The Cluster Initiative Greenbook 2.0

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Acknowledgements

The original Cluster Initiative Greenbook was launched at the TCI Annual Global Conference in Gothenburg in September, 2003. The idea, initially formulated by Emiliano Duch and Lars Eklund, was to take stock of what was going on in terms of organizing clusters around the world. Thus, the Greenbook presented the first comprehensive study of cluster organizations: what they were doing, how they were organized and governed, how they were financed, and not least some measure of good or bad performance.

For this study, PhD candidate Assia Viachka acted as our research assistant throughout the whole project, working with the survey data. Assia did a tremendous job of first creating the survey, then reminding respondents to fill in the survey, and finally transforming data into legible tables. We sincerely thank her for that work.

We are also grateful to all the cluster managers around the world who took the time to fill in the survey.

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Now, a decade after Gothenburg, celebrating the 16th TCI Annual Global Conference in Kolding, Denmark, we are pleased to present the Greenbook 2.0.

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Executive summary

- This book presents a study of cluster initiatives: what they do, how they operate, how they perform. It revisits issues studied in the Cluster Initiative Greenbook, published in 2003, and adds some new perspectives on cluster initiatives and cluster policy. Another previous study was conducted in 2005.
- The analysis is based on data from 356 cluster organizations in 50 countries world-wide, primarily in OECD countries. The data was collected through the Global Cluster Initiative Survey (GCIS) in 2012. Respondents were cluster managers.
- Most CIs active in 2012 were initiated in 2007 or later. The most common sectors targeted by cluster initiatives (CIs) are IT, Food, Automotive, Green Technology, Health and Energy.
- Cluster initiatives have on average a staff of 4 employees (compared to 2 in 2005). 87% have a website (79% in 2005).
- Most CIs have half or more of the cluster firms in one-hour driving distance from the CI's office. About a third of CIs have most of the firms on a greater distance.
- 73% of CIs have formal membership (up from 64% in 2005). Among these CIs, the average number of members is 80. Restrictions on formal membership are quite rare, the most common being that no firms outside the target region may join.
- 41% of CIs were initiated primarily as reaction to a public call or policy program, and equally many primarily as a private sector initiative. The remaining 18% had more complex backgrounds.
- From a list of ten objectives, two objectives relating to generally promoting collaboration in the CI, namely Identity and brand and Strategy and vision, have the highest priority ratings, followed by Innovation and R&D and Business environment improvement. Joint purchasing is the objective with the lowest priority ratings. On average, CIs rate 3.9 objectives out of ten as "high priority".
- CIs with large staffs pursue more objectives. In particular, Innovation and R&D, export promotion, promoting cluster growth and investment, value chain development, and joint purchasing are all objectives particularly pursued by CIs with a large staff size.
- CIs with many members also pursue more objectives, in particular Strategy and Vision, Export promotion, and Growth and investment.
- With respect to age, the pattern is that the number of objectives with "high priority" increases after the first five years, and then declines again after the second five years.
- On average, 34% of CI revenues come from primarily private sources, such as membership fees and sales of services. About 54% come from public sources, mainly regional and local public funding. 12% come from other sources.

Disregarding the "other" group, this gives a split of public vs. private funding of about 60/40.

- Contrary to what we found in the study in 2005, the split 60−40 does not vary with age. National public funding decreases with age, but this is compensated by an increase in international public funding. Regional public funding remains rather constant. For private funding, a drop in membership fees is compensated by a growth in sales of services.
- The average cluster manager has 3-5 years' work experience with cluster initiatives. Half of them have worked 6 years or more in the private sector, while experience from the public sector, academia or non-profit organizations is less extensive. Work experience in the financial sector is the most rare.
- 65% or CIs are legal entities. The main governing boards are dominated by representatives from the private sector, who on average make up 61% of the board, compared to 16% for academia and 14% for the public sector. In 73% of CIs, members appoint the main governing board.
- 62% of CIs are subject to a formal evaluation. 85% collect some form of evaluation data at least annually. Various data sources are used, the most common being member surveys, followed by stakeholder interviews, industry statistics and peer benchmarking.
- The cluster manager's work experience with cluster initiatives is strongly correlated with the CI's performance. Previous work experience in the private sector has some relationship to performance, but apart from that the previous work experience does not seem to matter much.
- Having a large staff is strongly related to performance, while having cluster firms nearby is not.
- Objectives most strongly related to cluster growth performance is Growth and investment, and Joint purchasing. For innovation performance, the strongest relationship is with Export promotion, Innovation and R&D (not surprisingly), Growth and investment, and Strategy and vision. For competitiveness performance, Export promotion is strongly related, but also Innovation and R&D, and Growth and investment.
- As was also the case in 2003, CIs addressing strong clusters perform best. High levels of trust also have a positive effect on performance, mainly internal performance (i.e. meeting deadlines and goals, becoming financially sustainable, attracting new participants).
- Cluster managers are most frequently in touch with representatives for firms, followed by the public sector, research institutions, education institutions, other cluster organizations, international markets, and least frequently with financial institutions.
- The cluster managers frequency contacts with different types of actors is related to performance, especially contacts with firms, other clusters and global markets.
- The priority given to collaboration with firms is strongly related to performance, as is the priority given to collaboration with other clusters, global markets, and financial institutions.
- Contact frequency and collaboration priority with research institutions, education institutions and public organizations are not directly related to performance.
- In cluster policy, the emerging hypothesis is that cluster policy is more likely to be beneficial if it is focused on leveraging clusters rather than creating them.

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Chapter 1
A decade later

In the foreword to the original 2003 Greenbook (Sölvell, Lindqvist & Ketels, 2003), Professor Michael Porter wrote: "As more and more resources are devoted to efforts to foster cluster development, the need to understand best practice has become urgent". The first Greenbook tried to do exactly that. We analyzed what cluster organizations were up to; what objectives they pursued, how they were initiated, governed and financed, and what explained their performance. We think it is fair to say that the Greenbook was very timely and was well received (and later translated into Czech and Polish). The number of downloads is now several tens of thousands.

A couple of years after the Greenbook, we followed up with new data, focusing on cluster initiatives in developing and transition countries, and the "Bluebook", was born. Now, a decade later, with fresh data from the 2012 Global Cluster Initiative Survey (GCIS), we are proud to present the Greenbook 2.0.

The original Greenbook was the first comprehensive study of cluster initiatives around the world, and dealt with the territory between "natural" and "planned" clusters. In this territory we saw room for organized cluster initiatives, which we defined as:

> "Cluster initiatives are organized efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community."

Now, after another decade of research on the concepts of clusters, cluster initiatives and cluster organizations, we think that this definition still holds. However, let us take a closer look at two of the parts of the definition: organized efforts, and growth and competitiveness, and see how they have evolved over the last decade.

Cluster initiatives and cluster policy becoming more organized

A decade ago, many of the initiatives were quite entrepreneurial, and often without a robust legal form or clear policy framework surrounding them. Cluster initiatives constituted a mix of bottom-up private initiatives and top-down public initiatives. Over time, formal cluster policies and programs have gained legitimacy across the world, and today almost every country, region and international aid agency has some form of a cluster program. In the 1990s we saw the beginning of what could be labeled "cluster policy"(Raines, 2001; Swann, 2006; Ketels & Memedovic, 2008). Inspiration came from work on regional innovation systems (Cook, 2002; Asheim & Gertler, 2003), the learning region (Morgan, 1997), knowledge spillovers (Audretsch & Feldman, 1996), and most importantly Michael Porter´s work on clusters and competitiveness (Porter, 1990). Critical voices have

also emerged (Martin & Sunley, 2003; Asheim, Cook & Martin, 2006; Duranton, 2011).

Cluster policy tends to have a focus on interaction and collaboration (Rosenfeld, 1996, 1997), by constructing frameworks for localized networks (Morgan & Nauwelaers, 1999). Thus, it is not directed directly to firms but more towards how firms interact, with other firms and with other actors on the cluster stage. As Diez (2001) puts it: "rather than an innovation policy for companies, it is a question of an innovation policy with companies". The concept of cluster policy will be further developed in Chapter 5.

The emergence of cluster inspired policy has expanded the territory of cluster initiatives and cluster organizations; to such extent that we now can talk about an "industry" of organized clusters. There are clear policies in the fields of innovation, regions and industry, using organized clusters as political tools – tools for enhanced innovation, growth and competitiveness. These policies in turn set the rules of the game and select on certain cluster forms and strategies. Thus, depending on the international, national and regional policy frameworks at play, we see certain cluster organizations being promoted, in terms of their forms, strategies and activities/services. Industry focus can vary where sometimes certain industries are favored (e.g. high-tech in many parts of the world), activity focus can be on innovation promotion (e.g. in northern Europe) or business development (e.g. promoting SME cooperation in developing countries). And financial set-up can vary from 100% public financing to various forms of co-financing. Yet other cluster programs promote membership of cluster organizations whereas others are more prone to work with more loosely couple d partners. All these developments are examples of institutional isomorphism (DiMaggio & Powell, 1983).

As a case in point let us take a look at Europe. By means of EU funding, accreditation schemes for cluster organizations have now emerged (www.cluster-excellence.eu). European cluster organizations can thus apply, and if successful, receive bronze labels and gold labels through this accreditation process. This creates normative pressures on cluster organizations in Europe to adhere to certain principles and institutional rules as adopted by the accreditation organization. Over time, talk about cluster initiatives, implying a wide variety of bottom-up activities, has been replaced by talk around cluster organizations and national and regional cluster programs. A decade ago we analyzed the role of the cluster facilitator or the "clusterpreneur". Now they have become "managers", with a set of professional norms and institutions. A couple of years ago the EU Commission launched a "cluster managers club" for training and exchange of practices.

In 2007, the European Cluster Observatory (www.clusterobservatory.eu) was launched, offering data on cluster organizations, in addition to cluster mapping data on more than 600 industries in over 400 regions. In 2013 the U.S. Department of Commerce, in collaboration with Harvard Business School, launched a U.S. web-based mapping tool, also including both clusters and cluster organizations. Thus, cluster organizations have become a natural species on the cluster commons.

Other initiatives to institutionalize the "industry" in Europe include awards (e.g. Cluster Manager of the Year Award since 2006), and other means of public recognition (www.cluster-excellence.eu). For matchmaking between clusters there is a European collaboration platform (www.clustercollaboration.eu), and special matchmaking events are organized for cluster organizations and their member firms by a number of organizations across Europe.

On the global scene, The Competitiveness Institute (TCI) has gained massive interest from cluster practitioners around the world. Every year there are a number of regional conferences gathering the industry, and once a year there is a global conference. Again, these are signs of professionalization of the industry and the job of being a cluster manager.

The establishment of robust and well-defined cluster organizations also has implications for the funding of these initiatives. We had anticipated that as cluster initiatives grew into stronger organizations, the private share of funding would increase and at some point become the dominant part. It is easy to argue that the initiatives need public funding in early stages. However, our results do not point towards this (see Chapter 3). If we compare the public/private division of funding across sectors, geographies, age and size of cluster organizations, there seem to be a "hard rule" of 60/40, with 60% public funding. One explanation to this, we believe, is that as the organizations grow older and establish more legitimacy in surrounding society (as just discussed), they will find new sources of public funding. And access to public funding of cluster organizations has also improved over the last decade in connection with regional (economic development), innovation and industry policy. Cluster organizations thus seem to develop as true private-public partnerships.

Growth, competitiveness – and innovation

Ten years ago we wrote that the goal of cluster initiatives was to promote growth and competitiveness of clusters. This we still believe this holds true, but over time the concept of innovation has grown stronger in relation to clusters. As we have come to work more and more with organized clusters, we think that innovation is really at the heart of what clusters should be about.

From a range of studies we know that clusters play a critical role in innovation processes among firms and in regions (Furman, Porter & Stern, 2002; Sölvell, Ketels, & Lindqvist, 2008). To understand why, we must first see the cluster as a collection of different types of complementary actors, and second how these actors interact. The most important is the firm. It is firms, and individual entrepreneurs, that take innovations to markets and subject them to the test of competition. Another type of actor includes research organizations, which produce new advanced knowledge. A third type is education organizations, such as schools and polytechnics. Universities are a special case, because they play the double role of being both research and education institutions. A fourth type is the capital providers, such as angel networks, venture capitalist and commercial banking institutions, who provide the capital needed for the exploitation of inventions and new business models. And, fifth, government and public bodies are actors that make and implement policy decisions about public infrastructure investment, regulations, cluster programs and so on, critical for the innovation climate. The public side includes many levels of government and a wide range of public agencies.

The reason clusters are relevant for innovation is that when there is a critical mass in a location of a sector or industry, the different actors can support each other, and new ideas are formed in both planned and unplanned meetings and interactions. Through interaction within the cluster, conditions are more likely to emerge that are adapted to the needs of the firms, and that are conducive to innovation. However, network and collaboration failures are typically abound in most clusters of the world, and this is precisely where cluster organizations fit in.

By building a commons where firms, research and education institutions, and the other cluster actors can meet, exchange ideas and collaborate in projects, the innovation climate can be radically improved (Sölvell & Williams, 2013).

In our earlier work (Sölvell & Lindqvist, 2011; 2012), we have identified seven gaps of innovation in clusters. There are five internal gaps:

1. The research gap barring interaction between firms and research organizations
2. The education gap barring interaction between firms and education organizations
3. The capital gap barring interaction between firms and education organizations
4. The government gap barring interaction between firms and public bodies
5. The firm-to-firm gap barring interaction among firms in the cluster

In addition there are two more gaps, external to the cluster, which are critical to innovation dynamics:

6. The cross-cluster gap barring interaction with firms in other clusters/technologies
7. The global market gap barring interaction with global markets and value chains

Cluster organizations can help bring the different types of actors together, and overcome the seven innovation gaps. They can connect business with academia, education with industry, and large firms with small firms. They do this by providing activities and meeting places where common issues can be discussed and acted on jointly. They help the different agents overcome the obstacles and start talking to each other. In doing so, they get the traffic moving along the paths and over the bridges into the commons.

In the original Greenbook we identified some key challenges that cluster initiatives face. One main challenge was about setting objectives and monitoring performance. Another challenge was about integrating the cluster initiatives into a broader microeconomic policy agenda (for a discussion see Chapter 5).

Setting objectives and selecting activities

As was described in the 2003 Greenbook, cluster initiatives are typically involved in a number of activities (some refer to it as services) in parallel, to accomplish a number of objectives. The six main types of activities we pointed to included:
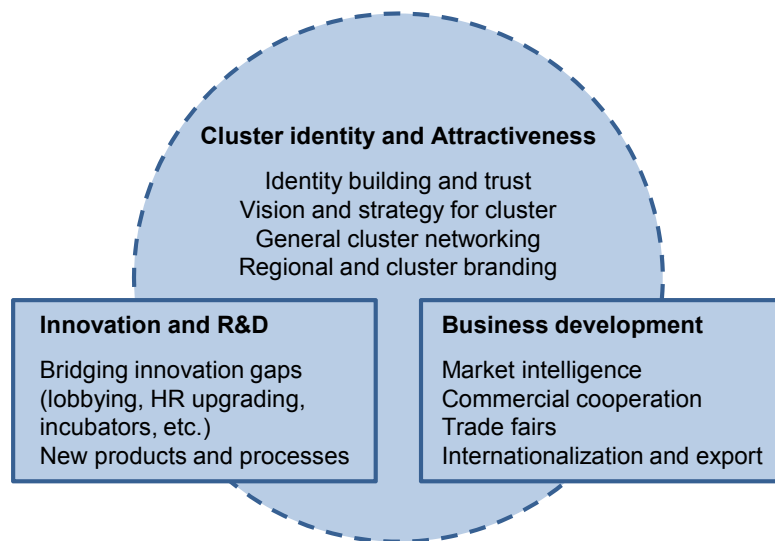
- **General cluster networking** where different types of actors come together to better understand the cluster's strengths and weaknesses. Activities include publishing cluster reports, sharing of information through seminars, inviting speakers and developing websites.
- **Human resources upgrading** to develop the available skills pool, e.g. vocational training and management education. Such efforts can focus on different target groups of people. One type is intended to attract and retain students to ensure the future supply of a skilled workforce. Another type targets managers, and a third type is sector-specific vocational training and technical training.

- **Cluster expansion** aims to increase the number of firms, through incubators or by promoting inward investment to the region.
- **Business development** promotes firm operations, for example through joint export promotion, joint purchasing, or sharing of services to reduce costs. These activities often target SMEs.
- **Innovation and technology** objectives promote product, services and process innovation, for example through increased commercialization of academic research. There are two general approaches to innovation, and they are often combined. One is to promote innovation through enhanced cooperation and networking between firms. The other is to enhance cooperation between the business sector and the research sector in order to commercialize academic research.
- **Business environment** objectives aim at enhancing the microeconomic conditions for business, through improving the legal and institutional setting or improving the physical infrastructure. Improving the business environment means that conditions outside firms are improved. Business environment objectives therefore focus on issues that are in the hands of government, rather than working with firms directly. There are two main aspects of the environment that can be addressed: the physical/technical infrastructure, and the legal/institutional setting. In addition, regional branding is an objective that can be assigned to this category.

In the 2003 data we saw that the typical cluster organization worked with 4-5 lines of activity in parallel, and in our statistical analysis we could not detect any effect on performance from being "broad" in scope. Over time we have seen a proliferation of cluster organizations, where some tend to be more innovation/technology oriented, and some more business oriented.

Based on three pillars of activities (Figure 1.1), different cluster organizations put different weights on the three pillars, and for each cluster organization it can vary over time. Some activities and services are oriented towards building the fundamentals of the cluster commons, whereas other activities are geared towards direct collaboration between particular firms and organizations; with an innovation and technology focus, or collaboration with a business development focus. All the three areas interact and overlap.

