



The Wisconsin Manufacturing Study: An Analysis of Manufacturing Statewide and in Wisconsin's Seven Economic Regions

EXECUTIVE SUMMARY

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Wisconsin's Manufacturing – and Economy – at the Brink

Wisconsin's industrial economy is well-positioned to become a 21st Century leader in manufacturing, but it must adapt to emerging trends in information technology, logistics, and management theory that will favor industries with new ways of competing globally.

Manufacturing remains the engine that drives regional economies. Every \$1 of final demand spent for a manufactured good generates \$0.55 of Gross Domestic Product in the manufacturing sector and \$0.45 of Gross Domestic Product in the non-manufacturing sectors.¹ Thus, manufacturing is inextricably tied to non-manufacturing—everything from raw materials to intermediate components to software to financial, legal, health, accounting, transportation, and other services—in the course of its normal business functions.

The **Wisconsin Manufacturing Study** was designed to find the leverage points that would help the state tip its manufacturing base and policies toward the New Economy future.

- First, it pinpoints the major manufacturing industries that drive Wisconsin's economy.
- Second, it compares their capabilities with eight other states to measure Wisconsin's manufacturing competitiveness.
- Third, the Study examines the state's overall business climate to determine just where those leverage points exist.
- And, finally, from these facts, a picture emerges of where the major producers stand compared to their present and prospective opportunities for moving into the New Economy.

The Key Findings of the Study

1. Wisconsin is home to 24 *statewide* manufacturing driver industries. By almost every measure—gross product, productivity, capital expenditures, employment, and foreign exports—manufacturing and its related industries comprise *almost one half* of the state's economy.

¹ Manufacturing in America: A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers, U. S. Department of Commerce, January 2004, p. 14. See www.ita.doc.gov/media/Publications/pdf/manuam0104final.pdf

In 2004 alone, Wisconsin's manufacturers generated more than \$46 billion in gross product, employed 512,630 workers, who produced \$90,000 in gross product per employee, and exported \$14 billion in manufactured goods.

2. The Study employed a new, sophisticated quantitative analysis to identify 43 manufacturing industries in the state's seven economic regions that sell their products outside of the region, state, or country, thereby returning new monies to Wisconsin's economic regions. These industries are driver manufacturing industries. They *drive* Wisconsin's manufacturing economy.

3. If a driver industry is located in two or more of the seven economic regions, it is defined as a *statewide* driver industry. Of these 43, 24 driver industries are located in two or more of the seven economic regions. They are Wisconsin's *statewide* manufacturing driver industries. The remaining 19 driver industries appear in only *one* of the seven regions and, therefore, are not statewide drivers. This Study focuses on just the 24 *statewide* manufacturing driver industries, analyzing their strength and economic competitiveness.

4. Other, single firms in Wisconsin—no matter how large—or groups of small firms with similar products, no matter how successful, do not meet the statistical test and are not called “driver industries” under this Study's methodology. A single firm does not comprise an “industry”; and small, though successful, firms do not generate enough business volume to meet the threshold for the designation of “driver industry.” However, they may become driver industries in the future.

5. Driver industries, together with their suppliers and their customers, are *industry clusters*. When they have close buy-sell relationships, use common technologies, or share a specialized labor pool—i.e., are concentrated—industry clusters have a competitive advantage over the same industry in other regions, states, or countries.

6. Today, all 24 of Wisconsin's *statewide* manufacturing driver industries indicate concentrations that afford them a competitive advantage over those industries in other states throughout the country.

7. Wisconsin manufacturers interviewed and surveyed recognize the strengths of the state that support a vibrant manufacturing-based economy. They listed:

- Wisconsin's proximity to a vast consumer population.
- Excellent transportation infrastructure.
- At present, a superior, highly skilled workforce.
- Well educated managerial and engineering talent.
- Outstanding support industries.
- Active manufacturing intermediaries.
- A highly valued quality-of-life.

