

Snapshots of Rural Innovation: A Compendium of Rural Industry Cluster Vignettes

Businesses tend to cluster, to locate near other similar or complementary companies to achieve external economies of scale. To be competitive in today's economy a firm needs quick access to the store of informal knowledge and experience that are most apt to be found among suppliers, customers, competitors, educational institutions, research labs, and in the labor force.

"A cluster," for the purposes of this compendium, "consists of groups of companies and/or services and all of the public and private entities on which they depend, including suppliers, consultants, bankers, lawyers, education and training providers, business and professional associations, and government agencies" (*Just Clusters*, RTS, 2002). Business clusters in the U.S. are often associated with population centers. Metropolitan clusters, such as semiconductors in Silicon Valley, finance on Wall Street, and autos in Detroit, are easily identified by the sheer number of firms in close proximity and media attention that is attracted to cities.

In rural areas, however, clusters can be just as effective in promoting the economic health of an area but never appear on the radar screen formed by common measures. They often are too small to be identified by conventional data. Some straddle political boundaries and others may be dominated by micro-enterprises. In rural areas where roads are relatively free of traffic and people are more accustomed to driving longer distances, clusters may extend across a region with up to a hundred mile radius. Still others may be based on unique interdependencies not associated with product.

There is, however, a base of knowledge from RTS's own experience and research, other published materials, and the history of industry networks. This study draws on that knowledge to produce a sample of rural clusters. The vignettes in this compendium are collected by Regional Technology Strategies, Inc. with support from the Hubert H. Humphrey Institute of Public Affairs at the University of Minnesota under a grant from the U.S. Department of Agriculture. Contributing authors include Jody Berwick, Sarah Butzen, Phil Psilos, Jana Shannon, Linda Swanson, and Johannes Traxler.

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Aquaculture Cluster in Coastal Maine, USA

Maine aquaculture has grown rapidly over the past decade and the state has become a major center of the industry in North America. Aquaculture currently employs over 1,200 people (2,500 including indirect employment) and produces Maine's second largest seafood harvest with a value in excess of \$100 million.

History

The development of a commercial aquaculture industry in Maine is about 30 years old. It began with shellfish culture in the midcoast region in the 1970s. In the 1980s and 1990s, a substantial salmon culture industry developed, primarily in eastern Maine. The establishment of the Maine Aquaculture Innovation Center in 1992 signaled the importance of this industry as a potential growth center and source of employment. The Maine aquaculture industry largely grew from small companies into larger ones, but none of the larger organizations have played a significant role in spinning off additional firms. The industry is composed of a wide range of firms varying in size from small companies that are not particularly growth oriented and medium-sized Maine-owned companies that have worked hard to secure their market share through technology to large firms in the salmon industry that are subsidiaries of multinational aquaculture companies. Salmon farming is by far the largest sector of Maine's aquaculture industry, producing \$78.9 million in landed salmon in 2000. Value-added processing increased significantly from 0 percent of landed fish in 1996 to 40 percent in 1999.

Competitive Advantage

Aquaculture is grounded in the geographic advantage of Maine's coast. For salmon farming, there are only a few places in the United States with the combination of fresh and saltwater and protected embayments where salmon aquaculture is possible. Aquaculture in Maine has a variety of resources and expertise available for research and development, including the University of Maine's Advanced Technology Centers at Walpole, Franklin, and Eastport. These centers are organized with the goal of spurring innovation and entrepreneurial activity, not just research. The University of Maine also offers a well-regarded four-year program in aquaculture, and courses are available at the technical colleges as well.

Key Businesses

- Salmon farms, value-added products
- Shellfish aquaculture
- Marine biotech research

Supporting Institutions

- Maine Aquaculture Association (MAA)
- Maine Aquaculture Innovation Center <http://maineaquaculture.org>
- University of Maine Center for Collaborative Aquaculture Research (CCAR)

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Sources

Colgan, et al. 2002. Assessing Maine's Technology Clusters. Prepared for the Maine Science and Technology Foundation
O'Hara, Frank, et. al. 2003. Economic Impact of Aquaculture in Maine. Prepared for the Maine Aquaculture Innovation Center
Correspondence with Michael Hastings, Oct 2003

Auto Supply Chain Cluster in Central Tennessee, USA

Central Tennessee contains one of North America's most extensive concentrations of automobile and auto-related manufacturing. This concentration stems not only from the presence of four final-stage manufacturers, but also from other vehicle assembly plants proximate to the central Tennessee region and scores of parts producers located throughout. The auto cluster has contributed considerably to the economic growth in the region over the past two decades. With an annual motor vehicle production level of over 600,000 cars and trucks, the state of Tennessee ranks fifth in the nation in terms of production output, after Michigan, Ohio, Missouri, and Kentucky. Nissan, Saturn, Corvette, and Peterbilt, the region's four original equipment manufacturers (OEMs), are part of a broad multi-state network of twelve major assembly plants in surrounding states. This has spawned a ready market for Tennessee's motor vehicle parts suppliers that total over 800 firms and include such high-profile plants as Bridgestone/Firestone and TRW. Together, the four OEMs and the more than eight hundred in-state suppliers employ approximately 128,000 people – about one-fifth of the state's total manufacturing work force.

Cluster History

Much of the growth of Tennessee's auto industry has occurred over the past fifteen years, though a number of prominent firms have been in the region for several decades. The development of the state's auto cluster benefits from national industry trends characterized by the shift of the industry away from the coasts and northern urban centers, and the disaggregation of suppliers employing labor-intensive production practices to areas of inexpensive labor in the South. Although this geographic shift has not eliminated the intensive auto industry presence in the Midwest and Northeast, it has shifted the axis of concentration from an east-west orientation to a north-south corridor that stretches from Michigan to Alabama and includes parts of Indiana, Ohio, Kentucky, Alabama, and Tennessee. Development of the auto cluster in central Tennessee began in the metropolitan areas, but in the last decade has spread to the outlying non-metro regions. Recently, outer ring counties have attracted more new suppliers than metropolitan counties.

Competitive Advantage

Several key factors helped Central Tennessee attract its four OEMs: the state's right-to-work status, which discourages union organizing; its low cost of labor; its perceived high quality of life paired with a low cost of living; the availability of transportation networks; and the region's proximity to key markets – the interstate highway system gives the region one-day access to more than three-quarters of U.S. consumer markets. Once these OEMs were in place, they became an additional source of competitive advantage for the region, which was then able to attract suppliers to the OEMs and, in turn, suppliers' suppliers (i.e. second- or third-tier suppliers).

Key Businesses

- OEMs: Nissan, Saturn, Corvette, Peterbilt
- Motor vehicle parts and accessories plants

Supporting Institutions

- Tennessee Automotive Manufacturers Association (www.tama.to)
- Oak Ridge Transportation Technology Center (www.ornl.gov/centers/or_transport_tech.html)
- Center for Cooperative Transportation Research (in development – a cooperative effort among Lockheed Martin, the University of Tennessee at Knoxville, and the Development Corporation of Knox County)

Industry Contact

Tennessee Automotive Manufacturers Association
2100 West End Avenue, Suite 700
Nashville, TN 37203
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Sources

RTS, 2000. "Clusters in Rural Areas: Auto Supply Chains in Tennessee and Houseboat Manufacturers in Kentucky." Final Report to TVA Rural Studies.

Automotive Cluster in Northwestern South Carolina, USA

The automotive cluster in South Carolina is the fastest growing manufacturing sector in the state, growing at nearly ten times the national rate, according to Automotive Engineering Magazine. Automotive companies are located in 41 of the 46 counties, with a high concentration in the northwest. Among these manufacturers are international giants that play a prominent role in the international market.

Cluster History

Since the turn of the century when the South Carolina-based Milliken & Company supplied fabric seats and roofs for Henry Ford. South Carolina has been home to automotive companies. A monumental decision in 1992, BMW chose South Carolina as the site of its only North American assembly plant, home to the Z3 and X5 models. Companies such as BMW and Honda have found the business environment very welcoming, both firms achieving the fastest start-ups in their company histories. Continued investment by manufacturers and assemblers in the state maintain the cluster's growth trend.

Competitive Advantage

South Carolina boasts of the advantages lent to the automotive industry through its favorable business climate, including having the lowest unionization rate in the US and low employment costs. The NSF awarded a prestigious grant to the state technical college system in order to expand the skilled workforce. Since 1961, over 19,000 employees have received automotive training through the Center for Accelerated Technology Training (CATT). Taxation is minimal, with no local income tax, wholesale tax, or property tax on inventory, and the lowest business income tax rate in the Southeast. There are also a number of state tax incentives for job creation and capital development. South Carolina calls itself a "one-stop shop" for the automotive industry, due to the strong presence of many sectors of the industry.

