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Driving Ohio's Prosperity (Auto supply chain)

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Driving Ohio's Prosperity

Central Ohio Is the Leverage Point of a *Two-Job* Strategy for Growing the Value of Automotive & Advanced Manufacturing

How to help manufacturers do today's job of meeting customers' demands and tomorrow's job of continuing to innovate and improve

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ABOUT THIS REPORT

CompeteColumbus commissioned this report on the Central Ohio automotive cluster following a regional assessment of cluster competitiveness by the Monitor Group in 2005. CompeteColumbus engaged a team of consultants to craft a strategy document that would advance regional cluster competitiveness and strengthen the Central Ohio automotive cluster.

Between January and April 2007, the MPI Group surveyed suppliers in Central Ohio's automotive cluster. The benchmarking survey generated 71 responses.[1] Of those who responded, 57 percent were Tier 1 suppliers, 24 percent were Tier 2 suppliers and 19 percent identified themselves as Tier 3 or "other." In all, respondents reported supplying parts for 16 different car and truck OEMs, with an equal share – 61 percent – saying they served Honda and General Motors. This figure clearly indicates that the supply chains for domestic- and foreign-owned OEMs are entwined, with suppliers, especially Tier 2 and beyond, perhaps manufacturing parts for Honda Accords, Chevy Cobalts and Ford vans, as well as Toyota Camrys assembled in Kentucky and Indiana.

The interconnected nature of the automotive supply chain is important to understand. First, it illustrates that the distinction between "American" and "foreign" vehicles is fuzzy. An October 2007 letter from the Federal Reserve Bank of Chicago highlighted just how meaningless the distinction has become: "Some models produced by the American-owned Detroit Three carmakers have a smaller share of domestic parts than models produced by foreign-owned carmakers." For example, the 2006 Honda Accord had more domestic content – 70 percent – than the 2006 Ford Mustang, which consisted of 65 percent domestic content. Which of the two models is more "American"? The letter went on to make a point that is particularly instructive for the scenario playing out in Ohio, which is home to both American-owned and Japanese-owned assembly plants: "Domestic carmakers rely more on imported parts, foreign carmakers increasingly use parts that were produced in the U.S., and foreign parts companies have established production operations in North America." Going forward, it is important to understand that the meaningful economic distinction is between domestic auto assemblers and suppliers, both old and new, and vehicles assembled outside the nation. The challenge for Ohio's automotive industry is to become ***globally competitive locally.***

Phase 2 of the project took place between July and November 2007 and entailed interviews with 34 representatives of OEMs; Tier 1, 2, and 3 suppliers; and raw material and logistics providers. Those interviewed represented a variety of operational responsibilities – from plant manager to president, engineering to human resources – giving voice to perspectives that crossed the business enterprise and work experiences that crossed the globe. The manufacturers selected for interview, the majority of which operated out of Central Ohio, reflected the mix described in the Federal Reserve letter: Some were longtime suppliers to the Detroit Three automakers who had lost business to countries promising parts at a lower cost; several were foreign-owned companies that had located in Central Ohio to supply the original Honda plant in Marysville. Others are Ohio-born companies that are operating globally to satisfy the demands of their customer OEMs.

As the Detroit Three automakers have struggled, their longtime suppliers have felt caught in a squeeze on prices. To survive, many of these "old domestic" suppliers have tried to align themselves with "new domestic" assemblers, such as Honda and Toyota. Drawing from these interviews and the survey responses, we endeavor to benchmark the state in general – and Central Ohio in particular – as a location for automotive and advanced manufacturing, discuss the primary issues, explore potential government roles for addressing these issues, and map a strategy for, as the one manufacturer put it, making Central Ohio the place where advanced manufacturing rebounds when the "hidden costs" of supposed low-cost countries are finally fully understood.

EXECUTIVE SUMMARY

Few other states have suffered the pains of global competition as intensely as Ohio, losing some 236,000 manufacturing jobs over the past 10 years alone. Yet, Ohio's industrial base has been extraordinarily resilient in these challenging times. Despite a 9.5 percent drop in gross domestic product during the 2001 recession, Ohio's manufacturing GDP had rebounded to levels slightly above those of 1998 after adjusting for inflation. As a whole, the state did lag the nation in GDP growth from 2001 to 2006. Ohio enjoyed a 12.1 percent real increase in manufacturing GDP from 2001 to 2006, compared to the 17 percent national increase that propelled the United States to a GDP of $1.5 trillion. However, one region of the state managed to steer clear of many of the obstacles of job loss and plant closings to navigate a relatively smooth and stable road to global competitiveness: Central Ohio. Columbus-area manufacturers fared even better than the nation – dropping less than 4 percent during the 2001 recession – and growing by a sizzling 24 percent since then.

These Central Ohio manufacturers that have been growing sales, while their counterparts in other areas of the state have been struggling, provide insight and example of what it takes to compete globally and win. Ten years ago, Columbus-area manufacturers accounted for about 12 percent of the state's manufacturing GDP of $80.5 billion. By 2007, those manufacturers contributed nearly 14 percent of the state's manufacturing GDP. There can be little doubt that the engine helping to propel Central Ohio manufacturers forward is partially made by Honda. While other regions of the state have experienced the sputters that have choked growth among the "Big Three" automakers, the engine of the Japanese-headquartered automakers has continued to rev.

The successes among Central Ohio manufacturers suggest that there is still opportunity for the state to revitalize its storied manufacturing might. State and local policy makers who read worrisome headlines about troubles in the automotive industry may doubt that Ohio's future success relies on the long-term strength and stability of motor vehicle manufacturing. However, automotive manufacturing provides the glue and springboard for Ohio companies to capture the high-value-added gains of advanced manufacturing – and reinforces strengths in IT, logistics, materials joining, and other key parts of the region's economic base. The existing automotive complex also provides the ingredients for a transformed industry. The United States will always have demand for personalized transportation systems. No matter the fuel source, North America will demand between 15 million and 17 million automobiles a year. No matter the value of the dollar against competing currencies, the vast majority of these vehicles will be assembled in the United States. Central Ohio's challenge is to remain globally competitive locally.

Without a doubt, the manufacturing industry is locked in a transformation. Nowhere is that more evident than in the area of motor vehicle manufacturing and its cluster of suppliers. As the distinction between American- and foreign-owned becomes more and more blurred, state and local leaders would be well-served to begin to craft policies that help all domestic automakers, both old and new, and their increasingly integrated chains of suppliers compete more effectively against manufacturers making parts and cars outside the United States — be they in Canada, Mexico, Europe, Japan, Korea, China or India. Increasingly, suppliers traditionally serving the "old domestic" automakers are pinning their futures on getting business from the "new domestics." Central to this mission should be supporting manufacturers in their efforts to add value.

The manufacturers that are thriving are those that have quickly learned to navigate the new terrain of a global landscape. They have embraced new technology, encouraged innovation, eliminated waste and enhanced the value of their products. Unfortunately, too few are thriving. Many assemblers – in Central Ohio, as well as throughout the state – are struggling to survive. Nearly 43 percent of suppliers surveyed say operational inefficiencies threaten their profitability. A similar number – 42 percent – perceive

global competition as a threat to profitability, with 18 percent also citing global sourcing as a concern. A statewide survey of automotive parts suppliers detail the difficulties of competing in a rapidly changing business environment. They have plenty of worries:

- 72 percent cite raw material and component costs.
- 38 percent cite labor costs.
- 35 percent cite finding skilled labor.
- 27 percent cite finding skilled leaders.
- 26 percent cite customer instability.
- 12 percent cite logistics and transportation costs.

Some of the primary concerns of respondents – such as the costs of raw materials that fluctuate with global market prices – are beyond the reach of local, regional or even federal government intervention. However, other concerns represent ripe opportunities for state and local leaders to intervene with programs and tools to help manufacturers overcome challenges, bridge gaps, and especially address labor-market failures. The increasing demands on manufacturers to be forever engaged in product- and process-improving innovation has in turn meant that every employee – from shop floor to corner office – must be actively working two jobs: today's job to meet production demands and tomorrow's job to continually improve. State and local leaders would be wise to adopt such a strategy for retaining and growing Ohio's important manufacturing base: Today's job for policy makers is to address potential hurdles and problem areas that make the state a less-than-ideal environment for manufacturing. Based on survey and interview responses, top among policy concerns are workforce development, energy, taxes, and workers' compensation. Tomorrow's job for policy makers is to position Ohio to capitalize on future opportunities. One manufacturer interviewed summarized the need this way: "When the cost of manufacturing structures breaks down in China or India, where will they want to come back to? We need to make it here in Central Ohio." To be ready for such opportunities, manufacturers today need help with product and process innovation, support for research and development, and a workforce system that invests in increasing the skill level of the incumbent and entering workforce.

Central to the two jobs of policy makers and manufacturers should be the goal of adding value. U.S. manufacturers of commodity products are challenged by countries with low labor costs. In a competitive global environment, manufacturing jobs that employed generations of Ohioans are "not coming back, not unless we add some huge high-value-added distinction that creates that price for the product," said one Central Ohio supplier. The good news is that high-value-added distinction can happen – and is – here in Ohio, according to that supplier and many others. However, manufacturers need help from state and local leaders in creating a business environment that supports high-value-added manufacturing. In fact, manufacturers are not the only ones that need to be concerned about adding value. If manufacturing in Ohio is to grow, the state needs to consider what value it adds to the profitability equation.

The two-job strategy for growing the value of advanced manufacturing in Ohio should develop from one of the state's core strengths **– the Central Ohio automotive cluster**. Supporting and nurturing that core represents the best opportunity to foster economic growth throughout the state's industrial base. For decades, the automotive industry has helped drive Ohio's prosperity. It can continue to serve as that economic engine. However, to support the industry in getting from where it is today to where it needs to be tomorrow, state and local leaders must develop a road map to success. The main thoroughfares for policy to nurture Central Ohio's automotive manufacturing industry are business environment, operating infrastructure, technology and workforce.

Today's Job: Improve the Business Environment

- Focus on retaining OEM assembly plants and their supply chains.
- Work on maintaining state business tax reforms and incentives.
- Support collaboration between OEMs and parts manufacturers.
- Address uncompetitive aspects in the workers' compensation system.

Today's Job: Support Incumbent Manufacturers

- Ensure long-term energy price stability & reliability and help finance "last mile" energy infrastructure.
- Regionalize and integrate state & local economic development retention and expansion activities.
- Provide seamless processes and best-practice improvement services.

Today's Job: Focus on Workforce Improvement

- Focus and invest in the incumbent manufacturing worker in a demand-driven system.
- Make all training and funding outcome-based and customized.
- Base the subsidy for workforce training, which is a recognized focus of Ohio's two-year college system, on credit hour provided, not on student enrollment in degree-granting programs.
- Establish one source of contact across all service providers.

Tomorrow's Job: Develop Thought Leadership

- Recruit Tier 1 & 2 headquarters and research and development functions.
- Become a thought leader in global integrated manufacturing production (global process improvement).
- Build on existing leadership in manufacturing ergonomics and joining technologies.
- Develop leadership in the areas of lightweight metals, composites, forming technologies, alternative fuels and related propulsion systems, and non-destructive materials testing.

INTRODUCTION

To paraphrase Mark Twain, reports of the death of manufacturing in Ohio have been exaggerated. It is no exaggeration, however, to say that manufacturing is undergoing a transformation. Over the past decade, some 236,000 manufacturing jobs have disappeared from Ohio's economy. These losses – accounting for more than 7 percent of the 3 million manufacturing jobs that have evaporated nationwide – have led reporters, educators, politicians and even many workers throughout the state to write off manufacturing as a relic of an "old economy" that has been all but lost to low-cost countries such as China, Mexico and India.

