dimension).
The **horizontal dimension** describes the links within a cluster through complementary products and services, end-users, distribution channels, the use of similar specialised input, technologies or institutions. The advantages of these agglomerations are reduced costs of coordinating dispersed sources of knowledge and overcoming the problems of asymmetrical access to information for different firms producing similar goods and competing with one another. (Jacobs / de Man 1996)

“The advantages of proximity arise from continuous observation, comparison and monitoring of what local rival firms are doing, which drives innovation as firms race to keep up with or get ahead of their rivals.” (Gertler / Wolfe 2005: 3)

The possibilities for cooperation in the horizontal dimension are limited, because sharing information in cooperative projects could jeopardise the competitiveness of the focal firm. “It might be tempting [for policy makers] to regroup within a cluster initiative a large number of regional firms serving related or connected markets (e.g. for marketing purposes). However, if actual possibilities for interacting and collaborating on research and development, training etc. are limited by too diverse value chains, the cluster will not be able to gain momentum and generate much added value for its members. As a consequence, they will likely lose interest and show little commitment to the initiative.” (Interview Y. Guyon, CCIL)

To strengthen the commonalities in the horizontal dimension of a cluster, Jacobs / de Man (1996) recommend sector initiatives (e.g. environmental policies) and the organisation of strategic conferences.
**Vertical agglomerations** are connected by being part of the same value chain. The network consists of supplier, service and customer relations serving adjacent phases in the production process. Geographic proximity is important for knowledge diffusion. In contrast to horizontal agglomerations, vertically linked firms are mainly collaborators. The existence of a value chain is in many cases a defining element of a cluster (OECD 1999: 12, Kulicke 2009: 11).

*Prof. Russo* from the *University of Modena and Reggio Emilia* describes her experience with vertically connected agglomerations: “In the clusters I’ve studied, we observe companies producing many related components and semi-finished goods, belonging to different industrial sectors, often within a same global value chain or filiere.” For instance “in the ceramic tile district of Sassuolo there are companies producing tiles as well as companies producing tile machines, designers specialised in decorating tiles, producers of glazes, etc., all these companies belonging to different industrial sectors.” *(Interview)*

Regional and national (Hausberg et al. 2008) programmes to support clusters emphasise the presence of all actors along the value chain as a pre-condition for policy support. *Y. Guyon, CCIL* states that “the presence (…) of a sufficient number of actors along the complete value chain, from research to marketing and sales” is an important criterion for policy support. “In specific cases, if some parts of the value chain are missing, it might be envisaged to take action in order to attract those missing parts to the region.” *(Interview)*

To improve the information flows, policy makers can stimulate cooperation (e.g. co-development, co-producing) and strengthen the network of main suppliers and specialised workers. Here, it is particularly important to consider the influence of cluster actors “pulling” innovations on the innovativeness of the whole cluster (Jacobs / de Man 1996).

The **lateral dimension** describes cross-sectoral commonalities of clusters. In these cases, the actors are interconnected by sharing certain capabilities (e.g. the multimedia cluster) or a certain philosophy e.g. by sharing the same interest (e.g. sustainability cluster). The use of synergies between sectors can be important in addressing niche markets and developing a more specific common vision (e.g. design cluster instead of furniture cluster).

An institutionalised cluster can facilitate the possibilities of cross-sectoral cooperation, because firms of different industries are typically not connected by a network. *Dr. Bommer, Bavarian State Ministry* provides an interesting example about the ability of clusters to bring actors from different sectors together. In the Bavarian case, a local producer of CCTV cameras was interested in promoting
the cameras for medical applications, but lacked the know-how to develop these cameras on his own. The local cluster provided the firm with a network to cooperate with a local hospital and a University of Applied Science in order to get the cameras ready for market.

**Case: The Paper Province (M. Williams, cluster manager)**

M. Williams provides an example of the possibilities and the potential of strengthening the lateral dimension: “TPP (The Paper Province) has over the years had a focus on assuring competitive knowledge for the companies. This focus has now been complemented with a clear cut strategy to boost innovation and new businesses in the surrounding service sector. “The future factory” (Framtidsfabriken) stand for a holistic approach where common thematic businesses and technology platforms (ICT, Energy savings, Plant Design etc) are established between the pulp and paper companies and the service sector companies.” (Interview)

The **focal dimension** describes the relation of firms to a central actor like a firm, a research or educational institution.

In cases of clusters with a central research institution, policy can enhance spill-over effects by improving the interaction between the organisations and stimulating the mobility of staff between the knowledge infrastructure and companies. (Jacobs / de Man 1996).

On the other hand, clusters dominated by a single core firm can lead to disadvantages linked to dependency on the main actor’s decisions and its economic success. Paniccia (2006) called agglomerations consisting only of a “limited number of small firms [...] operating as subcontractors to larger commissioning firms” satellite platforms or hub and spoke agglomerations. In these groups of firms cooperation occurs only one-way along the supply chain in order to “entail supplier quality upgrading, the shortening of delivery times and inventory control.” Often, mass or standardised production allows the key firm to relocate the production to low-cost regions. The dependence on a single firm can damage the local economy more seriously in the case of company relocation and lead to unemployment. A positive external effect of these agglomerations is the occurrence of spin-offs. According to Paniccia (2006) this type of agglomerations is the weakest of all cluster types.

So-called **technology or science-based geographical agglomerations** (Paniccia 2006) are characterised by sharing the same technology (e.g. biotechnology clusters). These clusters are often located around research institutions and universities. These organisations form a highly attractive infrastructure both for sci-
entists and for specialised suppliers of materials, equipment and services. The reason for being part of these networks is the diversification of costs and risks of developing new technologies and the innovative environment.

The technological dimension can be improved by maintaining and developing technological competences e.g. by safeguarding world class research in the region (e.g. Jacobs / de Man 1996). The innovativeness of a cluster through the collaboration of governmental agencies, firms and research institutions (triple helix) can be strengthened by policy makers by improving the interaction of these actors.

The relevant policy measures to target these various dimensions are systematically summarised in the following table:

<table>
<thead>
<tr>
<th>Cluster dimension</th>
<th>Relevant policy measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>horizontal</td>
<td>• Sector initiatives e.g. environmental policies</td>
</tr>
<tr>
<td></td>
<td>• Organise strategic conferences</td>
</tr>
<tr>
<td>vertical</td>
<td>• Stimulating development of relations between suppliers and contractors in the direction of co-development, co-makership</td>
</tr>
<tr>
<td></td>
<td>• When shaping policies, take into account which actors in the network “pull” innovation</td>
</tr>
<tr>
<td></td>
<td>• Strengthen networks of main suppliers and specialised jobbers</td>
</tr>
<tr>
<td></td>
<td>• Direct quality and environmental policies at the whole value system</td>
</tr>
<tr>
<td>lateral</td>
<td>• Technological synergies between sectors direct choices in technology policy</td>
</tr>
<tr>
<td>technological</td>
<td>• Starting point for choices in technology policy; e.g. regarding the location of top research institutes</td>
</tr>
<tr>
<td>focal</td>
<td>• Enhance interaction between organisations via “cluster projects”</td>
</tr>
</tbody>
</table>

Table 7: Political measures to improve the interaction along the cluster dimensions (Jacobs / de Man 1996: 432)

3.2.7.2 Is there mutual trust among the actors?

Mutual trust is important for the flow of tacit and codified knowledge. “When trust is created the flow of knowledge and information between enterprises and institutions increases and therefore, the establishment of a trustful environment
is a precondition for clustering as a source of growth” (ADA Mühendislik 2009: 10). “Costs in terms of coordination, time and resources […] can hold back cluster actors from collaborating. Such costs are reduced when trust-based relations develop among cluster actors and institutional arrangements (governance) are in place which facilitates coordination and collaboration.” (Interview M. Clara, UNIDO)

According to Y. Guyon, CCIL “it is necessary to present the advantages of the cluster initiative, to build up trust between the participants - and the management unit! – and to initiate first collaborative initiatives. This work needs to be funded and it can hardly be expected that companies pay from scratch as long as they have not clearly seen the benefits. Later on in the process, the reduction of public subsidies can be planned.” (Interview) The ties between the actors can be improved by supporting common projects (e.g. R&D), conferences, meetings, and other opportunities of social interaction and can help to streamline the activities for network building by creation of a common vision, trust, etc.

3.2.7.3 Do the actors have a common vision and strategy?

A common vision or strategy and the presence of supporting institutions can intensify the interaction within a cluster. Dr. Lefebvre, Ecole des Mines de Paris states in his interview: “It is also critical and often neglected to ensure that cluster develop a shared vision and strategy. This can be stimulated by policy makers (also as part of their cluster monitoring). Performing a strategic diagnosis is also, for the cluster actors, an efficient way to come together and commit to a shared vision.” (Interview)

The development of a common vision is generally conducted at a local level by the individual cluster initiative in close collaboration with the relevant stakeholders (Cluster Navigator 2001). Organisations such as the UNIDO address the challenges at the early stage with professionals who work in the cluster for the entire duration of a technical assistance project to promote dialogue among cluster actors and the formulation of a shared vision and action plans, etc.

On a regional and national level there are initiatives that make policy funding contingent on the existence of a vision, a cluster strategy, common goals (milestones), and / or a roadmap to exploit potential. Examples include e.g. the cluster competition in Baden-Württemberg and Hessen in Germany, Tillväxtverket in Sweden, Pôles de Compétitivité in France).
3.2.7.4 Is there an institutionalisation of the cooperation among the actors?

The organised efforts to increase growth and competitiveness of certain clusters are institutionalised in a cluster initiative (CI) (Sölvell et al. 2003). The responsibilities of cluster initiatives are

- cluster organisation (cluster management, office, Website, etc.),
- cluster governance (e.g. board of directors), and
- the financing of cluster activities.

(Sölvell 2009)

Typically, a cluster initiative involves all relevant stakeholders (e.g. firms, public, academia, etc.). Common characteristics of institutionalised clusters are

- a cluster management,
- a formalised membership,
- a shared vision or strategy, and / or
- common public relations.

A. Davis, OECD, explains the rationale for the institutionalisation of clusters: “From a business perspective, a cluster does not necessarily need to be institutionalised, but in terms of credibility of the cluster, the way the firms work together and the labelling effect are apparently quite important, also in terms of attracting investments, accessing venture capital, accessing national or supranational funds, etc.” (Interview)

Cluster initiatives are nearly equally led by public-private partnerships (PPP), the government, or industry (Sölvell et al. 2003). Nevertheless, in 54 % of all cases (GCIS 2005) the initiatives are financed primarily by the government. The implementation of cluster initiatives is mostly initiated at a local level.

3.2.7.5 What is the balance between cooperation and competition in the cluster?

“Clusters are about collaboration and about competition. Without intensive competition the long- or even mid-term sustainability is jeopardised. Experiences indicate that cluster initiatives based “only” on collaboration decline shortly after government support has stopped.” (Interview M. Dermastia, Anteja) On the contrary, competition can lead to opportunistic behaviour and thus limit the possibilities for collaboration. Companies may fear the loss of critical knowledge to a competitor firm within a cluster and thus hesitate to engage in such cooperation. Therefore Porter (2001) recommends that regional policy makers consider the creation or the support of innovation-based competition.
### Summary

The above mentioned characteristics can be summarised in the following table, building on Koschatzky / Lo (2007: 4):

<table>
<thead>
<tr>
<th>Typical Feature</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nature of actors</strong></td>
<td></td>
</tr>
<tr>
<td>Competitive firms of one branch / one technology</td>
<td>Firms of one branch / technology that are active in different markets</td>
</tr>
<tr>
<td>Complementary and supplier firms and services (including private research activities)</td>
<td>Mixture of large, medium-sized and small firms</td>
</tr>
<tr>
<td>State and semi-state organisations of the branch (among others, specialised educational institutions)</td>
<td>Demanding customers</td>
</tr>
<tr>
<td><strong>Spatial extension</strong></td>
<td>Local</td>
</tr>
<tr>
<td><strong>Critical mass / Number of actors</strong></td>
<td>Branch-specific (reference: over 30 firms or large world market share)</td>
</tr>
<tr>
<td><strong>Geographical orientations</strong></td>
<td>Closed internal / regional networking</td>
</tr>
<tr>
<td><strong>Connections between enterprises</strong></td>
<td>Formal relationship mainly in the vertical direction</td>
</tr>
<tr>
<td><strong>Dynamics and linkages within the cluster</strong></td>
<td>Existence of mutual trust</td>
</tr>
<tr>
<td><strong>Competitive type</strong></td>
<td>Nightcap competition, “lock-in”</td>
</tr>
<tr>
<td><strong>Competitiveness</strong></td>
<td>Low competitiveness</td>
</tr>
<tr>
<td><strong>Lifecycle</strong></td>
<td>Birth</td>
</tr>
</tbody>
</table>
Table 8: Cluster features and the respective characteristics 
(adapted from Koschatzky / Lo 2007: 4) 

Depending on the industrial and economic sector and on the value-chain considered, the characteristics listed above have a different weight and take different values. Thus, it is impossible to design a generic set of quantitative characteristics suiting all frameworks. Those characteristics focus on the cluster itself, not taking into account its position on the market. This equally important aspect is dealt with in the following chapter.
3.3 Assessing a cluster’s market position

3.3.1 What is a cluster’s market position?

3.3.1.1 What is the target market of the cluster?

The target market of a cluster is the target market of its companies. “In order for clusters to develop well the presence of clearly identified markets is necessary.” (Interview Y. Guyon, CCIL)

In practice, a cluster might address several different target markets, even though in the latter case those markets tend to be connected:

- clusters defined along a single value chain, such as automotive or aeronautics clusters for instance, usually have one clearly identified target market;
- clusters building on a common technology or bundle of technologies, such as an ICT cluster or a biotech cluster, might also build multiple value chains and address multiple target markets.

Typical questions about the target market(s) include:

- What are the most important target markets of a cluster and of its main companies and how are those markets structured (regional markets, product niches, specific client groups)?
- What is the global turnover of those markets and how will it develop in the mid- to long term?

3.3.1.2 What is the position of a cluster in its target market?

The position of a cluster in its target market(s) primarily mirrors the market position of the cluster companies. The cluster as a whole has its position and reputation as well, though, as described in the following paragraph.

3.3.1.3 What is the position of the cluster compared to other clusters?

Beyond the market position of the companies, the market position of a cluster does also have a generic dimension, where a cluster compares itself to other clusters addressing the same target market:

- the size of the cluster:
  - number of companies
  - number of jobs
  - ...

• the dynamics of the cluster:
  o concentration
  o entrance or withdrawal of major competitors
  o number of new companies
  o job creation
  o ...

• the innovativeness of the companies:
  o R&D quota
  o patents
  o new products
  o ...

• export quota
• location factors (see success factors)
• ...

An example of professional documentation of such a positioning, albeit not covering all the aspects mentioned above, is provided by the European Cluster Observatory (www.clusterobservatory.eu/).

Cluster sprouts need to be dealt with separately. In the case of cluster sprouts, especially when they are active in new high-tech fields, the considerations above prove to be difficult to apply in practice:

• new technology markets might be rapidly changing and extremely difficult to identify and characterise,
• the products themselves as well as the commercialisation channels are not established; market structures are evolving fast,
• the cluster sprouts are too small to be “statistically” significant on the basis of the number of jobs or turnover but they might show enough potential to be considered as a policy priority.

These challenges specific to cluster sprouts are already been tackled by e.g. the European Cluster Observatory. Their work also includes developing a new methodology of cluster mapping and the compilation of special reports of clusters in emerging industries by qualitative means. (Sölvell et al. 2009)
3.3.2 Why should policy makers assess a cluster’s market position?

Assessing the market position of a cluster / regional clusters in general enables policy makers to answer questions such as:

- *What does the regional cluster landscape look like?*
- *What are the strengths and weaknesses of a cluster in comparison to competing clusters?*

3.3.2.1 What does the regional cluster landscape look like?

Assuming that a regional cluster policy addresses several clusters, an immediate reason for policy makers to perform an assessment of the regional clusters’ market positions is to get an understanding of the regional cluster landscape and its dynamics.

A useful tool for policy makers is, for instance, the *market segmentation matrix*. This is a multidimensional approach to characterise and compare the competitive position of all industrial sectors – considered as potential clusters - in a region. Segmentation charts are created using the employment concentration ratios (also known as Location Quotients or the “specialisation metric” – see characteristics of clusters) on the vertical axis, and the forecast growth rate in the region on the horizontal axis.

Along these lines four categories arise:

- *Star Industries* are those which are forecast to have stronger than average growth and have Employment Concentration Ratios (ECR) greater than the national average.
- *Opportunity Industries* in which the industry’s ECR is below the average, but which nevertheless represent a major opportunity because the industry is forecast for strong output growth.
- *Cash Cow Industries* in which the region has an undisputed comparative advantage although they may be slower growing than others on the list.
- *Challenge Industries*. In these industries, the region currently has low specialisation, and they are not projected to grow quickly. Yet these, despite their forecasts, cannot afford to be ignored – the possibility that unique factors may come into play to reverse the European trend can be discounted, but not ignored.”
3.3.2.2 What are the strengths and weaknesses of a cluster in comparison to competing clusters?

While performing a comparison of a regional cluster with its competitors, policymakers might become aware of specific strengths and weaknesses of clusters, such as:

- incomplete or weak parts of the relevant value chain (missing competences...),

Figure 3: Market segmentation matrix
(Interview M. Dermastia, Anteja)
• weak location factors (missing physical infrastructure...),
• strong export or R&D quota,
• .....

Assuming the cluster does show potential for growth, the identification of specific weaknesses does normally imply a need for action (see assessment of needs) in order to foster the expected growth.

The identification of strengths, especially in the framework of benchmarking, might legitimise future policy action and provide input for marketing the cluster. Benchmarking is likely to reveal and document – with numbers and rankings – the strengths of a cluster. The region of Karlsruhe, while already aware of the IT cluster CyberForum and its strengths, “discovered” for instance thanks to the European Cluster Observatory how well positioned it is Europe-wide (one of five top – i.e. 3 star – clusters).

3.3.3 How to assess a cluster’s market position

Experience shows that obtaining valid quantitative data can prove to be difficult. The specific data needed to assess turnover volume and market growth will vary across different markets as well as their robustness and availability. Policy makers have to bear in mind that data might be difficult to obtain and that it must be interpreted with great caution.

In the following, we address the most common methods used to assess a cluster’s market position:
• analysis of a cluster’s turnover,
• analysis of a cluster’s growth potential, and
• benchmarking of a cluster with competing clusters.

3.3.3.1 How to measure the turnover volume of the cluster

A possible way to obtain information on the turnover volume and the market growth are for instance trade associations in which actors of the target market are often organised. A potential drawback of these data is that they may be incomplete and / or biased towards the interests of the respective trade organisation. Policy makers have to bear this in mind when interpreting such data. When aggregated data of the target market is lacking, the market share and the growth potential can be assessed by aggregating the turnover volume of the most important players in the target market.
3.3.3.2 What is the growth potential of the cluster?

The growth of these aggregated turnover volumes can be used to assess the market growth. The growth rate of these markets indicates the likely future development and the saturation level of these markets. Also market studies can deliver information about growth and market potential. In practice, when dealing with regional clusters, most of the information available will come from the companies themselves through discussions with the cluster leaders.

In the following, we describe two cases illustrating the differences – and the related difficulties – when dealing with clusters defined along a single value chain and clusters dealing with emerging multiple value chains, respectively:

**Case study: Automotive cluster Upper Austria, Austria** ([www.automobil-cluster.at](http://www.automobil-cluster.at))

The example of the Automotive Cluster Upper Austria has been chosen as an example of a mature cluster active along a well identified and stable value chain.

As illustrated in the following figures, the companies within the clusters can be positioned on the value chain. Their contribution is clearly identified, as are their products and services.
89 service providers & institutions*

8 OEM**

104 suppliers*

45 companies*

The data contains double nominations

** thereof some OEM’s not automotive specific
Similarly, quantitative data on the cluster are available, such as for instance:
- Turnover (billion): € 22.39
  - Turnover of producing companies (billion): € 15.12
  - Turnover of supplying companies (billion): € 12.47
- Total number of employees: 87,000
- R&D quota: 3.69 %
- Export quota: 82.34 %

Also, future trends are discussed between experts and cluster members, building on market and trend analysis widely available for the automotive sector.

*Case study: CyberForum, Karlsruhe, Germany*
CyberForum is today a network of about 750 members within the TIMES sectors (telecommunication, information technology, media, entertainment, security). It has developed in a region counting about 3,600 enterprises in total in those sectors. CyberForum is a cluster dominated by small and medium-sized
innovative enterprises. Over the years, and as the cluster has grown, new “sub-networks” such as the initiatives MobileRegion Karlsruhe or the Karlsruher IT-Sicherheitsinitiative (IT Security initiative Karlsruhe) have emerged.

Looking at the membership, it is clear that the target members addressed by the cluster companies are quite diverse and hard to display with a simple figure. This is also due to the complexity of rapidly evolving IT markets: They concern almost all other industrial sectors – automotive, banking, etc. are among the largest “vertical” target markets of the cluster– but they do also contain a large number of “horizontal” markets such as IT security, customer relationship management, web 2.0 applications etc. that can be broken down into numerous specific product and niche markets. And of course, the technologies and markets change extremely rapidly due to the rapid innovation pace of the sector.

During 2007, a core group of members started to work on a proposal for the German competition “Spitzencluster” with the ambition of turning the region of Karlsruhe into a worldwide leading cluster for the future Internet technologies and services.

While trying to assess the market position and prospects of the cluster, the members noticed rapidly that very little data were available as the internet-based markets are evolving rapidly and are not well taken into account in commonly available economic statistics. The diversity of the network itself and its different value chains made it difficult to collect data on current figures about turnover and growth within the cluster. The team in charge of the proposal decided to collect global data available through market studies and trend analyses in order to assess the potential market growth within the different horizontal target markets of the cluster - digital rights management, “service as software”, service-oriented architecture, semantic web technologies… - as shown in the figure hereafter:
In parallel, a closer look was taken at the automotive and the finance sectors, two of the major vertical markets of the cluster, in order to estimate to what extent future Internet-based technologies might penetrate and shape those markets from the cluster’s perspective.

The overall potential for the cluster was estimated on the basis of the presence of technology and market leaders within the cluster and their ability to develop and market new solutions.
3.3.3.3 How to collect relevant qualitative information

Information on the target market of a cluster and its evolution comes primarily from the cluster companies themselves. (Source: interviews with policy makers and cluster managers). Such information can be collected via different channels, as already described earlier in this chapter:

- informal face-to-face discussions with cluster members,
- interviews and questionnaires,
- focus groups.

Such a process inherits the additional advantage of helping policy makers to grasp if there is sufficient network dynamic within the cluster.

3.3.3.4 How to benchmark a cluster against its competitors

There is currently no clear standard methodology for benchmarking clusters (see chapter 5 Evaluating Cluster policies, p. 117), partly because clusters are very different and comparisons between them not straightforward, and partly because data on clusters is not always easy to collect.

In practice there are various approaches that can be used by policy makers, which we summarise in the following:

- **The European Cluster Observatory** ([www.clusterobservatory.eu](http://www.clusterobservatory.eu))
  The methodology used by the European Cluster Observatory for its cluster mapping on European level builds on employment statistics available at regional level and allocating “stars” to clusters according to the following indicators:

  - **‘Size’:** if employment reaches a sufficient share of total European employment, it is more likely that meaningful economic effects of clusters will be present. The 'size' measure shows whether a cluster is in the top 10% of all clusters in Europe within the same cluster category in terms of the number of employees. Those in the top 10% will receive one star.

  - **Specialisation:** if a region is more specialised in a specific cluster category than the overall economy across all regions, this is likely to be an indication that the economic effects of the regional cluster have been strong enough to attract related economic activity from other regions to this location, and that spill-overs and linkages will be stronger. The 'specialisation' measure compares the proportion of employment in a cluster category in a region over the total employment in the same region, to the proportion of total European employment in that cluster category over total European employment (see equation).
If a cluster category in a region has a specialisation quotient of 2 or more it receives a star.