Figure 1.1 Three Pillars of Cluster Organizations

Cluster identity and Attractiveness

Identity building and trust
Vision and strategy for cluster
General cluster networking
Regional and cluster branding

Innovation and R&D

Bridging innovation gaps
(lobbying, HR upgrading,
incubators, etc.)
New products and processes

Business development

Market intelligence
Commercial cooperation
Trade fairs
Internationalization and export

The first pillar is about overall cluster identity and attractiveness. Here the cluster organization is deeply involved in building a sense of belonging and identity, general trust and networking; in short, building the cluster commons. The second pillar relates more directly to R&D and concrete innovation projects, where the cluster organization helps build bridges and stimulate traffic across the innovation gaps. Bridging to public organizations can lead to improved regulation and redirection of public investments. Bridging to research can involve incubator services and commercialization of research results, and bridging to education can improve HR supply and upgrading inside the cluster. The third pillar involves business development among member firms. Typical objectives and activities include export promotion/internationalization, joint trade fairs, joint purchasing and other commercial cooperation, often between SMEs not large enough to carry out these activities on their own.

Monitoring performance

As the interest in cluster organizations has grown, so has the interest in evaluating the impact from their activities. Cluster evaluation is both about building robust evaluation models, but also about learning and action.

"Cluster program evaluation is the careful assessment of the merit, handling, and effects of on-going or finished public interventions, with the intention to acquire greater knowledge and improve on future actions" (Sölvell, 2009:81).

As cluster policies and programs have become important parts of the political toolbox, one would expect that carefully planned evaluations should be mandatory, but as this study shows only some 60% of cluster organizations are subject to formal evaluation programs. Sound evaluation is important both to legitimize a policy or program, and to facilitate learning from the process in order to improve it.

Evaluations of regional and cluster programs have pointed in different directions. Some have emphasized quantitative evaluations, e.g. "job creation", measuring the cost of adding jobs (Foley, 1992). Others have emphasized more qualitative aspects (Turok, 1990). We propose a mix of more quantitative

measurements (direct effects on firms as well as indirect effects on cluster dynamics), with qualitative interpretations, based on interview data, in order to detect unintended consequences from such programs.

Cluster programs include a range of intended effects. Some relate to the overall functioning of the cluster (e.g. trust, degree of networking, closing of innovation gaps), whereas some are more directly related to cluster firms, such as improved sales, employment, exports, innovation, sustainability etc. In our model, developed in collaboration with the Cluster Observatory, we have used the following measures:

Indirect measures (cluster dynamics overcoming innovation gaps):

- Cooperation and interaction firm-to-firm
- Cooperation and interaction firm-to-research
- Cooperation and interaction firm-to-education
- Cooperation and interaction firm-to-capital providers
- Cooperation and interaction firm-to-public organizations
- Cooperation and interaction firm-to-other clusters
- Cooperation and interaction firm-to-global markets and value chains

Direct measures (impact on member firms):

- Competitiveness
- Value added growth
- Profitability growth
- Wage increase per employee
- Sales increase
- New or better products and services
- Employment increase
- Workplace equality
- Workplace diversity
- Sustainability

We propose the use of both objective accounting data and subjective views of managers, as captured through surveys and interviews. Accounting data has the advantage of being objective and one can easily build control groups (firms not under "cluster treatment"), to control for drivers of change outside the scope of the cluster initiative. Survey and interview data on the other hand is of course subjective and full of biased responses, but on the other hand it gives the evaluator the possibility to pick up unintended effects (inside and outside the target area). Also, by asking questions where one makes direct references to the cluster initiative, one can partly control for outside explanations (see further discussion below).

Figure 1.2. Planned effects of a cluster program
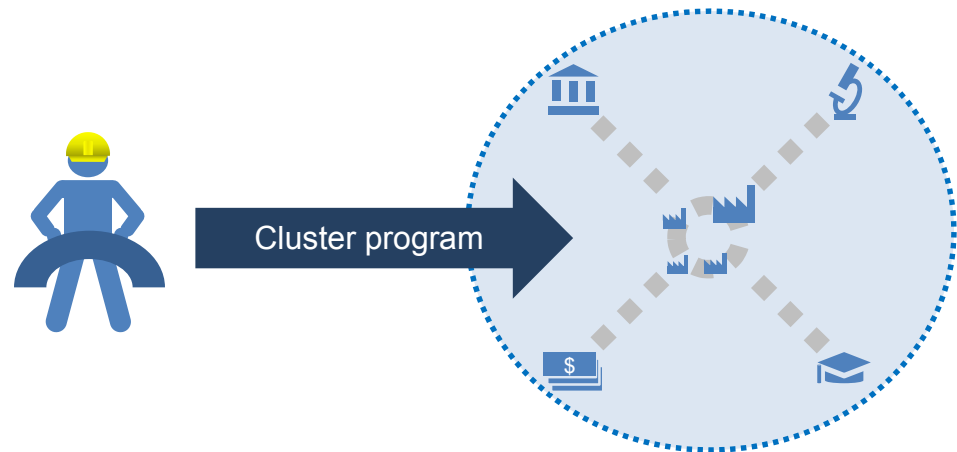
So how do we know that the cluster program has not led to unintended effects, positive or negative? And if there are unintended effects, are they within the target area, i.e. the cluster, or outside the target area? Purple arrows in Figure 1.3 below depict these effects. Public sector interventions invariably lead to consequences, which were not foreseen in the original plan. Evaluators should always search for side effects, so-called process tracing (Vedung, 2009), through interviews. Planned intervention goals should be retained for the main effects. But, for unanticipated side effects, there can be no pre-set intervention goals, so value criteria must be developed either during the evaluation process or ex post when the evaluation is finished.

Figure 1.3 Unintended effects of a cluster program, inside and outside the target area
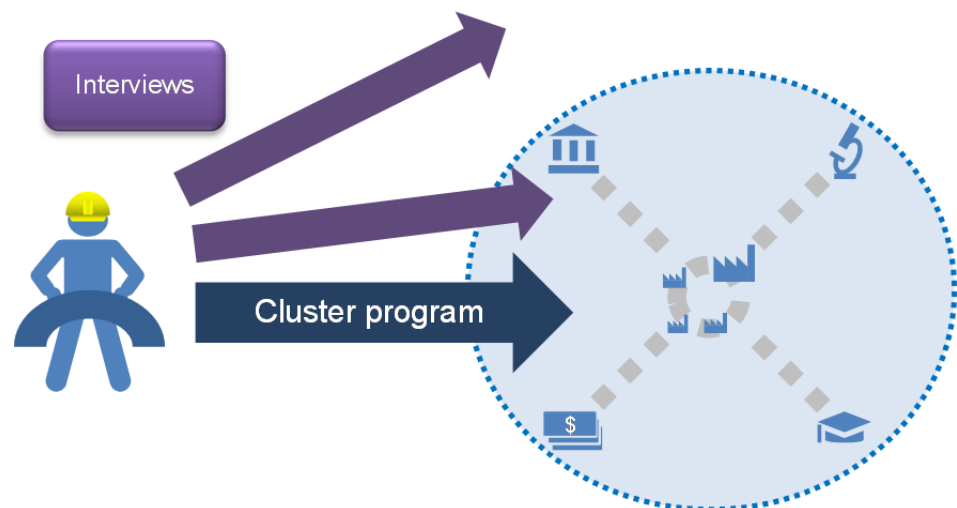

Now we come to an even more tricky part of cluster evaluation. How about the effects we measure, are they actually caused by the initiative? Or are there other explanatory factors? (red arrow in Figure 1.4). There might be other programs going on at the same time, affecting the cluster, and there is of course a whole

range of regional, national and international economic conditions, that impact the firms in the target area. In order to control for outside explanatory factors, one can craft various control groups, facing the same regional and or industrial conditions, but not being part of the cluster initiative (so called generic control). One way is to match the sample of member firms of a cluster (size groups and industry) to a similar group in a territory without a cluster initiative, and compare performance over time. One can also follow firm performance for member firms and non-member firms, both before and after the cluster initiative was started, thus controlling for a selection bias among those firms that decided to get involved in the cluster initiative.

Another way to control for outside explanations is to ask managers of firms to isolate the effects from the cluster program, according to their own judgment. Here one can include survey questions such as "in your view has your involvement in the organized cluster activities led to a change in X" (measured on a scale from "not at all" to "very much").

Figure 1.4 Outside explanations to measured effects in target area
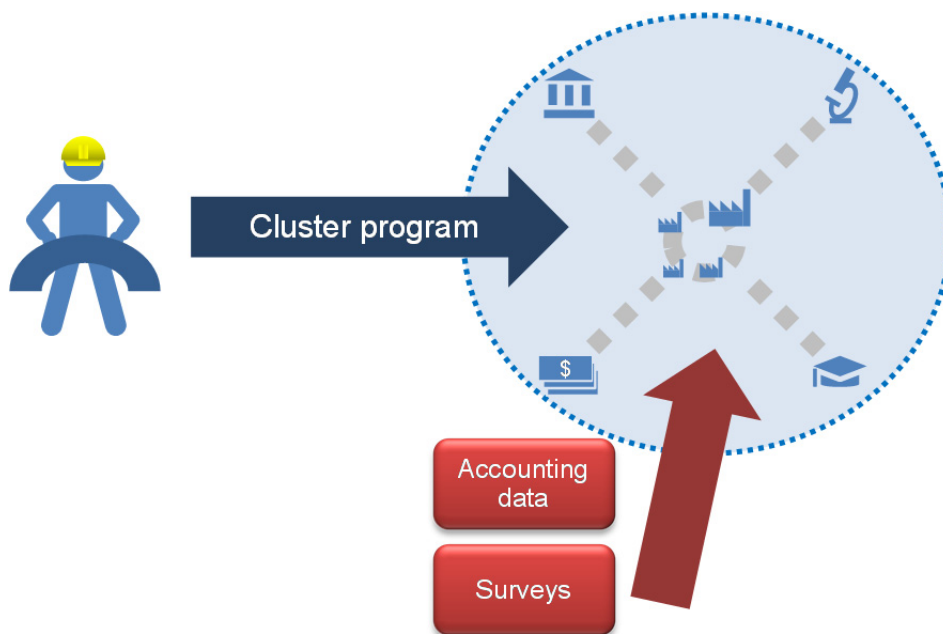
On the one hand every cluster program must have its carefully planned impact. On the other hand, with strictly predetermined goals, there is a risk of blindness to unintended side effects, some of which might be highly valuable, both inside the cluster itself, and potentially to the larger region. In summary, by developing a model with several components, one can partly control both for external explanations, by using carefully selected control groups and survey instruments, and to capture unintended effects through process tracing through interviews. For a full description of the Cluster Observatory model and how it can be used please refer to Sölvell & Williams (2013).

So now it is time to turn to the 2012 GCIS data. Do cluster organizations look the same in 2013? And are our results from 2003 on what drives performance of organized clusters confirmed? Some things have clearly not changed, but on the

other hand we see some new patterns emerge, regarding funding, resources, and collaboration.

Methodology of the GCIS 2012 study

In 2012, the European Cluster Observatory carried out a survey of cluster organizations throughout the world, which forms the basis for this book.

The questionnaire

The Global Cluster Initiative Survey 2012 was first drafted in the early 2012. The initial draft was based on the previous GCIS questionnaires, undertaken in 2003 and 2005. The survey questions were then adapted in order to reflect the evolution of clusters practices and to better address current topics. This process was divided in several rounds where the questionnaire was first tested by a group of testers. The testers all had a significant background within cluster research and/or clusters management. Furthermore, we ensured that they came from different parts of the world in order to accommodate for geographical differences. Based on the feedback of the testers, the GCIS 2012 team modified the questions and the survey flow.

The survey was launched on April 3, 2012 and data collection for the analysis used in this report ended on August 31, 2012. The survey response collection process was entirely web-based. The questionnaire included about 30 questions, many of which had several sub-questions.

Distribution

The list of recipients was established using two different methods. One was by compiling lists of cluster organizations. For example, we used respondent lists for GCIS 2003 and GCIS 2005. We also manually collected email addresses of cluster organizations around the world, using Google and other search methods.

The other method was to promote the survey through various channels, and that potential respondents provide us with their contact details. Thus, we promoted the survey on the Cluster Observatory's website, on TCI's website, on the European Cluster Collaboration Platform website, and through a number of newsletters, made available to us by our partners. Furthermore, we contacted the registered users on the Observatory Website, who responded very positively and showed a high interest in the initiative.

The actual survey was then distributed using an online survey management system called Qualtrics. Each respondent was sent an individualized link to the questionnaire, which allowed the respondent to answer a part of the survey, and then return at a later time to complete it.

Each participant received at least two reminders via email. Every reminder included a link, which took the respondent to the page of the survey they had completed last.

Response rate

The intended target for the survey was managers (or the equivalent) of cluster organisations. In total we sent 2580 individual links to survey participants. Out of those, 669 (26%) actually clicked on the link, and 579 of them recorded at least

some replies. 356 replies qualified as coming from cluster managers who went through the questionnaire all the way to the last page.

356 completed replies out of 2580 invitations gives a total response rate of 14%. In comparison, the response rate in 2003 was 47% and in 2005 it was about 30%. We can only speculate about the reason for the gradual decline in response rates, but we believe "survey fatigue" could be on reason. Cluster managers are today called on participating in large number of surveys, unlike in 2003 when such surveys were still rare. It has been especially difficult to get replies from respondents outside of Europe.

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Chapter 2
A profile of cluster initiatives

This chapter presents a profile of the 356 respondents that completed the questionnaire. Although all of these reached the last page of the survey, they may have skipped individual questions. The total number of respondents for an individual question is therefore usually slightly below 356.

Countries

Respondents from 50 countries took part in the survey. A majority is found in OECD countries. 254 are found in Europe (EU and EFTA).

Table 2.1. Country of respondents

Country	Respondents	Country	Respondents
Germany	37	Norway	8
Spain	34	Austria	7
Denmark	20	UK	7
Sweden	18	Finland	6
Colombia	14	Russia	6
Poland	14	Iran	5
Serbia	14	Ireland	5
USA	14	Latvia	5
Switzerland	12	Bulgaria	4
Hungary	11	India	4
Mexico	11	Netherlands	4
Belgium	10	Slovenia	4
Italy	10	Argentina	3
Portugal	10	Estonia	3
Turkey	10	Greece	3
Romania	9	Other	26
France	8	**Total**	**356**

Note: Other countries are: Australia, Bolivia, Brazil, Canada, Czech Republic, El Salvador, Iceland, Jamaica, Lebanon, Lithuania, Macedonia, Malta, Montenegro, New Zealand, Pakistan, Slovakia, Tanzania, and Uruguay.

Age of the cluster initiative

Figure 2.1. Initiation year of cluster initiative
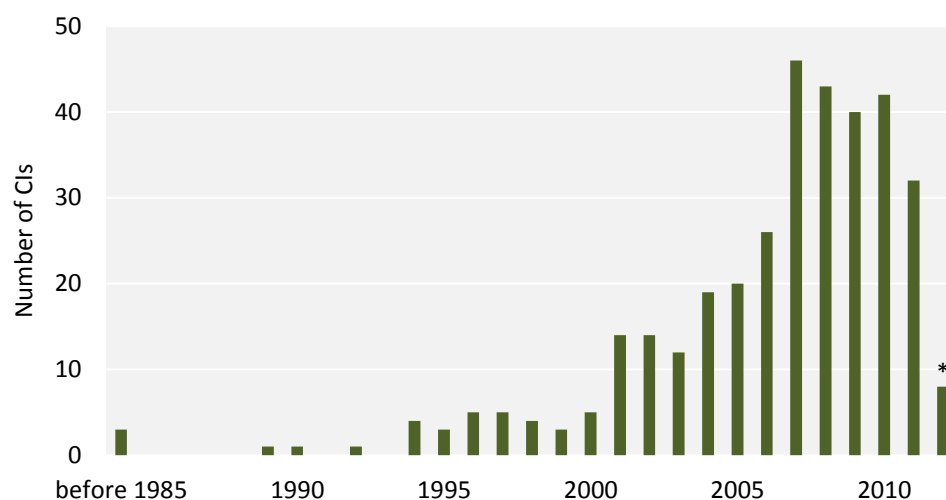
Note: * The survey took place in early 2012, which explains the large drop between 2011 and 2012.

Initiation of cluster initiatives took off in the mid 1990's, and 32 initiatives founded in or before 2000 are found among the respondents. 59% of the cluster initiatives in this study were launched in 2007 or later.

Sectors

Respondents are spread across a large number of sectors. The most frequent sector is IT.

Table 2.2. Industry sector of the respondents

Sector		Sector	
IT	55	Materials	10
Food	23	Biotech	9
Automotive	21	Medical	8
Green Technology	19	Optics and Photonics	8
Health	19	Education	7
Energy	18	Forest Products	7
Textiles	17	Micro and Nanotechnology	7
Metal Manufacturing	13	Aerospace	6
Tourism	13	Business Services	6
Transportation and Logistics	13	Chemical	6
Agricultural Products	12	Media and Publishing	5
Construction	12	Furniture	4
Production Technology	12	Entertainment	2
Creative Industries	11	Telecom	2
Maritime	11		

The sectors are not entirely comparable to those used in the 2003 study, but some differences are apparent. Food has advanced to be the second most frequent sector, whereas Medical and Biotech seems to have declined in relative prominence.

Cluster initiative staff size and website

Cluster organizations rely on various resources to carry out their activities. Employed staff and a website are two important types of resources.