8. However, the state's manufacturing *output*, compared to eight other states that compete with Wisconsin's 24 driver industries, is stagnant. It typically ranks last or next to last among these competitors. Wisconsin's average output per manufacturing employee is 86% of the national average. Wisconsin's manufacturing executives believe they face four major barriers that could limit the state's readiness for competition with other states and countries. These are:

- Manufacturing has a poor image professionally.
- Taxes of all types are high.
- Businesses are unable to contain manufacturing costs.
- There is an emerging two-tiered workforce. Older, reliable workers are retiring soon. Their potential replacements are difficult to attract and retain.

9. The consequence is that Wisconsin is beginning to approach critical difficulties as it attempts to transit from low-cost, high labor, low profit Old Economy commodity products to the high-cost, low labor, high profit New Economy niche and specialty global markets. However, New Economy manufacturing might reverse the present status and offer the incentives to attract a highly motivated workforce.

10. As commodity products yield to low-pay countries, Wisconsin's manufacturing executives predict a migration of corporate headquarters, research and development, and production from the state in the next five years. This may signal the loss of market share in commodity markets.

11. Wisconsin has a surprising number of small manufacturing firms compared to the eight competing states: 82.4% of Wisconsin manufacturers' corporate parents have annual revenues of less than \$100 million, while all of the other states have percentages less than 65%. While addressing the needs of its driver manufacturing industries, the state's many *small* companies may offer significant opportunities for moving into the global market. From 1992-2001, 30% of U.S. exports were from small- and medium-sized exports, two-thirds of which had 20 or fewer employees. Their numbers grew twice as fast as large company exporters. Smaller, more flexible companies may be able to adjust more rapidly to the New Economy than their larger competitors.

A New Manufacturing-and Economic-Paradigm

Manufacturing in Wisconsin and elsewhere has changed dramatically in recent years, resulting in often traumatic reorganizations of existing industries and significant dislocations of workers and communities around the globe. Factors affecting manufacturing worldwide include:

- Globalization of competition, due to advances in logistics that make sourcing from distant regions a viable strategy;
- Reduced trade restrictions between nations;
- Availability of low-cost labor in emerging markets;
- Advances in information technology, including the emergence of the Internet, that allow businesses and consumers to compare a wide array of products and prices, pressuring manufacturers to reduce prices on an ongoing basis.

These factors have driven almost every product category toward commoditization in which product features, quality, and prices become standardized over time. Manufacturing competition in the 21st Century will favor New Economy firms and regions that adopt some combination of the following strategies:

- A commodity strategy, in which the firm or region commits to becoming the low-cost provider of standardized products in a given industry, earning lower margins on higher volumes of product; and
- A non-commodity, or value-added, strategy in which the firm or region commits to combining products and services into complete value packages that allow for greater customization, earning higher margins on lower volumes of products.

Globalization is here to stay, and most of the world's market is outside of the United States. To survive, manufacturers will have to adapt their businesses to a new reality: Customers increasingly want very different things from what they used to demand. They now expect value to increase continuously. Wisconsin's manufacturers must *and can* respond.

The state is ready for a transition from the Old Economy manufacturing-high labor percentages in cost of goods sold, low wages, and commodity sales strategies-to the New Economy manufacturing with its low labor percentages in cost of goods sold due to automation, its high wages, and its high tech, specialty, and niche markets. Wisconsin is ready, but it is not assured of success in making or surviving this transition.

Driver Industries for Wisconsin's New Manufacturing and Economic Future

For Wisconsin to take advantage of the manufacturing opportunities before it, the state must focus on those industries that are most competitive and have the greatest potential for national and global prominence. These are Wisconsin's statewide manufacturing driver industries. The fundamental methodology for discovering these primary economic forces in manufacturing is based on an analytical tool developed by Ned Hill and John Brennan (2000), part of the team that created the Study report.²

The Importance of the Methodology

The statistical methodology of Hill & Brennan differs markedly from other approaches in that it is far more comprehensive and analytical. The methodology applies 12 different measures to generate indicators of relative individual industry strength, and these measures allow the quantitative results to be interpreted in economic terms. And, the methodology groups industry variables for analysis by one of three types: (1) competitiveness (productivity, national market share, and relative earnings); (2) export orientation (output and employment specialization), and (3) regional centrality (share of regional output), all of which generate statistical measures for determining an industry's relative strength.³

In contrast to the Hill & Brennan methodology, other approaches are most often limited by over-simplification. Typically, they may look only at (1) a select group of industries instead of all possible industries; (2) qualitative analysis with limited case studies, with their associated quantitative industry profiles, which cannot adequately translate into quantitative findings; (3) quantitative analyses that cannot capture industry dynamics due to weak analytical tools that address only relative strengths; or (4) one or very few variables as indicators of industry strength. In short, these other approaches are simply not as robust in scope or as concentrated in economic analysis as the Hill & Brennan methodology.