- **Focus:** if a cluster accounts for a larger share of a region's overall employment, it is more likely that spill-over effects and linkages will actually occur instead of being drowned in the economic interaction of other parts of the regional economy. The 'focus' measure shows the extent to which the regional economy is focused upon the industries comprising the cluster category. This measure relates employment in the cluster to total employment in the region. The top 10% of clusters which account for the largest proportion of their region's total employment receive a star.”

(www.clusterobservatory.eu)

In addition to this information, the methodology encompasses two performance indicators:

- **Innovation index:** “Innovation index is based on the Regional Innovation Scoreboard 2006 conducted by Maastricht Economic and social Research and training centre on Innovation and Technology (MERIT). RIS is calculated for the region as a whole, without any division by cluster categories. So it can only indicate the general innovation climate within a region.

- **World export share:** The underlying data represented the world’s share of a country in exports of a given cluster category.”

(www.clusterobservatory.eu)

This methodology is a first attempt to make comparisons between statistics that are easily accessible at European level.

As an example, the following picture shows a comparison of European automotive clusters according to criteria such as geographic concentration, size, innovativeness and export.
**Cluster Mapping Database**

**Automotive regional clusters in Europe**

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Employees</th>
<th>Size</th>
<th>Spec.</th>
<th>Focus</th>
<th>Stars</th>
<th>Innovation</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stuttgart, DE</td>
<td>136 353</td>
<td>5.25%</td>
<td>6.62</td>
<td>9.35%</td>
<td>***</td>
<td>High</td>
<td>Very strong</td>
</tr>
<tr>
<td>Piemonte (Turin), IT</td>
<td>85 915</td>
<td>3.31%</td>
<td>3.49</td>
<td>4.92%</td>
<td>***</td>
<td>Medium</td>
<td>Weak</td>
</tr>
<tr>
<td>Oberbayern (München), DE</td>
<td>82 339</td>
<td>3.17%</td>
<td>3.69</td>
<td>5.22%</td>
<td>***</td>
<td>High</td>
<td>Very strong</td>
</tr>
<tr>
<td>Braunschweig, DE</td>
<td>79 997</td>
<td>3.08%</td>
<td>10.73</td>
<td>15.16%</td>
<td>***</td>
<td>High</td>
<td>Very strong</td>
</tr>
<tr>
<td>Dogu Marmara (Bursa), TR</td>
<td>44 901</td>
<td>1.73%</td>
<td>4.64</td>
<td>6.53%</td>
<td>***</td>
<td>N/A</td>
<td>Strong</td>
</tr>
<tr>
<td>Västsverige (Gothenburg), SE</td>
<td>42 832</td>
<td>1.65%</td>
<td>3.66</td>
<td>5.17%</td>
<td>***</td>
<td>High</td>
<td>Strong</td>
</tr>
<tr>
<td>Karlsruhe, DE</td>
<td>40 694</td>
<td>1.57%</td>
<td>3.03</td>
<td>4.28%</td>
<td>***</td>
<td>High</td>
<td>Very strong</td>
</tr>
<tr>
<td>Niederbayern (Landshut), DE</td>
<td>37 960</td>
<td>1.46%</td>
<td>7.44</td>
<td>10.51%</td>
<td>***</td>
<td>Medium</td>
<td>Very strong</td>
</tr>
<tr>
<td>W Midlands (Birmingham), UK</td>
<td>37 913</td>
<td>1.46%</td>
<td>2.26</td>
<td>3.20%</td>
<td>***</td>
<td>High</td>
<td>Weak</td>
</tr>
<tr>
<td>Sud - Muntenia (Ploiești), RO</td>
<td>32 935</td>
<td>1.27%</td>
<td>2.71</td>
<td>3.82%</td>
<td>***</td>
<td>N/A</td>
<td>Weak</td>
</tr>
<tr>
<td>Severovýchod (Hradec Králové), CZ</td>
<td>31 578</td>
<td>1.22%</td>
<td>3.40</td>
<td>4.80%</td>
<td>***</td>
<td>Low</td>
<td>Strong</td>
</tr>
<tr>
<td>Strední Čechy (Prague Surroundings), CZ</td>
<td>29 511</td>
<td>1.14%</td>
<td>4.02</td>
<td>5.68%</td>
<td>***</td>
<td>Medium</td>
<td>Strong</td>
</tr>
<tr>
<td>Castilla y León (Valladolid), ES</td>
<td>27 136</td>
<td>1.04%</td>
<td>2.07</td>
<td>2.93%</td>
<td>***</td>
<td>Low</td>
<td>Strong</td>
</tr>
<tr>
<td>Hannover, DE</td>
<td>25 980</td>
<td>1.00%</td>
<td>2.72</td>
<td>3.84%</td>
<td>***</td>
<td>High</td>
<td>Very strong</td>
</tr>
</tbody>
</table>

*Figure 4: Extract of the cluster mapping database (European Cluster Observatory)*
• **Practice of benchmarking regional and local clusters**
Benchmarks are a tool used by policy makers for assessing clusters’ market positions and to identify strengths and weaknesses on the one hand but also as an important tool for learning from others and increasing the professionalism of cluster policy and cluster initiatives at regional level.

Policy makers tend to use following indicators for benchmarking purposes:

- *Cluster characteristics as defined in chapter 3.2 (p. 27)*
  Summarised in table 8 – cluster features and the respective characteristics; p. 44.

- *Success factors*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Typical measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking Partnership</td>
<td>• Collective strategic plan or vision</td>
</tr>
<tr>
<td></td>
<td>• Acceptance of cluster name or brand</td>
</tr>
<tr>
<td></td>
<td>• Degree of institutionalisation</td>
</tr>
<tr>
<td></td>
<td>• Partnership agreements among members</td>
</tr>
<tr>
<td>Innovative Technology</td>
<td>• R&amp;D expenditures from government and private sources that involve cluster members,</td>
</tr>
<tr>
<td></td>
<td>• Patents and copyrights</td>
</tr>
<tr>
<td></td>
<td>• Investments in new technologies</td>
</tr>
<tr>
<td></td>
<td>• New products or services</td>
</tr>
<tr>
<td>Human Capital</td>
<td>• Number of enrolments in relevant programmes</td>
</tr>
<tr>
<td></td>
<td>• Graduates hired by cluster</td>
</tr>
<tr>
<td></td>
<td>• Graduates delivered by the Education System</td>
</tr>
<tr>
<td>Physical Infrastructure</td>
<td>• Availability of business incubators, technology parks, cluster specific infrastructure</td>
</tr>
<tr>
<td>Presence of Large Firms</td>
<td>• Presence of technology and market leaders</td>
</tr>
<tr>
<td>Enterprise Entrepreneurialism</td>
<td>• Number of new start-ups generated by the cluster</td>
</tr>
<tr>
<td></td>
<td>• Number of companies attracted to the cluster</td>
</tr>
<tr>
<td>Access to Finance</td>
<td>• Value of venture capital and loans invested in the clusters</td>
</tr>
<tr>
<td></td>
<td>• Participation of financiers in cluster activities</td>
</tr>
<tr>
<td>Specialist Services</td>
<td>• Number of consultants and further specialist services  (patent attorneys...) relevant to the cluster</td>
</tr>
</tbody>
</table>

*Table 9: Cluster success factors (adapted from dti 2004:6)*
• **Policy measures**
Policy makers also benchmark their cluster policies against other regions in order to learn from them. Such comparisons mainly encompass the form taken by cluster policy and the methods used for implementation (see chapter 4, p. 81).

### 3.3.4 Summary – How important is the assessment of a cluster’s market position for policy making? Which information is really needed?

When assessing a cluster’s market position the following typical situations may arise:

- a cluster’s market position can be so weak that any type of cluster support seems questionable.
- clusters with a strong market position on declining markets should not be encouraged to try even harder in the same direction. Instead, policy might provide incentives and arenas for bringing together a cluster’s key stakeholders and jointly look at new market opportunities. Approaches such as regional foresight processes can be more appropriate to help identifying and implementing a new / modified focus. The reorientation of the declining glass-blowing industry in Bavaria represents a good practical example of such an approach: by inventing new glass products, the formerly declining industry has undergone a dramatic shift towards new applications and markets.
- clusters with a reasonable position in high growth markets could substantially profit from a further strengthening of the available research and innovation competence in the region. For instance, policy might consider investing into further boosting the relevant fields by
  - supporting higher educational institutions (HEIs) in offering education to more students in the respective fields,
  - financially supporting investments into the public research infrastructure (e.g. laboratories),
  - improving business-friendly framework conditions (e.g. favourable regulations for foreign workforce).
- clusters can be well positioned in a high growth market. However, in cases of such high performing clusters policy makers should further optimise the framework conditions, and avoid harming the cluster (*Interview Prof. Müller, BAK Basel*). If there is a well established cluster initiative policy makers should substitute public funds with private or industry funding.
As shown above, the assessment of a cluster’s market position does provide useful information for policy makers. However, according to practitioners, this information must – especially at regional level – not be given undue weight in comparison to human and networking factors.

Y. Guyon, CCIL
“The market positioning of the clusters initiated by the CCIL was performed at least at European level. It was not decisive for the launch of the initiative or not as it gives only a static picture; as long as the analysis of the cluster demonstrates enough potential for creating a cluster dynamics, the decision can be taken to launch the initiative.” (Interview)

W. Pamminger, Clusterland Upper Austria
Pamminger describes the process of implementing cluster policy: “In Upper Austria we reduced all cluster mapping activities to minimum. We asked key-players in the region and saved the cost of a consulting company. In my opinion the mapping issue is generally overestimated. (…) The main success factor of our cluster policy was to make a courageous decision - no ifs, ands, or buts.” (Interview)

When a decision in favour of cluster support has been taken, a cluster’s market position can provide further information on the support level and the specific activities to be funded, as well as the appropriate policy support tools.
3.4 Assessing the need for a cluster policy

As will be shown in annex A.2 (p. 117), there is a wide consensus that cluster policy is a powerful approach to fostering sustainable competitiveness in regions and that cluster policy is feasible in most circumstances.

Regions and clusters face a wide range of differing challenges. However, it is not the mandate of policy to compensate for all existing weaknesses and challenges but to invest tax payers’ money in a way to maximise return on investment in the currencies judged most relevant by policy (e.g. number of new or secured jobs, increased tax income, improved quality of life ...). This means that policy needs to be aware of the needs of clusters for support but also of the potential an investment – be it with money or in kind – promises.

The importance given to and the shape of cluster policy should be adapted to the specific circumstances. Amongst the many variables which could be taken into account, the following ones have, or should have, a major impact on cluster policy:

- the characteristics of a cluster,
- its market position, and
- the factor conditions affecting cluster development.

In the following we describe how those variables affect on the one hand the potential for investment in cluster policy and on the other hand the needs for cluster policy.

3.4.1 How do the characteristics and market position of a cluster affect the potential for cluster policy?

The following table displays a summary of how the characteristics and market position of a cluster affect the potential for cluster policy from a policy maker’s perspective.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>National policies</th>
<th>Regional policies</th>
<th>Local policies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cluster dominance</strong>:</td>
<td>Dominance is not a decisive selection criterion. A current high share of jobs in a given field (rightfully) becomes less and less a guarantee for support, whereas thematically open calls or thematic calls based upon megatrend analyses become more frequent.</td>
<td>Current dominance is a clear selection criterion. For selected clusters, trend analyses are commissioned and cluster policy aims at strengthening the cluster's competitiveness in line with the trends.</td>
<td>Local cluster policy is to a large degree aimed at defending existing strongholds. The opportunities to boost new high growth clusters are limited.</td>
</tr>
<tr>
<td><strong>Critical mass</strong>:</td>
<td>It should not be attempted to create clusters from scratch. However, national policy can meaningfully support cluster sprouts without full critical mass (but high potential) by e.g. directly contributing to increasing the competence base (e.g. provide funding to federal research institutes). Theme-specific calls constitute an appropriate means of awareness raising and bringing together potential cluster members.</td>
<td>Clusters cannot be created from scratch at regional level. Critical mass is an important selection criterion. At regional level, cluster alliances / cluster platforms are fostered in order to create critical mass in terms of secondary functions like e.g. PR, legal issues, etc..</td>
<td>Clusters cannot be created from scratch at local level. Critical mass constitutes a strong selection criterion.</td>
</tr>
</tbody>
</table>
### Policy Characteristics

<table>
<thead>
<tr>
<th>Actors</th>
<th>National policies</th>
<th>Regional policies</th>
<th>Local policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ Variety / types of actors:</td>
<td>At national level, commitment from all three triple helix dimensions (government, firms, and research institutions) is seen as necessary. Such a commitment is e.g. stimulated by the selection for clusters receiving national support.</td>
<td>At regional level, policy decides itself to actively contribute to cluster success. It will and should demand commitment from the relevant business and research sectors.</td>
<td>At local level, policy tends to focus on companies as drivers of cluster development and attempts to get support institutions involved.</td>
</tr>
<tr>
<td>→ Interaction between actors</td>
<td>At national level, a high density of a cluster and at least an openness to engage in international inter-cluster interaction are typically pre-conditions for cluster support. In many cases these are prerequisites for policy support.</td>
<td>At regional level, a strong interaction between at least cluster firms (but preferably also between cluster firms and research) are regarded as necessary. The existence of a road map is explicitly used as a selection criterion.</td>
<td>At local level, intensive company interaction is a major selection criterion for support. At the same time, financial means are provided to further intensify this interaction.</td>
</tr>
<tr>
<td>a) Intra-cluster interaction</td>
<td>In many cases prerequisite for policy support.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Inter-cluster interaction[^6]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ Common cluster vision</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The existence of a road map is explicitly used as a selection criterion.</td>
<td></td>
<td>Adjusting common vision / Foster development of a common vision (e.g. cluster initiative).</td>
</tr>
</tbody>
</table>

[^6]: The existence of a road map is explicitly used as a selection criterion.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Policy</th>
<th>National policies</th>
<th>Regional policies</th>
<th>Local policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperation projects</td>
<td>Cooperation is often a prerequisite for national policy support, as is evidence of competition within the cluster.</td>
<td>Incentives for cooperation projects are provided.</td>
<td>Provide information to realise potential cooperation projects (Sölvell 2009).</td>
<td></td>
</tr>
<tr>
<td>Institutionalisation (e.g. cluster management...)</td>
<td>Institutionalisation is sometimes a pre-requisite for receiving support. In the case of non-institutionalised cluster sprouts, strong evidence of commitment (inc. striving for institutionalisation) is typically demanded.</td>
<td>Degree of institutionalisation is a selection criterion.</td>
<td>Following the philosophy of the OECD, institutionalisation is often considered less relevant at local level.</td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>Important selection criterion.</td>
<td>Important selection criterion.</td>
<td>Important selection criterion.</td>
<td></td>
</tr>
</tbody>
</table>

10 / 11
Cluster sprouts and emerging clusters face a series of key challenges, e.g.:

- the visibility and attractiveness of the cluster is moderate, i.e. its attracting force towards potential new members is limited and its power to prevent key individuals and organisations (private and public) from moving to other places is low.
- the degree of institutionalisation is low, i.e. the bundle of professional support services is small and free riders exploit available free services,
- the cluster often lacks a strong identity, i.e. there is no agreement on an overall roadmap specifying main directions for the future development.

At this stage the focus of cluster policy is to strengthen critical mass (e.g. by providing additional research funds to a University), improve the density and outreach of networks and to stimulate the development and gradual specification of a common vision.\(^{13}\)

Local policy makers can efficiently support the networking process. During the early stages, most cluster initiatives completely depend on public funding.\(^{14}\)

The regional adviser of the region of Värmland Staffan Bjurulf recommends “assisting clusters to focus on innovation measures. This is especially important for clusters which have evolved with a focus on education and securing a competitive work force (labour market policy vs. innovation policy). Innovation measures in
this phase are entrepreneurship stimulation measures, partner search, project development etc.” (Interview)

**Mature clusters**

Mature clusters can undergo a renaissance by regaining new business dynamics and innovativeness and attracting new firms. It is the mandate of policy to thoroughly analyse the potential and likelihood of such a renaissance and if judged possible to stimulate rejuvenation by e.g. stimulating and contributing to foresight processes which help mature clusters to regain competitiveness (e.g. through re-orientation).

Regional and local players can accompany the process of a cluster’s renaissance.16

<table>
<thead>
<tr>
<th>Policy Characteristics</th>
<th>National policies</th>
<th>Regional policies</th>
<th>Local policies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market position</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Market size:</strong></td>
<td>No decisive criteria if there is high market growth</td>
<td>Presumably more important but not decisive</td>
<td>Presumably more important but not decisive</td>
</tr>
<tr>
<td><strong>Market share:</strong></td>
<td>Presumably more important to secure national competitiveness but rational in emerging markets.</td>
<td>Presumably not an important selection criterion. Support without high market share is conceivable.</td>
<td>Presumably not an important selection criterion.</td>
</tr>
<tr>
<td><strong>Market growth:</strong></td>
<td>Important selection criteria on national level.</td>
<td>“[H]igh growth potential and awareness of competitors”17 are important selection criteria.</td>
<td>Presumably not an important selection criterion.</td>
</tr>
<tr>
<td>high / low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reputation (e.g. well-known research institutions, marketing activities...)</strong></td>
<td>“nationwide broadcast (Awareness, perception)”18</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Innovativeness</strong></td>
<td>Decisive criterion.19</td>
<td>Important criterion.</td>
<td>Clusters lacking innovativeness can be supported as ”[c]luster</td>
</tr>
</tbody>
</table>
policy can play an important role in motivating / helping clusters to shift focus” (J. M Esteban) in order to regain innovativeness.

Table 10: Significance of cluster characteristics for national, regional, and local policy support
3.4.2 How do factor conditions affect the need for cluster policies?

Factor conditions are critical for cluster emergence (Brenner / Mühlig 2007: 5) and can slow down cluster growth (Rosenfeld 2002: 14).

In annex A.2 (p. 117), we describe the success factors for cluster development:

<table>
<thead>
<tr>
<th>Necessary factors</th>
<th>● Networking Partnerships</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● Innovative Technology</td>
</tr>
<tr>
<td></td>
<td>● Human Capital</td>
</tr>
<tr>
<td>Contributing factors</td>
<td>● Physical Infrastructure</td>
</tr>
<tr>
<td></td>
<td>● Presence of Large Firms</td>
</tr>
<tr>
<td></td>
<td>● Enterprise Entrepreneurialism</td>
</tr>
<tr>
<td></td>
<td>● Access to Finance</td>
</tr>
<tr>
<td>Complementary factors</td>
<td>● Specialist Services</td>
</tr>
<tr>
<td></td>
<td>● Access to Markets</td>
</tr>
<tr>
<td></td>
<td>● Access to business support services</td>
</tr>
</tbody>
</table>

Table 11: Success factors for cluster development

Following an assessment of strengths and weaknesses of a cluster with respect to these success factors, policy makers can infer a need for policy support, as summarised in the following:

Networking partnerships

Policy initiatives are legitimate and needed where networks and partnerships are weak. Those initiatives aim at demonstrating the benefits of clustering and provide an initial impetus to the cluster.

In practice, there are different ways to provide such support:

- institutionalising the network (cluster initiative);
- creating communities of interests or practices (e.g. for training, recruiting, production issues...) – there can be several of them within a cluster;
- engaging firms by involving them actively in the strategy building. Fore- sight processes constitute a very powerful approach to boost interaction;
- creating a physical focal point for the network, a place where services are provided and actors can meet (e.g. cluster office, house of innovation etc.).
However, policy makers should keep in mind that networking should not be promoted for the sake of networking, but with a clear purpose, in order to generate interest and demonstrate clear benefits for the companies.

**Innovative Technology**
Promoting the development of innovative technologies in the cluster relates to innovation or R&D policies. Those policies can be linked to cluster policy by different means:

- supporting the development of research infrastructure needed by the cluster actors;
- supporting technology transfer activities within the clusters, for instance by supporting “demonstration centres”, fostering joint projects between research and industry;
- etc.

**Human Capital**
Policy can support the availability of human capital to the cluster companies by fostering education in general but also by influencing education providers and fostering the development of an adequate provision. Policy can also support the development of inter-company joint initiatives.

Examples for such initiatives are:

- fostering the development of specific programmes by existing education providers (technology curricula...);
- supporting the development of internship programmes, vocational training, summer schools etc.;
- promoting career perspectives within the cluster sector;
- etc.

**Physical Infrastructure**
Enhancing regional infrastructure is a natural area for policy intervention and covers many aspects:

- science, technology and business parks are a tool that can support cluster development and usually require policy intervention, either alone or often within public-private partnerships;
- business incubators are also supportive to cluster development;
- land use policies are generally to be taken into account while planning and implementing cluster policy; “the availability of sites and premises for potential investors and for the expansion of existing businesses is an important component of maintaining the long-term success of a cluster” (dti 2004: 44);
transport and communication infrastructure also need to be considered, according to the specific needs of the clusters.

**Presence of Large Firms**
Where large firms are present but not heavily involved in cluster activities, policy can play a role by looking proactively for initiatives aiming at increasing their involvement and enforcing their local anchoring.

Examples for such measures are:
- supply chain management: encouraging and helping large firms to use local competences;
- support potential spin-outs.

Promoting inward investment is generally speaking a field for policy that supports cluster development and can help attracting large firms to the area.

*Example: « Cittadella Politecnica » at Politecnico di Torino, Italy*

The Cittadella di Politecnico provides an example for an innovative inward investment policy fostering cluster development.

The initiative provides international innovative enterprises with the opportunity to take advantage of the Politecnico's knowledge, research potentiality, students and labs, through location proximity and by means of knowledge-intensive technology transfer. The “Cittadella Politecnica” is inside the Politecnico main site.

The local government provided support to Politecnico di Torino with the initiative.

**Access to Finance**
Policy can intervene to enhance access to finance for cluster members where market failure is observed.

Such measures usually concern:
- provision of information and support with respect to access of finance;
- support to public and private R&D funding (loans, tax incentives...);
- seed funding for start-ups (business plan competition, seed fund, etc.)
- fostering access to venture capital;
- support to the creation of business angel networks;
- etc.
3.4.3 Summary

The role of policy is to assess, throughout the clusters’ lifecycles, their respective strengths and weaknesses with respect to the different success factors and to identify development barriers clusters are facing, such as:

- deficits in networking efficiency,
- lack of innovativeness,
- lack of qualified human resources,
- deficits in physical infrastructure,
- lack of access to capital,
- ...

and to assess whether and how those needs can be addressed through adequate policy measures.

It is also the role of policy to identify and to communicate where success factors are not present and there is no realistic chance of fostering those factors.

The following example shows the importance of framework conditions with respect to cluster performance:

**Example: «Benchmarking of Life Sciences clusters in the Baltic Sea Region (BSR)»**

The pilot study conducted in the framework of the BSR InnoNet project represents an instructive example of how cluster performance can be linked with cluster specific framework conditions. The analysis covered the six largest life sciences clusters in the BSR and framework conditions included factors in human resources, new knowledge, entrepreneurial activity, regulation and public demand, and cooperation among enterprises. The study shows that the better performing group among the six clusters enjoys rather better framework conditions than the somewhat less well performing one. (Rosted 2009; Fora 2009; Competence Networks Germany & FORA 2010)
3.5 Assessing the appropriate policy-mix

3.5.1 Why assess the appropriate policy mix?

The policy mix comprises all measures to create favourable conditions for clusters. As shown in the previous chapter, the needs for policy support of a cluster can be quite diverse, according to their strengths and weaknesses with respect to the different success factors for cluster development.

*Interview Prof. Müller, BAK Basel*

Favourable framework conditions constitute a key determinate for cluster success. “Today framework conditions are very much man-made. Historically, natural resources played a much bigger role (chemical industry needs water ...). A key dimension of man-made framework conditions is access to qualified personnel (supplied primarily by the university and attracted from abroad) but also legal conditions in terms of labour, taxes, etc.. Another ingredient is access to data, i.e. transparency.”