Key Businesses

- Vehicle Assembly – There are four major vehicle assembly plants for personal vehicles, ATVs, personal watercraft, and fire and emergency vehicles.
- Automotive Parts Suppliers – South Carolina has a strong base of raw materials that are essential to the automotive industry; it is home to nearly 300 plastic producers, 20% of US capacitor production, over 100 aluminum casting and forging companies, nearly 50 fabricated metal stamping and forging companies, and 35 basic steel production facilities
- Tire Manufacturing – three of the world's largest tire companies have facilities in the region

Supporting Institutions

- Center for Accelerated Technology Training (CATT) – a pre-employment training program providing workers with job-specific skills (www.sctechsystem.com/centertech.htm)
- South Carolina Technical College System (TECH) – a network of 16 colleges that offer instruction in three areas: CATT, Continuing Education to assist companies with skills enhancement, and Technical Resource Centers to provide specialized training and equipment (www.sctechsystem.com)
- International Center for Automotive Research, Clemson University – a 250-acre University research campus anchored by a graduate systems integration engineering center with an adjacent 150-acre property that will be privately developed, scheduled for completion in 2005 (www.clemson.edu/autoresearch/)
- University of South Carolina – offers a top Graduate International Business School and technology research centers, in particular: the Center for Industrial Research, the Center for Machine Intelligence, and the Quality Institute of Manufacturing (www.sc.edu)

Industry Contact

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Sources

SC Department of Commerce, December 2002.

"Automotive Excellence"

Carpet Manufacturing Cluster in Dalton, Georgia, USA

The birthplace of rugs, Dalton, GA is well known as the carpet capital of the world. Through the years, the Dalton area has continued to be the center of the tufted carpet industry and today the 177 tufted goods manufacturers located there produce more than 70% of the annual total world output of over US\$9 billion. Carpet production is over 1.1 billion square yards, with shipments worth more than US\$6.5 billion dollars. Approximately 54% of Dalton's labor force of over 50,000 is employed in carpet manufacturing.

Cluster History

The carpet industry spawned from the innovation of the bedspread, first sewn in Dalton at the turn of the 20th century. In the 1930s, as a result of the increasing demand for bedspreads, the Glen Looper Foundry of Dalton developed the first mechanized tufting machine. Mats and rugs were then created with the same process. Volume increased rapidly after World War II. The industry consumed 30,000 bales of cotton in 1946. By 1950, approximately 500,000 bales were used, and the industry was the third largest consumer of cotton grown in Georgia in 1952. Machinery was continually widened, creating larger mats and rugs, and then broadloom carpet. Developments of synthetic fibers accelerated the growth of carpet. Until 1954, cotton was the only fiber used in tufted products. Wool and manmade fibers (polyester, nylon, rayon, and acrylics) were gradually introduced by textile men in Dalton. The most important development in the industry was the introduction of bulk continuous filament nylon yarns that produced a quality durable carpet: an inexpensive substitute for wool.

Competitive Advantage

Northwest Georgia leverages its reputation as "the carpet capital" to bring in manufacturers from around the world. The industry is capital intensive, not labor intensive. Sufficient infrastructure (electricity, natural gas, water and wastewater) is required to run the large machinery. This type of investment is not easily replicated offshore. The labor force requires very diverse skill sets and training support is offered through Dalton State College, Quick Start, and on-site training. Scale attracts specialized services that reduce transaction costs. Also important is the proximity of suppliers pulled to the area by this scale: yarn, sheeting, duck mills, dye plants, and laundries are located in the area. Today 75-80% of yarn used by the carpet industry is produced and processed in Georgia. Strict US guidelines and warranties stave off most foreign competition from US markets.

Key Businesses

- carpet manufacturers – the 6 largest carpet companies and 18 of the largest 35 carpet companies are headquartered in Georgia
- supporting industries - yarn mills, finishers, backing manufacturers, machinery suppliers, maintenance services, and sample companies that employ another 28,000 people

Supporting Institutions

- The Carpet and Rug Institute (CRI) - the national trade association representing the carpet and rug industry headquartered in Dalton. CRI provides carpet information, technical services, governmental and consumer affairs coordination, and public relations services. www.carpet-rug.com

Industry Contact

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Sources

CRI Industry Facts
Information also provided by George Woodward at
the Dalton-Whitfield Chamber of Commerce,
(www.daltonchamber.org), Oct 2003

Ceramics Cluster in Southern Tier/Alfred, New York, USA

In 1999, the Southern Tier region of New York had over 7,000 employed in the ceramics and material processing industries with 27 establishments. The cluster is centered on Corning, Inc., and houses a diversified cluster of glass, ceramics, and advanced materials companies. Other major companies include IBM, Phillips Lighting, Toshiba, Cutler-Hammer, and others.

History

The ceramics cluster of Southern Tier, New York, centered around Alfred and Corning/Painted Post, was initiated in 1868 with the establishment of the Corning-Flint Glass Works (currently Corning Incorporated). In the early 20th Century, Corning was a leader in applying the scientific method of discovery to the industrial R&D environment. In 1900, the State of New York established the New York State College of Ceramics at Alfred University to prepare workers for a growing local industry. Throughout the 20th Century, ceramics applications broadened from building materials and other traditional applications into automotive, aerospace, defense, and IT hardware applications.

Competitive Advantage

Easy mining of shale deposits, proximity to coal supplies, and canal infrastructure (the Chemung Canal which was ultimately connected to the Erie Canal), as well as a desire to escape labor unrest and other crowding in previous urban manufacturing centers, contributed to initial location of ceramics in the region. Unique educational and technical resources at the New York State College of Ceramics, and a commitment to the region by Corning have sustained the region's centrality to the global ceramics industry over time. Since the late 1980s, cluster growth has been sustained by new spinoffs from Corning, Xerox, IBM, and other magnet employers with technical and business assistance provided by the New York State College of Ceramics many relevant research centers and the Ceramics Corridor Innovation Centers' two incubator facilities.

Key Businesses

- Ceramics manufacturers
- Whiteware manufacturers
- Advanced ceramics and glass applications research and manufacturing
- Photonics companies

Institutions

- New York State College of Ceramics at Alfred University <http://nyscc.alfred.edu/>
- Whiteware Research Institute at Alfred University: <http://wrc.alfred.edu/Default.htm>
- Center for Advanced Ceramics Technology (CACT): <http://cact.alfred.edu/index.html>
- Ceramics Corridor Innovation Centers, Alfred and Painted Post/Corning NY <http://www.ceramicscorridor.org/>

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Sources

Empire State Development, *The Materials Processing Industry Cluster in New York State*, April 2001
Jeffrey J. Matthews, "Yankee Enterprise! The Houghtons of Massachusetts & the Rise and Fall of 'Corning Inc.', 1851-1871" Univ of Puget Sound

Crafts Cluster in Western North Carolina, USA

North Carolina is world-renowned for its crafts. Scattered among the small towns tucked away in the Blue Ridge Mountains in Western North Carolina, craftspeople work in shops, studios, classrooms, and galleries. The annual sales revenue from handmade crafts made by the more than 4,000 artisans in the region is approximately US\$122 million. This is four times the revenue of burley tobacco, the region's largest cash crop.

Cluster History

The original intent of handcrafted items was primarily household use. With the coming of the industrial revolution, these household items could be manufactured more easily and cheaply by machines, leading to the decline of traditional craftmaking as a livelihood. North Carolina retains strong ties to the independent way of life fostered by its farm economy roots, and this has supported the retention of independent artisan traditions. North Carolina has become synonymous with the breadth and diversity of the craft field today.

Competitive Advantage

Handmade in America is a nonprofit organization that focuses on sustainable economic development to provide business and financial support for craftspeople and nurturing the region's craft culture through public relations and education. Handmade in America also publishes a guidebook of the Craft Heritage Trail system, which is made up of seven scenic loop automobile tours of rural craft businesses that stretch out from the Blue Ridge Parkway across Western North Carolina. Located in the Blue Ridge Mountains of Western North Carolina, Penland School of Crafts is a national center for craft education begun in 1923. Penland offers workshops in a variety of media and sponsors artists' residencies, educational outreach programs, and a craft gallery open to the public. The crafts cluster has a strong marketing connection to the tourism industry. Several websites feature North Carolina crafts, such as Blue Ridge Web Market and discovercraftnc.org

Key Businesses

- Galleries, retail shops
- Craft festivals
- Cooperatives

Supporting Institutions

- Handmade in America www.handmadeinamerica.org
- Penland School of Crafts www.penland.org
- Center for Craft, Creativity and Design <http://www.craftcreativitydesign.org>
- The Craft Emporium www.eastplaza.com/crafts/nc/index.htm

North Carolina Arts Council www.discovercraftnc.org

Industry Contact

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Sources

CraftNet industry cluster

network, internal documents, RTS

Handmade in America, Penland and

North Carolina Arts Council websites

Creative Enterprise Cluster in Southwestern Montana, USA

Creative enterprises exist across the state, accounting for more than four percent of all establishments with employees, more than five percent of all establishments, and about four percent of the workforce. While the actual number of people making a living from creative enterprises alone is unknown, the cluster study for the Governor's office Arts Council listed almost 10,000 firms employing about 10,800 people in the state. The firms and supporting institutions are most heavily concentrated in the southwestern mountain corridor that runs from Bozeman to Missoula.

