SURVEY ON THE CHARACTERIZATION
OF REGIONAL CLUSTERS:
Initial Results

Working Paper

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1. Introduction

This working paper reports the initial results from a project to characterize regional clusters. Despite of, or perhaps because of, the growth in interest and literature on regional clusters, there has been a tendency to group several phenomena under the term. "Regional clustering" has been used to describe industrial districts of small crafts firms, high technology centers, agglomerations of financial and business service firms in cities, company towns, and large branch plants and their supply chains. While there are certain similarities among the different types of regional clusters, the unfortunately imprecise terminology has resulted in confusion and a tendency for knowledge about clusters to fail to cumulate. "Cluster" terminology seems so embedded that one despairs of redefining or sharply defining the term. However, it can be made far more useful by identifying empirically the families of clusters that exist. There have been some attempts to categorize regional clusters,¹ but these have been done by creating ad hoc typologies with little in the way of empirical investigation of their relative importance.

Two other areas of interest are the roles played by public policy and by specialized cluster-based organizations in cluster development. There have been a number of works that describe specific policies toward regional clustering in particular places, but relatively little that attempts to identify the prevalence of specific types of policy initiatives.² The result is that it is difficult or impossible to know which sets of policies are commonly used and which appear to be successful. In addition, several authors have written about cluster-based organizations, but there appears to be little work that tries to identify the areas in which they coordinate activities of firms and little that assesses their importance to the cluster development process.

The present working paper is designed to provide some initial insights into these issues.

2. The Cluster Survey

The present paper reports on the results of a survey designed to obtain information sufficient to characterize clusters, cluster policies, and cluster-based organizations. The survey asked individuals knowledgeable about particular clusters and cluster initiatives a series of questions about the nature of the cluster, interaction within the cluster, the activities of cluster-specific organizations, and the role played by governments and public policies in cluster development.

The survey instrument was developed over a several month period in 1998 and 1999. Subsequently, it was distributed to cluster professionals on five continents for comment. A pilot test was then carried out in New Zealand in 1999 and final modifications were made. The revised instrument was distributed to cluster professionals in mid-1999. Mailing lists of regional development organizations and individuals known to be working on cluster-related issues were compiled. Each was asked to provide information on the clusters with which they were familiar. If more than one response was received for a particular cluster, the results were averaged and entered as a single response. In the four instances in which more than one response was received for a given cluster, the responses on most questions were very similar. A total of 160 usable responses were received, with a geographic breakdown of: Americas 39, Europe 65, Australasia (including Asia, Australia, and New Zealand) 52, Africa 4.

It should be noted that the responses reflect clusters with which the respondents were familiar. Since this requires some knowledge or prior research, it biases the sample toward clusters that have been studied or that have been part of a cluster initiative. Clusters that might exist that have not been studies in detail or have not been part of a cluster initiative are

¹ Such as Storper and Harrison (1991) and Markusen (1996)
² An exception is OECD (1999)
far less likely to be picked up by this method. The responses also depend on what the respondents call a "regional cluster." In fact, the survey provides detailed information on what it is that the respondents generally have in mind when they use the term "regional cluster."

Simple summary results are provided here. Further detailed analysis will be undertaken to try to identify families of clusters and cluster development policies. A larger sample size will be necessary for some types of analysis. The author would appreciate it if anyone that can add to the database contact him.

3. The Dimensions of Clusters

Respondents were asked to characterize the cluster along a series of dimensions, including geographic scope, breadth, depth, activity base, elements of growth potential, competitive position, innovative capacity, (transaction) governance, ownership structure, and cluster type.

3.1 Geographic Scope

The geographic scope of a cluster refers to the territorial extent of the firms, customers, suppliers, support services, and institutions that are embedded in the ongoing relationships and interdependent activities that characterize the cluster. The geographic span of a cluster can range from a small area within a city to areas encompassing much of a nation.

The bulk of regional clusters identified by respondents (95) are reported to be linked to a city, with the most frequently reported geographic span involving a city and its surrounding area. A smaller number (40) were reported to span much or most of a sub-national region. Most "regional clusters" reported are rather highly localized. This can be due to a sharp localization in regional clusters, the equation of "regional clusters" with particular types of clusters that are highly localized (such as the Italian industrial districts), or both.

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3 See Enright (2000) for a more detailed treatment of the dimensions of regional clusters and types of policies toward regional clustering.

4 See also Enright (1993)
3.2 Breadth.

The breadth of clusters refers to the range of horizontally related industries (industries related by common technologies, end users, distribution channels, and other non-vertical relationships) within the cluster. Narrow clusters consist of one of a few industries and their supply chains. Broad clusters provide a variety of products in closely related industries.

