Cluster Economic Performance
Concept – Present
Experiences and Future Developments

Simona BIRIESCU
simona.biriescu@feaa.uvt.ro
West University of Timisoara

Abstract
Cluster-based economic development has become an increasingly popular topic for researchers and economic development professionals. Clusters are groups of companies and institutions co-located in a specific geographic region and linked by interdependencies in providing a related group of products and/or services. Given changes in the global environment, businesses and countries are changing the way they compete. These changes are characterised by the ability of multinational corporations to locate their investment – production plants, R&D facilities, service centres, etc., – in any location in the world where they find an adequate business environment. The increasing interest in clusters is only one aspect of a broader re-orientation of research and economic policy towards the microeconomic foundations of prosperity and growth.

Key words: economic development, strategy and competitiveness, clusters, performance

1. Introduction
The economic policy debate had in previous decades been to a large degree dominated by macroeconomics and the creation of market institutions in transition economies. Clusters are groups of companies and institutions co-located in a specific geographic region and linked by interdependencies in providing a related group of products and/or services. Because of the proximity among them – both in terms of geography and of activities – cluster constituents enjoy the economic benefits of several types of positive location-specific externalities. These externalities include, for example, access to specialized human resources and suppliers, knowledge spillovers, pressure for higher performance in head-to-head competition, and learnings from the close interaction with specialized customers and suppliers.

2. Types of clusters
Clusters differ in many dimensions: the type of products and services they produce, the locational dynamics they are subject to, their stage of development, and the business environment that surrounds them, to name a few. At a first level, clusters can be classified by the type of product and/or services they provide. There are clusters in automotive, in financial services, in tourism, in ceramic tiles, and many more. Within these clusters, recent research has pointed out how different locations play different roles.

More recent research on clusters indicates that even within a given field there is room for many different successful clusters, each taking a unique, individual role. Clusters are differentiated by their specialization in a particular stage of their field’s value chain, by their focus on specific geographic areas, or by targeting selected customer needs or market segments.

Two main reasons can limit that choice: Many industries are tied to their location by the need to be close to their customers. These “local” industries are serving only local markets and are distributed across space roughly according to population. They might cluster in a more narrow geographic

283
sense like a part of a city - mainly due to complementarities in attracting customers - but these effects are not strong enough to influence the locational patterns across regions. Others industries are tied to their location by the need to be close to natural resources. These “natural resourcedependent industries” serve global markets and are concentrated across space according o the presence of natural resource.

Clusters develop over time, they are not a phenomenon that just appears or disappears overnight. While the exact understanding of the evolution of clusters is still the subject of much research, a number of observations emerge from case studies and the conceptual thinking. For many clusters, the roots of their development go back many years. The steel industry around Pittsburgh, for example, owes its existence to the deposits of coal in the region that provided affordable energy. Today, there is still a huge cluster of steel and other production technology companies located around the city, although the local coal deposits are of little remaining importance. Another root for cluster development can be the existence of initial institutions, such as companies or universities, which over time act as an anchor for the cluster spinning-off new businesses and attracting the investment from companies outside the region.

Many clusters have developed without the presence of any dedicated efforts to upgrade them. The inherent economics of proximity have been enough to over time attract increasing numbers of companies and other institutions, leading to a selfreinforcing cycle that was often started by a chance event. But other clusters have developed much faster because of the determined action of regional leaders that had spotted the potential of their region for the cluster.

The concept of “economic impact” used here is derived from standard methodology for the economic evaluation of development projects. The analysis focuses on impacts that satisfy three screening criteria:
- highly probable;
- attributable;
- quantifiable;

3. Clusters and economic performance
Clusters develop (fig.1) and are important because they create economic benefits. The benefits of a cluster come in three dimensions: First, companies can operate with a higher level of efficiency, drawing on more specialized assets and suppliers with shorter reaction times than they could in isolation. Second, companies and research institutions can achieve higher levels of innovation. Knowledge spillovers and the close interaction with customers and other companies create more new ideas and provide intense pressure to innovate while the cluster environment lowers the cost of experimenting. Third, the level of business formation tends to be higher in clusters. Start-ups are more reliant on external suppliers and partners, all of which they find in a cluster. Clusters also reduce the cost of failure, as entrepreneurs can fall back on local employment opportunities in the many other companies in the same field.