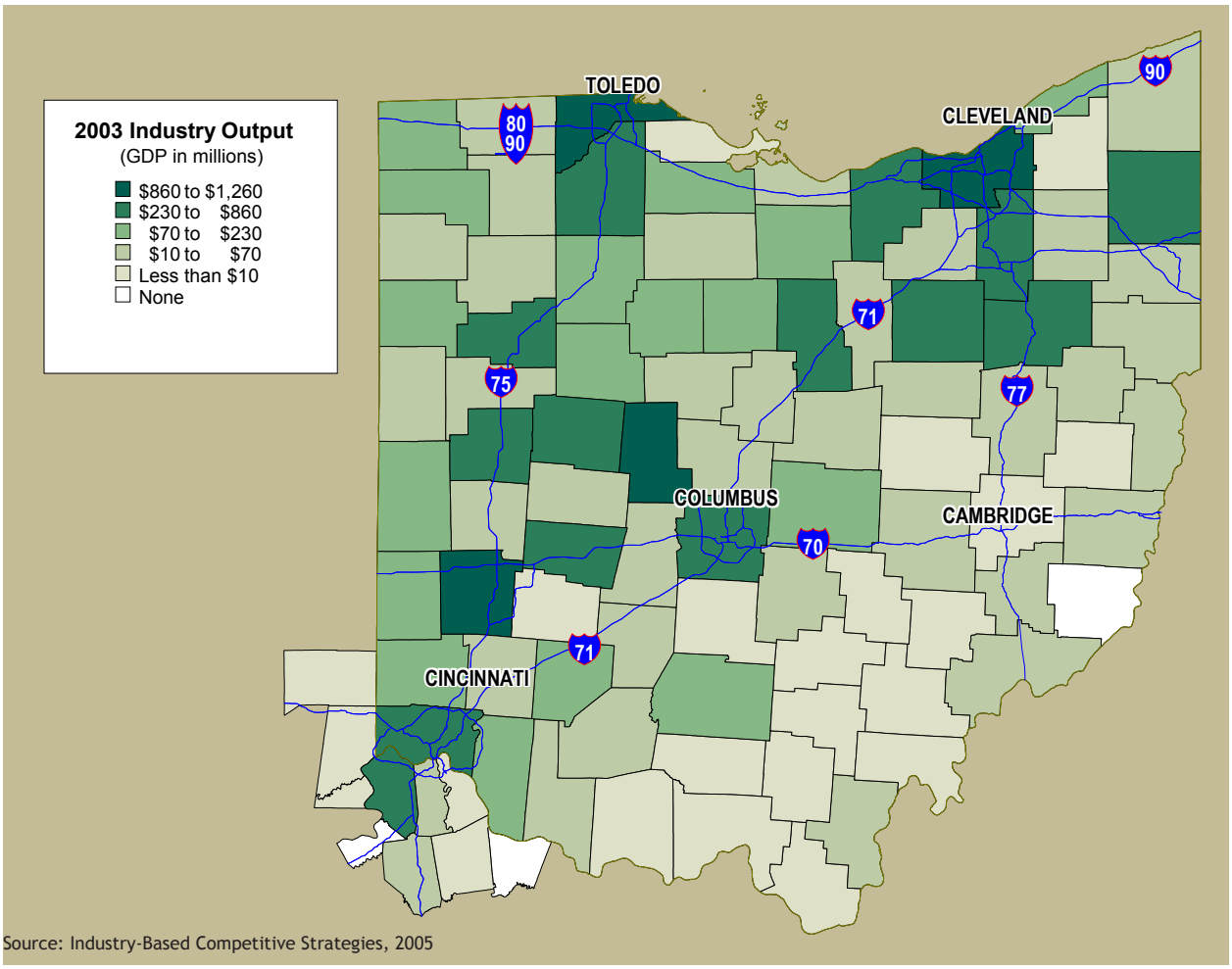
In today's so-called "knowledge economy," why should Ohio care about maintaining the long-term vitality of its manufacturing base? The view of manufacturing as providing a wealth of good-paying, highly repetitive jobs with long-term benefits for a legion of low-skilled, undereducated workers illustrates thinking that is firmly stuck in yesterday. Those jobs are either gone or on the way out. However, that is not to say that manufacturing, in the nation and in Ohio specifically, will itself be gone along with those jobs. Manufacturing has in fact been undergoing an evolution, one largely sparked by the intersecting forces of technology and globalization. Ohio – and Central Ohio in particular – with its combination of skilled labor, educational resources, proximity to markets and manufacturing density, in fact, could be at the nexus of a new era in American manufacturing. And while it is true that Ohio has lost more than 236,000 manufacturing jobs over the past decade, a loss of that magnitude in almost every other state would mean that its manufacturing capacity had ceased to exist; in Ohio, more than 700,000 direct manufacturing jobs that produce more than 20 percent of the state gross product were maintained.

Manufacturing remains a vibrant and vital engine of Ohio's economy today and provides an important foundation for the state's future well-being. True, it's not the muscular engine that employed generations of Ohio workers in low-skilled, higher-paying jobs that were expected to exist for a person's work life; however, it is a more efficient engine incorporating newer technology, enhanced productivity and added value, and it holds the promise of driving a new era of prosperity for Ohio. State and local leaders do not need to look far for a high-octane engine with the potential power to rev the state's flagging economy: The automotive industry provides the foundation for a strategy to grow Ohio's share of advanced manufacturing.

Automotive assembly plants should be considered the glue that holds much of Ohio's manufacturing base in place. As can be seen by the following map, Ohio has distinct regional hubs of automotive activity. These manufacturing hubs are anchored by assembly plants, which need constant and continual infusions of parts arriving just in time to be turned into cars, trucks, minivans or sport utility vehicles. The glue of just-in-time delivery of parts and finished subassemblies is in the process of being strengthened by increases in the cost of fuel. These hubs of motor vehicle assembly are among the core drivers of four of the state's regional economies (Central, Northeast, Northwest and the Dayton area), as well as one of the few statewide economic engines with strengths in all regions.

Keeping those hubs actively humming should be central to any state or regional strategy for growing the economy. Similar to the old sports adage "The best offense is a good defense," the best strategy for attracting new business to the state at large is to support and nurture the economic players already here, the incumbent employers. One Central Ohio manufacturer summarized an ideal state attraction strategy this way: "If you take [the companies in] your base and you make them really competitive, give them the tools to be globally competitive, I guarantee you history will repeat itself. Things will start to spin off and grow and things will spin off to support these things. But you have to have something that's a catalyst to do that and it starts with what we have."

Figure 1: VALUE OF MOTOR VEHICLE PARTS MANUFACTURING IN OHIO, 2003



Source: Industry-Based Competitive Strategies, 2005

Maintaining the long-term health and vitality of the automotive industry has benefits that stretch beyond the overall health and vitality of manufacturing in Ohio. Assembly plants, whether in Northwestern, Northeastern or Central Ohio, serve as the glue attracting and holding headquarters and research and development operations and countless professional services, as well. As will be discussed later in this report, the state already has a number of key competitive advantages for staking a claim as the nucleus for future value-added manufacturing: the state's history of manufacturing and its subsequent pool of skilled labor, its central location within a day's drive of two-thirds of the nation's population, its network of educational resources, and its strength in logistics and research and development, among others.

Central Ohio is taking shape as the epicenter of this new wave of advanced manufacturing. Anchored by the long-term stability and success of Honda of America Manufacturing's $6 billion investment in its assembly plants in Marysville and East Liberty, one of the nation's largest engine factories in Anna and a transmission plant in Russells Point – coupled with a significant research and development center also located at Honda's Marysville campus –the region is proving to be fertile ground for retaining and attracting new businesses.[2] Central Ohio has not been shielded from job losses, but the region has not been as hard hit and has not experienced the same fluctuation in fortunes as in other hubs of automotive manufacturing throughout the state. As regions more historically tied to the "old domestic" automakers deal with a drop in domestic market share, Central Ohio – and the rest of the state – has benefited from

the relative health and vitality of "new domestic" automakers. In reality, the distinction between domestic and foreign cars is becoming more blurred, and the chain of manufacturers supplying both domestic- and foreign-headquartered automakers is becoming much more integrated. (The economically meaningful distinction among automobiles is between the old domestic portion of the industry, the new domestic portion of the industry, and imports no matter the nameplate.) The increased integration across the old- and new-domestic supply chains provides both opportunity and threat. As the new domestic auto assemblers gain market share, the state, and Central Ohio in particular, is strategically positioned to benefit from that growth. However, obstacles in the road – such as a lack of workers with necessary skills – threaten to steer the state away from this potential source of economic growth and prosperity.

Central Ohio manufacturers are concerned that state and local leaders fail to recognize their importance and contributions to the overall well-being of the state. They see a frustrating disconnect between their needs to succeed in a challenging environment and public policies to attract and support growth. One spoke candidly of his discontent with the political status quo: "I wonder if our government gets it at all, really understands. If they really got it, if they really understood the things we're talking about, and could think collectively as a team about what we could or should do as a state, they could make a huge difference very quickly." Just as manufacturing is undergoing a transformation, state and local programs must be transformed to reflect the reality and respond to the rapidly changing needs of a globally competitive world.

Quite simply, jobs are derived from product demand. If no one demands Ohio's products, no Ohioan will be employed. Yet, when evaluating whether to provide support or incentives for incumbent manufacturers, the state bases its decisions on job creation. No matter the productivity improvement, the change in output value or the net capital investment, manufacturers complain that their efforts to remain competitive and remain in Ohio – and keep existing jobs viable – do not gain state approval unless they create net new jobs. Although given the number of manufacturing jobs that have been lost in the state, this insistence on job creation is understandable politically. However, in taking this stand, state and local leaders may be missing out on opportunities to grow Ohio companies and develop an environment that will attract new ventures and industries to the state. Consider the experience of one Central Ohio-based Tier 1 supplier appealing for government assistance in expansion efforts: "After Honda [expanded into] Indiana, we couldn't get that 0 percent financing offer from the state because we didn't think we would add jobs." [And they would not make up the numbers.] They would keep the jobs they already had and keep the work they were doing and gain more, but that wasn't enough to receive state support. Policy makers endeavoring to spur economic development are using the wrong measurement to gauge progress toward their goal. Earnings growth reflects productivity; therefore, the focus of economic development should be on product and process innovation. Invest in programs and tools that encourage innovation and reward business investment.

