Building the Cluster Commons

An Evaluation of 12 Cluster Organizations in Sweden
2005 - 2012

Örjan Sölvell
Mats Williams
BUILDING THE CLUSTER COMMONS
BUILDING THE CLUSTER COMMONS

AN EVALUATION OF 12 CLUSTER ORGANIZATIONS IN SWEDEN 2005 - 2012

Örjan Sölvell
Mats Williams
## Books by

**Ivory Tower Publishers**  
**Academic Books for Practitioners**

<table>
<thead>
<tr>
<th>Year</th>
<th>Book</th>
<th>Authors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Greenbook</td>
<td>Örjan Sölvell, Göran Lindqvist and Christian Ketels</td>
<td>The Cluster Initiative Greenbook</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Also available in Czech and Polish.</td>
</tr>
<tr>
<td>2006</td>
<td>Bluebook</td>
<td>Christian Ketels, Göran Lindqvist and Örjan Sölvell</td>
<td>Cluster Initiatives in Developing and Transition Economies</td>
</tr>
<tr>
<td>2009</td>
<td>Redbook</td>
<td>Örjan Sölvell</td>
<td>Clusters – Balancing Evolutionary and Constructive Forces</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Also available in Spanish.</td>
</tr>
</tbody>
</table>

All books can be downloaded free of charge at [www.clusterobservatory.eu](http://www.clusterobservatory.eu)
To Per Eiritz
For his work with building the commons
Executive summary

This book is about how cluster organizations can help building cluster commons, where different actors, including large and small firms, universities, capital providers and public organizations, are attracted to meet, exchange ideas and collaborate in various projects. Such enhanced mobility and interaction in the commons, in turn, we expect will lead to improved innovation and financial performance among cluster firms. To test this proposition we have studied 12 cluster organizations, throughout North Mid Sweden (one of eight EU denominated regions in Sweden) over several years.

Overall, our studies show that cluster organizations have generated a range of positive results for involved firms in the region, as measured through accounting data, through surveys, and confirmed in interviews. Results also show that there are still important innovation gaps in the cluster commons, reducing the dynamics and innovation potential of the clusters. Results vary across organized clusters, where some clusters outperform others on almost all dimensions.

Bridging Innovation Gaps in Clusters

Our data show that working with clusters can generate important results in the area of reducing the innovation gaps in clusters and thus help building a cluster commons. The cluster organizations have been most successful in facilitating Firm-to-Firm cooperation, including both large and small firms. Thus, this gap has shrunk over time as a result of cluster activities. The most pervasive gap is between firms and capital providers. There are some indications of increasing gaps after the 2009 crisis, i.e. indicating damages to the commons.

General Performance of Member Firms

Cluster activities have proven to support firms in generating new and improved products and services, and also leading to enhanced sales. Here, some 40% of firms (2012) agree that coordinated cluster activities have had an impact on these two dimensions.

The general trend is that work in organized clusters has led to some improvements, also in the other areas of study: employment, workplace equality, workplace diversity and environmental sustainability. If levels are now at 20%-30% of member firms agreeing to an effect, they were earlier only at 10%-15%.

In some cases of successful clusters, employment has actually shrunk among member firms, but at the same time wages have risen, implying a transformation to more productive jobs. In the long run this transformation in jobs is critical to every region. Other programs than cluster programs, and of course well-functioning labour markets, should take care of the redistribution of labour into other sectors. Thus, one should not equate cluster programs necessarily with more jobs, but, judging from our data, with better, i.e. more productive, jobs.
Financial Performance of Member Firms

Results show that cluster firms are more resistant to business downturns than the general regional economy. Cluster firms have also taken hits but have rebounded more quickly than control groups (non-member firms in the same industries).

Compared to selected control groups, cluster firms in 11 out of 12 organized clusters performed better on at least two out of the three performance variables: value added growth, profitability growth and wage growth. Part of this effect can be explained through the self-selection of better performing firms joining cluster activities, but, as we show in this report, we can partly control for this effect by comparing member firms and non-member firms’ performance before the start of the organized cluster.

Process Tracing

Our interviews with managers of member firms and cluster leaders, have given many insights into organized cluster work within the region. There is a general tendency that member firms expect more than they get out from their involvement in cluster activities. However, we do not necessarily see this as a problem, but rather that expectations are set high by the firms that engage in cluster activities.

Some unexpected effects have emerged. For example in several cases the large impact from cluster work has not come in the target area (e.g. joint innovation projects) but in other areas (e.g. support in reaching international markets). In other cases firms expected that joint cluster activities would lead to contacts with other firms, but in effect led to contacts with university research and students, or got them involved in policy dialogues that they had never accessed before.

The organized clusters have, through their many activities, helped to make the clusters more visible in their region, particularly to policymakers.

Compared to clusters around the world, the clusters active in North Mid Sweden seem to have a stronger focus on innovation projects (as compared to commercial collaboration enhancing efficiency, particularly among SMEs), including new technologies, products, processes and business models.

The more mature clusters tend to have formal membership, and financing is more varied. More recently established cluster organizations typically rely on public financing. Also, as expected, firms active in cluster activities (formal or informal “members”) in well-established clusters, report more satisfactory results than members of more recently established organizations.

There are instances where SMEs have felt at unease by the activities of the cluster organization. It is as if the organization (e.g. when selling services in search of private funding) becomes more of a competitor than a catalyst for change among firms and organizations. Larger multinational firms have also expressed concerns when cluster organizations have begun to act in international markets.

Introduction of cluster organizations adds new actors onto the regional stage. This entry is not unproblematic, in that established private and public organizations (at the local, regional and sometimes even the national level) might feel redundancy and competition.
# Table of Contents

Preface ................................................................................................................................. 5
1. Introduction .......................................................................................................................... 7
   The Cluster Commons .......................................................................................................... 8
   What Cluster Organizations Do ........................................................................................... 10
   Measuring Effects from Organized Clusters ......................................................................... 11
2. The Cluster Observatory Evaluation Model ........................................................................ 13
   Some Issues Related to Cluster Program Evaluation ............................................................. 14
3. The Seven Innovation Gaps and Bridge Building ................................................................ 19
   Evaluation Results ............................................................................................................... 23
4. Financial Performance among Cluster Firms ......................................................................... 27
5. General Performance Among Cluster Firms .......................................................................... 33
6. Future Directions ................................................................................................................. 37
   Building an Improved Model ............................................................................................... 39
References ............................................................................................................................... 45
Appendix 1. Method .................................................................................................................. 47
   SIMPLER ............................................................................................................................. 47
   Survey Instrument ................................................................................................................ 47
About the Authors .................................................................................................................... 49

