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Introduction

Regional industrialization efforts include industrial recruitment, entrepreneurial and small business development, and business retention and expansion programs. Recently, many states and communities have targeted their industrialization programs at specific industries to promote the development of industry clusters (see Table 1 for examples). Broadly defined, an *industry cluster* is a loose, geographically bounded collection of similar and/or related firms that together create competitive advantages for member firms and the regional economy.

The purpose of this note is to summarize the debate concerning the advisability of industry cluster targeting as an employment generation strategy for states and sub-state regions. Proponents of an industry clusters strategy point to carpet manufacturing near Dalton, Georgia (230 firms, 25,000 jobs) and furniture near Tupelo, Mississippi (240 firms, 22,000 jobs) as examples of industry clusters that provide large numbers of jobs for area workers. And additional cluster “success stories” are predicted if industrialization programs are redirected to encourage the development of new industry groupings. Skeptics of this strategy acknowledge the benefits associated with developed industry clusters; however, they question whether this is a realistic industrialization strategy for many regions. The development of a cluster requires specific conditions that may be attainable only at significant costs. For areas deficient in these necessary conditions, the promotion of industry clusters will be unproductive.

Our review of the appropriateness of a clusters strategy begins with a summary of industry cluster characteristics. Next we present the potential advantages developed clusters provide regional economies and the difficulties of establishing competitive clusters in new locations. We conclude with a summary of the implications of an industry clusters strategy for regional industrial development.

Industry Cluster Characteristics

Industry clusters include groupings of firms with diverse characteristics, and as a result, varied potentials for employment growth and local economic development. For example, a cluster may consist only of firms engaged in the production of similar

Table 1. Examples of Initial Target Industry Selections

Alabama	Microelectronics, New Materials, Biotechnology, Telecommunications, Civilian Aircraft, Machine Tools, Computers
Arizona	Information, Business Services, Aerospace, Health/Biomedical, Mineral/Mining, Agriculture/Food Processing, Transportation, Tourism, Environmental Technologies, Optics, Software
Florida	Space Industries, Laser/Optics, Health Technology, Information Industries, Biomedical, Defense Industries
New York	Biomedical, Optics and Imaging, Advanced Machinery, Environmental Technologies, Information Technologies, Business and Financial Services, Information, Media and Design
Oregon	Forest Products, Agricultural Products, High-Tech, Metals, Fisheries, Film and Video, Biotechnology, Software, Plastics, Aerospace, Tourism, Environmental Services
South Carolina	Textiles/Apparel, Chemicals, Capital Equipment, Plastics, Transportation Equipment, Forest Products, Information Technologies, Health-related Products and Services, Environmental and Energy-related Technologies, Tourism

products (e.g., apparel, upholstered furniture, or automobile parts). Clusters also may be composed of vertically integrated firms (e.g., sawmills, millwork, cabinet manufacturers) or firms linked by their reliance on specialized services or labor markets. Interaction among cluster members ranges from limited purchase - sale relationships to extensive interfirm collaboration, and state and local support for cluster firms ranges from passive to proactive.

Each cluster is unique as a result of differences in industry sectors, number and sizes of firms, purchase-sale linkages, and extent of interfirm cooperation and collaboration. Ann Markusen argues, however, that shared characteristics among industry clusters permit them to be grouped into four general types: Marshallian, hub and spoke, satellite platforms, and state-anchored clusters (Table 2).

Marshallian clusters are comprised primarily of locally owned, small and medium-

sized businesses concentrated in craft-based, high technology, or producer services industries. Substantial trade is transacted between firms, and specialized services, labor markets, and institutions develop to serve firms in the cluster. Firms consciously “network” to solve problems, and government policy evolves to improve cluster competitiveness.

Hub and spoke clusters are dominated by one or several large firms surrounded by smaller suppliers and related activities. Smaller firms may evolve in the cluster to buy from or sell to an anchor firm or to take advantage of activities attributed to the anchor firm’s presence. Cooperation exists between small and large firms (generally on the terms of the hub firm), but noticeably absent is much cooperation among competitor firms to spread risks, stabilize markets, and share innovations.

Table 2. Markusen’s Typology of Industry Clusters

Cluster Type Growth	Characteristics of Member Firms	Intra-cluster Interdependencies	Prospects for Employment
Marshallian synergies provided	Small and medium- sized locally owned firms	Substantial interfirm trade and collaboration, strong institutional support	Dependent on and economies by cluster
Hub and Spoke	One or several large growth firms with numerous smaller smaller suppliers and service firms	Cooperation between large firms and smaller suppliers on terms of the large firms (hub) firms	Dependent on prospects of large
Satellite Platforms	Medium- and large- sized branch plants	Minimum interfirm trade and networking	Dependent on ability to recruit and retain branch plants
State-anchored	Large public or non-profit entity and related supplying and service firms	Restricted to purchase- sale relationships between public entity and suppliers	Dependent on region’s ability to expand political support for public facility.