Figure 2.2. Number of employees in the cluster organization
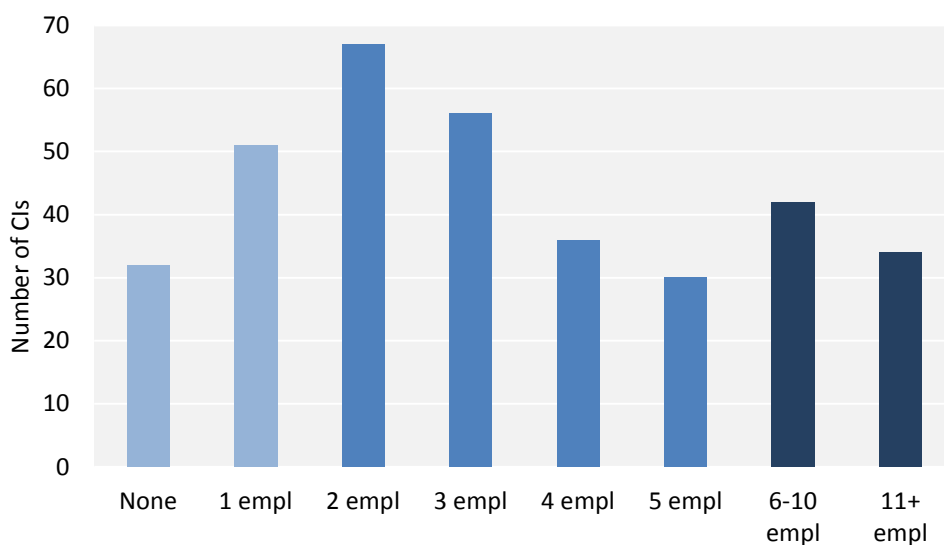
Half of cluster initiatives in this study have 3 or fewer employees, but many have substantially larger staffs. In this report, we divide them into three staff size groups: 0-1 employees, 2-5 employees, and 6+ employees. The average number of staff is about 4.

Staff is slightly bigger today than when the study was carried out in 2005. Then, the median staff in both advanced and transition economies was only 2.

Figure 2.3. Share of cluster organizations with a website
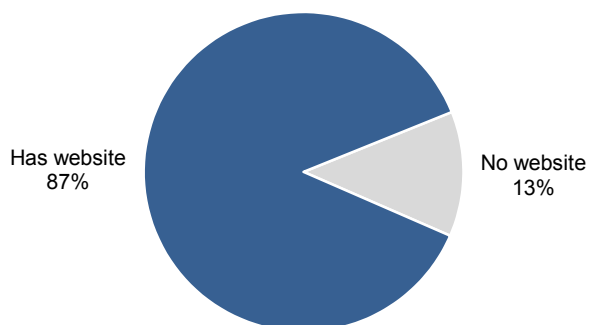
An overwhelming majority of the participating cluster initiatives have a website. (To some degree, this could be an effect of that we used web searches as a way to identify respondents, but we also employed other methods that did not rely on the respondent having a website.)

The number is higher today than in 2005, when 79% in advanced and 41% in transition economies had a website.

Participating firms

We now turn to the participants in the cluster initiative, in particular to the participating firms. Cluster initiatives vary greatly in terms of how geographically proximate they are, whether membership is formal or not, and what type of restrictions are put on membership eligibility.

**Figure 2.4. Share of cluster firms within one-hour driving distance from CI office**
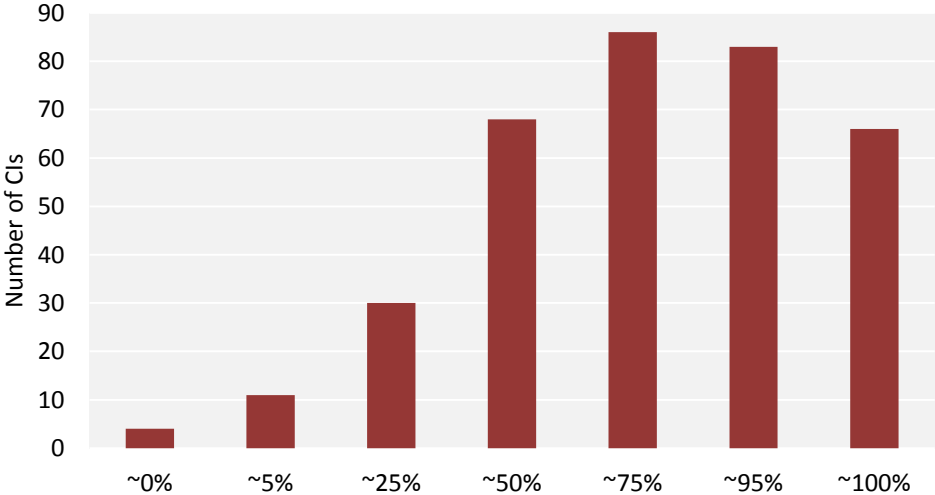
Most of the respondents have half or more of their member within a one-hour driving distance from the CI office. However, almost a third of CIs have most of their members on a greater distance. In this respect, CIs have not changed since the 2003 study.

Figure 2.5. Share of CIs with formal membership

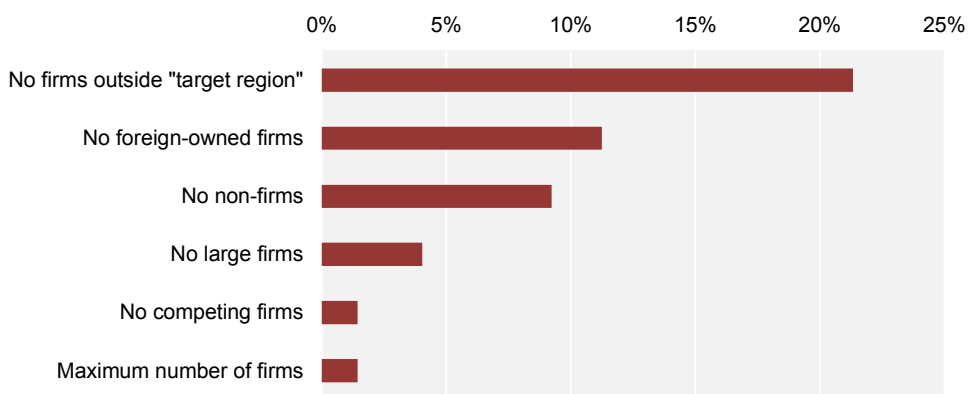Has formal membership, 73%

No formal membership, 27%
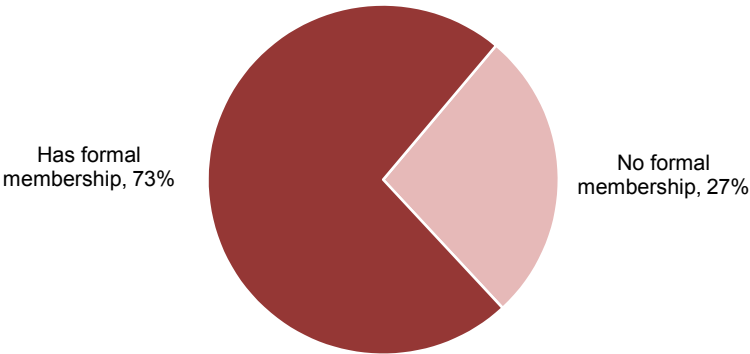
About three quarters of the respondents have formal members. Formalization of membership has increased since 2005 when, only 64% in advanced economies, and 46% in transition economies had a formal membership.

Figure 2.6. Number of formal members
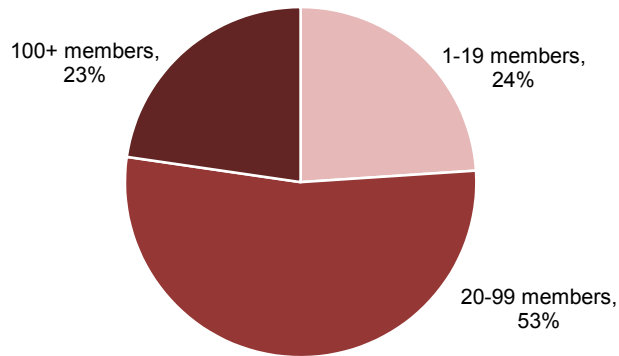
Among those CIs that have formal members, about a quarter had 1-19 members, half had 20-99 members, and a quarter 100 or more members. The average number of formal members is 80.

Figure 2.7. Share of CIs with limitations to formal membership

Some CIs apply some restrictions to formal membership. The most frequent limitation is that only firms within the target region are allowed to be members. Less frequent are rules against foreign-owned firms, and even fewer CIs only have firms as members (and not, for example, universities). It is rare that CIs do not allow large firms to join (focusing exclusively on SMEs), or that competing firms cannot join. It is also rare that there is a cap on the number of firms that may join.

Chapter 3
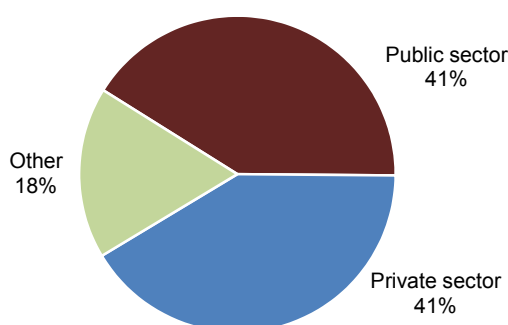# How cluster initiatives operate

This chapter presents findings about how cluster initiatives are organized and how they perform.

Original trigger for initiation

The role of government versus business when it comes to initiating a CI has long been a debated issue. On the one hand, a "business-lead" CI can promote a strong focus on issues most relevant for the competitiveness of the firms; on the other hand, government can play a crucial role of promoting collaboration to build trust where otherwise only competition would occur.

In practice, it can be difficult to determine if the main trigger for a CI came from the public sector or from the private sector. Nonetheless, in the survey 41% of the CIs were indicated to be a "response to a public call/policy program", while just as many were "a private sector initiative". The remaining 18% were various types of public-private partnerships, academic initiatives, or had an initiation that was difficult to classify.

**Figure 3.1. Original trigger for the initiation of the CI**

The picture is similar to that in 2003, when only slightly fewer CIs were classified as initiated by industry than by government.

Objectives

The objectives of cluster initiatives vary greatly. The list of potential objectives is long, and there is large variation in how many objectives a particular organization pursues, as well as in the relative importance is given to them.

Respondents were asked to rate a list of ten objectives (presented to respondents in random orders to avoid influencing the results) according to how important they have been during the last three years. The rating replies were "Not done", "Low priority", "Mid priority" and "High priority".

Figure 3.2. Level of priority for ten objectives
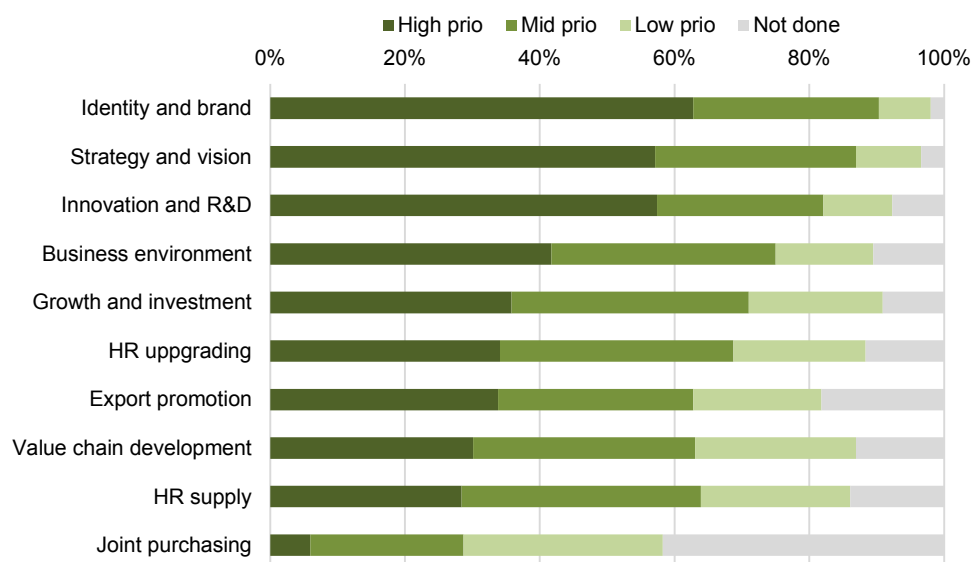
Responses suggest that promoting collaboration, in itself, is considered a fundamental objective for CIs. The two top objectives both relate to the need for building a collaborative environment working towards common goals. The most highly rated objectives were creating a cluster identity and building a brand and sense of community for the cluster. The second highest ranked objective was building a strategy and vision for the cluster (e.g. identifying a desirable market position or developing a technology road map).

Almost as highly rated was R&D and innovation promotion, followed by lobbying government for improved business environment (e.g. infrastructure or legislation). Least frequent is joint purchasing arrangements, a high priority for only 6% of respondents.

Replies are similar to those in 2003. Then, fostering networks between firms and between people were considered top objectives. Innovation was also a frequent objective, while purchasing was one of the least frequent.

Respondents could rank as many of the objectives as "high priority" as they liked. Some picked only one, while others rated several as "high priority". The number of "high priority" objectives reported by respondents is broken down by CI age, staff size, and membership size in Figure 3.3 below. This range of objectives can be called "width": wide CIs have many high-priority objectives, while narrow have only a few.

On average, respondents rated 3.9 out of the ten possible objectives as "high priority".

Figure 3.3. Average number of high-priority objectives for cluster initiatives, by age group, by staff size group, and by member size group
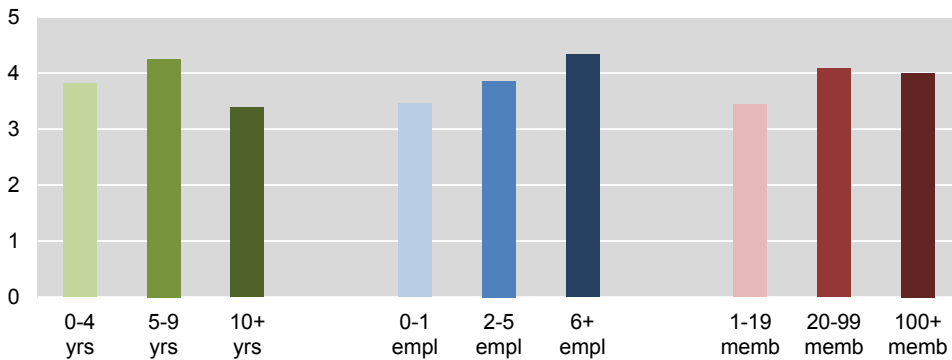
When broken down by age group, a "hump effect" is clear and also statistically significant: CIs in the middle age group are wider (focus on a larger set of objectives) than younger CIs, and they are also wider than older CIs.

CIs increase their width with larger staff sizes. Those with 6+ employees are significantly wider than those with fewer employees.

Similarly, those with 20-99 formal members are significantly wider than those with 19 or fewer formal members.

Let us now return to the age effect. It appears that CIs start with a wide range of objectives, then widen the scope further, and then narrow it down as they get older. The survey also suggests that different objectives have different importance over the age of the CI. Figure 3.4 below shows how the priority for individual objectives changes with age.

Identity and branding, although popular on all age groups, is most important for young CIs. Conversely, Innovation and R&D is more frequent among old CIs than young, and the same is true for HR supply (attracting and securing supply of students, workers, engineers, managers, etc).