## Figures and tables

<table>
<thead>
<tr>
<th>Table/Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Cluster Organizations in North Mid Sweden</td>
<td>8</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Three Types of Activities Performed by Cluster Organizations</td>
<td>10</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Three Evaluation Methods and Two Levels of Data Collection</td>
<td>14</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Planned Effects of Cluster Programs</td>
<td>15</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Planned Direct Effects on Firms From Cluster Programs</td>
<td>16</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Unintended Effects of Cluster Programs, Inside and Outside Target Area</td>
<td>17</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Outside Explanations to Measured Effects in Target Area</td>
<td>18</td>
</tr>
<tr>
<td>Figure 8</td>
<td>A Dynamic Cluster With Intense Interaction Across Actors</td>
<td>20</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Drivers of Interaction in Clusters</td>
<td>21</td>
</tr>
<tr>
<td>Figure 10</td>
<td>A Static Cluster With Limited Interaction Between Actors</td>
<td>22</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Cluster Gaps Experienced by Firms (2006 – 2012), All Clusters North Mid Sweden</td>
<td>23</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Cluster Gaps Experienced by Firms (2006 – 2012), Member Firms Accumulated into Three Regions and North Mid Sweden (grey line)</td>
<td>24</td>
</tr>
<tr>
<td>Figure 13</td>
<td>Firm-to-Firm Cluster Gap for Ten Clusters</td>
<td>24</td>
</tr>
</tbody>
</table>
Preface

During the last two decades, policymakers around the world have initiated programs to enhance innovation, and to support cluster formation, growth and competitive dynamics. We have worked in this field for many years, and have come across numerous examples of such regional, national and international economic development policies. We have argued that such programs must be evaluated to facilitate learning, and adaptation of strategies and lines of action. According to our data only some 60% of cluster organizations around the world are subject to formal evaluation (Global Cluster Initiative Survey, 2012). In this report we present a comprehensive evaluation model, built on three mutually reinforcing methods, and results from our work carried out in the North Mid Sweden region.

In North Mid Sweden, comprising the three regions Dalarna, Gävleborg and Värmland, economic development policies have included the support of organized clusters. We have had the fortune of accessing evaluation data and reports for 12 organized clusters, covering an extended period (2005 – 2012). By publishing these results, we hope to bring the knowledge and learning we have gained to cluster leaders and policymakers around the world. In order to be able to describe reality in a frank and true way, we have decided to anonymize the three sub-regions and the 12 cluster organizations throughout the report.

Many people have been involved in this endeavor. Caroline Walerud acted as our research assistant during the whole project, first and foremost working with the survey data. Given that this data emanates from various sources over the years, Caroline did a tremendous job of putting everything into legible graphs and tables. We sincerely thank her for that work.

Grufman Reje Management AB carried out the collection and analysis of financial data, using the SIMPLER method. We are particularly indebted to Anna Löfmarck and Håkan Wolgast for their meticulous work on the financial performance of cluster firms. Dotank AB in Karlstad conducted the 2012 cluster survey, and we thank Lars Sandberg and Emma Dorward for all their impressive work. We also would like to thank Sara Westlindh and Linda Harkman, under guidance of Gunnel Kardemark, Karlstad University School of Business, who carried out interviews with managers of cluster firms. As an extension of our evaluation model we also had a chance to experiment with measuring cluster activity through Email traffic, a work that was initiated and carried out by Johan Bång, General Manager of Future Position X in Gävle, and Prem Sundaram of TSG TrakPointe in Santa Monica, California. Elena Braccia, at the Center for Strategy and Competitiveness in Stockholm, nicely handled the manuscript, and finally turned all text and figures into a book.

We would also like to thank Staffan Bjurulf, manager of the SLIM project in the region, for initiating this project, and for assisting us with historical survey data. This project would not have been possible without his relentless support. Finally, we would like to acknowledge our intellectual debt to Professor Emeritus Evert Vedung, whose expertise on evaluation has been a major source of inspiration to us. And, were it not for Ifor Ffowcs-Williams, world-leading expert on cluster management, we would never have embarked upon this journey of studying performance of cluster organizations, and the long-term struggles of building cluster commons.

London and Melbourne in April 2013,

Örjan Sölvell Mats Williams
Chapter 1
Introduction

This book is about the conscious acts of what we have labeled “building the cluster commons”. Large and small firms, education and research institutions, and other types of private and public organizations carry out these acts. These are actors that are prepared to invest time and money into building more dynamic and innovative clusters. They do this by constructing a commons where actors meet and exchange ideas, and by initiating cooperative projects across actor boundaries. As we will soon explain in more detail, one can think of this commons as the “white space” in between the actors. This book will take a deeper look at one particular type of organization, namely cluster organizations, which has the potential of acting as powerful builders of cluster commons.

Cluster organizations have become commonplace (for surveys see Sölvell, Ketels & Lindqvist, 2003; Ketels, Lindqvist & Sölvell, 2012). Beginning in the 1990s clusters emerged as one of the central tools within regional, industrial and innovation policy, sometimes referred to as cluster policy (Jacobs & de Man, 1996; 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). Critics are also abound (Martin & Sunley, 2003; Asheim et al, 2006; Duranton, 2011).

Cluster policies tend 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 to firms directly, as traditional industry policy, but 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”.

In North Mid Sweden, one of eight EU-denominated regions in Sweden, regional programs have focused on innovation activities in clusters, ranging from process industries, such as forestry, paper and steel, to tourism and ICT. These programs have introduced organized clusters to stimulate inter-firm collaboration, and linking firms with research institutions (through incubators, test beds etc.), education institutions (through specialized education programs, new PhD schools etc.), and other important cluster actors.

Evaluation of these organized clusters began at an early stage. Data for this report cover the period 2005 – 2012, a period long enough to trace real results from the cluster programs. Over 30,000 employees in some 1,000 firms (2012) gather into 12 organized clusters, see Table 1.
Table 1. Cluster Organizations in North Mid Sweden

<table>
<thead>
<tr>
<th>Cluster Organization</th>
<th>Industry</th>
<th>Start Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Province</td>
<td>Paper products</td>
<td>1999</td>
</tr>
<tr>
<td>Compare</td>
<td>ICT</td>
<td>2000</td>
</tr>
<tr>
<td>Fiber Optic Valley</td>
<td>Fiber optics</td>
<td>2001</td>
</tr>
<tr>
<td>Triple Steelix</td>
<td>Steel</td>
<td>2003</td>
</tr>
<tr>
<td>Future position X</td>
<td>Geographical positioning</td>
<td>2004</td>
</tr>
<tr>
<td>ITS Dalarna</td>
<td>IT for logistics</td>
<td>2004</td>
</tr>
<tr>
<td>High Voltage Valley</td>
<td>High voltage technology</td>
<td>2005</td>
</tr>
<tr>
<td>The Packaging Arena</td>
<td>Packaging</td>
<td>2005</td>
</tr>
<tr>
<td>Stål och Verkstad</td>
<td>Engineering and machinery</td>
<td>2006</td>
</tr>
<tr>
<td>Dalabit</td>
<td>Prefab wooden homes</td>
<td>2007</td>
</tr>
<tr>
<td>Destination Dalarna</td>
<td>Tourism</td>
<td>2007</td>
</tr>
<tr>
<td>FindIT</td>
<td>Industrial IT</td>
<td>2008</td>
</tr>
</tbody>
</table>

In addition to private industry, including buyers, suppliers, service providers, and consultants, a wide range of related organizations, and three regional universities, also play important roles within the clusters.