Source: Markusen (1994).

Satellite platforms are industry clusters dominated by the branch facilities of externally-based multi-plant firms. These branch plants are large and relatively independent. Minimal trade or networking takes place among the clusters’ branch plants, and the incidence of spin-off

activities (entrepreneurship and suppliers) is relatively small.

Finally, *state-anchored industry clusters* are regions where the local business structure is dominated by a public or non-profit entity (e.g., military base, university, government offices). Supplier and service sectors develop around these public facilities, but these local firms are relatively unimportant to the development of these clusters.

Markusen notes that all four cluster types are promising employment generation alternatives. However, differences among the four clusters' characteristics suggest alternative strategies for cluster growth. Regions with Marshallian clusters will focus on programs to enhance entrepreneurial activity, small business development, and intra-cluster collaboration. Employment growth in regions with satellite clusters is determined primarily by the ability of these regions to recruit new branch facilities. Development efforts in areas with hub-and-spoke clusters will focus on programs to expand the hub firms and to encourage stronger linkages to local supplying firms (spokes). Finally, the growth of state-anchored clusters is dependent on the ability of areas to expand funding and political support for their core public facilities.

In summary, industry clusters differ significantly with respect to characteristics of the dominant sectors, extent of interdependencies among firms, availability of governmental and institutional support, and employment generation potentials. Thus assessments of the costs and benefits associated with cluster development are not possible without detailed information pertaining to the cluster's characteristics. However, insights into the desirability and appropriateness of an industry cluster strategy are provided by comparing the potential advantages and shortcomings associated with such strategies.

Advantages of An Industry Cluster Strategy

Targeting industrial development programs at an industry cluster is based on the assumption that such a strategy will provide greater economic development benefits than those associated with a more diverse industrialization effort. These advantages are grouped into four areas.

Clustering Strengthens Localization Economies. The concentration of an industry at a particular location may result in significant cost savings to firms in the cluster. These cost savings are referred to as *localization economies*. Sources of potential savings include a greater availability of specialized input suppliers and business services; a larger pool of trained, specialized workers; public infrastructure investments geared to the needs of a particular industry; financial markets familiar with the industry; and an enhanced likelihood of interfirm technology and information transfers.

Clustering Facilitates Industrial Reorganization. The transition in industrial organization from large firms engaged in mass production to small firms focused on speciality production is well documented. This change in industrial structure is attributed to increased global competition and the emergence of new production technologies (e.g., computer-aided manufacturing).

Clusters are attractive locations for the small, specialized, computer-aided manufacturers. Product specialization and the adoption of new production technologies are more prominent and easily attained among firms in industry clusters. Proximity between the more specialized firms and their input suppliers and product markets enhances the flow of goods through the production system. Ready access to product and input markets also enables firms to more quickly adapt to market changes. And a spatial concentration of firms provides the pool of skilled labor required by the computer-aided technologies.

Clustering Encourages Networking Among Firms. Networking is cooperation among firms to take advantage of complementarities, exploit new markets, integrate activities, or pool resources or knowledge. This cooperation occurs more naturally and frequently within industry clusters. And surveys of manufacturing networks find that firms in networks perceive significant advantages from cooperation with their counterparts. Networking firms are more likely than non-networking firms to engage in collaborating and information sharing in marketing, new product development, and technological upgrading. The networking firms also report that their competitiveness and profitability are enhanced by interfirm cooperation and collaboration.

Clustering Permits Greater Focusing of Public Resources. The targeting of industry development efforts permits regions to use their limited economic development resources more efficiently. First, a clusters approach enables regions to focus their recruitment, retention and expansion, and small business development programs rather than attempting to provide assistance for many different business types. This tailoring of development initiatives permits clearer identification of specific industry needs and enables (for a given budget expenditure) the provision of fewer but more highly valued programs. Second, because of linkages among firms in a cluster, programs supporting specific businesses will have relatively large multiplier effects for the area economy. The total employment and income gains from recruiting (or retaining) cluster members will likely exceed those associated with non-cluster firms of similar size.

Shortcomings of An Industry Cluster Strategy

The potential benefits associated with industry clusters are strong inducements to pursue a strategy focused on cluster development. The principal shortcoming inherent in following such a strategy is that the likelihood of success will be low for many regions. Industry clusters are difficult to establish for three reasons.

Regions Will Have Difficulty Picking Winners. A prerequisite to developing a cluster is the identification of regional competitive advantage based on labor force characteristics, unique regional attributes, availability and quality of public and private infrastructure, and proximity to input and product markets. Industrialization efforts next must identify the targeted industry/firms and provide the services and infrastructure necessary to insure that these businesses remain successful. Thus, the designing of an industry cluster program requires an extensive understanding of the region and its economic processes.