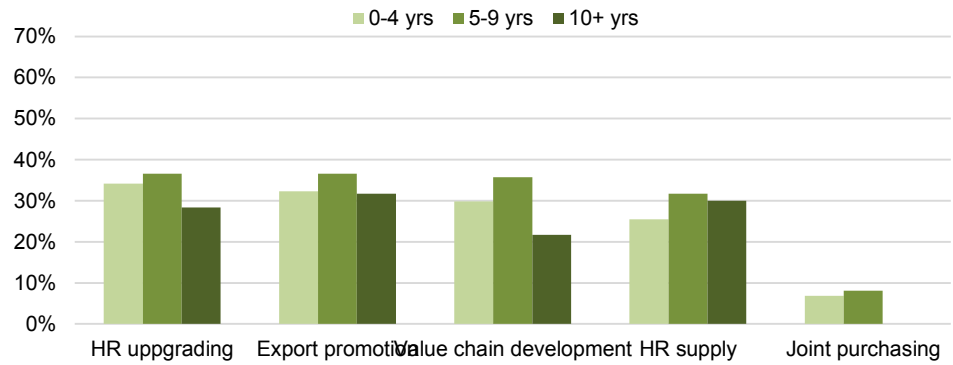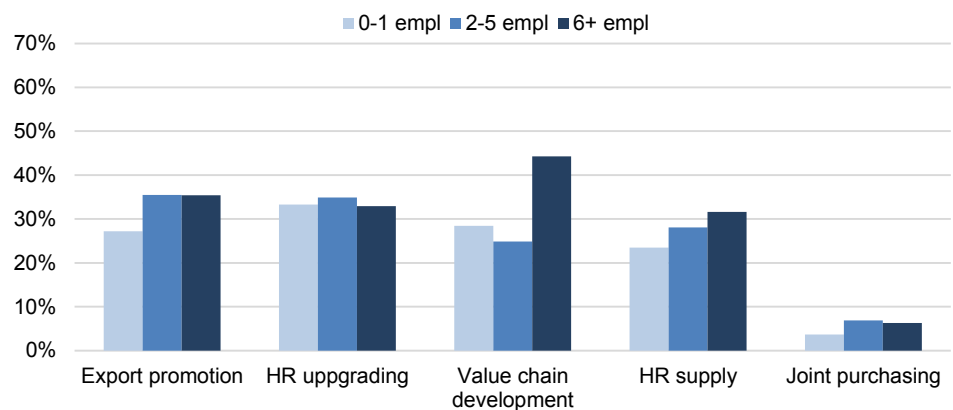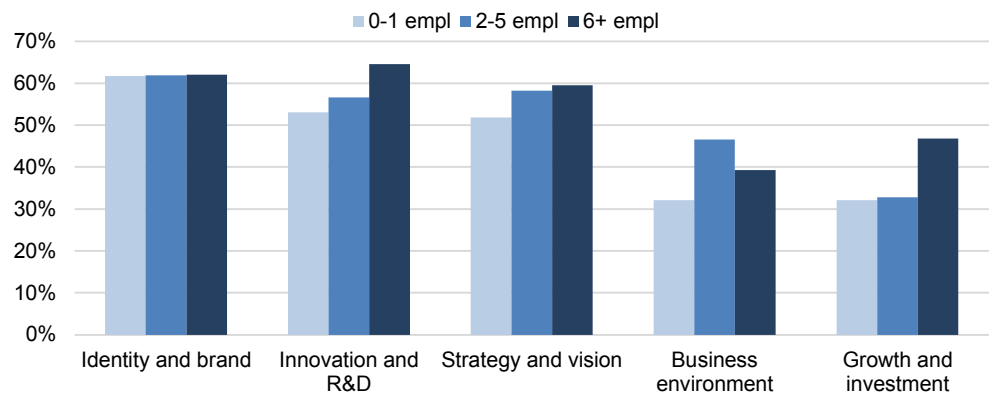**Figure 3.4. High-priority shares for ten objectives, by CI age group**
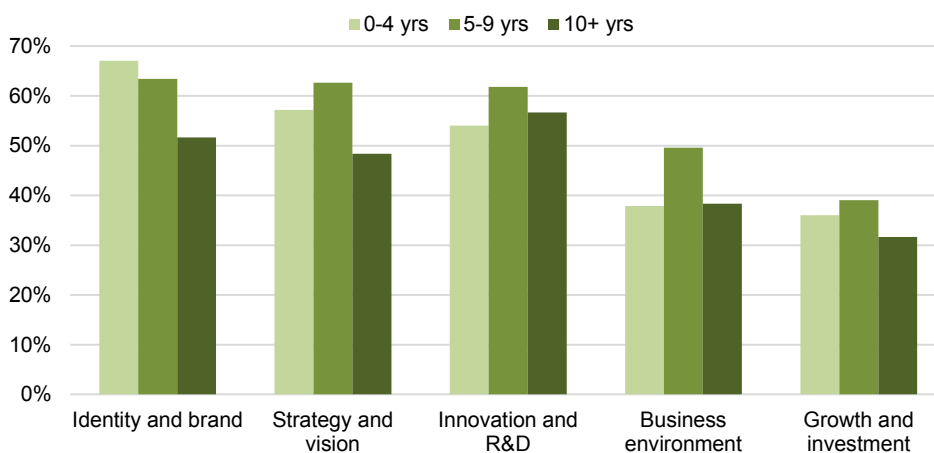
Figure 3.5 below shows how the priority for individual objectives varies with staff size. Innovation and R&D, export promotion, promoting cluster growth and investment, value chain development, and joint purchasing are all objectives that are significantly correlated with staff size.

Figure 3.5. High-priority shares for ten objectives, by staff size group

And finally, the Figure 3.6 below shows how the priority for individual objectives varies with membership size. The objectives most clearly correlated to staff size are Strategy and Vision, Export promotion, and Growth and investment, all three of which increase highly significantly with staff size.
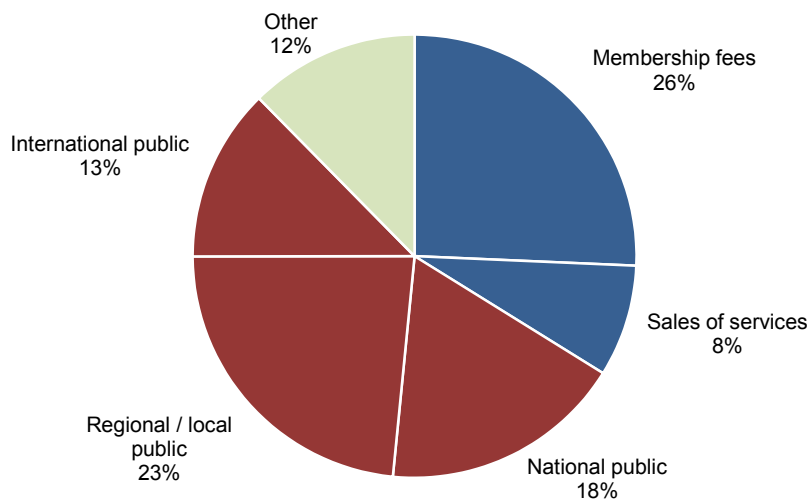
Figure 3.6. High-priority shares for ten objectives, by membership size group
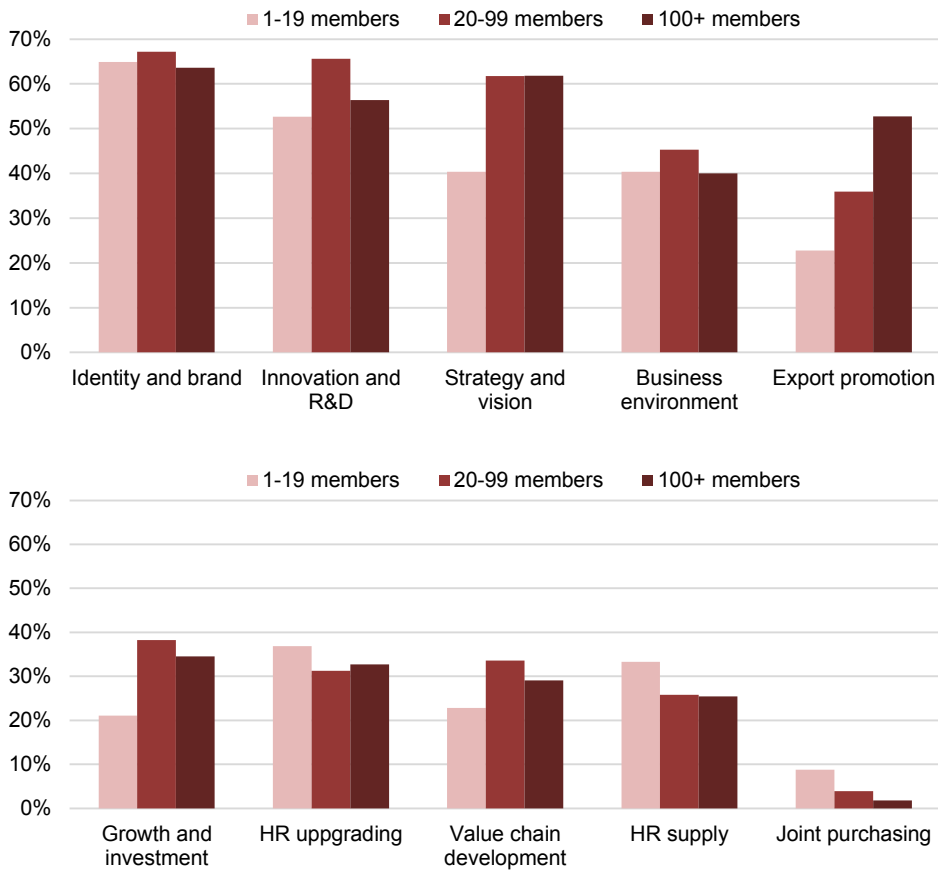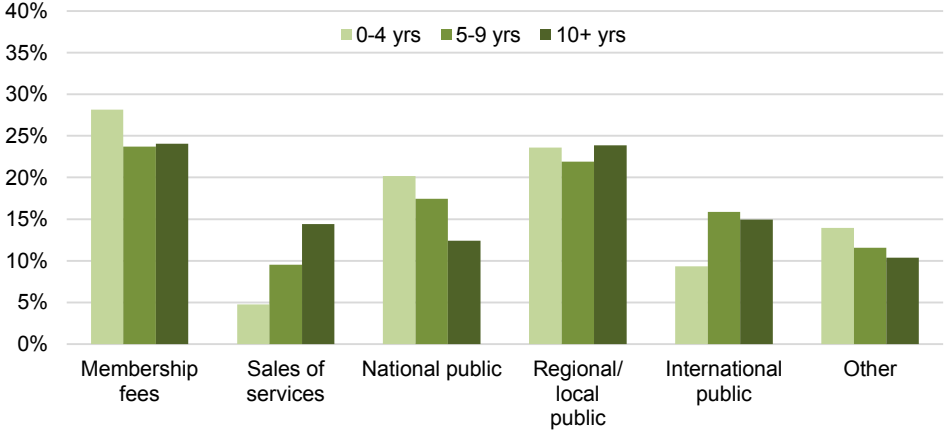

Funding

Most cluster initiatives rely on funding from a mix of sources, private as well as public. The average breakdown of sources is presented in Figure 3.7.

Figure 3.7. Sources of CI revenues

On average, about 34% of CI revenues comes from primarily private sources, such as membership fees and sales of services. About 54% come from public sources, mainly regional and local public funding.

**Figure 3.8. Sources of CI revenues, by age of CI**

Funding varies by age, although the change in the mix between private and public funding is much smaller than we expected. The revenue share from membership fees decline somewhat with age, but this is offset by an increase in sales of services. On the public side, national public funding decreases with age, while international public funding (e.g. EU funding) increases.

The pattern we can observe in the current study is quite different from what we found in the 2005 study. Then, there was a distinct decline in public funding and a correspondent increase in private funding. This effect is mostly absent in the current study. There seems to be a split 60-40 between public and private funding (ignoring the "other" category) which is fairly constant with age.

The size of staff is also a factor that influences the funding sources, as shown in Figure 3.9.

**Figure 3.9. Sources of CI revenues, by size of CI staff**
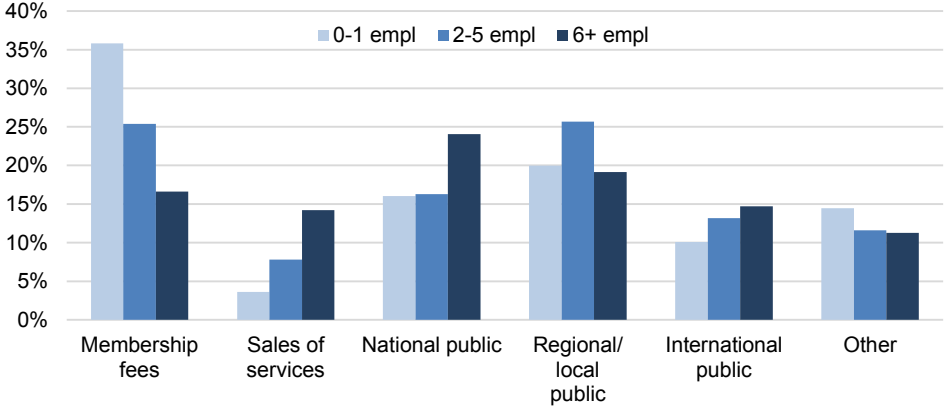
Small CIs with a small staff rely more heavily on membership fees, whereas those with a larger staff can produce higher revenues from sales of services. It is also those with a larger staff that receive most national and international public funding, suggesting that being well-staffed means that the CIs that gets visibility and legitimacy to attract national public support. Or it might be because CIs with more staff have the administrative capacity to successfully apply for national and international public finance. For CIs with a medium sized staff, the shortfall of national and international public support is compensated by regional and local money, but CIs with the smallest staff are left relying heavily on membership fees.

The cluster manager

Since the study in 2003, being a cluster manager (or "facilitator") has become more of an established role. Where once there were enthusiasts and social entrepreneurs to drive the cluster initiatives forward, there are now many experienced cluster managers and courses and certifications for how it is done.

The survey was aimed cluster managers as respondents (defined as "a leader of a cluster initiative on a day-to-day basis"), and contained a range of questions about their background.

Figure 3.10. Cluster manager's work experience with cluster initiatives
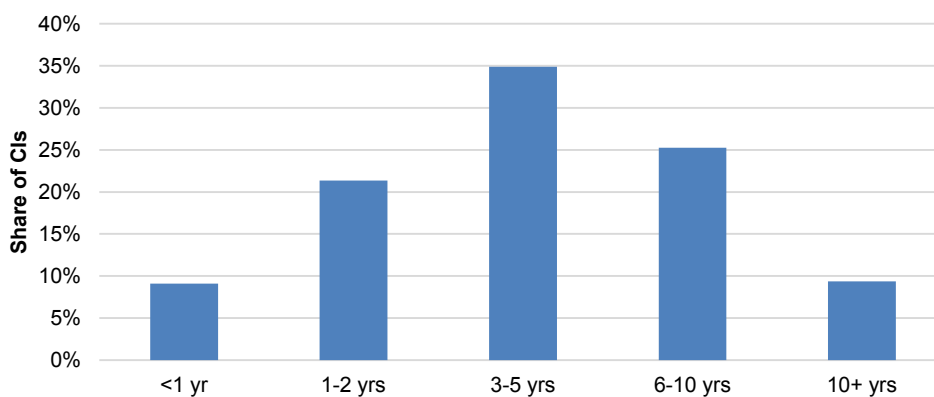
The typical respondent has 3-5 years' work experience with cluster initiatives, and many have six years work experience or more. Less than 10% of the cluster managers are beginners when it comes to working with cluster initiatives.

Figure 3.11. Cluster manager's previous work experience in different sectors
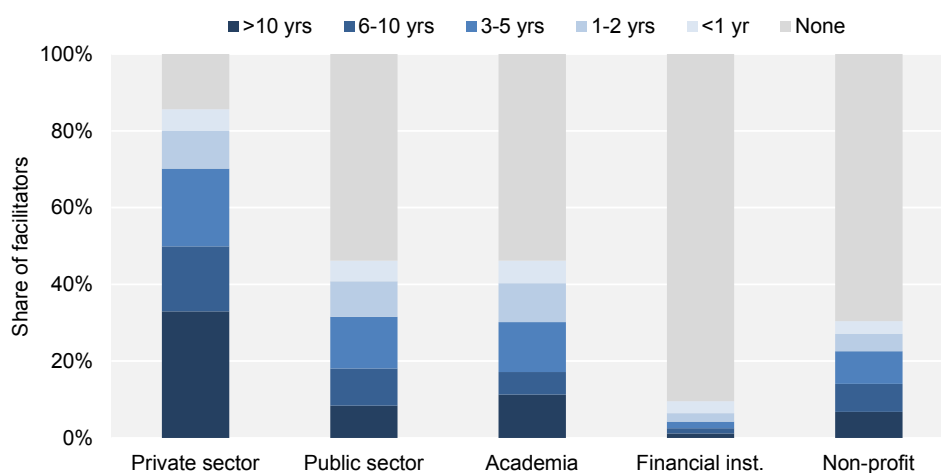
Cluster managers' prior work experience has been mostly in the private sector. About half of the managers have worked 6 years or more in the private sector, and only about 15% have no experience from the private sector. This agrees with the findings in 2003, where more than half of the cluster managers were considered to have an industry background, rather than a public or academic background.

Very few cluster managers have previous work experience from financial institutions.

Governance

We now turn to how the cluster initiative is formally organized and governed.

Figure 3.12. Legal status of the cluster initiative
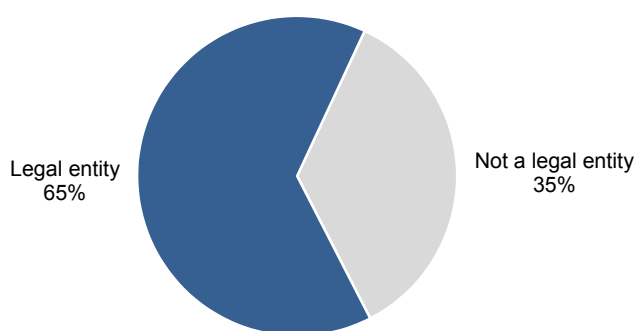
About two thirds or CIs are organized as a separate legal entity, as opposed to being an informal organization or being a non-separate part of some larger legal entity.

Figure 3.13. Sectoral composition of main governing board
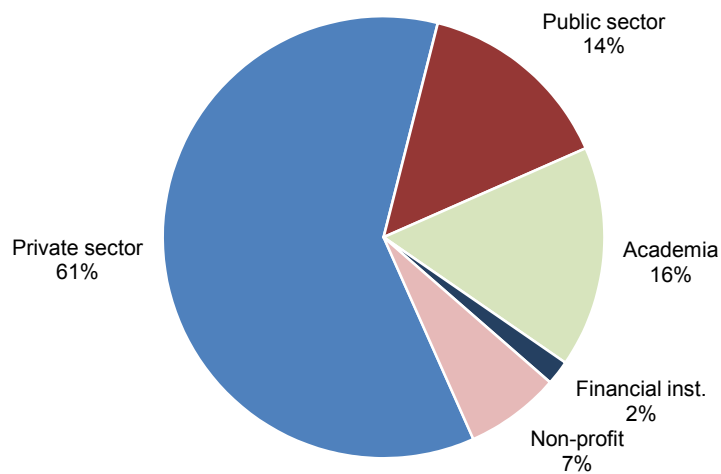
Main governing boards of CIs are dominated by the private sector. On average 61% of their members have a background primarily in the private sector. 16% have a main background in academia, and 14% in the public sector. Only 2%, on average, have a background in financial institutions.