The Cluster Commons

The late Nobel laureate Elinor Ostrom has written several influential works on the theme of collective action, and governing the commons (Ostrom, 1990). To her it was about governing a commons that was already in place, such as a water reservoir, a fishing ground or a mountain meadow. Furthermore, she was interested in individuals making use of such common-pool resources (CPRs). The cluster commons, as we see it, has many similarities to Ostrom’s writings. However, we do not talk about an existing commons, but something that under certain circumstances is constructed (even if entrants in later periods might see cluster resources and relationships as something already existing, and offering public goods). And, furthermore we are not only interested in how individuals use the commons, but also how firms and other organizations connect and collaborate. However, to the point that the governance of the commons has many solutions, and that it must not be governed from the outside, we are on the same track. Ostrom (1990) writes that neither the state nor the market is uniformly successful in enabling individuals to sustain long-term productive use of the commons. Here we agree; there are many collective solutions to construct a cluster commons. Such initiatives can come from the outside (e.g. from a regional economic development program) and from the inside (e.g. from an initiative by some corporate leaders). As is well described by Ostrom, we also see the problems of free riders, and the risk of the “tragedy of the commons” depending on the circumstances. Why would firms invest in building a commons that can be used by others who are not pitching in? At first sight they would not, but as we will see in this report there are many actors prepared to invest time and money in the commons.

Clusters are typically seen as a collective set of actors; firms, research institutions, educational institutions, capital providers, public organizations and so on. In addition to actors, there is also “white space” in between, just like a meadow close to a group of farmers. The question is whether this meadow will be accessible at all, or full of dirt and big holes; or, if it will offer green grass for the cluster to thrive on? Some meadows offer very little in terms of CPRs, whereas others are very attractive for grazing. In order for a cluster to be blessed by a meadow with fresh grass, it has to be constructed by the different actors in the cluster. Some organizations, i.e. cluster organizations, are
even set up as meta-organizations with the sole purpose of building the commons. Paths and bridges have to be built before you will notice any traffic and collaboration (Figure 1).

So how should we envision the grass on the commons? We think it is fair to say that the common-pool resources we try to catch consist of at least four things:
- some level of **trust** which allows for exchange of ideas and collaboration
- some level of common **identity** stimulating construction and use of the commons
- some type of **structure** facilitating meetings and networking – these can be seen as paths and bridges linking the various actors (see Chapter 3)
- some level of continuous **traffic** constituting the ground for cross-border networking and collaborative projects (between firms, between firms and the research community etc.), where new ideas, concepts, product, processes and services are being tried, tested and developed, i.e. what we refer to as the process of taking seeds of innovation to full fruition.

**Figure 1. Constructing the Cluster Commons**

There is often suspicion, especially among economists, of the role of collaboration in society. Should not firms compete? Of course they should, but as we see it we have two fundamental, and complementary, types of exchange mechanisms in society: the market and the cluster commons. If the marketplace is the place where buyers and sellers meet, with competition as the key mechanism, the cluster commons is the place where cluster actors meet, with cooperation as the main mechanism. And whereas markets have rapidly become more global in character, proximity is still
fundamental to the functioning of the commons. Firms and other organizations have to live in both worlds.

In earlier studies we have pointed to the “seven innovation gaps of clusters” (Sölvell & Lindqvist, 2011) limiting mobility, interaction and collaboration. One answer in many parts of the world has been to organize cluster activities. Thus, cluster organizations constitute a particular type of actor on the cluster commons. So what do they do? And do they deliver measurable results in term of paths, bridges and fresh grass of value to cluster firms?

What Cluster Organizations Do

Cluster organizations around the world come in many shapes and forms. They differ in the way they are organized and governed (some have explicit members whereas others work with different sets of firms and organizations depending on the project), the way they are financed (various combinations of public and private funding), and what activities and services they provide (see Sölvell, Lindqvist and Ketels, 2003, for an overview). Some activities are more oriented towards building the fundamentals of the cluster commons, whereas other activities and services are geared directly towards firms, e.g. initiating joint innovation projects. Such collaboration can be divided into two fundamental types: projects with an innovation focus, and projects with a business development focus (see Figure 2). All the three areas interact and overlap.

Figure 2. Three Types of Activities Performed by Cluster Organizations

Hence, we argue that cluster organizations rest on three pillars of activities. The first 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 a 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.

**Measuring Effects from Organized Clusters**

In order to evaluate the effects from cluster initiatives, we have developed an evaluation model based on three mutually reinforcing methods (Chapter 2). Our goal is to measure both intermediary effects and final effects on firms participating in cluster activities. The intermediate effects cover different cluster gaps (Chapter 3), hindering effective mobility and collaboration inside clusters, and also between clusters and the outside world. We measure performance related to six gaps:

- The degree to which cluster activities improve inter-firm collaboration (Firm-to-Firm)
- The degree to which cluster activities improve collaboration between firms and universities (Firm-to-Research and Firm-to-Education)
- The degree to which cluster activities improve collaboration between firms and capital providers (Firm-to-Capital)
- The degree to which cluster activities improve collaboration between firms and public actors (Firm-to-Policy)
- The degree to which cluster activities improve collaboration between firms and actors in related clusters (Firm-to-Cluster)
- The degree to which cluster activities improve collaboration in international markets (Firm-to-Global)

We also measure final effects on firms participating in cluster activities. This is done through two methods. The first one is based on official accounting data for firms. Through the SIMPLER method (Chapter 4) we can measure firms’ performance compared to the overall regional performance of all businesses, and compared to a selected control group of firms in the same industries (not taking part in cluster activities). The financial performance of all member firms (formal and informal membership in cluster activities) is accumulated into “cluster performance”. In total we measure 4 variables:

- Competitiveness (efficiency measure which is compared to an overall Swedish baseline for cost of capital)
- Value added growth
- Profitability growth as a percentage of value added
- Wage increase per employee

Compared to control groups, only one out of 12 clusters performed worse than the peer group in terms of value added growth. For profitability and wage increase per employee, only two out of 12 clusters performed below the control groups.

A second method to measure direct effects on firms is based on survey data from managers of member firms. Here, they are asked to assess the impact stemming from work carried out through their cluster organization. In total we measure 6 variables related to the general performance of firms (Chapter 5):

- Sales
- New or better products and services
If we take a look at the evaluation data over the period, we can conclude that cluster organizations contribute mostly to sales and innovation through new and improved products and services. The effect on employment, increased equality, workplace diversity and environmental sustainability is substantially smaller, but has grown in the recent years. But now let’s turn to the evaluation model with its different components.
Chapter 2
The Cluster Observatory Evaluation Model

As cluster policies and programs have become part of the political toolbox, we have witnessed an increasing interest in evaluating the effectiveness of such initiatives. Sound evaluation is important both to legitimize a new policy or program, and to facilitate learning from the process in order to improve it. In spite of a rapid increase in the number of cluster policies and programs, and thousands of cluster initiatives around the world, we still see limited attention to serious cluster evaluation in our studies.

Evaluations of regional programs 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). Here, we propose to merge 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 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). The measurement part involves a wide variety of issues (Vedung, 2009), of which we will point to three:

• What should be evaluated? Do we focus on evaluating the program or initiative as such (which is often the case), or do we evaluate the real impact on the cluster?
• How do we measure impact? By what standards should success or failure be judged?
• How do we identify real impact? To what extent is the outcome, intended, or unintended, a real effect of the intervention? Besides the intervention, what other factors contributed to the outcome?