The following table provides an overview of the most common policy measures, as identified in the literature and our interviews, addressing different success factors for cluster development and the policy level required:

<table>
<thead>
<tr>
<th>Success factor</th>
<th>Policy measures</th>
<th>Policy level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking Partnership</td>
<td>Financial support to cluster initiatives</td>
<td>National and / or regional</td>
</tr>
<tr>
<td></td>
<td>Institutionalisation of the cluster</td>
<td>National and / or regional</td>
</tr>
<tr>
<td></td>
<td>Manpower and other resources provided to cluster initiatives</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Innovative Technology</td>
<td>R&amp;D tax credits (rarely cluster specific)</td>
<td>Usually national</td>
</tr>
<tr>
<td></td>
<td>funding for basic or applied research</td>
<td>National and / or regional</td>
</tr>
<tr>
<td></td>
<td>technology transfer schemes</td>
<td>National and / or regional</td>
</tr>
<tr>
<td></td>
<td>development of specialised research facilities</td>
<td>National and / or regional</td>
</tr>
<tr>
<td></td>
<td>supporting the development of research networks</td>
<td>European, national and / or regional</td>
</tr>
<tr>
<td></td>
<td>linking firms, research institutes and other interested parties together</td>
<td>European, National and / or regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td><strong>Human Capital</strong></td>
<td>Support to higher education – companies collaboration for training and recruiting</td>
<td>Regional</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>Vocational training initiatives</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Promoting specific areas within education</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Physical Infrastructure</td>
<td>Business incubators</td>
<td>National and/or regional</td>
</tr>
<tr>
<td></td>
<td>Technology parks</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Business parks</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Communication infrastructure</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Presence of Large Firms</td>
<td>Inward investment activities</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Regional marketing</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Initiate supply chain management projects</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Enterprise Entrepreneurialism</td>
<td>Regional development funds targeting cluster areas</td>
<td>Regional</td>
</tr>
<tr>
<td>Access to Finance</td>
<td>Innovation Funds</td>
<td>National and/or regional</td>
</tr>
<tr>
<td></td>
<td>Support firms with access to national and European Schemes</td>
<td>National and/or regional</td>
</tr>
<tr>
<td></td>
<td>Business Angel networks</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>“Fit for funding” training measures</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Access to Markets</td>
<td>Support internationalisation of companies</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Support joint branding and marketing</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Provide information on markets</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Complementary aspects</td>
<td>Access to business support services</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Supportive policy environment in general</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Quality of life</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

**Table 12: Political measures to improve the interaction**
Cluster policy appears not to be a single defined policy but very much a mix of different policies anchored in different government areas and at different policy levels. More specifically, cluster policy is and should be made by different administrative levels and by different disciplines. Regional and local policy makers have to align their policies with policy measures of higher administrative divisions (state, national, European policies).

*Interview Prof. Russo, University of Modena and Reggio Emilia*

“Regional authorities have the task to understand which supporting elements are available in the region and to make them available to each specific area which would need them.”

In order to do so policy makers need to answer a series of questions described in the following.

3.5.1.1 *Is there adequate financial support available?*

In order to specify and justify the allocation of public subsidies for cluster support, a comparison with competing policy measures makes sense. Such a comparison is very difficult to make and adequate data are hard to collect. The following figure shows, by way of example, the case of such a comparison for Germany between:

- regional cluster policies,
- agricultural subsidies,
- unemployment subsidies,
- support to large companies settling down in a region.

The case compares the costs of the measure per person (employee or jobless person) with the added value generated per job created over a period of 5 years.
According to Heuser (2008), regional cluster policies do clearly outperform other policy measures competing for the same funds. A systematic documentation of such data over time would be a very powerful tool to legitimise cluster policy and the set-up of an adequate policy mix.

### 3.5.1.2 Is there willingness among the cluster’s actors to collaborate with policy makers?

Many countries with governments with different ideologies and philosophies have successfully implemented cluster strategies. Long-term commitment from various actors on different levels appears to be the most crucial determinant of cluster success. Therefore, there is a need for long term consensus-building and concertation processes. (Andersen et al. 2004)

Local and regional policy makers benefit from the possibility of an informal and pragmatic dialogue between private actors (e.g. firms, employees) and policy about specific measures (e.g. infrastructure). At national level this dialogue is much more political and ideology-driven: it is typically led by professional representatives and “friends of” and not core stakeholders. (Ketels 2007). Consequently, it is often easier to build a consensus on a regional level.
3.5.1.3 How to align traditional policies with cluster policy

The policy mix should aim at aligning different policies on different administrative levels in order to support clusters. According to the European Commission (2008b), different policies can be categorised in three different groups depending on the motivation and the objective of this policy:

- **facilitating policies**: creation of a favourable microeconomic business environment for growth and innovation that indirectly also stimulate the emergence and dynamics of clusters;
- **traditional framework policies**: industry and SME policies, research and innovation policies;
- **development policies**: creating, mobilising or strengthening a particular cluster resulting in particular cluster (cluster policy).

The OECD describes the possible ways that traditional policies can target specific clusters:

<table>
<thead>
<tr>
<th>Regional stream</th>
<th>Old approach</th>
<th>New approach</th>
<th>Cluster programme focus</th>
</tr>
</thead>
</table>
| Regional policy     | Redistribution from leading to lagging regions    | Building competitive regions by bringing local actors and assets together | - Target or often include lagging regions  
|                     |                                                   |                                                   | - Focus on smaller firms as opposed to larger firms, if not explicitly then de facto    |
|                     |                                                   |                                                   | - Broad approach to sector and innovation targets                                     |
|                     |                                                   |                                                   | - Emphasis on engagement of actors                                                     |
| Science and technology policy | Financing of individual, single-sector projects in basic research | Financing of collaborative research involving networks with industry and links with commercialisation | - Usually a high-technology focus  
|                     |                                                   |                                                   | - Both take advantage of and reinforce the spatial impacts of R&D investment          |
|                     |                                                   |                                                   | - Promote collaborative R&D instruments to support commercialisation                  |
|                     |                                                   |                                                   | - Include both large and small firms; can emphasise support for spin-offs and start-ups |

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| Industrial and enterprise policy | Subsidies to firms; national champions | Supporting common needs of firm groups and technology absorption (especially SMEs) | Programmes often adopt one of the following approaches:  
- Target the drivers of national growth  
- Support industries undergoing transition and shedding jobs  
- Help small firms overcome obstacles to technology absorption and growth  
- Create competitive advantages to attract inward investment and branding for exports |

Table 13: The alignment of different policy streams toward clusters  
(OECD 2007a: 41)

3.5.2 How does the policy mix change throughout the lifecycle of a cluster?

As described previously, the needs of a cluster for policy support do change over time; consequently, the policy and support measures need to be adapted to the evolution of the cluster along its lifecycle.

This is strikingly summarised by M. Dermastia, Anteja:

“We must take into account that there are different stages of cluster development and in these different stages the policy probably has to come up with different measures.  
At the beginning, the emphasis is more on building network partnerships, then – once these connections are there – it is important to support different common projects, maybe on R&D.  
And then, when things start running, you can also include other measures, like incubators, technology parks, technology transfer mechanisms, etc.  
It is not even necessary that this is part of the cluster policy, but should be coordinated with the different policies.” (Interview)
4 Implementing cluster policy

Once cluster policy has been thoroughly planned, it can move towards implementation. This phase brings new challenges, which are presented and discussed here.

The guide provides recommendations and examples on how to set up a sound cluster programme as well as regional cluster agencies and cluster initiatives in order to generate an efficient chain of responsibilities for the actual implementation of cluster policy.

Finally the guide deals with the controversial issue of an exit strategy for cluster policy.

4.1 How to set up a cluster programme (p. 85)

When designing a cluster programme the cluster guide proposes the following criteria to be met:

- design a formal structure that provides:
  - incentives that foster cluster dynamics,
  - long-term funding,
  - clear milestones,
  - planning stability;
- limit the likelihood of collateral costs due to conflicting policies; and
- define clear roles and responsibilities of different groups of participants.

To provide assistance to policy makers on different administrative levels, this chapter shows examples of

- regional cluster programmes such as in the case of the economic development department Karlsruhe, the Chamber of Commerce and Industry of Lyon (CCIL) or the Baltic Innovation Agency,
- national cluster programmes such as the “Pôles de compétitivité” in France, the “Spitzencluster Wettbewerb” in Germany and the “Pole Programme” in Hungary.

4.2 How to set up cluster agencies (p. 95)

This part of the guide argues that cluster agencies (dealing with cluster policy only) can be powerful champions of cluster development and inter-cluster learning. The following cases of regional cluster agencies give an overview of possible services and competences:
Baltic Innovation Agency, Estonia,
TMG, Upper Austria, Austria, and
Veneto Innovazione, Italy.

Furthermore, this chapter demonstrates how cluster activities can be integrated at regional level based on the experience in the Land of Baden-Württemberg in Germany and with Clusterland Upper Austria.

4.3 How to select and set up cluster initiatives and how to foster cluster institutionalisation (p. 101)

In the process of selecting appropriate clusters for a funding programme, policy makers can opt for a top-down or a bottom-up approach, or a combination of both. This chapter gives information on each approach and their application and appropriateness, supplemented by
- a summary of different motivations behind the approaches,
- policy makers’ and experts’ views on their advantages and disadvantages, as well as
- the case of Upper Austria as an example of a mixed top-down and bottom-up approach.

Instruments aiming at motivating potential actors to engage in clustering are explored:
- leadership groups,
- institutionalisation,
- call for proposals and open competitions.

The implementation of a formal cluster initiative as leading driver for cluster development is discussed:
- cluster initiatives a means of raising awareness and reinforcing cluster dynamics: leadership groups, open calls for proposal, cluster institutionalisation,
- management and governance of cluster initiatives, and
- funding model for cluster initiatives.

This chapter also falls back on the cluster policy makers’ and experts’ views on what constitutes good cluster management.
4.4 When should policy support and intervention be reduced or stopped along the cluster lifecycle (exit strategy)? (p. 115)

Finally, the complex issue of the right timeframe for cluster policy and the opportunity of an exit for cluster policy, i.e. the closure of cluster programmes, is debated:

- for most experts exit strategy is primarily about exiting from supporting specific clusters and less about exiting from cluster policy,
- having and communicating an explicit exit policy or a conscious non-exit policy is crucial,
- exit strategies are highly controversial with strong voices in favour of permanent cluster support as long as the investment generates adequate returns for the tax payer.
4.1 How to set up a cluster programme

As discussed earlier, cluster policies are not “stand-alone” policies but the bundling of several pre-existing policies. Cluster policy can be understood as an umbrella for many other policies. (ADA Mühendislik et al. 2009)

Cluster policy typically comprises various traditional policy areas which need to be co-ordinated. The following table provides an overview of the connection of traditional policy areas with cluster policy:

<table>
<thead>
<tr>
<th>Policy Domain</th>
<th>Connection with clustering policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Development Policies</td>
<td>“Value creation” from geographical (regional) industrial concentrations. Development based on local dynamics and internal potential</td>
</tr>
<tr>
<td>Industrial Policies</td>
<td>“Clustering” as a tool for strengthening inter-organizational collaboration in the value chain.</td>
</tr>
<tr>
<td>Science and Technology Policies</td>
<td>Technological innovation through collaborative interactions and “regional innovation systems”</td>
</tr>
<tr>
<td>SMEs Development Policies</td>
<td>Strengthening the linkages and collaboration between SMEs and strengthening the competitiveness of SMEs on an individual enterprise level.</td>
</tr>
<tr>
<td>Foreign Trade Policies</td>
<td>Necessity of export-oriented policies in order to increase the competitiveness of the economy by shifting to a high value-added production structure.</td>
</tr>
<tr>
<td>Agriculture Policies</td>
<td>Within the framework of sustainability, establishing Unions of Agricultural Manufacturers so that a clustering approach that addresses competitiveness may be adopted.</td>
</tr>
<tr>
<td>Tourism Policies</td>
<td>Establishment of Infrastructure Unions; supporting R&amp;D in the sector through collaboration among public, private sector, and universities.</td>
</tr>
<tr>
<td>Labor Policies</td>
<td>Increasing registered employment and the quality of workforce, creation of a skilled workforce as required by the economy.</td>
</tr>
<tr>
<td>Education</td>
<td>Enhancing vocational training and thus, the quality of workforce and skilled labor for SMEs located within a cluster.</td>
</tr>
</tbody>
</table>

Figure 6: The connection of traditional policy domains with cluster policies (ADA Mühendislik et al. 2009: 23)
“Clusters can (even) be assisted by policy without a specific cluster policy. Possible examples of such policies include:
- Investments in training / skill formation ...
- Representation to the outside world (typical in e.g. biotech)
- Provision of support services related to e.g. trade fairs
- Advertising existing of clusters / support joint marketing activities
- Provision of market support functions” (Interview Prof. Cooke)

Considering the complexity illustrated above, one can understand that “the design of cluster policy programs and their integration in a broader economic policy agenda are crucial for the impact cluster policy can achieve” (Ketels 2009: 27).

To maximise the impact of cluster policy makers should
- have a portfolio perspective of all cluster efforts,
- leverage the experience of the cluster efforts for policy learning, and
- integrate cluster efforts into a broader economic strategy to symbolise and communicate the unique advantage of the location. (Ketels 2009: 29)

The primarily tool used by policy makers in order to implement their cluster policy are cluster programmes: “to move from intent to real action, governments then design specific programmes that allocate funding, create organisational responsibilities and define specific conditions under which funding can be made available.” (Oxford Research 2008: 6)

The design of a cluster programme should meet the following criteria:
- design a formal structure that provides:
  - incentives that foster cluster dynamics (e.g. competitive selection, process support in the application phase, incentives for involvement of additional new partners),
  - long-term funding,
  - clear milestones,
  - negotiations at the beginning of the process to provide planning stability;
- limit the likelihood of collateral costs because of contradictory policy strategies;
- define appropriate roles of different groups of participants, because restricting participation in cluster initiatives or enforcing specific action priorities may harm the cluster. (Ketels 2009: 28-29)
The following section discusses how this is mirrored in regional and national cluster programmes, as the latter are obviously also relevant to regional policy makers.

### 4.1.1 How are regional cluster programmes structured?

The promotion and facilitation of collaboration is at the core of regional cluster programmes. As Dr. Meier zu Köcker states, “[c]luster policy aims primarily at inter-linking organisations”. For instance, in Baden-Württemberg, the mandate of the cluster policy division is “to serve as a catalyst in the process of professionalising existing clusters and networks as well as to initiate new networks.” *(Interview J. Oswald)*

Compared with national cluster programmes, regions do often integrate – in addition to financial support – in-kind contributions focussing on the promotion of networking and the provision of knowledge (market information, ...) *(Oxford Research 2008: 32)*. Many regional governments or agencies do for instance help by providing human and further in-kind resources; they provide the clusters with a cluster manager or facilitator, rooms for meetings, secretariat, public relations etc.

In addition, regions do also offer funding, often by bundling financial support schemes from different governmental levels: regional, national and European.

Specific examples are given below:

**Case study: Karlsruhe (Germany)**

The managers of the economic development department in Karlsruhe (Germany) R. Eichhorn and S. Buhl describe their cluster activities as follows: “We see ourselves as initiator, partner and supporter of the clustering process, trying actively to communicate the meaning of the process among the partners.

In economic development and site development policy we focus on issues such as sustainable job creation, innovative firms and innovative perspectives and are engaged in cluster activities since the foundation of the CyberForum in 1997 (founded as founder initiative and since 2003 enhanced as a model cluster).”

The region is involved in the following cluster activities:

*Automotive Engineering Network Southwest, AEN* *(www.ae-network.de/)*
The AEN is a communication platform for firms and institutions in automotive, research and development.

**EnergieForum Karlsruhe** ([www.energieforum-karlsruhe.de/](http://www.energieforum-karlsruhe.de/))
The region Karlsruhe aims to be at the vanguard in the efficient use of energy. For that reason the local council adopted a climate protection concept which underlines the importance of synergies to reduce the energy intensity.

**CyberForum** ([www.cyberforum.de](http://www.cyberforum.de))
The city Karlsruhe has taken an active part in the CyberForum since the foundation in 1997.

“Our contribution as the economic development department is that we actively support the initiatives which were initiated by ourselves or by others. We try to involve all important stakeholders no matter if the individual initiatives were initiated by European, national, or state programmes to safeguard a sustainable cluster development in the starting phase as well as in the growing phase.

It is important for us to join in a coordination process with all actors influencing the region (e.g. regional, national, and/or international partners) because we like to capture exterior initiatives and push them forward.

For us as an economic development department it is important to be involved in the process but our engagement depends on the participation of our partners in the cluster activities. Our supporting function results from our objective as economic development agency. We are some kind of initiator accepted by all actors.

In general we are more involved in younger initiatives, supporting cluster organisations but sometimes we are also concerned with activities in the area of event or cluster management (but only for limited time).”

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**Interview Y Guyon, CCIL**
“My role was originally to convince and motivate regional authorities to engage in cluster policy. Later on I initiated, in the framework of my activities within CCIL, several industrial clusters.

CCIL is engaged in cluster policy as an initiator of clusters and promoter of support policies to clusters.

CCIL is involved in the set-up and management of the following clusters:
- Competitiveness Pole Lyon Urban Trucks & Bus (LUTB, [www.lutb.fr](http://www.lutb.fr))
- Defence / Military activities
• Light
• Aerospace

All those clusters are in a young stage of development. Further possible clusters are currently under examination. The role of the CCI, beyond the initiation of the clusters, is to provide human resources for the animation of the cluster. In some cases the activities are funded by regional authorities, in others the CCIL has taken the initiative and provides the resources for the cluster management team.”

Interview R. Tönnisson, Baltic Innovation Agency
“I manage an ICT cluster. Formally, it started only last year, when the consortium agreement was signed, but the discussions about cooperation and networking activities and events took place for the last 2-3 years. So the initiative originally started in 2006. The whole cluster focuses on strengthening the growth potential of companies. In a small country like Estonia growth comes mainly from export and internationalisation. We have also joint product development activities and a human resources component, which involves preparing, adapting and training curricula at universities, in order to add new courses and studies to their curricula.

There are basically 3 kinds of activities that can be funded:
• Training activities – on how to network and build strategic partnerships, as well on the role of clusters in competitiveness
• Supporting cluster management
• Supporting specific action plans – clusters can come up with specific action plans, saying that they want to create a kind of joint development centre in some areas and the government gives a subsidy to build, start and run the centre. It would also finance the implementation of pilot projects and actions.”

4.1.2 How are national cluster programmes structured?

The design of national cluster programmes usually involves significant financial support to clusters. This support is usually aligned with national strategic priorities (key technologies ...) and focuses, in addition to the support for cluster management activities, mostly on R&D and innovation projects.
In the following, three examples of recently defined national cluster programmes with high relevance for regional policy makers will be presented:

- “Pôles de compétitivité” (France)
- “Spitzencluster Wettbewerb” (Germany)
- “Pole Programme” (Hungary)

While the first two cases represent policy programmes in old EU member countries, the Hungarian case reflects the specific situation in one of the newer EU member states. The concept of the Hungarian programme might be particularly indicative for policy makers in new EU countries without a long history of cluster funding.

**France, Pôles de compétitivité (71 clusters)**

**Cluster policy - Cluster strategy**

- Develop partnerships between the various stakeholders, based on their complementary skills;
- Construct shared strategic R&D projects that can benefit from public funding, particularly the Interministerial Fund (FUI);
- Promote an overall environment favourable to innovation and the cluster’s stakeholders via presentations, knowledge-sharing and mutual support among cluster members on topics such as training and human resources, intellectual property, private-sector financing, international development, and so on.

**Cluster programme - Public support for clusters**

By allocating, through the Single Interministerial Fund, financial support for the best R&D and innovation platform initiatives via calls for projects

- Partial financing for cluster governance structures, alongside local authorities and companies
- Financial support for theme-based collective actions initiated by clusters in a wide range of areas, via the various Regional Directorates for Industry, Research and the Environment

By involving various partners, such as the Caisse des Dépôts, or the French National Research Agency (ANR) and OSEO, both of which finance R&D projects led by cluster stakeholders

- By bringing new means from public research centres,
- Finally, by seeking assistance from local authorities, who can also provide financial support for cluster projects (R&D, innovation platforms).

**State funds for the period 2009-2011**
• Leadership – €50M financing for governance structures,
• Structuring projects – €600M including €495M for R&D projects and €105M for structuring projects (innovation platforms),
• Agency interventions – €850M including €600M for the French National Research Agency (ANR) and €250M for OSEO and the Caisse des Dépôts for single collaborative projects within the clusters.
Spitzencluster Wettbewerb (Leading Edge Cluster Competition) of the Federal Ministry of Education and Research (Germany)

Cluster policy - Cluster strategy
A core element of the High-Tech Strategy for Germany is the building of bridges between science and business: to safeguard growth and employment, research results having innovation potential must be recognised and quickly and successfully brought to market. At the same time, research matters of relevance for the future must be formulated and solutions found. This requires close cooperation between the business and scientific communities.

Clusters in which companies, scientific institutions and policy makers are all pulling in the same direction offer excellent conditions for this. Clusters can bring together a range of competences at an early stage. They offer a singular combination of factors for success:

- long-term research strategies,
- technological development with a market focus,
- favourable conditions for start-ups,
- strategic expansion of international collaborations.

Cluster programme - Public support for clusters
The following criteria are decisive for funding:

- The cluster must possess the necessary critical mass, the necessary potential and high development dynamism,
- Implementation of the strategy involves significant financial participation by business and private investors. The planned projects build on the strengths of the cluster and lead to sustainable changes.
- The strategy enables the raising of innovative capacity, the development of unique selling points relevant to the competitive environment and the attainment or consolidation of a leading international position.
- The preconditions for implementation of the strategy are fulfilled. The cluster strategy is characterised by economic viability; instruments are available for ensuring sustainability following the end of funding.

State funds
The plan is to hold three rounds of competition up to eighteen months apart. In each round of the competition, up to five clusters will be selected to receive a maximum of EUR 200 million of funding over a period of no more than five years.
Funding period:

1st funding phase: Project duration max. 5 years. After approx. 2 years progress reports with projects for the 2nd funding phase.

2nd funding phase: Max. project duration to end of funding period up to 5 years.

The Hungarian Pole Programme

Cluster policy - Cluster strategy
The Hungarian Pole Programme represents a comprehensive economic development program that harmonises the sources of several operational programs of the Hungarian NSRF 2007-2013 with total funds worth €1.5 billion. The national cluster development policy forms part of the Pole Programme.

The Pole Programme was developed as a strategy to address challenges such as a general lack of trust and confidence among business actors in clusters and a lack of stable and consistent policies for existing business co-operation and clusters.

Cluster programme - Public support for clusters
The framework of the Pole Programme comprises a four-stage cluster development model providing different support schemes for co-operation and clusters according to their development level. The accreditation of clusters was intended to place them at the appropriate stage of the cluster development model but also to entitle winning clusters to preferential treatment and dedicated support sources. An objective of the Cluster Accreditation Pole Programme is to identify, by 2013-2015, five to ten successful Poles Innovation Clusters in Hungary that are able to reach a significant market share in Europe.

The fact-based accreditation system is based on criteria in five selection groups:

- Cooperation in the cluster
- Members of the cluster
- Business performance of the SME members
- R&D performance
- Strategic and operational plan
State funds
The form of support depends on the level of development assigned to the cluster through calls for proposals. Support to Cluster Initiatives (stage 1) and Developing Clusters (stage 2) focuses mainly on the strengthening of the cluster management. Clusters with the potential to produce high added value that are highly innovative and export-oriented can be labelled as Accredited Clusters (stage 3) and Pole Innovation Clusters (stage 4). Accredited Clusters benefit by a sole right to apply for dedicated pole programme sources. Also, they benefit from advantages and preferential treatment in many calls for proposals.