How the main governing board is appointed can vary. In 73% of CIs, members appoint the main governing board, and in the remaining 27% it is appointed by some other mechanism.

Figure 3.14. Share of CIs where members appoint the main governing board
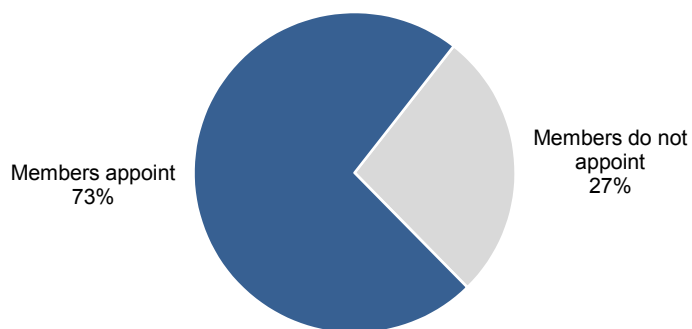
Evaluation

Another area that has seen large progress since 2003 is evaluation of cluster initiatives. As mentioned in Chapter 1, evaluation a complicated matter, but 62% of CIs are nonetheless subjected to a formal evaluation program, for example a formal evaluation for government funding (Figure 3.15).

Figure 3.15. Share of CIs that are subject to a formal evaluation program

Subject to formal evaluation
62%

Not subject to formal evaluation
38%
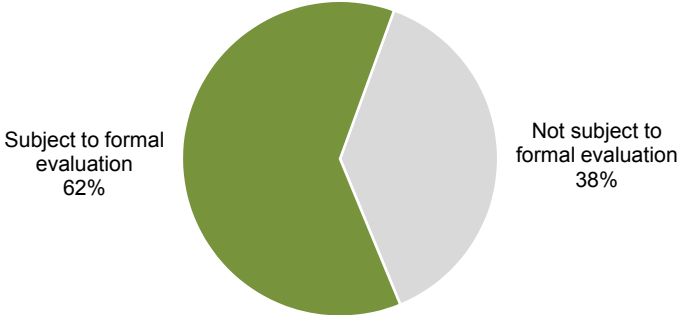
Figure 3.16. Frequency of data collection for evaluation

Share of CIs

Every year · Less than every year · Never
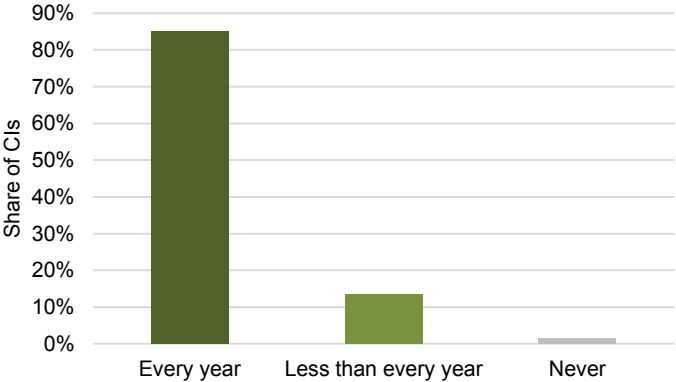
Almost all CIs, 99%, collect some form of data for evaluation (Figure 3.16). In other words, also CIs that are not subjected to a formal evaluation collect data that measure their performance in some way. 85% do so annually, while 14% do it less frequently.

Figure 3.17. Sources used for evaluation of CI performance

■ Every year ■ Less often than every year ■ Never

Share of CIs

Member surveys · Stakeholder interviews · Industry statistics · Peer benchmarking
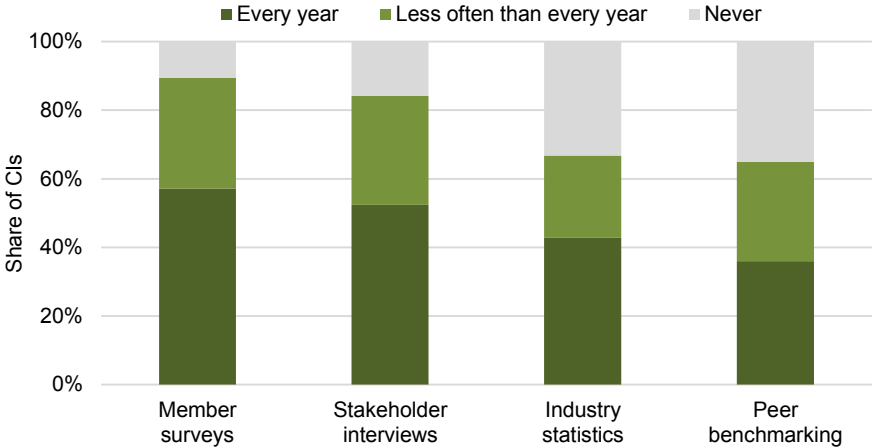
CIs rely on a range of various sources for evaluation data, both data from within the cluster organisation and from external sources (Figure 3.17). Internal sources are used by more CIs and at a higher frequency than external sources. The most commonly collected type of data used for evaluation purposes are member surveys, followed by stakeholder interviews, published industry statistics, and peer benchmarking.

Performance

We now turn to the question of performance. Although all CIs have their own particular goals, in this survey we have used even generic performance indicators. One set of three questions were used to measure *external performance* of the cluster initiative over the last three years: growth of cluster (i.e. the number of firms, employment); innovation (i.e. new products and services); and improvement in the international competitiveness of the cluster firms. Another set of four questions referred to *internal performance* over the last three years: the CI's ability to meet deadlines; its ability to meet goals; its financial sustainability; and its ability to attract new members and participants. The results are presented in Figure 3.18 below.

Figure 3.18. Performance of CIs, external and internal

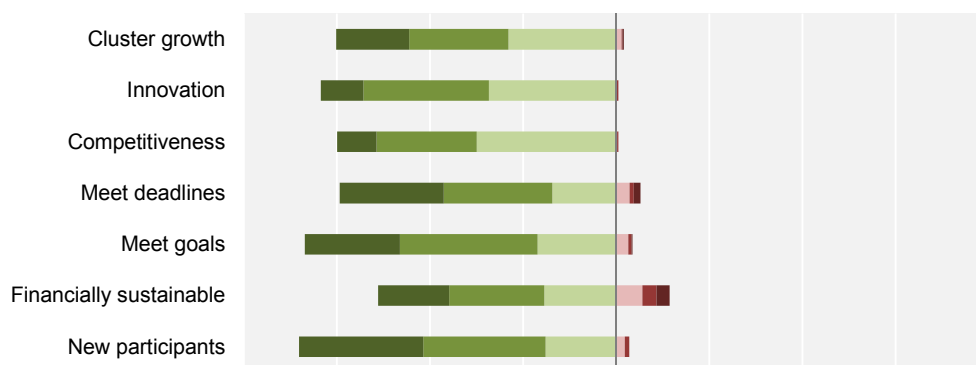Note: Dark green represents the reply "Improved strongly" for the top three and "Strongly agree" for the bottom four performance indicators, and brighter green represent lower positive performance. Red shades represent negative performance.

Respondents reported overall positive results of the CIs. They reported best performance in attracting new participants, and least success in being financially sustainable.

More interesting than performance in itself is, however, to see how performance is related to other factors. In the remainder of this chapter, we will examine what the relationship is between the seven performance indicators and a range of different other factors.

A technical note: The statistical method used is the so called "Kendall's Tau-b", which is a rank correlation. It compares respondents and measures if a difference in their answer to one question is related to a difference in their answer to another question. It is a non-parametric test, suitable for the kind of data we get from GCIS. It allows us to test the hypothesis whether a relationship we observe between two questions is likely or unlikely to have occurred by mere chance. In the graphs

below, we present relationships on the 1% significance level (two-tailed) in dark green, and on the 5% significance level in light green. To put it simply, if a relationship between two questions in the survey is so strong that the likelihood it would occur by chance alone is 1% or less, it is said to have a significance level of 1%.

The cluster manager's background

Figure 3.19. Relationship between cluster manager's experience with cluster initiatives and performance
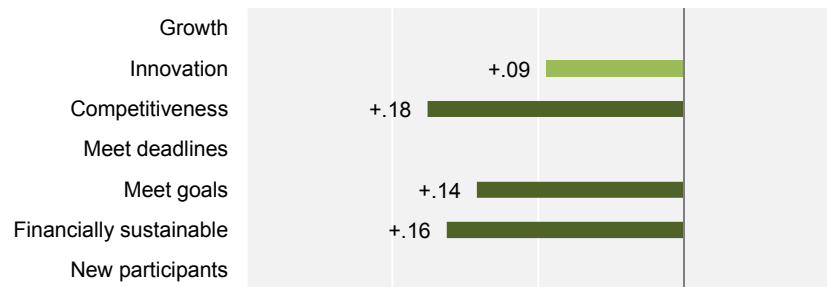
Note: This graph and the following similar graphs show correlations, measured by Kendall's tau. Dark green bars indicate correlations that are significant on the 1% level. Bright green correlations are significant on the 5% level. Less significant correlations are not shown.

In GCIS 2003, we found that a cluster manager with deep knowledge of the cluster, a strong network of contacts and high respect among the CI members were associated with good performance. Today, many cluster managers often have extensive experience with cluster initiatives, and this seems to have a positive effect on performance. In the current study we see that the experience of the cluster manager, measured as number of years working with cluster initiatives, is significantly related to internal performance, and also to performance in terms of improved competitiveness and, less strongly, innovation.

Figure 3.20. Relationship between cluster manager's work experience in the private sector and performance
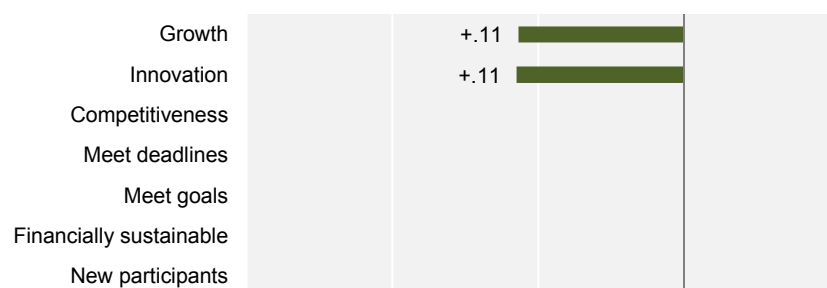
We also surveyed the previous work experience of the cluster manager, measured as the number of years spent working in the private sector, the public sector, academia, finance, and non-profit organizations (chambers of commerce, trade

unions, etc.) respectively. On the whole, this previous work experience does not have a significant relationship to performance. The exception is work experience in the private sector, which has some relationship to cluster growth and innovation performance.

Staff and members

Figure 3.21. Relationship between staff size and performance

Growth	+.10
Innovation	+.13
Competitiveness	+.13
Meet deadlines	+.17
Meet goals	+.20
Financially sustainable	+.17
New participants	+.16
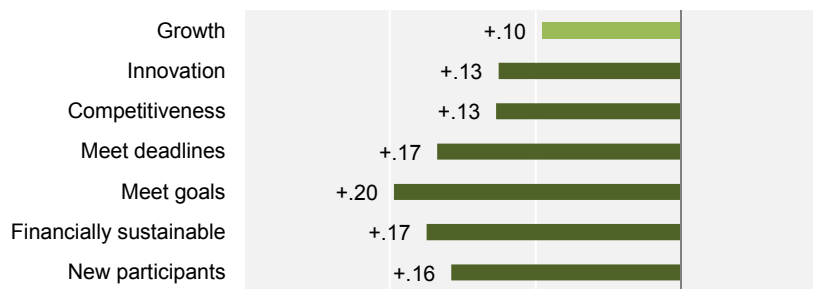
One of the strongest relationships with performance we find in the study is that cluster initiatives with large staffs perform better in every aspect, both internally and externally.

Figure 3.22. Relationship between share of cluster firms within one hour driving distance and performance

Growth	
Innovation	
Competitiveness	
Meet deadlines	
Meet goals	-.09
Financially sustainable	
New participants	
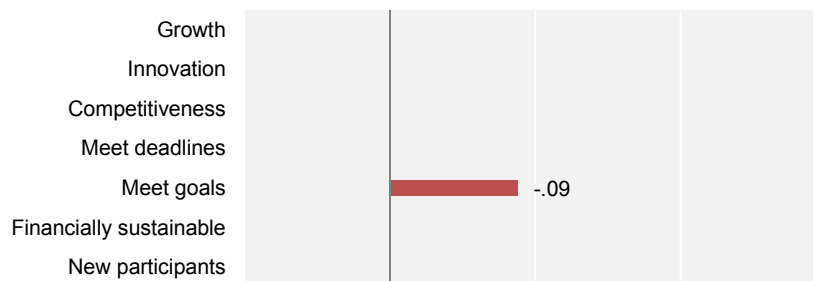
Note: The correlation is negative, i.e. a *larger* share of members in close proximity is related to *lower* performance in meeting goals.

However, CIs with a higher share of members close to the CI office do not perform better. To the contrary, they perform worse in terms of improving competitiveness. We could not find any positive effects in 2003 either. One interpretation of this is that although close proximity makes communication easier, it also introduces the risk of defining the cluster's geographical borders too narrowly.

Objectives

In the 2003 study, we found strong connections between the objectives that CIs pursue and how they perform. We find the same effects in the current study. To begin with, four of the nine objectives were related to performance in terms of growth.

Figure 3.23. Relationship between objectives and cluster growth performance
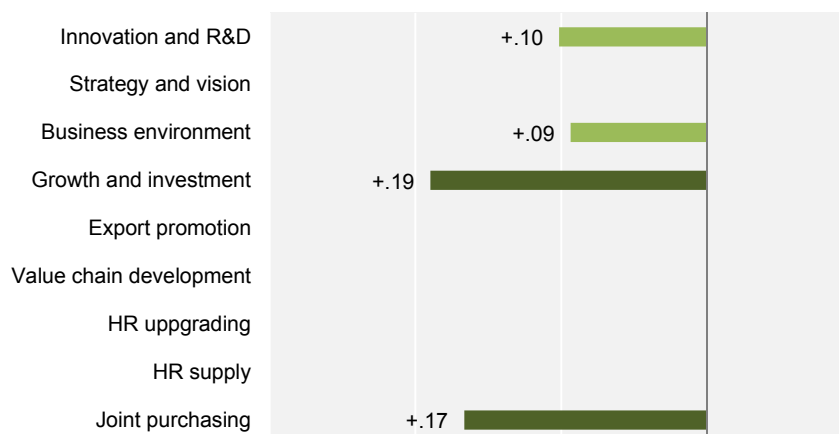
Cluster initiatives that rate Growth and investment and Joint purchasing as high priority objectives perform better in terms of cluster growth. Also, but to a lower degree, Innovation and R&D and Business environment are related to growth performance.

Figure 3.24. Relationship between objectives and innovation performance
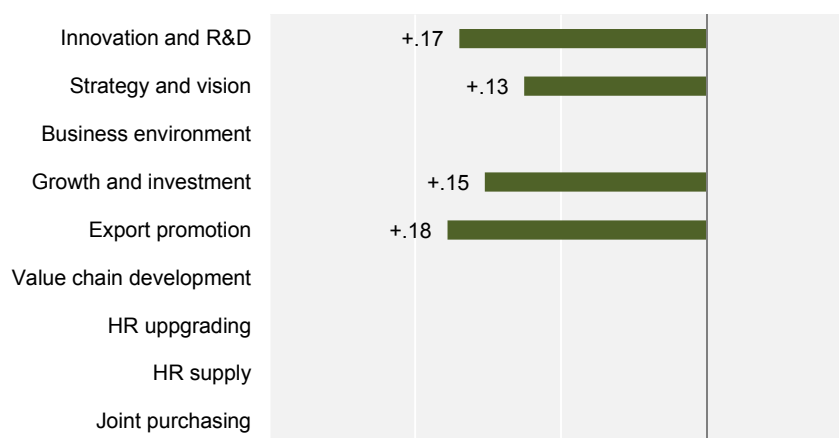
Cluster initiatives that rate Export promotion and, unsurprisingly, Innovation and R&D as high priority objectives perform better in terms of innovation. This is also true for Growth and Investment and Strategy and vision.

Figure 3.25. Relationship between objectives and competitiveness performance

Objective	Value
Identity and brand	
Innovation and R&D	.152
Strategy and vision	.095
Business environment	
Growth and investment	.126
Export promotion	.314
Value chain development	
HR uppgrading	.107
HR supply	
Joint purchasing	
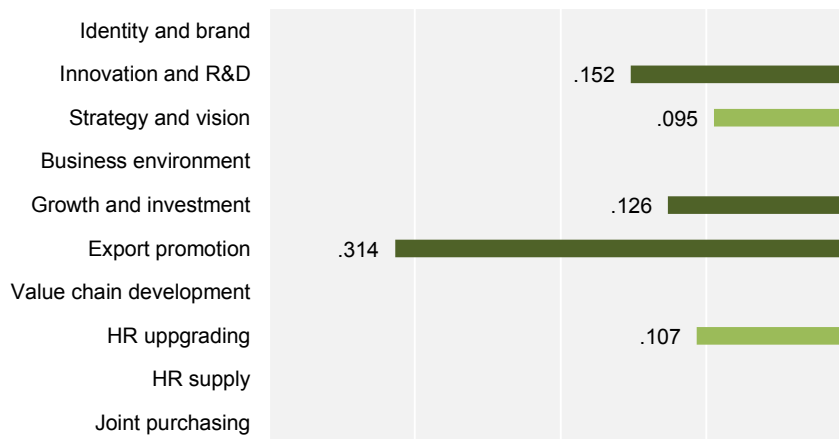
Cluster initiatives that rate Export promotion as a high priority objective perform considerably better in terms of improving international competitiveness, and some other objectives also have some effect.