Our answer to the first question is that we emphasize the measurement of real impact on member firms in clusters, and also intermediate effects on cluster networking and dynamics. The answer to the second question is that we have developed a model measuring a range of indirect and direct effects, covering a total of 16 measurable variables (wages, value added, sales, innovation etc.). The answer to the last question is that our model combines three sets of evaluation methods, improving the likelihood of capturing both unintended effects, and outside explanations to measured effects.

Data for these three sets of methods are based on: official accounting data for firms, surveys to cluster member firms (measuring both direct effects on general firm performance and cluster dynamics), and interviews with cluster member firms and cluster organization managers. Data is thus collected both at the level of member firms and the level of the cluster organization (see Figure 3). For a methodological note please refer to Appendix 1.
Some Issues Related to Cluster Program Evaluation

Cluster programs include a range of intended effects. Some are more direct, such as increased financial performance of member firms, and general performance targets related to sales, employment, innovation, sustainability etc. In the Cluster Observatory model we mix both objective accounting data (the SIMPLER method), and subjective views of managers captured through surveys and interviews. Other targets are more indirect and related to the general construction of the cluster commons. Such targets include improved networking and cooperation, both between firms and across firms and other actors (public bodies, research organizations, education organizations, capital providers) on the cluster stage. In our model we refer to this as gap performance, implying how a cluster program has or has not contributed to the construction of bridges and enhanced traffic on the commons (more about this in Chapter 3). All our instruments (SIMPLER, surveys and interviews) are designed to pick up effects directly on member firms, and on the cluster as a whole, see Figure 4.
In total, our model tries to capture effects along 16 variables. The direct effects on companies (accumulated into the level of clusters) include 10 variables, four emanating from SIMPLER and six from the surveys (see Figure 5). The 10 variables include:

- Competitiveness (efficiency measure which is compared to an overall Swedish norm of cost of capital)
- Value added growth
- Profitability growth as a percentage of value added
- Wage increase per employee
- Sales increase
- New or better products and services
- Employment increase
- Workplace equality
- Workplace diversity
- Sustainability
Figure 5. Planned Direct Effects on Firms From Cluster Programs

The second set of performance variables is designed to measure to what extent organized cluster work leads to more cooperation and mobility across the different actors, i.e. constructing a cluster commons. Here, we cover six variables (Sölvell & Lindqvist, 2011), including:

- Cooperation and interaction firm-to-firm
- Cooperation and interaction firm-to-university
- 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.

But how do we know that the cluster program has not led to unintended effects? And if there are unintended effects, are they within the target area, i.e. the cluster, or outside the target area? Green arrows in Figure 6 below depict these effects. Our way of handling unintended effects is to use an open format in the interviews, where unexpected events are discussed. 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. 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.
Then we come to the next tricky area. How about the effects we measure, are they actually caused by the program? Or are there other explanatory drivers? (the red arrow in Figure 7). There might be other programs going on at the same time, within the target frame, 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, we craft various control groups, facing the same regional and or industrial conditions, but not being part of the cluster initiative (so called generic control). In our survey instrument we also ask managers of firms to isolate effects from the cluster program, according to their own judgment (so called shadow control). We ask questions such as “in your view has the organized cluster led to a change in x”.
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.

By developing a model with several components, we manage to partly control both for external explanations, by using carefully selected control groups (generic control), and to capture unintended effects through process tracing through interviews. Thus, we argue that our model is robust, and by using data over several years, we hope to gain insight into some of the real effects following from organized clusters.
Chapter 3
The Seven Innovation Gaps and Bridge Building

Clusters play a critical role in innovation processes among firms (Furman, Porter & Stern, 2002). To understand why, we must see the cluster as a collection of different types of actors (Sölvell & Lindqvist, 2011). 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 banks, who provide the financial resources 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, which is 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. Universities set up research groups that produce cutting-edge knowledge in relevant fields, and channel those findings to firms in the cluster or lead to spin-offs. Colleges offer specialized education programs and graduate students with skills particularly suited for working in the cluster. Capital providers become experts in technologies and skills related to the cluster, and they can provide “smart money” by being better at assessing risks and opportunities in the cluster. Local government and public agencies learn to understand the needs of the firms, and make decisions that promote the cluster, and removes obstacles to progress. In all these ways surrounding actors support firms and entrepreneurs, and make it easier for them to be innovative and competitive. Also, not least important, firms interact with other firms. Small firms interact with large firms; domestic firms interact with multinationals and so on. They engage with each other as buyers, suppliers, and technology partners, but competing firms also attract staff from each other, they imitate each other at a fast rate, and firms in the surrounding cluster simply act as a source of inspiration to aim higher in competition, and to set more ambitious goals.

Figure 8 illustrates all these interactions in a cluster. There are five main types of actors on the cluster stage, and between them there are paths along which actors can interact with one another. One path, or perhaps rather one set of paths, runs between research organizations and firms, another between government and firms, and so on. In an ideal cluster these paths are busy with traffic. People change jobs between actors, network across boundaries, bring news to others in formal and informal gatherings, discuss with others, and tie the cluster together in a thousand different ways. All this traffic helps make the cluster more dynamic. Knowledge is created, spread and shared. Collaboration ensures that resources are used in the best possible way. Coordination aligns the interests and actions of different agents.
Figure 8 is a compelling picture. It shows a cluster commons in an ideal way. It is the kind of cluster everyone wants. Unfortunately, in reality most clusters don’t look like this at all. In real clusters, communication between different kinds of actors is massively flawed. Small firms who believe they have something new exciting to offer have a hard time even to be allowed to meet with the right people at a large enterprise. Large firms searching for a new supplier are more likely to look for an established international supplier, than to go searching among innovative SMEs located right under their nose. Policy makers often have only vague ideas about what business really needs. Researchers are more interested in academic publishing than commercializing their new findings. Schools formulate their curricula with little knowledge of what skills industry really needs. Entrepreneurs find it difficult to persuade banks to invest in new innovative businesses. Many business people, particularly in SMEs, would laugh at the idea to approach the local university to see if they have some skill or new technology they could use. In some cases a robust commons has never been built and in other cases in has been ruined through the “tragedy of the commons” where everyone is utilizing it, but no one is prepared to invest in it.

It is not difficult to understand that these connections will not just happen spontaneously. After all, the different types of actors have different roles to play in society. Universities are supposed to do research, not to serve as R&D departments of companies. Policy makers have responsibilities that go far beyond serving companies with whatever they require. Education organizations have many other stakeholders than firms to oblige. And firms are in business to make a profit for themselves, not to provide altruistic support to each other. Even so, with some additional effort put into coordination and collaboration, large benefits could be reaped, which now remain neglected.

In other words, more often than not, clusters in reality do not live up to the potential that cluster theory grants them. Clusters possess tremendous potential, but in many cases, this potential remains largely untapped. At first, these immense missed opportunities may seem hard to accept. If the world is a place that is constantly moving towards an ideal equilibrium, i.e. a state of efficiently used resources, it seems unlikely that this kind of gross misalignments could endure. After all, why would clusters not make the best possible use of the potential they enjoy? Why should these possible benefits remain untapped, when all that is needed is a little interaction?