Most of the regional clusters reported comprise at least a few horizontally related industries. Only a very small number (7) are seen to comprise a single segment within an industry. This is consistent with a view of regional clusters as agglomerations of resources, skills, and capabilities that spillover into related industries (Enright 1998).

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**Breadth of the cluster: number of responses**

<table>
<thead>
<tr>
<th>Breadth Description</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>One segment within an industry</td>
<td>1</td>
</tr>
<tr>
<td>One industry</td>
<td>42</td>
</tr>
<tr>
<td>A few horizontally related industries</td>
<td>27</td>
</tr>
<tr>
<td>Multiple horizontally related industries</td>
<td>28</td>
</tr>
</tbody>
</table>

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3.3 Depth

Cluster depth refers to range of vertically related industries within the cluster. Deep clusters are those in which a region does not just contain an industry or set of related industries, but complete or nearly complete supply chains, whereas shallow clusters are those that rely principally on inputs, components, equipment, technology, and support services from outside the region.

The vast majority of "regional clusters" reported by respondents either have many or all the steps in the vertical production chain performed within the geographic confines of the cluster. This indicates that relatively few of the reported clusters would be simple assembly operations and presumably relatively few would be dominated by foreign companies, which could not be expected to perform many or all of the vertical production stages in a single location. As would be expected, respondents reported that subcontracting and provision of supporting services are provided mostly from within the "regional clusters." Major components tended toward a mix of sources form inside and outside the clusters. Raw material and capital goods were the inputs most likely to come from sources outside the clusters.
3.4 Activity Base

The activity base of a cluster involves the number and nature of the activities in the value-added chain that are performed with the region. In activity-rich clusters, most or at least many of the critical activities in the value-added chains of the relevant industries are performed locally. Firms in such clusters tend to carry out the core strategy-setting, product or service development, marketing strategy, and corporate co-ordination activities within the region in question. Activity-poor clusters, on the other hand, involve one or only a few activities in a given industry or set of related industries.

Respondents indicated that firms within the clusters reported tend to perform most of the corporate activities that they firm need to perform within the geographic confines of the cluster. This is particularly true of activities related to strategy formulation, support services, marketing and sales management, and logistics management. The lower number of responses for component, input, and assembly manufacturing and performing the main service for clients are the result of the mix of manufacturing and service industries represented within the sample. Thus the clusters are "activity rich" as opposed to "activity poor."
3.5 Growth Potential

The growth potential of an individual cluster depends not only on the growth in demand for the products and services supplied by the cluster, but also the competitive position of the cluster relative to outside competitors and the availability (or ability to create or attract) resources necessary to support growth. Due to the difficulty in assessing growth potential of clusters, respondents were asked about the relative growth rates of the cluster in question versus the worldwide industries of which it is part (results still be analyzes). Respondents also were asked to characterize the stage of development of the cluster from embryonic and growing to mature and declining.

On average, the respondents reported that the sales of the clusters they reported were growing at a higher rate than those in the worldwide industry as a whole. It is not surprising that most of the clusters reported are mature (and either growing or stagnating), since mature clusters are more likely to be known than embryonic or emerging clusters. More than two-thirds of the clusters reported were growing, with the rest stagnating or declining.

Please estimate the world-wide growth of the industries relevant to the cluster (this is a world growth figure, not a figure for growth of the cluster) per year.
Please estimate the growth of the cluster’s sales over the last two to three years.

- >10% per year
- 5% to 10% per year
- 2% to 5% per year
- -2% to 2% per year
- -5% to -2% per year
- -10% to -5% per year
- -10% per year <

How would you describe the stage of development of the cluster?

- Embryonic and Growing
- Embryonic and Stagnant or Declining
- Emerging (beyond the Embryonic stage)
- Mature and Growing
- Mature and Stagnating
- Mature and Declining

3.6 Innovative Capacity

The innovative capacity of the cluster refers to the ability of the cluster to generate the key innovations in products, processes, designs, marketing, logistics, and management that are relevant to competitive advantage in the industries in question. The distinction between high innovation and low innovation clusters is far more useful than that between "high technology" and "low technology" clusters. Some "high technology" industries are not at all innovative and some "low technology" clusters are. A cluster’s ability to sustain itself is related more to its innovative capacity than to the level of technology produced or used in the process.