Cluster History

This cluster developed largely because of a rugged natural environment and history that inspires artists and writers. As colonies of creative people developed they attracted other like-minded people and when a critical mass of people accumulated, support organizations and schools began to form. While these creative enterprises are unlikely to experience explosive growth, success may instead be measured by slow and steady growth, and will depend heavily on an area's ability to maintain a high quality of life and offer a supportive and accepting environment, social infrastructure, and tailored support services.

Competitive Advantage

This cluster is defined by enterprises whose principal competitive advantages are based on the aesthetics and originality of form or content that either distinctively define, or are embedded in, their products and services. The strongest advantages are natural—a combination of natural resources and biodiversity. Of equal significance is the homegrown talent of a people that have been honed over long periods of rural self-sufficiency and were forced to find creative ways of earning a living. The low population density, along with its western history, independent lifestyle, and cultural amenities allow creative people to feel free to pursue a wide range of interests.

Key Businesses

- Missoula Children's Theater
- Artisan Doors
- Rocky Mountain School of Photography

Supporting Institutions

- Archie Bray Foundation - supporting the enrichment of ceramic arts. www.archiebray.org
- The Montana Center for the Book www.montanabook.org
- The Emerson www.theemerson.org
- Montana Arts Council. www.art.state.mt.us
- Montana Humanities Council. www.umt.edu/lastbest
- Montana Association of Weavers and Spinners www.maws.fiberarts.org
- University of Montana www.umt.edu

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Sources

Clusters of Creativity: Innovation and Growth in Montana. A Report to the Montana Governor's Office of Economic Opportunity, Regional Technology Strategies, (2003)

Furniture Cluster in Northeastern Mississippi, USA

The 10-county Appalachian region in northeastern Mississippi located around the city of Tupelo is the largest producer of upholstered household furniture in the nation. The products of this cluster are not the fashionable traditional pieces of North Carolina or the stylized pieces of Oregon, but functional furniture made in quantity and distributed largely through mass marketing to chain stores. The furniture industry is the region's largest employer: approximately 200 companies employ about 25,000 people, or about one-third of the population of the region.

Cluster History

In 1948 Morris Futorian opened the first furniture manufacturing plant in New Albany, Mississippi, applying the less costly mass production methods of the automobile industry to the upholstered furniture process. Futorian was attracted to Mississippi by the supply of raw material, low cost labor, and supportive community. Futorian's plant is now part of the Mohasco Corporation covering over 25 acres. Over time many of the people trained in Futorian methodology spun off into their own firms. As the cluster grew, it attracted other companies producing similar and compatible furniture, as well as suppliers and support services. Community leaders also worked to recruit key suppliers to the area. The state aimed to diversify by attracting non-upholstered furniture companies like Krueger International, which located in Tupelo in 1963. In the early 1980s local entrepreneurs organized the Tupelo Furniture Market and trade show in Tupelo for promotional lower-priced furniture. Today the market niche is well established and the bi-annual shows attract over 20,000 buyers each year.

Competitive Advantage

Tupelo boasts massive showrooms, an advanced technology center, a highly skilled labor force and dozens of suppliers that support the cluster. The proximity of suppliers tends to be a main competitive advantage: about 75% of upholstered furniture suppliers are located in the region. Intense rivalry and rapid diffusion of technology also propel the industry's growth. Technical programs in the area are generic and lack formal ties with enterprises but are familiar with the industry.

Key Businesses

- about 200 manufacturers of upholstered and non-upholstered wooden furniture
- suppliers (wood, machinery)

Supporting Institutions

- The Community Development Foundation – business management services, problem solving, international promotion, and special projects for the furniture industry, instrumental in establishing the Tupelo Furniture Marketing Association (www.cdfms.org)
- Itawamba Community College – offers services for upholstered companies located within 100 mi of Tupelo: training, placement services, and diagnostic problem solving
- MS State University's Furniture Research Unit – provides research, product testing, demonstration of technologies, technology transfer and extension, and education
- Tupelo Furniture Marketing Association – founded 1988 to market Mississippi furniture and operate the bi-annual Tupelo Furniture Market: a 1.5 million sq. ft. showroom, resource center, and Preview Magazine (www.tupelomarket.com)

Industry Contact

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Sources

DADCO & RTS, Cooperation in Action: The Power of Partnerships, Apr 2003

DADCO & RTS, Labor Needs & Skills Assessment Report for Mississippi's Forest Products and Furniture Cluster, Dec 2002

Gaming Cluster in Tunica County, Mississippi, USA

Rarely is the genesis of a business/industry cluster so closely and inexorably tied to a single event of regulatory change as in the genesis of the Tunica, MS gaming cluster.

Cluster History

The legalization of gambling by the Mississippi legislature in 1990 catalyzed the development of a gaming industry statewide. Tunica County, was once referred to as “America’s Ethiopia” by Jesse Jackson for its grinding poverty and lack of economic opportunity. From 1992 to 2002, over \$3 billion of gaming and resort-oriented investment has flowed into the County, directly responsible for the creation of over 12,000 resort jobs and over 19,000 total jobs. In this period, unemployment fell from 13.6% to around 5%. Per capita annual income has risen from \$9,900 to \$20,400. To expand the region’s destination appeal to a broader market, the County has reinvested significant tax revenues generated by gaming in complementary services and facilities for the county’s 9 casinos. It has spent \$29 million on the Tunica Arena and Exposition Center and \$12 million on the Tunica National Golf and Tennis Center.

Competitive Advantage

The Tunica gaming industry’s competitive advantage is derived from three factors. First, when Mississippi legalized casino gambling it did so across the board, without restrictions on numbers of casinos, etc. As a result, Tunica has pursued a “pure”, market-driven development path, with success in initial ventures catalyzing expanded and broadened investment. Second, Tunica’s location adjacent to the Memphis metropolitan area provides both a ready local market and a gateway to a national customer marketplace. Third, county authorities have aggressively reinvested tax revenues from the gaming industry to expand destination appeal, upgrade local services and infrastructure, and improve quality of life through enhanced education, recreation, and public services.

Key Businesses

- Casinos
- Hotels and Resorts
- Golf Courses
- Convention Center(s)

Supporting Institutions

- Mississippi Gaming Association (www.mississippi-gaming.org)
- Tunica County Convention and Visitors Bureau

Industry Contact

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Sources

The Effects of Casino Gambling on Tunica County, Mississippi: A case study 1992-1997, James Thomas Snyder, Mississippi State, 9/99
Tunica Miracle- 2002 Annual Report (Tunica County Convention and Visitors’ Bureau and Chamber of Commerce
Mississippi Gaming Association

Hosiery Cluster in Catawba Valley, North Carolina, USA

North Carolina's hosiery cluster produces more than two-thirds of the nation's hosiery output and employs roughly 30,000 workers. Most firms are small, family-owned operations with fewer than 75 employees that use high tech equipment to drive production innovations and quality improvements and contribute \$4 billion in annual sales to North Carolina's economy. Many are clustered around the Catawba Valley, particularly near Hickory, a city of about 40,000.

Cluster History

Hosiery manufacturing has been part of Western North Carolina's economy since the turn of the century when manufacturers from New Jersey and Pennsylvania migrated south for cheaper labor. An estimated 60% of the smaller firms in the area were started by former employees of the larger corporations that first settled in the Catawba Valley (e.g. Hanes and Kayser-Roth).

Competitive Advantage

The strength of the cluster is closely related to the operations of the Carolina Hosiery Association, formerly the Catawba Valley Hosiery Association, created in 1959. The original hosiery network sprung from a group of firms joining together to share the cost of a new measuring technology that no single company would have been able to obtain alone. It has led to a series of shared R&D and expensive sophisticated equipment among the firms, The Hosiery Technology Center (HTC) was established in 1990 to provide training, testing, environmental, and marketing services and a sock testing laboratory, available to the industry at large. To combat the recent influx of imports, the HTC has shifted its focus from strictly training to implementing lean manufacturing tools and developing niches (e.g. fashion socks, hiking socks).

