

Uncovering excellence in cluster management

In this report, we examine cluster management excellence as a process rather than an output. We also suggest that focusing on cluster management alone is not enough, and that the notion of cluster governance needs to be brought onto the stage.

February 2011



For further information on this report please contact:

Jan-Hendrik Schretlen, Drs., Partner

Head of Cluster Advisory Practice

Telephone: +31 88 792 32 48

Email: jan-hendrik.schretlen@nl.pwc.com

Kristina Dervojeda, Drs.

Expert Cluster Advisory Practice

Telephone: +31 88 792 32 28

Email: kristina.dervojeda@nl.pwc.com

Wouter Jansen, Dr.

Expert Cluster Advisory Practice

Telephone: +31 88 792 31 09

Email: wouter.jansen@nl.pwc.com

Britta Schaffmeister, MSc.

Expert Cluster Advisory Practice

Telephone: +31 88 792 61 17

Email: britta.schaffmeister@nl.pwc.com

Executive Summary

Knowledge-intensive clusters play a key role in driving innovation, regional development and competitiveness. There is no doubt that cluster excellence matters, and the main questions of scholars and practitioners refer to the ways of achieving it. One of the factors that is seen as essential for achieving cluster excellence refers to the excellence in cluster management.

The current discussions on cluster management excellence primarily focus on the outputs related to clusters and cluster organisations. In this report, we examine the notion of **cluster management excellence as a process rather than an output**. We suggest that excellence in outputs derives from excellence in the process, and therefore specific attention needs to be paid to how the cluster management process should be organised. Consequently, we aim to shift the discussion from what the clusters should try to achieve towards how the clusters can best achieve their objectives.

Cluster management can be defined as the organisation and coordination of the activities of a cluster in accordance with certain strategy, in order to achieve clearly defined objectives. Cluster management represents a **continuous activity of a cyclical nature**. It is a complex, interactive and non-linear process. The main stages of the cluster management cycle can be split into (1) Define; (2) Design; (3) Implement, (4) Monitor, (5) Evaluate, and (6) Revise.

Cluster management goes **beyond management of an individual organisation**. It implies mediating and facilitating the relationships of multiple cluster members. Each of the cluster members has own agenda, and a key challenge for cluster managers is to make sure those agendas are united into common objectives and collective actions, that conflicting interests are resolved, and the relevant organisations see enough added value from their participation in cluster activities.

We also suggest that focusing on **cluster management alone is not enough** for cluster excellence, and that the notion of **cluster governance has to be brought onto the stage**. Cluster governance refers to the intended collective actions of cluster stakeholders to advance the cluster and develop a sustainable competitive advantage. Cluster governance thus represents the interests of cluster stakeholders (e.g., universities and research institutes, large and small companies, government, supporting structures etc.), while cluster managers strive to serve the needs of cluster stakeholders. We were able to observe that clusters driven exclusively by the efforts of cluster managers and without joint commitment of the stakeholders are doomed to fail.

The **key pillars of excellence in cluster management** include a regular review of both cluster objectives and the objectives of the cluster organisation, 'trying out' various types of actions and learning from the results of those actions, as well as constant monitoring and regular evaluation, adaptive performance measurement systems and active engagement of cluster stakeholders at all stages of the management cycle.

In the report, we present various examples of good practices related to both cluster management and cluster governance. However, we conclude that there is no golden recipe for excellence in cluster management. Not only do different clusters require different approaches, but even the same cluster is likely to require new approaches as it passes through various stages of its development, or in response to various external drivers. Cluster managers operate in a turbulent and highly complex environment. To survive in such unpredictable environment, **adaptive management structures are needed**.

The information presented in this report is based on our experience in working with knowledge-intensive clusters from all over the world. By this report we only aim at sketching the contours of how to achieve excellence in cluster management. We are convinced that **each cluster is unique, and so is the best approach towards cluster management in a particular cluster**. We are committed to support cluster managers on their way towards professionalism, thereby helping them to position their clusters at the forefront of the knowledge-based economy.

Table of contents

1.	Introduction	6
2.	The essence of cluster management	8
<hr/>		
2.1.	Cluster management cycle	8
2.2.	Define	9
2.2.1.	Defining cluster vision	9
2.2.2.	Defining mission of the cluster organisation	9
2.2.3.	Developing cluster strategy	9
2.2.4.	Identifying key uncertainties	10
<hr/>		
2.3.	Design	10
2.3.1.	Developing action plan	10
2.3.2.	Developing communication platform	11
2.3.3.	Establishing agreements with cluster participants	12
2.3.4.	Setting up systems for data collection	12
<hr/>		
2.4.	Implement	13
2.4.1.	Facilitating networking activities	13
2.4.2.	Providing information and signposting	13
2.4.3.	Articulating needs and lobbying	14
2.4.4.	Stimulating collaboration	14
2.4.5.	Providing education and training	14
2.4.6.	Cluster promotion	14
<hr/>		
2.5.	Monitor	15
2.5.1.	Collecting and recording information on cluster progress	15
2.5.2.	Reviewing cluster progress	15
2.5.3.	Identifying problems in planning and/or implementation	16
<hr/>		
2.6.	Evaluate	16
2.6.1.	Determining the purpose of evaluation	16
2.6.2.	Developing key evaluation questions	17
2.6.3.	Deciding whether to go for internal or external evaluation	17
2.6.4.	Facilitating the evaluation process	18
<hr/>		
2.7.	Revise	18
2.7.1.	Revising objectives and uncertainties	18
2.7.2.	Reporting to stakeholders	19
<hr/>		
3.	The essence of cluster governance	20

3.1.	Distinguishing between cluster management and cluster governance	20
3.2.	Cluster governance in the life-cycle of a cluster	21
3.3.	Cluster governance model	21
3.4.	Effectiveness	22
3.5.	Accountability	23
3.6.	Transparency	23
3.7.	Efficiency	24
3.8.	Commitment	24
3.9.	Responsiveness	25
3.10.	Inclusiveness	25
3.11.	Consensus	26
3.12.	Participation	26

4.	In pursuit of excellence: concluding remarks	27
	Cluster Advisory Practice	29

	A Comprehensive Range of Services	29
	Individual Approach	29
	Global Possibilities and Local Knowledge	29
	Other Relevant Publications	30

1. Introduction

Current evidence suggests that in the presence of universities, research centres and supporting structures, a geographical concentration of high tech companies has a positive effect on the economic performance of those companies in a cluster¹. As a result, knowledge-intensive clusters play a key role in driving innovation, regional development and competitiveness².

The ability of clusters to deliver high economic performance is often labelled as **cluster excellence**. Cluster excellence can, for example, be expressed in terms of cluster growth, added value, productivity and innovativeness. Therefore, there is no doubt that cluster excellence matters, and the main questions of scholars and practitioners refer to the ways of achieving it. One of the factors that is seen as essential for achieving cluster excellence refers to high quality cluster management³ or **cluster management excellence**⁴.

Cluster management excellence is often linked to the strength and professionalism of the cluster organisation. By a cluster organisation one should understand organised efforts to facilitate cluster development, which can take various forms, ranging from non-profit associations, through public agencies to companies⁵. A cluster organisation typically functions as a mediator between various cluster members and adds value by stimulating collaboration both within the cluster and between the cluster and the outside world. Cluster management excellence thus refers to the organised efforts allowing to achieve and maintain cluster excellence.

The term and the notion of “cluster management excellence” are increasingly gaining popularity. Labelling excellent cluster managers becomes common practice at both the European and national levels⁶. Cluster organisations seek for ways to demonstrate excellence towards their members, policy makers and the community. Policy makers, in turn, launch a number of projects and initiatives aiming to improve the efficiency of existing efforts in cluster management⁷.

The current discussions on cluster management excellence primarily focus on the **outputs** related to clusters and cluster management. The typical questions these discussions aim to answer are: Which performance indicators could be used to define cluster excellence? Based on what results can we conclude that cluster managers demonstrate excellence? How can we best compare clusters and cluster organisations?

At the same time, the materials on the actual **process** of cluster management, let alone excellence in this process, hardly exist. How should the cluster be managed? What are the key pillars of cluster management excellence? How can cluster management excellence be achieved and maintained? The materials on those issues would be of great help to all cluster managers, and to the managers of emerging clusters, in particular.

The objective of this report is to support cluster managers, policy makers and other relevant stakeholders in **crystallising the notion of cluster management excellence as a process rather than an output**. In this report, we present our vision on the essence of cluster management, and identify the key pillars of excellence.