²E. Hill & J. Brennan (2000). A Methodology for Identifying the Drivers and Clusters: The Foundation of Regional Competitive Advantage. *Economic Development Quarterly*, 14, pp. 65-69.

³Further details about the methodology appear in Section 2, with a full description in Section 14.2.

Drivers and Industry Clusters

Driver industries are concentrated by numbers in a region and produce more goods than can be consumed locally. Those goods are exported-out of the region, the state, and the country. By selling their product outside of the region, these companies bring new monies back into it. Thus, they drive the regional economic growth.

Industry clusters form around the *driver industry*. They are the suppliers *to* the drivers and the buyers *from* the drivers. They are firms in the same industry that have close buy-sell relationships with other industries in the region, use common technologies, or share a specialized labor pool that, together, provide these firms with a competitive advantage over the same industry in other regions, states, or countries.

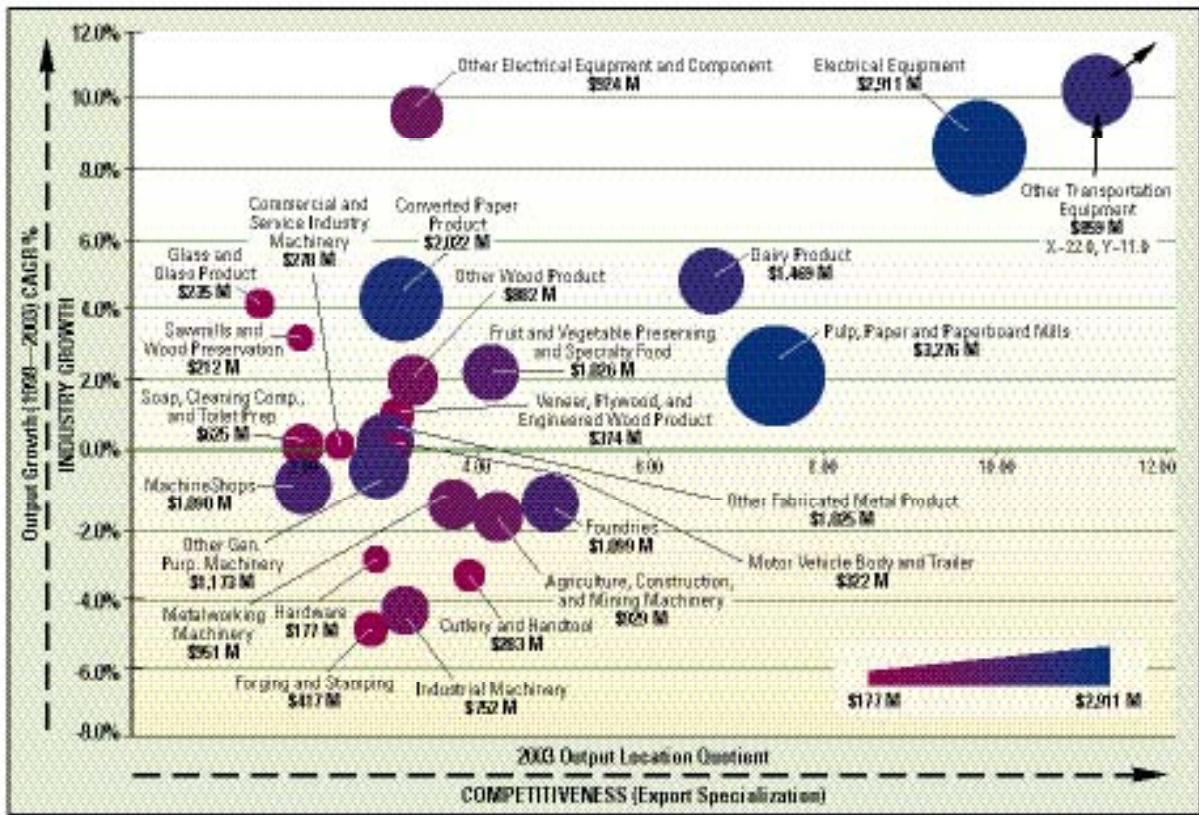
The Hill & Brennan methodology identified driver industries in Wisconsin's seven county-based economic regions.

