FOREST-BASED ECONOMIC CLUSTERS

MODELS FOR SUSTAINABLE ECONOMIC DEVELOPMENT

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Introduction

The concept of "business clustering" has gained increased attention in recent years as public and private sector interests have attempted to identify strategic opportunities for economic development. Cluster development may also be strategically beneficial to emerging bioenergy, biochemicals and related industry development.

In the most general terms, a "cluster" is any instance of closely located (i.e., geographic proximity) and closely aligned operations (i.e., high frequency or number of transactions, or closely related product lines). For a cluster to be maintained, it is also necessary that the parties involved derive mutual benefit. Clusters can be formal (e.g., trade associations, buyer groups, cooperatives) or informal (e.g., friends, family, neighbors) and may or may not include traditional financial interactions (e.g., the cluster may be based upon barter of goods and/or services). One appealing characteristic of clusters is that they often appear to provide benefits of efficiency, enhanced productivity and greater resiliency due to synergies and relationships they support. On the other hand, clusters may also be viewed as creating conditions of co-dependence, which may limit any individual participant's ability to innovate. Interdependence could also contribute to the quick demise of enterprises due to significant changes in economic, social, or environmental conditions.

In 2008, the U.S. Endowment for Forestry and Communities commissioned a study to examine the status of and opportunities for business clustering within the U.S. forest products sector and other closely aligned sectors.[1] For the purposes of that study, the focus was on forest industry clusters. The study defined an industry cluster as "a group of firms and institutions located in close proximity whose businesses are interlinked through value and supply chains, labor, and use of similar inputs, technology, and complementary products."

This report discusses some of the findings from the recent study of U.S. forest sector clusters, highlights the conditions needed to increase the likelihood of success of any business cluster, and provides opportunities for new cluster development.

Background

Today, clusters benefit industries as diverse as auto manufacturing, film and movie studios, medical and health care, pulp and paper, boat building, and education and research. Clusters are apparent within both the public and private sectors and in countries around the globe. A key element of cluster development and their longevity is similar interests or needs of participants and dependence upon each other to achieve success. In other words, clusters form where there is common interest, interdependence and where the means to the end includes cooperation. With this in mind, it is easy to imagine what defines the working lifespan of a cluster. In a nutshell, when cooperation is no longer needed, a cluster may be dissolved.

[1] Funded by the U.S. Endowment for Forestry and Communities, Inc., the project partners were the Forest and Wildlife Research Center of Mississippi State University, the Department of Forestry at the University of Missouri and Dovetail Partners, Inc. The complete project report and materials are available at the U.S. Endowment website: http://www.usendowment.org

Outside of the forest sector, one of the most well-known industry clusters in the U.S. is the auto manufacturing cluster located in and around the state of Michigan. The formation and life cycle of this cluster can be traced back to the initiation of automobile manufacturing in this region in the early 1900s. From the beginning, the industry relied upon certain raw materials (e.g., rubber, steel, iron, oil, electricity), human labor, and industrial transportation networks. These elements were either available or made available through the development of the cluster located near the core manufacturing plants.[2] Over the decades, hundreds of companies "clustered" around this core industry to provide supporting services and products. For many decades the success of this cluster and the fruitful businesses it spawned were the topic of leadership lessons, instruction on strategic investment and many political careers. However, in recent years, some of the shortcomings of clusters can also be illustrated within the U.S. automakers sector.

In the forest sector, one state long known for attention to forest cluster development and support is Oregon. Here, in late 2007, the chairs of the Oregon Economic and Community Development Commission, Oregon Board of Forestry, Oregon Forest Resources Institute Board, and Dean of the Oregon State University College of Forestry/Director of the Oregon Forest Research Laboratory signed a joint resolution to set Oregon on a path to craft a comprehensive new forest cluster economic development strategy. That strategy, still under development, seeks to strengthen a complex set of interrelationships (Figure 1, next page), broaden and diversify the cluster, and thereby allow the state to remain competitive in the global market for commodity forest products.

Why Clusters Form

Clusters form where there is mutual benefit from cooperation. Frequently, the desired benefit from industry clusters is lower costs of production. The U.S. Endowment study identified the following potential benefits to firms included in industry clusters.