The answer lies in the fact that interaction between agents is not such an easy thing to do. If all it would take were a simple phone call from one person to another, then clusters would surely be a lot
more efficient. But in reality, there are a thousand reasons why that phone call never takes place. The policy maker doesn’t pick up the phone, because she doesn’t expect to hear any deeper insights from the industry of what they really need. If the college teacher talks to the business world, it is about finding placement positions for the students or arranging recruitment fairs, but certainly not to discuss the curriculum. The businessman has no idea what the researchers at the university are doing, he probably doesn’t know their names and he certainly doesn’t know within what departments they are organized in. The researcher might want to see her latest discovery turned into a successful commercial innovation, but she knows that her career depends on publishing papers, and it will in no way be furthered by interacting with business people; in fact, it will be hampered. And if, by chance, the businessman and researcher would meet and discuss each other’s work, they would soon find that they speak different languages and have different mindsets, almost as if they were living in different worlds.

What this all means is that there are obstacles to interaction, such as lack of trust or limited knowledge across actor boundaries. Obstacles make it difficult for actors to communicate with each other, to initiate collaboration, and to diffuse knowledge. Figure 9 below gives a list of such obstacles.

Figure 9. Drivers of Interaction in Clusters

- **Weak Interaction**
  - Poor knowledge
  - Weak networks
  - Different “languages”
  - Different norms and attitudes
  - Different vision
  - Low trust
  - Negative incentives to collaborate

- **Strong Interaction**
  - Good knowledge
  - Dense networks
  - Common “language”
  - Similar norms and attitudes
  - Shared vision
  - High trust
  - Positive incentives to collaborate

It is obstacles like these that prevent the research world to spread its new knowledge to the business world, and that stop policy makers from seeking advice from business people. Obstacles make traffic slow and awkward where it preferably should be rapid and easy. Obstacles isolate systems when they should be connected. In short, obstacles create gaps where there should be paths. The picture of the cluster that we sketched above, with its wide paths and its intense traffic is not what we often see. Real life clusters have obstacles, much like the rivers and streams that a path has to cross.
These gaps, which are quite persistent, have great implications for innovation and competitiveness. It means that clusters despite their great potential for dynamic interaction between actors, often only exploits a small share of this potential. People do not make the most of the possibilities found around them, because they simply lack knowledge about what opportunity is nearby, they lack the networks to utilize it, they fail to initiate collaboration they would benefit from, and they fail to coordinate their actions with others. In short, people and organizations lack a commons. Without a lush commons, clusters will suffer from knowledge failures, network failures and cooperation failures, leading to innovation failures.

There are five internal gaps, inside the cluster, shown in Figure 10 above:

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 cluster dynamics:

6. The cross-cluster gap barring interaction with firms in other clusters
7. The global market gap barring interaction with global markets

Public support can help to correct for knowledge failures, networking failures and cooperation failures, and this is where cluster organizations come into the picture. Cluster organizations, financed through both public and private means, can bring different types of actors together and correct for some of the failures. They 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 actors overcome the obstacles and start talking to each other. In doing so, they get the traffic moving along the paths. One could say that a critical mission for cluster organizations is to build bridges (meeting places, forums, platforms) across the seven innovation gaps, and support traffic (meetings, innovation projects) on those bridges.
Evaluation Results

Through our survey methodology we were able to trace the innovation gaps over time. The Firm-to-Research gap and the Firm-to-Firm gap are the two with the longest time series. As we can see from Figure 11 below (representing summary data for 11 clusters), gaps were decreasing throughout the period 2006-2009, but following the crisis; one can discern that firms have experienced increasing gaps. Judging from only one year of estimation, the Firm-to-Capital gap is the most pervasive one (almost 80% of all respondents report this as an obstacle).

Figure 11. Cluster Gaps Experienced by Firms (2006 – 2012), All Clusters North Mid Sweden

Judging from Figure 12 we can see that the Firm-to-Firm gap is the one where cluster activities have had the most positive impact. Historically some 60% of firms saw this as an obstacle as opposed to only 40% today.

If we summarize (unweight average) the six measured gaps into one variable, we see that firms in three regions experience different levels of cluster gaps. Cluster firms in the green region clearly experience larger gaps than firms in region blue, whereas firms in region red are right on average. One can also see that gaps in region red diminished radically between 2008 and 2009. Again, average gaps have increased after the crisis in all the three regions.
If we take a closer look at some of the clusters, we discover that the Firm-to-Capital gap is the most pervasive, and the Firm-to-Firm gap the least troublesome. A cluster’s Firm-to-Firm gap was measured as the percentage of companies responding “1 (a little)” to “5 (very much)”, rather than “0 (no)”, to the question “Has the company during this period increased its cooperation with other companies, through activities arranged by the cluster organization?”

As seen in Figure 13, the Firm-to-Firm gap was an issue in 2.4 times as many firms in the worst performing cluster (Kilo) compared to the best (Hotel). Thus, we conclude that there is a large potential for transfer of good practices on inter-firm collaboration from Hotel to Kilo.

**Figure 13. Firm-to-Firm Cluster Gap for Ten Clusters**

*Note: Black dotted line is the unweight average of cluster scores, 42%.*
By adding the data for each gap, we can visualise a cluster’s total performance through a stacked chart (Figure 14). Kilo and Hotel once more show up as the lowest and highest performing clusters.

**Figure 14. Total Cluster Gaps for Ten Clusters**
In this chapter we will report on the results from our work with official accounting data, measuring how well firms perform on a number of dimensions. Through the SIMPLER method, the data allows us to compare results of member firms of organized clusters, with a) control groups of all firms in the same region, and b) firms with a similar industry composition not being part of the cluster activities. Here we use four performance measures:

- Competitiveness of cluster firms (labor cost plus capital cost over value added) as compared to all businesses in the region
- Value added growth of cluster firms as compared to a control group in the same industries
- Profitability of cluster firms as compared to a control group in the same industries
- Wages per employee of cluster firms as compared to a control group in the same industries

For the first variable, each firm is represented by its added value (revenues minus purchased goods, services and annual depreciation). When aggregated, we get the total value added produced by the companies in the cluster, year by year. This value added is created through a mix of labor and capital. We then divide total personnel costs with value added and capital cost with value added, and depict this on a chart (see Figure 15). Thus, the two axes represent personnel cost/value added and capital cost/value added. A cluster (sum of its firms) using fewer resources (i.e. mix of labor and capital) than its added value is considered competitive (inside the triangle towards the lower left corner). A cluster that uses more resources than its added value, i.e. outside the 1-1 diagonal, is uncompetitive and at some point destroys value. Thus, the position in the diagram is an assessment of how competitive firms in the cluster are as a collection of firms.
In total we have measured all member firms in 12 clusters. As a first comparison, the cluster firms are compared to all companies in the region where the cluster is situated. Here we see some interesting results. For example, for region red we can conclude that:

- 2006 and 2007 were good years for the region (behind the large bubble in Figure 16), 2008 and 2009 representing a drop, only to bounce back in 2010.
- Cluster firms were also affected but moved back to a competitive state (inside the efficiency triangle) quicker than business overall in the region