To date, €46.5 million have been granted to clusters in different stages of development:
- Start-up co-operation initiatives - €8 million
- Developing co-operations – €5.3 million
- Accredited clusters – €33.2 million
- Pole innovation clusters – under elaboration.

(Zombori 2009; Competence Networks Germany & FORA 2010)

Regional policy can benefit from national policies through:
- access to funding schemes not available at regional level,
- support for their best clusters in national “beauty contests”,
- opportunities for regional policy makers to co-operate with colleagues from other regions and learn from their experience, exchange information on practices, etc.,
- benefit from achievements in terms of policy and management tool development.
4.2 How to set up cluster agencies

4.2.1 How to coordinate the implementation of a cluster programme

Cluster programmes are usually a bundle of different programmes led by different ministries and government departments. This raises the question of coordination and implementation of cluster programmes. This function can be effectively served by what is known as a cluster agency; a cluster agency is in charge, on behalf of the government, of implementing the cluster programmes. The cluster agency may be a dedicated organisation such as a government agency or part of the government organisation itself and hosted by a ministry or department.

A strong trend observed is the bundling of implementation responsibilities under the roof of a government agency in charge of the implementation.

Interview Prof. Cooke

“A horizontal organisational set up of cluster policy (covering all relevant Ministries) sounds good, but is often not taken seriously. More pragmatically, I favour a dedicated unit in a specific Ministry (or semi-independent Agency - like e.g. Scottish Enterprise or Vinnova - which has to report to Government; this Agency can / should very much have responsibilities beyond cluster policy).”

Such agencies usually deal with the implementation not only of cluster policies but also of R&D, innovation and other policies; in most cases those agencies already exist before the implementation of cluster policies and are specialised in the implementation of government policies.

This is the case both at national and regional level. “Most of the agencies responsible for implementation of cluster policy at regional level focus on business and regional development in general. These organisations can be anchored regionally or be a part of a national organisation with a regional responsibility.” (Oxford Research 2008: 29)

Some examples of regional cluster agencies and their competences are presented below:
**Baltic Innovation Agency, Estonia**

“Baltic Innovation Agency (BIA), a member of Enterprise Europe Network, is providing innovation, clustering, technology and business development related services to public, private and third sector organisations.

BIA is working with different cluster development activities and initiatives in various sectors focusing on issues like cluster internationalisation, joint marketing and branding, human capital development and training. BIA is implementing projects both in traditional industries such as wood, forest, food, chemical, energy and environment sectors but also in new sectors like biotechnology, nanotechnology and ICT.

The main competence areas where BIA is offering development services and training are the following – cluster management, strategic and business planning; technology transfer and commercialisation, market research and analysis, innovation financing and investment readiness; intellectual property rights; evaluation, benchmarking and foresight.” (www.bia.ee)

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**TMG, Upper Austria, Austria**

“Within the last few years, Upper Austria has positioned itself as a competent region for clusters and networks. The policy for economic development and technology is cluster and network oriented and is consequently realised – as a strategy for companies to sustain innovation and competition. This idea will be continued systematically in the future based on the strategic programme “Innovative Upper Austria 2010”.

Since 1998, clusters were gradually developed in important economic branches in Upper Austria: automotive, plastics, eco-energy, furniture & timber construction, food, health technology, and mechatronics. In addition, inter-branch networks have been set up in the fields of human resources, design & media, logistics, environmental technology and energy efficiency. Small & medium-sized enterprises are particularly supported in our policy.
**Clusterland Oberösterreich GmbH newly founded**

All clusters and networks, which were directed by Upper Austria’s location and innovation agency (TMG) till the end of 2005, are now part of Clusterland Oberösterreich GmbH. Since January 2006, Clusterland Oberösterreich GmbH is now operationally active. Managing Director is DI (FH) Werner Pamminger. Legitimate owners are TMG with 61%, Upper Austrian Chamber of Commerce, and the Federation of Austrian Industry with each 19.5%.”

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**Veneto Innovazione, Italy (Interview Dr. Boesso)**

Italy implemented Technological Districts to improve networking between research and businesses in 2003 (OECD 2007a: 18). There is a strong focus on commercialisation of new products. I. Boesso, manager of the regional innovation agency Veneto Innovazione S.p.A., describes his case: “The regional law imposes on the district to have a minimum number of companies and one site in the region, but does not restrict the location of all companies within a certain area. With an example: there is a District on logistics based between Venice, Padua and Verona – while traditionally a district had only one centre. The regional law is rather flexible but – being a regional law – it implies that the district is based within the regional territory and that the companies forming it are located in the region in order to be recognised as part of the District (and in case they are linked to other companies outside of the region, only the companies within the region are recognised as part of the District).

This is a legal issue: the companies forming the District sign a document called “District Pact” (a sort of development agreement), which encompasses a series of projects that will be partly financed by the Regional Authorities; on its side, the Veneto Region is only allowed to distribute its financial resources to actors located within its territory. This is the reason why it was so difficult for us to introduce a philosophy of transnational cooperation – in fact, also in this case the Region only finances the regional part of the project but not the cooperating partners. This is e.g. the case of the MultiMedia District (MDM MetaDistretto DigitalMediale), sited here at the VEGA, which cooperates with Cap Digital in France, where Cap Digital is financed through the French OSEO Funds while our District is financed by the Veneto Region.

(...)
Furthermore every Region has its own policy approach: as regions started dealing with cluster policy about 10 years ago (it was a national matter before), they all started working separately on a regional law, with different results. While some Regions tend to specialise on a specific subject, here a bottom-up process was started, which led to forming about 40 different regional Districts (which is a really large number, considering the 65 available in France as a whole!) (…) Today the number is still high but the aggregation of Districts in MetaDistrict is a process already started and 10 out of the total of 44 are now MetaDistricts.

(…) Veneto Innovazione works together with the Economic Development, Research and Innovation Unit of the Veneto Region, in particular with its Technology Districts Office, which coordinates the regional policies. We are involved in one of the INNO-NETS on clusters (INNET) in the framework of which we have published an international call for proposals focussing on supporting the international cooperation among clusters. In this specific occasion we worked very closely with the Technology Districts Office and managed to give the call for proposals the international approach we desired, making of the international cooperation among clusters a condition to receive a better evaluation and, possibly, a higher contribution. This was only possible because the Economic Development, Research and Innovation Unit shares our targets – developing such activities requires that the different institutions work together with the same approach and same objectives.

Further cooperation fields between Veneto Innovazione and the Economic Development, Research and Innovation Unit are the Regional Law on Research and Innovation and the Districts Observatory, a regional initiative monitoring the impact of local laws and formulating improvement possibilities, which we manage on their behalf.”

At European level, regional efforts aimed at cluster organisations such as those described above are also backed and registered by the European Cluster Excellence Initiative. This initiative aims at gathering key European figures and organisations in order to identify and set up quality indicators and peer assessments of cluster management. (Duch 2009; Competence Networks Germany & FORA 2010). By labelling the quality of cluster organisations the trend seems to point towards the continuous development and increasing efficiency of cluster agencies.
4.2.2 How to integrate cluster activities at regional level

Beyond providing support to single clusters through appropriate channels, regional governments rightfully give a specific weight to the interlinkage of different regional clusters in order to foster synergies, mutual learning and professionalisation of cluster initiatives.

A good practice approach to integrate the cluster activities is the foundation of a regional cluster platform.

**Baden-Württemberg, Germany**

*J. Oswald, Ministry of Economic Affairs in Baden-Württemberg (Interview)*

In Germany, the State of Baden Württemberg supports the “provision of transparency and thus enabling collaboration (Cluster-Atlas), meeting places (Technologieplattformen – technology platforms: serving an awareness raising function; interface management and initiation of inter-disciplinary projects), [and] financial support. 18 thematic areas have been identified for initiatives. Regional strongholds and potential become interlinked at State level.”

**Clusterland Upper Austria, Austria**

Upper Austria is a popular example for connecting different clusters through a regional platform ([www.clusterland.at](http://www.clusterland.at)). The platform interconnects cluster initiatives in automotive, plastics, eco-energy, furniture & timber construction, food, health technology, and mechatronics. In addition, the platform connects inter-branch networks in the fields of human resources, design & media, logistics, environmental technology and energy efficiency.

*W. Pamminger, Clusterland Upper Austria (Interview)* explains that the interdependencies between the clusters are a part of the strategy. The core of the strategy is the inter-disciplinary networks (e.g. mutual development of human resources), and the centralisation of the cluster management. Because the cluster managers from the different clusters are located at a single level there are many synergies. The proximity makes it easier to discuss applications of a technology in another area.

The former managing director of the technology and marketing agency in Upper Austria (TMG) *G. Pöchhacker-Tröschler* recommends “[connecting] regional clusters e.g. via regional marketing agencies or certain government institutions.”
4.3 How to select and set up cluster initiatives
How to foster cluster institutionalisation

4.3.1 Should the clusters supported be defined top-down or should there be involvement by potential cluster actors in a more bottom-up approach?

One of the first decisions of policy makers when facing the selection of clusters to be funded in the framework of a cluster programme is whether to pursue a top-down or bottom-up approach, or a combination of both.

Top-down refers to measures to support (potential) clusters initiated by government bodies. In contrast, bottom-up processes are characterised by strong involvement by the private cluster actors. The general difference in the approaches is that the “a top-down approach tends to define criteria a priori [by policy makers] whereas a bottom-up approach relies on the mobilisation and commitment of local actors” (Interview P. Lefebvre).

Cluster selection based on predetermined criteria (e.g. national strategic priorities, statistic characteristics) can be labelled as top-down.

Methods without any predefined criteria such as group discussion, open calls, etc. can be described as bottom-up selection. Restricted calls for tenders can be seen as a combination of the bottom-up and the top-down approach. A call is more bottom-up whereas the prerequisites are set top-down. (OECD 2007a)

The appropriateness of the approach depends very much on the policy level considered and the strategic objectives of the policy.

_A. Davis (OECD)_ describes the advantages of the approaches depending on the programme objective: “if it is the national government who wants to strengthen the biomedical industry, then it would use a top-down approach, it would pre-select the areas it wants to target – as a national authority it can identify how strengths are located in biomedical research and firms. If you want to build general capacity at local level and you don’t have set objectives, then the bottom-up approach is a good way of identifying whether there is the necessary motivation for a cluster.”

Awareness raising is another reason for a top-down approach at the early stage of a cluster. _J. M. Esteban_, the Co-ordinator of Cluster Policy, Department of Industry, Trade and Tourism of Basque Government and the President of TCI,
describes the Basque approach: “important changes have been made over time […] from a pro-active top-down cluster policy in the early years aimed primarily at awareness raising and platform building (get started)” to a policy that “has become more responsive and follows a bottom-up philosophy”.

Table 14 below summarises the different motivations behind the various approaches. In general, bottom-up cluster support is better suited to activating cluster members and to strengthening the identification with the cluster. Nevertheless, authors such as Fromhold-Eisebith et al. (2005) conclude that a top-down approach is better for new clusters characterised by a lack of material assets, entrepreneurs, and cooperation because of a higher internal and external signal value. The cluster policy of the Basque country supports this approach.

| Top-down | • Clear targets (strategic, quantitatively identifiable)  
|          | • Coherence with other programmes  |
| Bottom-up | • When best or possible participants not clear upfront  
|           | • Information best obtained by self-identification  
|           | • Gauge motivation of the participants  |
| Combination | • Best choice in a pre-defined universe  
|            | • Lower level of government best placed to select  
|            | • Collaboration across levels of government required  
|            | • Special additional considerations in cluster selection  |

Table 14: Motivation for different policy approaches  
(OECD 2007a: 82)

The combination of top-down and bottom-up approaches is quite appropriate on a national level to strengthen fields of strategic societal and economic interest like health, environment, energy, ICT, safety / security, etc..

Successful examples are e.g. the BioRegio programme in Germany as well as the Pôle de compétitivité approach in France which focus on innovation and R&D related activities. The risk of pre-determined calls according to Prof. Cooke is that “things are in fashion this year and out of fashion next year. Most countries had a bio-tech focused S&T policy (resulting in biotech cluster policies) and will change to green / clean technologies (resulting in green platform / cluster policies). Rapid change of foci is dangerous.” (Interview)

On the other hand, the “Swedish approach does not politically define key areas, but emphasises its investments in clusters into those fields where the highest returns on investment can be expected.” (Interview Prof. Sölvell, Stockholm School of Economics)
At regional and local level, both approaches have been adapted. Whereas the Basque country and Bavaria have followed a strict top-down approach, Baden-Württemberg pursues a strict bottom-up strategy (Interview: J. M. Esteban, Dr. Bommer, J. Oswald, R. Eichhorn / S. Buhl).

According to Dr. Meier zu Köcker, at regional level a top-down approach may be appropriate, because the “State Government could identify strongholds and pro-actively approach the respective champions, discussing the possibilities of cluster policy.” This strategy can help to develop coherence across different policy levels by selecting clusters for which funding from higher governmental levels are foreseen (R&D projects, TT projects, innovation projects, etc.). Dr Boesso, Head of Unit European and Technology Transfer Projects, S.p.A. (Italy) described this criterion as the most important one for selecting clusters in order to decide on policy support.

In the following, the case of Upper Austria is described, an example of a mixed top-down and bottom-up approach.

Interview W. Pamminger, Clusterland Upper Austria

“In our case we apply a combination of the top-down and the bottom-up approach.

For the initiation and the structure of cluster we apply the top-down approach comparable to the Bavarian approach. We decided to organise all clusters within the same organisation which manages the cluster without a competition. On the other hand the operational business of the cluster organisation is determined bottom-up by the individual firms. The government decides about the cluster and initiates the process but there are no presets for the day-to-day business. The only thing we recommend is to consider the individual issues of the respective industry but there are no specific instructions. There are neither policy makers nor public officers in the management board, even though the public authorities are a part of the PPP.

The Bavarian approach is strongly science-driven (cluster spokesmen are often vice chancellors of universities). The primary objective there is to bring businesses and science together. In contrast, our model is strongly oriented on the needs of the firms. The triple helix is also relevant but we focus on SMEs. Our advisory board consists of 10-11 ambassadors of companies compared to one professor. This dimension was chosen deliberately.
The bottom-up approach here in Upper Austria is like the competence centre programme in Bavaria. Baden-Württemberg and North-Rhine Westphalia just provide public funds and select certain clusters applying for this money. That concept is completely different from a One Stop Agency which is responsible – but in our opinion this approach has many advantages. In my opinion, the second best solution is to have several responsible organisations. I have often seen that certain associations, research institutions, private supporting organisations, etc. get money for cluster management and at the moment the funding ends all activities were stopped. The problem is that these organisations have various interests and functions.”

4.3.2 How can potential cluster actors be motivated to engage in clustering?

There are various approaches to motivate cluster actors to engage into clustering.

The authors of the Cluster Navigator (2001) propose establishing a leadership group consisting of a “group of senior stakeholders who collectively cover the broader dimensions of the cluster” by the cluster facilitator (e.g. local economic agencies). This leadership group develops a common vision, identifies stepping stones, outlines an action agenda as well as expected results and initiates the institutionalisation of the cluster. The challenge is to involve senior leaders of the core firms during the early stage of a cluster because the benefits of the cluster are not clear upfront. The motivation of the further participants depends on early benefits of the cluster for the stakeholders. The time and involvement of senior actors in the process of cluster building is a first indication for success of the initiative. In the words of Y. Guyon: “Key actors need to be involved both at institutional and personal level.” (Interview)

Institutionalisation can motivate the cluster actors to engage in projects and clustering. A cluster association can serve as an arena to come together, to articulate needs, and to apply for grants (Rosenfeld 2002). The motivation of the cluster members depends on the benefits from actually participating in cluster activities. The Cluster Initiative Greenbook (Sölvell et al. 2003) shows that lobbying for improved infrastructure, improved regulations and policies, and subsidies is done by most cluster initiatives.

International cluster networks can also help setting up cluster initiatives by transferring the experience of more mature clusters to emerging ones. An example can be drawn from the Connecting Energy Clusters across Europe project (CENCE). The CENCE consortium played a vital role in the development of a
new Bioenergy Innovation Cluster in Northern Hungary. Embedded in international co-operation, the new Hungarian cluster received practical advice and support in structuring and managing the new cluster organisation from the start. Thanks to these efforts, the cluster has received funding from the Hungarian government amounting to €5.3 million (European Commission 2008b: 55; see also CLOE)

Calls for proposals and open competitions are another possibility to generate projects and stimulate clustering. In general, calls have a highly mobilising effect (Interview: Prof. Kiese, Dr Meier zu Köcker). Dr Lefebvre (Assistant Professor at the Mines ParisTech, France) underlines that “[calls] enable / foster the commitment of local actors and also allow enough room for innovative proposals.”

Cluster manager D. Hermanns provides a good example: “Recently we benefited enormously from the Top Cluster Contest of the BMBF. The strong involvement of the actors about the topic cluster, SWOT analysis, etc. gave us a very clear picture of the area. The first time we have collected reliable data about the region and in addition the cooperativeness has been strengthened.” (Interview)

To apply for calls, a certain degree of organisation / institutionalisation is needed. Policy makers should keep in mind that new clusters often lack an adequate cluster organisation. Thus, young clusters are at a disadvantage in a formal call process, if they are competing directly with existing clusters.

Case study: “Pôles de compétitivité” (competitiveness poles)

“The competitiveness poles were identified through an open call for proposals, on the basis of the definition and criteria given here above. The proposals were evaluated:
- at regional level by the representative of the State (Préfet de région);
- by the ad hoc inter-ministerial working group;
- by external independent experts (groupe des personnes qualifiées);
67 out of 105 proposals were awarded the label Pôle de Compétitivité. At a later stage 4 additional poles were labelled.” (Interview V. Susplugas)

4.3.3 Should a cluster initiative be implemented as leading driver of cluster development?
A cluster initiative is an organised effort to increase the growth and competitiveness of clusters. Such cluster initiatives organise the membership of the cluster actors, the cluster organisation (cluster management, office, website, etc.), the governance, and the financing of common activities. (Sölvell 2009)

According to the Global Cluster Initiative Survey 2003 (Sölvell et al. 2003), the most common objects of cluster initiatives are to:
- foster networks among people,
- promote expansion of existing firms,
- establish networks among firms,
- facilitate higher innovativeness,
- promote innovation, new technologies,
- attract new firms and talent to region,
- create brand for region.

The CLOE Cluster Management Guide (2006: 16) presents an overview of the tasks and activities to reach the typical targets cluster initiatives:

![Diagram](image)

*Figure 7: The objectives, tasks and activities of cluster initiatives (CLOE 2006: 16)*
Clusters are striving for growth. There is rarely a common vision to communicate the cluster idea and to align the interests of the members. Networks to strengthen the cluster are in most cases underdeveloped. Cluster initiatives can provide decisive support for mobilising the actors and initiating projects in the initial phase of a cluster’s lifecycle.

This has been underlined in the interviews by practitioners and policy makers:

**J.-D. Malo, DG Research**

“Giving themselves a joint legal structure brings many benefits to the clusters. It stimulates the joint strategy process and fosters the collaboration among the actors. It also empowers the clusters and gives him possibilities for taking action and being more visible.”

**M. Williams, Paper Province, Värmland** explains that the awareness of the companies' needs is an important driver for cluster success:

“Listen to the companies and plan cluster strategies and activities accordingly. Meeting companies is the most important thing we do!”

**Y. Guyon, CCIL** describes the implementation process for new clusters: “In the first years of a cluster’s lifecycle, cluster policy is necessary for a timeframe of around 3 to 5 years. During this period, it is necessary to support especially the networking processes between the actors. Regional companies do not necessarily spontaneously cooperate with their local competitors; it is necessary to present the advantages of the cluster initiative, to build up trust between the participants and the management unit and to initiate first collaborative initiatives. This work needs to be funded and it can hardly be expected that companies pay from scratch as long as they have not clearly seen the benefits.”

**Dr. Bommer of the Bavarian State Ministry for Economic Affairs, Transport and Technology** underlines the importance of a central institution. “A common orientation is important for the cluster members to identify themselves with the cluster and to develop a cluster brand. It is necessary to know an actor to address complaints to in cases of difficulties in order to develop a cluster identity”.

**W. Pamminger**, Clusterland Upper Austria emphasises the advantages of a specific organisation only responsible for cluster management: “In this case, the management is doomed to success. The employees need to be successful, because otherwise they lose their jobs. If a university is in charge for the cluster development, and the cluster did not work well, then there are still the traditional
activities. In our case, the cluster management is required to ensure the individual needs of the businesses much more intensively and target-oriented.”

However, cluster policy should keep in mind that there is only potential for few cluster initiatives to develop successfully (Interview Prof. Koschatzky, Fraunhofer ISI), because cluster organisations are quite easy to start and generate considerable early excitement, but have proven difficult to sustain without long-term support (Landabaso / Rosenfeld 2009). Policy makers have to be sure that there is a need for cluster policy.

4.3.4 Who should govern the cluster initiative?

Individual firms are the driving force behind cluster success. To act in the interest of the private sector, cluster initiatives should be led by representatives from industry.

_W. Winetzhammer_ explains the approach in Upper Austria: “Institutionalisation (Clusterland GmbH) with the companies in the driver’s seat. All clusters have a Board in which the stakeholders are represented. All cluster speakers stem from the business sector and have a seat in the Supervisory Board of Clusterland GmbH.” (Interview)

_E. Andersson, Tillväxtverket_ in Sweden explains: “The commitment of the industry is important to get sustainability and necessary since it cannot be controlled or managed by Tillväxtverket or VINNOVA. Evaluations have shown that without this commitment the activity can stop as soon as the funding disappears.” (Interview)

Obviously, there are a few very successful exceptions to this rule. The Danish food cluster called Øresund Food Network (ÖFN) is an example for a cluster led by academia. The manager of the cluster _M. Olofsdotter_ describes the cluster’s history: “In November 2000, the ÖFN was founded as a knowledge-based Danish-Swedish network uniting research, business and authority within the food value-chain. Initiated by the Øresund University (...), the ÖFN coordinates and participates in several multidisciplinary projects within food, pharma, ICT and environment.”
4.3.5 Who should manage such a “cluster initiative”?

The cluster management comprises all activities in the field to foster the interaction of public and private actors in order to strengthen the location and the private actors (Terstriep 2008: 62).

“Cluster management is crucial to success” (Interview Dr Meier zu Köcker). A lack of consensus, the absence of a common vision, and weak network of contacts are the main reasons for the failure of cluster initiatives (Sölvell et al. 2003: 51). Those weaknesses can often be traced back to weak cluster management.

A. Richter of the city of Hamburg states that the cluster management of the local aviation cluster “strengthens internal networking / interlinking, provides specific service offers, serves as mediator / ambassador / integrator and develops relations to other relevant domestic and international aviation locations.” (Interview)

“Cluster managers 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”. 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. (…) A number of initiatives exist already that organise cluster training programmes…” (EC 2008b: 46)

According to Dr Meier zu Köcker, good cluster management comprises at least three experienced members. There is no clear qualification profile for cluster managers. In the following we quote some typical requirements expressed by experts and practitioners:
Prof. Kiese
“(…) a good cluster manager needs to be knowledgeable of and well inter-
woven in the respective sector, needs to be anchored in the region and network
intensively outside the region.”

Dr Meier zu Köcker
“It has turned out that network competence is more important than a high com-
petence in industry-specific issues. Universities / university staff engaging in
cluster management show below average performance, in particular a lower
performance compared to managers with industrial backgrounds”

W. Pamminger, Clusterland Upper Austria
(…) professional understanding and business expertise are necessary but at least
as important as communication, organisation and presentation skills, willing-
ness to travel, willingness to learn new things, the ability to bring people to-
gether, and teamworking…

Pamminger warns that there is no ideal manager type: “Manager / Researcher,
age 50 or more, a specialist within the respective industry.” More important
than hard skills are the soft skills.