Other factors

There are many other factors that are related to a CIs performance.

Who should initiate a CI: government or industry? In 2003, the data did not show any difference in performance depending on who took the initiative, and the current study gives the same result. The survey indicates no significant differences in performance between the CIs that were initiated through a public call or policy program and those that were initiated by a private sector initiative.[1] Nor does there seem to be any effect from whether the cluster initiative is organized as a legal entity or not, with one exception: CIs that are a legal entity are more likely to be financially sustainable.

Having a website, on the other hand, is strongly associated with many performance measures. Cluster initiatives with a website perform better in terms of innovation, competitiveness, meeting deadlines and goals, being financially sustainable and attracting new participants than the very few that do not have a website.

Having formal membership is strongly associated with financial sustainability, attracting new participants, and with improved collaboration among firms and with other clusters. Even more important is evaluations. CIs that are subject to a formal evaluation program perform better on every performance indicator in the survey, internal and external.

We now turn to the effect of conditions in the CIs environment.

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[1] For this and the following two paragraphs, we used independent samples t-tests for equality of means, 5% two-tailed significance.

Figure 3.26. Relationship between the cluster's international competitiveness and the CI's performance

Performance indicator	Value
Cluster growth	+.09
Innovation	+.16
Competitiveness	+.36
Meet deadlines	+.23
Meet goals	+.23
Financially sustainable	+.22
New participants	+.20
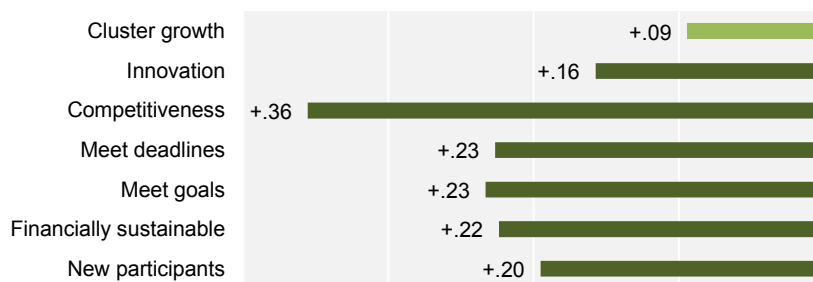
CIs that address internationally competitive clusters perform better on all performance indicators. This confirms the observation in the 2003 study, that CIs focusing on already strong clusters achieve the best results.

Figure 3.27. Relationship between the cluster's regional importance and the CI's performance

Performance indicator	Value
Cluster growth	+.13
Innovation	+.17
Competitiveness	+.28
Meet deadlines	+.24
Meet goals	+.28
Financially sustainable	+.25
New participants	+.26
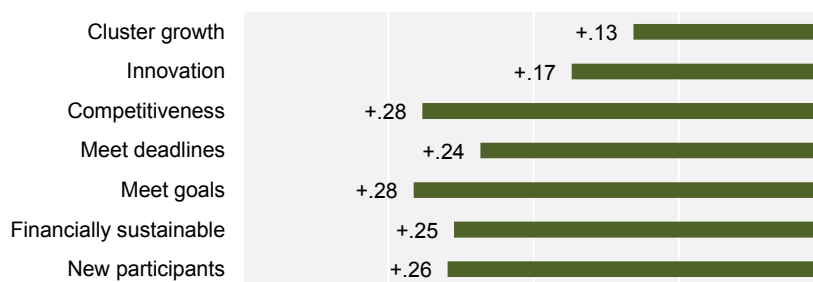
Factors in the context in which the cluster initiative takes place are also important. CIs that address clusters which are one of the more important clusters within its region perform better in every internal and external aspect, especially in terms of improving competitiveness.

Figure 3.28. Relationship between firm's trust in government and the CI's performance

Performance indicator	Value
Cluster growth	
Innovation	
Competitiveness	+.11
Meet deadlines	+.17
Meet goals	+.20
Financially sustainable	+.20
New participants	+.14
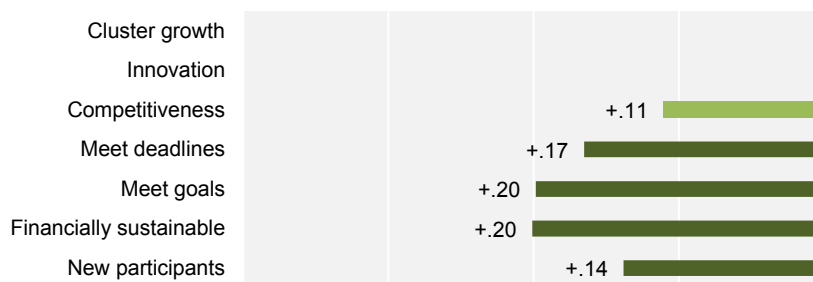
Trust is often mentioned as an essential prerequisite for cluster development, and the survey confirms that internal performance as well as competitiveness

performance is related to firms' trust in government. The same can be said about the effect of trust between firms in business relationships (see Figure 3.29 and 3.30 below).

Figure 3.29. Relationship between trust in business relationships and the CI's performance

Cluster growth	
Innovation	
Competitiveness	+.11
Meet deadlines	+.15
Meet goals	+.20
Financially sustainable	+.16
New participants	+.19
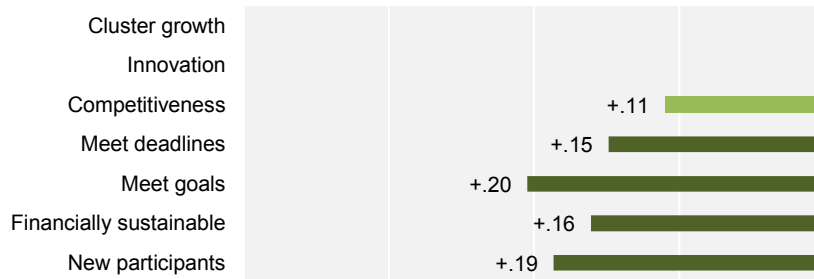
Figure 3.30. Relationship between stable and predictable government policy and the CI's performance

Cluster growth	
Innovation	
Competitiveness	
Meet deadlines	+.15
Meet goals	+.19
Financially sustainable	+.16
New participants	+.13

Similarly, an environment where government policy is perceived as stable and predictable is related to better in internal performance.

Chapter 4
Gaps and bridges

Introduction to the Gap Model

One way to view cluster organizations is that their fundamental task is to facilitate collaboration. This chapter is devoted to analyzing CIs from that perspective, and to do this we use what we call the "gap model". The model views clusters as groups of actors of different types: firms, research institutions, education institutions, and government.[2]

Figure 4.1. The Gap Model – types of actors in a cluster
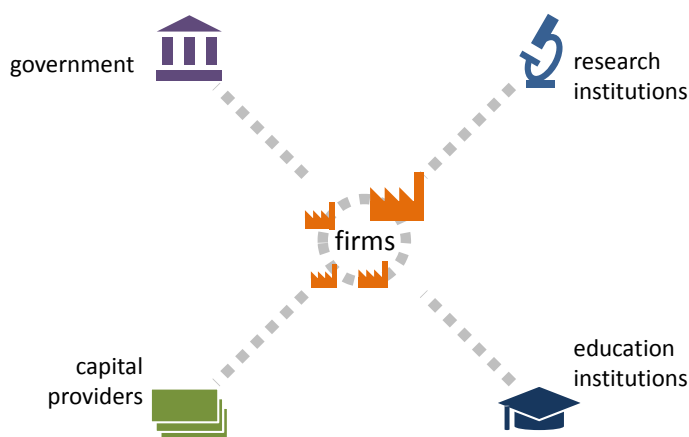
In an imaginary ideal cluster, these actors collaborate perfectly. Government is fully tuned to the needs of firms. Researchers are in constant dialog with business. Educational institutions communicate with firms about how best to supply the cluster with the skills and competences it needs. Capital providers interact with firms and supply the capital needed.

  However, in reality there are barriers of many kinds that prevent interaction. These barriers create gaps in the cluster leading to far from perfect collaboration, which in turn prevents innovation processes. A key role for cluster organization is to bridge these gaps, to improve interaction and enhance the performance of the cluster.

In addition to the gaps within the cluster, cluster initiatives also work with bridging two external gaps: between the cluster and other clusters (sometimes called "cross-clustering"), and between the cluster and global markets (both

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[2] For Life Science clusters it also makes sense to add a sixth type of actor: health care, i.e. hospitals and other health care providers.

attracting talent and investment from outside, and reaching out to global buyers, suppliers and partners).

Figure 4.2. The Gap Model – the seven innovation gaps
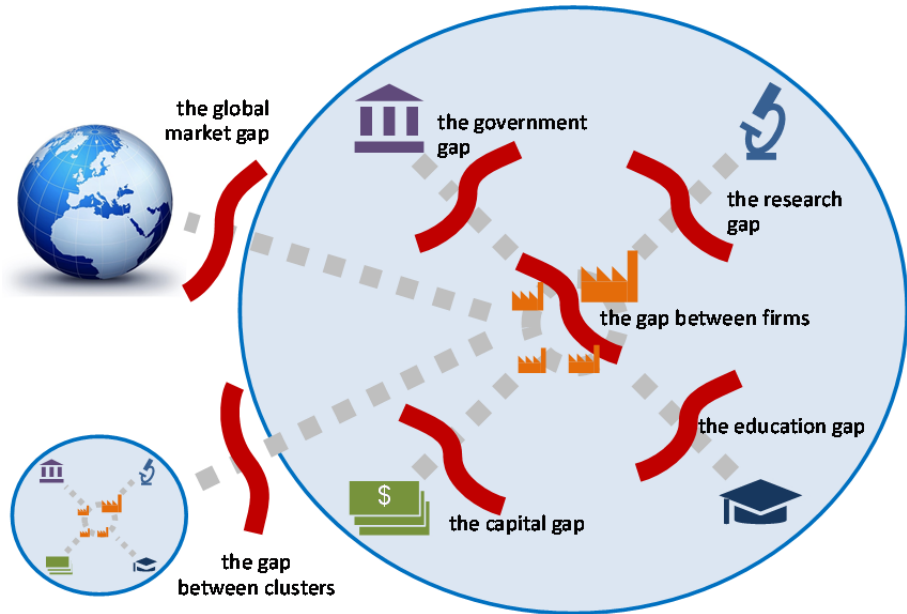
This model therefore revolves around interaction between different types of actors. We shall now see what GCIS can tell us about how the gaps are addressed by the cluster initiative.

Cluster managers' contacts with different actors

Cluster managers spend a lot of time talking to other people in the cluster. But who do they speak to, and how often?

Figure 4.3. Frequency of cluster manager contacts with other persons in various sectors (Europe)
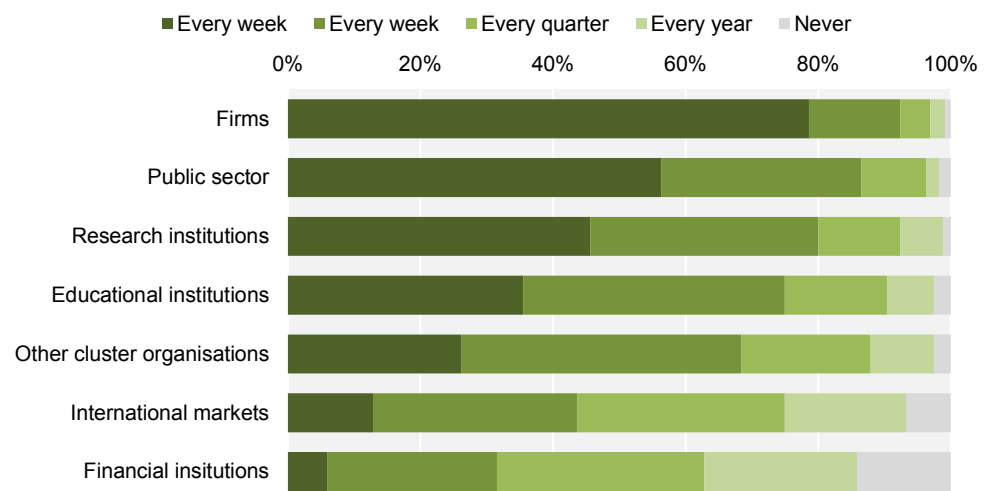
Cluster managers are most frequently in touch with firms in the cluster. About 80% are in touch with firms at least every week. In falling order, they also talk to representatives of the public sector, research institutions, educational institutions, other cluster organizations, international markets, and least frequently financial institutions.

Figure 4.4. Level of priority for seven types of collaboration promotion
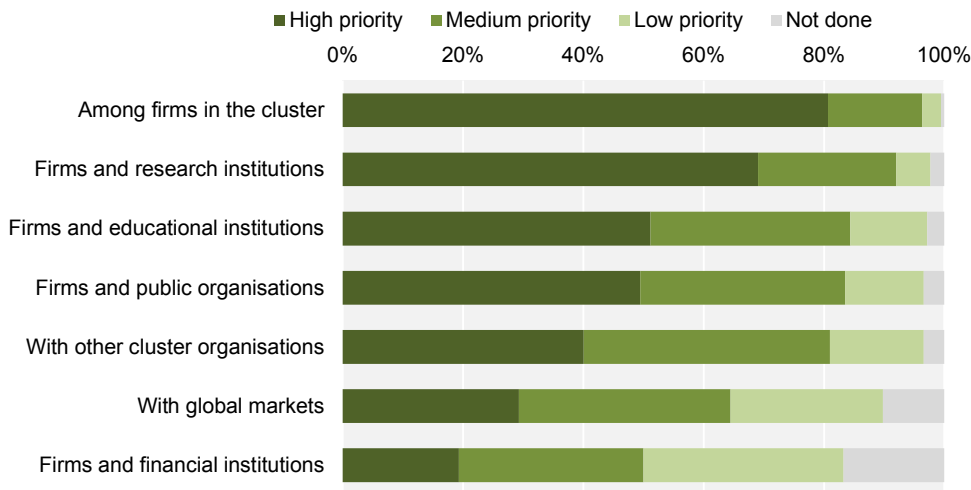
Over 80% of cluster initiatives consider promoting collaboration between firms a high priority in order to reach their goals. The priority that is given to a particular gaps agrees with the frequency that cluster managers are in touch with those actors, with one exception. Although collaboration between firms and the public sector is ranked as less of a priority than with research institutions and educational institutions, cluster managers none the less are more frequently in touch with the public sector than with research institutions and educational institutions.

Figure 4.5. Share of clusters managers who are in weekly contact with persons in various sectors, by how high priority that kind of collaboration is given
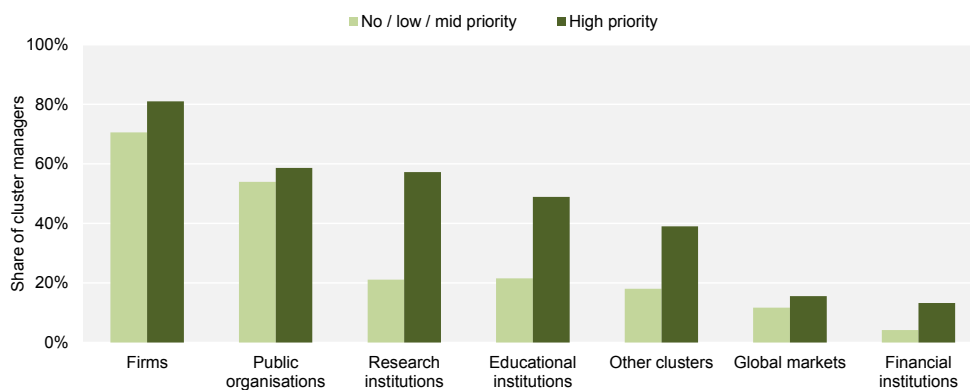
The priority given to promoting collaboration with a type of actors, is clearly reflected in how frequently cluster managers talk to that kind of actors. For

example, in cluster initiatives where collaboration between firms is no/low/mid priority, 71% of cluster managers are in weekly contact with firms, whereas where it is a high priority 81% are in weekly contact with firms. Again, the public sector is the exception. Slightly less than 60% or cluster managers are in weekly contact with the public sector, regardless of how high priority firm-to-public sector contacts are given.

Improvements in collaboration

Figure 4.6. Impact of CI on interaction and collaboration
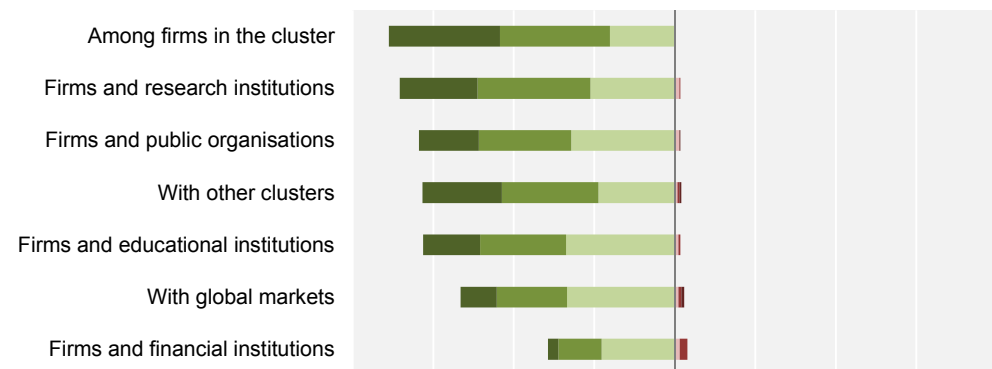
Note: Dark green represents the reply "Much better", and brighter green represent lower positive performance. Red shades represent negative performance, down to "Much worse".