Many regional scientists are skeptical regarding the availabilities of public officials to either identify regional competitive advantage, select “good” industries/firms to target, or design programs to assist specific sectors. Regional competitive advantage changes over time in response to new technologies, tastes, and institutions. It is a leap of faith to assume that state and local development authorities appreciate regional, national, and international economic processes well enough to accurately assess regional competitive advantage. In addition, the selection of specific targets for industry clusters is problematic because projections of industry-wide growth prospects are notoriously unreliable, growth prospects change over time in response to market forces, and individual firms within an industry may exhibit employment and sales trends counter to that of the industry as a whole.

Latecomers May Not Be Competitive. The benefits available to members of a cluster provide early clusters with distinct competitive advantages over late imitators. Early sites provide cost savings, specialized infrastructure, institutional support, and well-developed networks not readily available in newer or smaller clusters.

Can latecomers overcome the advantages inherent in existing clusters? The consensus of researchers is “yes,” but only under special circumstances. New clusters can compete with existing industry concentrations if the starting positions are not too unequal, workers and firms can relocate rapidly, and localization economies are realized early. Also, late imitators may succeed if there are local endowments of a special variety or an industrial structure exists onto which new activities may be grafted. However, in the absence of these special circumstances, overcoming latecomer disadvantages will require significant public expenditures.

Supportive Institutions are Not Easily Established. Research on industry clusters is remarkably consistent in its description of the institutional environment required to nurture and support clusters. Recommended are changes in political, social, and economic conditions to encourage trust and collective action. Indeed, interfirm competition is discouraged because such rivalries impede networking and the provision of collective services such as labor training programs, marketing information, technology development and transfer, and new product development. Thus the question of the intentional creation of industry clusters reduces, in part, to the question of changing beliefs.

Are beliefs and institutions in regions readily enough changed to permit widespread development of industry clusters? Many economists are not optimistic that appropriate institutional arrangements will emerge because cooperative behavior is limited by incomplete information, opportunistic behavior, and committed assets. These researchers conclude that a consensus for promoting economic development will occur only when the total gains are expected to be very large, when the distribution of the benefits and costs is quite clear, and when the community can reach agreement on helping those who might be harmed.

Implications For Regional Industrial Development Policy

Our findings indicate that the development of an industry cluster can provide significant advantages to local firms and the area economy. The principal shortcomings inherent with a clusters strategy relate to the difficulty of establishing a cluster in a location where an industry grouping is not present. The key for policy prescription, therefore, is to compare the costs of initiating or expanding a cluster with the potential benefits of a successful cluster development. Based on these potential costs and benefits, we believe that most regions will fall into one of the three categories with respect to the advisability of adopting a clustering strategy.

One, regions with well developed industry clusters will likely find that programs to expand these clusters will be reasonable strategies for industrial development. Three program initiatives are recommended by Rosenfeld. Regions can support the development of industry organizations that help firms develop a shared vision, identify similar interests, and pursue new opportunities. Regions can assist in creating broker services that help firms discover what they need and where to find it. Services include analyzing market and technology trends; encouraging cooperation and collaboration in the areas of marketing, sales, and input purchases; and providing applied research, labor training, and business assistance programs. Regions can provide a subsidized center that focuses on the needs of a specific industry cluster. Services of such centers include training in technologies and management techniques, sponsoring research, and providing access to information.

Two, regions with small industry clusters may wish to pursue a cluster promotion strategy if such a strategy is not too costly. Smaller clusters generally will be at a disadvantage in competing with larger, established industry clusters. To be competitive, regions with smaller clusters may need to offer financial inducements to prospective firms, invest in specialized infrastructure, and/or subsidize labor training programs. The costs of these programs may be small or large depending on the specific industry, area characteristics, and the head start attained by earlier clusters. Thus, assessments of the costs of overcoming latecomer disadvantages must be undertaken on a case by case basis.

Three, regions with no distinct industry clusters (or clusters of declining sectors) will likely find little success from a clustering strategy. In this case, state and local governments should focus their efforts on efficiently providing local public services and improving the quality of the regional labor force. Such efforts, in conjunction with an active small business development program, will provide these areas with a receptive environment for the “historical accident” that could possibly be nurtured into a new industry cluster.

In summary, the promotion of industry clusters is not an industrial development solution for all areas. The clustering approach is most promising for areas with existing, well-developed clusters in growing industries. Regions with concentrations in declining sectors or areas with diverse industrial bases probably should continue to concentrate their industry development resources in the more traditional program areas -- recruitment, small business development, retention and expansion. The difficulties and costs associated with developing new industry clusters in these regions render clustering an impractical employment generation strategy.

Suggested Readings

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