1 Anderson, T., Bjerre, M., Wise Hansson, E. (2006) “The Cluster Benchmarking Project”, Nordic Innovation Centre; Cortright, J. (2006) “Making Sense of Clusters: Regional Competitiveness and Economic Development”, Impresa, The Brookings Institution Metropolitan policy Program; OECD (2001) “Innovative Clusters – Drivers of National Innovation Systems”; Porter, M. (1990) “The Competitive Advantage of Nations”, Harvard Business School; Porter, M. (2003) “The Economic Performance of Regions”, Harvard Business School

2 Promoting Cluster Excellence, Measuring and Benchmarking the Quality of Cluster Organisations and Performance of Clusters Gerd Meier zu Köcker, Jørgen Rosted (Eds.) 2010

3 For example, see Europa InterCluster White paper on “The emerging of European world-class clusters” at www.intercluster.eu/images/stories/white_paper/white_paper_the_emerging_of_european_world_class_clusters.pdf

4 Promoting Cluster Excellence, Measuring and Benchmarking the Quality of Cluster Organisations and Performance of Clusters Gerd Meier zu Köcker, Jørgen Rosted (Eds.) 2010

5 A Practical Guide to Cluster Development. A Report to the Department of Trade and Industry and the English RDAs by Ecotec Research & Consulting. ECOTEC, (2004)

6 Gerd Meier zu Köcker, New Approaches towards Cluster Management Excellence. Presented in Delhi, December 2010

7 See, for example, European Cluster Excellence Initiative www.cluster-excellence.eu/; European Cluster Managers' Club <http://www.clustermanagersclub.eu/Site/home.html>

The objectives of clusters and the corresponding indicators of cluster management excellence may vary per cluster; nevertheless, we suggest that some key principles can be distilled which are applicable to various clusters independently of their objectives. We thereby aim to shift the discussion from ***what the clusters should try to achieve*** towards ***how the clusters can achieve their objectives***.

We also suggest that ***focusing on cluster management alone is not enough*** for cluster excellence, and that the notion of ***cluster governance has to be brought onto the stage***. Cluster governance represents the interests of cluster stakeholders (e.g., universities and research institutes, large and small companies, supporting structures etc.), while cluster managers strive to serve the needs of cluster stakeholders. Cluster managers are thus given power by cluster stakeholders to administer the cluster. Consequently, omitting the stakeholder part when discussing cluster management excellence would be a one-sided approach.

The information presented in this report is based on our experience in working with knowledge-intensive clusters from all over the world⁸. The report exclusively contains the general principles of excellence in cluster management and does not take into account contextual or sectoral issues. We are convinced that each cluster is unique, and so is the best approach towards cluster management in a particular cluster. By this report we only aim at ***sketching the contours of how to achieve excellence in cluster management***. The reader should not act upon the information contained in this report without obtaining a specific professional advice.

The remainder of this report is organised as follows. In the next chapter, we examine the essence of cluster management and elaborate on each of its key elements. In the third chapter, we elucidate the notion of cluster governance and its building blocks. In the fourth chapter, we present our vision on the excellence in cluster management by combining the notions of cluster management and cluster governance. We conclude by emphasising the need for cluster managers to employ ***adaptive management approaches*** that would enable them to operate in a turbulent, uncertain and highly complex environment.

⁸ For some examples of the relevant PwC studies see “Other relevant publications”

2. The essence of cluster management

Cluster management goes beyond management of an individual organisation. It implies mediating and facilitating the relationships of multiple organisations, i.e., cluster members. Each of the cluster members has own agenda, and a key challenge for cluster managers is to make sure those agendas are united into common objectives and collective actions, that conflicting interests are resolved, and the relevant organisations see enough added value from their participation in cluster activities. Consequently, cluster management deserves specific attention on its own.

2.1. Cluster management cycle

Cluster management can be defined as the organisation and coordination of the activities of a cluster in accordance with certain strategy, in order to achieve clearly defined objectives. Cluster management represents a continuous activity of a cyclical nature. It is a complex, interactive, non-linear process. Different activities are thus likely to take place simultaneously. Figure 1 schematically presents our vision on the main stages of the cluster management cycle: (1) Define; (2) Design; (3) Implement, (4) Monitor, (5) Evaluate, and (6) Revise⁹. In the remainder of this chapter, we will elaborate on each of those stages in more detail.

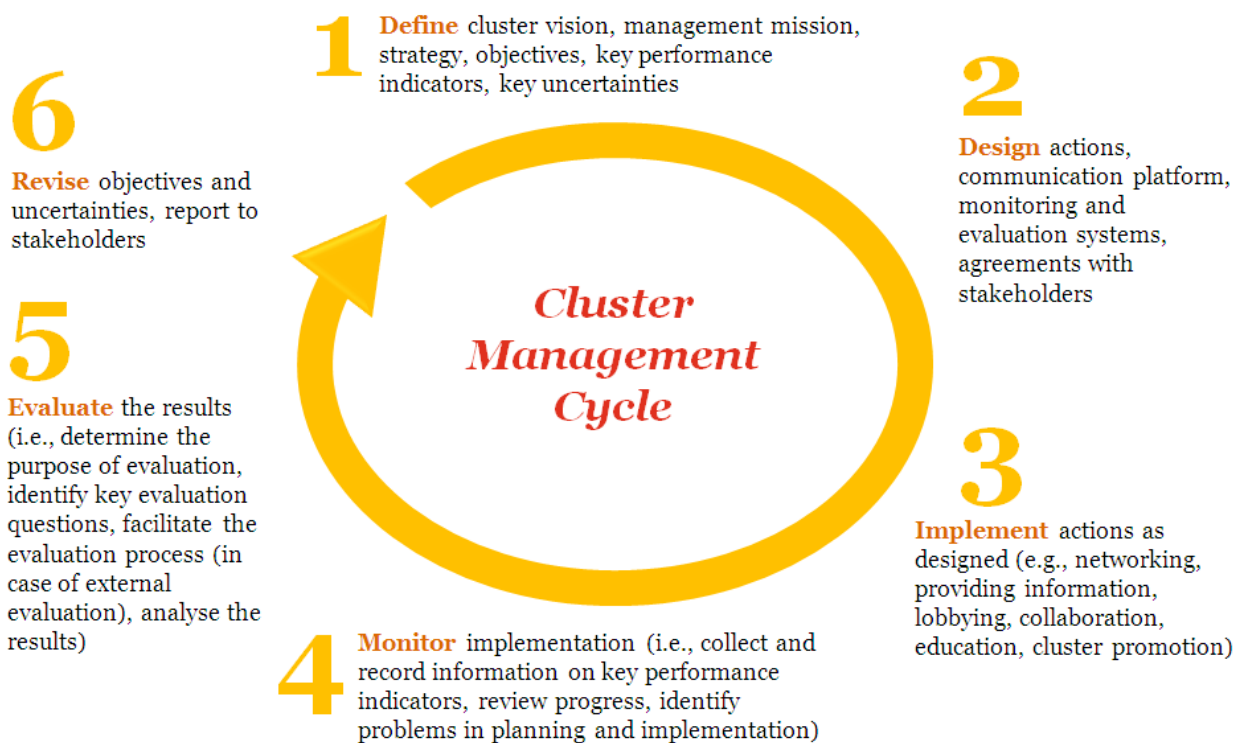


FIGURE 1: Cluster Management Cycle

⁹ Based on Murray, C., Marmorek, D. (2004) Adaptive Management: A Spoonful of Rigour Helps the Uncertainty Go Down. Paper presented at 16th International Conference Society for Ecological Restoration, August 24-26, 2004, Victoria, Canada

2.2. Define

The first stage of the cluster management cycle refers to defining what the desired outcomes for the cluster should be. At this stage, the vision, mission, strategy and objectives of the cluster are formulated. The outputs of this stage form the basis for the whole cluster management process.

2.2.1. Defining cluster vision

Cluster vision refers to the inspirational description of what the cluster would like to achieve in the long-term future (typically five-ten years). The vision thus represents a framework for the cluster's strategic planning. For example, a biotech cluster might have a vision statement that reads: "The cluster as a global hotspot of biotechnology and biomedical research, with a solid and competitive industrial base".

2.2.2. Defining mission of the cluster organisation

While the vision refers to the cluster as a whole, the mission defines the fundamental purpose of the cluster organisation itself, i.e., why it exists and what its role is in achieving the cluster vision. For example, a cluster organisation may aim to help create a vibrant collaborative environment in the cluster by bringing cluster participants together, facilitating strategic training and promoting entrepreneurship.

2.2.3. Developing cluster strategy

Cluster strategy, in turn, refers to the long-term action plan in order to realise the cluster vision. Cluster strategy typically covers the following six elements:

- (1) *Direction*: where the cluster is trying to get in the long term;
- (2) *Scope*: what the key activities are that the cluster should focus on;
- (3) *Competitive advantage*: what the key strengths of the cluster are and how those can be best utilised;
- (4) *Resources*: what resources (i.e., skills, assets, finance, relationships, technical competence, facilities) are required to realise the cluster vision;
- (5) *Climate*: what external factors are likely to affect cluster's development (e.g., political, economic, legal factors);
- (6) *Stakeholders*: what the values and expectations of the key cluster stakeholders are and how those can affect cluster's development.

Cluster strategy needs to be operationalised into a set of cluster objectives. The following three key types of cluster objectives can be distinguished:

- *Strategic objectives*, i.e., the objectives related to the long-term effects of the cluster (e.g., improved visibility and reputation of the cluster; attractive investment climate; entrepreneurial culture).
- *Specific objectives*, i.e., the objectives related to the results of cluster activities (e.g., the amount of venture capital attracted to the cluster, nr of new spin-offs, employment growth etc.).
- *Operational objectives*, i.e., the objectives related to the immediate outputs of the cluster (e.g., nr of networking events, nr of collaboration projects etc.).

However, knowledge-intensive clusters often pursue strategies the results of which cannot be known in advance. As a result, only some general objectives can be clearly defined in the beginning. The appropriate approaches to achieve those objectives will gradually evolve during implementation¹⁰.