Management is not the direct responsibility of policy makers but they should be
in a position to intervene in cases where management appears to be weak.

4.3.6 How should the funding scheme of cluster initiatives be designed?
What is the right amount of funding?

Financial resources can come from public and private sources. The following list
gives an overview about the possible sources of funds for cluster initiatives:

- government aid:
  - governmental cluster support programmes,
  - grants from regional and local economic development agencies,
  - funding as part of EU projects.
- private sources of income:
  - membership fees,
  - earnings from cluster services,
  - provision,
  - commissions from the placement of orders (e.g. B2B export promo-
tion services),
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○ revenue from events,
○ revenues from the acquisition of public projects (national calls, European Union, World Bank),
○ participation in fees and royalties of joint patents and licenses
○ investment companies, venture capital, sponsoring.
(gtz 2007: 28)

The appropriate level of public funding depends on the objectives of cluster policy, the individual cluster, and the respective country. UNIDO development officer M. Clara explains: “We have observed very different budgets in different clusters and countries – it is not possible to provide indications on the required budget ahead of a proper cluster analysis.” Koschatzky gives a more detailed picture about the considerations of policy makers before clarifying the level of funding needed: “If policy decides to implement clusters policy, it has to be clear how much money will be invested and if the amount is appropriate to attain the respective goals. The financial resources depend on the objectives of policy. To develop a pre-cluster by supporting first networking activities, €100-200K might be enough to sponsor an event or to support travelling costs, etc. On the other side €3 million might not be enough to build up the institutional structures for an automotive cluster.”

Case study: Basque country (Spain)
“11 selected mature priority clusters. The respective cluster offices annually receive a maximum of € 240,000 (which covers some 40% - 50% of their costs).” (Interview J.-M. Esteban)

Case study: Baden-Württemberg
“Maybe most importantly, the Ministry of Economic affairs runs the “Regional Cluster-Wettbewerb” (regional cluster competition). 36 regional initiatives submitted their bid with deadline September 22nd, 2008 (the next call will be published at the end of 2010). A jury comprising of representatives from e.g. commercial associations, members of the “Innovationsrat Baden Württemberg” (High Level Advisory Board of the Government of Baden-Württemberg) and cluster research and the two responsible Head of Departments of the Ministries of Economic Affairs and Science, Research and Arts selected twelve initiatives which have been invited to submit ERDF proposals for funding. The total budget per initiative is €600,000 for a three-year period: 50% stemming from the EU, and the remaining means partly from the State and partly from the initiatives’ own sources.

Case study: Clusterland Upper Austria
W. Winetzhammer
“We serve as initiators and provide
• Reputation and manpower
• Financial support (c. €5 million per annum out of maybe €6 million provided by all public institutions together)”

W. Pamminger
“If we look at the plastic cluster, which we support with €150,000-200,000 a year and which manages to provide 700-800 additional jobs a year in Upper Austria, it is a good investment, particularly with regard to the respective amount of tax money we used to subsidise a job. But this is no stipulation to be successful.”

Case study: Hamburg
“Within the framework of a special investment programme and the programme ”Investitionen für neue Arbeitsplätze“ (investments for new jobs), the City of Hamburg has co-invested €37.5 million during the years 2006 – 2010. The remaining budget comes from the other cluster partners.” (Interview A. Richter)

Case study: Värmland
“Public regional money is either used as co-funding alongside private money (cluster companies) for the development and management of cluster processes, co-funding of projects (e.g. ERDF funds) or used as “injections” targeted at specific activities asked for by policy makers. For example those clusters which elaborate a technology transfer strategy together with the University of Karlstad receive €15,000 in co-funding on condition that the cluster companies pay (time or cash) an equal amount.” (Interview S. Bjurulf)

The design of the timeframe of the funding scheme is of strategic importance (Interview Dr Meier zu Köcker). Policy makers should be clear about the signalling effect arising from the predefined timeframe of public cluster support. Prof. Koschatzky reflects on the opinion of most practitioners about the design: “Firstly, it is important to signal that it is only an initial funding which might decline over time. In addition, policy makers have to define which goals should be attained within 5 years. The output of the programme at the end of the funding periods must be clear. Even if the predefined objectives cannot be completely outlined, policy has to impose certain pressure on the actors to attain the respective goals.” (Interview)

Case study: Basque country (Spain)
J.-M. Esteban recommends designing the policy support of clusters to motivate strategic planning. “The Basque clusters are all preparing 4-year strategic plans which are updated on an annual basis. Based upon this planning, each cluster applies for a moderate financial support from the Government. (…) Continuity is decisive. So is long term commitment.” (Interview)

Case study: UNIDO (Clara)
M. Clara describes the cluster program of the UNIDO: “We operate exclusively under the Framework of Technical Co-operation funded by Donors. We normally prefer 4-5 year agreements with donors but have been engaged in projects lasting 2-3 years as well. The UNIDO cluster development program has provided technical assistance to Thailand, Zimbabwe, Jamaica, Colombia, Ecuador, El Salvador, Honduras, Nicaragua and Mexico.”

In established cluster initiatives, a high self-financing ratio is an indication that a cluster initiative meets the needs of the actors. The self-financing ratio is a measure describing the willingness of the firms to pay for services and benefits provided by the cluster initiative (Interview: W. Pamminger, Clusterland Upper Austria).

Case study: CyberForum (D. Hermanns)
The cluster manager D. Hermanns describes the difficulty of motivating private sponsors: “It is not easy to get private sponsorship, because the cluster's entrepreneurs and companies are only aware of a limited number of the cluster benefits. Probably it will be a long process until the entrepreneurs recognise the whole benefit for themselves– in this region we are relatively successful in this point.” (Interview)
4.4 When should policy support and intervention be reduced or stopped along the cluster lifecycle (exit strategy)?

4.4.1 Is there a need to focus on specific phases of a cluster’s lifecycle?

The cluster mapping performed by Oxford Research in the framework of the Europe INNOVA initiative from the EC shows that about half of the sixty nine national cluster programmes identified do not have a focus on specific phases of a cluster’s life cycle whereas most of the others do focus on “emerging and embryonic clusters” (Oxford Research 2008: 7).

![Figure 8: Programme focus of national cluster programmes on cluster’s lifecycle](image)

(Oxford Research 2008: 25)

As already mentioned for the planning phase, support to clusters is particularly meaningful during their initial phases and this can be mirrored in cluster programmes specifically addressing cluster sprouts.

Cluster sprout programmes should basically aim to foster the initial impetus, helping cluster actors to find each other, to network and to initiate initial joint projects. “And then, when things start running, you can also include other measures, like incubators, technology parks, technology transfer mechanisms, etc.” (Interview M. Dermastia, Anteja).
4.4.2 What about the exit from cluster policy and the closing of cluster programmes?

Political stability is important, because the policy impact of cluster policies on certain cluster can only be realised in a mid- to long-term perspective. As G. Pöchhacker-Tröscher states “continuity is paramount for cluster policy”.

Even successful clusters (e.g. in Upper Austria) have been and needed to be supported by both the Upper Austrian Government and the EU for about 10 years before they reached a level of self-financing allowing to substantially reduce governmental support.

Many policy makers and researchers interviewed tend to think that cluster policy is a long term policy and that the question is more about how it should change while the cluster goes through its lifecycle than how it should stop.

Dr. Lefebvre, Ecole des Mines de Nancy

“This point (the exit of cluster policy) remains a research issue. Basically, support depends on the level of interaction between the actors. Instruments will need to be adapted according to the different needs.

There is certainly a need to think of an exit from cluster policy but policy makers need to understand that the development of significant clusters take decades and that exit can only be envisaged on a long-term basis. Within most OECD countries the clusters and cluster polices are quite recent; the clusters do not have a long enough history.”

M. Dermastia, Anteja

“If you follow the cluster policy lifecycle (which foresees that a cluster has a kind of programme, ending in a specific point in time), at the end of it you will have an evaluation – this was the case in Slovenia – based on which positive and negative aspects of the activities as well as suggestions for improvements can be identified. Based on the evaluation results – and again this was the case in Slovenia – the new programmes can be designed. So in the case of Slovenia, after the evaluation the next programme was much more focussed on specific development needs of the clusters or networks. Furthermore, the programme was not only open to clusters and networks, but to all Slovenian companies. On the other hand, because in clusters universities and companies did a very good job in the past, their networks were very strong, so that they had easier access to research money available. So actually in my experience when a programme ends, it flows into a new programme.”
A. Davies, OECD
“I don’t know whether it [exit] is necessary.
One of the problems with the evaluation is that most of the time these programmes seem to have a short project cycle. They are trying to identify changes which are not likely to appear quickly enough to be caught by the project evaluation. This might be one of the problems of these strategies. And I personally do not think these programmes run long enough to need an evaluation, really! They have a 3 or 4 year funding cycle. And when it’s over you start a new programme.”

V. Susplugas, French Ministry for Economy, Industry and Employment, « Pôles de Compétitivité” office manager
“Exit is an inherent part of the Pôles de Compétitivité policy as the first two funding phases have been planned for a period of 3 years each, although the policy intent was and still is to commit on a longer term to the scheme.
The 3-year planning period enables the policy maker to take into account the results of the policy evaluations and to introduce necessary changes either in the policy scheme itself – for instance by bringing in new instruments – or to intervene in specific cluster initiatives which do not meet their target and do not show sufficient progress.
The exit option is a key instrument for the policy maker with regard to the monitoring of its cluster strategy. A 3-year period might be actually too short when it comes to cluster policy but as long as the availability of follow-up funding is made clear, the incentive for clusters is high enough.”

4.4.3 What is the right timeframe for funding of single cluster initiatives? Should an exit be considered?

Dr Meier zu Köcker explains the reasons for an ongoing partial funding of clusters: “clusters serve some public functions (non-cluster specific functions). The satisfaction of political objectives should be financed with a going concern philosophy in mind.” W. Winetzhammer responsible for the cluster policy of the state Upper Austria recommends: “Ideally, our clusters are around 50% self-financed. However, this depends on circumstances like the context for a particular sector. For instance, the automotive cluster used to be self-financed to a pretty high degree (…)”

Dr Meier zu Köcker, Agency Competence Networks Germany
“The time frame should be strategic. Whereas degressive funding can very well be used, you must not expect that clusters can be entirely self-financed after
three years of public financial support. Also, one has to remember that clusters serve some public functions (non-cluster specific functions). Cluster policy should be rather perceived as a continuous funding philosophy rather than viewed from a project perspective.” (Interview)

W. Winetzhammer, Amt der Oberösterreichischen Landesregierung
“Innovative continuity is the key to success. Short-term projects are doomed to fail.” (Interview)

I. Ffowcs-Williams, Cluster Navigators Ltd
“Five year minimum.” (Interview)

Prof. Russo, University of Modena and Reggio Emilia
“It depends on the project [...] There is no general rule. Some policies require immediate action (opening a new geographical market), other policies require wider time frames. Education policies, for instance, require the time needed to create and transfer knowledge (maybe 1 to 2 years), while policies for innovation need even more time (let’s say 5 years) and policies for reorienting technology actions could require up to 10 years. All these policies need an adequate framework and cannot operate in isolation. Every policy acts on a specific context – should other policies or events change this context, then the policies should be adapted to the new situation.” (Interview)

W. Pamminger; Clusterland Upper Austria
“I wouldn’t recommend 100% privately financed clusters even though this would be possible in some of our clusters. Such a situation would mean that we would have the function of a private-oriented advisor, more focused on subsidising larger projects. In Upper Austria, we have achieved a stable financing of the PPPs and an economic orientation of the clusters. It is important that economic duties are financed by public funds.” (Interview)

H. Hermans; CyberForum Karlsruhe (Germany)
“In my opinion, clustering is a basic public task because without political support clusters would rarely exist. A 100% privately financed cluster is rather unlikely. Nevertheless financing can be shared by membership fees, commercialisation services, sponsoring, etc. but you have to be realistic: To reach a certain output, the public authorities have to take a share of the costs.” (Interview)

On the other hand, the same cluster managers or policy makers see a need for evaluation and monitoring (see chapter 5.4 What to do with evaluation results) for stopping policy support when it does not deliver results.
Policy should be designed in a way to exit from supporting a particular cluster in case policy is convinced that further investments are unlikely to result an adequate return on investment. The criteria for making such a judgement need to be agreed upon early on in co-ordination with the cluster stakeholders, their monitoring needs to be transparent and time horizons should be reasonably long. Despite all necessity for continuity, policy has to ensure its freedom and must not become a hostage of a powerful cluster.
5 Evaluating cluster policies

The evaluation of cluster policies (and to a lesser degree the evaluation of specific clusters as a building block in evaluating policy impact) represents the final major block of the cluster policy guide at hand. As we will argue in the following, evaluation should be an integral part of cluster policy and thus deserves a separate chapter in the cluster guide. Based on the overall evaluation literature on research, technology and innovation policy and the specific insights on evaluating cluster policy gained during the interviews, the guide argues for a strategic approach to conducting and commissioning evaluations of cluster policy.

As will be illustrated in the following, evaluations can be a useful tool for accountability and policy learning, but should not be taken as a panacea. To make use of evaluations policy makers need to clearly specify the purpose of evaluation and have at least a general understanding of the technical aspects of evaluation.

5.1 What is evaluation and what is it good for? (p. 117)

In recent decades, evaluation has become increasingly relevant and often a necessity to demonstrate the appropriateness, feasibility, effectiveness, and efficiency of public policies. Cluster policy evaluation can provide policy makers with decision-making support in terms of:

- selecting clusters for funding,
- improving cluster policy programmes,
- exit from cluster support.

Despite the general consensus on the importance of evaluation, we will briefly introduce the reader to the multifaceted concept of evaluation in general and evaluation of cluster policy in particular, focussing on the usefulness of evaluation for policy makers. This chapter will give information on not only the advantages but also the pitfalls of (cluster) evaluation and clearly delineate what policy makers can expect from cluster evaluation exercises – and what they cannot expect.
5.2 How to do an evaluation (p. 117)

This part of the guide intends to provide policy makers with pragmatic and down-to-earth recommendations on how to plan and to make use of cluster evaluations. Cluster evaluations should closely follow the respective information needs and clearly specify the evaluative goals. Therefore policy makers should be clear about:

- the goals of the monitoring and evaluation process,
- the subject of evaluation,
- the evaluator in charge,
- the right timing of the evaluation,
- stakeholders to be involved,
- the costs of evaluation.

As practical examples this chapter includes:

- the case of Clusterland Upper Austria as an example of a relatively management-oriented monitoring and evaluation system,
- the case of the Paper Province in Värmland as another example focusing strongly on the corporate level.

5.3 Technical aspects of cluster evaluation (p. 117)

To understand how evaluations are performed and make an informed decision on cluster evaluation, this chapter focuses on:

- criteria and indicators to evaluate cluster policy,
- performance standards to compare selected indicators against,
- quantitative and qualitative evaluation methods.

Criteria of merit and indicators / measurable outcomes are needed to determine what can later be considered cluster policy success and failure. This chapter will provide the reader with:

- a selection of goal-oriented, effect-related and process criteria,
- indicators regarding:
  - the micro / firm level, meso / cluster level and macro level,
  - networking and organisation of a cluster initiative.

Performance standards are needed to provide meaningful results on the quality of (cluster) policy. This chapter will thus provide a list of types of controls.

Finally the reader will be acquainted with the most widely used methodological approaches and techniques including:
• expert judgement, interviews and case studies,
• benchmarking,
• network analysis,
• control group approaches.

5.4 What to do with evaluation results (p. 117)

Evaluating cluster policy is not an end in itself. Besides the usefulness for public accountability purposes and cluster policy programme improvement, this chapter will mainly focus on the issue of policy exit in relation to cluster evaluation results – a topic so far mostly ignored by comparable cluster policy guidelines.

Evaluation results can offer policy makers a starting point to tackle questions such as:

• How can policy retreat without too much harm to the cluster?
• How can we ensure that the cluster continues to prosper under its own steam?
• How can the reduced policy funding be substituted (membership fees / new investor etc.)?

The chapter concludes with three potential scenarios and strategies on:

• the underperforming cluster (scenario 1),
• the cluster showing “mixed results” (scenario 2),
• the outperforming cluster (scenario 3).
5.1 What is evaluation and what is it good for?

Often, (ex post) evaluations are primarily performed in order to ensure accountability for actions taken. With respect to the (preferably continuous) evaluation of cluster policy, the aspect of learning is essential. The evaluation provides valuable information and decision-making support for the design and implementation of an evidence-based policy which uses input from the evaluation in order to decide e.g. upon:

- How to select which clusters should be supported: definition of eligibility criteria, design of selection process (e.g. bottom up vs. top down, nomination of jury members)
- How to decide when which corrective measures should be demanded/taken in order to improve e.g. the efficiency of programme management
- Exit from supporting a specific cluster or family of clusters, or - much more rarely - exiting from cluster policy in general.

All these aspects will be successively discussed in the following sub-chapters.

5.1.1 What is evaluation good for?

Critics accuse evaluations of being too expensive, unnecessary and a diversion of precious funds from the real effort of a policy programme. (Miles / Cunningham 2006: 35). So why bother with evaluation?

There are at least two good reasons why policy makers need evaluations: to provide for accountability for their decisions and for policy improvement. This holds true both for public policies in general and cluster policies.

In order to legitimise often budget intensive (cluster) policies, policy makers are likely to be confronted with several pressing questions:

- On cluster policy impact
  - Have the objectives of the cluster policy been achieved?
  - What external effects do the policy actions have on actors beyond the cluster?
  - How do the cluster policy actions interact with and influence existing industrial and economic policies (local, regional, national and supranational)?
- On policy programme efficiency
  - Is the effect of the cluster policy large enough to justify the efforts/invested resources?
  - Are there other policy areas where the funding could be used in a more efficient way?
Evaluations contribute to answering these questions, help to decide whether policy support to an established cluster is still meaningful (or an exit is preferable), and serves as a basis for other recommendations. With well-conducted evaluations, policy makers are prepared to justify their expenses under increasing public scrutiny. Evaluations can also provide powerful arguments in the competition for public funds (see also Miles / Cunningham 2006: 29).

5.1.2 What is evaluation (in general)?

Evaluation in the broadest sense is the systematic application of social research procedures for assessing the conceptualisation, design, implementation, and utility of policies, programmes, projects or other subjects (Rossi / Freeman 1993).

Cluster policy evaluation, therefore, can be defined as the evaluation of policy measures aimed at supporting clusters against certain criteria. A common way to characterise evaluations is to differentiate between ex-ante, accompanying and ex-post evaluations (Kulicke 2009: 14):

- Ex-ante evaluations are performed before the implementation of a policy. They focus on the appropriateness of policy measures. At this stage of the policy process, evaluation can also assess policy implementation and policy effects as planned.
- Accompanying evaluations of ongoing programmes provide policy makers with continuous feedback according to predefined indicators i.e. on the effectiveness and efficiency of a cluster programme. These kinds of evaluation and monitoring results allow policy makers to react promptly to unexpected policy effects and implementation challenges.
- Ex-post evaluations are performed at or after the end of a programme and focus on the impact and sustainability of policies.

While ex-ante and accompanying evaluations tend to be more formative and better suited for policy design and development, ex-post evaluations of a policy or programme are mainly used for summative purposes and to provide for accountability.

In a wider sense, cluster evaluation can be seen as a continuous and iterative process covering the whole cluster policy cycle from start to end, with ex-ante, accompanying and ex-post evaluations flowing seamlessly into each other. The range of evaluation exercises ideally includes needs analysis, assessment of programme design, programme implementation and goal attainment, as well as impact analysis and efficiency analysis. Policy makers can, therefore, rely on evaluation both as a tool to determine the need and appropriateness of a cluster policy and to control whether the policy has been implemented as intended and assess its impact.
5.1.3 Evaluation in the cluster specific context

Evaluation of clusters can have very different implications. Cluster evaluations, as practiced today, often specifically focus on the management aspects of a cluster (initiative), assessing cluster success by variables such as satisfaction of cluster members, target group attainment, attainment of cluster specific goals or the efficiency of cluster implementation. Here, the evaluation focuses on the organisational and network level with its particular goals.

From a policy perspective, this level can be seen as the bottom part of an evaluation hierarchy. On a superordinate level, policy makers have to go beyond the goal of effective and efficient programme implementation and set-up of a new cluster. Policy makers are and need to be more concerned about the socio-economic impact of their cluster policy programmes, such as job preservation and increased competitiveness in the region. Thus, to prevent any ambiguity, a clear conceptual cut should be made between cluster evaluations that focus on a cluster itself and the evaluation of the impact of cluster policy. For example, an evaluation of cluster policy can cover the external effects of funding one cluster on the development of other clusters or industries.

Furthermore, one should differentiate between coordinated regional cluster policy comprising a set of policy initiatives and measures aimed at various clusters and cluster policy directed at a particular cluster. For example, the “Cluster Offensive Bayern” represents a coordinated regional cluster policy and concerns all clusters in Bavaria. Evaluations of this kind of cluster policy rather focus on the mix of different cluster policy programmes, its appropriateness and overall impact on the region, while evaluations of single cluster policies centre on particular clusters and local impacts.

Another important conceptual distinction is the one between monitoring and evaluation. Monitoring refers to the (systematic) collection and representation of information during the course of a programme such as a cluster initiative along predefined parameters. It constitutes a project management related activity and a controlling tool to periodically assess project progress. Standalone monitoring activities are not equivalent to evaluations and do not suffice to answer evaluative questions on objectives or the broader effects of a programme. (Miles / Cunningham 2006: 43) However, monitoring provides a set of useful information on programme processes and outputs that can be later used for evaluations, reducing the burden of ad-hoc data collection. (Miles / Cunningham 2006: 90). Ideally, monitoring should be an integrated part of evaluation, incorporating routine data collection throughout the cluster (policy) cycle. This helps to observe how outcomes, effects and impacts develop over time.
(Miles / Cunningham 2006: 89) Also, as will be discussed later in chapter 5.1.4 ("early warning system") preliminary results can be assessed to be used as indicators for the future development and a guideline for further policy action.

In practice, (cluster) monitoring will be most likely be an internal process coordinated by cluster management, while evaluations tend to be delegated to an independent third party. Ideally, monitoring should go hand in hand with evaluation, anticipating the data requirement of and questions targeted by evaluations. Policy makers therefore need to plan in advance for a coordinated monitoring and evaluation process.

5.1.4 What policy makers can expect from evaluation and what they cannot expect

While evaluation is an essential tool in the development of evidence-based policy making, it should not be mistaken for a panacea. Policy makers need to be clear about what they can realistically expect from evaluating cluster policy. However, concrete expectations are hard to formulate (Interview, Prof. Kiese, Leibniz Universität Hannover) as cluster evaluation has just started to gain momentum. As stated by A. Davies, OECD “…to make an effective evaluation you also need to have a clear idea on what you want to achieve and actually things may be a little blurred when you start a programme.” (Interview)

Up to date, there is still “very little evidence of serious cluster evaluation”, as very few cluster impact evaluations have been carried out to date (Sölvell 2009: 81; see also Kulicke 2009 on impact assessments of German cluster funding measures).

Also, cluster evaluations tend to concentrate on cluster initiatives and cluster success in terms of the effectiveness and efficiency of cluster management and implementation (e.g. success in cluster networking). Much less emphasis is being put on cluster policy in terms of the impact on cluster performance that goes beyond the individual firm performance.

The shortage of impact evaluations does not come as a surprise, as the evaluation of cluster policy is an immensely challenging undertaking for both evaluators and cluster participants. In real life situations, evaluations rarely bring about answers with the speed or level of detail desired by policy makers.

The main challenge lies within the complexity of cluster policies and policy measures. For accountability reasons, policy makers are usually most interested in a clear attribution of effects to the resources spent and the accurate measure-
ment of the positive impacts in monetary terms. For example, policy makers want to know whether – and to what extent - cluster policy has led to:

- Enhanced innovation (new product launches, private R&D)
- Increased research activity (patents, publications, etc.)
- New firm formation (incubator results)
- Job creation
- Sales growth
- Productivity growth
- Investments
- Strengthened cluster dynamics (membership, network meetings, communications)
- Attraction of new resources (inward foreign direct investments, skilled personnel etc.)