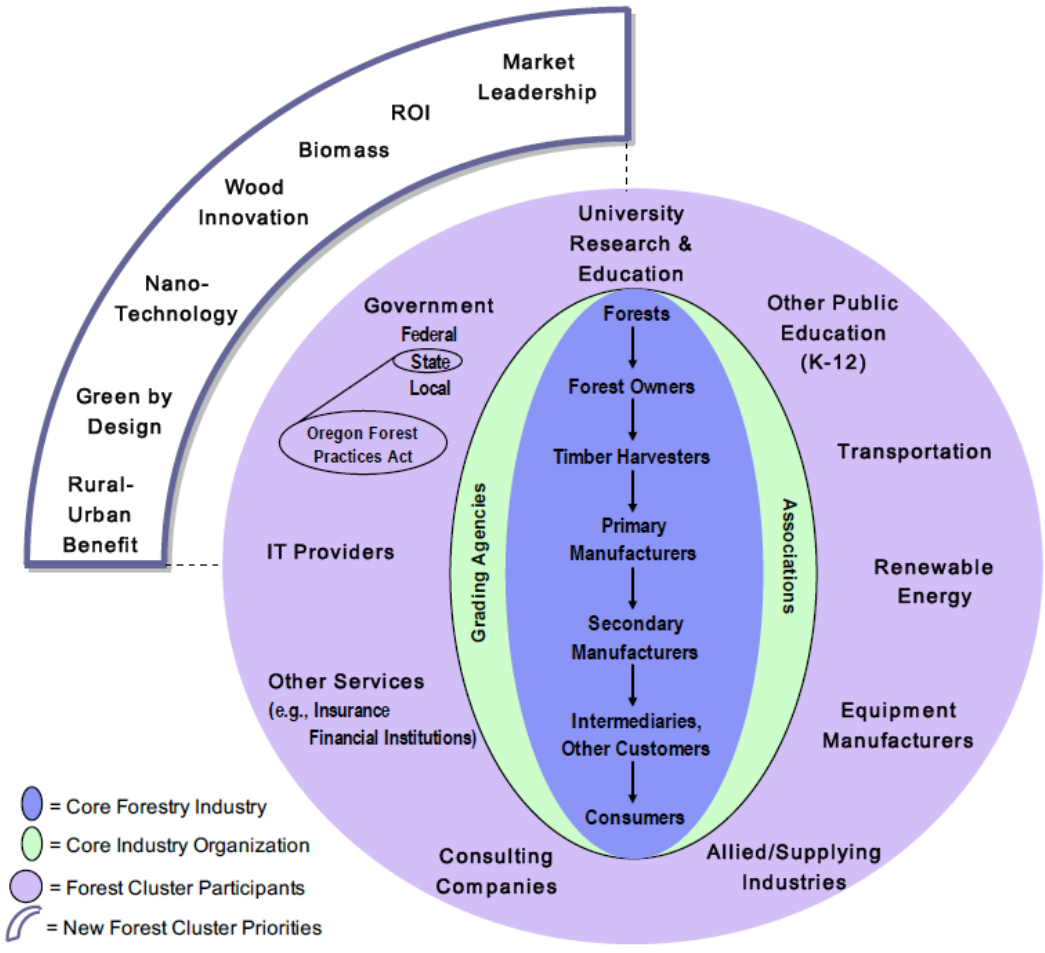
Benefits of Industry Clusters

- Easier and Less Costly Recruitment of Workers: Clusters create a pool of workers with desired skills and training
- Easier and Less Costly Access to Production Inputs: Close proximity to suppliers improves communication, reduces transportation costs and avoids potential delays
- Better Understanding of Suppliers and Consumers: Frequent interactions support efficiencies, exchange of ideas and problem solving services
- Companies Provide Complementary Products and Services: Firms interactions complement one another with diminished direct competition
- Improved Access to Public Institutions and Goods: Enhanced level of group activities attracts additional public and private sector investment and infrastructure support

[2] The cluster also facilitated procurement of natural rubber; in this case automakers and tire companies collaborated to establish extensive overseas rubber plantations to ensure latex supplies.

- Better Motivation for Continuous Improvement: Companies can compare practices and stimulate innovation and productivity improvements
- Higher Wages: Decreased costs support increased productivity and employment and improved compensation for skilled workers
- Improved Employment Opportunities: Specialized operations improve skills and productivity
- Improved Communication and Company Interaction: Closer collaboration supports improved logistics, innovation and productivity
- Increased Economic Growth: Success attracts additional cluster participation and new businesses

Figure 1
Oregon's Forest Sector and Key Drivers



Source: Hovee (2005)

Any given cluster may provide some or all of these benefits at some time during its operation. Cluster participants may emphasize specific desired benefits and deemphasize or avoid others. For example, to support the benefit of motivation for continuous improvement it is necessary for cluster participants to share practices and information with each other, which may not be possible in some businesses where information is proprietary or information sharing is otherwise restricted.

The benefits listed above are primarily characterized in terms of economic impacts of industry clusters. A cluster may also provide social or environmental benefits. For example, a cluster may provide the benefit of preserving or supporting a traditional community practice such as harvesting of wild rice, maple syruping or handicrafts. A cluster may also yield environmental benefits, for example, by establishing criteria for business participation that includes the use of responsible materials, participation in a recycling or reuse program, or a carbon offset investment by members. The products or services provided by a cluster may also be designed and manufactured with adherence to environmental benchmarks established through collaboration and with input from cluster participants.