When respondents were asked to describe the technological activities of the firms within the clusters, there was a fairly even split between "technology generators" and "technology users," with "technology adapters" somewhat behind. This shows that while some well-known clusters are generators of new and advanced technologies, many others are not and must try to achieve competitive advantages in other ways. In describing the innovative capability
across all activities (not just technology related), "world leaders" and "strong competitors" were the most frequent responses.

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**How would you describe the technological activities of the firms within the cluster?**

![Graph showing the distribution of technological activities among firms within the cluster.]

**How strong is the innovation capacity of firms in the cluster?** (across all activities, check all that apply)

![Graph showing the distribution of innovation capacity among firms within the cluster.]

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**3.7 Competitive Position**

The competitive position of the cluster involves the cluster's position in national and international markets. Several questions were used in an attempt to isolate the competitive position of the regional clusters in the sample. In addition to direct questions about the respondent's view of the competitive position of the cluster, information on the share of the cluster in national output, the geographic space over which the cluster has sales, and a sense of the stage of development of the cluster were obtained.

The clusters in the sample showed a bimodal distribution in terms of their share of national output, with less than 20% and more than 80% being the two most common answers. Most of the reported clusters have sales that are global in scope, indicating some competitive advantages in international markets. The vast majority of the reported clusters have a leadership position in either global, (supra-national) regional, or national markets.
Please estimate the cluster’s percentage of national output in the main industries in the cluster.

Over what geographic space do the firms in the cluster have significant sales?

How strong is the competitive position of firms in the cluster?

3.8 Governance Structure

In this survey, a cluster’s governance structure refers to the relationships among firms in the cluster in terms of the way that transactions within the cluster are organized and the overall industrial organization of the cluster. Governance structure in this context does not mean the forma of governance associated with cluster-based development initiatives or the management of cluster-specific organizations. Transactions can be governed by spot markets, various types of coalitions, other forms of relationships, or hierarchically within firms.
A variety of forms of industrial organization may be found in clusters, ranging from domination by atomistic small firms to domination by a single large firm, and encompassing most forms in between.

The respondents indicated that the dominant form of managing transactions within the sample is long-term relationships. This implies that the transactions within clusters tend to take place between parties that are relatively well-known to each other and that vertical relationships tend to persist over time. The respondents indicated that the most common industrial organization among the clusters they reported involved a mixture of sizes with a limited number of firms having most of the contacts with the rest of the world. The second most common response involved clusters that are dominated by small and medium-sized firms, many of which have contacts with the outside world. The former structure is consistent with the notion of a number of internationally-oriented firms supported by a local supplier and service base. The latter structure is consistent with the “Italian industrial district” type of cluster.
What is the industrial organization of the cluster?

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominated by small and medium-sized firms</td>
<td>50%</td>
</tr>
<tr>
<td>Mix of firm sizes, with a limited number of firms having most of the links with the outside world</td>
<td>75%</td>
</tr>
<tr>
<td>Mix of firm sizes, with a single firm having most of the links with the outside world</td>
<td>5%</td>
</tr>
<tr>
<td>Dominated by large firms</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>

3.9 Ownership Structure

The origin or ownership structure of the industrial base in the cluster, in particular, whether the bulk of the cluster is domestically owned or foreign owned provides another dimension. Clusters that have grown in an organic fashion tend to be dominated by locally owned firms. Transplant clusters, clusters based on the facilities of foreign firms are, by definition, dominated by foreign owned firms.

Most of the clusters reported are dominated by locally-owned firms. Relatively few pure "transplant" clusters were found in the sample, although several with a roughly even mix of local and foreign ownership were reported.
How would you describe the nature of ownership of the major firms in the cluster?

3.10 Cluster "Type"

Respondents also were asked to characterize clusters by their "type," or the extent to which the cluster exists, is self-aware, and is self-reinforcing.

- **Working clusters** are those in which a critical mass of local knowledge, expertise, personnel, and resources create agglomeration economies that are used by firms to their advantage in competing with those outside the cluster. Working clusters tend to have dense patterns of interactions among local firms that differ quantitatively and qualitatively from the interactions that the firms have with those not located in the cluster. They often have complex patterns of competition and co-operation and often are able to attract mobile resources and key personnel from other locations. Even if participants do not call themselves a "cluster" there tends to be knowledge of the interdependence of local competitors, suppliers, customers, and institutions.

- **Latent clusters** have a critical mass of firms in related industries sufficient to reap the benefits of clustering, but have not developed the level of interaction and information flows necessary to truly benefit from co-location. This can be due to a lack of knowledge of other local firms, a lack of interaction among firms and individuals, a lack of a common enough vision of their future, or a lack of the requisite level of trust for firms to find and exploit common interests. In any case, such groups of firms do not think of themselves as a cluster and, as a result, do not think of exploring the potential benefits of closer relationships with other local organizations.