As show in Figure 4.6 above, CIs report the best impact on improved collaboration among firms in the cluster. 89% report improvements (over the last three years) in collaboration among firms. Similar results are reported for collaboration firms-research institutions. Improvements are somewhat more moderate for collaboration with public organizations, other clusters and educational institutions. Even less progress is reported for improved collaboration with global markets, and least for collaboration between firms and financial institutions.

Collaboration and performance

We saw above how cluster managers vary in how often they communicate with different actors, in how high priority different types of "bridge building" is given, and in how much improvement they can see in the degree of collaboration across the different gaps. We now turn to the question if any of this matters for performance in a wider sense: does all this "bridge building" matter for a clusters growth and competitiveness?

Who the cluster manager talks to appears to be important for performance. The frequency of contacts with different sectors is related to external performance, as shown below.

Figure 4.7. Relationship between cluster manager's contacts with various sectors and external performance
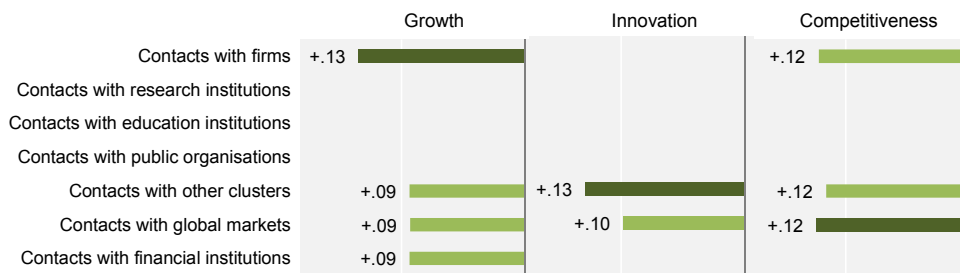
The survey suggests a relationship between the frequency of cluster managers' contacts with various actors and external performance, meaning cluster growth, improved innovation and enhanced competitiveness. When cluster managers are more frequently in touch with firms, this is related to improved growth and competitiveness performance. Contacts with financial institutions are related to improved growth. Contacts with other clusters and with global markets (buyers, sellers, and partners abroad) are related to all three types of external performance. However, the frequency of contacts with public organizations, research institutions or education institutions shows no direct relationship to performance.

Figure 4.8. Relationship between priority of collaboration among firms and performance

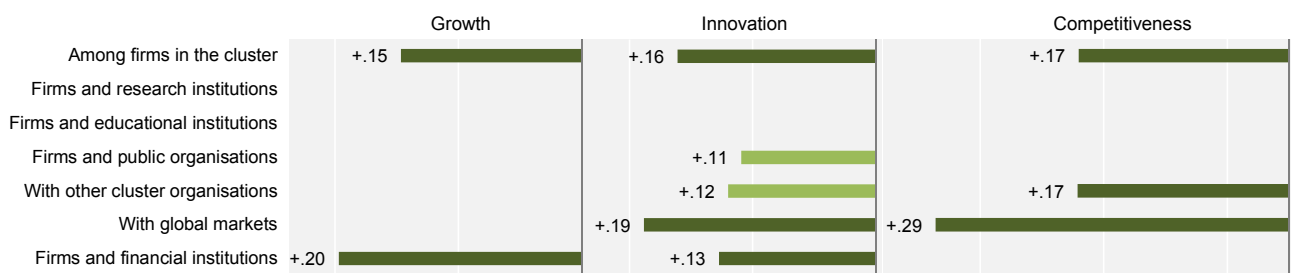The survey also suggests a relationship between how high priority collaboration is given and external performance. For all three types of external performance (growth, innovation, and competitiveness) a high priority on improving collaboration among firms in the cluster is strongly related to better performance. A high priority on collaboration with other cluster organizations is related to innovation performance and competitiveness performance. Collaboration with actors on global markets is relevant for innovation and competitiveness, while collaboration with financial institutions is related to growth and innovation.

However, the study also suggest that the priority of collaboration with research institutions and educational institutions has no clear impact on external performance. A high priority on collaboration with public organizations is only moderately related to innovation performance.

How to interpret these results without a deeper analysis is not entirely straight forward, and we cannot say for sure what is cause and what is effect. This said, the findings do suggest that the traditional triple helix perspective does not give the whole picture of how clusters benefit from collaboration. The main relationships of the traditional triple helix, namely firms-to-academia and firms-to-government

cannot alone account for performance. Firm-to-firm collaboration appears to be the most important to have as a high priority, and the few CIs that do not rate his as a key priority is a small group that stand out as low-performers. Conversely, only a small group of CIs consider firm-to-finance a high priority, and the data suggests this group is particularly high-performing. The data also suggests that giving high priority to the two gaps outside the cluster, namely the cluster-to-cluster gap and the cluster-to-global markets gap, is important for performance.

Chapter 5
Cluster Policy

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Introduction

Cluster initiatives operate almost everywhere in some relation to government policy. In some locations they are the direct result of such policies, having been created through government efforts. In others, they use government funding provided more generally for specific activities that also cluster initiatives are active in. And even cluster initiatives that have no direct financial or organizational linkages to government operate in an environment heavily influenced by economic policy decisions.

Over the last decade, the economic policy context in which cluster initiatives operate has changed significantly. Governments have launched many new programs that explicitly draw on cluster initiatives as instruments or partners. These programs at least partly reflect a better understanding of the role that cluster policy can play conceptually, and where a role for government is motivated through the existence of market failures. Cluster policies are in this sense part of a broader discussion on whether government policy should move beyond a focus on upgrading an effective cross-cutting business environment and engage also at the level of specific sectors or groups of industries.

In this chapter, we track the changes in the conceptual thinking about cluster policy as well as in the practice of cluster programs. We then discuss how the new wave of cluster policies have influenced cluster initiatives, and how this is reflected in the survey responses from the 2012 GCIS.

A theory of cluster policy

Cluster policy is used for a wide array of government programs oriented towards clusters. The lack of a widely agreed upon definition of cluster policy has made it difficult to come to any agreement on the impact and value of cluster policies.

Despite this lack of a shared understanding of the term cluster policy, the conceptual debate has made significant progress over the last decade. There is now significantly more clarity on the specific factors that drive the widely diverging views about cluster policy. There is also an increasing amount of data that will over the coming years help us to further evaluate the key competing positions. What have been emerging are essentially two different views on the role of clusters in explaining performance differences across locations, on the nature of cluster policies, and on their ability to generate prosperity benefits.

Figure 5.1 Three perspectives on clusters

The Impact of Cluster Presence	The Nature of Cluster Policies	The Impact of Cluster Policies

First of all, there is general agreement that local externalities – through knowledge spillovers, shared input markets, and other linkages - exist and have an impact on the performance and location of companies. There is also agreement that locations do significantly differ in their specialization profiles, and that individual groups of related industries tend to be concentrated in a narrow set of locations (Chatterji *et al.*, 2013 for an overview).

There are, however, different views on whether these externalities are largely confined to sets of related industries, or connect large sectors of a location's economy. The prior view is consistent with much of the cluster literature (e.g., Porter, 2008; Delgado/Porter/Stern, 2010), while the latter is more often underpinning the literature on urban regions and regional innovation systems (e.g., Scott; 2012; Glaeser, 2012; Cook, 1992). There are also different views on the size of the externalities; some measures significant effects (Greenstone *et al.*, 2010; Delgado *et al.* 2012) while others see a more marginal impact (Martin *et al.* 2010). Underpinning this empirical question is the deeper conceptual debate as to whether clusters are 'endogenous', i.e. naturally emerge where business environment conditions are conducive, or 'exogenous', i.e. have an independent effect on economic outcomes.

The emerging hypothesis is that clusters do exist at all levels of economic development (and thus business environment quality, which suggests that they are not purely endogenous) and work largely as a multiplier that enhances the benefits of business environment conditions rather than being a substitute for weaknesses. While the direct effect of co-location in clusters might thus be limited – many estimates suggest an elasticity of cluster wages to specialization at around 2-3% - there leverage effect can be substantial.

Second, given that there is agreement on the existence of local externalities, there is also agreement on at least a principal case for policy to address the market failures that these externalities create. Cluster policies thus have much in common with the set of policies that are being discussed under the heading of New Industrial Policies (Rodrik, 2008), where the argument for policy also rests on the identification of externalities driving market failure.

There are, however, two very different sets of policy approaches that have emerged to address these externalities (Duranton, 2011; Ketels, 2013; Rodriguez-Clare, 2005/2007). One set of actions tries to have an impact on economic geography and the emergence of clusters directly. The idea is to create incentives for companies to co-locate in order to create more externalities. Such incentives are seen as needed and justified, because individual investors to not consider the positive externalities they create in their investment location. Another set of actions tries to leverage the existing presence of clusters and organize knowledge sharing

and joint action. The idea is to internalize the externalities that exist and thus drive activities that make better use of the potential from co-location. These two sets of approaches have radically different implications for policy practice. The first leads to policies that try to create clusters, that have to intervene early and massively to shape an emerging economic geography profile, and that encourage zero-sum competition between locations. The latter one leads to policies that leverage existing clusters that have developed naturally, that work consistently over time and with modest resources, with a view to better use existing government programs rather than distributing new funds, and that encourage specialization, linkages, and competition across locations.

The emerging hypothesis is that cluster policy is significantly more likely to be beneficial if it is focused on leveraging rather than creating clusters. The alternative approach is very risky and as the old-style big push, industrial policy approaches subject to many potential pitfalls. In essence, governments lack the knowledge to evaluate where new clusters could emerge in welfare enhancing ways given the appropriate policy intervention. Governments can, however, respond to the market signals of clusters that have already emerged, and work with them to address existing externalities – this is exactly the role that cluster initiatives play as the 'bridge building'-metaphor introduced Chapter4 describes.

5.2 Two perspectives on clusters
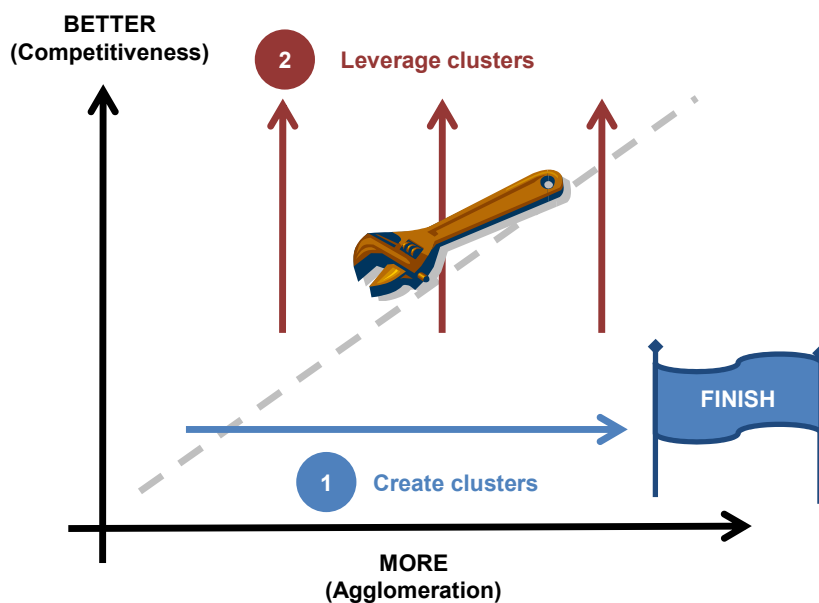
Third, depending on which positions one takes on the two issues raised so far, i.e. the nature of cluster effects and the profile of cluster policies, the expectations on the possible impact of cluster policies differ widely. But even when adopting the view that clusters have a meaningful impact on economic outcomes and that cluster policies ought to focus on leveraging clusters, the theoretical literature has identified important issues that are relevant for cluster policies and cluster initiatives.

One issue is related to political economy consideration. Even if welfare-enhancing cluster policies are possible, they might open the door to powerful

interest groups capturing rents. This is one of the key general arguments against policies that use sector- or industry-specific measures rather than focusing only on cross-cutting framework conditions. The danger of such interest group capture that channels public funds to narrow groups under the cover of cluster policies is higher the less effective public institutions are. Cluster policies might be more appropriate for some locations than for others, depending on the robustness of the political system and the capacity of public administration.

Another issue is related to the tension between focusing on existing strengths and enabling structural change. A significant literature has over the last few years discussed how locations need to change what they do in the course of economic development (Hausmann *et al.*, 2012; Lin, 2011). A focus on existing clusters in cluster policy efforts might work against these tendencies. This is one of the factors that has motivated a new look at regional policy in Europe that aims to encourage the 'entrepreneurial discovery' of new activities (Foray *et al.*, 2009). In addition, cluster research has for some time discussed the danger of 'lock-in', i.e. the focus on entrenched positions and technologies in clusters that become too much inward-focused. Cluster policies might need specific tools both to open up for the emergence of new activities and the renewal of existing clusters. The need for different types of cluster policies depending on the stage of development of the underlying cluster has become a new topic in the conceptual debate about cluster policies (Christensen *et al.*, 2012).

The practice of cluster policy

Cluster policy practice has evolved as well over the last decade, influenced but not driven by the advances in conceptual thinking. More often the practical needs of policy makers have dominated the next stage of cluster policy program. There is now a wide range of cluster policy efforts in place, spanning the entire range of efforts discussed in the conceptual debate. Unsurprisingly, there is an equally wide range of outcomes that these policies have triggered, giving everyone plenty of examples to point to when making their respective argument about the case for or against cluster policy. What is lacking, is a coherent framework and systematic data that would enable us to link specific outcomes to different types of cluster programs. There is some progress in this direction – the cluster mapping work is generating more data, and the cluster initiative performance model (CIPM) introduced in the first CI Greenbook and reapplied here gives a sense of how the assessment can be structured. But the data quality remains limited, especially in Europe, and there is no classification of cluster programs to draw on.

The evolution of cluster policy practice can be exemplified through looking at the European experience. Europe is particularly interesting because here policy makers have been most active in creating cluster programs over the last decade.

Around 2000, the first wave of cluster policy efforts started. European institutions reacted to the experience at the level of member countries and regions. Cluster policies were largely seen as an extension of existing programs to support small- and medium-sized companies. The European Commission started with some narrow experimentation of its own, supporting cluster efforts in some of the candidate countries in Central and Eastern Europe through the PHARE program. It also started to collect data on cluster policies and clusters.

Following the 2005 re-launch of the Lisbon Agenda, an EU strategy to enhance the global competitiveness of the European Union that had failed to deliver the expected results, cluster efforts were identified as one of the new tools with

potential. Clusters became now much more a tool of innovation policy. Around 2007 the European Commission started to make much more determined forays into supporting cluster policies. At this time, the focus was on getting a common understanding about this new tool, and on sharing it more widely with policy makers throughout Europe. The High Level Advisory Group on Clusters drafted the European Cluster Memorandum, a document that outlined the role and potential of cluster efforts. It included a commitment from regions throughout Europe to use such efforts, and specific suggestions to the European Commission to create an environment conducive for such activities. The Commission invested in the knowledge infrastructure for cluster policies, launching the European Cluster Observatory and financing a number of pilot projects to develop tools and practice manuals.

5.3 A decade of European cluster policy
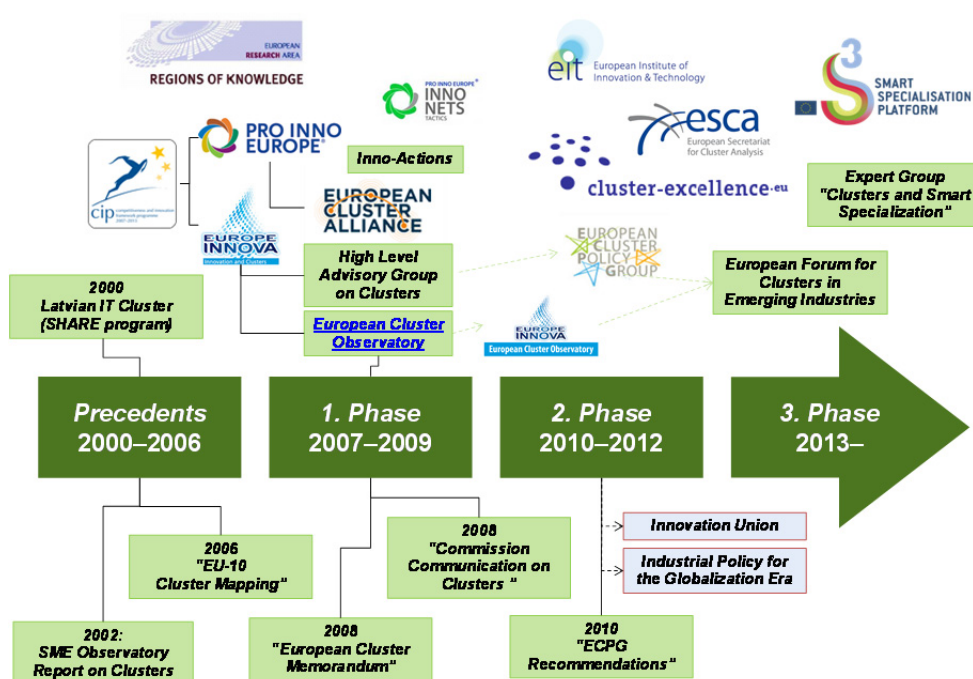
Around 2010, the focus shifted from encouraging the use of cluster policies to raising the quality of cluster policies across Europe. The European Cluster Policy Group outlined key characteristics of effective cluster programs. The European Commission developed a range of new projects to develop tools to enhance the quality of cluster initiative management, using benchmarking as well as cluster initiative training. Cluster policy was further integrated into the policy mix, specifically in efforts to raise innovation but also as regards a new industrial policy for Europe.