¹⁰ OECD (2009) Governing Regional Development Policy: The Use of Performance Indicators

2.2.4. *Identifying key uncertainties*

In most cluster management domains (independent of a sector or a life-cycle stage), there are low degrees of certainty regarding the effectiveness of the activities of the cluster organisation in achieving desired objectives. It is often difficult to prove causality between certain activities of cluster managers and cluster success. Cluster managers thus operate in a highly uncertain environment, and need to be able to proceed despite uncertainty regarding the best course of action. One of the ways to reduce such uncertainty is first to identify what the key uncertainties actually are.

Some other typical uncertainties that cluster managers have to deal with include:

- the continuity of commitment of the key stakeholders;
- financial instability;
- changes in technological and regulatory fields;
- external competition;
- market developments.

In the course of action, cluster managers are likely to acquire new knowledge regarding the identified uncertainties, and the course of action will need to be adjusted based on that knowledge.

Excellence in cluster management

- ✓ Vision, mission and strategy are developed in collaboration with the key cluster stakeholders.
- ✓ Cluster objectives are fully aligned with the objectives of the region. Cluster objectives are specific, measurable, attainable, results-oriented and time-bound.
- ✓ Vision, mission and strategy are communicated to the cluster stakeholders and to the outside world. Cluster participants understand how they benefit from being part of the cluster.
- ✓ In case of multi-level structure of the cluster, the objectives of sub-clusters are customised and aligned. Multi-dimensional goals are set to lead to a synergetic effect.
- ✓ The key uncertainties are identified, and the course of action will be adjusted based on future knowledge.

2.3. *Design*

The “Design” stage implies translating the strategy into the operational action plan. In addition, the attention needs to be paid to developing a clear stakeholder communication platform, making agreements with stakeholders and setting up systems for monitoring and evaluation.

2.3.1. *Developing action plan*

An action plan refers to a set of activities that must be performed for the cluster strategy to succeed. It typically contains an overview of specific tasks and assigned responsibilities, detailed planning and allocation of resources (i.e., people, finance). The time horizons of an action plan may vary from several months to several years. For monitoring and evaluation purposes, it may be reasonable to develop action plans on a yearly basis.

Excellence in cluster management

- ✓ Vision, mission and strategy are translated into a clear operational action plan containing an overview of specific tasks, detailed planning and allocation of resources.

2.3.2. Developing communication platform

The communication of information plays a vital role within the cluster. Effective communication supports the development of positive relationships with the stakeholder community and can also be employed to influence attitudes and behaviours outside the cluster. Effective communication also leads to informed decision making and creates awareness about the role of the cluster organisation in the cluster. The key questions that cluster managers need to address at this stage include:

- Who are the cluster stakeholders?
- Why is it important to communicate with the cluster stakeholders?
- What needs to be communicated to the cluster stakeholders?
- When should this communication take place?
- What communication mechanisms should be employed?
- What are the key challenges for effective communication? How can these challenges be overcome?

The main stakeholder groups for knowledge-intensive clusters typically include large companies and SMEs, universities and research centers, national and regional policy makers, other regulators (e.g., European Commission), Technology Transfer Offices, incubators and other supporting structures, general public of the region. Consequently, cluster managers are required to present accurate, meaningful and actionable information to a highly diversified audience. It is therefore important to acknowledge the difference between various stakeholder groups and tailor communication to the needs of particular group(s).

It is essential that a platform for effective communication is adopted by all key stakeholders of the cluster. This platform would form the basis for all communication within the cluster and would be the agreed basis for information sharing and dissemination. Failure to communicate effectively leads to delays in collaborative action, reduces the quality of shared information and thus hinders the development of the cluster.

Excellence in cluster management

- ✓ Communication with stakeholders occurs on a regular basis. While some stakeholders require daily attention, others may only need passive communication every few months. Web-enabled solutions allow for a constant flow of up-to-date information to a wide variety of stakeholders (e.g., customised cluster web pages depending on a stakeholder group).
- ✓ Communication routines are well developed, and different methods are used to communicate with different stakeholders. A selection of specific communication mechanisms includes newsletters, Annual Reports, emails to stakeholders, interactive web portals, formal and informal dialogue (e.g., meetings).
- ✓ Communication with cluster stakeholders is based on a clearly defined communication plan and follows agreed timeline.
- ✓ The cluster organisation has a developed competency in the area of communication and the appropriate resources to carry out this activity.

2.3.3. *Establishing agreements with cluster participants*

The cluster organisation and the key stakeholders need to decide on the membership of the cluster. One of the approaches implies broad entrance criteria such as geographic location of a potential cluster participant, area of activity, general interest in cluster activities etc. Another approach would be to create an 'elite' network by applying criteria of academic and/or commercial excellence, reputation etc. In any case, the prospective cluster participants should be contacted at two levels: (1) the head of the organisation; (2) those individuals within an organisation who will be the champions/actors within the network¹¹.

Communication within the cluster often implies pre-action information sharing, which, in turn, is related to the issues of confidentiality and commercial sensitivity, especially for the stakeholders from industry. Therefore, the establishment of formal agreements, for example, confidentiality and mutual agreements in the context of an agreed communication platform for the cluster participants, is essential. The presence of such agreements proves to increase the quality and the amount of exchanged information, which, in turn, is likely to lead to a more intensive collaboration within the cluster.

Excellence in cluster management

- ✓ The protocols for membership and for decision-making within the cluster are established (e.g., cluster governance agreement).
- ✓ Other formal agreements, for example, confidentiality and mutual agreements in the context of an agreed communication platform for the cluster participants, are established.
- ✓ The cluster organisation extends relationships beyond the core membership (e.g., other cluster organisations, participants from other clusters etc.).

2.3.4. *Setting up systems for data collection*

Another essential activity at this stage refers to setting up systems for data collection, i.e., the indicator systems for future monitoring and evaluation. The relevant indicators should be derived from the key objectives of the cluster. Each type of objectives (i.e., operational, specific and strategic) implies its own indicators measuring the extent to what those particular objectives are achieved.

There is no optimal number of indicators for data collection system. An adequate number of indicators should be selected to provide a comprehensive picture of cluster performance (the definition of 'adequate' depends on the degree of specificity of cluster objectives). A very large number of indicators is likely to result in an administrative burden and overload of information.

Similar to cluster objectives, the key performance indicators should reflect the key values of cluster stakeholders, and therefore the development of an indicator system is a process of dialogue and engagement with the stakeholders. Examples of indicators related to the operational objectives include the number of initiated collaborations, the number of networking events and meetings, the number press releases (cluster PR activities) etc. Specific objectives of knowledge-intensive clusters typically correspond to the number of new companies created, the amount of invested venture capital, employment growth etc. Finally, strategic objectives are the most challenging to measure, and typically involve more qualitative indicators such as attractiveness of the investment climate, entrepreneurial culture, visibility and reputation of the cluster.

Setting up systems for data collection at this stage allows for continuous monitoring and evaluation of cluster activities in the future. The indicators represent performance targets of the cluster and the cluster organisation, and thus set a clear direction. Gathering data at later stages enables cluster managers to measure progress and

¹¹ Creech, H. and Willard, T. (2001) Strategic Intentions: Managing knowledge networks for sustainable development. International Institute for Sustainable Development

take the necessary actions. It is often difficult to go back and set up systems for monitoring and evaluation once the action plan is running.

Excellence in cluster management

- ✓ The objectives of the cluster are translated into an adequate number of performance indicators. Each type of objectives implies its own set of performance indicators.
- ✓ The development of an indicator system represents a process of dialogue and engagement with the cluster stakeholders. The issues of reliability and availability of data are taken into account.

2.4. Implement

The “Implement” stage of the cluster management cycle refers to a set of operational activities of the cluster organisation. These activities may vary depending on the needs of the cluster and the mission of the cluster organisation. The operational activities imply the actual implementation of the action plan. Some typical activities include¹²:

- Networking;
- Providing information;
- Articulating cluster needs and lobbying;
- Stimulating collaboration/joint action;
- Providing education/training; *and*
- Cluster promotion.

2.4.1. Facilitating networking activities

The networking-related activities of the cluster organisation among others refer to setting up institutional networks, as well as organising seminars, workshops and conferences on scientific and business issues, preparing and sending newsletters, arranging social events. Cluster networks represent complex systems that require constant maintenance for them to be effective. In addition, those networks require a clear structure, action plans, timelines and deliverables. Broader publics should also be informed about the cluster network through the effective use of web communication technologies on a cluster website, and through marketing and positioning on other websites, including the individual sites of cluster participants¹³.

Workshops being part of networking activities may be organised as stand-alone events or those may be embedded into larger national and international conferences. To optimise costs and to increase networking opportunities, cluster managers often go for the second approach. Holding workshops as part of existing conferences usually is beneficial for advancing existing relationships and establishing new ones, as larger conferences attract larger numbers of participants. At the same time, such workshops typically do not provide enough time for extensive discussions. Stand-alone workshops are thus more appropriate for exchange of content and deeper relationship building.