- **Central:** Adams, Clark, Langlade, Lincoln, Marathon, Portage, Taylor, Waushara, Wood
- **East Central:** Brown, Calumet, Door, Kewaunee, Marinette, Menominee, Oconto, Outagamie, Shawano, Waupaca, Winnebago
- **North:** Ashland, Bayfield, Burnett, Douglas, Florence, Forest, Iron, Oneida, Price, Rusk, Sawyer, Vilas, Washburn
- **South:** Columbia, Crawford, Dane, Grant, Green, Iowa, Juneau, Lafayette, Marquette, Richland, Rock, Saulk, Winnebago, IL
- **Southeast:** Dodge, Fond du Lac, Green Lake, Jefferson, Kenosha, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington, Waukesha
- **West Central I:** Barron, Buffalo, Chippewa, Dunn, Eau Claire, Pepin, Pierce, Polk, St. Croix
- **West Central II:** Jackson, La Crosse, Monroe, Trempealeau, Vernon

The following chart shows 24 statewide manufacturing drivers compared to (1) their gross product in dollars, (2) their competitiveness, and (3) their percent growth over a five-year period.

This chart relates the economic health of driver industries in Wisconsin by two factors—their “competitiveness” in terms of export orientation or specialization on the X axis (i.e., the horizontal axis)⁴ and their “growth” on the Y axis (vertical). *Competitiveness* is measured in terms of output location quotient, which is a ratio of the industry’s concentration in the state compared to the

Overview of Wisconsin's Statewide Drivers



industry’s concentration nationally. In general, a location quotient above 1 indicates that the industry is more concentrated in Wisconsin than it is nationally. This concentration suggests that the industry exports its products, and that Wisconsin offers competitive advantages to the industry over other states throughout the country. An industry is increasingly more competitive as it moves to the right on the X axis. And the more competitive it is, the more it sells goods outside of Wisconsin, thereby generating more money for the state.

Industry *growth* is measured in terms of compound annual growth rates over a five-year period and is shown on the Y axis. An industry is growing faster as it moves upward from 0.0%; it is declining if it is below 0.0%. The area (size) of each circle represents the gross product of each industry and indicates the industry’s size compared to the other industries. Through this picturing of all of the 24 statewide drivers, a sense of the overall strategies and services that will be needed in Wisconsin begins to emerge.

⁴The “competitiveness” values appear in the middle of the chart. “Competitiveness” is marked in even increments—2, 4, 6, 8, 10, and ending with 12 at the far right of the chart.