- **Potential clusters** are those that have some of the elements necessary for the development of successful clusters, but where these elements must be deepened and broadened in order to benefit from the impact of agglomeration. Often there are important gaps in the inputs, services, or information flows that support cluster development. Like latent clusters, they lack the interaction and self-awareness of working clusters.

- **Policy driven clusters** are those chosen by governments for support, but which lack a critical mass of firms or favorable conditions for organic development. Many of the electronics and biotechnology "clusters" found in government programs are examples of this type of cluster. Policy driven clusters tend to be chosen more on political grounds than through any detailed analytical process. They tend to rely on the notion that policy can create clusters from a relatively unfavorable base.

- **“Wishful thinking” clusters** are policy driven clusters that lack, not only a critical mass, but any particular source of advantage than might promote organic development.
The bulk of the respondents reported clusters that they considered to be "working clusters." This is not surprising, given that this is probably what they think of when they think of "clusters" in the first place. It also is not surprising that only a few respondents were willing to characterize the clusters they reported as "wishful-thinking" clusters. The author's experience would suggest that both "policy-driven" and "wishful-thinking" clusters are underreported in the sample.

Please describe the type (see above) for this cluster

![Diagram showing distribution of cluster types]

- Working
- Latent
- Potential
- Policy-driven
- Wishful thinking
4. Specialized Organizations

Respondents were asked about the existence and roles played by specialized organizations associated with the regional clusters they reported. A surprisingly high number indicated that such organizations existed. Perhaps this is due to the inherent bias of asking respondents about cluster they know well. In many cases, such knowledge would have come from studying such clusters at the behest of some organization.

A surprising finding is how low the respondents rated such organizations in terms of their ability to coordinate the activities of firms within the clusters. On average, such organizations appear to play a very minor role in coordinating the activities of firms within the cluster. Only for lobbying government do the organizations score above "Moderate" in importance. In most categories they rate between "Very Unimportant" and "Unimportant."

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Are there any specialized organizations (e.g. associations of firms, specialized institutions, or specific cluster organizations) that coordinate the activities of firms in the cluster?

Yes 126
No 35

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Please rate the importance of specialized organizations (e.g. associations of firms, specialized institutions, or specific cluster organizations) in coordinating the following activities among firms in the cluster.

(Very Important = 5, Important = 4, Moderate = 3, Unimportant = 2, Very Unimportant = 1, No Activity = 0)
5. Government Policy towards Clustering

Although many authors have written about the cluster development initiatives that have been undertaken in various places in the world, there has been little work that has tried to characterize the policies that have been used and their relative importance to the development of the clusters in question. Despite apparent similarities, policies toward clustering actually vary significantly from place to place.

5.1 Nature of Government Intervention

Cluster development strategies can differ in the nature of government involvement and intervention. Governments with very different attitudes toward the role of the public sector have adopted cluster-based strategies. Some have used the notion of clusters to provide sharper tools for interventionist policies. Others have used the notion of clusters to identify and try to overcome market failures in otherwise market-oriented philosophies. In addition, governments at different levels have become involved in cluster based strategies. While many efforts have come from the local or regional level, others have operated at the national level or even supranational level.

Respondents were asked to identify the impact of the policies of different levels of government. They also were asked to assess the nature of the involvement with the following categories:

- **Non-existent** means no cluster-based policies.
- **Catalytic** means government tries to bring interested parties together, but provides limited support or direction. Government takes an indirect role by encouraging private sector efforts.
- **Supportive** means catalytic plus making cluster-specific investments in infrastructure, education, training, or providing passive promotional support.
- **Directive** means supportive plus either government using cluster program to reshape the local economic structure, or the presence of fairly directive targeting programs.
- **Interventionist** means directive plus either government making the major decisions about the evolution of the cluster rather than the private sector, or using active means, such as substantial subsidies, targeted attraction incentives, protection or regulations to develop the cluster, or significant government ownership and control in the cluster.

Most respondents indicated that local and regional governments seemed to be more involved in cluster policies than supra-national organizations or national governments. This is consistent with a tendency toward devolution of policy making to local levels of government and with the focus of regional clustering being in relatively small geographic areas. Most respondents characterized the nature of government policy as non-existent or supportive, rather than catalytic, directive, or interventionist.
Please characterize government policies towards this cluster.

5.2 Elements of Cluster Strategies

Many cluster development strategies have elements in common, though how these elements are carried out in practice can differ widely. Respondents were asked to rate the importance of different types of government policies in the development of the cluster. These activities were divided into several categories.