As the threat of foreign competition continues to challenge the supply chain management of textiles in the US, the hosiery industry in Catawba Valley retains a strong unified lobbying position. "The resiliency of North Carolina's hosiery cluster has been mainly due to the strength of its local trade association and its ability to rally the companies around common crises of global competition and of the effects of an increasingly consolidated customer base" (Rosenfeld, 2002).

Key Businesses

- Manufacturers (86 Hosiery Association members in NC, including Sara Lee, Kayser-Roth, Gold Toe Brands and Kentucky Derby Hosiery)
- Suppliers of yarn, dyes, chemicals, equipment (DuPont and National Spinning Co)

Supporting Institutions

- Carolina Hosiery Association: regional chapter of the National Association of Hosiery Manufacturing (www.hosieryassociation.com).
- The Hosiery Technology Center: a joint effort between Catawba and Randolph Community Colleges to help the hosiery industry compete globally through training, R&D, testing, process improvement (www.hosetech.com) and ecommerce (www.legsource.com)

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Sources

Rosenfeld, S. 2002. *Just Clusters*. RTS, Inc.
Interview with Dan St. Louis of HTC, Oct 2003

Hosiery Cluster in Fort Payne, Alabama, USA

Fort Payne, Alabama is known as the “Sock Capital of the World” for the 110+ sock mills located in DeKalb County with the majority concentrated in and around Fort Payne. Today an estimated one million dozen pair of socks are produced each week in DeKalb County. Over 7,000 people (about 13% of DeKalb’s population) are employed in the plants.

Cluster History

The hosiery industry in Fort Payne began in 1907, after the decline of iron and coal, with the transformation of the old Alabama Builder’s Hardware Manufacturing Building into the W.B. Davis Hosiery Mill. The surplus of available labor skilled in manufacturing and a supportive local administration brought manufacturing back to the industrial infrastructure of the area. From the W.B. Davis Mill, many enterprising entrepreneurs branched off to establish their own mills. Because the parent mills often needed more capacity to fill orders, the smaller mills contracted the manufacturing of grey material and then sold to the parent to finish. Often these younger mills are passed along family lines; for example, one of the leading manufacturers, the Prewett family, runs several mills in the vicinity. Entrepreneurs who were more technologically minded could build machines from old mill frames for very little cost. Over the past 15 years, technology has improved so that equipment is mainly imported from Europe, thus raising the barrier to entry for new mills. Over the past few years, the number of hosiery mills has declined due to an oversupply from large capacity mills and increasing foreign competition.

Competitive Advantage

The degree of automation at the plants in Fort Payne allows the cluster to continue to produce large volumes of commodity socks. Most of the plants are very high tech facilities utilizing the most modern Italian equipment. Even though the equipment suppliers reside across the ocean, much of the equipment now standard in the industry was invented and perfected in Fort Payne by the entrepreneurs. Experience from the older generations that created the cluster is the main source of innovation that drives the industry. These generations of family-run mills are deeply rooted to the community: there is a high level of networking, both formal (through the Alabama Chapter of The Hosiery Association (THA), and informal breakfasts and meetings to keep the mills working closely together and sharing technology. Working closely with the Hosiery Tech Center in the Catawba Valley, Fort Payne has been developing its own Alabama Hosiery Technology & Research Center to offer in-facility training services.

Key Businesses

- three primary manufacturing entities: Prewett Associates, DeSoto Hosiery, Cooper Hosiery
- smaller independent mills
- suppliers: yarn distribution centers
- packaging plants: mostly located within 100 miles

Supporting Institutions

- Alabama Chapter of THA – regional chapter of THA (www.nahm.com)
- Alabama Hosiery Tech & Research Center – effort by the NE Alabama Community College to provide training, R&D, equipment and human resources to hosiery firms

Industry Contact

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Sources

Interviews with Charles Cole of Alabama Footwear
and John Shugart of WY Shugart & Sons, Oct 2003

Houseboat Manufacturing Cluster in Somerset, Kentucky, USA

The houseboat manufacturing industry in the four south central Kentucky counties near Lake Cumberland, one of the 10 largest lakes in the country, produces more than half of the country's houseboats each year worth more than \$100 million in sales. All together the nine houseboat manufacturers employ about 900 people, approximately 2% of the combined civilian workforce in the four counties, which are considered to be "moderately prosperous but with pockets of continued poverty."

Cluster History

Somerset, KY (pop. 13,000) is the birthplace of the houseboat. Somerset Houseboats, located in the city of Somerset, incorporated as the first houseboat manufacturer in the country in 1953. Entrepreneurial spin-offs from Somerset created the foundation for the micro-cluster, which has developed over the last two decades, adding five new firms in the late 90s. Due to the specialized nature of building a houseboat (i.e. building a floating residence), the houseboat "micro-cluster" evolved naturally from the shared experience of learning the trade. However, without an organizing institution, the Kentucky houseboat cluster has been very adversarial. They have been reluctant to share resources and frequently steal skilled workforce from competitors with competitive pay. Other than lumber, all houseboat components are shipped from out of state. While the houseboat industry is a major source of revenue for the Kentucky counties, the micro-cluster has yet to attract a major supplier in the area.

Competitive Advantage

Despite the hostile environment, advantages for the industry include a relatively skilled local workforce and tangential marketing, particularly for newer smaller companies without the Somerset or Stardust name recognition. Because the production of houseboats is so specialized, concentrated and fairly isolated, potential buyers are likely to visit many of the firms while shopping for an end product, simply because they are "in the neighborhood."

Key Businesses

- houseboat manufacturers: Somerset, Jamestown, Stardust, Lakeview, Sharpe, Thoroughbred

Supporting Institutions

- Center for Rural Development (www.centertech.com)
- Houseboat Industry Association – a division of the National Marine Manufacturers Association (www.nmma.org)

Industry Contact

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National Marine Manufacturers Assoc.
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Sources

RTS, Inc. 2000. Clusters in Rural Areas: Auto Supply Chains in Tennessee and Houseboat Manufacturers in Kentucky, Final Report to TVA Rural Studies.
Houseboat Magazine
(www.houseboatmagazine.com)

Log Home Cluster in Bitterroot Valley, Montana, USA

Wood products comprise Montana's strongest manufacturing sector in terms of employment. The fastest growing, highest value-added, most highly concentrated cluster of wood products is prefabricated log homes. The log home industry in Montana employs 850 full- and part-time employees (eight percent of MT forest industry employment) and reports sales of nearly \$100 million. From 1988 to 1998 production more than doubled in constant dollars (boosted by 37 new companies between 1993 and 1998). Western Montana has been the source of innovation for the industry and is home to 79 companies that make log homes, with the highest concentration along I-93 in the Bitterroot Valley, appropriately nicknamed "log home alley".

Cluster History

In 1938 the first start-up log home manufacturer appeared in Montana, but soon moved out-of-state. In 1946, National Log Construction re-founded the milled log home industry in Montana, and in 1957 Gallatin Gateway commenced production. In 1972 Ken Thuerbach created Alpine Log Homes out of a stagnant Gallatin Gateway and reinvented the industry. His innovation was to prefabricate niche log homes out of rough (and longer than standard) handcrafted logs in modules at a single site, disassemble and ship them, and reassemble them on site. Alpine also proved to be a wellspring of entrepreneurship as employees left to start new companies in Montana and across the West. The establishment of a number of plants in Ravalli County in the 1970s ushered in a period of growth centered in the Bitterroot Valley, which has become a major log home processing center.

Competitive Advantage

Montana has an abundance of several suitable species of timber, most notably the lodgepole pine (used in 53 percent of the homes made in 1998) whose form, stability, and light weight make a desirable house log. Much of the innovation of the log home industry has emerged from Thuerbach – who developed techniques, codebooks, engineering standards and chinking methods for production – and nearby Alpine spin-offs. The value added by log home manufacturers is about three times the cost of raw wood. Compared to other sectors of the primary forest products industry, the log home segment is very labor intensive and has become more so over the past 25 years, largely because of the high degree of product processing and custom product designing. An abundance of forested land and a mountain lifestyle is associated with Western Montana, giving Montana log homes a mark of authenticity.

Key Businesses

- Manufacturers—log home builders, roundwood producers
- Raw material suppliers – U.S. national forest harvests supply over half of the timber; private and tribal timberlands (both U.S. and Canada)
- Transportation – truck and rail carriers for output; harvested logs often require helicopters

Supporting Institutions

- Montana Manufacturing Extension Center – a state organization that assists companies in technology needs, with a wood products industry specialty (www.mmec.montana.edu)
- Montana Wood Products Association – (www.montanaforests.com)
- Montana School of Log Building – teaches the full-scribe method of log construction that creates an efficient chinkless fit. (www.imt.net/~logworker)

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Sources

RTS and DADCO Consulting, 2003. Clusters of Creativity: Innovation and Growth in Montana, Section III: The Wood-Based Product Cluster

Oil and Gas in Southern Louisiana, USA

Louisiana (including offshore) is the top oil producing state and the number two natural gas producing state in the country and accounts for over 27% of the national oil and gas production. Most of the oil and gas related activities are concentrated in the southern part of the state. The Louisiana oil and gas industry includes exploration and production, refining, marketing, and transportation.