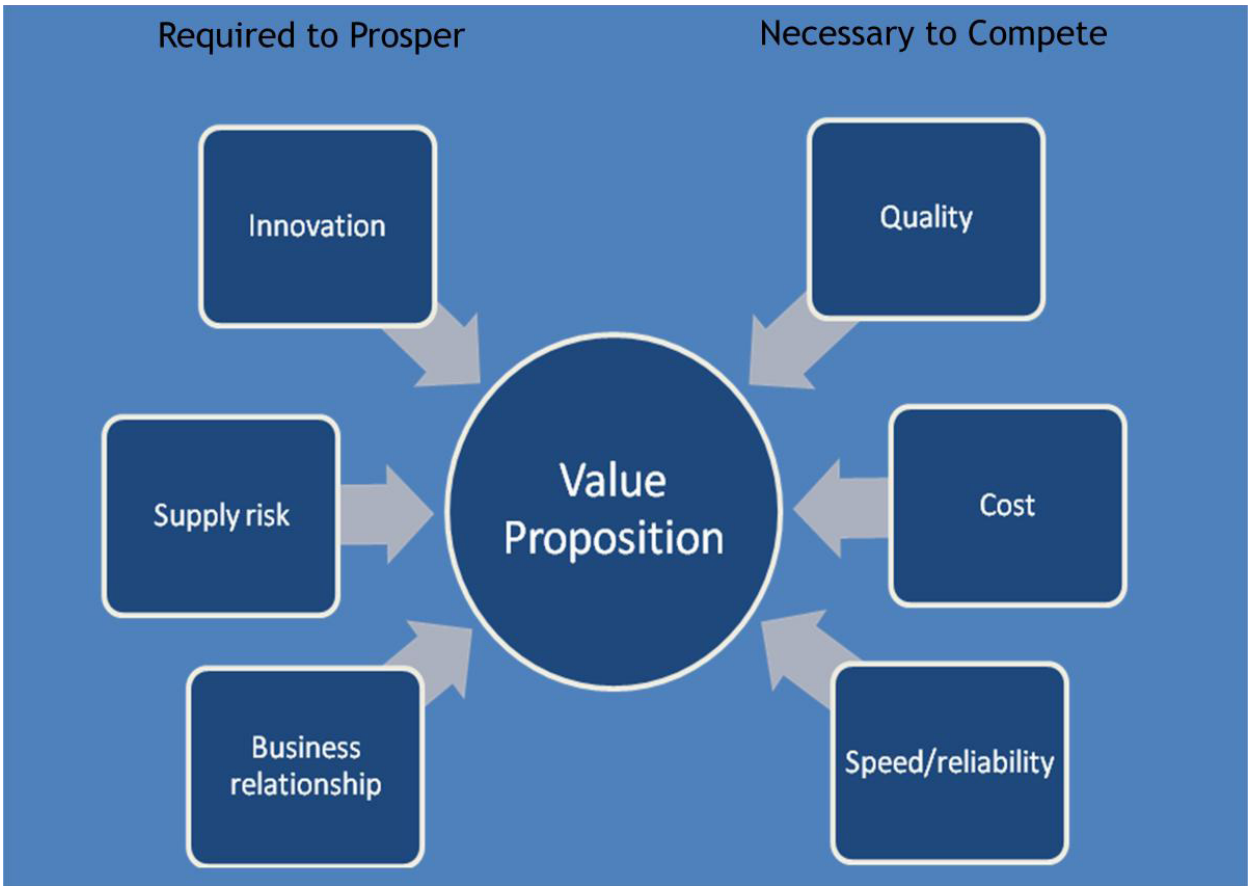
To remain competitive in a global market, Ohio manufacturers must be continuously engaged in the pursuit of innovation, developing new products and processes that will give them a winning edge. To compete with low-cost countries such as Mexico and China, manufacturers have cut jobs and improved productivity. Those still in business have leaned their operations of production and managerial fat. However, lean, efficient production processes can only go so far in keeping manufacturers competitive. As long as other countries pay wages that are a fraction of those in the United States, manufacturers here will need to offer competitive advantages that offset the price of a part at a foreign factory location. The key to global competitiveness is high-value-added manufacturing. The key to value is both product and process innovation. With so much riding on product and process innovation, companies must harness the creative and resourcefulness of their workers. Every employee – from shop floor to top management – must be actively engaged in two jobs – their job for today supports production and immediate value creation.

Their job for tomorrow is one of continuous improvement justifying investment. How can the product be better, the process more efficient? What need isn't being served? Where could untapped opportunities lie? Quite simply, employees and employers both have a stake in this two-job strategy: Without today's job, there will be no work tomorrow. However, employers and employees also need to invest time, energy, and money to create tomorrow's product. Without tomorrow's products here, there is no future.

Central to both jobs should be the goal of adding value. Domestic manufacturers who tend to focus production on what has become a "commodity product" will eventually succumb to cheaper production platforms in other regions of the world.. When bolts or windshield wipers can be made in China and shipped to an automaker halfway across the world at a price significantly cheaper than what an Ohio supplier can offer, the Ohio manufacturer will lose out. In a competitive global environment, manufacturing jobs that employed generations of Ohioans are "not coming back, not unless we add some huge high-value-added distinction that creates [justifies] that price for the product," said one Central Ohio supplier.

So what determines a company's value proposition? The following figure details the six key components. The traditional ways in which manufacturers have tried to add value to products have been to offer better quality, lower cost or more speed or dependability in meeting just-in-time demands. These factors have become business necessities: Delivery reliability, quality and cost are now standard. The new value opportunities lie in customer experience, supply risk, and product and process innovation. The quality of the business relationship, the support for innovation, and the drive to minimize supply risk perhaps best explain why some OEMS are succeeding and others are struggling. New domestics like Honda of

Figure 2: COMPONENTS OF A COMPANY'S VALUE PROPOSITION



America Manufacturing tend to nurture a close relationship with their chosen suppliers, even providing access to the production lines in order to improve not only product but process. Tier 1 suppliers spoke favorably of customer companies that exhibited willingness to work with them on product development and pricing. This kind of close relationship has real economic benefit in that it helps reduce risk and spur innovation.

As will be detailed throughout the remainder of this report, a two-job economic development strategy focused on retaining existing manufacturers and supporting them in their efforts to add value presents the best opportunity for driving economic prosperity in the state. That focus should leverage the assets that exist in a core competitive strength of the state – the automotive manufacturing industry in Central Ohio.

A QUICK WORD ON HIDDEN COSTS, COMPETITIVE ADVANTAGE AND DEVELOPMENT STRATEGY

As noted earlier, many in the state – and the nation at large – have been quick to write off much of the manufacturing industry to low-cost competitor countries. Depending on which side of the political fence they sit on, they will attribute the inability of U.S. manufacturers to compete with low-wage competitors in Mexico and China as due to unfair trade policies or the long-term consequences of labor unions and legacy costs. However, manufacturers interviewed were quick to point out that the unrelenting drive to obtain the lowest price for parts has not been a true comparison of how U.S. manufacturers' products stack up against their foreign competitors. The overriding focus on cost fails to factor in the hidden costs of supply risk, the requirement to hold extra inventory in the supply chain, and potential disruptions caused by defects. In a just-in-time system, manufacturers buying parts from halfway around the world need to keep a larger inventory on hand than would be needed if buying parts from the supplier an hour's drive down the highway. Responding to design flaws also tends to be more challenging the farther away the supplier is from the OEM. "There's a huge amount of hidden costs," one manufacturer said. "In general you have to have high-volume, low-value products to be competitive if purchasing from overseas. There has to be a lot of labor involved in order to beat the cost [of producing] here. If it's a design-generated product, we can probably produce it here." Echoed another parts supplier feeling the squeeze of low-cost parts: "The advantage of low-cost countries is a lower labor base and lower standard of living. The disadvantages, and there are many, are lead time, problems in shipments. If you have a defect or a design problem, you have a hard time fixing [it] with so much product in the stream."

One supplier shared his experiences with the pricing demands of working with certain automakers: "You hear that sourcing parts is based on lots of factors – that's BS – cost is more like 98 percent and everything else [quality, inventory, risk] is 2 percent," he said. "The hidden cost of overseas production is an absolute nightmare – a $40 part becomes a $15 part moved to China. But that doesn't count the hidden costs, losses, etc. … Then there is the organizational drain on people; they have to track down parts … it's a holiday. … Quality is a main part of the risk; there can be a 6-month lag on correcting the quality of a low-cost country sourced part. In a pinch you have to charter the parts [and fly them] over, and they often require payments upfront when the parts leave the plant. You have to really understand the risk profile of overseas suppliers."

Many of the suppliers interviewed told of efforts to compete on quality and added product value, but said it continues to be an uphill struggle to get many companies to look at issues beyond per unit price. "If a competitor turns in a bid using overseas parts, we may lose the bid," one supplier explained. "The quality may not be there, but it may be another two to three years to regain the business based on cost and quality."

Domestic auto assemblers, and other original equipment manufacturers (OEMs), need to think carefully about the fully accounted, risk-adjusted cost of sourcing. In plant visits to Tier 1 suppliers and conversations with OEMs and consultants who work with OEMs in a number of industries, we ran into cases of supply chain breakdowns that imposed significant costs and risks to the purchasing company. It is clear that there are serious cost-accounting issues involved in determining the economic costs of sourced components and parts. There are costs associated with product development and other costs associated with assembly.

Development Costs

The economic value of the business relationship becomes evident in the way that OEMs develop products with their supply chains. There are two polar models, with a great deal of variation between the poles. The first is an *auction model* of the supply chain relationship. In this model the OEM specifies the part or subassembly in great detail and puts the part out to auction and awards the supply contract to the lowest-cost bidder. In some sense, an auction supply chain relationship is "plug and play" – that is, any supplier that can hit quality and delivery targets is allowed to bid and plug its part into the supply chain if it wins the auction.

The model at the other pole is a *business relationship model*. Under the relationship model, the supplier is prequalified by having an existing relationship with the OEM. The supplier has to bid for the work, but the number of firms bidding is bounded. Both OEM and supplier place an economic value on the business relationship, frequently share a business culture, and often share information. The return that both parties receive from these relationships is risk mitigation.

What are the risks that are mitigated and where are the cost savings for the OEM? The OEM mitigates costs throughout the lifecycle of the part or subassembly, as well as mitigating costs and risks in the production process itself. The first set of savings consists of transaction cost savings. The OEM has a prequalified supplier with knowledge about quality, delivery performance, and experience with the OEM's production process. The supplier can anticipate the idiosyncrasies of working with the OEM and with each production site. Second, in the relationship model, suppliers and the OEM are apt to jointly engineer parts and subassemblies. The cost savings from this relationship may not come in the form of lowest cost or cheapest factory gate pricing from the supplier but from the improved lifecycle performance of the part or subassembly.[3] These savings could include: improved performance of the subassembly, the introduction of new product features, cost savings in the way the part is engineered, improvements in the way the final product is assembled, or reductions in warranty costs later in the product's life.

The supplier benefits in three major ways. First, the long-term working relationship reduces the risk involved in bidding because the supplier understands the accuracy of the sales forecasts provided by the OEM. Second, the value placed on the business relationship ensures that the OEM will not "price them [the supplier] out of business." Finally, the supplier knows that the investments made in engineering and developing the product will result in a more stable operating environment.

There is symbiotic danger in the relationship model for both the OEM and the supplier. The first is that the relationship slips into what economists term "efficiency pricing." This occurs when the supplier is paid an amount that is slightly above market rates to ensure that the supplier does not leave the OEM's fold. It can be seen as paying an insurance premium to ensure the value of the relationship. The danger for the OEM is that it can become overly dependent on the business of a single supplier. The linked danger for the supplier in having an undiversified order book is twofold: First, The supplier's fortunes rise and fall with its dominant customer. Second, its customer can morph into a monopsonist (a single purchaser), with the power to determine the price of the product and slowly grind the supplier into bankruptcy.

The survey responses and interviews conducted for this report found no evidence of efficiency pricing in the automotive parts industry. There is just too much capacity, and the resulting competition means that margins are tight up and down the value chain. What then is the benefit of a business relationship for the Tier 1, 2 or 3 suppliers? Interviewees indicated that they benefited from the honesty built into the relationship and that they were willing to accept lower margins for immediate work in return for a more successful business horizon. They saw their relationship with the OEM as reducing their longer-term business risk. However, the relationship model is only sustainable if the OEM either has a very good idea of what the market price of the component should be or if there is credible threat of entry from an alternative supplier.

Several Tier 2 and 3 companies mentioned that "business ethics" were a major problem in the automotive supply chain today. These complaints and comments are closely related to surveys of suppliers' satisfaction with their business relationships with their customers, the OEMs. One company that has a tradition of supplying old domestic assemblers observed that the auction supply chain management model is particularly risky for his company because of the frequent, and he thinks intentional, misrepresentation of the size of production runs. This causes the supplier to misestimate its average fixed costs and endangers the financial health of the supplier. As an example, he cited a request for a quote on 100,000 parts, but the parts are to be released in increments as needs arise. "In the end, the requests only come in for 60,000. It destroys the original cost quote."

The relationship supply chain management model removes this source of risk. "[T]he Japanese OEMs had the best handle on where a target price should be when they let the contract," said one longtime supplier. "With other companies, you might have 10 jobs that are dogs, but one that you hit a home run with."

Assembly Costs

Fully accounting for the cost of a sourced part or subassembly gets clearer the closer the part moves to the assembly line, or to production. Yet, even here there are supply chain risks that should be accounted for in the sourcing decision. Most cost accounting begins and ends with the delivered price of the part to the plant (the Free-on-Board price plus delivery costs). However, in a risk-adjusted accounting framework consideration must be given to the ability of a supply disruption to stop production and the cost of expediting the renewed flow of parts. The disruption could come from the loss of a single supplier due to fire or natural disaster at the point of production. The offset would be the cost of dual tooling and managing two sets of supplier relationships and the consistency of the part. A second risk consideration is the probability of a supply chain disruption in the logistics system due to weather, natural disaster, strike, seasonality, or equipment shortage. A third risk in international sourcing is the currency risk that is inherent in any long-term contract. The final sets of risks all relate to the demands of a just-in-time system that values quality.