- Though not necessarily linked specifically to clusters, efforts to improve the generalized business environment, by reviewing tax policy, regulations, costs of services, streamlining administration, and maintaining a favorable business climate often become parts of cluster development policies.

- So to do efforts to provide information and data on business and economic trends as well as information and data specific to individual clusters, such as market data, information on customers and competitors, information on technological trends, and so on. In many instances, governments have commissioned detailed consulting reports that identify, profile, and make suggestions to cluster participants.

- Most jurisdictions, at least in advanced nations, provide basic infrastructure, education, and training. In cluster-based programs, these investments tend to become far more focused on the specific infrastructure, skills, and capabilities required by specific clusters. This can include effluent treatment facilities for specific industries, dedicated water supplies, dedicated electricity lines, and specialized port or airfreight facilities. It can mean specific education and training program that are linked specifically to individual clusters.

- Cluster development programs have used a variety of means to foster business networking and inter-firm collaboration. Some programs have relied on informal networking, through introductions, referral lists, industry associations, and other mechanisms. More formal programs have added a cluster dimension to networking programs, in which small and medium sized enterprises can receive government support to create networks and collaboration.

- In several regions, governments have made investments to provide business services ranging from basic research, to market research, to materials testing, to business process consulting, to accounting and record keeping, to advice on business management. The idea is to provide scale and perhaps experience sensitive services that small and medium sized firms cannot perform or afford for themselves individually.

- In some locations, governments have used investment attraction policies to try to develop or enhance local clusters. The rationale can be to develop a cluster based purely on foreign companies, to develop a cluster in which foreign firms provide a catalyst to the development of a vibrant local cluster, or efforts to enhance existing clusters through the attraction of foreign firms.
• Finally, many groups interested in promoting cluster development engage in activities of fostering social interaction and community based organizations that can be best termed community building. As Scott (1998), Putnam (1993), Rosenfeld (1995), among others have observed, it is difficult or impossible to separate a region's economic development from its social and community development.

Respondents were asked about the importance that various government policies have had in promoting the individual regional clusters. In most of the categories, "No Policy" was the most frequent response. This indicates that many of the policies to support clustering that have appeared in the literature do not seem to actually be used within many clusters. None of the specific policies assessed even rated "Moderate" in importance across the whole sample. The most important single policy in terms of promoting the clusters in the sample appears to be the provision of general communication, transportation, and physical infrastructure. Second was the provision of general education and training for business. The results indicate that the policy mixes across clusters are rather different (so that no individual policies stand out), that individual policies have not had an important impact on the clusters, or both. The results do leave open the possibility that whereas no individual government policy has made an important contribution across the sample, that government policy as a whole has. However, with most of the policy areas scoring less than "Unimportant," such a conclusion might be something of a stretch.
Please rate how important government policies in the following areas have been in promoting the development of this particular cluster. (Very Important = 5, Important = 4, Moderate = 3, Unimportant = 2, Very Unimportant = 1, No Policy = 0, Negative Impact = -1)

![Bar chart showing mean responses for various policies](image)

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6. Conclusion

This working paper reports initial results of a worldwide survey on regional clusters. These results were assembled for distribution to those who participated in the survey. As a result, they are being distributed before the author has been able to undertake a complete analysis of the data. Such analysis will focus on identifying the families of regional clusters that exist, the families of policies toward regional clustering that have been adopted, and (where possible) the relationship between cluster family and/or cluster policies and cluster performance.

There are several interesting results that emerge even based on a cursory examination of the data. Most of the clusters reported have a relatively narrow geographic scope. Most are relatively broad in terms of their industry scope. Most are relatively deep in terms of vertical relationships and most are activity rich. The clusters reported tend to be international if not global in their sales and tend to have relatively strong competitive positions. While many of the clusters are technology generators, a nearly equal number are technology users, and a substantial number are technology adopters. The reported clusters tend to manage transactions internal to the cluster through long-term relationships and to have an industrial organization characterized either by a mixture of firm sizes or dominance by small and medium-sized firms.
Two surprising results have emerged. The first is that most policy areas assessed were rated, on average, as "Unimportant" (or less) in terms of their contribution to the development of the individual clusters. The second is that even though the vast majority of the clusters reported have some cluster-specific organization attached to them, the impact of the coordination efforts in a series of activities by specialized cluster organizations were rated as "Unimportant" (or less).

Although preliminary in nature, such results should prove very useful to researchers investigating the regional clustering phenomenon as well as development professionals and policy makers interested in formulating and executing development policies based on regional clustering.
7. References