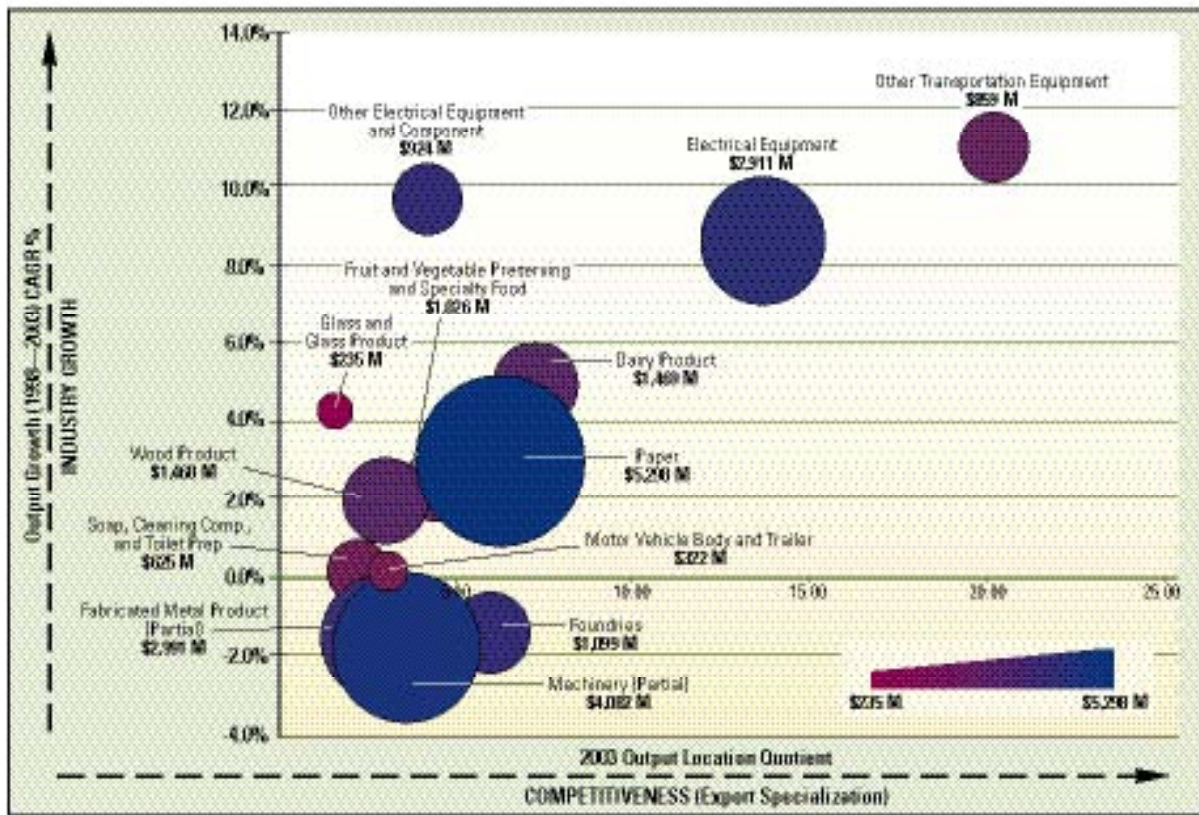
A further perspective appears when affiliated industries are combined. This is possible because a number of the 24 statewide driver industries are closely related by raw material used, the manufacturing process employed, and / or the shared technology or workforce. For example, the two categories, 3221-Pulp, Paper, and Paperboard Mills and 3222-Converted Paper Product Manufacturing, both use the same raw material and similar processes; therefore, they can be grouped under the 3-digit NAICS code, 322-Paper Manufacturing. The same can be said about the industries in 3211, 3212, and 3219.

Table 1-1 Statewide Driver Industries

	NAICS	Title
1	3114	Fruit & Vegetable Preserving & Specialty Food Manufacturing
2	3115	Dairy Product Manufacturing
3	321	Wood Product Manufacturing (Complete)
	3211	Sawmills and Wood Preservation
	3212	Veneer, Plywood, and Engineered Wood Product Manufacturing
	3219	Other Wood Product Manufacturing
4	322	Paper Manufacturing (Complete)
	3221	Pulp, Paper, and Paperboard Mills
	3222	Converted Paper Product Manufacturing
5	3256	Soap, Cleaning Compound, and Toilet Preparation Manufacturing
6	3272	Glass and Glass Product Manufacturing
7	3315	Foundries
8	332	Fabricated Metal Products (Partial)
	3321	Forging and Stamping
	3322	Cutlery and Handtool Manufacturing
	3325	Hardware Manufacturing
	3327	Machine Shops, Turned Product, and Screw, Nut, & Bolt Manufacturing
	3329	Other Fabricated Metal Product Manufacturing
9	333	Machinery Manufacture (Partial)
	3331	Agricultural, Construction, and Mining Machinery Manufacturing
	3332	Industrial Machinery Manufacturing
	3333	Commercial and Service Industry Machinery Manufacturing
	3335	Metalworking Machinery Manufacturing
	3339	Other General Purpose Machinery Manufacturing
10	3353	Electrical Equipment Manufacturing
11	3359	Other Electrical Equipment and Component Manufacturing
12	3362	Motor Vehicle Body and Trailer Manufacturing
13	3369	Other Transportation Equipment Manufacturing

The chart below regroups similar 4-digit industries into four 3-digit categories, allowing the 24 statewide drivers to be consolidated into 13 statewide drivers. This might suggest that future planning could be centered around these 13 drivers, not all 24.