The just-in-time risks are the ability to time deliveries on a cycle that minimizes inventory at the plant. Long, slender supply chains need to buffer inventory somewhere in the system. Another problem is the impact of global supply chains in making corrections to parts that are defective or out of specification. During an interview session with a Tier 1 part supplier, a warped subassembly housing was observed. The supplier noted that the OEM approved the use of the part for two reasons: First, the part was expected to outlast the OEM's warranty period. In other words, the part was good enough for customers. Second, not using the part would disrupt the OEM's production because tooling had to be corrected at the supplier, which was located on another continent. The Tier 1 manufacturer bluntly and colorfully said that the OEM's purchasing department considered nothing but the delivered price of the part — issues of manufacturability, quality, or supply chain risk were absent from the vendor selection decision.

Table 1: TOTAL REAL GROSS DOMESTIC PRODUCT AND GDP FROM MANUFACTURING FOR THE U.S. AND OHIO (1997 to 2006 Millions of $2000)

Year	United States		Manufacturing GDP	Ohio		Manufacturing GDP	Ohio's share of
	Total GDP	Manufacturing	% of U.S. GDP	Total GDP	Manufacturing	% of Ohio GDP	U.S. manufacturing GSP
1997	8,620,955	1,205,414	14.0%	350,603	80,537	23.0%	6.7%
1998	9,004,670	1,286,185	14.3%	362,724	84,744	23.4%	6.6%
1999	9,404,251	1,342,121	14.3%	368,482	83,144	22.6%	6.2%
2000	9,749,103	1,426,218	14.6%	372,006	83,968	22.6%	5.9%
2001	9,836,576	1,346,866	13.7%	365,735	75,961	20.8%	5.6%
2002	9,981,850	1,384,377	13.9%	373,457	80,612	21.6%	5.8%
2003	10,225,679	1,400,092	13.7%	378,719	79,307	20.9%	5.7%
2004	10,608,934	1,490,683	14.1%	388,624	84,076	21.6%	5.6%
2005	10,923,951	1,523,109	13.9%	392,872	84,321	21.5%	5.5%
2006	11,291,375	1,573,845	13.9%	397,243	85,189	21.4%	5.4%
	% change 2001 to 2006		Change in Share*	% change 2001 to 2006		Change in Share*	Change in Share*
	14.8%	16.9%	0.25%	8.6%	12.1%	0.68%	-0.2%

Note: Change in share is from 2001 to 2006

Source: http://www.bea.gov/regional/gsp/ Obtained: February 28, 2008

WHAT'S AT STAKE IN OHIO?

Table 2: TOTAL REAL GROSS DOMESTIC PRODUCT AND GDP FROM MANUFACTURING AND NON-MANUFACTURING IN OHIO
(from 1997 to 2006 in millions of $2000)

Year	Total GDP	Manufacturing	Non-manufacturing
1997	350,603	80,537	270,066
1998	362,724	84,744	277,980
1999	368,482	83,144	285,338
2000	372,006	83,968	288,038
2001	365,735	75,961	289,774
2002	373,457	80,612	292,845
2003	378,719	79,307	299,412
2004	388,624	84,076	304,548
2005	392,872	84,321	308,551
2006	397,243	85,189	312,054
	Percent change from 2001 to 2006		
	8.6%	12.1%	7.7%

Source: http://www.bea.gov/regional/gsp/ Obtained: February 28,2008

First, it would be instructive to detail just how much manufacturing – despite job losses, plant closings and low-cost competition – continues to contribute to Ohio's economic well-being. Despite all the talk of new economies built on service and knowledge, Ohio continues to be a state where items – whether cars, plastics or airplane parts – are made. According to a 2006 report from the U.S. Bureau of Economic Affairs, Ohio accounts for 5.4 percent of all manufacturing activity in the nation – down from 6.7 percent in 1997.

But how healthy is manufacturing in Ohio? If the spotlight is placed on the number of jobs and the trend in the decline in that number over time, it is easy to become pessimistic. Manufacturing has lost 160,000 jobs between 2001 and 2006, a drop of 16.8 percent. If you stop reading at this point, then you come away asking if the last employee left will turn out the factory lights on the way out the door. However, if you look at the value produced in Ohio's factories over the same time period, a different picture emerges. The inflation-adjusted GDP from manufacturing increased by 12.1 percent over the same time period. Putting that figure in context, total GDP growth in the state was 8.6 percent, and the growth in GDP from the non-manufacturing sectors of the economy was 7.7 percent. In other words, manufacturing and the spending of manufacturing workers dragged the rest of the state along with it. Manufacturing in Ohio is large, complicated and diverse. Yet one thing is certain: The automotive assembly cluster is a critical piece of the competitiveness puzzle.

The state claims a sizable share – between 14 percent and 16 percent – of the nation's gross domestic

product generated by auto assembly and parts manufacturing.[4] That figure represents a 1.5 percentage point rebound from 2003. To put that share in perspective, Ohio motor vehicle assembly and parts manufacturers generated $17.4 billion in gross domestic product in 2005, compared to $14.6 billion in 1997.[5] There is often confusion as to the meaning of Gross Domestic Product. It is the sum of value added by the industry, *not gross sales*. As the table shows, automotive manufacturing productivity has increased sharply for both the state and nation since the 2001 recession.

Figure 3: PERCENT CHANGE IN REAL AUTOMOTIVE ASSEMBLY GDP & EMPLOYMENT IN THE U.S., OHIO & CENTRAL OHIO FROM 1997

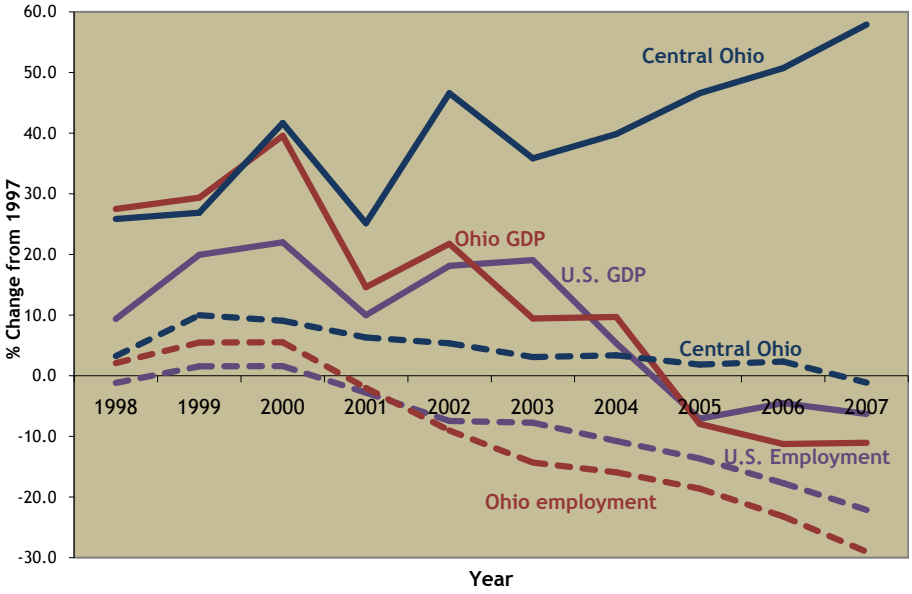
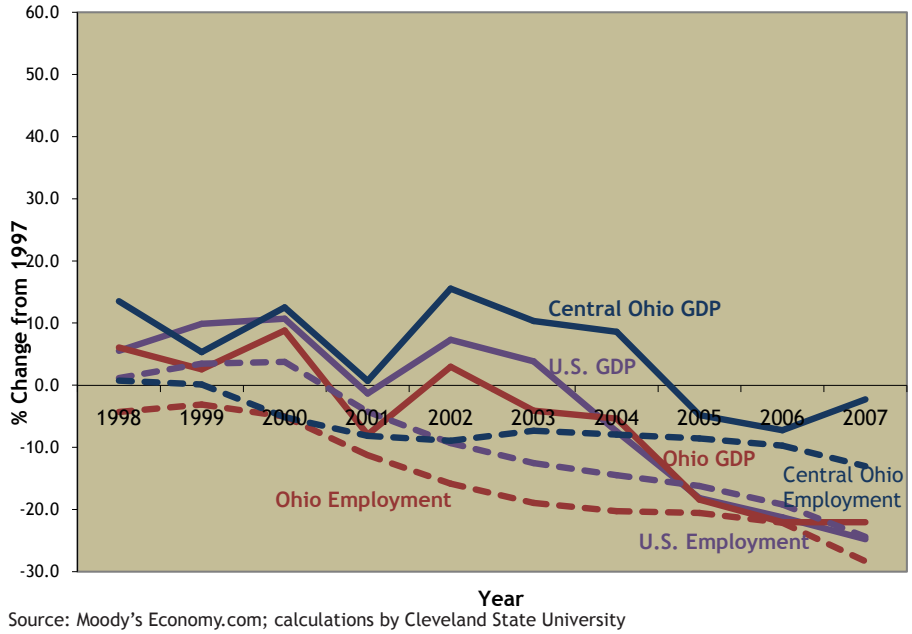


Figure 4: PERCENT CHANGE IN REAL AUTOMOTIVE PARTS MANUFACTURING GDP & EMPLOYMENT IN THE U.S., OHIO & CENTRAL OHIO

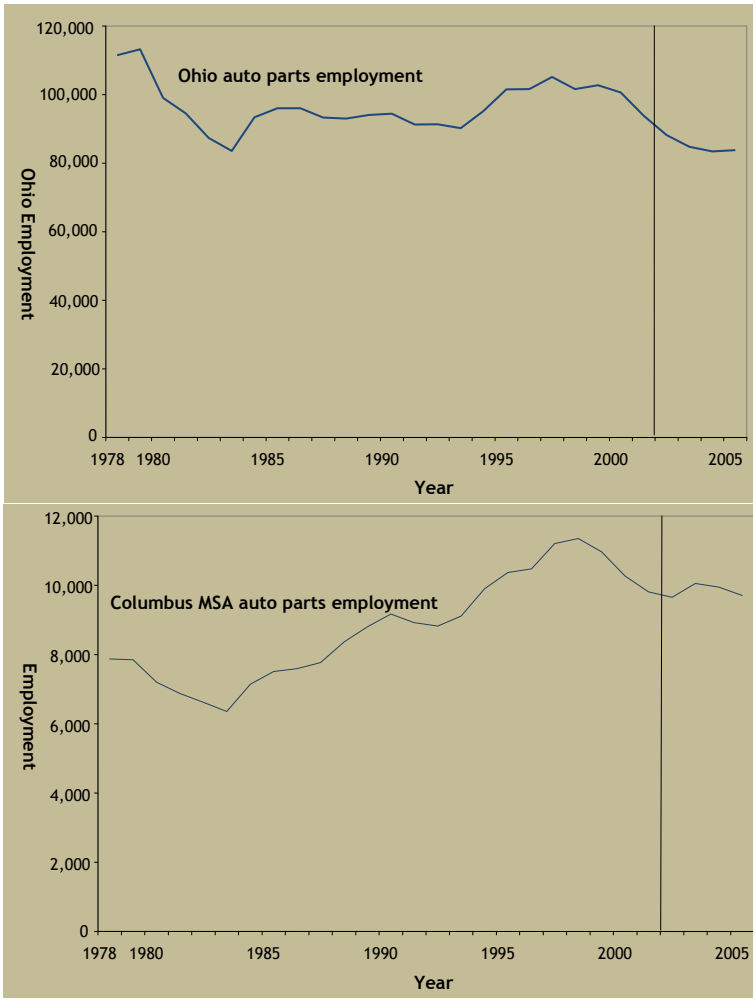


Source: Moody's Economy.com; calculations by Cleveland State University
Note: Automotive assembly is NAICS 3361; automotive parts is NAICS 3363.