2.4.2. Providing information and signposting

The task of providing information and signposting implies developing a cluster website, participant directories, as well as providing helpdesk services. A cluster website represents a powerful communication tool between the cluster organisation and the cluster participants, as well as the cluster and the outside world. A directory of

¹² Biotechnology Clusters (1999). Report of a team led by Lord Sainsbury, Minister for Science, United Kingdom

¹³ Creech, H. and Willard, T. (2001) Strategic Intentions: Managing knowledge networks for sustainable development. International Institute for Sustainable Development

cluster participants (including short organisational profile and contact details) ensures transparency with regard to cluster membership, as well as allows cluster participants and actors from outside the cluster to effectively get in touch with each other.

2.4.3. Articulating needs and lobbying

Articulating cluster needs and lobbying refers to the interaction with local, national and EU government. The objectives and action plans of the cluster should clearly articulate the link to the policy process. It is not enough to know which types of decision-makers the cluster aims to influence, it is also important to identify the key policy and implementation processes these decision-makers are involved in. Those include public consultations, legislative initiatives etc.

2.4.4. Stimulating collaboration

One of the vital tasks of the cluster organisation refers to stimulating collaboration between cluster participants. This task among others include the development of web-based ‘match-making systems’, equipment sharing schemes, joint access to digital libraries and specific expertise, e.g., legal services. The cluster organisation may also be involved in organising partnering events with companies and venture capital investors overseas.

2.4.5. Providing education and training

Cluster organisations often ensure that education and training services are provided to the cluster participants. Those refer to seminars or workshops on specific topics such as entrepreneurship, regulatory issues, marketing, business development, finance. In some cases, cluster organisations encourage universities to put specific subjects into the university’s curriculum. In other cases, cluster organisations employ the services of external consultants or training centers.

2.4.6. Cluster promotion

Finally, the cluster organisation is responsible for cluster promotion. The promotion activities typically include the development of a common brand (including the visual identity of the cluster), presenting the cluster at national and international conferences and exhibitions, preparing press releases and giving interviews. Media events and press releases are useful methods for communicating with the media and the outside world. Media events are typically combined with network workshops or other cluster events.

Excellence in cluster management

- ✓ The cluster organisation encourages cluster participants to go beyond sharing information and emphasises joint value creation by creating new knowledge together (co-creation of knowledge).
- ✓ The cluster network has a clear structure, action plan, timelines and deliverables. The network thus has a specific purpose.
- ✓ The cluster network is of transdisciplinary nature; however, it focuses on a limited set of specific issues rather than a broad spectrum of interests.
- ✓ The cluster managers constantly monitor network activities (whether the network is reaching its objectives).
- ✓ The cluster website contains a directory of cluster participants, as well as calls for tenders, opportunities for collaboration, calendar of events and other up-to-date information on the cluster and its activities.

Excellence in cluster management

- ✓ The cluster needs are regularly articulated to local, national and (if applicable) EU government. Policy makers constitute an important part of the cluster network.
- ✓ The cluster organisation offers cluster participants a web-based match-making platform by this stimulating collaboration within the cluster and with the outside world.
- ✓ The cluster organisation ensures that specific education and training services are provided within the cluster (e.g., entrepreneurship, regulatory issues, marketing, business development, finance).

2.5. Monitor

Monitoring refers to the systematic collection and analysis of information as the activities of the cluster organisation progress. It aims to improve the effectiveness and efficiency of the cluster organisation, and it is based on the objectives and action plan defined during the planning phase. Monitoring represents an invaluable tool for good cluster management, and it provides a strong basis for evaluation. Monitoring involves collecting and recording information, reviewing progress and identifying problems in planning and/or implementation.

2.5.1. Collecting and recording information on cluster progress

Collecting and recording information during the monitoring stage typically refers to the so called *process* indicators of the cluster, i.e., the indicators related to the operational activities of the cluster organisation (e.g., nr of networking events and meetings and the corresponding number of participants, nr of initiated collaboration projects, nr of press releases etc.). The cluster organisation needs to have a clear vision on what type of information has to be collected, how this information needs to be collected and who should be involved in collecting it. The process-related information on the activities of the cluster organisation is often readily available. The key task at this stage is to make sure the information is regularly recorded in a systematic way.

Besides process-related indicators, the cluster organisations sometimes choose to continuously collect information on the outputs of the cluster (e.g., nr of newly created spin-offs, nr of patents, licences and products). Although such approach allows for continuous measurement of progress, it requires active participation of cluster members and their willingness to pro-actively share this information with the cluster organisation on a regular basis. Such approach may be useful in case of special events or circumstances for which the cluster organisation has to prepare an up-to-date report on the status of the cluster (e.g., a meeting with potential investors). However, in most cases that we were able to observe, the information on the key performance indicators is collected and recorded on a semi-annual or annual basis.

2.5.2. Reviewing cluster progress

The purpose of reviewing cluster progress is to make changes where necessary, and to identify and build on strengths of the cluster and the cluster organisation. Possessing such knowledge allows for effective decision making. Reviewing cluster progress enables the cluster organisation to determine whether the cluster develops according to the plan, whether the available resources are sufficient and whether those are being well used, as well as whether the available capacity is sufficient and appropriate¹⁴.

¹⁴ Shapiro, J. (2001) Monitoring and Evaluation. CIVICUS: World Alliance for Citizen Participation

2.5.3. *Identifying problems in planning and/or implementation*

Comparing actual progress of the cluster against its objectives allows for identifying problems in planning and/or implementation. Hence monitoring provides continuous feedback on the activities of the cluster organisation.

However monitoring has little value if the cluster organisation does not act upon the information that comes out of the analysis. The cluster organisation needs to report this information to the stakeholders and make effective decisions about how to move forward. Different types of stakeholders require different types of reporting, e.g., written reports, verbal messages, PowerPoint presentations, videos etc. Cluster governing bodies typically require a written report based on monitoring analysis. An appropriate reporting format for the staff of the cluster organisation refers to a presentation or a written report presented at an internal meeting. Other cluster stakeholders can be informed at cluster meetings by means of a verbal presentation supported by tables, charts and visual materials. In contrast to evaluation, the monitoring results are typically not communicated to the wider community.

Excellence in cluster management

- ✓ The cluster organisation has a clear vision on what type of information has to be collected, how this information needs to be collected and who should be involved in collecting it.
- ✓ The cluster organisation continuously gathers information on the indicators reflecting its operational activities (e.g., nr of networking events and meetings and the corresponding number of participants, nr of initiated collaboration projects, nr of press releases etc.).
- ✓ The cluster organisation monitors whether the available resources are sufficient and are being well used, whether the available capacity is sufficient and appropriate, and whether the cluster develops according to the plan.
- ✓ The cluster organisation regularly reports progress to the stakeholders.

2.6. *Evaluate*

Evaluation is the comparison of the actual impacts against the agreed strategic plans *at a certain point of time* (in contrast to monitoring which is a continuous process). Evaluation results allow to conclude whether the objectives of the cluster are being achieved, what the strongest areas are, and which areas require special attention. Furthermore, the information on cluster performance forms a solid basis for communication with policy makers, investors and with the outside world.

Evaluation typically takes place once a year, unless there are specific events or circumstances requiring to have such information in between. Successful evaluation often hinges upon successful monitoring.

2.6.1. *Determining the purpose of evaluation*

Evaluation can be of formative or summative nature. *Formative* evaluation implies analysing the way the cluster organisation functions. The analysis of impacts in this case refers to determining whether what the cluster organisation did made a difference for the development of the cluster. Formative evaluation thus refers to the performance measurement of the cluster organisation. *Summative* evaluation, in turn, implies improving the way the cluster develops, and analyses the impact of the cluster on the regional development (including employment growth, attraction of investments etc.). Both types of evaluations are often combined to obtain a complete picture. In this report, we will mainly focus on summative evaluation.

Besides measurement purposes, evaluation needs to be conducted for several other reasons. First, evaluation allows for the validation and review of cluster objectives (whether the initial objectives are still relevant and feasible to achieve). Second, evaluation needs to be carried out for accountability and decision making purposes. It informs stakeholders about the allocation and the use of resources. Hence evaluation allows for making and justifying difficult choices in the context of fast-moving social, political and economic environment with sometimes shifting or conflicting policy priorities. Third, evaluation is vital for learning, development and improvement of the current cluster activities. Evaluation identifies the necessary changes in cluster strategy, action plan and the operational activities of the cluster organisation.

2.6.2. Developing key evaluation questions

The following five key evaluation questions can be distinguished:

- What is the justification for public and private investments in the cluster? (Rationale)
- Is there continued justification for cluster support in light of the evolving needs and priorities of the region? (Relevance)
- How efficiently have the inputs (i.e., public and private investments) been converted into outputs? (Efficiency)
- Is the cluster meeting its objectives? (Effectiveness)
- What difference has the cluster made for the region? (Impact)

Successful evaluation requires careful planning and consistent use of reliable research techniques. Evaluation should rely on the indicator system set up during the planning stage.

The indicators that are typically used include “creation of employment”, “turnover”, “investment in R&D”, “number of companies”, “number of spinoffs created”, “% of R&D investment against benefits” and “number of R&D employees”. As mentioned before, the appropriate indicators need to be derived from the cluster objectives, and each type of objectives implies its own set of indicators.