Consolidated Overview of Wisconsin's Statewide Drivers



Since all of Wisconsin's 24 driver industries (or 13 industry categories) have a Location Quotient greater than 1, indicating competitiveness, they are all more concentrated in the regions than in the rest of the nation. **This is a significant competitive advantage.** And, all of the industries above 0.0% on the Y axis have been growing through the recession, from 1998-2003, the Other Transportation Equipment category most of all. However, the metal industries are competitive but not growing. They include Industrial Machinery, Forging and Stamping, Cutlery and Handtools, Metalworking Machinery, and Other General Purpose Machinery, along with the machine shops that supply them.

These driver industries represent Wisconsin's manufacturing future, not only for themselves but for the industry clusters which depend upon them—a manufacturing future with the potential for growth and global competitiveness, but it is one which is not guaranteed. Indeed, each of these driver industries faces a host of challenges, issues, and opportunities both within Wisconsin and around the globe. These are analyzed in Section 5 for each of Wisconsin's 13 driver industry categories, including:

- Driver industry definition
- Top 10 employers
- Export changes
- Products
- Gross product
- Associated industry clusters
- Employment
- Industry challenges and recommendations

Obstacles to Becoming a New Economy State

The Wisconsin Manufacturing Study includes information directly from Wisconsin's manufacturers, in addition to data from many documents. Information sources include a panel discussion conducted by the MPI Group and attended by representatives of Wisconsin's manufacturing industries on May 17, 2005, in Milwaukee, and MPI's online questionnaire for Wisconsin's manufacturers. *(The complete transcript of the panel discussion appear on the WMEP website, findings from the questionnaire appear in the Appendix of the Study report, and documents cited are footnoted throughout the report.)* To a remarkable extent, these sources agreed, in detail, on the present condition of Wisconsin's business climate—the state's strengths, weaknesses, and opportunities.

Wisconsin's manufacturers believe that they face four (4) major barriers that could limit the state's readiness for competition with other states and countries in the global marketplace:

1. Manufacturing has a poor image professionally in Wisconsin; therefore, it is difficult to attract and then retain high quality replacement labor.
2. Taxes of all types are high in Wisconsin, compared to border and other competitor states.
3. Businesses are unable to contain manufacturing costs, due to spiraling health care, liability insurance, on-the-job training, and new machinery and technology costs.
4. There is an emerging two-tiered workforce in Wisconsin. Older, reliable, hard-working employees are retiring soon. Their potential replacements may not be as dedicated to the work ethics of their forerunners and they are increasingly difficult to hire and retain.

To improve their competitive position, both in domestic and foreign exports, manufacturers believe that Wisconsin must:

1. Reinstate tax incentives to encourage the purchase of new equipment and higher technology.
2. Support automated manufacturing through tax incentives or other subsidies.
3. Support or provide state-funded on-the-job training, especially for new employees.
4. Introduce tort and regulatory reform that will reduce product, workplace, and environmental liability for manufacturers.

5. Improve regional economic development planning and coordination to recruit new businesses to Wisconsin, especially in the southwest.

6. Provide assistance in linking manufacturers to new export distribution channels.

7. Provide assistance in overcoming ethnic language blocks through pre-employment training or English classes to provide more high quality workers.

It is notable that most Wisconsin manufacturers who participated in the panel discussion and online questionnaire still emphasize Old Economy concerns—taxes, work ethic, costs of doing business, poor image of manufacturing—even as they begin to recognize the need for long-term strategies that would move them into the New Economy.