The good news of GDP gain has been largely overshadowed by the decidedly negative news of job losses and plant closings. The past year has been a particularly bumpy road for the automotive industry: General Motors posted an astounding $39 billion loss in the third quarter of 2007; Ford Motor Co. slipped from its 76-year reign as the nation's No. 2 automaker and announced a new round of buyouts; DaimlerChrysler sold off controlling interest in the money-losing Chrysler Group to a private equity firm. Delphi came come out from the protection of bankruptcy court in March 2008. These troubles – just the most recent in a steady stream of well-documented woes among the Detroit Three automakers and their supply chains – contribute to an overall bleak view of the auto industry in the state and nation.[6] Given Ohio's significant stake in the automotive industry, the state feels a disproportionate share of the sector's pain. In fact, as can be seen in Figures 3 and 4, the change in automotive GDP (using 1979 as the base year) has fluctuated wildly since 1997, with the state dipping lower than the nation and failing to rebound as high.

The upper portion of each figure plots the percent change in real GDP for the United States, Ohio, and Central Ohio from 1997.[6] Therefore, each point in the figures is read as the percentage difference in the real value of GDP from the automotive cluster in that year compared to 1997. The volatility in real GDP is clearly represented in the figure, with downturns evident in 2001 and then from 2003 on. What is important to note is that Central Ohio experienced a downturn beginning in 2003, but it was not as steep as the nation or the state as a whole, and there are signs of a recovery in 2007. The lower portion of each figure plots the percentage change in the number of jobs in the automotive cluster over the same time period, again using 1997 as the base year. Job losses are evident, but, again, Central Ohio is the center of stability compared to the nation as a whole or Ohio as a whole.

Figure 5: AUTO PARTS EMPLOYMENT



Source: Economy.com

The state has been particularly hard hit by job losses in the automotive industry. Ohio auto parts workers have seen their numbers shrink dramatically since 1998, although it's worth noting that employment levels for the industry that year were at their highest level in the state since 1978. The northern part of the state and the Dayton region have absorbed the bulk of the thousands of jobs that have disappeared over the past 30 years, but the rest of the state has not been shielded.[7] After several years of significant growth since the early 1980s,

Table 3: MULTIPLIERS FOR MOTOR VEHICLE AND RELATED INDUSTRIES

NAICS	Industry Name	Multiplier		Rank
		Direct & Indirect	Direct, Indirect & Induced	
3361	Motor Vehicle Manufacturing	2.89	3.67	9
3261	Plastics Product Manufacturing	1.51	1.92	71
3363	Motor Vehicle Parts	1.50	1.90	74
3369	Other Transportation Equipment Manufacturing	1.44	1.83	93
3364	Aerospace Product and Parts Manufacturing	1.43	1.81	99
3362	Motor Vehicle Body and Trailer Manufacturing	1.42	1.80	105
3312	Steel Product Manufacturing from Purchased Steel	1.39	1.76	108
3329	Other Fabricated Metal Product Manufacturing	1.26	1.59	173

Source: IMPLAN Input-Output Model, April 2005; CSU/Deloitte Analysis
Note: Ranked by total multiplier out of 271 industries

employment levels peaked in the Central Ohio automotive parts industry in 1998 and then fell off sharply not to recover.

The job losses have hurt workers and families; plant closings have threatened entire communities. Despite those harsh realities, automotive manufacturing continues to be an important part of Ohio's economy. Automotive manufacturing activities create an environment conducive to the development of other goods and services. When it comes to amplified effect on the economy, motor vehicle assembly ranks among the state's top industries. As can be seen in Table 3, every $1 in motor vehicle manufacturing output contributes $3.67 in direct, indirect and induced output to the state's economy. That's a conservative estimate. **In Ohio, the multiplied impact of manufacturing, its supply chain and employees account for 40 percent of total employment and 60 percent of total output value**.

The impact of Honda of America's manufacturing, engineering, purchasing, research, and product development operations in Ohio was the subject of an economic impact study released in 2004.[8]

The study found that in 2003:

- Honda, Central Ohio's largest private employer, purchased $6.8 billion in parts and materials from 154 Ohio suppliers. Although the automaker's suppliers were located in 54 Ohio counties, the greatest concentration was in Franklin County and its contiguous counties.
- For each $1 in output produced by Honda, an additional $1.10 in output was generated, resulting in a total statewide output of $36 billion.
- For each job Honda provided, an additional seven jobs were generated, resulting in total Ohio employment of 128,000. Honda directly employed 16,000 associates; direct suppliers employed an additional 40,000 Ohioans, nearly half of whom are directly involved in manufacturing parts for Honda.
- For each $1 paid in wages by Honda, an additional $3.30 in earnings was generated, resulting in total statewide earnings of $4.85 billion. Honda, its associates and the employees of its suppliers annually paid more than $138 million in state and local taxes.
- Honda has invested $6.1 billion in its Ohio operations, a return on $27 million in direct economic development incentives provided to the firm in addition to $64.4 million in highway improvements.

WHAT'S IN THE AUTOMOBILE ASSEMBLY CLUSTER?

To explain the motor vehicle industry's significant multiplier effect, it would be good to understand just how broad-reaching the industry is. As can be seen in Figure 6, the motor vehicle cluster extends well beyond the assembly line where cars are produced. Moving from concept to consumer relies on an intricate web of skills, materials and processes. The supply chain consists not only of the manufacturers of parts that go in to a particular model – those who make the chassis, the engine, the brakes, the wheels and the electronic controls – but the designers, engineers, IT professionals, raw material suppliers, logistics providers, researchers, investors, policy makers and regulators that all play a role in shaping the ultimate product.

The state's motor vehicle assembly industry is directly supplied by at least five other drivers of Ohio's economy – motor vehicle parts manufacturing, metals, distribution and warehousing, chemicals and headquarters and division offices – and one industry that is an emerging competitive strength of the state's economy – research, design, development and engineering services – as well as a number of smaller industry sectors.

Figure 6: THE MOTOR VEHICLE CLUSTER

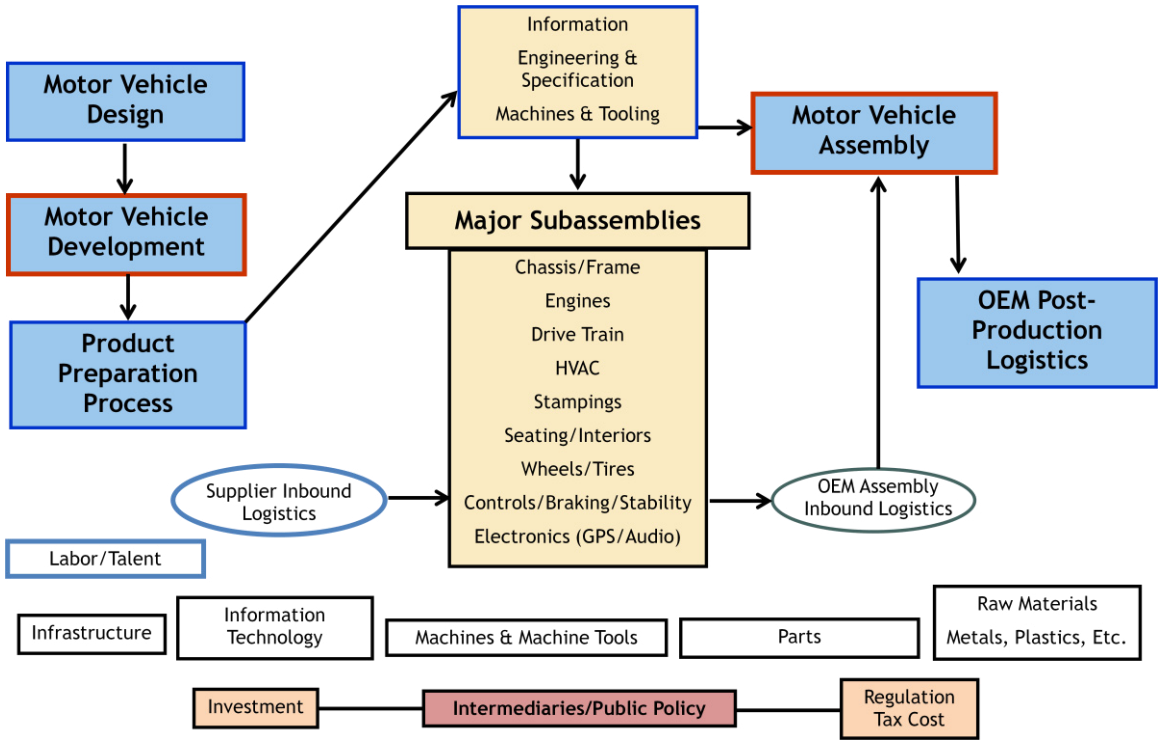
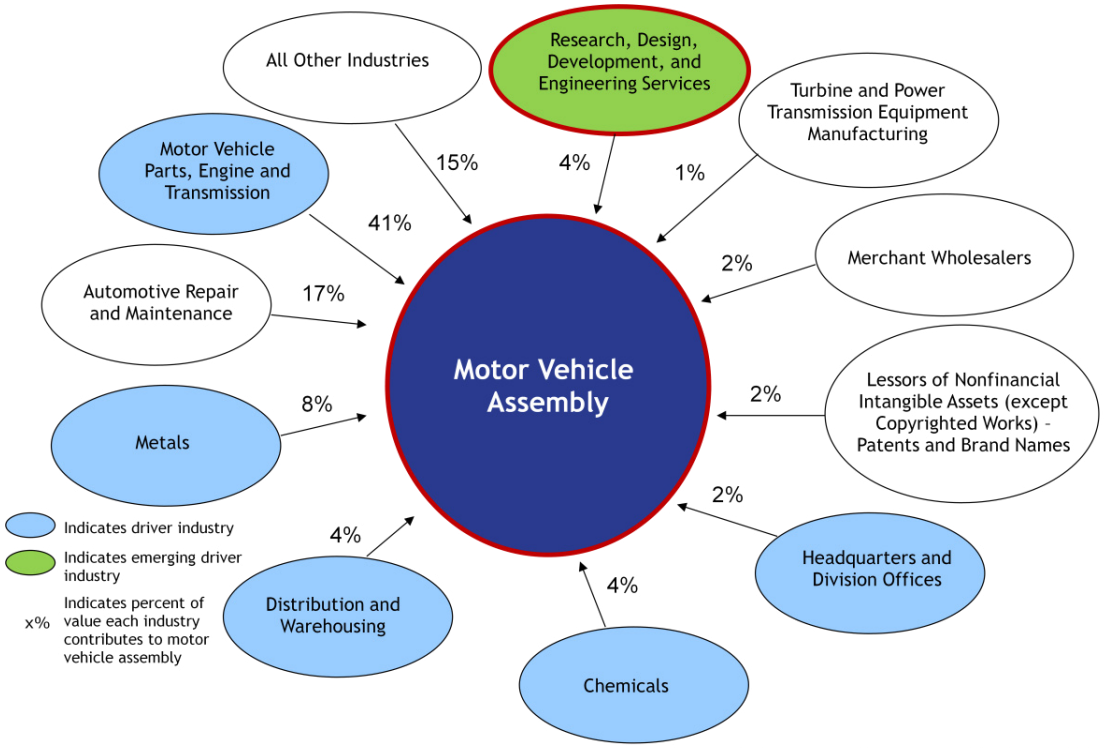


Figure 6 outlines the automotive assembly complex, building on work that the Monitor Group conducted for CompeteColumbus in 2005. What this report has discovered through interviews is that there are two investment leverage points in the complex. The first is the well-recognized just-in-time supply chain that revolves around the assembly process itself. (This is the box outlined in red in the upper right-hand corner of the diagram.) Most Tier 1 suppliers want to locate within a 1- to 2- hour truck drive to the assembly plant but outside of the assembly plant's direct labor shed. The rule of thumb is that the heavier the component, the closer the desired location to the assembly plant because of the cost of transportation and the critical role that the major assembly has in the production process.[9] If a major subassembly component that is large and heavy is missing, the assembly line will shut down. Having said that, even small, highly-engineered components have brought production lines to a halt or necessitated Herculean logistics efforts at high expense.