History

In 1901, the Heywood well six miles from Jennings was brought in, producing the first oil discovered in the state in commercial quantities and marking what is recognized as the birth of the industry in the state. The new refinery in Baton Rouge (which is the Exxon refinery of today, one of the largest refineries in North America in terms of capacity) went on stream in 1909. The 1940s mark the discovery of major oil fields in the Gulf of Mexico off the Louisiana coast. Oil and gas production in Louisiana peaked in 1969 and 1970, and reserves began to decline at that point. In 2002, a study estimated the direct and indirect impact of the oil and gas industry on the Louisiana economy to total \$92.6 billion. The industry employs 62,511 workers in the exploration, production, pipeline and refining sectors and supports almost 280,000 other indirect jobs in related sectors.

Competitive Advantage

The offshore oil and gas reserves in the Gulf of Mexico play a crucial role for the success of the South Louisiana oil and gas industry. Port facilities in the Gulf of Mexico, including the Louisiana Offshore Oil Port (LOOP) provide an excellent infrastructure through which offshore and foreign oil is transported to the state's refineries. Several university and research facilities support the industry, including the University of New Orleans Energy Conversion and Conservation Center, the University of Louisiana at Lafayette Energy Institute, and the Louisiana State University School of Energy Studies

Key Businesses

- Crude oils and natural gas extraction companies
- Refineries
- Oil and gas field machinery and equipment manufacturers and other support activities

Institutions

- Louisiana Mid-Continent Oil and Gas Association: represents all sectors of the oil and gas industry operating in Louisiana and the Gulf of Mexico. (<http://www.lmoga.com>)
- Louisiana Independent Oil and Gas Association: LIOGA was organized to represent the independent sector of the oil and gas industry in Louisiana. (<http://www.lioga.com>)
- MetroVision Oil and Gas Cluster (<http://norcc.org/oilgas.shtml>)

Contact

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Sources

- Louisiana Oil & Gas Industry Overview (online at <http://www.lmoga.com>)

Paper Products Cluster in Fox River Valley, Wisconsin, USA

Wisconsin has been the leading paper producing state in the US for the past fifty years, employing over 50,000 directly and thousands more in supplier and machinery industries with total annual paper shipments of over \$12.4 billion, and almost \$16.8 billion in paper, lumber, and wood products.

History

Papermaking took root in the Fox River Valley of Wisconsin in the 1850s and 1860s. In 1872, Colonel H.A. Frambach introduced wood-based papermaking (Germany's *Keller groundwood process*) to the region, opening up an era of significant growth for papermaking in the region. Following further growth in demand for newsprint during the Civil War, the industry flourished. The industry has transformed itself through technology and diversification at least twice over its history. First, in 1911, the removal of tariffs on Canadian paper mills led to diversification into new kinds of paper products. Second, in the late 1920s, facing competition from new market entrants in the U.S. South, Wisconsin mills diversified into production of higher value-added products such as printing and writing papers, tissue, specialty paper, and paperboard. More recently, the paper industry has evolved to respond to challenges presented by a more complex packaging industry. While industry consolidation has reduced the total number of paper companies operating in Wisconsin from 35 to 28 since 1980, the region's paper output continued to grow until the economic downturn of 2000-2001. Paper and forest products are the largest employer in 28 Wisconsin counties, and in the top 3 in 14 additional counties.

Competitive Advantage

The Fox River has both the fresh water and a topography that favors papermaking: significant mill-power could be generated along the river, which descends approximately 170 feet over 35 miles between its origin at Lake Winnebago to Green Bay. A significant printing and publishing industry focused on Milwaukee provided nearby and ready markets for outputs. The creation of Appleton's Institute for Paper Chemistry (later Institute for Paper Science) in 1933 was a direct response to environmental problems created by the industry's sulfide byproducts. The IPS became a key regional asset until its relocation in 1988. Establishment of the University of Wisconsin Stevens Point's Paper Sciences undergraduate program facilitates a skilled workforce in the region (half of its graduates remain in the Wisconsin paper industry), as does the proximity of publishing in Milwaukee and packaging industries throughout the upper Midwest. In addition, plentiful fiber (inputs) and high shipping costs preserve the region's competitive position vis-à-vis international competitors.

Key Businesses

- Paper mills and specialty paper producers
- Papermaking machinery and equipment manufacturers
- Printing and publishing

Institutions

- Wisconsin Paper Council – the trade association representing the pulp, paper and allied industry in public affairs and public relations; serves as a center for the exchange of ideas (www.wipapercouncil.org)
- University of Wisconsin, Stevens Point: Paper Sciences Dept – offers bachelor of science degree program in the science and technology associated with the manufacture of pulp and paper (www.uwsp.edu/papersci)

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Sources

The State of Wisconsin's Paper Industry, Wisconsin Paper Council, February 2003.
 Wisconsin Paper Council Website, History of Papermaking in Wisconsin,
<http://www.wipapercouncil.org/paperwi.htm>

Plastics Cluster in Berkshire County, Massachusetts, USA

The Plastics Cluster in Berkshire County, in the western part of Massachusetts, consists of about 50 companies of varying size, employing 2,500 people. In 2000 the plastics industry in Berkshire County generated an estimated \$180 million in revenue.

Cluster History

GE operated its moldmaking and injection molding facilities in Berkshire until the early 1950s. Many of the existing businesses are third-generation family businesses established by the former GE employees who became entrepreneurs as the GE plants closed. Some who started as toolmakers have naturally evolved into multi-disciplined plastics services providers. Western Massachusetts is now widely recognized for its production of a wide variety of plastic products and components.

Competitive Advantage

Plastics companies in Western Massachusetts have the advantage of a strong long-standing industry network. What was once the relatively low key Association of Plastics Industries of Berkshire County became the Berkshire Plastics Network (BPN) in 1986 to provide more structured marketing and educational services to its members. Concentrating broad-reaching expertise in a localized area, the BPN offers technical support through collaboration and acts as a clearinghouse to meet all plastics manufacturing needs, thereby reducing transportation and scheduling costs. The BPN has also established a four-year state-accredited apprenticeship program for moldmakers. GE Plastics participation has been vital to the BPN, allowing use of its facilities and teaching faculty at network-sponsored events in exchange for the access to innovation and control techniques designed by the smaller companies.

Key Businesses

- GE Plastics – parent company, still has engineering plastics facility
- Product Design & Development
- Molding Companies (design, injection, extrusion, vacuum, compression)
- Machinery & Repair Companies

Supporting Institutions

- Berkshire Plastics Network: a consortium of more than 30 independent companies, representing virtually every discipline in the design and production of molds, components and plastic products (www.berkshireplastics.org)

Industry Contact

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Sources

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Connected: Berkshire Plastics Network" Network Profiles, *Firm Connections*, RTS

BPN website

Potteries Cluster in Seagrove, North Carolina, USA

About 80 potters live and work in the rural town of Seagrove (pop. 246), the “Pottery Capital of North Carolina,” 10 miles south of Asheboro in the clay-rich Piedmont area. Some Seagrove potters trace their craft back as many as nine generations. Others have settled here after graduating from college or working as an apprentice elsewhere. While Seagrove is the identifiable hub, more than 100 potteries stretch 25 miles into unincorporated towns in Randolph, Moore and Montgomery counties. Wares range from teapots and face jugs to whimsical animals and elegant, custom-made jewelry.

Cluster History

Seagrove’s claim to fame as an arts community dates back 300 years, when Colonial potters, mostly from Staffordshire, England, began crafting earthenware milk crocks, churns, bean pots, storage jars, and whiskey jugs for everyday use. For decades the pottery was fired from the region’s heavy red clay and sold from covered wagons rolling through North Carolina. Jacques and Juliana Busbee, artists from Raleigh, NC, traced an orange pie dish to Moore County, and found that local potters were making salt glazed wares, along with orange and earthenware. The Busbees saw an opportunity to assist the survival of a then dwindling craft, founded Jugtown Pottery and turned the area’s pottery making into an art form. To market these products, Juliana set up the Village store in 1918 in Greenwich Village, NY.