Not all of those indicators have to be of quantitative nature. The evaluation of impacts often implies working with qualitative indicators (e.g., reputation, visibility, attractiveness of the cluster for investors). In general, depending on the target audience (e.g., government, potential investors), different indicators are used in a presentation or report. For example, indicators related to employment growth are of particular interest to the regional and national governments, while the number of new companies and the number of products launched are of more interest to companies.

Rather than focusing only on indicators that are often believed to represent direct cluster performance (e.g., nr of spin-offs created, nr of new products launched etc.), some cluster managers pay specific attention to the *process-* rather than outcome-related indicators. Those include indicators related to the scientific and industrial base of the cluster, as well as entrepreneurial culture, financial and other supporting structures. The key assumption behind this strategy is that achieving excellence in the outcomes is only possible through achieving excellence in the process. Therefore, it is the process rather than the outcome what needs to be prioritised and supported. In addition, to evaluate the efficiency of the cluster, data on cluster inputs are needed (i.e., total private investments, total public investments).

2.6.3. Deciding whether to go for internal or external evaluation

A decision on whether to go for internal or external evaluation depends on a number of reasons. Internal evaluators are more familiar with the cluster, its objectives, operational activities and participants. In case of sensitive information, cluster participants are more likely to share it with the internal evaluators than with outsiders. At the same time, internal evaluators may lack specific skills or training in evaluation techniques. In addition, internal evaluators are likely to have a biased approach leading to a tendency of reaching positive conclusions. External evaluation is likely to be more objective and professional. Furthermore, it gives greater credibility to the obtained findings, which is particularly important for communication with regional and national governments and private investors (e.g., when additional funding needs to be secured). At the same

time, external evaluation is likely to be more costly. An external evaluator may also not understand the culture within the cluster and the actual objectives of evaluation¹⁵. Therefore, in case external evaluation is chosen, cluster managers and external evaluators should ensure good communication with each other.

2.6.4. Facilitating the evaluation process

Cluster managers aiming at effective evaluation enter the relationship with an external evaluator in a collaborative way. The evaluation issues can be dealt with effectively only by joining the cluster manager's knowledge of the cluster with the evaluator's specialised knowledge of evaluation techniques. Evaluation becomes a joint undertaking, with equal attention to both quantitative and qualitative issues. Data collection and analysis become joint efforts. While the external evaluator is often responsible for gathering data from the stakeholders, the role of the cluster manager is to facilitate this process and supply the evaluator with the information the cluster organisation already possesses (e.g., data from the monitoring system, previous reports etc.). At the same time, it is a task of the external evaluator to engage both the cluster manager and the key stakeholders into all stages of evaluation (i.e., not only for data collection, but also for the analysis of results and for drawing conclusions).

Excellence in cluster management

- ✓ The indicator system is linked to the level of maturity of the cluster. The indicator system allows for comparison with other clusters.
- ✓ Evaluation takes place at least once a year. It is based on careful planning and consistent use of reliable research techniques. Evaluation relies on the indicator system set up during the planning stage.
- ✓ The cluster managers aiming at effective evaluation enter the relationship with an external evaluator in a collaborative way, i.e., data collection and analysis become joint efforts.

2.7. Revise

The final stage of the cluster management cycle includes revising objectives and uncertainties, and reporting to the stakeholders.

2.7.1. Revising objectives and uncertainties

The knowledge obtained as a result of monitoring and evaluation allows to revise cluster objectives, the objectives of the cluster organisation and the key uncertainties. The process of cluster management is therefore about continuous learning and adjustments.

Such reviews are particularly important for operational objectives, i.e., there is a need to regularly check whether those actually lead the cluster towards achieving its strategic objectives. Strategic objectives may also require reconsideration later in time. Usually it should be done once in three-five years by means of conducting objective-free evaluation. It does not necessarily mean that strategic objectives need to be changed. It is more about the validation of the relevance and feasibility of strategic cluster objectives after a certain period of time.

¹⁵ Shapiro, J. (2001) Monitoring and Evaluation. CIVICUS: World Alliance for Citizen Participation

2.7.2. *Reporting to stakeholders*

At some point, the evaluation results need to be communicated to the stakeholders and the wider community. Different reporting mechanisms may be appropriate for different stakeholders. The staff of the cluster organisation and the key cluster stakeholders need to be provided with a written report accompanied by a verbal presentation by the evaluation team. The wider community should be informed by means of journal articles, conferences, seminars and publications on the relevant websites. Mature cluster organisations typically publish their annual reports on the cluster website.

The conclusions and recommendations that come out of evaluation help cluster organisations make effective decisions about the further course of action and lead to adjustments in the cluster's strategy and action plan, thereby closing the cluster management cycle.

Excellence in cluster management

- ✓ Based on the results of monitoring and evaluation, cluster objectives and the objectives of the cluster organisation are regularly reviewed, and the course of action is adjusted, if needed.
- ✓ The cluster organisation prepares annual cluster reports with a brief overview of the progress made during the last year and shares those reports with a wider community.
- ✓ Cluster managers maintain regular contacts with cluster organisations from other clusters to exchange experiences and best practices with regard to cluster performance measurement.
- ✓ The evaluation results are communicated to the key stakeholders and the wider community.

3. *The essence of cluster governance*

So far in this report, we have been examining the notion of cluster management. However, we suggest that focusing on cluster management alone is not enough for cluster excellence, and that the notion of cluster governance has to be brought onto the stage. Cluster governance refers to the intended *collective* actions of cluster *stakeholders* to advance the cluster and develop a sustainable competitive advantage. We were able to observe that clusters driven exclusively by the efforts of cluster managers and without joint commitment of the stakeholders are doomed to fail.

3.1. *Distinguishing between cluster management and cluster governance*

Cluster governance should not be equalled to cluster management. While cluster management is about the actual management of the cluster, cluster governance is about ensuring that the cluster is well managed. Cluster governance represents the interests of cluster stakeholders (e.g., universities and research institutes, large and small companies, government, supporting structures etc.), while cluster managers strive to serve the needs of cluster stakeholders. Cluster management addresses day-to-day cluster activities such as planning, allocation of human and financial resources, monitoring cluster progress etc. Governance, in turn, among others refers to appointing cluster managers and evaluating their performance, setting the vision and strategy of the cluster and approving action plans.

Table 1 provides an overview of the key differences between cluster governance and cluster management.

TABLE 1: Cluster Governance vs. Cluster Management

Aspect	Cluster Governance	Cluster Management
Essence	The intended collective actions of cluster stakeholders to advance the cluster and develop a sustainable competitive advantage	The organisation and coordination of the activities of the cluster in accordance with certain strategy, in order to achieve clearly defined objectives
Actors	Triple Helix actors (i.e., representatives of academia, industry, government)	Cluster managers (i.e., professionals appointed by cluster stakeholders)
Responsible entity	Cluster governance board	Cluster organisation
Key responsibilities	Making sure the cluster is well managed: appointing cluster managers, evaluating their performance, developing vision and strategy, approving cluster plans etc.	Managing and enhancing the overall performance of the cluster: carrying out day-to-day cluster activities such as planning, allocation of human and financial resources, monitoring cluster progress etc.

3.2. Cluster governance in the life-cycle of a cluster

Cluster governance is about the formalisation of relationships among cluster members, and it is not immediately present once the cluster is established. In the beginning of the cluster’s life-cycle, the need for cluster governance may not always be obvious for all cluster participants. One of the key prerequisites for cluster participants to consider the issues of cluster governance refers to a strong external pressure of (foreign) competition. Without such common external threat, it often becomes highly challenging to convince cluster participants that there is a need for cluster governance¹⁶.

It may take some time before cluster members decide how the cluster should operate, what its objectives should be and how those can be achieved most efficiently. Gradually the governance arrangements will become more clear, and can be codified in a cluster governance agreement. However, if governance discussions take place too early in the life cycle of the cluster, there is a risk that the strongest and the most powerful members will dictate the governance arrangements without a clear picture of how the cluster will function over the next several years.

3.3. Cluster governance model

Figure 2 presents the key elements of the cluster governance model. As a basis for the model, we used the major characteristics of good governance suggested by the United Nations¹⁷ complemented by the notion of Triple Helix¹⁸.