The second leverage point is a second just-in-time system that revolves around the technical development and specification of the motor vehicle. Here locational sensitivity is directly tied to the way the OEM works with the member companies of its supply chain. If the OEM specifies the parts and subassemblies in detail and holds *de facto* auctions for the work, product specification is not geographically tied. If, on the other hand, the OEM has a close working relationship with its suppliers, especially Tier 1 suppliers, then the specification of the part or subassembly is developed in cooperation with the supplier. Here geography provides a competitive advantage, allowing the supplier to work closely with the OEM's tech center. Being able to "go up the road" to work with the OEM makes for better quality, smoother product launch, and greater ability to cooperatively lean cost from the vehicle. Central Ohio's location near the tech centers of the growing segment of the domestic automobile assembly industry gives it the ability to compete for research and development locations of Tier 1 manufacturers.

Figure 7 highlights the important and far-reaching effects of motor vehicle manufacturing. As can be seen,

Figure 7: MOTOR VEHICLE MANUFACTURING SUPPLY CHAIN



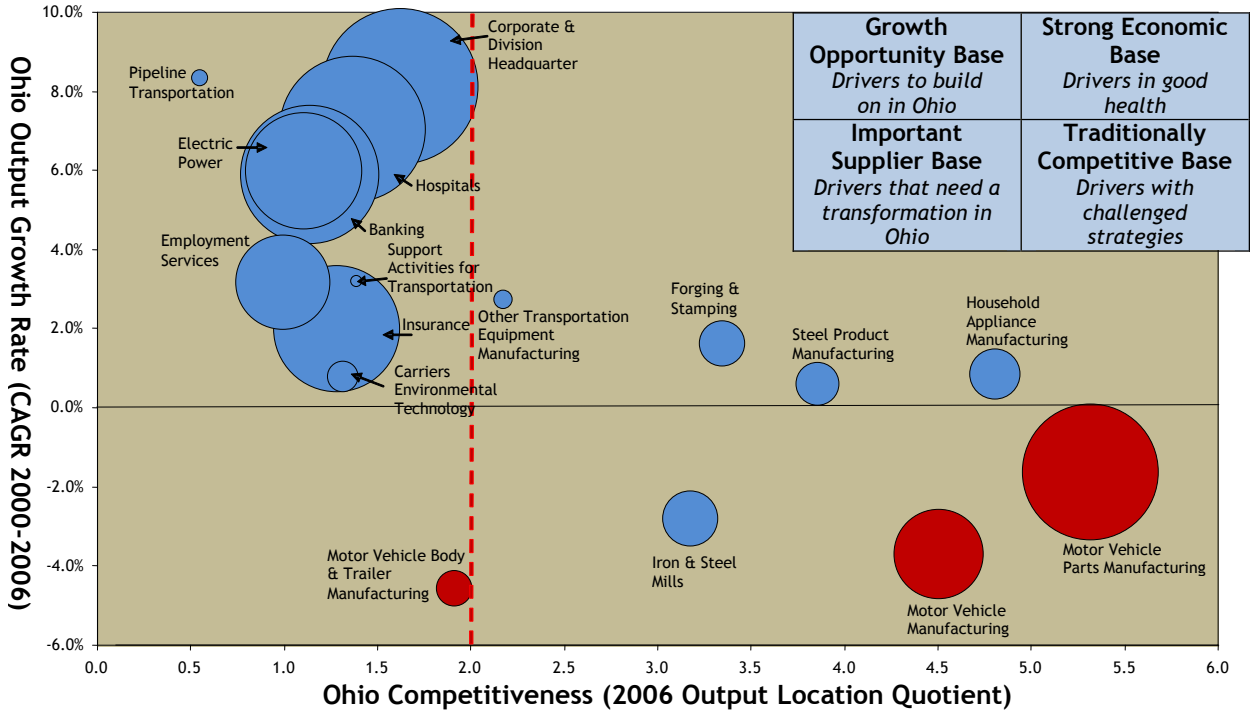
Source: Industry-based Competitive Strategies, 2005

motor vehicle manufacturing is interwoven and embedded throughout the state's economy. Despite the focus on huge job losses at old domestic assembly plants, it's worth noting that Ohio's automotive parts industry is dominated by small- to mid-sized manufacturers. According to Census Bureau and Harris Directory data, only 55 of the state's 330 plants supplying parts to automakers in 2003 employed more than 500 people. These smaller manufacturers are not as likely to get media attention when they cut jobs and are less likely to attract government support when they struggle to remain viable or even when they experience modest growth.

Motor vehicle manufacturing continues to be a driver of Ohio's economy, but it is an industry sector facing sizable obstacles in the road. In 2005, the Ohio Department of Development commissioned a study to determine the state's driver industries and their relative health.[10] The driver industries for the state have been taken from that work, and the data has been updated to look at change in output to 2006 from 2000. As illustrated in Figure 8, most of the state's driver industries experienced at least some growth in output between 2000 and 2006. Driver industries related to motor vehicle assembly – along with iron and steel mills – were the only exceptions. The three industries that are the core of the motor vehicle cluster are colored red in the figure. Those drivers lost ground, indicating their need for new strategies to overcome the challenges to their industries.

In the figure, the horizontal axis is a measure of the competitiveness of an industry; it is the ratio of an industry's share of regional GDP divided by the same industry's share of national GDP. The red dotted line is the place where the ratio is 2.0. — that is, the industry's share of regional GDP is twice as large as its share of national GDP. The vertical axis is the compound average growth rate in GDP from 2000 to 2006. If the dot is above the line, growth was positive; if below, growth was negative. The size of the bubble is the industry's value of regional GDP in 2006.

Figure 8: COMPETITIVE POSITION OF MOTOR VEHICLE MANUFACTURING IN OHIO



Source: Moody's Economy.com; calculations by Cleveland State University

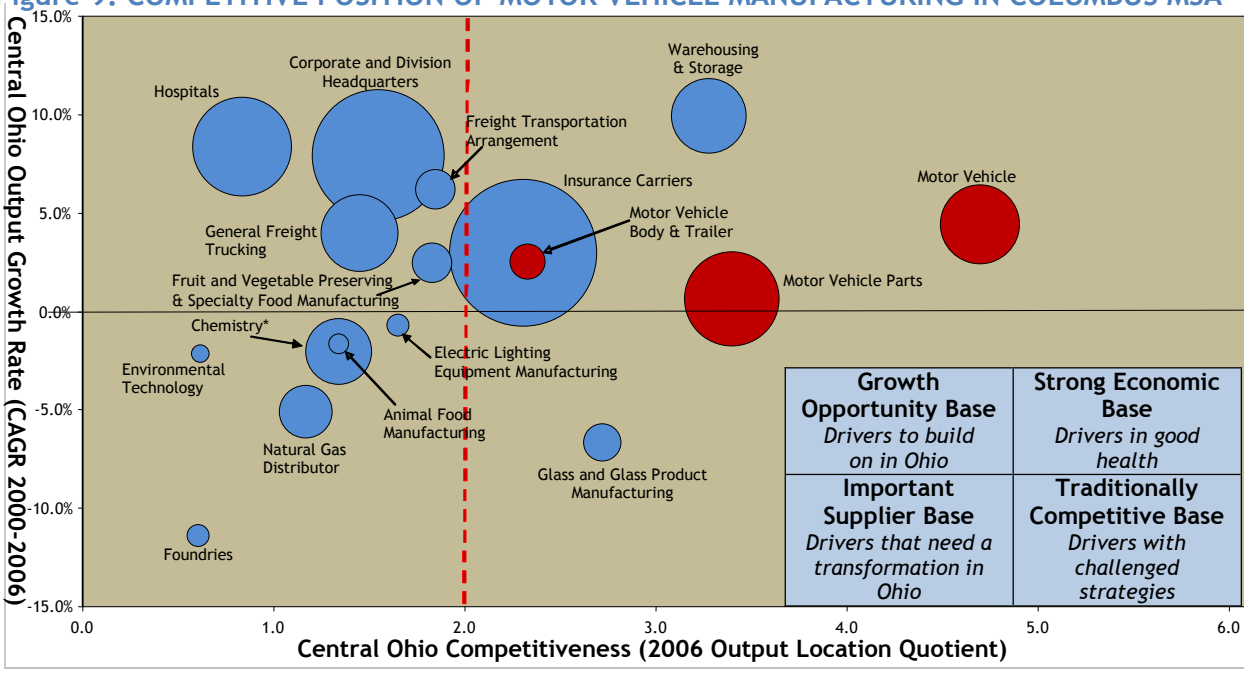
As can be seen by comparing Figures 8 and 9, the automotive industry fares much better when only the Central Ohio region is considered. Motor vehicle assembly, parts and body and trailer manufacturing are among the region's healthy core industries, providing Central Ohio with a strong economic base on which to build. Although the relative output of motor vehicle parts is much smaller in the Columbus area than for the state overall, the industry is facing a similar set of strategic challenges. As noted earlier, the supply chains for the "old" and "new" domestics are increasingly intertwined, particularly among the Tier 2 and 3 suppliers. Although the new domestic OEMs have not been experiencing the same business challenges as the old domestics – declining sales, layoffs, buyouts, plant closings, striking workers, legacy costs, billion-dollar losses – the Central Ohio auto market's relative health does not insulate Columbus-area suppliers against the troubles upstream.

The data presented about the automotive cluster in "Central Ohio" is conservative because it does not fully and clearly represent the entire impact of the automotive sector in the region. For example:

- The corporate and division headquarters industry includes significant assets associated with the automotive assembly and supply chain network in the region. Corporate and division headquarters is a separate industry in Figure 9 and an important driver of Central Ohio's economy in its own right.
- Freight transportation, general freight trucking, and warehousing and storage industries are directly associated with the automotive value chain (including joint ownership). Again, these are separate industries and the core of Central Ohio's logistics cluster.
- The regional impact excludes major engine and transmission operations that are located just outside the region in Anna and in Russells Point but that have their headquarters and primary customers located within the boundaries of Central Ohio.

Although output among Columbus-area automotive manufacturers is growing, the same cannot be said

Figure 9: COMPETITIVE POSITION OF MOTOR VEHICLE MANUFACTURING IN COLUMBUS MSA



*Chemistry combines seven related industries: Paint, Coating, and Adhesive (NAICS 3255), Soap, Cleaning Compound, and Toiletries (NAICS 3256), Rubber Product (NAICS 3262), Clay Product & Refractory (NAICS 3271), Agricultural Chemicals (NAICS 3253), Other Nonmetallic Mineral Product (NAICS 3279), and Chemical Merchant Wholesalers (NAICS 4246)