Competitive Advantage

One of the most charming characteristics of Seagrove is that its artists are so willing to talk about their craft or demonstrate their glazing, turning, and sculpting techniques. One potter who uses a rare 1,500-year-old Chinese glazing technique has customers ranging from Bill Clinton to dignitaries in China and Latin America, but the potter encourages visitors to touch the delicate, crystalline vases lining his shop. Another advantage is the Professional Crafts: Clay program at Montgomery Community College (MCC). With continuing education and degree/certificate options, the 17-wheel program serves potters at all levels of expertise from Randolph, Moore, Lee, and Montgomery counties. When the program began in 1973, there were five potteries in the area. The potteries number more than 100 now, with MCC instrumental in the training of many of the local potters.

Key Businesses

- Potteries
- Galleries

Supporting Institutions

- Montgomery Community College, Troy, NC—offers AA Degree, Certificate in Professional Crafts: Clay; curriculum designed to prepare individuals for employment as professional potters or in pottery related fields; instruction includes technical knowledge, design skills and business essentials.
- Jugtown Pottery, Westmoore, NC-- a museum, pottery and craft shop begun in 1917 by Jacques and Juliana Busbee, artists from Raleigh, NC.
- The North Carolina Pottery Center, Seagrove, NC—Has exhibits and educational programming on NC history and technology of pottery making; has information on pottery shops in Seagrove area and NC; preserves a collection of North Carolina pottery and related artifacts.

Industry Contact

North Carolina Pottery Center

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Sources

Henderson, Nancy Bearden “A Pottery Kind of Town” on www.americanprofile.com
NC Pottery Center www.ncpotterycenter.com

Prison Cluster in Fremont County, Colorado, USA

A cluster of Colorado State prisons has grown up in Cañon City, the county seat of Fremont County. In the nearby city of Florence, the federal government has built a complex of prisons within which they plan to build a single administration building to serve the surrounding prisons. The Colorado Department of Corrections and the Federal Bureau of Prisons are the two largest employers in Fremont county. In 2000, the nine correctional facilities in Cañon City employed 1,554 and the three facilities in Florence employed 993 people.

Cluster History

In 1871 the Territory of Colorado built the first territorial prison in Cañon City, the county seat of Fremont County. Since then, Cañon City has been the primary geographic location for corrections for the State of Colorado. Cañon City now has Colorado State Penitentiary (opened in 1993), Arrowhead Correctional Center (1990), Pre-Release Correctional Center (1983), Four Mile Correctional Center (1981), Women's Correctional Facility (1968), Skyline Correctional Facility (1964), Centennial Correctional Facility (1964), Fremont Correctional Facility (1962), and Colorado Territorial Correctional Facility (1871). The nine facilities are of modest size individually, but collectively they had a capacity of 4,129 inmates in 2000. The city of Florence has two U.S. penitentiaries, one that opened in 1990, the other in 1994, as well as a Federal Correctional Institution, opened in the 1990's. As of 2000, the three facilities together had 2,964 inmates. Consequently, the Colorado and federal prison system, including the wardens, employees, and inmates, has played an important role in the history of Cañon City and Fremont County.

Competitive Advantage

A major preference has developed for locating facilities in rural and small town locations in recent years, rather than in the metro areas from which at least 80 percent of inmates come. Fifty-seven percent of all new prison facilities built in the 1990's were placed in small town sites, compared to 36 percent of those built pre-1980. Locating correctional facilities in less densely populated areas allows agencies to avoid the location cost and community oppositions common to urban or suburban sites. Clustered correctional facilities offer the advantage of combining administrative functions, thus cutting costs. Additionally, nearby trained personnel allows for quick assistance in case of prison riots or break-outs.

Key Businesses

- Prison facilities
- Support businesses such as eating places, gas stations, and motels.

Supporting Institutions

- Economic Development Association of Fremont County
- Cañon City Chamber of Commerce

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Sources

Cañon City Chamber of Commerce
(www.canoncitychamber.com)

Beale, Calvin. "Cellular Rural Development",
presentation paper (see contact info. at left)

Specialty Foods Cluster in Southeastern Ohio, USA

The rural network of specialty food companies in southeastern Ohio is comprised of two core counties, Athens and Washington. Approximately 30 food processing companies participate in the informal network. Most of the companies are privately owned, many with at least the owner working at another job as well. Specialty food companies employ approximately four to five percent of the workforce in the area. Together, the companies have about \$1.5 million in sales annually. While they tend not to share recipes, the companies share other information and band together in purchases such as labels or jars for economy of scale.

History

Although the group of companies is still small, a shared-use kitchen incubator managed by ACEnet, the Appalachian Center for Economic Networks, Inc. is facilitating growth in both the number and size of the companies. ACEnet saw the opportunity to capitalize on the agriculture of the area, and about 9 years ago began providing a place for entrepreneurs to develop and produce specialty foods using the produce of the local farms. Some clients of the “incubator without walls” use all of the services of the facility, while others rent storage space, avail themselves of marketing assistance, or use the labeling line for their finished products.

Competitive Advantage

The farms of the area provide the companies with an abundance of local fresh produce for the base of their product. A substantial amount of the specialty food products of the area are sold through the local farmers’ market, which is 30 years old and the oldest in the state. In addition, there is a local buyer’s market for the products. The Athens community surrounding Ohio University provides momentum for the large organic, “buy local” movements in the area. The area has two large employers, Martin Marietta and Ohio University, with higher paid employees so the local area has customers with the level of income to allow them to buy the pricier organic, specially prepared products. ACEnet is currently working on the challenge to expand the market for the local products by tapping into the nearby urban markets of Columbus, Cincinnati, and Cleveland.

Key Businesses

- Food product brokers and distributors
- Supermarkets, natural food stores, specialty food stores
- Restaurants
- Mail order retail

Institutions

- ACEnet— Appalachian Center for Economic Networks, Inc., Food Ventures Department
- Ohio University Small Business Department
- Rural Action— a grassroots organization working for the revitalization of Appalachia

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Sources

ACEnet website (www.acenetworks.org)
Correspondence with Larry Fisher, ACEnet,
December 2003

The Tourism/Experience Enterprise Cluster in Western Montana, USA

Montana has one of the highest rates of non-resident travel of any state. In 2001, 9.55 million people traveled into the state (27 percent more than a decade earlier), spent more than US\$1.7 billion, and generated an estimated US\$563 million in personal income, making Montana 13th in the nation in per capita spending by tourists. The most dynamic tourism region follows the Rockies from Yellowstone north to Glacier National Parks. The firms and entrepreneurs that structure, promote, and facilitate experiences, by providing the transportation, accommodation, supplies, and equipment to take advantage of these experiences fostered in particular by the natural resources of the area. These companies and freelancers represent a large source of employment and wealth and also support the related souvenir and creative art industries.

Cluster History

Montana is an ideal location for this cluster to prosper because of its natural resources, diverse topography, wildlife and wilderness areas, and its distinctive heritage – including Native American and frontier clusters. The Western region in particular has a wide variety of landscapes and business enterprise catering to tourists. Since 1991, the Montana Department of Commerce Tourism and Promotion Division have produced a statewide strategic plan for tourism. Their third and most recent plan, *Big Sky Value... Montana Tourism and Recreation Strategic Plan 2003-2007*, involved over 75 community groups in its formulation. The state continues to promote tourism and linkages within the industry.

Competitive Advantage

Clearly, Montana's natural environment and cultural heritage are prominent and distinct assets. The Rocky Mountains and the Lewis & Clark trails continue to attract many tourists drawn to seeking out pristine landscapes and native American traditions. The cluster is well organized, both formally and informally, along common interests and similar services, leading to the development of social capital. The strong public-private partnership found in Western Montana is supported by numerous local associations and networks. Promotions are run at the local Convention and Visitors Bureau level, the regional level, and statewide. The state also secures a 4% lodging facility use tax to support the tourism industry.

Key Businesses

- Yellowstone National Park
- Glacier National Park
- Kampgrounds of America (KOA)

Supporting Institutions

- State of Montana – Governor's Office and Department of Commerce (www.state.mt.us)
- Travel Montana – provides statewide tourism promotion (www.travelmt.com)
- Montana Magazine – provides statewide promotion (www.montanamagazine.com)
- Rocky Mountain International – interstate (WY, SD, MT, ID) regional coordination for international tourism activities (www.rmi-realamerica.com)

Industry Contact

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Sources

Clusters of Creativity: Innovation and Growth in Montana. A Report to the Montana Governor's Office of Economic Opportunity. (2003)
Institute for Tourism and Recreation Research,
University of Montana – Missoula.

Wood Products Cluster in the Upper Peninsula, Michigan, USA

Wood products is the largest industry in the Upper Peninsula (U.P.) and consists of a wide variety of businesses ranging from major paper corporations to small family-owned logging and saw milling operations. Michigan harvests about 4.5 million cords of lumber per year. There are about 93 primary wood manufacturers and 182 secondary wood manufacturers in the Upper Peninsula. One-third of these businesses are located in just two counties: Delta and Menominee. In total approximately 8,000 local residents are employed at the logging companies and wood product manufacturers. Sawmills and pulp and paper plants hire hundreds more on a seasonal basis.