(Examples from Sölvell 2009: 92; Interview J. Rosted, FORA)

In reality, it proves enormously difficult to even guesstimate the net effect of cluster policies due to time lags, multi-causal relationships, unclear and / or conflicting policy goals and the unspecific nature of cluster policies. Also, unintended effects of cluster policy, such as windfall gains, crowding out and substitution effects are hard to detect and even harder to quantify. As indicated by Prof. Koschatzky, disentangling the causalities is “impossible… as the cluster policies are so broad and unspecific and aim at different areas …”. (Interview)

In the policy realm, results are expected within a fairly short timeframe which is closely linked to political cycles and terms of office. Policy makers, therefore, face the quandary of taking decisions about successor programmes or changes in the policy mix before a programme is completed and measurable impacts have occurred (see Miles / Cunningham 2006: 180). Cluster development, however, is a long-term process and difficult to be assessed during short political cycles.

Also, as emphasised by Prof. Koschatzky, clusters need to be understood as complex systems which do not display the impact of policy measures on target variables such as income or employment in a linear fashion. It is equally difficult to try to isolate the effects of cluster policy from exogenous factors such as cyclical fluctuations and influences of other policy instruments that run in parallel. These general problems with the evaluation of economic development policy are exacerbated with cluster policies because of their unspecific nature. (OECD 2007: 126; Interview Prof. Koschatzky, Fraunhofer ISI).

In a nutshell, what is most relevant for policy makers is the real impact of cluster policy. But what they will rather get in the short and medium term are distant proxies for the real impact. Due to the problems indicated above, simple rate of
return figures for every Euro spent on cluster policy are highly problematic (Rojo 2002: 36).
What policy makers can expect will also depend on the goals they set for cluster policy. This must be communicated to the evaluator. As stated by Prof. Koschatzky, “politicians need to say what results they expect after 5 years… saying, when the funding period ends, we expect so and so much output…” (Interview)

Nevertheless, policy makers can fruitfully exploit preliminary results and continuously measured indicators as an “early warning system”. By measuring the effects of cluster supporting measures at company level, evaluations may arrive at “indications as to whether the cluster initiative is developing in a positive direction”. (Sölvell 2009: 122). These indicators can relate to immediate outputs on the cluster management level and to more indirect indicators on the corporate level.

Cluster policy practice has already recognised the need for an early warning system, as can be shown in the context of cluster policy in Schleswig-Holstein. Here, continuous monitoring efforts are still primarily focussed on cluster management and process steering. The monitoring system is centred around the question whether member companies derive benefits from clusters. However, this is already far ahead of traditional reporting on the expenditure of funds and clearly linked towards the goal of policy to take corrective measures at the right time. (Hirschfeld 2009).
5.2 How to do an evaluation

After this general overview of cluster evaluation, the guide will provide the reader with the nuts and bolts of cluster evaluation. Again, the recommendations are based on up-to-date cluster evaluation literature and the experience of cluster managers and policy makers. At the same token, it should be emphasised that the evaluation of cluster policy is still in its infancy and few examples of systematic evaluations exist. (Sölvell 2009: 91).

The following questions offer a starting point for implementing a monitoring and evaluation system:

- What goals does the monitoring and evaluation process have?
- What should be evaluated?
- Who should do the evaluation?
- When should the evaluation be done?
- Who should be involved in evaluation?
- What are the costs of evaluation?

As discussed above, cluster evaluation should closely follow the respective informational needs and clearly specify the evaluative goals.

5.2.1 What are the goals of the monitoring and evaluation process?

Evaluations should not be conducted as an end in itself. They can be done for many different purposes. Examples of cluster (policy) evaluations, such as the evaluation of the Värmland Paper Province cluster in Sweden, show that evaluation can help:

- policy makers to prioritise cluster initiatives
- to increase political understanding of working with this type of regional development policy
- to create a basis for learning and dialogue in connection with continued development.
- to better understand the needs and demands of cluster participants
- to legitimise cluster activities and increase regional mobilisation around cluster initiatives (Sölvell 2009: 123)

In the practice of cluster policy evaluation, monitoring and evaluation usually aim at bringing about timely information to guide future policy making and / or the adaptation of running cluster policy programmes to a cluster’s development. The goals will vary from situation to situation and will often be agreed upon in consultation with various stakeholders.
In general, as suggested by the national Swedish agency for innovation systems – VINNOVA - the goals of an evaluation of cluster policy consist of operational organisational learning regarding programme operations, policy feedback and system impact. It should be decided on a case-by-case basis which goal is at the top of the agenda. With respect to programme operations, evaluation can be used mainly to provide management with feedback on the effectiveness and efficiency of policy implementation. In terms of policy feedback, evaluation focuses on the outcome and impacts of policy interventions. On the level of system impact, evaluations rather aim at answering questions regarding a (regional) innovation system and the adequate policy mix of different programmes (Miles / Cunningham 2006: 72).

5.2.2 What should be evaluated?

As depicted above (5.1.3 Evaluation in the cluster specific context), evaluation in the context of clusters can primarily focus on the cluster initiative / management level, the cluster as a whole or a set of different clusters. It is convenient to conceive these different levels as being related in a causal fashion, i.e. the output at cluster management level representing the inputs causing the effects on the next higher level. However, cluster research warns against the assumption “that an increase of so many outputs will lead in a linear fashion to so many results in policy beneficiaries” (Raines 2003: 194).

Defining the exact object of evaluation and prioritising the most relevant questions to be addressed is essential as evaluations will always face budgetary, time and methodological constraints. In the words of M. Olofsdotter, Øresund Food Network, “it is important not to measure everything, but rather what matters.” (Interview)

The following practical examples of cluster evaluations in Austria and in Sweden can give an idea of what policy makers / evaluators have focused on in their specific context.

Case study: Clusterland Upper Austria (Interview W. Pamminger, cluster manager; TMG 2004)

Clusterland Upper Austria – hosting eight different clusters - represents an example of a rather management-oriented monitoring and evaluation system. As described by Pamminger, around 80 to 90 indicators are monitored that solely focus on cluster operations. These indicators are measured monthly, quarterly
and annually, and reported to the shareholder and financiers of the cluster organisation, which is structured in a public-private partnership. Among others, the indicators include:

- The number of cooperation projects in the individual clusters
- Project duration / Funding period
- Number of cluster partners per cluster involved in cooperative projects
- Project volume versus public funding volume
- Innovation volume ("Innovationsvolumen")
- Time and effort measures on the implementation of cooperation projects (preparation, personnel costs, etc.)
- Number of product, process and market innovations resulting from cluster projects

These monitoring efforts are complemented by expert reports, studies on the added value of the clusters as well as external evaluations on the umbrella cluster organisation, covering various different clusters.

Case study: Paper Province (Sölvell 2009: 109)

The evaluation of the Paper Province in the Swedish Region Värmland serves as another example that strongly focuses on the corporate level, examining four central processes of cluster development: business development, entrepreneurship, near-industry research and human resources. At the same time, concrete growth effects, such as increases in sales and new employees or improved products and services, are related to growth indicators in the Värmland region such as a greater spirit of entrepreneurship and increased near-industry research. The Värmland model pursued a rather broad approach and covered various cluster policy impacts over an evaluation period of three years. The decision to use such an approach was explicitly made to induce policy learning and foster dialogue between the stakeholders.

Policy makers should know that there is no universal rule to decide what should be evaluated. Instead, the object of evaluation will vary with the different clusters and regional specifics and what has been decided in a potentially joint consultation process with the cluster stakeholders. The object of evaluation will depend on many different factors, such as e.g. the overall goal of the evaluation (accountability, policy learning, ...) or the respective stage of cluster development.
The decisions made on the goals and the object of evaluation will in turn impact the selection of indicators and performance standards (to be discussed in Chapter 5.3).

5.2.3 When should the evaluation be done?

Evaluators and cluster researchers often emphasise the importance of planning evaluations (of cluster policies) before the policy programme starts and to conduct them in a continuous fashion.

In reality, evaluations often start during the implementation or close to the end of a policy programme. Depending on the questions at hand, evaluations can be conducted at different points in time during the programme duration or even years after a programme has ended. Ex-ante evaluations that focus on the appropriateness of a policy measure and its feasibility are performed before or at the beginning of a (cluster) programme. In cluster policy practice, there is usually a high demand for accompanying or real-time evaluations of cluster initiatives. (see Jappe-Heinze et al. 2008:1).

This kind of evaluation should ideally start with the setting up of a cluster initiative, e.g. to establish an ex-ante picture of networking structures and allow for measuring their gradual intensification over time.

The same logic applies to ex-post evaluations designed to measure the long-term impact of cluster policy. Ex post evaluation find limited application in cluster policy involving multiple actors and measures (Jappe-Heinze et al. 2008: 1).

But when performed, the evaluators and policy makers need to know what effects can be realistically expected at an early stage in the cluster policy cycle, as the impacts need sufficient time to materialise.

By the same token, pre-measurements can be done during the cluster programme to provide for a comparative benchmark. The earlier in the process of cluster funding / development the evaluation is undertaken the fewer policy-relevant benefits can be measured (Scottish Enterprise 2008: 13).

Ex-post evaluations focusing on short-run economic and external effects, as practised e.g. in research policy evaluation in Norway, are scheduled just after the end of a programme.
This time frame - taken from research evaluation practice - corresponds with expert voices such as Prof. Russo from the University of Modena and Reggio Emilia: “It depends on the project. … We had an evaluation of innovation policies after 5 years.” However, “in case of other kinds of policies or initiatives for building a commercial network, etc, the time frame could be very different. There is no general rule.” (Interview)

5.2.4 Who should do the evaluation?

The choice of the evaluator is not a trivial question. Evaluations can be performed internally by the respective government agency or the cluster programme management or externally by an independent third party. Independent evaluators can be recruited for example from private consultancies or academia.
Usually, independent evaluators enjoy a higher level of credibility to the public than cluster managers and policy makers performing an evaluation of their own activities. Where a policy is contentious and credibility to various stakeholders is paramount, the choice of a reputed and independent evaluation agent is indispensable. Evaluators should be practically independent and free of conflicts of interest (Miles / Cunningham 2006: 189, Scottish Enterprise Evaluation Guidance 2008: 52). Commissioners of an external evaluation can for example require a formal declaration on the absence of such conflicts.

External evaluation expertise provides cluster managers and policy makers with a fresh and holistic view on cluster organisation as well as impacts and external effects. Depending on their experience with the evaluation of other clusters and cluster policies, external evaluators can add a more balanced view on a particular cluster or policy by comparing it to relevant benchmarks.

On the other hand, policy makers and cluster managers usually possess more in-depth knowledge of internal cluster processes and easier access to data concerning the cluster members, as they work with each other more closely.

Cluster management organisations are therefore ideally positioned to engage in monitoring activities and help gathering time-series data later to be exploited for evaluative purposes. Embedding monitoring in the routines of a cluster policy programme can also help to keep the costs for evaluation at an economically justifiable level. Ideally, policy makers will design monitoring processes in line with evaluations or draft a coordinated monitoring and evaluation strategy. This facilitates external evaluators to work closely with cluster management and articulate their informational needs as to what indicators should be continuously monitored.

### 5.2.5 Who should be involved in evaluation?

There is a consensus that key stakeholders in cluster policy, such as cluster participants, cluster managers and other potentially affected parties, should be involved in the evaluation process (Scottish Enterprise Evaluation Guidance 2008, Miles / Cunningham 2006) Depending on the evaluative approach, the level of involvement of cluster participants / managers can range from mere data providers to active participants in co-designing the evaluation and jointly determining the questions and evaluative criteria.

Stakeholder involvement in the evaluation process can help to gain the trust of those being evaluated (e.g. cluster management or firms participating in a cluster) and enhance participation in evaluators’ data collection effort. Without
doubt, evaluations represent an additional burden to all participants. Involving stakeholders can give them a sense of ownership in the studies and increase their willingness to disclose information. Also, stakeholder involvement in “participatory evaluations” can be a major source of learning for all involved parties. (Miles / Cunningham 2006: 144). It is advisable to discuss indicators to be measured within an evaluation with programme stakeholders in order to enhance understanding and acceptance. (Miles / Cunningham 2006: 95)

On the other hand, evaluators and commissioners of evaluations need to make sure that no single view or stakeholder group is dominating the focus or goals of the evaluations. Also, time and financial constraints will usually prevent an evaluation addressing all questions voiced by the stakeholders.

5.2.6 What are the costs of evaluation?

The costs of evaluation are a major concern for policy makers. The financial implications of and efforts associated with evaluations may have contributed to the hitherto scarcity of cluster policy evaluations. So how much should policy makers spend on cluster evaluations?

Miles / Cunningham (2006: 88) refer to a range of 1-5% of overall programme costs. However, they consider this rather notional as “some of the work of evaluation should be embedded into the routines of the programme, for example the data that are produced for routine monitoring”.

(Cluster) evaluation practice provides the following suggestions on how to reduce the costs of evaluation.

- “Having a clear hierarchy of information requirements in order that the collection of data is prioritised in strict accordance to its utility.
- Developing sets of common indicators, which may be collected routinely by participants in a number of related or similar programmes. This process also tests the feasibility of using particular indicators and increases the effectiveness of their use. The possibility of using sets of indicators to compare related programmes constitutes another benefit.
- Indicators, clearly linked to programme objectives, should be defined prior to the initiation of programmes and should be collected, where appropriate, from the start of a programme. This not only permits ongoing monitoring and enhances programme management but also builds a database of consistent indicators which may be used by evaluators (either internal or external) without recourse to an expensive post hoc data gathering exercise.
• Prioritising the use of methodologies that have a minimal impact on those evaluated and maximise the rate of information return (telephone surveys over face-to-face interviews, web-based surveys rather than mail surveys).
• Gaining the trust and compliance of all stakeholders, through demonstration of the utility of the evaluation process, in order to minimise implicit or explicit resistance to the evaluation process.
• Ensuring that evaluators have the required competencies and exhibit a track record in the range of methodologies required for the evaluation.
• If evaluation is explicitly acknowledged to be part of a learning process, then some of the evaluation costs can be seen as training costs, and to the extent that these reduce costs for ordinary training within the organisation, some funds may be acquired from this source.”

(Miles / Cunningham 2006: 88)

With regard to the methods used in cluster evaluation, policy makers have to be aware that a full-fledged evaluation with some of the methods to be described below will be prohibitive in terms of costs. (see also Raines 2003: 197). Policy makers need to understand this trade-off between validity and efficiency.
5.3 Technical aspects of cluster evaluation

Now, having established the goals of the evaluation and selected the evaluating institution, policy makers need also to understand how the evaluation is actually performed. To determine the value of cluster policies, evaluators face the challenge to establish what defines successful cluster policy and find ways to measure it.

Standard policy programme evaluation comprises of the following steps:

- “Identify appropriate criteria to be used in the assessment.
- On the chosen value criteria, select performance standards that constitute success or failure.
- Measuring the actual performance of the evaluation and on each criterion and comparing it to each standard.
- Decide whether or not to integrate the judgements into a single, overall appraisal of worth of the intervention.” (Sölvell 2009: 84)

5.3.1 Which criteria and indicators exist to evaluate cluster policy?

When evaluating cluster policies it is imperative to first define the respective value criteria which represent theoretical dimensions of what can be later considered cluster policy success and failure. As is the case with the evaluation of other policies, cluster policy evaluations may use criteria that are predetermined before the start of the policy intervention, during the process of the evaluation or even constructed ex-post.

Sölvell (2009) provides a useful list of commonly used criteria, consisting of substance (goal-oriented), economic (effect-related) and process criteria:

**Substance Criteria** – what are the goals?
- Goals (effectiveness evaluation)
- Goals plus criteria for assessing side-effects
- Client criteria
- Professional criteria: Peer criteria, Self-criteria
- Stakeholder concerns and issues

**Economic Criteria** - what are the effects?
- Economy (is it reasonably inexpensive?)
- Productivity (ratio output to cost)
- Effectiveness (cost – benefit)
EVALUATION … – TECHNICAL ASPECTS

Process Merit Criteria – is achievement of goals balanced against legal equity, legitimacy, procedural fairness, and openness to public scrutiny?

- Legality
- Equity (Rule of Law)
- Legitimacy
- Procedural fairness
- Publicity (openness to public scrutiny)
- Client involvement
- Representativeness
- Participatory democracy (Public participation in final decision-making)

Source: Adapted from Vedung (1997, 2006).

Table 16: Evaluation criteria
(Sölvell 2008: 61)

Applying some of the criteria to a real cluster policy can be a challenge. Due to the pilot character of cluster policy, pre-existing criteria may sometimes be missing or only vaguely defined. Relevant criteria to measure success or failure may be derived from the respective objectives of a policy programme. However, cluster policy – in the shape of cluster initiatives – often has multiple and sometimes even conflicting goals. This problem is exacerbated by the heterogeneity of the cluster policy addressees that follow different objectives to be achieved in clusters. For example, the concept of additionality will have different implications for different stakeholders. The expectations of large research-focused firms as to what constitutes the value-added from cluster policy may differ from those of developing SMEs or research institutions. (Jappe-Heinze et al. 2008: 11). Evaluation literature also suggests including a wider set of criteria derived from social needs such as equity, i.e. the goal of levelling regional inequalities. (see Scottish Enterprise 2008)

Having established the criteria of merit, they need to be operationalised into concrete indicators which “are the measurable outcomes which show whether the programme objectives are being achieved.” (Miles / Cunningham: 95)

Among other things, the choice of indicators will depend on whether the evaluation focuses on the cluster initiative level, the cluster as a whole or even on several clusters. Usually, the evaluative criteria will not be established by the commissioning party or the evaluator alone. Evaluation practice advises a collaborative discussion with programme stakeholders and interested parties to ensure the
acceptance of the indicators and agreement on their interpretation (see Miles / Cunningham 2006: 95). Policy makers may have quite different informational demand and expectations from cluster managers and cluster participants.

The cluster evaluation literature offers different ways of categorizing relevant performance indicators in regard to cluster policy. One straightforward way is to look at performance measures on micro / firm level, meso / cluster level and macro level. The variables on each lower level can be regarded as the preconditions of outcomes on the next higher level. At firm level, cluster policy directly aims at better company performance. At cluster or meso level, evaluation can focus on indicators such as improved innovative capacity, high-growth firm establishment and development, the attraction of more venture finance, and the development of specific talent pools. (Learmonth et al. 2002: 568). On the macro level, the indicators include the major policy objectives related to cluster activities such as job creation and productivity.

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**Figure 9: Cluster monitoring and evaluation framework**

(Learmonth et al. 2002: 569)
While the indicators at micro level can be measured relatively early in the cluster development process, cluster and macro level objectives are expected only in the medium and long-run. Again, policy makers should not hesitate to work with micro-level results in the sense of an early warning system. At the same time, they need to interpret preliminary results with due caution, as they come with a high level of uncertainty.

Regional and local policy makers involved in a concrete cluster initiative will most likely focus on the micro level and cluster level indicators. At micro level, a helpful distinction can be made between indicators regarding cluster strategy, organisation and network building when a cluster initiative is being implemented and the immediate effects of cluster activities on companies and other cluster members. These two “sub-levels” must not be confused. As many clusters are still in the cluster development phase, indicators regarding effective implementation and networking are frequently applicable. While the “output is not equivalent to attendance of [cluster] events or entries in a mailing list, one can also argue that this is a first step to generate an output at a later stage” (Interview Prof. Koschatzky, Fraunhofer ISI).

The overview of the indicators can be complemented by many more indicators (Andersen et al. 2006, Jappe-Heinze et al. 2008, Ossenkopf et al. 2004, Rosenfeld 2002):

**Regarding networking and organisation of a cluster initiative**

- Intensity and effectiveness of the network by measuring the network density, cohesion and rate of centralisation
- Level of participation in the cluster
- Definition of topics, target groups, goals and milestones in the cluster process
- Number of cluster management personnel / budget
- Funding rate or self-financing ratio (e.g. membership fees or donations)
- Quality of cluster network management
- Target group range and coverage
- Cluster member satisfaction
- Degree of institutionalisation as indicated by the duration of cooperative relationships, the cooperative climate or the image and the cluster’s degree of awareness

(for a more detailed list on characteristics, criteria and indicators on cluster initiative level see overview by Jappe-Heinze et al. 2008: 20-28)
Cluster outputs at organisational and cluster level

- R&D infrastructure, number of R&D personnel, level of R&D spending, amount of research funding, proportion of international researchers etc.
- Ranking of higher educational institutions (HEIs) and other educational institutions, number of students
- % of workforce with documented specialised competencies
- % of workforce with higher education
- Number of studies (from local universities) developed for use by the cluster
- Innovation activity measures, e.g. number of companies who have introduced new products or services in the last three years
- Number of new ventures and spin-offs
- Regarding the (international) competitiveness
  - Employment and turnover development compared to a higher level (e.g. national, regional)
  - Market share and international direct investment
  - Degree of export specialisation, revealed comparative advantage (RCA)

While potential indicators in cluster evaluation abound, their selection can be rather difficult in the face of constraints related to time, money and data availability. V. Susplugas, French Ministry for Economy, Industry and Employment, illustrates further difficulties in identifying and monitoring indicators in the context of the national cluster programme “pôles de compétitivité”. Such difficulties are often rooted in the structure of statistical information itself: “Example: a French large company performs significant R&D activities in a given region but, as its headquarters are located in Paris, the R&D activities and expenses at local level will statistically be assigned to the headquarters and not appear in the measurement of the R&D expenses within the regional cluster…” The difficulties as encountered with French clusters again reflect that clusters “do not fit neatly into existing sectoral and statistical classifications used in other policy evaluations” (Raines 2003: 195).

In practice, different stakeholders in cluster policy may choose the indicators along different thematic priorities. Also, in order to prevent “evaluation fatigue” among the evaluannds “we must make sure that this does not overburden the cluster members and that the decisive success criteria are measured. For instance, I want to know whether cluster members are satisfied and not how many e-mails have been exchanged.” (Interview A. Richter, EDD Hamburg)
In practice, policy makers have to know what indicators are feasible in their particular cluster context and sometime adopt a pragmatic approach. As argued by W. Pamminger, cluster manager of Clusterland Upper Austria, only two indicators are essential: the self-financing rate and participant satisfaction. (Interview). When lacking the time and financial resources necessary in a full-fledged monitoring of a large set of indicators, starting out with these two indicators seems to be a step into the right direction.

5.3.2 What performance standards should be used in cluster evaluation?

Evaluators and commissioners of evaluations need to understand that choosing and measuring indicators does not per se constitute an impact assessment. Evaluation is more than measuring indicators. Evaluations imply the comparison of indicators against performance standards in order to provide meaningful results on the quality of (cluster) policy.

To illustrate this, evaluation practice considers outputs of cluster activities such as the number of patent applications, scientific papers or successfully completed R&D projects a kind of “pulse check’: showing that the patient is alive and that some of the right kinds of processes are going on.” (Arnold 2005 et al.: 391).

So, meaningful benchmarks need to be established. However, this is easier said than done. To illustrate the problem, let’s take employment, being probably the most popular impact measure for policy makers. The absolute number of jobs created without any kind of control cannot show whether this represents a “good” result. It might be possible that even more jobs would have been created with an alternative policy measure.

Especially with “new” policy approaches, empirical standards derived from programme history (e.g. predecessor programmes) often do not exist. Also, goals formulated in policy programmes seldom represent specific performance criteria. But if historic data exist, they can be a useful benchmark.