Similar results were found in clusters in region blue and green. This indicates that firms in clusters are more resistant to business downturns than firms in general.
It is reasonable to ask the question, whether, the stronger performance of firms organized into clusters, are doing better because of this fact, or because these firms are part of natural clusters; where we expect stronger firms. Thus, we have to distinguish between the cluster effect and the effect from being part of an organized cluster. We know from a broad range of studies that firms in clusters tend to perform better on a number of accounts. Thus, financial performance of our cluster firms might be due to the fact that there is a natural cluster effect. Such improved performance we can expect when compared to all firms in the region (including massive amounts of firms not being affected by cluster dynamics). However, when comparing with a peer group of firms, with the same industry composition, that are not part of the organized cluster, we are getting closer to an effect emanating from the cluster initiative. In Table 2 we show these results. As a matter of fact, when comparing the financial performance of companies in our 12 clusters, to a control group (firms in same industries in the surrounding regions, not being part of the organized cluster), 10 clusters (11 in the case of value added growth) outperform their control group in terms of financial performance and wage growth.
Table 2. Summary of Financial Performance of 12 Clusters

<table>
<thead>
<tr>
<th>Total Rank</th>
<th>Cluster</th>
<th>2006-2010</th>
<th>Value Added Growth</th>
<th>Profitability Growth</th>
<th>Wages per employee</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cluster</td>
<td>Control</td>
<td>Diff</td>
<td>Rank</td>
<td>Cluster</td>
</tr>
<tr>
<td>1</td>
<td>Alpha</td>
<td>38%</td>
<td>21%</td>
<td>17%</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Bravo</td>
<td>27%</td>
<td>-1%</td>
<td>28%</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Charlie</td>
<td>8%</td>
<td>-6%</td>
<td>14%</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Delta</td>
<td>67%</td>
<td>21%</td>
<td>46%</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Echo</td>
<td>-11%</td>
<td>-8%</td>
<td>-3%</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Foxtrot</td>
<td>16%</td>
<td>4%</td>
<td>12%</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Golf</td>
<td>40%</td>
<td>28%</td>
<td>12%</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Hotel</td>
<td>31%</td>
<td>18%</td>
<td>13%</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>India</td>
<td>18%</td>
<td>11%</td>
<td>7%</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Juliett</td>
<td>29%</td>
<td>20%</td>
<td>9%</td>
<td>8</td>
</tr>
<tr>
<td>11</td>
<td>Kilo</td>
<td>33%</td>
<td>26%</td>
<td>7%</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>Lima</td>
<td>45%</td>
<td>38%</td>
<td>7%</td>
<td>9</td>
</tr>
</tbody>
</table>

The top performing clusters have a value added growth of 20% or more above the control group, over the 5-year period. Alpha, the overall top performer (unweighted average of the three performance rankings), had a 10% larger wage increase than the control group over the period. Echo underperforms on value added, Foxtrot and Lima underperform on profitability, and Juliett and Lima underperform on wage growth.

But now comes an even more difficult question. We now know that firms in organized clusters do better than firms in clusters in general (Tallman et al, 2004); but what if the firms that choose to involve themselves in cluster work are the better performing ones? This is the problem of self-selection that potentially can bias our results. We cannot be sure of controlling for this effect across our data. However, we know that more successfully organized clusters tend to attract more interest and more member firms over time. As more and more firms in the natural cluster becomes involved in organized cluster activities there is less of a problem of self-selection (and the control group must be composed by firms in another geography). We can see in a couple of cases, where the organized cluster was started recently, and we have financial data preceding the start of the organized cluster, that the cluster member group and the control group performed at similar levels (value added growth and profitability), before the organized cluster was initiated; indicating that there is not such a self-selection issue at hand. In Figure 17 (Y axis representing value added growth) we can see such an example from a cluster organized in 2007. The light blue line depicts the non-member firms in the cluster, the green line the member firms, and the red line the sum of all regional firms. As can be seen from the figure, the initial member firms were not selected from the better performing group. In effect they had a worse historical record, and only in 2010, three years after the cluster was organized, did they outperform the control group.
Figure 17. Example of a Cluster Compared to a Control Group and Overall Region
Now it is time to turn to our survey data, describing how managers of member firms have assessed the impact stemming from work performed by their cluster organization (for a methodological note please refer to Appendix 1). The surveys have covered the following areas:

- Expectations from cluster membership
- Results from cluster membership (general performance, bridging of cluster gaps)
- Suggestions on how to improve work of the cluster organization

In total we have used six measures of general performance. Overall, expectations from member firms exceed what organized clusters in the end can deliver. Still, results are quite impressive, although not always in line with expectations. Over time, the most pervasive results come from improved sales and enhanced innovation (specified as “…membership has led to new and/or improved products and services”). In 2012, some 40% of firms reported that the cluster initiatives had had an impact on these two performance variables. This can be compared with levels of around 15% seven years earlier.

On the other hand, only some 20% - 30% (2012 figures) of firms agree that the cluster work has had any impact on:

- Increased employment
- Increased workplace equality
- Increased workplace diversity
- Increased sustainability

Thus, on these dimensions we see limited results from cluster work. But, having said that, one should also point to the fact that the general trend is one of improvements across the board (Figure 18). If levels are now at 20% - 30% they were earlier only at 10% - 15%. This we see as a clear shift in what firms experience from organized cluster work.
If we split the total sample into the three regions, we see the following results. Cluster work among clusters in region red is producing more results across the board compared to region green, with region blue somewhere in between (Figure 19). Looking at the data over time we can see a large improvement in region red across the different performance variables in 2009.

The twelve clusters vary widely according to how member firms assess their impact, both overall and for specific criteria. The low performers in the SIMPLER results (Hotel, Julillt, Kilo, Lima), also rank low on general performance impact on member firms, see Figure 20.
Figure 20. General Performance per Cluster (2012), Survey Based

Note: As each measure goes to 100%, the max value would be 600% if each company in the cluster reported an effect on each performance measure through activity in the cluster organization.
Building the cluster commons involves relentless work, and we should always expect free riders. To avoid the tragedy of the commons many actors must be involved in the construction work, but of course cluster organizations play a very particular role in this endeavor. In our research we have now tried to measure real impact from such work. The test has been to look both at the building of bridges (as experienced by cluster firms), and the performance of firms that involve themselves in cluster activities. Do they perform better over time as a result from this work and are there any bridges built? The simple answer is yes, but clearly some cluster organizations do it better than others.

By using three complementary evaluation methods, we have been able to trace results for some 1,000 firms engaging in cluster activities. Some organized clusters clearly perform better than others on almost all accounts, and one must ask why? Probably there are differences in the underlying cluster strength – where “the stronger the cluster, the easier to arrange for cluster networking and innovation projects”. There are probably also other explanations, such as differences in cluster management quality, differences in support from local and regional government and so on. However, we think that one of the most pervasive factors is that of age and financial strength. Older clusters have built more muscles and deliver real results to member firms, whereas the younger and more thinly financed clusters struggle to make any noticeable impact. Some of the new cluster initiatives will never get off the ground and should disappear out of our sample, but at least they should first get a chance to show that they are capable of creating lasting results. Therefore, local and regional public actors should not spread their resources too thin, spending money on everything resembling a cluster fragment. Instead, they must offer enough financial resources, and other types of support, for the chosen organized clusters to take-off. Results show large differences in performance among clusters across the three regions, leaving room for continued benchmarking and cross-cluster learning.