Cluster History

The retreat of the glaciers left a wealth of virtually pristine forest in the U.P. In 1836 Farnsworth & Brush built the first sawmill in Menominee County. The “Golden Age” of economic opportunity in the U.P. between 1880-1913 attracted thousands of people to the mining and lumber jobs. The expanding timber industry capitalized on the rich white pine forests and later on the hardwoods. In 1893 as a tribute to the logging industry, the World’s FairLoad was sent from U.P. to be displayed in Chicago. People have been logging and milling in the area ever since. The current market faces several challenges to profitability: commodity values for primary products limit revenue potential; the value of secondary and tertiary products are not optimal; and the large amount of residues produced in mills creates waste that could have value.

Competitive Advantage

Natural resources sustain the wood products industry in the U.P.: eighty-five percent of the 16,000 square mile landmass is forested. People have been commercially harvesting these woods for about 175 years, lending to a mass of experienced lumberjacks and millers. The U.P. is embracing technological change in order to reduce costs and improve efficiency. Recent innovation such as large harvesting machines operated by just two people can accomplish the same productivity as a team of lumberjacks. Electronic sensors measure the girth of the tree, determining how it should be cut and even estimating how many board feet of lumber or pulp it can produce. These machines not only cut down the tree, but strip the limbs, crosscut into logs and transport them to staging areas. Workforce development designed to enable this innovation is augmented by the establishment of the M-Tec Center in 2000 which teaches this new technology through high-tech simulators. There are several other initiatives in the area for technical assistance and research, many spearheaded by Northern Initiatives.

Key Businesses

- logging operations
- primary and secondary wood manufacturers

Institutions

- Northern Initiatives – a not-for-profit community development corporation that works to improve economic conditions through the sustainable use of regional natural resources (www.northerninitiatives.com)
- M-Tec Center, Bay de Noc Community College – established by the Michigan Econ Dev Corp; provides training; the only educational center with a timber-harvesting simulator (www.uptrainingnetwork.com/m-tech.htm)
- Michigan Tech – offers MS and PhD degrees in Forest Ecology and Management (<http://forestry.mtu.edu>)

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Sources

Upper Peninsula Economic Development Alliance
 website (www.upeda.org)

Wood Products Cluster in Oregon, USA

The Oregon wood products industry is still experiencing substantial growth, especially in rural communities where timber and wood-related jobs play leading roles in the local economy. About 40 percent of industry workers are employed in secondary wood product manufacturing. The secondary wood products manufacturing industry in Oregon is composed of approximately 800 firms employing approximately 22,000 persons in the manufacture of moulding, millwork, windows, doors, cabinets, furniture and specialty wood products. Although overall forest products employment in the northwest has declined, a significant number of jobs have been added in the secondary wood products industry since 1991. Primary and secondary wood products companies now account for between 37-42 percent of all manufacturing employment in Oregon.

Cluster History

The State of Oregon recognizes its first commercial sawmill operation to have opened in 1827 at Fort Vancouver. Many small operations dotted the forests until the major sawmill companies arrived in the late 1930s. In the late 1980s, Oregon, with more than a third of its manufacturing jobs in the wood and lumber industries, was hit hard by a court ruling designating the spotted owl an endangered species. The legislature formed an Interim Legislative Committee on Forest Product Policy to shift emphasis from primary wood products – harvesting and exporting logs – to secondary wood products and adding value through manufacturing.

Competitive Advantage

Oregon's Senate Bill 364 established effective July 1991 the Oregon Wood Products Competitiveness Corporation (WPCC), now the independent Northwest Wood Products Association (NPWA). Its goal is to "improve and promote the competitiveness of Oregon's secondary wood products industry," planning around its top priorities of access to capital, market development, and workforce preparedness. NPWA collaborated with the state's community college system to obtain a significant state grant to support the development and implementation of a community college curriculum for the industry.

Key Businesses

- Wood products manufacturers (primary and secondary)
- Service providers

Supporting Institutions

- NPWA – a private non-profit association of Oregon wood product manufacturers and service providers, works to improve market opportunities, financing opportunities, training programs, alternate sources of supply, and communication between manufacturers (www.nwpa.org)
- Wood Products Extension Team – part of Oregon State University's Extension Forestry program, serves Oregon's primary and secondary wood products industry through extending technology to wood products industries, R&D, and marketing guidance (www.wood.oregonstate.edu)

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Sources

Secondary Wood Products Training System
Final Report, 1995-99,
www.lbcc.cc.or.us/swpc/
Wood Products Extension Team website,
www.wood.oregonstate.edu

Ceramics Cluster in Sassuolo, Italy

The home of 80% of Italy's ceramic tile production (and 18% of world production) is in the Emilia-Romagna region, mainly in the towns of Sassuolo and Fiorano. Over 25,000 people are employed in 185 firms, generating 540 million sq. meters of tile and sales of US\$ 4.1 billion (1999), 75% of which is exported. Sassuolo also houses world-leading producers of glazes, enamels, and tile production equipment and the dominant equipment manufacturer, System.

Cluster History

Tile production in Sassuolo grew out of the earthenware and crockery industry, which dates back to the thirteenth century. Italian tradition, natural resources, and climate inspired a new demand for ceramic tiles during the reconstruction phase following WWII. In 1955 there were 14 Sassuolo tile companies; by 1962 there were 102. These new tile companies benefited from a regional base of wealth and a local pool of mechanically trained workers from nearby sophisticated firms such as Ferrari, Maserati, and Lamborghini, and a large number of creative design firms. As skilled work force grew, technicians became able to purchase their own equipment and machinery and start their own small companies. The relationship between Italian tile and equipment manufacturers was a mutually supporting, made even more so by their close geographic location. Local firms were used to pilot new technology and gained an edge over firms in other regions. The concentration of tile producers and equipment manufacturers encouraged the formation of suppliers (e.g. molds, glazes, packaging materials, and transportation) and consulting firms around Sassuolo to complement the process. Most recently the industry has been going through a consolidation, and the five largest "groups" (consortia of firms), led by Marrazzi, now account for about 55% of the production.

Competitive Advantage

With a natural base of local talent and raw materials, the way in which the cluster developed encouraged the localization of all players in the production chain. The strong rivalry between the firms, both between direct competitors and indirect competitors seeking to gain market share along the production chain, place a constant pressure on the firms to upgrade and innovate. At the same time, the firms understand that success depends upon their interdependence and continued interaction. ACIMAC, Centre Ceramica (which does on-site testing) and Assopiastrelle provide an additional forum for their members to interact and act collectively to take advantage of new technologies to learn about new market opportunities and to solve mutual problems (e.g. logistics, energy costs, and infrastructure).

Key Businesses

- 185 tiling companies
- Large Groups such as Marazzi
- Technological equipment manufacturers, particularly System
- Complementary firms (i.e. design, glazing, marketing, and distribution)
- consulting and marketing firms

Supporting Institutions

- Assopiastrelle – industry association for tiling manufacturers, founded 1963
- ACIMAC – industry association for machinery producers, founded 1988 (www.acimac.it)
- Centro Ceramico di Bologna, conducts process research, product analysis, and testing, founded in 1976 as the first cluster center of ERVET, the regional development agency

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Fishing/Seafood Production in Nelson, New Zealand

The Nelson fishing and seafood production sector contributes about \$383 million per annum to the regional economy and employs over 3000 in 168 companies. Nelson is renowned as the home of scallops and the wider Nelson-Marlborough area has a well-established aquaculture industry producing Greenshell™ mussels, oysters and salmon. While many of the farms are in the Marlborough Sounds, most of the processing and support industries are based in Nelson.

Cluster History

Two-thirds of New Zealand's current seafood exports were untapped resources just twenty years ago. Now the seafood industry is looking for further growth in mid- and deep-water fisheries and aquaculture. New Zealand is currently the world's leader in fisheries management and supports an industry based on sustainable harvest and environmental principles. The sustainable management of New Zealand's 'wild-catch' fisheries, achieved by a Quota Management System that gives fishers transferable harvesting rights has created an attractive base for the seafood industry. The Port of Nelson, which provides 24-hour unloading as well as full servicing, engineering and supply facilities to the industry attracted many fishing companies to the region.