Types of controls to be used as performance standards include:

- Experiments with Randomised Controls
- Experiments with Matched Controls
- Generic Controls
- Reflexive Controls
- Shadow Controls
- Cross-sectional Controls
- Explanatory Process Evaluation

(Sölvell 2009: 87)
While many of these controls face considerable practical problems, generic and shadow controls are somewhat easier to apply and rather frequently used in cluster evaluation. Generic control could be a comparison of outcome scores in a cluster with values of the whole country or a competing cluster.

Shadow control can be established by “the judgement of experts, programme managers, staff, or participants on what outcomes they believe would have happened without the intervention”. (Sölvell 2009: 87) The problem with such shadow controls is their arbitrariness. As suggested before, stakeholders can arrive at very different judgements. A popular question in surveys to programme participants aims at their estimate of the value added by a policy programme. While such measurement means limited efforts for evaluators, the answers might not be free from bias and social desirability effects. Overly positive answers by the beneficiaries of the programme might exaggerate the impact of the programme.

Reflexive controls can also be used for cluster evaluation, involving measurements before and after the cluster establishment. Again, evaluators are left with the problem that multiple factors besides the cluster policy have affected the performance and cannot be clearly separated.

In spite of these problems, policy makers should not refrain from evaluations. The performance standards may be imperfect, but still give a hint at what cluster policy can do for a region.

### 5.3.3 Evaluation methods

When commissioning a cluster policy evaluation, policy makers will be in a better position to make an informed decision if they have a general overview on the methodological repertory of cluster evaluation. The “educated” policy maker will better understand what evaluation methods to specify in e.g. procurement specifications and how to interpret evaluation proposals. By the same token, policy makers should neither overspecify nor too strongly limit the range of methodological approaches to be used for cluster evaluation.

In theory, the evaluation of cluster policy can fall back on the broader range of methods and techniques to evaluate research and technology development policy. The spectrum of methodological approaches and techniques range from qualitative and semi-qualitative methodologies such as interviews, case studies and expert panels, to modelling methodologies, such as control group approaches, micro- and macroeconomic modelling and simulation and statistical
data analysis methods such as benchmarking and innovation surveys. (Polt / Rojo 2002b: 65pp)

However, in the current practice of cluster evaluation, the set of commonly used methods is much more limited. Cluster evaluation as practised today is clearly leaning towards qualitative methods. Reasons are to be found in the unspecific nature of cluster policy, the presence of many qualitative cluster policy goals (learning effects, development of competencies and regional organisation capacity or the increase of the cooperative intensity and the difficult access to relevant primary data potentially to be used for econometric analysis (Kiese 2009: 32; Kulicke 2009: 14). Therefore, purely quantitative approaches that are not complemented by qualitative components are not suited for cluster policy evaluation. This problem can e.g. be illustrated with regard to the goal of increasing networking intensity and quality, which requires a mix of different methods, e.g. interviews, surveys or network analysis (see also Miles / Cunningham 2006: 96).

As always, the choice of methods should follow the questions and informational needs in a specific situation and be deemed appropriate by the evaluands. Also the relevance and appropriateness of the methods will vary depending on the level of evaluation (micro, meso or macro).

The following overview provides a selection of methods that should be discussed in cluster evaluation:

**Expert judgement**

*Expert judgement* - in form of expert panels or interviews - constitutes a popular method in the evaluation of cluster policy. They can be used ex-ante in the cluster mapping process in order to identify promising clusters (or cluster candidates) (see also chapter 3.1.3.2). They are also applicable in accompanying or ex-post evaluations to locate and assess a cluster programme’s position and “fit” in the overall regional or national innovation policy spectrum. The interim evaluation of the “Cluster-Offensive Bayern” by Fraunhofer ISI illustrates the use of an expert hearing to allow for a comparison of the cluster policy with alternative national and international cluster funding approaches (Bührer 2009: 23).

Expert judgement is closely related to and forms the basis of *foresight studies*. The foresight methodology involves a structured consensus building process to provide an insight into most evident social, economical and technological development opportunities and outcomes available to policy planners. Foresight can be used “to identify potential mismatches in the strategic efficiency of projects and programmes” (Rojo / Polt 2002b: 67). There is also a strong action-
oriented component, as foresight is thinking about the future, debating the future but primarily jointly shaping the future.

Due to the complexity and innovative character of cluster policy and difficulty of quantifying its socio-economic impact, interviews and case studies often are the methods of choice. These approaches use “direct observation of naturally occurring events, generally from the perspective of programme participants and stakeholders, to investigate behaviours, stimulated by the innovation programme, in their indigenous social setting.” (Miles / Cunningham 206: 139)

Every cluster can be taken as a single case, in which the evaluator seeks to understand the underlying processes. Case studies – conceived as an evaluation framework – can involve the collection of quantitative and qualitative data, e.g. by using surveys, content analysis, statistical analysis of secondary data or observation. While case studies are not suited to testing causal relationships, they are useful to investigate into how various context factors relate to impacts. (Stern 2002: 173)

“Standard” cluster evaluation studies often fall back on a mix of document analysis, written questionnaires, email / web-based surveys, personal interviews as well as expert consultations. The questions designed may focus on immediate outcomes of, but also more indirect effects of cluster policies. For example participants can be directly asked for the additional value created by participation in a cluster. However, one problem with these questions is the potentially strategic behaviour of cluster participants, as they might intentionally give over-positive answers in order to sustain further support (see e.g. Fier 2002: 291 or Gerber 2000: 32).

What may be advanced by the use of case studies is an examination of how changes in the cluster behaviour are linked to the cluster members’ performance and the impacts on the cluster as a whole. This is particularly relevant in cluster policy, as – in contrast to traditional economic development evaluation – “it is not the final impacts on individual businesses that matter so much as the impacts on the clusters as a whole” (Raines 2003: 198)

**Benchmarking**

*Benchmarking* is a method increasingly used in policy evaluation. The benchmarking process usually involves a comparison with the “best” along predefined quantitative indicators. Benchmarking can be applied to various subjects such as services, products, policies, structures and processes and is considered a learning tool to reflect the performance of one reference object against others and induce improvements (Miles / Cunningham 2006: 139, Polt 2002: 201). An important and useful distinction to be made is the one between benchmarking and
stocktaking. While stocktaking constitutes a form of ranking primarily serving awareness raising and marketing functions, benchmarking aims at “improving processes based upon the insights on what makes processes effective and efficient.” (IRE 2006: 6)

Applied to clusters, benchmarking can be used to provide information to networks on the structure, processes, developments, methods or services of one cluster with those of another cluster. (Wessels / Meier zu Köcker 2009: 39) As outlined in chapter 3.3.3.4, benchmarking can also be a valuable assessment tool in the cluster mapping process to learn about a cluster’s positioning. To illustrate the importance of benchmarking in cluster evaluation, J. Rosted, FORA says, “if I see that the ICT cluster has developed very well but cannot see that this is half the level of ICT clusters in best performing countries, than I have a problem ...”. (Interview)

Benchmarking goes beyond mere ranking, but should be conceived as an active learning and continuous improvement process. The advantages of benchmarking as conceived by Wessels / Meier zu Köcker (2009), is the limited effort for the cluster / network management and the fact that cluster members do not necessarily have to be involved. Policy practitioners can also use benchmarking in a portfolio of clusters to identify the comparably weaker clusters.

Some disadvantages of benchmarking are to be found in the definition, selection and construction of indicators. Indicators have to be carefully selected in order not to compare “apples with oranges”. Another problem – also encountered by our interview partners – is the existence and accessibility of internationally comparable data. “We have discussed this very much over the last five years and most countries said five years ago that they would like to benchmark, but clusters are so different – so it is impossible. This is changing slightly now, regions see that benchmarking is important and try to find the way to apply it on clusters over Europe.” (Interview J. Rosted, FORA)

Network analysis

As with other evaluation methods, network analysis represents a method that can be used both in the cluster identification / mapping and the cluster evaluation process (see also chapter 2.1.4.1). As described above, (social) network analysis measures different aspects of the collaborative relationships in a cluster (e.g. density, centrality etc.). As it can be used as a learning medium for cluster / network members, evaluation literature considers this quantitative / semi-quantitative method particularly suitable for intermediate evaluation (Bührer 2002: 185).
Network analysis as used in evaluations seeks to explain participants’ behaviour by the characteristics of the cooperation relationships (Smart Innovation 2006: 139). As cluster policies seek to induce structural and behavioural changes in the cluster organisations, network analysis seems to be a particularly useful way to assess the improvement in the cluster processes. These immediate outcomes of cluster policy can then be taken as a hint towards the more long-term goals of clusters. Evaluations focusing on the network effects of cluster policy may find answers to the following questions:

- Did policy result in new members joining the cluster?
- To what extent are the members aware of a cluster-wide collective, as defined by their individual networking behaviour?
- Did policy increase the value of the cluster and collective action to individual members?

(Raines 2003: 197)

Network analysis offers many possibilities for policy improvement, an overview of which is provided by Bührer (2002: 189):

- Identify weak spots in the communication and co-operation of network members
- Provide surprising results even to network members
- Comparison of separate participant groups within a network
- Derive specific success factors by comparing different network types
- Potential to derive “best practice” from comparing different network types and their organisational model.

Network analysis exercises can be rather resource-intensive as detailed data on cluster/network actors has to be collected. These can be done by surveys of cluster members with standardised questions on member characteristics and cooperative behaviour, and complemented by personal interviews. Besides the potentially high time requirements, further difficulties can arise in obtaining a sufficiently high response rate. (Bührer 2002: 189, Kiese/Schätzl 2008)

**Control group approaches**

*Control group approaches* are very appealing when it comes to the effects of a policy intervention on programme participants as compared to non-beneficiaries. However, the idea of comparing the performance of supported and non-supported groups is seldom translated into the harsh reality of policy evaluation. Practical difficulties, such as the lack of comparable control groups or the high coverage of the target group by a policy measure, are even exacerbated in the context of clusters. Clusters may be very unique in their regional
contexts and in different stages of development. Also, as cluster policy gains popularity across regions, it is difficult to find clusters that are not subject to policy support. (For more detailed information on control approaches see Kinsella 2002: 131-141)
5.4 What to do with evaluation results

Evaluation results should be useful for policy makers and stakeholders. Well planned and executed, evaluation exercises can easily be used to provide for public accountability. This can be done by (fully) publishing evaluation reports in the public domain and transparently showing how the conclusions on programme effectiveness have been derived. Also, policy makers can use the insights gained and recommendations derived from cluster policy evaluation to improve a programme. Depending on the evaluative questions asked, policy makers can receive hands-on and specific recommendations on the design of a cluster policy programmes. For example, the evaluation of the French cluster funding scheme Pôle de Compétitivité induced changes in management of the scheme, the reorientation of project funding in clusters and a greater focus on the set-up of full “innovation ecosystems”. (Interview V. Susplusgas, Ministry for Economy, Industry and Employment)

Making use of evaluations for accountability purposes and smaller corrective issues is quite straightforward. It is much more difficult to address another key question motivating the evaluation of clusters: Should support be terminated? When treating the policy process as an integrated process we should also focus on the relationship between policy evaluation and termination (DeLeon 1983: 631). By providing initial support, cluster policies intend to leverage clusters to a level of self-sufficiency and create self-reinforcing dynamics (Bührer 2009:20).

Therefore policy makers want to learn whether monitoring and evaluation can help provide the relevant information to identify the point when policy can retreat from cluster funding or shift policy focus. In general, the complete retreat from the cluster approach as a policy instrument is a rather uncommonly practised approach. So when we talk about policy retreat we mean a retreat from funding a specific cluster.

Policy termination is not only topical in case of programmatic inefficiencies or budget reductions. For example, when cluster policy has successfully leveraged cluster building by start-up financing, policy makers can start thinking about how to reduce public support.

The most relevant questions include:

- How can policy retreat without too much harm to the cluster?
- How can we ensure that the cluster continues to prosper under its own steam?
- How can the reduced policy funding be substituted (membership fees / new investor etc.)?
However, the question of whether, when and how to retreat from cluster policy is not uncontentious in cluster policy practice.

While some experts consider continuous cluster policy support indispensable for the sustainability of clusters, others strongly emphasise the importance and adequate timing of policy retreat. So far, the literature does not yet provide unambiguous instructions. In theory, both the success and the failure of cluster policy may require policy termination. In case a threshold linked to cluster policy success or failure exists, evaluation can help deciding whether or not pursuing policy exit. Cluster policy practice to date seems to have a more concrete view on the consequence for underperforming clusters than on excelling clusters.

**Scenario 1**

Let’s start with scenario 1 of an underperforming cluster, i.e. despite possible future public support, it appears unlikely that the cluster (sprout) will be capable of developing a strong self-sufficient position. The cluster members may or may not be aware of this situation.

- **Scenario 1a:** Cluster members have not understood this and demand more money: In this case it is the responsibility of cluster policy to clearly communicate that unless cluster members demonstrate a stronger commitment and provide a convincing roadmap for the future, no additional support will be granted.

- **Scenario 1b:** Cluster members understand their dangerous lock-in situation and are open to new solutions: An effective approach to overcome this would be a politically initiated and supported foresight process. An example for a cluster reorientation is provided by W. Winetzhammer (State Government of Upper Austria, Austria). “For instance, we intervened when the suppliers to the automotive industry were in a crisis. We contributed together with the cluster members to re-position the suppliers by fostering / co-financing e.g. relevant research, training, and participation in trade fairs / exhibitions.”

Policy makers, researchers and cluster managers alike agree on the need to exist “when it’s obvious in a fairly early stage that little results are to be expected…” (Interview, Prof. Koschatzky, Fraunhofer ISI). Also, Prof. Russo, University of Modena and Reggio Emilia argues that “policies should be intended as a way to qualify the assets which are made available to the society. If after 5 years (in which public funds were distributed) a cluster is recognised not to be good enough to be financed any further or not to be able to exist without public funding, then no further public funds will be assigned in the first place. But then the authorities should ask the cluster to "give the society back" some of the assets of the five-year-action. In this context "cluster" is a collective beneficiary of the policy, but also a specific set of companies.” (Interview)
Scenario 2

Scenario 2 is a cluster with “mixed results”, i.e. not all milestones have been achieved, but the cluster can credibly demonstrate that it is striving to become sustainably competitive. In the practice of cluster policy, policy makers have used evaluation results to identify these clusters and to ask clusters to strengthen and signal their efforts in order to receive further funding. An example for this can be taken from the French cluster programme “pôle de compétitivité”. In this context, continuing funding to “laggard” clusters was made dependent on the submission of new action plans with clear objectives and the realisation of the goals within a predefined timeframe.

Scenario 3

Scenario 3 concerns an outperforming cluster which does not appear to need additional support any longer. But should policy makers cut off funding at this point? As pointed out by Dr Bommer from the Bavarian State Ministry for Economic Affairs, Transport and Technology (Interview), it would be a pity to punish excellently performing clusters by withdrawing funding. This might create the wrong incentives for clusters. Many cluster policy makers and cluster practitioners - such as D. Hermanns from CyberForum (Interview) - agree that clusters perform important public tasks as well. This represents the major rationale for continuous cluster support - even if the cluster already performs very well. Also, we did not find a single policy maker who said he targeted calls and support programmes for the third and fourth best cluster.

Based on the individual evaluation results, policy makers may choose to support strong clusters by different means, e.g.:

- Do PR: Take cluster representatives on policy visits to other nations; focus on inward investment activities; award a cluster excellence prize
- React to cluster wishes (e.g. bigger airport; additional resources to university)
- Pay for delivery of “public” services (motivating school children to study natural science)

Whatever approach policy makers opt for, they need to act strategically and based on the individual situation. Also, policy needs to decide very early what it wants to achieve with its measures and how long it wants to contribute to achieving specific targets. It is counterproductive for cluster development if policy commissions impact evaluations without any ideas on how to use the results. Policy makers are strongly advised to decide up-front how to deal with different evaluation outcomes and to communicate its intentions to partners and beneficiaries. For example, it should be clear whether cluster policy aims at international competitiveness or rather the levelling of regional economic disparities. Also, in case of policy exit, policy needs to plan ahead and communicate whether the cluster should be self-financing or financed by another body (e.g. federal policy
might intend to hand over to regional policy; regional policy might intend to hand over to local policy).
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Sölvell 2008

Sölvell et al. 2003

Stern 2002

Susplugas 2009

Terstriep 2008

Terstriep 2008a

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Varga 2006

Walter 2008

Wessels (Ed.) 2009

Wessels (ed.) 2008

Wessels / Meier zu Köcker 2008

Zombori 2009
Annexes

A.1 Interviewees – overview

A.1.1 Cluster Researchers

<table>
<thead>
<tr>
<th>Cluster Researchers</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Prof. Philip Cooke</td>
<td>Director of the Centre for Advanced Studies, University of Wales, UK</td>
</tr>
<tr>
<td>PD Dr. rer. nat. Matthias Kiese</td>
<td>Research Assistant at the Institut für Wirtschafts- und Kulturegeographie, Leibniz Universität Hannover, Germany</td>
</tr>
<tr>
<td>Today: Prof. Dr. Matthias Kiese</td>
<td>Professor at the University of Applied Sciences Northwestern Switzerland, Switzerland</td>
</tr>
<tr>
<td>Prof. Dr. rer. nat. Knut Koschatzky</td>
<td>Head of Competence Center &quot;Policy and Regions&quot; at Fraunhofer Institute for Systems and Innovation Research ISI, Karlsruhe, Germany</td>
</tr>
<tr>
<td>Dr. Philippe Lefebvre</td>
<td>Assistant Professor at the Observatory for Pôles de Compétitivité, Ecole des Mines de Paris, France</td>
</tr>
<tr>
<td>Prof. Dr. rer. pol. Urs Müller</td>
<td>Director of the BAK Basel Economics, Basle, Switzerland</td>
</tr>
<tr>
<td>Prof. Margherita Russo</td>
<td>Professor at the Department of Political Economy, University of Modena and Reggio Emilia, Italy</td>
</tr>
<tr>
<td>Prof. Dr. Örjan Sölvell</td>
<td>Professor at the Department of Marketing and Strategy, Stockholm School of Economics, Sweden</td>
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A.1.2 Policy makers – Representatives from EU, UNIDO, OECD, National, Regional and Local Level

<table>
<thead>
<tr>
<th>Policy makers</th>
<th>Institution</th>
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<tr>
<td>EU, UNIDO, OECD</td>
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<tr>
<td>Michele Clara</td>
<td>Industrial Development Officer UNIDO Private Sector Development Branch (PTC/PSD/CBL), Clusters and Business Linkages</td>
</tr>
<tr>
<td>Andrew Davies</td>
<td>Head of Regional Innovation and Competitiveness Unit; OECD</td>
</tr>
<tr>
<td>Dr. Mikel Landabaso</td>
<td>DG Regional Policy; Thematic coordination, innovation; Head of Unit</td>
</tr>
<tr>
<td>Jean-David Malo</td>
<td>DG Research; Head of Unit</td>
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<tr>
<td>Dr. Nikos Pantalos</td>
<td>DG Enterprise; Support for innovation; Policy Officer</td>
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### National Level

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Institution</th>
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<tr>
<td>Juan Manuel Esteban</td>
<td>Co-ordinator of Cluster Policy; Department of Industry, Trade and Tourism; Basque Government</td>
</tr>
<tr>
<td>Dr. Gerd Meier zu Köcker</td>
<td>Director of the “Agency Competence Networks Germany” and Head of department International Technology Cooperation &amp; Cluster within VDI/VDE Innovation + Technik</td>
</tr>
<tr>
<td>Dr. Göran Marklund</td>
<td>Vice general director of VINNOVA, the Swedish Governmental Agency for Innovation Systems, Sweden</td>
</tr>
<tr>
<td>Jørgen Rosted</td>
<td>Director of FORA, the Danish Enterprise and Construction Authority’s Division for Research and Analysis</td>
</tr>
<tr>
<td>Vincent Susplugas</td>
<td>IGF at the French Ministry of Economy Finance and Employment</td>
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### Regional and Local Level

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Ewa Andersson</td>
<td>Swedish Agency for Economic and Regional Growth - Tillväxtverket, Sweden</td>
</tr>
<tr>
<td>Staffan Bjurulf</td>
<td>Regional Advisor Region Värmland, Sweden</td>
</tr>
<tr>
<td>Dr. Rolf Bommer</td>
<td>Bavarian State Ministry for Economic Affairs, Transport and Technology, Germany</td>
</tr>
<tr>
<td>Yves Guyon</td>
<td>Chamber of Commerce and Industry of Lyon (CCIL), France</td>
</tr>
<tr>
<td>Jürgen Oswald / Peter Gauß</td>
<td>Ministry of Economic Affairs in Baden-Württemberg, Germany</td>
</tr>
<tr>
<td>Hofrat Mag. Walter Winetzhammer</td>
<td>Amt der Oberösterreichischen Landesregierung, Abteilung Gewerbe / Wirtschaft, Upper Austria, Austria</td>
</tr>
</tbody>
</table>

### A.1.3 Practitioners – Representatives from Cluster Managers, Economic Development Departments, other Groups

<table>
<thead>
<tr>
<th>Practitioners</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Roger Deckers</td>
<td>MD of the Automotive Technology Centre (ATC), Helmond, Netherlands</td>
</tr>
<tr>
<td>David Hermanns</td>
<td>MD of the CyberForum, Karlsruhe, Germany</td>
</tr>
<tr>
<td>Maria Olofsdotter</td>
<td>CEO of the Øresund Food Network, Denmark</td>
</tr>
<tr>
<td>Werner Pamminger</td>
<td>MD of the Clusterland Upper Austria, Austria</td>
</tr>
<tr>
<td>Rene Tönnisson</td>
<td>Member of the Executive of the Baltic Innovation Agency, Estonia</td>
</tr>
<tr>
<td>Mats Williams</td>
<td>MD of the Paper Province, Värmland, Sweden</td>
</tr>
<tr>
<td>Economic Development Department</td>
<td>Ralf Eichhorn, Steffen Buhl</td>
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<tr>
<td>---------------------------------</td>
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</tr>
<tr>
<td>Dr. Ivan Boesso</td>
<td>Head of Unit European and Technology Transfer Projects, Veneto Innovazione S.p.A., Italy</td>
</tr>
<tr>
<td></td>
<td>Economic Development Department Karlsruhe, Germany</td>
</tr>
<tr>
<td></td>
<td>Head of the Division Industry and Technology at the Hamburg State Ministry for Economic and Labour Affairs, Germany</td>
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<table>
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<tr>
<th>Other Groups</th>
<th>Mateja Dermastia</th>
<th>Gerlinde Pöchhacker-Tröscher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ifor Ffowcs-Williams</td>
<td>President of Anteja ECG, Slovenia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cluster Navigators Ltd, New Zealand (<a href="http://clusternavigators.com/">http://clusternavigators.com/</a>)</td>
<td></td>
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<tr>
<td></td>
<td>CEO of PÖCHHACKER Innovation Consulting GmbH</td>
<td></td>
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<tr>
<td></td>
<td>Former Managing Director of OÖ. Technologie- und Marketinggesellschaft m.b.H. (TMG), Austria</td>
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</table>
A.2 The rationale and limitations of cluster policy

Cluster policies are governmental efforts to support clusters and cluster sprouts. These policies represent “organised efforts to increase growth and competitiveness of clusters within a region, involving cluster firms, government and / or the research community” (EC 2008b: 10). They are “directed at strengthening the economic dynamism of existing clusters and to improving the opportunities for new clusters to emerge” (High Level Advisory Group 2007: 5).

There appears to be a wide consensus that cluster policy is a powerful approach to fostering sustainable competitiveness in regions and that cluster policy is feasible in most circumstances. Looking beyond this broad consensus, we briefly summarise the rationale of cluster policy and its limitations:

More specifically, this section provides the reader with answers to the following questions:

- Why are clusters important for regions?
- Why should cluster policy be adopted?
- What are the key challenges of cluster policy?
- What are the main risks of cluster policy?
- Is cluster policy always feasible?

A.2.1 Why are clusters important for regions?