Recently established cluster organizations throughout the three regions are almost wholly funded through public means. Over time clusters should be able to reach a more balanced financial situation, with a public part of around 50% - 60%, in line with international benchmarks. Private financial sources can include memberships, project co-funding and service fees. Top-down public initiatives should be met by bottom-up private initiative and company involvement; otherwise the initiative will never gain legitimacy, or lead to improved innovation performance within the cluster.

In general, cluster organizations have made a difference when it comes to bridging innovation gaps, particularly the inter-firm gap. The innovation gaps were decreasing until the 2009 crisis hit, but there are worrying signs of increasing gaps again, for example the Firm-to-Research gap. Gaps to capital providers have not been attended to. Among the group of 12 clusters, almost all perform financially better than their control groups. And, it is interesting to note that financial performance seems to go hand in hand with the innovation gap performance and general firm performance as measured through surveys. In three cases we can trace a considerable distance in results between the two methods. In the case of Alpha, firms experience a much lower performance (innovation, sales etc.) from cluster activities, and ability to close innovation gaps, than the financial performance suggests. In the case of Hotel and Kilo, the situation is the opposite. Firms are much more content with the performance of the organized cluster than what financial data suggests (see Table 3).
Table 3. Comparison of Survey Rankings with SIMPLER Rankings, 11 Clusters

<table>
<thead>
<tr>
<th>Comparison of rankings</th>
<th>Survey rank</th>
<th>Survey gap rank</th>
<th>SIMPLER rank</th>
<th>Distance</th>
<th>Mismatch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>6</td>
<td>Firms more disappointed</td>
</tr>
<tr>
<td>Charlie</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Delta</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Echo</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Foxtrot</td>
<td>7</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Golf</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hotel</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>7</td>
<td>Firms more appreciating</td>
</tr>
<tr>
<td>India</td>
<td>6</td>
<td>10</td>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Juliett</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kilo</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>8</td>
<td>Firms more appreciating</td>
</tr>
<tr>
<td>Lima</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Note: Survey data missing for Bravo ranked number 2 in SIMPLER

Moving over to the role of cluster organizations, we want to point to the fact that these organizations are newcomers on the regional scene, with the clear purpose of building cluster commons, and to strengthen innovation cooperation. Thus, they can be seen as a complementary policy instrument to science parks, incubators and other bridge builders.

Some cluster organizations are active in high tech areas (e.g. IT, geographical positioning systems), whereas others are in more traditional industries (paper products and prefab homes). Some have a stronger service focus (tourism). Thus, cluster organizations can facilitate rejuvenation of traditional sectors, but also help in building emerging sectors in a region. The need for increased cluster dynamics is as important in emerging industries as in mature industries. Firms in all clusters can, if they innovate and upgrade their competitive advantages, compete in international markets.

Interview data confirms observations from the survey and SIMPLER. However, a couple of interesting effects emerged from the data. For example, in several cases the large impact from the organized cluster work did not materialize in the target area (e.g. enhancing joint innovation projects), but in other areas (e.g. reaching international markets). In other cases firms expected that joint cluster activities would lead to contacts with other firms, but in effect led to contacts with university research and students, or got them involved in policy dialogues that they had never accessed before.

The organized clusters have, through their many activities, helped to make the clusters more visible in their region, particularly to policymakers. The more mature clusters tend to have formal membership and the financing is more varied. More recently established cluster organizations typically rely on public financing. Also, as expected, firms active in cluster activities (formal or informal “members”) in well-established clusters, report more satisfactory results than members of more recently established organizations. Introduction of cluster organizations adds new actors onto the regional stage. This entry is not unproblematic in that established private and public organizations (at the local, regional and sometimes even the national level) might feel redundancy and competition.

Cluster initiatives and organized clusters have become commonplace all around the world. As we gain more knowledge about the results they deliver, new research and evaluation work can help to improve cluster policies and programs, and support cluster management in their endeavours. Thus, it is our sincere hope that this book will act as a source of inspiration to cluster managers and policy makers around the world, in their work of building cluster commons and more innovative firms.
Building an Improved Model

In the future we hope to deploy the Cluster Observatory evaluation model in other parts of the world. In addition to the three methods used here, we propose to add another dimension, namely benchmarking across regions and clusters (see Figure 21), leading to a model with four complementary components:

- Firm financial performance using the SIMPLER method based on accounting data
- General firm performance and overall cluster performance using surveys (including social media)
- Cluster performance using interviews (cluster organizations and other cluster actors)
- Cluster (and regional) performance using benchmarks across geographies and sectors
Figure 21. The Cluster Observatory Evaluation Model

The Cluster Observatory Evaluation Model
Four Complementary Components

I
1. Company Financial Performance
   (Collection/Cluster definition/Control groups)
   A Value added
   B Wages
   C Profitability
2. Statistical Analysis

II
1. Surveys of member firms/organizations in cluster
2. Surveys of cluster organisations
3. Surveys of social media (text analysis)

III
1. Interviews
   (process tracing/confirmation stats)
   A Member firms/organizations
   B Cluster Leader
   C Cluster Organisation Board
2. Participatory observation

IV
1. Benchmarking with other...
   A Regions
   B Clusters
   C Cluster organisations
2. Peer Evaluation Teams
We also plan to expand some of the components of the model in several ways. One way is to include measurement of cluster traffic, and the density and type of communication between different actors. So far we have not been able to evaluate overall cluster traffic, for example between firms, only because the required information is very hard to collect. Instead, in this first experiment, we choose to measure traffic between a cluster organization and surrounding firms and organizations, on the seven islands in our cluster model (Chapter 3). With access to Email traffic we have been able to gain insights that were not possible before, and it provides more immediate feedback metrics to decision makers for guiding strategy and resources. Most importantly, this analysis allows cluster organizations to monitor and manage the cluster bridges being built in real time.

Our first test was with a cluster organization, Future Position X (FPX) in the city of Gävle, Sweden. FPX works in the area of geographic information technology, and helps build a cluster commons involving over 200 member firms and other organizations around Geographical IT, in the region. In our first test we collected Email traffic to FPX for a whole month. Working with FPX’s information management consulting partner TSG Inc., the traffic was categorized according to the seven “islands” of our gap model, where the cluster organization has contacts with 1) firms, 2) research institutions, 3) education institutions, 4) capital owners, 5) public organizations, 6) international market contacts and 7) other clusters organizations in Sweden and abroad (note that research and education institutions were merged into one category). The results were then graphed in a number of ways both using traditional and node graphing techniques. At this stage the information has been analyzed on three key dimensions:

- Volume
- Frequency
- Diversity

The volume of communication measures the total number of emails received in a given month (for all organizations within an actor category), frequency of communication measures how often each organization is involved in traffic, and diversity measures the mix of traffic among the different actor categories. This information was compared to initial goals that had been set up by FPX. Due to the innovative nature with which FPX is measuring these new metrics, the cluster organization continuously updates its metrics.