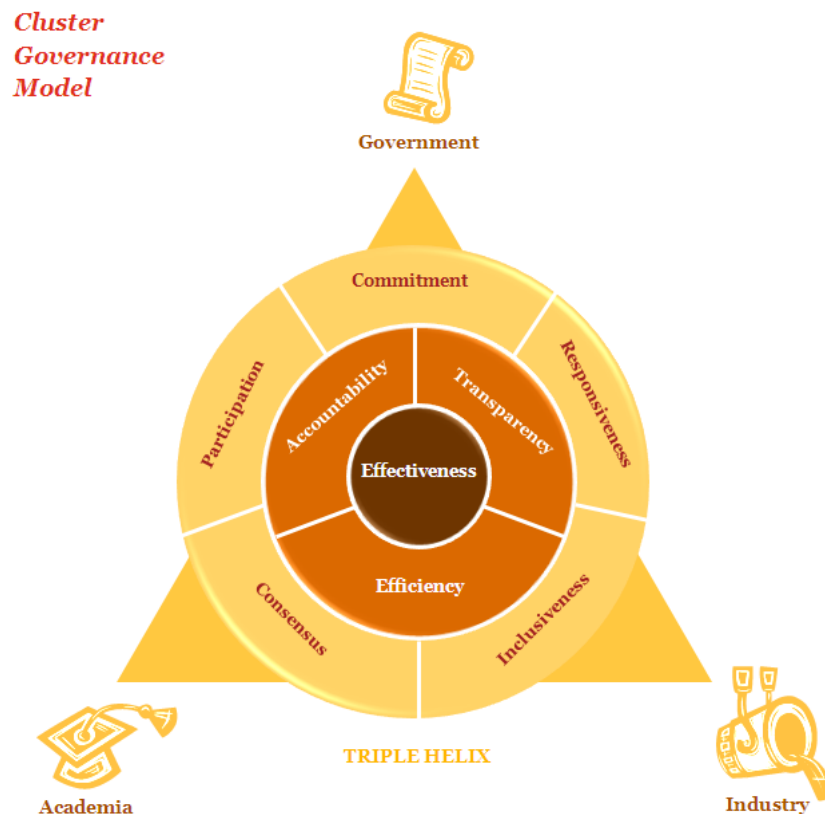


FIGURE 2: Cluster Governance Model

16 Gilsing, V. (2000) Cluster governance: How Clusters Can Adapt and Renew over Time. Paper presented at the DRUID PhD conference, Copenhagen
 17United Nations (2007) What is good governance?, <http://www.unescap.org/huset/gg/governance.htm>; see also PricewaterhouseCoopers (2007) Staying in control while unlocking the knowledge: Practical study on good governance for knowledge institutions with regard to knowledge valorisation process. http://www.pwc.com/nl_NL/nl/assets/documents/pwc-good-governance-oktober-2007.pdf
 18 Etzkowitz, H. (2008) The Triple Helix: University-industry-government innovation in action. Routledge

The key elements of the model refer to the fundamental values of the cluster members that determine how they participate in the cluster in order to achieve its vision. These values include:

- Effectiveness;
- Accountability;
- Transparency;
- Efficiency;
- Commitment;
- Responsiveness;
- Inclusiveness;
- Consensus; *and*
- Participation.

In the remainder of this chapter, we discuss each of those values in more detail. Although, as illustrated above, cluster governance and cluster management are two distinctive notions, in this chapter, we will continue focusing on ***the role of cluster managers*** in ensuring there is excellent cluster governance.

3.4. Effectiveness

Effectiveness means focusing on the cluster's vision and the outcomes for its stakeholders and beneficiaries. It comes down to formulating a clear mission and objectives of the cluster and being clear about the functions of the cluster governance board.

Governance typically begins by setting down the membership arrangements (i.e., who is part of the cluster) and the duties and responsibilities of the members (i.e., what the members are expected to do). The governance structure also clarifies the decision-making process, i.e., what types of decisions the members of the cluster have the authority to make. In addition to the roles and responsibilities of members, the role of the cluster organisation should also be described. The governance agreement should contain specific terms and conditions related to member withdrawal from the cluster (e.g., if a company decides to move to another region). For instance, if the member has received funding for executing a cluster project, withdrawal from the cluster may only occur upon conclusion of the member's obligations. Another important aspect refers to the role of special interest committees, task forces and advisory groups. Finally, the governance agreement typically includes the procedures of cluster project proposals and evaluation of results¹⁹.

The governance structure should be developed for a limited period of time (e.g., three years), with evaluation activities incorporated into the governance agreement. In the final year of the agreement, the governance structure should be evaluated, and decisions should be made about the continuation of cluster governance in the current way or its transformation, if necessary. Such evaluation also provides an opportunity to renew the vision of the cluster.

Excellence in cluster management

- ✓ The cluster organisation carries out stakeholder consultation to gather input for the vision, strategy and action plan of the cluster.
- ✓ The activities of the cluster organisation are derived from the key stakeholder issues and are of proactive rather than reactive nature.
- ✓ The cluster organisation establishes a dialogue with the cluster stakeholders to ensure it is aware of issues important to the stakeholders. The stakeholders are offered a platform to ask questions and provide their opinion, and the stakeholder inputs are constantly taken into account.

¹⁹ Creech, H. and Willard, T. (2001) Strategic Intentions: Managing knowledge networks for sustainable development. International Institute for Sustainable Development

3.5. Accountability

Accountability refers to an obligation of cluster members to account for their joint activities and to accept the related responsibilities. In practice, cluster governing bodies have multiple accountability relationships. Those include the relationships with Triple Helix actors, i.e., academia, industry and government from the region and nationally, as well as to the market and society in general.

Cluster's accountability to **academia** implies cluster's obligation to stimulate the development of new companies and products from university research and thereby boost knowledge commercialisation. Academic actors participating in cluster activities are likely to benefit from gaining access to industry skills and facilities, from keeping abreast of industry problems, as well as by securing additional funding for research and getting access to the initial markets for their spin-offs.

Cluster's accountability to **industry** refers to the cluster's obligation to provide access to skilled personnel and offer opportunities to establish collaborative partnerships with both academic and industrial actors. In addition, companies are likely to benefit from gaining access to expensive equipment of universities and other research institutes. Furthermore, big industry is often dependent on small firms concentrated in knowledge-intensive clusters. As large firms become even larger (e.g., due to mergers and acquisitions), they usually do not increase their amount of scientific discoveries with the same pace. In fact, existing research shows that large firms typically experience a decreasing number of discoveries. New ideas usually come out of smaller dedicated firms located in clusters. Consequently, clusters provide large companies with a strong knowledge base²⁰.

Government has traditionally been considered the most important stakeholder in terms of accountability relationships. Clusters' accountability to government primarily refers to the fair use of budgets that were meant to be spent on cluster activities, as well as the achieved results (determined based on the key performance indicators). The latter typically include employment growth in the region, attracted venture capital, entrepreneurial climate in the region (e.g., nr of new companies, nr of new products) etc.

Cluster's accountability to the **market** implies the cluster's obligation to create added value. Cluster's accountability to **society**, in turn, implies cluster's obligation to generate products and services leading to a higher quality of life for the whole society.

Excellence in cluster management

- ✓ Cluster objectives are tailored to the needs of all relevant stakeholder groups (i.e., specific sets of objectives are developed for specific stakeholder groups).
- ✓ Separate groups of performance indicators are developed for measuring cluster accountability to different stakeholder groups (e.g., academia, industry, government, market and the society in general).

3.6. Transparency

Transparency implies openness of the cluster when it comes to sharing information about its functioning with others. In practice, this means sharing information related to existing conditions, decisions and actions that provides the society as a whole with sufficient information to judge the management of the cluster. This information can be provided, for example, by means of newsletters, publications on the website, presentations and workshops. Information, however, must be timely, accurate, relevant and complete for it to be used effectively.

²⁰ Anderson T., Schwaag Serger S., Sorvik J., and Wise Hansson E. (2004) The Cluster Policies Whitebook. International Organisation for Knowledge Economy and Enterprise Development (IKED)

A specific component of transparency refers to financial transparency. The financial transparency relies on good records management, accounting (including planning, budgeting, spending, internal control and auditing, and financial reporting) and external auditing.

The financial flows administered by the cluster organisation are typically quite transparent, but those only represent a tiny part of investments in cluster development. Gathering data on the total investments in the cluster, however, often represents a big challenge for cluster managers. In particular, the amount of invested venture capital often does not get disclosed.

Excellence in cluster management

- ✓ The cluster organisation regularly produces and disseminates reports on cluster progress (progress papers). These reports are given wide publicity through print and electronic media.
- ✓ Discussions, seminars, meetings and other similar events are organised to discuss strengths and weaknesses, opportunities and threats of the cluster and cluster management.
- ✓ Annual cluster reports are prepared containing an overview of cluster members, vision, mission, activities that were undertaken, financial statements for the year reported, achievements and failures, as well as outstanding results.

3.7. Efficiency

While the effectiveness of the cluster refers to doing the right things, its effectiveness, in turn, implies doing things right. It is about the transactional costs of clusters, and it refers to the management of relationships within the cluster, motivation and performance of its members, as well as the cost effectiveness of the cluster approach. Financial efficiency refers to attracting additional funds to cluster activities, renewal of grants and the amount of direct financial contribution and in-kind support from cluster members, as well as the amount of money secured for cluster management.

Excellence in cluster management

- ✓ Measuring the efficiency of cluster management is built into the annual evaluation.
- ✓ A monitoring system is in place providing data on cluster performance against its planned strategies and operational targets.

3.8. Commitment

Joining a cluster implies long-term commitment to collaborative effort. Furthermore, such commitment goes beyond individual relationships and implies commitment of the whole member organisation (e.g., university, company). In addition, cluster members often require a significant amount of in-kind support from member institutions, especially during gaps in specific project funding.

The commitment of government proves to play a crucial role in cluster development. The key government measures that prove to be effective refer to the inclusion of cluster approach and specific clusters in governmental policies and strategic plans, including financial support. The latter proves to be particularly important at early stages of cluster development. At the same time, high unpredictability of continuation of

governmental support is often mentioned by cluster managers as the key barrier for the development of the cluster.

Excellence in cluster management

- ✓ Cluster managers are able to demonstrate to the cluster members that it is worth the additional investment of time and effort in order to sustain cluster momentum over time.