One promising factor in the struggle to transition from the Old Economy to the New Economy lies in the fact that Wisconsin's manufacturing firms are small when compared to those in the eight competing states: 82.4% of Wisconsin manufacturers' corporate parents have annual revenues of less than \$100 million, while all of the other states have percentages less than 65%. U.S. Trade Administration figures suggest that smaller, more flexible firms have significant opportunities for moving into the global market:

- More than two-thirds of the U.S. exporters have fewer than 20 employees.
- The number of small- and medium-sized exporters grew twice as fast as the number of large company exporters between 1992 to 2001.
- Small- and medium-sized export revenues rose 77% from 1992 to 2001.
- Small- and medium-sized exporters comprise roughly 30% of U.S. exports.⁵

⁵ U. S. Department of Commerce, "Summary Graphs," Small & medium-Sized Exporting Companies: A Statistical Handbook: Results from the Exporter Data Base, pp. 6-11. See www.ita.doc.gov/td/industry/otea/docs/SMEseminar.pdf

Analysis and Recommendations

Whether any of Wisconsin's driver industries succeed in transitioning to the New Economy will depend primarily on the performance of their leaders and employees in managing the complexities of a new global manufacturing paradigm. At the same time, state and regional policies, regulatory frameworks, and tax structures do impact competitiveness. To capitalize on its 21st Century manufacturing potential, Wisconsin will have to create a business and social environment that fosters (or at least does not hinder) responsible, growth-oriented manufacturing industries. At present, Wisconsin's business climate currently offers both significant opportunities and challenges to its manufacturers.

All of these challenges must be addressed within the context of Wisconsin's driver manufacturing industries and the seven economic regions in which they predominate. Therefore, any strategies for aiding an industry must also consider its growth / competitiveness position within a specific region. The regional profiles, along with each region's driver industries, appear in the Study report. Other information includes regional industry cluster suppliers and customers, the top companies in that industry, their gross products, employment, growth, competitiveness, and other data to pinpoint further where individual industry leverage points might reside.

We recommend that over the next 24 months, the project collaborators use the findings of this Study as the basis to convene working groups within each of the 13 statewide driver industry categories, with regional representation, to develop plans and recommendations specific to each industry. Notwithstanding regional differences, however, a number of statewide, cross-industry issues must be addressed by each of these plans-reflecting statewide, collaborative actions that must occur for Wisconsin to claim its place among the world's elite manufacturing centers.

We also recommend that Wisconsin focus its manufacturing transformation efforts in the following four areas:

1. Build on Wisconsin's driver industries. Nurturing driver industries is the key to economic growth. Wisconsin should concentrate its state and regional economic development efforts on strengthening driver industries and the cluster industries around them. The focus should be on helping these driver industries adapt to a new manufacturing economy.

For example, Wisconsin should consider:

a) Strengthening driver industry supply chains by targeting improvement services to driver industry suppliers. Encourage and foster the growth of driver industry-led original equipment manufacturer (OEM) supplier consortia to promote globally competitive Wisconsin suppliers.

b) Developing research/technology/innovation centers to support Wisconsin's driver industries. The transformation of today's driver industries depends on the adoption of new technology and techniques. Driver industry technology centers will spur innovation, attract new scientific and engineering talent, and spin off new businesses that are likely to stay in the area because the cluster already exists in the state. The recent formation of a paper products research center in the Green Bay area is an example of how a key driver industry can be advanced in this fashion.

c) Developing regional purchasing and management cooperatives for certain industries, particularly those that operate in a number of economic regions, such as the Dairy Industry, found in six of the seven regions, and Electrical Equipment found in five regions.

d) Redoubling efforts to expand Wisconsin exports and penetrate international markets, with special attention to non-commodity products. Emphasize Wisconsin's driver industries in the state's export promotion and assistance programs.

e) Encouraging manufacturing service providers and regional economic development entities to deliver services targeted to driver industry firms and supply chains. Those services should continue to support in competitive strategies such as Lean Manufacturing but should be expanded to emphasize New Manufacturing Economy imperatives of innovation, marketing, and value-added services bundling.

2. Create structural change that fosters sustainable focus on manufacturing.

Efforts to adapt to the world's new manufacturing paradigm have been sporadic and inconsistent in Wisconsin and elsewhere. A dedicated effort to identify the keys to success for Wisconsin's driver industries - and to replicate those success factors among the state's large number of smaller manufacturers - will pay dividends for decades to come.