Competitive Advantage

The cluster is composed of both lead fishing/processing and supporting companies located in the region. Developments in seafood processing, handling and storage techniques are shared among the neighboring rivals. Subsidiary manufacturing and servicing industries have located in the vicinity of the world-renowned Nelson harbor, and the increasing sophistication of the traditional support activities has led to the export of specialist services from the region, such as marine engineering and boat building, and a growing reputation for the seafood research and fisheries management expertise based in Nelson. The Nelson Seafood Cluster task force has been instrumental in coordinating a functional apprenticeship program through fishery "units of learning" incorporated into school curricula. The Seafood Technology Pathway is an educational program that offers a mix of practical work at Sealord Products, tertiary study at the New Zealand School of Fisheries, and secondary school subjects at Nayland College.

Key Businesses

- Fishing companies: Sealord Group (the largest seafood company in Australasia), Amaltal, Sanfords
- Seafood processing (factory vessels & land-based)
- Port Nelson: a strategically located modern port infrastructure with flexible customer-oriented services
- Supporting services: net making, ship repair, electronics and engineering
- Research institutions: fishery and seafood research, education facilities

Supporting Institutions

- Nelson Marlborough Seafood Cluster: granted under the Cluster Development Programme of Trade New Zealand (www.nzte.govt.nz)
- Educational facilities with fishery curricula: Nayland College; Nelson-Marlborough Institute of Technology; Nelson Polytechnic New Zealand School of Fisheries
- New Zealand Seafood Industry Council, Ltd. (SeaFIC): an industry owned company to represent and meet industry needs of fishers, harvesters, the aquaculture sector, processors, retailers and exporters (www.seafood.co.nz); includes a Seafood Industry Training Organisation (www.sito.co.nz).

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Sources

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Furniture Cluster in Central Jutland, Denmark

The furniture sector in Denmark comprises approximately 450 companies, which produce annual sales of US\$2.7 million. Nearly 83% of the production is exported, accounting for 4% of exported commodities in 2002 and making the furniture sector Denmark's fifth largest export industry. A significant number of firms, particularly mid-range wooden furniture makers, have clustered around the rural industrial areas of west Central Jutland. Over 100 producers of furniture and related wood products have located in the Salling Peninsula alone, employing approximately 6% of the peninsular workforce.

Cluster History

The western area of Central Jutland has been exporting furniture since 1961. The 1980s and 90s saw dramatic growth in the demand for solid pine and knock-down furniture in Northern Europe. The industry expanded and a number of spinoffs increased furniture producing firms in the Salling Peninsula increased 54% from 1980-1992. Employment in the industry grew 58.6% from 1984-1993. Most recently the number of firms has been reduced due to mergers and liquidations, and basic production is moving to Asia and other lower-cost regions while administration and niche manufacturing remain. Sales and production levels have remained constant over the past few years despite the reduction in firms and existing firms are larger. Specialization of wooden furniture production in the basic/home market (e.g. children's furniture, waterbeds, dining rooms) is significant, accounting for 90% of the firms.

Competitive Advantage

The most outstanding feature of the Jutland wood furniture manufacturers is their dynamic informal inter-firm relationships that make the region able to adapt quickly to demand shifts through substantial cooperative innovation and improvements in the industry. Frequent meetings of the local producers' guild provide information about technical opportunities, user needs, and local capacities and capabilities. Many companies operate as subsuppliers for their colleagues in the region, allowing them greater flexibility and innovation of design. In general, only very specialized goods, such as metal frames and foam, are purchased outside of the district. The level of automation in production has improved dramatically over the past few years, thus minimizing the labor costs. The high turnover of firms in the region is also key to the strength of the cluster. Low barriers to entry of producing furniture of this type and the local system of financing have retained both the capital and the talent in the area for decades. The industry largely sells to large distributors such as IKEA to compensate for the weak capacity to market brand names on their own.

Key Businesses

- Furniture manufacturers
- Design engineers
- Distribution and sales companies

Supporting Institutions

- Association of Danish Furniture Industries (ADFI) - an independent member organization that promotes the sale of furniture and related furnishing products (www.danishfurniture.dk)
- Danish Technological Institute, Jutland branch – an independent, not-for-profit institution that provides consulting, tests, certification, education and training; also members of the EU project InnovaWood Research Database Project for info about R&D within the forest industry (www.dti.dk)
- Moebel Center – an education center for the wood and furniture industry (www.moebelcenter.dk)

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Correspondence with Niels Buhl, ADFI, Dec 2003

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Toy Cluster in Ibi, Valencia, Spain

According to ANAIP, the organization representing the Spanish plastics industry, the Spanish plastics sector produced 200 million toys in 1998. About 40 percent of the 350 firms that comprise the Spanish toy industry are located in the central part of the Valencia region, mainly in the rural town of Ibi (population 20,000).

Cluster History

Ibi has long been a center for toy production in Spain. The tin toy factory Payá, was established in the region in 1905 and soon after other factories began to spring up in the area. During World War II, there was a decline in production of tin toys due to a shortage of raw materials but in the 1950s, the firms switched to plastics to make toys, and the industry was revived. AIJU (the Toys Institute) was established in Ibi in 1987 as part of the regional policy of the Valencia development agency IMPIVA to support local industry clusters and networking among firms.

Competitive Advantage

The Valencia region of Spain was the first in Europe to introduce a network of Business Innovation Centers tailored to the specific needs of industry clusters. One of the first, AIJU, was for the toy sectors. The technical institutes provide local small firms developmental services. Each is linked to an association of small firm entrepreneurs who comprise the majority of its board. This arrangement, coupled with a sector focus, encourages the institutes to be more client-sensitive and increases the relevance of their services, including training. AIJU features quality testing, training, technological assistance, R&D, and commercial activities. There is a toy library at the Institute where children can test toys from all of the member companies. The Toys Institute also acts as an inter-firm network coordinator, housing shared equipment and serving as an interface between competing yet collaborating firms. The Toys Institute has also become involved in marketing activities through the creation of a quality full color catalogue of toys of all its members for distribution to retailers.

Key Businesses

- manufacturers (Hasbro, Payá, Famosa)
- auxiliary industries
- suppliers of machinery
- suppliers of raw materials

Supporting Institutions

- AIJU (www.aitex.es/aiju)
- AEFJ (Spanish Association of Toy Manufacturers, Ibi office)
- IBIAI- Ibi's Entrepreneurs Association
- APROIBI Office for Economic Promotion

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Wireless Communications Equipment Cluster in North Jutland, Denmark

The ICT cluster in North Jutland focuses on wireless communication equipment. The cluster is defined by a joint knowledge base, including electronic signals transmitted in the air by radio waves. It consists of approximately 35 firms with a total employment of 3,900, more than 40% of all ICT employment in the region and approximately 1.6% of the total employment.

History

The cluster of firms in North Jutland can be traced back to 1948 and the foundation of SP Radio (now EuroCom Industries), a consumer electronics firm. In the mid-1960s the firm successfully shifted production and development to professional maritime communications equipment to accommodate local demand. Spinoffs such as Dancall and Cetelco emerged in the 1970s and led the cluster into the mobile communications area during the 1980s. The 1990s marked a new phase of foreign entrance and acquisitions. During this phase North Jutland was flooded with foreign capital in exchange for part of the local decision-making power for the region. In 1991 the first private Danish phone company Sonofon was established in Aalborg, complementing cluster activities with a telecom services provider. The crisis in the telecommunications sector that began in 1999 caused a restructuring of the multinationals to downsize many of the Aalborg divisions. Engineers fled the multinationals to the smaller local firms, or they founded their own companies (e.g. Wirtek, EB Denmark, and PI Engineering). Despite the increase in exits due to the crisis, there is still a growing number of firms in the cluster due to higher entry rates.

Competitive Advantage

A core asset to the cluster, Aalborg University delivers engineers and basic research to the cluster. What has distinguished this region from others appears to be a widespread awareness about the importance of further developing the technological base for the cluster. The establishment of a science park, NOVI, in 1989 brought together private and public actors to support the cluster. The formal network of wireless communications firms and knowledge institutions was established as NorCOM in 1997. NorCOM is subdivided into two fields: mobile communications equipment/components and maritime communications/navigation equipment.

Key Businesses

- EuroCom Industries (1948 – first in industry)
- Sonofon (1991 first private Danish phone company)
- Large multinationals with development and production facilities in North Jutland: Ericsson, Nokia, Motorola, Siemens and Flextronics

Institutions

- Aalborg University (AAU), founded in 1974 – known for its research capacity in radio-communications and speech recognition, especially the Institute of Electronic Systems and the Centre for Personal Communications; involved in a joint Aalborg Univ-Copenhagen Business School research unit: DRUID (www.druid.dk)
- NOVI – science park, founded in 1989 located adjacent to AAU, seed bed for new companies and a home for subsidiaries of foreign multinational companies
- NorCOM – an association of 21 wireless communications firms, AAU and NOVI, founded in 1997 (www.norcom.dk)

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