How Clusters Succeed

The success of a cluster can be measured in different ways and will depend upon the benefits that the cluster is intended to provide to participants. Clusters succeed when (and as long as) the benefits of cooperation are competitive with the alternative of direct competition between cluster members or with organizations outside of the cluster. Cluster members can be (and often are) fiercely competitive with one another. However, they also benefit individually by "working together" in key areas such as education, training, political activism, or other shared interests. It is important to note that clusters remain demonstrably "successful" so long as members are participating.

The U.S. Endowment sponsored study concluded that cluster success is based on advantages of location (such as proximity to raw material supplies and qualified workers), a positive business environment, research expertise, education, infrastructure, and innovativeness. Local entrepreneurship is frequently associated with cluster development and can lead to spin-off businesses emerging to expand and support a cluster. Key one-time events can also spark cluster development, such as creation of a government institution or the establishment of a college or university.

To understand clusters better, it is worthwhile to consider several descriptive categories of clusters: *Marshallian*, *hub and spoke*, *satellite platform*, and *state anchored*.

- *Marshallian clusters* are typically made up of local small and medium-sized companies that trade their products and services with cluster members. Secondary wood products manufacturers (e.g., cabinet manufacturing) are most likely to follow this type of business cluster.
- *Hub and spoke clusters* include one or several large companies serving as anchor companies interacting with numerous small suppliers. A combination of primary and secondary wood products manufacturers can make this type of cluster successful.

- *Satellite platform clusters* consist of large companies with multiple branch locations that act independently.
- *State-anchored clusters* are based on an anchoring institution such as a university, government agency or military installation.

Some key steps and strategies for increasing the likelihood of success of a cluster include:

- Examine economic conditions, existing infrastructure, labor resources, complementary industries and other key factors that define the feasibility of cluster development
- Fully evaluate inputs and markets needed to support the cluster and its long-term growth
- Collaborate with stakeholders from industry, government and supporting individuals and organizations to develop a vision for the cluster
- Engage the leadership of a key, external organization to coordinate activities, facilitate development and to gain policy support
- Secure sufficient funding to support technology development, workforce training, capital investment and other project aspects
- Focus on education and engagement of entrepreneurial thinking

Within the forest sector, the 2008 study found that stakeholders within existing clusters in the United States felt that the successful development of a cluster was largely driven by the availability of raw materials, access to product markets, transportation networks, labor availability, and public and private support (financial and non-financial).[3]

Why Clusters Fail

Clusters fail for all the same reasons that individual companies fail. Like any enterprise, clusters can run their course, outlive their usefulness or lose their competitive advantage. For example, cluster members may become self-sufficient or the products produced by the cluster may become outmoded, obsolete, or more efficiently produced elsewhere (i.e., overseas).

[3] An online registry of existing forest sector clusters in the U.S.is available at http://www.fwrc.msstate.edu/cluster/

The study of clusters concluded that efforts to support the continuation of a particular industry cluster require a detailed knowledge of cluster characteristics, stage of development (mature cluster vs. emerging cluster), competitiveness of the industry, and strengths of the region. Regions with well-established clusters may find greatest benefit from focusing on strategies for identifying companies' overlapping interests, new product and market opportunities (bioenergy as an example), and a shared vision for the cluster. Regions with small industry clusters may benefit from promoting cluster expansion by offering financial incentives for establishment of new firms, making improvements to infrastructure, and developing cost-share training programs.

Those seeking to develop new clusters or reinvigorate declining clusters need to be aware that their efforts might have limited success. Declining industries present obvious challenges to development of successful clusters (see sidebar). Where this is the case, attention to retention or strengthening of existing industries, and support of spin-off development may be helpful.

Mature Forest Industry Clusters and the Role of Bio-Energy

Output at U.S. pulp and paper mills is in a steep decline. As specific industry sectors mature, strategies must be developed and put into practice to prevent a total collapse of the industry cluster. Bio-energy presents an opportunity to "re-invent" mature industries and re-position them at or near the beginning of the industrial life-cycle curve. For example, bio-energy products can be integrated with existing pulp and paper mills (bio-refineries) or produced at stand-alone facilities. Also, forest product manufacturers typically are well situated to burn wood to generate heat, steam and electricity for internal use or sale. These firms are important to all the sub-clusters (loggers, sawmills, secondary wood users, equipment manufacturers, etc.) as they provide a market for byproducts or low value products, and present an opportunity for good forest management.

Federal, state, and local governments can provide a stimulus for successful cluster development. They can provide infrastructure (roads, buildings, power lines, etc.), organize development and training workshops, assist companies with collaborative innovation, conduct market assessments, and promote cluster development. Governments should avoid exclusive support of a single cluster or industry that could lead to increasing a region's vulnerability to economic fluctuations.