The most current development has been the integration of cluster efforts into regional policies. The smart specialization approach outlines the need to foster structural change alongside a focus on regions' existing strength. The European Commission has thus launched efforts to study the role of clusters in emerging industries and the broader context of smart specialization. With the general mechanisms for the professional support of existing clusters in place, the challenge is now to further differentiate how cluster policies can be structured to meet the needs of locations and clusters at very different stages of economic development.

Benchmarking cluster policies across Europe

By Gerd Meier zu Köcker, Thomas Christensen, Thomas Lämmer-Gamp

A pan-European benchmarking exercise has compared cluster programs across Europe in 2011 and 2012, covering 33 cluster programs in 23 countries. The analysis revealed nine key observations:

1. Different types of cluster programs serve different purposes

Cluster programs focus on one of the following three key objectives:

- regional economic development
- the development of national industries
- the commercial exploitation of the R&D potential of a country's economy

In addition, there are programs that promote the establishment of industry-driven R&D networks that often have a national rather than a regional scope. However, the networks created through this kind of programs are in many cases strongly related to clusters.

2. Most cluster programs still feature high on the government's agenda

Most cluster programs in Europe feature high in the overall national or regional policy context, although many of them have been running for more than 10 years. Moreover most of them are either embedded in an overall national strategy or do matter in terms of their budget. However, budgets heavily vary among different European countries.

3. Coordination with other funding programs shows room for improvement

The high profile of the cluster programs does not necessarily translate into a good coordination with other funding programs. Cluster programs seem to be much better coordinated with the national R&D programs than with infrastructure policies (see Figure 5.4).

Figure 5.4: Coordination of cluster programs on regional and national level with other national business development as well as national R&D programs
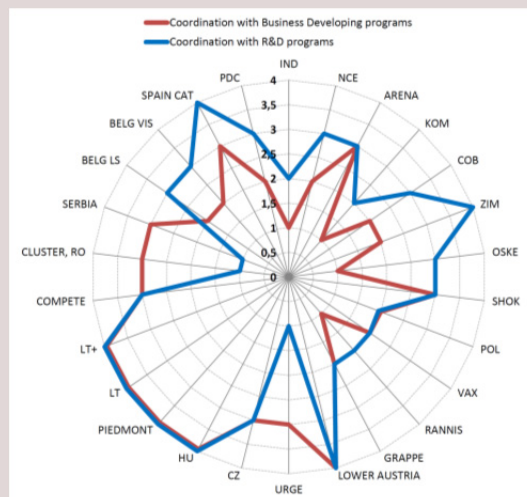
Note: 23 European member states participated. 0 = weak coordination, 4 = strong coordination.

4. Internationalization is often a key topic for clusters

Internationalization of clusters is an important objective of many cluster programs. However, quite often there is a considerable gap between the political rhetoric and the intensity of measures, actions or funds available for really support clusters and their actors to go international.

5. Program owners take over a more active role towards developing individual clusters

When it comes to support schemes applied within the cluster programs a paradigm change has happened. Individual professional support of cluster organizations through tailor-made services has gained more importance and has become a core element in many cluster programs. Cluster managers have been learning to consider program owners as partners for development and vice versa. In the past, there was much less active interference by the program owners as long as the program objectives had been fulfilled.

6. Cluster Management Excellence has become more important

Program owners now attach much more importance to Cluster Management Excellence. Cluster management excellence is considered being one of the key success factors, therefore the majority of program owners argued to focus their programs on cluster excellence instead of "numbers of clusters". Cluster support today is no longer about the mere establishment of clusters, but about clusters that have strong national/regional roots and that are internationally competitive.

7. Evaluation and impact measuring gained importance, but remains a challenge

Almost all programs have evaluation tools and processes in place. Each of these program evaluation systems is focusing on the programs themselves and on the supported cluster initiatives as well. All program owners consider the evaluation as a useful tool to improve the governance of a program and its effectiveness and efficiency. Many program owners consider formative evaluations as more useful than ex-post evaluations since they provide relevant information in the course of the program implementation which can be used for "real-time" improvements of the program. In contrast, ex-post evaluations are important to show policy makers and the public that the funds invested in clusters provide significant impact. However, satisfying approaches for such impact assessments are still missing, although some progress has been made recently. [1,2]

8. Cluster policy has become more important with EU enlargement

The EU member countries that joined the EU after 2003 have often out more emphases on the cluster programs than older member countries. This raises interesting issues, given the different economic context in these economies.

9. The European Regional Development Fund has led to better linkages between innovation support programs and cluster programs

The coordination of cluster efforts with national business development programs and other national programs is higher for those cluster programs that have been launched after 2007 (see Figure 5.5). These younger programs take often pace in the context of the European Regional Development Fund (ERDF), where the support of clusters is one of the objectives to promote regional competitiveness and employment. [3]

Figure 5.5: Comparison of "older" and "younger" cluster programs with regard to the coordination with other competitiveness programs
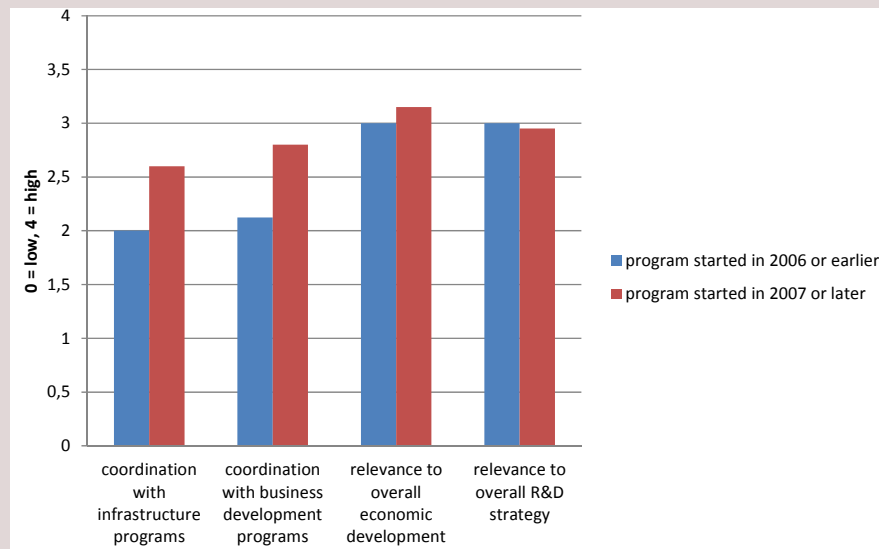
Note: 23 European member states with 33 cluster programs participated in the survey.

[1] Danish Agency for Science, Technology and Innovation, 2011: The Impacts of Cluster Policy in Denmark. An Impact Study on Behavior and Economic Effects of Innovation Network Denmark

[2] Kind, S., Meier zu Köcker, G. (2011): Evaluation concept for clusters and networks Prerequisites of a common and joint evaluation system, iit-Perspektive 7, http://www.iit-berlin.de/veroeffentlichungen/iit_perspektive-7 (June 2012)

[3] Official Journal of the European Union (2006). Regulation (EC) No 1080/2006 of the European Parliament and of the Council of July 2006 on the European Regional Development Fund and repealing Regulation (EC) No 1783/1999. (Article 5).

While cluster policies have been used most extensively in Europe, other countries and organizations have made use of this tool as well. In the United States, most cluster efforts have traditionally been driven by the private sector and individual states. Around 2010, however, the federal government also started to engage and launched a range of programs to support clusters. Many of these cluster programs are collaborations across a number of federal agencies like the Economic Development Administration (EDA) and the Small Business Administration (SBA) as well as a number of more specialized agencies. More recently, the EDA has also started to support cluster mapping efforts as in Europe.

5.6 Federally funded cluster initiatives in the United States

Source: http://www.sba.gov/sba-clusters
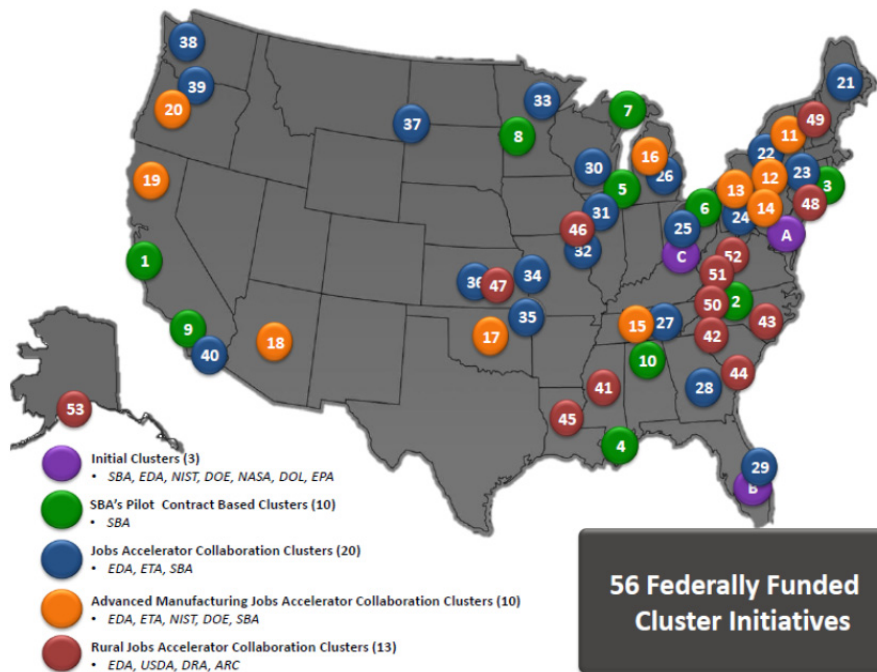
Apart from national policies there is also a range of organizations that use cluster policies in a development policy context. USAID is one of the bilateral aid organizations that supported an effort to analyze cluster initiatives in emerging and developing economies already in 2005/2006 (Ketels *et al.*, 2006). Aid organizations from some European countries were also active in this field. Among international organizations UNIDO has a long tradition of working with clusters and value chains in emerging and developing economies. These efforts have gained new impetus through the broader adoption of cluster policies in more advanced economies. In Latin America, both CAF and the Inter-American Development Bank have worked on cluster policy issues and funded more extensive cluster programs in some of their member countries over the last decade. The World Bank has gradually moved into this field as well, first through a guide on policy implications from cluster initiatives for developing economies (World Bank, 2009) and a number of publications on clusters in Asia and Africa. Its "Competitive Industries" practice has now a natural affinity to cluster policies as a tool that might also feature more prominently in World Bank programs with different countries. This brings the World Bank back to the central role it played prior to 2000, when it was instrumental in supporting the launch of TCI, the global network of cluster practitioners founded in 1998.

The new reality of cluster policies: implications for cluster initiatives

The first Cluster Initiative Greenbook discussed the importance of the policy context for the cluster initiatives and their impact on economic performance. This

policy context has, as discussed above, changed significantly over the last decade. What have been the implications for cluster initiatives so far, and what is the outlook for the future?

5.7 Implications of a new cluster policy context

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│                  │  ───▶    │        How         │
│                  │          │ cluster initiatives│
│                  │          │   are financed     │
│                  │          └────────────────────┘
│                  │          ┌────────────────────┐
│                  │  ───▶    │       What          │
│                  │          │ cluster initiatives │
│ A growing presence│         │        do           │
│ of cluster policies│        └────────────────────┘
│                  │          ┌────────────────────┐
│                  │  ───▶    │       Where         │
│                  │          │cluster initiatives  │
│                  │          │     emerge          │
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│                  │  ───▶    │       What          │
│                  │          │cluster initiatives  │
│                  │          │    achieve          │
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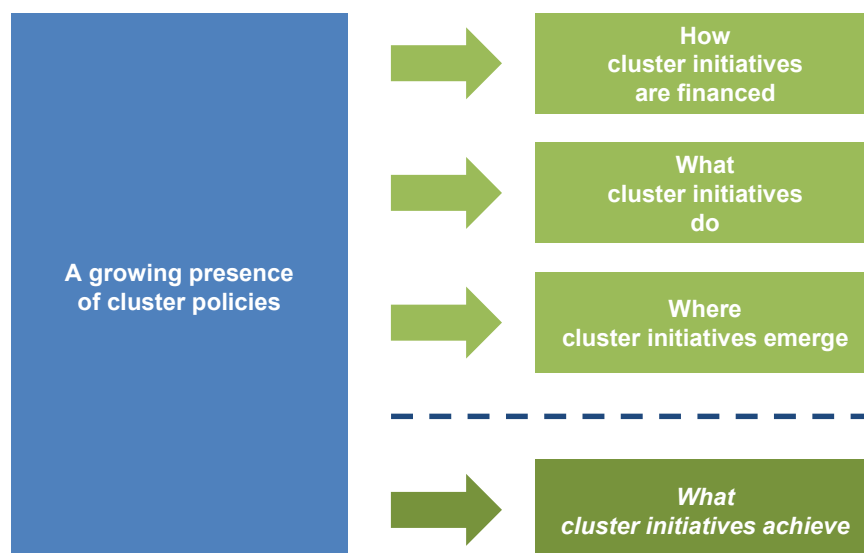
The most striking observation from the 2012 Global Cluster Initiative Survey (GCIS) is the continued dominance of the public sector in cluster initiative financing, especially in Europe. A decade ago that data suggested that over time cluster initiatives grow through adding member-financed activities, thus lowering the overall share of public funding. This is no longer visible: Instead there is a range of public sector funding sources that cluster initiatives tap into. While the role of different funding entities changes over time, the overall importance of public sector funding seems to be remarkably stable over the course of a cluster initiative's development.

A positive interpretation is that if cluster policies address an underlying externality, there is no reason to withdraw the public funding over time. While companies need to show that they value the platform for collaborative action through their engagement, the collective action problem does not disappear. Much of the private sector investment in cluster-related activities will in any case remain uncounted, as it happens through the commitment of time and energy, and the alignment of firm activities with those in the cluster organization. A less benevolent interpretation is that governments find it hard to withdraw funding, even when the outcomes of a cluster initiative are limited. Reasons can always be found to mobilize a new source of financing from another part of the public sector, especially in Europe where there are many different programs to tap into. While the reality is likely to be a mix of both, it is clear that the large role of public funding increases the need for effective impact assessment. The availability of these funds make it less likely that the market process itself is going to weed out those initiatives that do not create sustained value for the participating companies and the locations in which they operate.

Those that pay, decide. This simple formula is also relevant when thinking about cluster initiatives. Cluster initiatives are 'bridge builders'. The value of these

bridges depends on who wants to use them in a particular context. The 2003 GCIS had pointed out that a key driver of cluster initiative impact is that the choice of activities is made within the cluster initiative based on an analysis of the specific competitive context in which the cluster operates. While this is widely recognized as a reasonable approach, the realities of government funding can easily distort the choice of activities. Different parts of government fund those efforts that they control and/or that they view as important overall. In an ideal world, cluster initiatives then choose those funding instruments that are available to support the activities most critical for their cluster. In reality, the availability of funding can lead cluster initiatives to focus on what they can get reimbursed for rather than what they should do.

An illustrative example is the European Commission. It naturally focuses a lot of its attention on cross-border linkages – this is its domain while more specific funding in areas like innovation, workforce skills, SME upgrading, etc. are the responsibility of national or regional entities. Whether the significant growth in internationalization activities across European cluster initiatives over the last few years is justified, is hard to tell. There are good reasons that stronger global linkages are needed and that in their initial stages of development many cluster initiatives were too inward focused. Nevertheless, the availability of funding now for internationalization activities will have played a role. Again, there is a need for better evaluation mechanisms that can at the activity level help cluster initiatives select what to do and assess what worked.

Cluster policies are very often focused on specific types of economic activities. Governments want to support those exiting cluster categories that they view as having the most economic potential. They want to support clusters active in areas viewed as relevant to society; in Europe this is now often described as 'addressing grand challenges'. And they want to create clusters in areas that are not yet strong but are perceived as beneficial and potentially viable in a given location. In all of these situations, cluster policies is not just following market signals, but is trying to interpret these signals or shape the direction of developments. This tendency will be reinforced dramatically as cluster initiatives become a tool in the 'entrepreneurial discovery'-process driving structural change.

The 2012 GCIS again shows a high presence of cluster initiative in a sub-set of cluster categories. Whether this bias is appropriate and reflects differences in the underlying economics of cluster categories, for example the strength of externalities, is hard to tell. Most likely political interests and ambitions do play a role as well, not just the actual economic benefits that a cluster offers in a location. The key challenge is to design decision structures that are transparent: If governments take 'bets', they need to communicate where and why. And they need data to track whether these bets are playing out, or should be stopped as the market moves into another direction.

The growing presence of cluster policies has influenced how cluster initiatives are financed, what they do, and where they emerge. But has it made cluster initiatives better in terms of achieving economic impact? The data remains inconclusive. Especially the efforts to enhance the professional quality of cluster management is likely to raise the overall performance of cluster initiatives. But the growing number of cluster policies has also sustained or even increased the range of outcomes. Many cluster programs and the cluster initiatives they support receive positive reviews. Increasingly, there is also 'hard evidence' from an analysis of company results that point in this direction. However, there is also significant evidence that some cluster policies waste funds and channel resources

to specific interest groups. In part, this might have been a natural outcome of a period where the number of cluster initiatives has grown dramatically. It is now time to consolidate, and let the market process identify which of these efforts really generate value. Cluster policy is critical, because it will have to organize this 'market' by setting financial incentives to aligns funding with performance. This way cluster policy can drive the potential of cluster initiatives in leveraging the full economic potential of clusters.

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