For example, Wisconsin should consider:

a) Establishing an ongoing bi-partisan legislative manufacturing task force to ensure legislative attention commensurate with manufacturing's importance to Wisconsin. Manufacturing issues span the jurisdictions of multiple legislative committees. A legislative manufacturing task force would provide a cross-cutting perspective and be a resource to standing committees.

b) Establishing an ongoing cross-agency team of agency leaders to coordinate executive actions to advance manufacturing in Wisconsin. Agencies involved would include the Departments of Commerce, Workforce Development, Natural Resources, and others.

c) Assigning responsibility for ongoing research on manufacturing issues. This could provide manufacturers and policymakers with data to help make informed choices and provide benchmarks for progress. Valuable research areas could include biannual updates on driver industries in the state, regular assessment of best practices of competitive and growing firms, and regular benchmarking of other states' manufacturing support policies.

3. Take immediate action to correct the current and projected skill shortages in advanced manufacturing. The availability of talent is the most important factor for the long-term success of Wisconsin's driver industries. The private, public, and non-profit sectors should leverage resources in innovative solutions to attract and train entry level workers as well as professionals in engineering, science, and mathematics.

⁶Thomas L. Friedman, "Follow the Leapin' Leprechaun," The New York Times, July 1, 2005, p. 1.
See <http://query.nytimes.com/gst/abstract.html?res=F70715FE3B5E0C728CDDAE0894DD404482>

For example, Wisconsin should consider:

- a) Strengthening partnerships between driver industry firms and the state's workforce development boards, technical schools, and universities to design workforce development strategies and encourage placement of management, engineering, and technical talent with Wisconsin firms.
- b) Expanding internships for students and teachers to provide a first-hand look at manufacturing's state of technology and career opportunities.
- c) Integrating manufacturing into academic and technical institutions' curricula, especially into more K-12 education.
- d) Researching and replicating innovative workforce development models.
- e) Aggressively promoting manufacturing as a high-tech industry with a strong future and with high quality of life jobs. Industry, government, and academic leaders should have a visible role in communicating this message.
- f) Acquiring best practices from other states and countries that support economic competitiveness and investment, e.g., "flexible" labor laws, new education and research strategies, and "tax optimization" that "encourages more foreign direct investment."⁶

4. Prepare a broad-scale legislative package based upon close examination of policies affecting driver manufacturing industries and their industry clusters, with the goal of supporting Wisconsin manufacturing. Many Wisconsin manufacturers believe some state policies and practices are barriers to competitiveness. The state should initiate legislative action on issues that impact manufacturers and affect their ability to compete in the New Economy. Among the policies, practices and issues identified by manufacturers as potential barriers are:

- a) Rapidly rising health care costs
- b) Wisconsin's tax structure
- c) Skill shortages in key manufacturing occupations
- d) Regulatory authority, process, and limits
- e) Minimum wage levels
- f) Product and environmental liability

g) Access to capital for new technology investment

h) Economic development priorities

Perhaps most difficult of all, for any industry, will be changing public perceptions about the viability of manufacturing as an economic growth engine for the state and about the desirability of careers and communities based on manufacturing.

Wisconsin clearly has unique manufacturing assets and potential based on its long history of manufacturing leadership. The fundamental economic development question facing the state's leaders, manufacturers, and general population is whether they will have the savvy, persistence, and will to capitalize on what is before them—the New Economy.

This study addressed many issues, but there are a number of areas worth exploring more fully as Wisconsin seeks to retain and grow driver manufacturing sectors. Wisconsin should assign entities to track, analyze, and address issues associated with at least these two areas, and others as needed:

- The impact of manufacturing on other sectors of the economy. Manufacturing is shifting and a new manufacturing economy will depend more on outsourced suppliers and services. As a result, the true health of a manufacturing driver industry will be less apparent by looking at direct manufacturing employment numbers. A better understanding of this impact is essential.
- The impact of Wisconsin's heavy concentration of small, privately owned manufacturing base. The data clearly show that Wisconsin stands out in the percentage of firms that have this characteristic. It is unclear what implications this has on future manufacturing success in the state.