3.9. Responsiveness

Responsiveness means making sure that cluster objectives and activities respond to the present and future needs of its key stakeholders (i.e., academia, industry and government), the market and society in general. The latter refer, for example, to improving quality of life through developing revolutionary medical technology, educating new generations of professionals, producing healthier food, reducing CO₂ emissions etc. Cluster's responsiveness to the needs of society should be manifested in its vision (see Chapter 2). Responsiveness ensures added value and sustainability of the cluster.

Knowledge-intensive clusters function in a highly complex and unpredictable technological, regulatory and financial environment. As a result, the present and future needs of the key stakeholders, the market and the society in general may change with time. Consequently, it is crucial to constantly monitor changes in the environment and, if necessary, to adjust cluster objectives to better reflect those changes.

Excellence in cluster management

- ✓ Cluster objectives and activities respond to the present and future needs of its key stakeholders (i.e., academia, industry and government), the market and the society in general.
- ✓ Cluster objectives are regularly reconsidered to make sure those are still in line with the latest developments within technological, regulatory and financial environment.

3.10. Inclusiveness

Inclusiveness in cluster governance implies equal participation, equal treatment and equal rights of cluster members. It means that all stakeholders, including start-ups and SMEs, have the right to meaningfully participate in governance processes of the cluster and influence decisions that affect them.

Inclusiveness also refers to the sense of belonging to the cluster. Cluster organisations typically try to enhance the sense of belonging to the cluster by providing courses, organising round tables, workshops and other events on a regular basis. We were able to observe that not all companies feel being part of the cluster, because not all of them are engaged in actual collaborations within the cluster. Some companies work directly with organisations from abroad. The ones that do collaborate within the cluster, feel the need to do so in order to survive high competition outside the cluster.

Excellence in cluster management

- ✓ The cluster organisation tries to enhance the sense of belonging to the cluster by bringing cluster members together and demonstrating the benefits of joint action.

3.11. Consensus

Consensus reflects a need for the mediation of different interests in order to reach a broad consensus in what is the best interest for the whole region and how it can be achieved. Knowledge-intensive clusters involve diverse actors from public and private sectors. Those, among others, include various levels of government (e.g., city, region), universities and research centers, large and small companies, Science Parks, Technology Transfer Offices and incubators, business and legal advisors, financial institutions and other supporting structures. This results in an environment in which the emphasis is put on collaborative partnership, and the responsibility for outcomes does not lie with a single actor. Furthermore, each of the actors has own agenda, and the clashes of interest are likely to arise.

The orientation of the cluster towards consensus implies putting in place a strong system of agreements that define expectations and obligations of various cluster stakeholders. One of the key sources of disagreement among cluster members typically refers to the ownership of IP rights. However, as the cluster is usually not a separate legal entity, the cluster governance agreements typically do not cover the IP issues. The latter are often included in the funding agreements for specific projects and activities undertaken by cluster members.

Excellence in cluster management

- ✓ Expectations and obligations of different stakeholder groups are defined in the cluster governance agreement.

3.12. Participation

Participation implies that no specific types of organisations (e.g., start-ups, SMEs, large companies) are excluded from participation in cluster activities. Special attention should be paid to participation in case of multi-region or transnational clusters. Cluster managers should take into account not only the issues of geographical proximity, but also cultural differences and communication habits.

4. *In pursuit of excellence: concluding remarks*

From our experience in working with different clusters from all over the world, we were able to conclude that there is no golden recipe for excellence in cluster management. Not only do different clusters require different approaches, but even the same cluster is likely to require new approaches as it passes through various stages of its development, or in response to various external drivers.

Cluster managers operate in a turbulent, uncertain and highly complex environment. The key uncertainties, among others, are related to the continuity of commitment of the key stakeholders, financial instability, changes in technological and regulatory fields, external competition and market developments. To survive in such unpredictable environment, ***adaptive management structures are needed***, i.e., the structures that are able to change over time.

Adaptive cluster management provides a way to systematically reduce uncertainty through ***designing and carrying out management actions as experiments***. Such experiments help learn how the cluster responds to management and thereby increase the level of certainty regarding how cluster objectives can be best achieved. Adaptive cluster management requires a clear articulation of *what* the cluster organisation would like to achieve (i.e., desired outcomes), as well as the uncertainties about *how* to get there²¹. The adaptive management process includes setting objectives, actual acting, effectiveness monitoring, evaluation of the results, and the use of this new knowledge to adjust future actions (see Cluster Management Cycle in Chapter 2).

One of the key elements of adaptive cluster managements refers to a ***regular review of both cluster objectives and the objectives of the cluster organisation***. Such reviews are particularly important for operational objectives, i.e., there is a need to regularly check whether those actually lead the cluster towards achieving its strategic objectives. Operational objectives should be reviewed when new information becomes available. Strategic objectives may also require reconsideration later in time. Usually it should be done once in three-five years by means of conducting objective-free evaluation. It does not necessarily mean that strategic objectives need to be changed. It is more about the validation of the relevance and feasibility of strategic cluster objectives after a certain period of time. While the revision of operational objectives is typically done by cluster managers themselves, the revision of strategic objectives requires active engagement of cluster stakeholders and it typically carried out by the cluster governance board based on evaluation results.

An active adaptive cluster management process implies ***'trying out' various types of actions*** in order to achieve cluster objectives and ***learning from the results of those actions***. Such actions could, for example, include organising thematic meetings and events, creating Special Interest Groups, developing on-line match-making system for cluster members, providing educational seminars and training etc. These actions do not necessarily have to be large-scale, nor do they have to be long-term oriented. The effectiveness of such actions can often be determined quite soon after those were carried out, for example, by tracing how many new collaborations were initiated as a result of a certain activity carried out by the cluster manager.

Hence ***monitoring and evaluation*** are crucial for determining which activities of the cluster organisation lead to the best results. Although, if different types of activities aiming at a common result are carried out simultaneously, it may be quite a challenge to identify the contributions of individual types of activities. Nevertheless, in most cases, causal linkages between the activities of the cluster organisation and the immediate outputs of those activities are relatively clear. Therefore, a selection of a comprehensive set of output and intermediate outcome indicators may be best to ensure relevance for decision making for the cluster governance

²¹ For a general discussion on adaptive cluster management see Murray, C., Marmorek, D. (2004) Adaptive Management: A Spoonful of Rigour Helps the Uncertainty Go Down. Paper presented at 16th International Conference Society for Ecological Restoration, August 24-26, 2004, Victoria, Canada

board. However, there is a risk of holding the cluster organisation accountable for outcomes over which they have limited control²².

Adaptive cluster management implies **adaptive performance measurement systems**. There is a clear need to tailor cluster performance measurement systems to the interests of different stakeholder groups (i.e., industry, academia, government, investors), as well as to different stages of a cluster life-cycle (i.e., emerging, developing, mature, declining). Different sets of indicators are thus required for different levels of analysis. Consequently, excellent cluster management is based on a multi-level performance measurement system which is able to generate customised outputs. Some of the indicators employed by such systems would, for example, be more relevant for discussions with government and lobbying purposes, while other types of indicators would be more effective in attracting venture capital and other investments.

As demonstrated in Chapter 3, excellent cluster management implies **active engagement of cluster stakeholders at all stages of the management cycle**. Consequently, cluster management is about the ability to build and maintain relationships with people, the ability to change mentalities, overcome resistance and cultural differences, create collaborative environment and inspire others.

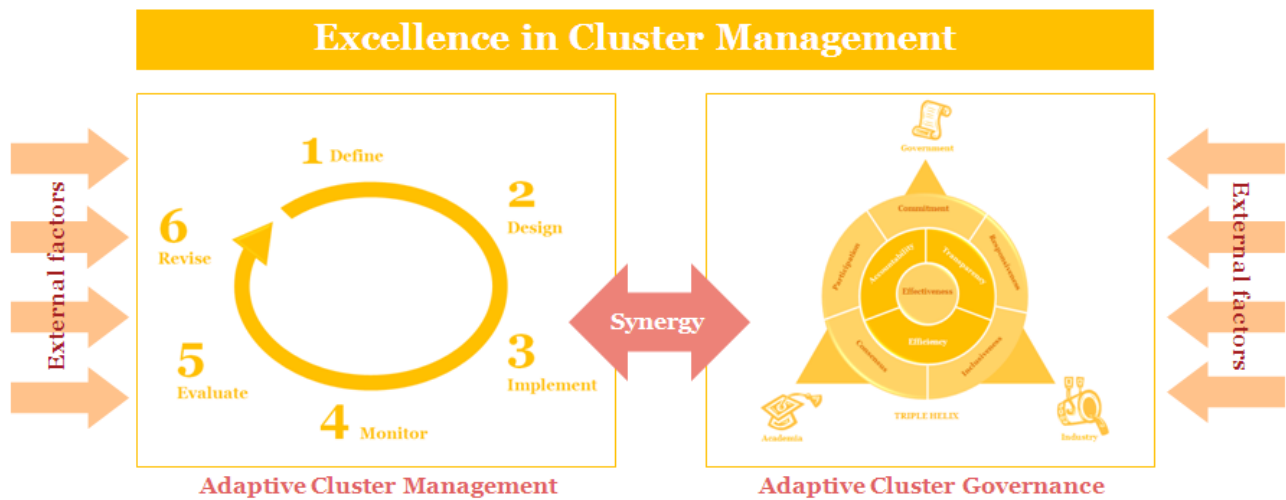


FIGURE 3: Excellence in Cluster Management

These are by far the most heavily emphasised aspects of cluster management which form the key pillars of cluster management excellence. By this report we aimed to shed some light on what cluster management actually is and what aspects are likely to make it excellent. We are committed to support cluster managers from all parts of the world on their way towards professionalism, thereby helping them to position their clusters at the forefront of the knowledge-based economy. We will highly appreciate your feedback on the information presented in this report. Please feel free to email your specific remarks or general impressions to Kristina Dervojeđa at kristina.dervojeđa@nl.pwc.com.