As stated by the High Level Advisory Group in the European Cluster Memorandum: “Clusters – regional concentrations of specialised companies and institutions linked through multiple linkages and spill-overs – provide an environment conducive to innovation. They enable “open innovation”, the creation and refinement of new ideas in networks of cooperating companies and institutions. And they lower the barriers for transforming new ideas into businesses and capturing the benefits of globalisation. In modern competition, all clusters need to be innovation clusters. Regions that combine risk capital, skills, and research excellence with strong cluster portfolios face more opportunities to become innovation hubs, while regions with no clusters or isolated research risk falling behind.” (High Level Advisory Group 2007: 1).

Such statements are far more than policy visions - recent analyses of clusters have shown that there is a positive correlation of clustering and innovativeness of regions (EC 2008a: 24) as well as prosperity (EC 2008a: 28). Clusters are increasingly being seen as an important factor in the competitiveness of European economies. In modern competition, private companies realise the significance of clusters in shaping their business environments and thus their opportunities to
succeed in global markets. “European companies need strong clusters and business environments at their home locations to compete successfully on world markets” (Ketels 2004: 5). The global networks of companies provide them with access to new ideas, specific competences, knowledge on and access to remote markets or simply lower factor costs. At the same time, most companies do still benefit from their anchoring in local clusters. This holds especially true where innovation processes and the creation of new added value are concerned; here spill-over effects have always played a significant role (Walter 2008).

Clusters bring about advantages both for their members and for the region as a whole. According to Boesso / D'Orazio (2006: 1), “clusters and networks can help companies to achieve critical mass, pool resources and find business partners as well as provide access to technology, knowledge and common services, which are otherwise difficult for single companies to reach. (…) Clustering has remarkable impacts on innovation, especially where there are strong links between firms and the supporting technological and research system within a region.”

In the past, many clusters have formed around specific natural resources. Today, the determinants of successful cluster development can be influenced by policy to a substantial degree. The potential benefits of clusters and thus the motivating forces for cluster stakeholders can be systematised as follows:

### Benefits for companies

- **“Proximity to markets”** - despite the reduced cost of international transport today there are still benefits associated with being close to markets. Close interaction with customers is one advantage, enabling firms to have a better understanding of changing tastes and needs. (…)

- **The presence of input and equipment suppliers** - close interaction and a high frequency of exchanges between co-located producers and users not only underpins competition but also stimulates innovation. It also enables specialisation to take place. Clusters may also provide a lower risk environment for new firms entering the cluster, as there is access to pre-existing customer bases and supplier chains. Savings can also be found through lower inventory costs, fewer delays, and predictable pricing arrangement.

- **Supplies of specialised labour** - specialised labour pools develop around clusters, often stemming from the proximity of universities. A shared labour pool provides flexibility and efficiencies for firms seeking specialist skills in the market and facilitates technology transfer.
• **The availability of infrastructure** - industries may benefit from the supply of both specific and generic infrastructure such as roads, ports, airports, R&D laboratories, education and training facilities etc.

• **The economies of scale in production** - there are some industries that can only support a small number of efficient-scale plants in a given market e.g. commercial airframes or jet engines.

• **Low transaction costs** - Localisation can reduce the costs of transactions, including the costs of negotiating and monitoring of contracts and the costs associated with the potential for opportunistic behaviour. When firms operate near to each other, and the frequency of interaction is high, familiarity, trust and social norms may reduce the costs of contract negotiation and enforcement. Some industry clusters may develop standardised contracts and transaction mechanisms as well as a common language that lower the cost of negotiation.

• **Superior access to information** - the literature on innovation suggests that informal, unplanned, face-to-face, oral communication is critical to the innovation process. Clusters facilitate this type of communication. The geographic concentration of firms, suppliers, and buyers in the cluster provides short feedback loops for ideas and innovations. Clusters provide the opportunity to access the specialised information embedded in personal, community and business relationships, about markets, technology and competitive strategies.

• **Institutional support** - clusters often have mutually supportive relationships with local universities, standards agencies, think tanks, research laboratories, training providers, trade association, and venture capital institutions.

• **Obtaining critical mass** - the clustering of firms can reduce the unit costs of technical services provided to members of the cluster. By operating in close proximity firms can also more easily subcontract to competitors those orders that exceed their own capacities, as proximity allows greater knowledge of the capabilities of contractors. Firms in a cluster are able to form a consortium to tender for large projects or access export markets. (...)

(McPherson 2001: n.p.)
Benefits for regions

- **Efficient use of existing policies** – most regional authorities do already have a series of policies dealing with research, education, innovation financing, etc. in place. “Cluster policy can to a large degree be a mechanism to apply existing policies in a more effective way” (High Level Advisory Group 2007: 3) and to concentrate scarce budget resources, providing policy with measures of increased visibility and higher impact.

- **Better regional organisation capacity** – the success of cluster policies requires the involvement of many different actors (different government departments, public agencies, trade associations, companies, higher education and research organisations...) and the coordination of their respective agendas and actions. A successful cluster policy enhances mobilisation and networking among regional players and the region’s organisation capacity for multiple actors’ initiatives.

- **Increased attractiveness of the regional labour market** – successful clusters provide interesting job opportunities for qualified people and make the regional labour market attractive for individuals (and their families) who have the option to chose among different offers. Clusters help to turn the threat of brain-drain into a brain-gain.

- **Strengthening regional key sectors** – cluster policies make it possible to focus on regional key sectors, to reach and maintain excellence in those sectors.

- **Improved business environment** – successful clusters generate a better business environment, which is especially favourable for the creation of new businesses and a higher survival rate of start-ups. “A good development of clusters does also have impact on neighbouring industries and service activities; in that sense cluster policy also benefits further regional actors and generates positive side effects.” (Interview Y. Guyon, CCIL).

- **Better assets in locational competition** – clusters do provide a better identification with the location and give it a better visibility. They can provide good success stories to be used by the regional marketing.

- **“Attracting foreign direct investment”** - regional clusters often provide a focal point for investments as they have the concentration of labour, skills and infrastructure that attract foreign investors.”
A.2.2 Why should cluster policy be adopted?

As discussed in the previous chapter, cluster benefits for companies and regions are widely known and accepted. Policy makers at local, regional, national, and multinational level have started to respond to this need for action and taken up cluster policy into their portfolios of measures since the 1990s. (Oxford Research 2008: 10) In contrast to traditional economic policies, the cluster policy approach integrates different policies aiming at maximising the positive externalities of certain clusters. The objective of this policy is a strategic, holistic and sustainable investment of public funds to secure prosperity, competitiveness and innovativeness of the region. “Cluster policy offers a superior mix of benefits and costs” (Ketels 2009: 22) compared to policies targeting either the entire economy or individual companies.

The motivation for cluster policy is strongly supported by interviews with practitioners and researchers:

Case: Basle, Switzerland (Prof. Müller, BAK Basel)
“Cluster policy means generating / developing the attractiveness of a location to (primarily) companies in order to motivate them to stay or to re-locate to the region.” (Interview)

Case: Hamburg, Germany (A. Richter, State Ministry)
• “Secure the need orientation of the innovation support infrastructure.
• Improve the interaction between cluster members.
• Strengthen the international (global) visibility of the cluster (and its host region).” (Interview)

Case: Sweden (Prof. Sölvell, Stockholm School of Economics)
“There is cluster policy which has an impact on awareness (e.g. Vinnova’s VINNVÄXT scheme motivated more than 100 regions to submit a proposal, many of them intensified their cluster efforts despite not receiving funding from Vinnova) and co-operation culture as well as on professionalism of cluster management and policy for clusters (e.g. regional policy, innovation policy, entrepreneurship policy) which defines the framework for clusters, i.e. has a decisive impact on agglomeration and dynamism.” (Interview)

Case: Australia (McPherson 2001: n.p.)
“Clusters policies enables local regions to build those special relationships and
Beyond those generic considerations, there is a specific reason for policy makers to engage into cluster policy when it comes to the emergence of new clusters. This means on the one hand enhancing the conditions to make the emergence of new clusters possible and on the other hand providing initial support to single cluster initiatives once they have been identified.

Creating the conditions for the emergence of new clusters has a lot to do with a regional entrepreneurship culture. J. Rosted from FORA in Denmark (Interview) observes a European weakness with respect to an entrepreneurial culture which needs to be addressed: “(... )good entrepreneurship activity and infrastructure is extremely important for the emerging of a cluster – you have to work carefully with your entrepreneurship infrastructure and culture. That’s one of the main reasons why the US outperformed the EU with 1% pro year in productivity during the last 20 years. This is because their entrepreneurship culture plays a very important role – and the lack of an adequate entrepreneurial culture in Europe (Nordic Countries, Central and Southern Europe) is a great disadvantage. Of course, there is a lot of entrepreneurship in Central and Southern Europe, but that’s for social reasons (not in fields like creative industries, in which we are really lagging behind). Europe is extremely strong in “old” clusters, much stronger than the US, but is not keeping the pace in respect to the new ones. This is why I am critical towards the analysis done by the EC and the observatory; I do not think they have seen the point – which is the emergence of clusters, which is weak in Europe. But there are promising exceptions from the rule once you have identified a cluster: for instance, in Berlin there may be an emerging mobile phone cluster. Berlin has a strong university, the Partnership of the German Telekom, and interesting spin offs. I think that Berlin will create one of the five / six strong mobile phone clusters in Europe. Southern Sweden and Finland are trying to do the same, and there might be some other in France and UK; but if the Germans realise their potential and pursue a more strategic policy, like the Finns do, then the Germans could compete. But, so far, they don’t.”

The interviews clearly demonstrate that supporting new clusters in their initial phase is a concrete and much needed action field for policy:

Case: Estonia (R. Tönnisson, Baltic Innovation Agency)

“In Estonia, the situation was quite clear: there was a strong need for cluster policy to crystallise the cluster activities in certain areas. There had been several
A.2.3 What are the key challenges of cluster policy?

Policy makers face quite a number of challenges when engaging in cluster policy. In the following table, we have listed the most urgent ones:

- **Inherent complexity of cluster policies**
  Cluster policy needs to integrate a set of existing policies in different government departments, which might have different priorities. Setting up a cluster policy involves bundling those single policies under a common framework:
  - besides governments, cluster policies involve a multitude of actors such as firms, educational and research institutions (colleges and universities), non-profit organisations and trade associations etc. Building a common strategy among those actors is a long and complex process – this process can be quite a costly one.
  - cluster policies are not a single policy tool. They require the integration of a complete set of policy instruments in the framework of existing government policies and budgets. “Depending on a region’s priorities and most pressing needs, little financial means may be left for a full-fledged cluster policy”. (McPherson 2001: n.p.)
  - cluster policies typically deals with several clusters. Policy makers need to “handle various complex clusters programs and projects, i.e. switch between various clusters which might have very different needs in terms of support and steering.” (McPherson 2001: n.p.)

Case: Lyon, France (Y. Guyon, CCIL)
“In the first years of a cluster’s lifecycle, cluster policy is necessary for a timeframe of around 3 to 5 years. During this period, it is necessary to support especially the networking processes between the actors. Regional companies do not necessarily spontaneously cooperate with their local competitors; it is necessary to present the advantages of the cluster initiative, to build up trust between the participants - and the management unit! – and to initiate first collaborative initiatives. This work needs to be funded and it can hardly be expected that companies pay from scratch as long as they have not clearly seen the benefits. Later on in the process, the reduction of public subsidies can be planned.” (Interview)
• **Long-term character of cluster policies**
  The long-term character of cluster policies contrasts strongly with the usually relatively short windows of opportunity for policy makers during their term of office. Thus, cluster policy involves securing commitments beyond the usual time horizon for policy makers.
  o “cluster development is a long term-process fraught with obstacles, where commitment, leadership and communication are keys to success. This emphasizes the need for long and often costly consensus-building and concertation processes.” (Andersson et al. 2004: 164)
  o each of the actors at the macro, meso and micro levels must commit to a common long-term vision for the development of the cluster and must play their appropriate role.
  o cluster policies take a long time (at least five to ten years) to show significant results.
  o it is important to “secure stakeholder commitment while using windows of opportunities in the policy making process.” (McPherson 2001: n.p.)

• **Action-oriented character of cluster policies**
  Cluster policies often require a high involvement of policy makers during the implementation of the policy:
  o depending on the position of the clusters addressed in their lifecycles, their needs for support and their own capacities, policy makers need to “act in various capacities, ranging from secretariat, program managers, dialogue facilitators, change agents, institution builders, regulation reformers, etc.” (McPherson 2001: n.p.)
  o each cluster is a specific organism with specific needs. There is – although examples from good practices are available – no “one size fits all” recipe for success. “Strict top-down interventions aimed at reproducing specific models can easily fail. Problems tend to be specific to a region or sector and require tailor-made responses.” (Andersson et al. 2004: 164)

In summary, setting up efficient cluster policies requires from policy makers a high level of skills and persistence.

**A.2.4 What are the main risks of cluster policy?**

Cluster policies can trigger positive developments but they do also inherit risks. Those risks come from both the nature of clusters and inappropriate policy
measures. According to Andersson et al. (2004: 43), the risks related to the nature of clusters and their life cycles are:

- **Vulnerability**
  In contrast to a diversified economy, a specialised region shows a high degree of dependence on the core market of the cluster and the development of some few key firms. In extreme cases, specialisation narrows down to only one cluster. Technological discontinuities may undermine specific cluster advantages, as may shifts in the general economy, trade patterns and customer needs.
  A strong focus on one specialisation can be a successful strategy in one region, such as the pharma cluster around Basle, but fail in another.
  “We are aware that Basle’s one-cluster landscape is risk and chance at the same time. Thus, possible additional foci are currently being discussed.”
  *(Interview Prof. Müller, BAK Basel).*

- **Lock-in effects**
  Excessive reliance on local contacts and tacit knowledge in combination with neglect of external linkages and lack of foresight may account for lock-in effects due to dominance of established practices.

- **Creating rigidities**
  Dense existing structures risk delaying a radical re-orientation or hindering needed structural adjustment.

- **Decrease in competitive pressures**
  Cooperation can cause a reduction in competitive pressures and hence in the driving forces for innovation. It can create societal inefficiencies as tight-knit groups of actors block entry by newcomers.

- **Self-sufficiency syndrome**
  Used to past successes, a cluster may fail to recognise changing trends. Harrison / Glasmeier (1997) suggest that clusters respond best to incremental changes in technology and market demand. In the presence of significant changes, clusters could hinder adjustment at odds with learning accumulated collectively through previous success periods.

There are also risks related to the art of policy making. Such risks are partly described in the literature, but were mainly pointed out by the interviewees:
• **Inflationary use of cluster labels**
  This risk is at best illustrated by the policy makers, researchers and cluster managers interviewed.

  Y. Guyon, CCIL (Interview) identifies two current inappropriate practices:
  o *Regroup too many players serving too large market segments in one single cluster initiative:* it might be tempting, for instance for marketing purposes, to (re-)group a large number of regional firms serving related or connected markets into one cluster initiative. However, if their actual possibilities for interacting and collaborating on research and development, training etc. are limited by too diverse value chains, the cluster will not be able to gain momentum and will generate little added value for its members. As a consequence, the target group companies will likely lose interest and show little commitment to the initiative.
  o *Focus only on production / manufacturing issues:* many regional initiatives like the SPL in France (Systèmes Productifs Locaux: Local Productive Systems) focus on specific production / manufacturing issues or technologies. This type of collaboration among companies is not sufficient to generate a cluster dynamic. Cluster initiatives need to address the whole value chain and not only production or manufacturing.

  Prof. Koschatzky, Fraunhofer ISI (Interview) comments that cluster policy is kind of trendy; many policy makers do initiate new cluster initiatives with very much enthusiasm and high expectations, but very often only a few of those initiatives have sufficient potential for positive cluster development.

  Prof. Cooke, University of Wales confirms this “fashion” risk: “Ministers meet regularly; things are in fashion this year and out of fashion next year. Most countries had a bio-tech focused S&T policy (resulting in biotech cluster policies) and will change to green / clean technologies (resulting in green platform / cluster policies). Rapid change of foci is dangerous.” (Interview)

• **Short term vs. long term policy making – understanding the limitations and balancing the expectations**

  Prof. Koschatzky, Fraunhofer ISI (Interview) summarises the issue of balancing expectations with regard to the outcomes of cluster policy. It is not possible to predict the outcomes of cluster policy; only an ex-post evaluation is possible. No one knows at the beginning of a cluster initiative whether the actors will get along well, whether an innovative spirit will emerge, etc. One can only create the framework conditions in order to increase the chances of success. Another difficulty is that those uncertain outcomes are difficult to estimate. Koschatzky highlights the current trend of
overestimating the effect of cluster policy: as has been the case in the past for other policy initiatives such as the regional innovation systems (RIS, RITTS), cluster policy is widely presented as a solution for all problems. It generates a “fashion” and a group pressure so that everybody wants to have a cluster policy because “the others have one”.

This argument is reinforced by Prof. Sölvell, Stockholm School of Economics: “Cluster policy is strategic policy; it cannot help mastering urgent challenges.” (Interview)

- **Implementation issues**

As already mentioned, cluster policy is an action-oriented policy. Governments often use existing vehicles, such as agencies, in order to implement their cluster policies. There is a significant risk that those agencies do not have the necessary competences or introduce a bias into cluster policy, according to their core competences.

“When technology agencies drive clusters, there is – no big surprise – a strong focus on technology; Export Agencies promote a focus on internationalisation (…) The danger is that the cluster focus is too close to the intent of the prime funding agency.” (Interview I. Ffowcs-Williams).

As emphasised by Y. Guyon, CCIL it is always bad practice to “forget to put the access to well-identified markets at the centre of the cluster initiative: clusters can only develop well, if they have access to clearly identified markets.” (Interview)

Finally, Mats Williams, Cluster Manager Paper Province identifies the risk of too static policies and priorities: “Development is more technology and market driven, and it is the role of policy makers to listen, understand and be flexible towards changes in industrial changes. There is a risk that policy making tends to cement priorities in strategic documents. Within long term priorities there should be room for a high level of flexibility from policy makers.” (Interview)

### A.2.5 Is cluster policy always feasible?

Clusters can greatly enhance the competitiveness and innovativeness of a region. The feasibility of cluster policy is therefore an important question. Cluster policy is feasible in most cases, but is particularly effective in the presence of both “regional” conditions for clusters and political conditions for policy development.
The “regional” conditions can be evaluated according to critical factors for cluster development, defined by e.g. the dti in a Practical Guide to Cluster Development (2004), a handbook for cluster managers:

The necessary success factors for cluster development are:

- **Networking partnerships**
  Networks that generate formal and informal flows of knowledge and information throughout a cluster provide the gel that binds success over time. Access to tacit knowledge can support collective learning and more competitive performance. Networks can be the means through which many cluster development activities are delivered. Successful clusters tend to have strongly embedded networks and relationship systems: “The key to growth for many small firms within a cluster is its ability to gain strength through co-operation and collaboration utilizing formal and informal networks” (OECD 1996). Trust and inter-personal relationships are highly important for the development, providing the cluster with a strong degree of social capital. This in itself could create a knowledge community.

- **Innovative technology**
  The evidence shows that product development and well-developed research structures, together with other forms of innovation, are vital for a dynamic cluster. Innovation maintains the cluster at the forefront of the market whilst a strong R&D base can provide the ideas and products for future development. The promotion of innovation and R&D are two separate activities, although inter-related. Innovation generally refers to product or process development whilst R&D refers to the development of new knowledge. In the best cases successful innovation is the outcome of the R&D process.

- **Human capital**
  There is a consensus across the literature that successful clusters are those that have been able to access and nurture a strong skill base, both in terms of higher level and management skills and a suitably qualified labour force more generally. This is seen as a key factor in attracting and retaining companies as well as contributing to the successful development of companies within a cluster. The quality and quantity of the available labour force is thus a critical component in the development of successful clusters.

The second category is contribution factors. These are usually important factors that add to the success of the critical success factors and consist of:
• **Physical infrastructure**
  Communication links, physical infrastructure and sites and premises have previously been identified as key factors in the development of successful clusters. The role of a modern and robust physical infrastructure, including the provision of facilities for companies and employees as well as good transport and communication links, is an important consideration for cluster managers. Good physical infrastructure has the potential to reduce transport costs, improve access to raw materials and improve access to skilled labour. Proximity to customers and suppliers is a key feature for the success of many clusters and good transport infrastructure can improve this position. In contrast poor or congested transport and communication links can act as a brake on the development of a cluster.

• **Presence of large firms**
  Large firms are often present in successful clusters. The much desired anchor firms are large sources of technology, markets and expertise. Large firms act as miniature innovation systems in their own right, supplying incubation space to employees, financing their own start ups, providing technical expertise, product specifications and initial markets. Large firms also provide a steady flow of trained people which small innovating firms can hire, and can share expertise with the supply chain. Large firms can have a catalytic role in a number of respects:
  o they create a critical mass of experienced managers and workers,
  o they can provide a customer and supplier base,
  o they provide a customer and supplier base,
  o they provide ideal conditions for high technology firms to grow and develop.

• **Enterprise entrepreneurialism**
  The presence of an entrepreneurial spirit is an important influence in the development of successful clusters. This is generally reflected in growth companies, business start-ups and spin-outs from existing companies or research institutes. It can occur within a wide degree of contexts within a cluster – within large or small firms, within technology transfer organisations, or within the ‘culture’ of a sector or responsiveness of the public institutions (with a ‘can do’ mentality). Equally an ability to adapt to market changes has been a factor for the continuing success of SMEs within successful clusters.

• **Access to finance**
  Companies in clusters are often dependent on the financial community to support them for long periods of time. Companies and investors valued be-
ing located close to each other in clusters. A problem at the national level is a growing shortfall in the amount of equity finance available for industrial companies. Hence, in order for the cluster to be successful it requires the right amount of funding as well as the right sources such as a mix between private and public.

The third category is **complementary factors** which means clusters do not need to have these factors in order to be successful but it would help by speeding up the development of a cluster:

- **Specialist services**
  Cluster based companies must be able to attract the best management and scientific staff from overseas and larger companies. Clusters can help attract staff by providing an intellectual and business environment, offering a range of employment opportunities for partners and career development. The quality of life, areas of natural beauty and vibrant international cities also play a role in individual decisions about where to locate. These types of services usually allow clusters to attract the professional staff.

- **Access to markets**
  Clusters need thriving start-ups as well as more mature companies that can act as role models. A crucial issue for companies in technological and other research driven sectors is how to sustain their R&D activities over the relatively long periods and then have the ability to enter the market. Making the product accessible to the market is an important factor since it allows R&D activities to be transformed into direct value adding procedure.

- **Access to business support services**
  Support is often provided to businesses within a cluster in order to facilitate improvements in their performance. This support can take numerous forms. Common interventions include:
    - support for new business start-ups,
    - business advice and guidance,
    - marketing, market intelligence and networking assistance.

Traditional business support measures do have their role in that they can promote the development of a strong firm base and the growth of new companies, contributing to a generally stronger economy. They can also be highly important in so far that they mean support the development of the seedbed for new clusters of the future, which cluster focused strategies might otherwise overlook. However, it is important for cluster managers to realise that business support measures on their own are not enough to pro-
mote the development of clusters.

On the basis of the success factors discussed above, regional policy makers can identify existing clusters and cluster sprouts with the potential to reach critical mass.

Pre-existing cluster candidates in a region represent a vital factor in reaching critical mass. We assume the existence of cluster sprouts or candidates as quintessential prerequisites for a successful cluster policy, because - in accordance with the general opinion - we consider that clusters might in specific cases be - but preferably should not be - created from scratch (Feser / Landwehr 2006, Roelandt et al. 1999, and Ketels 2004).

Our interviews enable us to add a further success factor, namely “the presence of natural leaders able to motivate and convince other actors” (Interview Y. Guyon, CCIL).

Political conditions required for a successful cluster policy include:
- a consensus to co-ordinate cluster policy across different Ministries / departments and political orientations,
- local leadership and commitment,
- minimum amount of resources,
- legal framework allowing for collaboration.