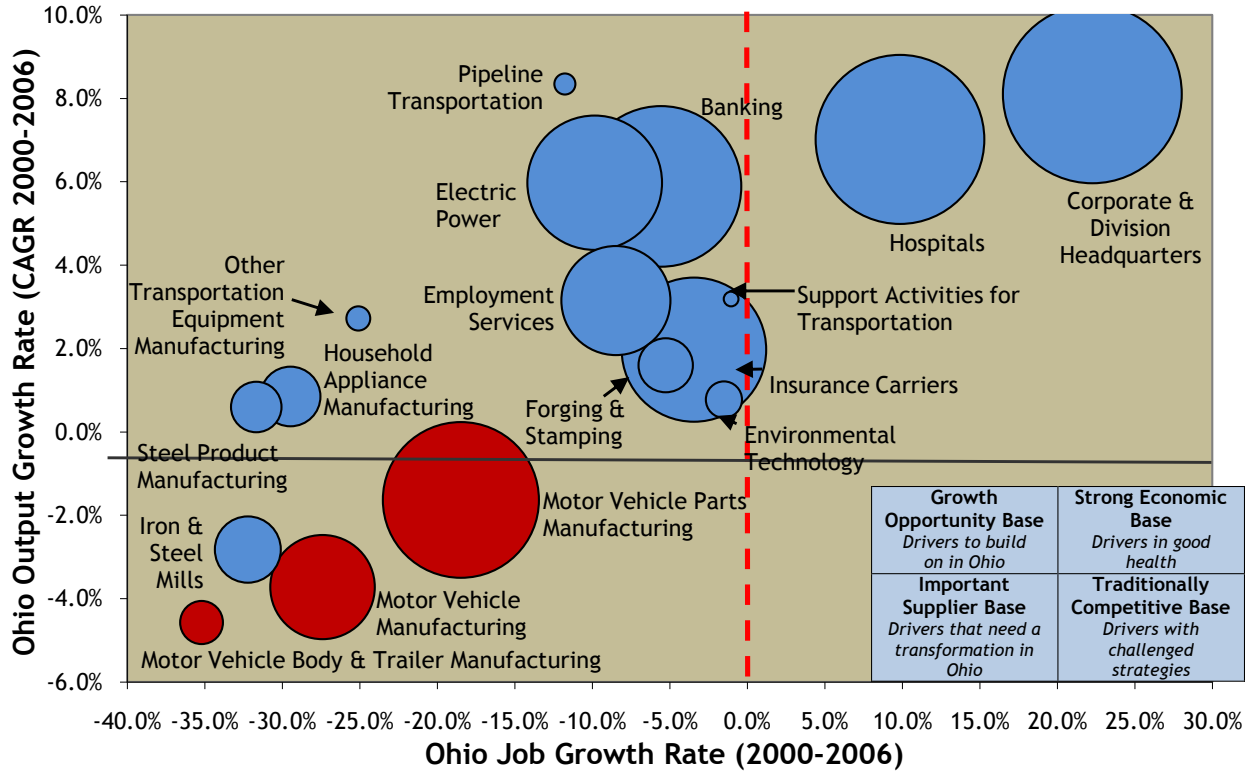
Source: Moody's Economy.com, Calculations by Cleveland State University

for employment rates. As can be seen by Figure 11, the automotive industry is among the Columbus area's biggest employers. However, unlike many other drivers of the region's economy, the automotive industry shed jobs between 2000 and 2006. The job losses have been small when compared to the overall number of Ohio auto assemblers and parts workers who lost their jobs over the same time span. Global competition, economic downturn and troubles in the auto industry account for many of these jobs, however, manufacturers' adoption of new technologies and automation has played a significant role in shrinking workforces while at the same time boosting productivity.

Figure 10 plots the employment growth rate from 2000 to 2006 for Ohio's driver industries on the horizontal axis and Ohio's compound average growth rate of GDP over the same time period. Hospitals and corporate and divisional headquarters are the only two industries in the state that grew both employment and GDP over this time period. The statewide automotive cluster was in the "negative-negative" quadrant.

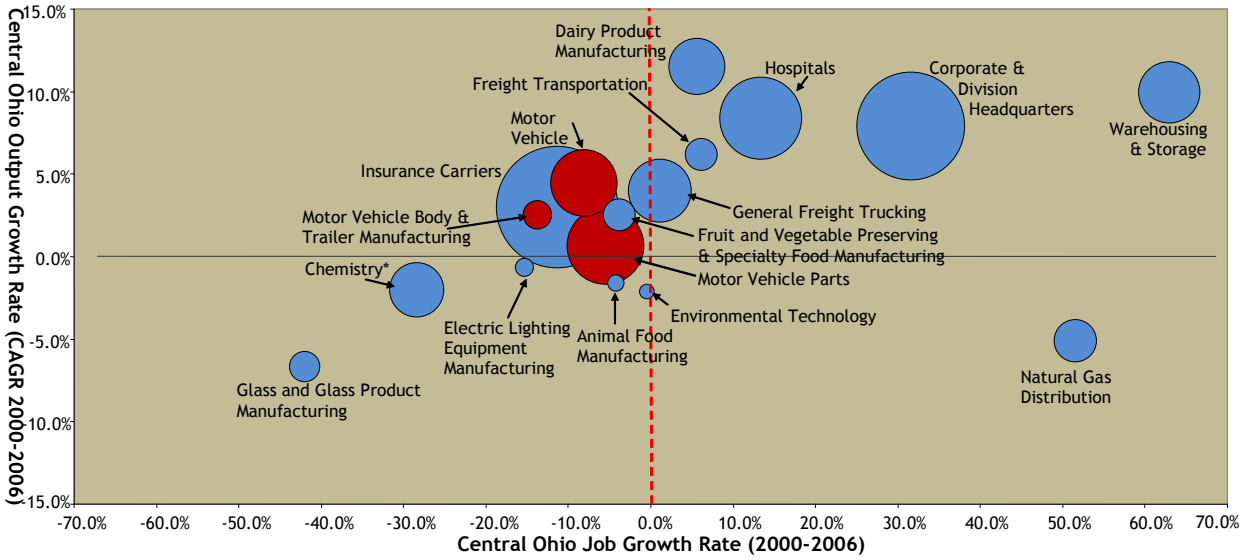
However, the picture changes when Central Ohio is examined. Although employment growth rates are slightly negative, growth in GDP is strongly positive.

Figure 10: PERCENT CHANGE IN OUTPUT & EMPLOYMENT FROM 2000-2006 AMONG OHIO'S DRIVER INDUSTRIES



Source: Moody's Economy.com
Calculations by Cleveland State University

Figure 11: PERCENT CHANGE IN OUTPUT & EMPLOYMENT FROM 2000-2006 AMONG CENTRAL OHIO'S DRIVER INDUSTRIES



*Chemistry combines seven related industries: Paint, Coating, and Adhesive (NAICS 3255), Soap, Cleaning Compound, and Toiletries (NAICS 3256), Rubber Product (NAICS 3262), Clay Product & Refractory (NAICS 3271), Agricultural Chemicals (NAICS 3253), Other Nonmetallic Mineral Product (NAICS 3279), and Chemical Merchant Wholesalers (NAICS 4246)
Source: Moody's Economy.com; calculations by Cleveland State University

BUILDING ON YESTERDAY'S STRENGTHS

The fact that Ohio historically has been one of the nation's top sites for manufacturing is a primary reason why the state continues to be an attractive location for advanced manufacturing. Yesterday's strengths are the foundation for today's jobs. However, sticking to yesterday's mindset about jobs, products and processes won't be enough to make the state thrive in tomorrow's increasingly competitive market. That will take leadership and a commitment to change ineffective policies and provide new tools to help manufacturers compete.

When crafting development policies and procedures, state and local lawmakers should always be mindful of playing to Ohio's strengths. Manufacturers interviewed are quick to tick off a list of attributes that continue to make the area an attractive site for doing business: "Some of Ohio's inherent strengths are its location to the market, its strong infrastructure, its strong supply base, its manufacturing history, which points to a potentially strong labor pool so that a manufacturer won't have to look for skilled workers."

Table 4: HOW STATES RANK AS A SITE FOR BUSINESS

Site Selection's 2007 Top State Business Climate Rankings

Overall Ranking	Executive Survey	2006 NP Rank	2004-06 NP Rank	Rank Per Million	Rank Per 1,000 Sq. Mi.	Final Total
1. North Carolina	2	3	6	5	5	27
2. Georgia	3	5	7	11	8	43
3. Texas	1	2	1	22	24	53
4. Virginia	9	4	8	4	4	56
5. Alabama	7	7	12	1	10	58
6. Tennessee	6	11	10	7	7	59
7. Ohio	14	1	2	3	2	64
8. Kentucky	10	13	14	2	11	80
9. Florida	5	9	11	29	13	82
10. South Carolina	4	18	18	14	17	83
11. Indiana	15	12	13	8	6	99
12. Michigan	20	8	3	15	14	120
13. Illinois	21	6	4	20	9	123
14. Pennsylvania	16	14	9	23	15	125
15. Oklahoma	12	19	25	13	28	133
16. Iowa	19	17	17	6	18	134
17. Mississippi	11	25	24	16	26	135
18. Missouri	24	16	19	18	20	169
T19. Nevada	8	32	32	34	42	172
T19. New York	28.5	10	5	31	12	172
21. Kansas	24	20	23	10	31	180
22. Minnesota	30	15	15	12	19	181
23. Arkansas	17.5	28	29	26	32	185
24. California	17.5	24	16	47	36	193
25. Maryland	32	21	22	24	3	198

Source: Conway Data New Plant Database

Executive Survey Business Climate Rankings

Top 10 States

1. Texas
2. North Carolina
3. Georgia
4. South Carolina
5. Florida
6. Tennessee
7. Alabama
8. Nevada
9. Virginia
10. Kentucky

Source: Site Selection survey of corporate real estate executives, October 2007

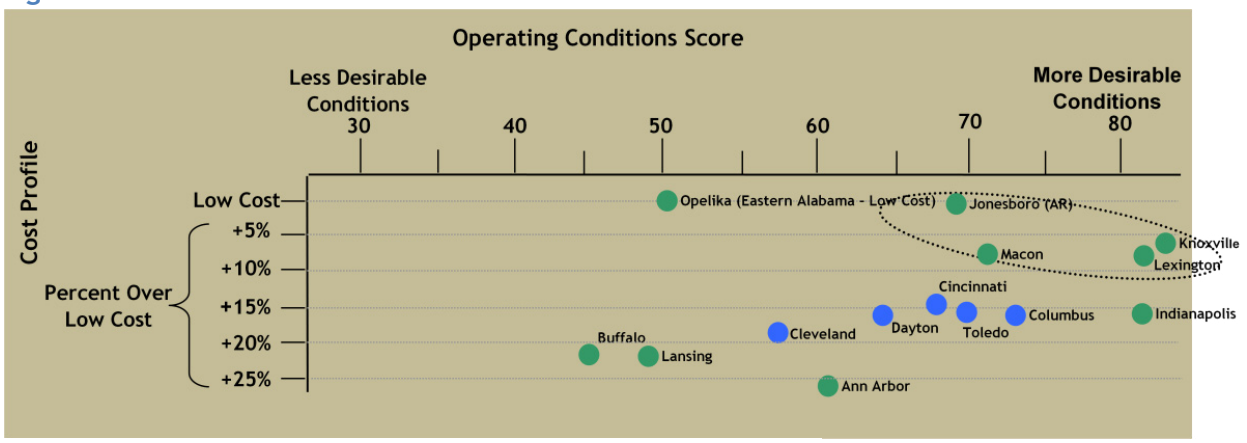
Business Climate Buzz

Site Selection's October survey of corporate real estate executives reveals which factors on average are most important to them when they are involved in location decision making.

1. Availability of desired work-force skills
2. Ease of permitting and regulatory procedures
3. State and local tax scheme
4. Land/building prices and supply
5. Availability of incentives
6. Transportation infrastructure
7. State & local economic development strategy
8. Flexibility of incentives programs
9. Higher education resources
10. Union activity

Central Ohio, specifically, draws on those statewide strengths and offers a number of other qualities attractive to businesses: available land, higher education resources, and a location at what can truly be considered the nation's crossroads. As one Central Ohio manufacturer put it: "Overall, Ohio, especially in the Northeast and Northwest, has a pretrained employee base, especially

Figure 12: BUSINESS OPERATING COSTS & CONDITIONS TRADEOFF MATRIX



with the three main domestics already having strong presence. In the past 20 years, Central Ohio also has developed on that base … [L]and availability in Central Ohio has allowed for the expansion of the base in the greenfield. From the technical base we also have a strong university base, such as [The Ohio State University], Otterbein and [Ohio Wesleyan University]. We have a strong engineering base in Cincinnati as well as Akron and Toledo. … [W]e have a good highway system to allow companies both big and small to get around the state and beyond."

According to *Site Selection* magazine's 2007 ranking of states, Ohio continues to offer a desirable environment for doing business. Ohio ranks No. 7 in overall business climate and actually topped all other states for the number of new plant openings and expansions in both 2006 and 2007. *Site Selection* magazine awarded Ohio back-to-back *Governor's Cup* trophies recognizing this status. Although Ohio tops all neighboring and Midwestern states, it loses out to the South, particularly southeastern states in the overall business climate rankings. Why? It is largely due to the state's low ranking in the business executive survey. In other words, the *perceptions* of the ultimate site location decision maker are what drive the state down in the rankings. In the world of business investment, the perceptions of the decision maker, the investor, drive the result.