²² OECD (2009) Governing Regional Development Policy: The Use of Performance Indicators

Cluster Advisory Practice

The objective of Cluster Advisory Practice (CAP) is to assist cluster managers in Europe and globally in professionalisation of their services. CAP stands for a combination of top flight qualifications, local knowledge, global reach and Thought Leadership in the field of knowledge-intensive clusters.

We support cluster managers in the following areas:

- cluster governance;
- measurement of cluster performance;
- project management, monitoring and evaluation;
- change management and human resources;
- strategic and operational planning.

A Comprehensive Range of Services

The specific services that we offer to cluster managers, among others, include:

- development of cluster performance measurement systems;
- carrying out cluster impact evaluations;
- development of communication plans and roadmaps;
- assistance with cluster governance (including the development of cluster governance models);
- development of cluster's vision, strategy and/or action plan.

Individual Approach

In the course of our work with various clusters, we have developed rigorous methodologies and efficient tools for comprehensive cluster performance measurement, cluster stakeholder analysis and cluster impact evaluation. However, we are convinced that 'one size fits all' approach is not applicable to knowledge-intensive clusters. Therefore, we treat each assignment individually, and together with cluster managers and cluster stakeholders we develop unique solutions that best fit the needs of the cluster in question.

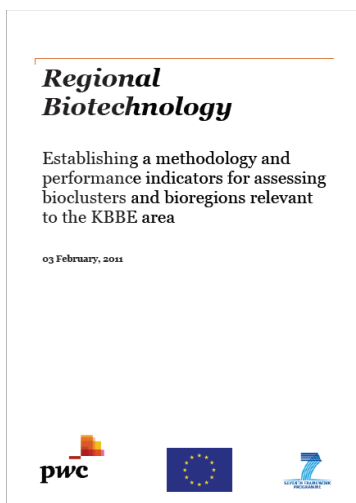
Global Possibilities and Local Knowledge

As one of the world's leading providers of professional services, we understand the importance of local specificities. The PwC network of firms has offices in all major cities and countries, and our dedicated CAP team comprises experts from all over the world. As a result, when carrying out assignments, we are able to achieve synergy of our global capabilities and local knowledge.

For more information on Cluster Advisory Practice please visit:

<http://www.pwc.com/nl/nl/subsidie-innovatie-beleid/cluster-advisory-practice.jhtml>

Other Relevant Publications



Regional Biotechnology: Establishing a methodology and performance indicators for assessing bioclusters and bioregions relevant to the KBBE area

This publication represents the Final Report of the “Regional Biotechnology” study that PwC has been commissioned to carry out by the European Commission, Directorate-General for Research and Innovation (DG Research and Innovation). The study aimed to identify and develop an adequate set of performance indicators specifically tailored to the needs of bioclusters, as well as to identify the critical success factors of cluster excellence including scientific and industrial base, financial support and relevant infrastructure. The main outcome of the study refers to a flexible policy tool that allows measuring the performance of bioclusters on a regular basis. The tool is applicable to both health and non-health bioclusters. In addition, the study provided a set of practical recommendations for policy-makers with regard to cluster support and development. These recommendations include an overview of best practices and proposed integration of identified regional policies in the wider EU innovation strategy.

Year of publication: 2011

Web link: <ftp://ftp.cordis.europa.eu/pub/fp7/kbbe/docs/regional-biotech-report.pdf>



See the future: Top industry clusters in 2040 revealed

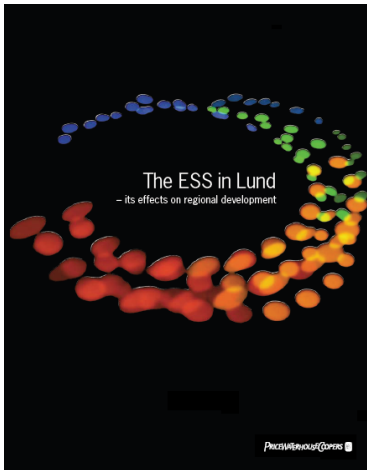
The old economic order is shifting. As the global economy recovers some emerging markets are likely to grow faster than traditional economic powers. At the industry level, these shifts are even more apparent with accelerating capital flows, fundamental demographic changes, and the rise of state capitalism reshaping the world map for many sectors. PwC's Macro Consulting team has developed a tool to map future clusters across the world. This report uses this tool to highlight the geographical locations that will host the largest clusters in five industries:

- pharmaceuticals
- automobile assembly
- asset management
- filmed entertainment and
- tertiary education

The expected top locations in 2025 and 2040 are disclosed for each of these sectors highlighting key trends for the industry and how the new economic order will influence future geographical winners.

Year of publication: 2010

Web link: <http://www.pwc.com/gx/en/consulting-services/see-the-future/assets/see-the-future.pdf>



The ESS in Lund – its effects on regional development

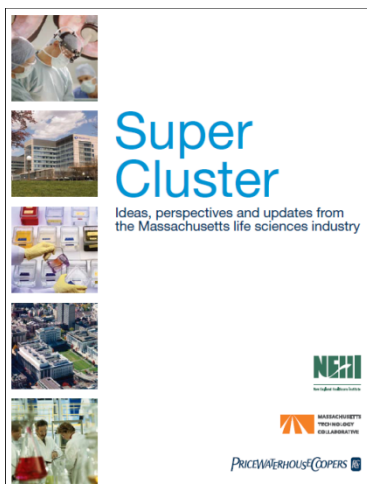
As commissioned by Region Skåne, PricewaterhouseCoopers (PwC) has carried out a study on the expected effects on regional development as a result of siting the ESS in Lund. The study has been carried out along two parallel tracks– one quantitative, the other qualitative. The former includes prognoses for growth in a number of selected sectors while the latter has its origins in an analysis of the world situation, a questionnaire, interviews and seminars that have resulted in a proposal for a common view of how the ESS (together with MAX IV) affects the development of the region in a number of fields.

As we see the situation, the whole of the ESS and MAX IV process is completely in keeping with, and creates the content of, the visions, aims and strategies that apply to the whole of Skåne based on the objectives of the regional development programme, growth, attractiveness, sustainability and balance.

The two tracks in the process are conditional on one another. The vision cannot be realised if the assumptions and measures that are indicated quantitatively do not occur and are implemented combined with a qualitative interactive process.

Year of publication: 2009

Web link: http://www.skane.se/upload/Webbplatser/Skaneportalen-extern/dokument/ESSengPart_one.pdf



Super Cluster: Ideas, perspectives and updates from the Massachusetts life sciences industry

The Massachusetts life sciences super cluster includes the activities of the state's world-class universities, teaching hospitals and research institutions, biotechnology, medical device and pharmaceutical companies, as well as the many software, venture capital, plastics and IT companies that contribute to the growth and vitality of the life sciences. Through the years it has provided a sustainable, growing economic foundation for the Commonwealth. Because of the groundbreaking work that has emanated from the super cluster, Massachusetts is recognized globally for discovering treatments and cures for the infectious and chronic diseases that afflict society.

This report is both a celebration of the success and potential of the Massachusetts life sciences super cluster as well as a warning against complacency. It contains articles by and interviews with some of the super cluster's biggest stars, including a Nobel Prize winner, top pharmaceutical, biotechnology and medical device CEOs, and experts from academia, medicine, venture capital and state government. It describes the current state of the life sciences super cluster, the outlook for the future, and critical areas of improvement so it can realize its true benefit to society.

Year of publication: 2007

Web link: <http://www.masslsc.com/SuperCluster.pdf>

This report has been prepared for general guidance on matters of interest only, and does not constitute professional advice. You should not act upon the information contained in this report without obtaining specific professional advice. No representation or warranty (expressed or implied) is given as to the accuracy or completeness of the information contained in this report, and, to the extent permitted by law, PricewaterhouseCoopers does not accept or assume any liability, responsibility or duty of care for any consequences of you or anyone else acting, or refraining to act, in reliance on the information contained in this report or for any decision based on it. This report (or any extract from it) must not be copied, redistributed or placed on any website, without PricewaterhouseCoopers' prior written consent.

"PricewaterhouseCoopers" and "PwC" refer to the network of member firms of PricewaterhouseCoopers International Limited (PwCIL). Each member firm is a separate legal entity and does not act as agent of PwCIL or any other member firm. PwCIL is not responsible or liable for the acts or omissions of any of its member firms nor can it control the exercise of their professional judgment or bind them in any way. No member firm is responsible or liable for the acts or omissions of any other member firm nor can it control the exercise of another member firm's professional judgment or bind another member firm or PwCIL in any way.