The performance of a cluster at a specific location is driven by the business environment that the cluster is operating in. “Business environment” is a broad and naturally vague term: almost everything – from the quality of the schools to the strategies of local competitors – matters for the level of productivity and innovation that companies in the cluster reach at this specific location.
Other recent research has also stressed the importance of different types of “institutions for collaboration”, that create specialized platforms for interaction among cluster participants. Because the performance of a cluster depends on the strength of interaction among its constituents, the presence of such institutions that allow knowledge to flow more easily and enable the cluster to organize collective actions has a significant impact on how the available assets in the cluster are being deployed.

4. Identification of clusters
First, clusters can be seen as elevations in a three-dimensional map of the geographic location of economic activity in a given field, using for example employment to indicate height. The question becomes at what height we deem this elevation significant enough to call it a hill or even a mountain. The exact answer clearly becomes somewhat arbitrary while the overall concept of a hill or mountain relative to the plains is not. For clusters, it takes a minimum critical mass to reach a meaningful level of the type of location-specific externalities that attach economic significance to clusters.

Second, clusters are defined by the relationships, market and non-market, that exist among companies and institutions in a given field. Again, the level of these relationships is a continuum without any one clear cut-off point. One way to define these cut-off points is by looking at the actual geographic distribution of economic activity: If across many regions two industries tend to co-locate in terms of their employment, there is a strong indication that they are tied by significantly strong relationship effects. The necessary condition to do any kind of systematic empirical work on clusters is to find a consistent definition of what economic activities belong to the cluster. The efforts to develop such cluster definitions based on empirical analysis have been come to known as “Cluster Mapping”.

To then identify cluster categories, Porter calculated the correlation of employment by industries across locations. Based on these correlations, industries were grouped into cluster and subcluster categories. Industries were assigned to one cluster as their primary association, giving rise to what we called “narrow” cluster definitions. With these definitions, the leading cluster locations in a cluster category could be identified and compared in size, profile, and performance.
5. Traded Clusters in the Economy

- Business Services  • Financial Services  • Hospitality and Tourism  • Education and Knowledge Cr.  • Distribution Services  • Heavy Construction Services  • Transportation and Logistics  • Metal Manufacturing  • Processed Food  • Automotive  • Entertainment  • Publishing and Printing  • Plastics  • Information Technology  • Analytical Instruments  • Building Fixtures, Equip, a. Serv.  • Production Technology  • Apparel  • Chemical Products  • Communications Equipment  • Heavy Machinery  • Motor Driven Products  • Textiles  • Forest Products  • Furniture  • Medical Devices  • Oil and Gas Prod. and Services  • Aerospace Vehicles and Def.  • Lighting and Electrical Equip.  • Prefabricated. Enclosures  • Power Generation and Transmission  • Agricultural Products  • Biopharmaceuticals  • Construction Materials  • Fishing and Fishing Product  • Tobacco  • Footwear.

The regional clusters it’s very important. A regional cluster can be characterized and comparatively measured in terms of seven attributes:

- **Size**: Absolute employment and revenue generated by the industries comprising the cluster. This is most relevant to determining the total output and contribution to GDP.
- **Specialization**: Degree to which employment in the industries comprising the cluster constitutes a higher proportion of total employment than the national (or international) average. This relative size is measured using a location quotient, when data permit. Specialized regions are more likely to already have or continue to attract more cluster agglomeration.
- **Growth**: Degree to which employment and revenue in the set of industries that comprise the cluster (taken as a whole) is growing at an annual average rate that is at or above the national (or international) average.
- **Depth**: The percentage of the final value of the good or service shipped from the region that is produced within the region. This is the attribute of the cluster that is of greatest concern, in that the appropriate retention of value permits more revenue to pass through into the economy, along with the associated economic multipliers.
- **Breadth**: The diversity of segments of the global industry present within the regional cluster. The more numerous the segments present, the more robust the cluster. This is not easily measured, but can be inferred by examining export data.
- **Dynamism**: A highly dynamic cluster is one that has a high degree of “vitality” or company formation and survival, as well as “autonomy”. Vitality is difficult to measure internationally but is typically determined by calculating ratios of new firms (0-5 years) to older firms (6-10 years). Autonomy has to do with the ratio of branch plants to headquarters or single proprietorships. A dynamic regional cluster has a good mixture of vitality and autonomy.
- **Stage of Life Cycle**: Clusters evolve over time and continue to change. A region’s clusters can be classified in terms of their stage of life-cycle in order to focus strategy and action. There are roughly four stages of lifecycle:
  - **Seed Cluster**: Prior to ever having a formal cluster, a region may have a “seed cluster” which consists of a distinct array of assets in the form of natural or man-made resources, skills, and research capability, among other factors that have yet to be commercially “harnessed”.
  - **Emerging Cluster**: This is an early-stage cluster where the employment and revenue growth is higher than the national average, but employment concentration (location quotient) is below the national average and therefore the focus for agglomeration - formation and recruitment of firms to deepen and broaden cluster structure - as well as promotion in global markets.
  - **Expanding Cluster**: Over time a cluster may reach a point where it has both high employment concentration and higher than average annual growth rate, and thus be a focal point both for firm retention and for adding new sources of value.
  - **Transforming Cluster**: Eventually a cluster may achieve a high concentration of employment but find itself with below-national average growth (or decline) in the region and consequently be a focus for productivity and innovation enhancement to regain position relative to competitors.
Cluster-based economic development policy
For many practitioners the motivation to look at clusters is not the analysis of an empirical phenomenon per se, it is the promise to develop a new approach for economic policy that can help to develop regional and national economies. It is important to keep these two aspects of research separated: There is increasing evidence and agreement among researchers that clusters exist and that they feature a number of positive economic effects.

Cluster-based economic policy as a new model
Cluster-based economic development should be seen as a new model for microeconomic policies at large, not as a narrow revision of traditional sectoral policies or a mere addition to the tool box available to policy makers. In this context, clusters have a significantly higher potential than just being the motivation for well-intentioned cluster initiatives that are innovative but often isolated and with little sustained impact.

Cluster-based economic development is concerned with the improvement of the overall microeconomic foundations of prosperity in a given location. To improve a location’s competitiveness, all elements affecting the context for productivity and innovation in individual firms and clusters have to be looked at. For dimensions are in our experience critical elements of such a strategy: Regions need to activate their clusters, address crosscutting weaknesses in their general business environments, create an institutional structure to focus on competitiveness beyond the life cycle of specific administrations, and define an overall understanding of the unique value they intend to provide relative to other locations. Without such a broader microeconomic strategy, cluster efforts are less effective.

6. Conclusion
Cluster-based economic development is entering a new era. As it is moving towards the mainstream of economic policy approaches in many countries and regions, it needs to face up to more rigorous demands:

- It needs to be based on shared conceptual foundations, many of which we argue already exist.
- It needs to make much more extensive use of data to test its hypotheses and to evaluate policies, a process that has just started in earnest.
- It needs to develop a conceptual framework of the implementation process, clearly separating the discussion about clusters from the discussion about cluster-based economic policy.
- And it finally needs to move beyond a narrow focus on clusters to a broader microeconomic policy for enhancing competitiveness.

The cluster approach to private-sector development has attracted global attention. Clusters are an important part of the economic landscape in many countries. It makes sense to think. The study was designed to produce provisional estimates on the assumption that a local-hire in organization would follow up on the analysis. Part of the consultant’s responsibility has been to train the staff member for this purpose, and provide guidance on tasks requiring further attention.

That cluster initiatives can foster innovations that contribute to competitiveness and productivity. Another reason for the approach’s popularity is that standard prescriptions for macroeconomic stability and liberalization have proved to be necessary but not sufficient conditions for rapid growth. This realization has led to a search for other approaches to accelerate development, such as institutional reforms and microeconomic interventions.

While cluster-based economic policy has a lot of potential, it is no panacea. In fact, the largest danger for this approach may be its current use as the fashionable next “new thing” in economic development. The high hopes pinned to cluster-based economic development can bear fruit. However, it will take both research and practice to step up to the more rigorous demands in this new era.
References

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