The analysis showed that, as expected, certain actor categories were more involved than others. Figure 22 illustrates the traffic categorized into six actors (research and education actors being combined into one called research). From the Figure it is clear, that on average during the month analyzed, contacts with firms and public organizations were the most pervasive. With this type of information a cluster organization can begin to measure real changes in traffic in clusters, and they can use the information for their own benchmarking and evaluation purposes.
FPX also decided to set up initial goals for traffic within each category of actors (where the number of sought after contacts varies with actor category), in order to reach “perfect diversity” in its contact pattern. Figure 23 shows Email diversity as compared to the preliminary goals set up. New insights continue to emerge as FPX uses this new information. It helps management to decide if its own metrics are correct, and it also supports them in making decisions regarding future resource allocations.
The traffic analysis that FPX is currently carrying out is just the beginning of a series of analyses to be conducted. With the basic Email engine (measuring incoming traffic) now in place, FPX will be able to monitor time-variation of traffic on a monthly basis for each organization and actor category. Furthermore, with the help of TSG, the Email analysis engine will be expanded to include text, sentiment and relationship node analysis, to help identify themes, opinions, and information about cluster actors. Such information will shed light on where the centers of influence are, and if certain organizations are consuming a disproportionate amount of resources. This will allow the cluster organization to have a better understanding of the nature of the communication, the trends, and ‘the pulse’ of the cluster.

As more information and datasets are made available to include cluster actors and cross-cluster information sets, while maintaining and securing privacy, a wider set of analysis data can be used to give more insights. Regarding privacy, great care is taken to keep the results at an organization, and not person, level, and all analysis is conducted at aggregate levels to maintain privacy.

Beyond Email traffic, we also plan to measure additional information sets, such as social network data (LinkedIn, Twitter, etc.), web and other electronic information sources, in order to provide an even better picture of cluster dynamics, and the working of the commons. And, in due time, we hope to bring the new metrics and tools to cluster managers around the world, to help them build even better cluster practices. Thus, it is our sincere hope that the extended Cluster Observatory model, with its complementary components and types of data, will help in building the cluster commons of the future.
References


Appendix 1

Method

The main data for this report is based on three methods involving three types of controls:

- The SIMPLER method based on accounting data for firms, where member firms are compared to selected control groups (generic control)
- Surveys to member firms, where respondents are asked to specifically assess results from the cluster initiative (shadow control)
- Interviews with member firms and cluster organizations, picking up unexpected results and outside explanations to measured impact (process tracing).

SIMPLER

The SIMPLER method has its strength in using objective accounting data. By comparing member firms of clusters (in cases of clusters without formal members, the member group was composed from those firms most involved in cluster activities over several years) with control groups, one can partially control for outside factors impacting the industry and region (general business climate, industry shocks etc.). Control groups are formed with:

- All companies in a geographic region, regardless of industry.
- A comparable set of companies (same industry classifications) in the region, which do not take part in activities performed by the organized cluster. If cluster activities are expected to lead to significant public goods, implying that all firms in the region will benefit (non-members being free-riders), this type of control has less relevance.

Survey Instrument

The survey results build on yearly surveys, carried out 2005–2012 (2010 excluded). Response rates (2007-2012) have varied from 62% to 31% (see Table).
Survey questions have changed somewhat over time. To facilitate the build-up of a times series we have used questions with similar wording. However, the tone of the questions has varied somewhat over the years, and thus one should be careful interpreting a single year. The idea of adding up the surveys over the years is to detect trends.

In two particular instances (general performance on innovation and sales) the wording was changed quite dramatically from “do you expect an effect” to “have you experienced an effect”. Naturally, when the wording changed, from expectations to what firms really had experienced, values dropped dramatically. To make a conservative comparison possible over the years, we normalized values before the change (2010) in the following way. We assume that the performance values of innovation and sales, relative to all the other performance variables (i.e. average distance between values), are the same in earlier years as in 2010/2011 and 2012. Thus, we downshifted the curves for innovation and sales before 2010 to reflect the same distance.

For the gap analysis we have collapsed two gaps into one; Firm-Research/Education, which was asked as one question 2010-2012, is calculated as the average between Firm-Education and Firm-Research for earlier years (2006-2009). The Firm-Global Gap was only reported 2009 onwards, with only one cluster reported 2010/11.

<table>
<thead>
<tr>
<th>Alpha</th>
<th>Bravo</th>
<th>Charlie</th>
<th>Delta</th>
<th>Echo</th>
<th>Foxtrot</th>
<th>Golf</th>
<th>Hotel</th>
<th>India</th>
<th>Juliet</th>
<th>Kilo</th>
<th>Lima</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>na</td>
<td>19</td>
<td>49</td>
<td>66</td>
<td>46</td>
<td>91</td>
<td>17</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>363</td>
</tr>
<tr>
<td>40</td>
<td>na</td>
<td>9</td>
<td>34</td>
<td>46</td>
<td>31</td>
<td>52</td>
<td>12</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>224</td>
</tr>
<tr>
<td>53</td>
<td>na</td>
<td>47</td>
<td>69</td>
<td>74</td>
<td>67</td>
<td>57</td>
<td>71</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>480</td>
</tr>
<tr>
<td>73</td>
<td>na</td>
<td>32</td>
<td>100</td>
<td>74</td>
<td>32</td>
<td>106</td>
<td>25</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>260</td>
</tr>
<tr>
<td>39</td>
<td>na</td>
<td>18</td>
<td>36</td>
<td>39</td>
<td>22</td>
<td>60</td>
<td>16</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>190</td>
</tr>
<tr>
<td>55</td>
<td>na</td>
<td>56</td>
<td>39</td>
<td>53</td>
<td>69</td>
<td>58</td>
<td>80</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>318</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sent</td>
<td>Sent</td>
<td>Sent</td>
<td>Sent</td>
<td>Sent</td>
</tr>
<tr>
<td>Respp</td>
<td>Respp</td>
<td>Respp</td>
<td>Respp</td>
<td>Respp</td>
</tr>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUM</td>
<td>480</td>
<td>518</td>
<td>332</td>
<td>1017</td>
</tr>
<tr>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

na = not included in survey
About the Authors

Professor Örjan Sölvell has been active as a researcher and teacher at the Stockholm School of Economics, SSE, since 1979. Since 2001 he is also a Senior Associate at the Institute for Strategy and Competitiveness, ISC, at Harvard Business School, led by Professor Michael E Porter. In 2005, Professor Sölvell set up a new research institute at SSE, the Center for Strategy and Competitiveness, CSC. He is the Director for the Cluster Observatory.

Mats Williams is a Senior Executive Fellow at the Center for Strategy and Competitiveness in Stockholm since 2011. With a background in industry, he has been a cluster manager for over a decade. In recent years, Mr Williams has acted as a coach and advisor to regional and national policymakers, cluster managers, and cluster program leadership around the world.
The Cluster Observatory Evaluation Model
Four Complementary Components

I. Company Financial Performance
   (Collective/Cluster definition/Control group)
   A. Value added
   B. Wages
   C. Profitability

II. Statistical Analysis
    1. Surveys of member firms/organizations in cluster
    2. Surveys of cluster organizations
    3. Surveys of social media (text analysis)

III. Interviews
     1. Interviews (process tracing/confirmaive stats)
     A. Member firms/organizations
     B. Cluster Leader
     C. Cluster Organization Board
     D. Participatory observation

IV. Benchmarking with other...
    1. Benchmarking with other...:
       A. Regions
       B. Clusters
       C. Cluster organizations
       D. Peer Evaluation Teams