Why Clusters are a Key Concept for the Green Economy

There are a number of environmental advantages of business clustering, and these can serve to accelerate the development of green industries. Clusters can:

- Allow more effective utilization of raw materials
- Create opportunities for cost-effective utilization of waste streams, recycling or reuse
- Enhance prospects for process and product innovation
- Help to create economies of scale that enable investment in environmental initiatives and mitigation
- Help to build a foundation for local self reliance

In the Lake States, there is a long history of strong forestry institutions, government support for forestry, well-established mechanisms for collaboration with a broad array of forest stakeholders, and a diversified forest industry. In this region there is a greater concentration of certified forests than anywhere in the U.S., with the three states involved (Minnesota, Wisconsin, and Michigan) accounting for more than 50% of third-party certified forests nationally. This region is also a leader in chain-of-custody certification for wood products manufacturers and distributors with the oldest continuously operating chain-of-custody certificate and 12% of America's chain-of-custody certified companies.

To support emerging bioenergy developments, Minnesota was the first state to proactively develop guidelines for harvesting of forest biomass for energy production. Now, aided by strong support from state governments for renewable energy development, significant alliances are developing between public utilities and the forest sector that are likely to accelerate the transition toward renewables.

There is no question that well established relationships and a history of collaboration in the forest sector of this region are contributing to environmentally beneficial development in the Lake States. Creation of a formal forest cluster organization might well bring further benefit.

Full circle clusters

Self-sustaining forest business clusters that provide a range of products and services are more likely to be less affected by adverse economic conditions than clusters focusing only on one component of the manufacturing process.

Such clusters provide numerous complementary products and services (for example, education, recreation and entertainment) that help build a strong base of dedicated clients and can be called "full circle clusters". The diversity of the cluster can provide resiliency and be responsive to change.

Clients with a previous positive experience periodically return to the cluster to purchase new products and services. This helps to build cluster reputation and gain competitive advantage.

The Wooden Boat cluster in Port Townsend, Washington is an example of a full circle cluster. This cluster builds wooden boats and related products, provides repair training and education services, and promotes an active tourism industry. Consequently, this structure helps to create additional demand for cluster services.

This cluster is a full-circle cluster and also an example of integration between forest-based businesses and marine trades. Forest business clusters consisting of primary and secondary forest product manufacturers (and providing not only pre-processed but also final products) can benefit by following this business model. Similarly, forest business clusters specializing in providing diversified recreational services may use this business model.

A full description of the Wooden Boat Cluster and seven other clustering case studies are available from the U.S. Endowment Study (Appendix B of the study report):
http://www.usendowment.org/images/BS_cluster_App_B.pdf

Recommendations

The 2008 study of U.S. forest sector clusters led to several recommendations for successful development of forest sector clusters.

- Industry, private and public sector stakeholders are important for successful forest business clusters
- External support and funding are needed to facilitate cluster development [4]
- Integration and diversification are important for improved competitiveness
- Collaboration helps gain competitive advantages and builds business resilience

As Minnesota and neighboring states seek to maintain a robust forest sector, the advantages (and downsides) of industrial clusters must be explored. Where opportunities exist to create, strengthen, or re-invent forest sector clusters, lessons learned from past experiences and research can be applied. Based on the current situation in Minnesota and the upper Midwest, bio-energy and related industries represent a potentially important addition to the forest sector cluster worth additional investigation and support. Coupled with the recent growth of a "green" forest certification cluster or "hub" in the Lake States, bio-energy is poised to develop into an "earth friendly" forest-based cluster capable of providing benefits to local industries and consumers as well as the nation at large.

The Bottom Line

The development of forest sector clusters can be helpful to the economic development of a community, multi-county area, state, or region. Forest sector clusters can be driven by diverse factors, among them entrepreneurship, innovation, public programs (government), private organizations (trade groups), research and educational institutions and cultural identity. The creation and success of a cluster is based upon mutual benefit of the members of the cluster. However, as noted above, too much of a co-dependency between cluster members can lead to limited economic diversity and negative consequences in a geographical area.

References

Oregon Department of Forestry. 2008. Forest Cluster Economic Development Strategy. Oregon Forest Cluster Strategy Project. November 20. (http://www.oregon.gov/ODF/RESOURCE_PLANNING/docs/ForestryWorkforceRecs.pdf)

Hovee, E.D. and Company. 2005. Oregon Forest Cluster Analysis. Oregon Forest Resources Institute. (http://www.oregonforests.org/assets/pdfs/ForestCluster_FINAL.pdf)

[4] Although external support and funding are often in the form of a government grant, loan or financial incentive, there are examples of successful clusters that received minimal government assistance. One such example highlighted in the U.S. Endowment for Forestry and Communities report is the Amish furniture cluster in Holmes County, Ohio.

This report was prepared by

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