Site Selection magazine, a bimonthly publication of the Industrial Asset Management Council, bases 50 percent of its annual rankings on new plant start-ups or expansions that represent investments of more than $1 million in land, building or equipment; create more than 50 new jobs; or add more than 20,000 square feet of building space. As noted earlier, Ohio bested all other states based on those criteria in 2006 and again in 2007. However, for the remaining 50 percent of the overall score, the magazine asks corporate real estate decision makers where they would "locate a new plant based on the area's business climate." The executives surveyed placed Ohio in the respectable but significantly lower position of Number 14, ahead of other traditional manufacturing states but well behind the southern states. The most important factors executives consider when evaluating an area's business climate are a skilled workforce, regulatory predictability, low taxes, available and reasonably priced land, and adequate infrastructure. The list provided here shows the order of importance.

One Central Ohio supplier we interviewed was in the middle of a $40 million expansion, nearly doubling its current facility to 750,000 square feet with the aim of improving efficiency, reducing internal logistics, and becoming more cost competitive. "We're taking a gamble that we're going to be here 25 more years," the manufacturer said. "And we're doing it in Ohio!" But the expansion hasn't been without challenges that may point to why Ohio does not rank among the surveyed site selectors' top 10 states. "The changes in Ohio building code [are] almost prohibitive in what we can and can't do," according to the expanding

manufacturer. "We've already spent about $3 million more [than we would have in a competing location in another state] because of changes in code over the last 10 years than what we would have spent. … Some of those were local codes, but those may have been driven by what Columbus has done." From water retention ponds and number of trees to smoke curtains and ventilation systems, the cost of the new regulations have been enhanced by frustration stemming from the complexity of the regulatory process. "It seems to me some of these things are being over-engineered so that it won't be long before companies won't be able to build or expand. I'm very worried about who is controlling or checking those regulations. When does it become prohibitive?"

Site selectors in the automotive industry specifically were interviewed for a 2005 study of the state's economy commissioned by the Ohio Department of Development. That study, which assessed metropolitan areas, also found that executives gave southern regions an edge. As can be seen in Figure 12, all Ohio cities examined were perceived as being higher-cost locations than sites available in the South. However, the Ohio cities largely were viewed as having desirable business and operating conditions, such as adequately skilled workers and necessary infrastructure. Although Cleveland, Toledo and Dayton have longer histories in the automotive industry, Columbus was viewed as the most favorable of Ohio's cities for automotive parts manufacturing. The growth of the new domestic industry and its supply chain, as well as a less-intense union environment, is likely behind this perception.

What explains the fact that Ohio won the battle for new plant start-ups in 2006 and 2007, but is not considered by site selectors to be among the nation's top 10 states for doing business? We can assume that tax reforms enacted by the Ohio Legislature in 2005 and reaffirmed in 2007, which call for the elimination of the tangible personal property and corporate profits taxes by the end of 2009, will change how some site selectors view the state's business environment. The tax reforms may also help explain Ohio's strong site selection standings in 2006 and 2007. During interviews with Central Ohio manufacturers, taxes did not rank among top business concerns. In general, manufacturers were pleased with the reforms and indicated that Ohio's tax structure may now serve as a benchmark for other states.

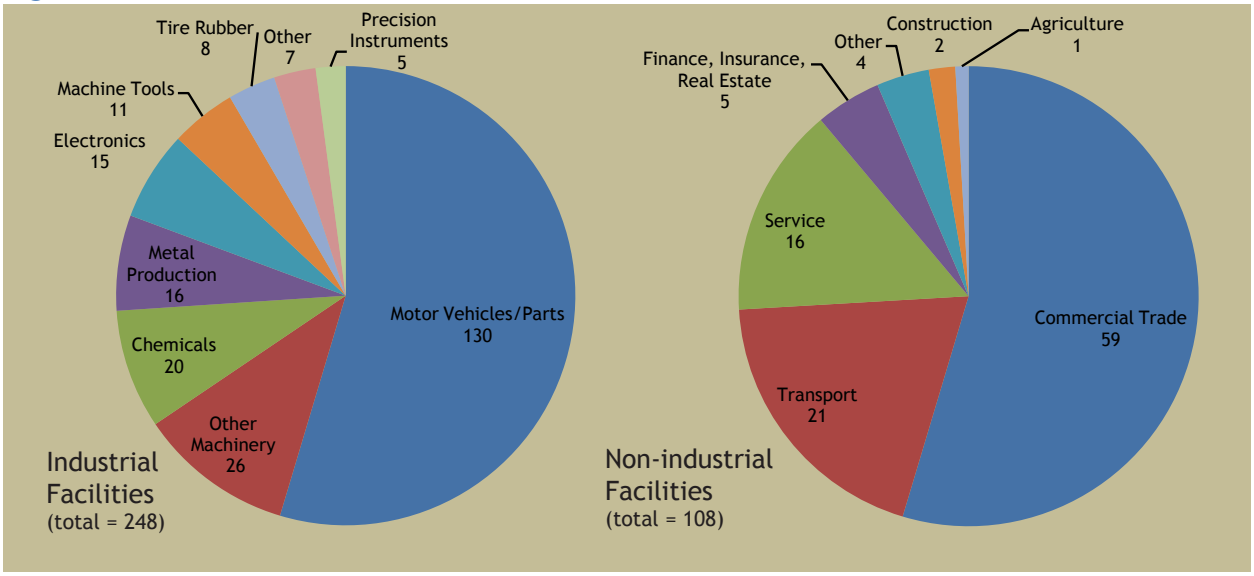
WHAT MAKES OHIO "STICKY"?

As was seen earlier in Figure 1, distinct clusters of automotive activity have developed in regions throughout the state. Consider auto assembly plants to be the glue that holds in place other manufacturers and even, to a certain extent, service businesses. As alluded to earlier, motor vehicle assembly has a supersized impact on the overall health of the state's economy. In the case of Central Ohio specifically, automotive assembly and parts manufacturing contributes about $2.9 billion in Gross Product, or value added, to a $12 billion manufacturing sector. The simple fact that Ohio already has auto assembly plants makes it more likely that the state will have the supply chain and support network to attract other companies wanting to locate a new assembly plant.

Not only do the Honda assembly plants in Marysville and East Liberty serve as the glue holding suppliers in Ohio, but they also serve as a magnet for Japanese investment in the state. That investment translates into jobs for Ohio workers. As can be seen in Figure 13, Japanese investors owned at least a 10 percent share in 356 Ohio facilities in 2006. Half of the 248 industrial facilities were directly engaged in motor vehicle assembly or parts production, and a large portion of the remainder supplied the automotive industry. Even among the 108 non-industrial facilities, many were drawn to Ohio to support the auto industry. Combined, these facilities employ nearly 63,000 local workers, more than 40,000 of them engaged in manufacturing activities.

However, in these days of just-in-time manufacturing, Columbus, and Ohio in general, has reason to be concerned about the growing concentration of auto assembly plants choosing to locate in southern states. The map in Figure 14 locates automotive assembly plants throughout North America, as of 2006. Six plants identified – four Ford plants and two GM plants – actually have been slated to close. What

Figure 13: JAPANESE INVESTMENT IN OHIO



5 & 10-Year Trends										
			Employees							
Year	Facilities		Total		Japanese		Local		Manufacturing	
1996	345		54,230		1,579		52,651		34,934	
2001	377		63,410		1,714		61,696		37,392	
2006	356		64,303		1,608		62,695		40,257	
5 yr. gain/loss	(-5.6%)	-21	(1.4%)	893	(-6.2%)	-106	(1.6%)	999	(7.7%)	2,865
10 yr. gain/loss	(3.2%)	11	(18.6%)	10,073	(1.8%)	29	(19.1%)	10,044	(15.2%)	5,323

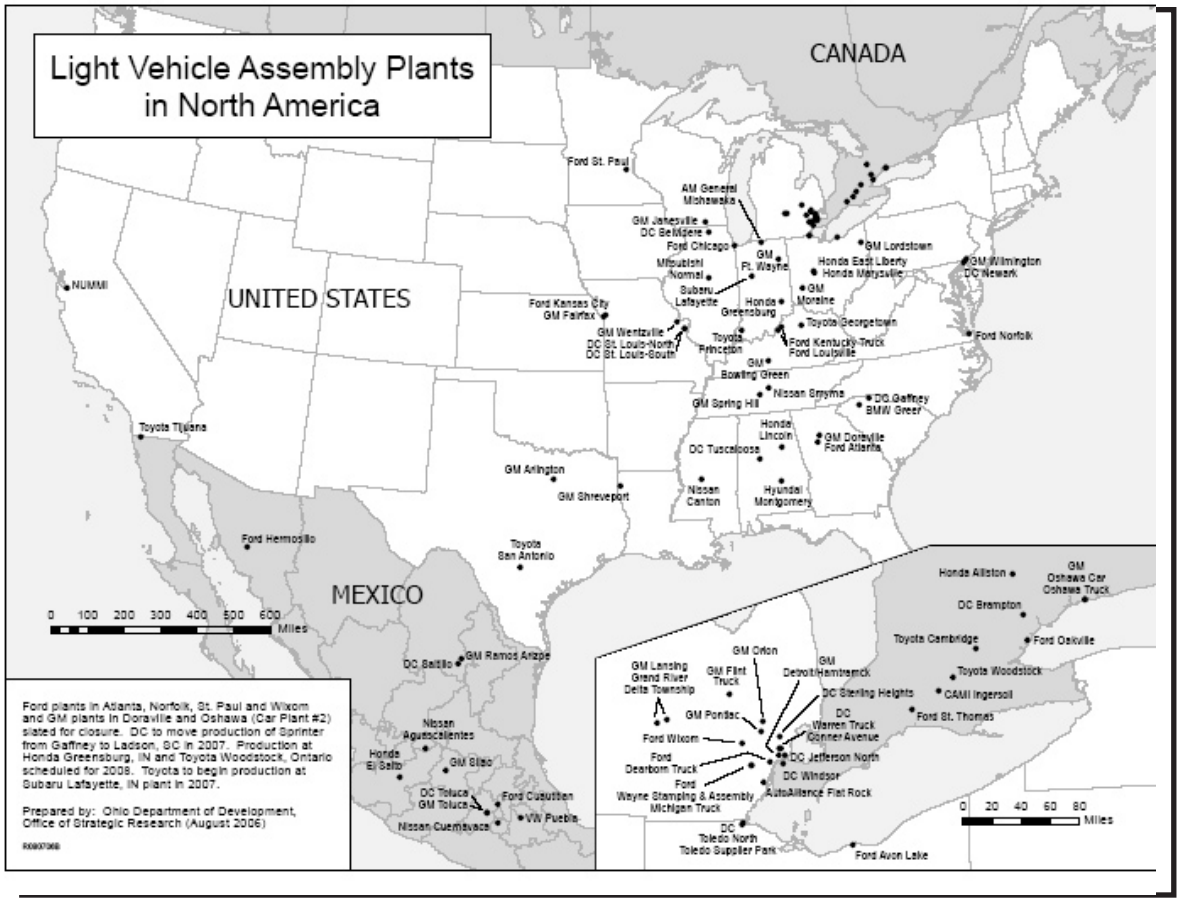
Note: The Consulate defines Japanese facilities as non-franchised operations with at least a 10% share of Japanese ownership. Past years' data are periodically revised.
Source: 2006 Japanese Direct Investment Survey: Summary of Ohio Results, Consulate General of Japan, Detroit

is evident from the map is the continued concentration of automotive manufacturing throughout the Midwest. However, it clearly details the migration of the industry south.

Increasingly, suppliers follow their primary customer. If Central Ohio loses a bid to retain or attract an auto assembly plant, it doesn't just lose out on those potential jobs and revenues. The impact is exponentially greater because it means the state also loses out on the network of suppliers – and the jobs they provide – that develops to serve the assembly plant. Tier 1 suppliers to the Honda assembly plant in Central Ohio report needing to be within about 70 miles of the OEM. This close proximity facilitates a complex choreography of parts – whether seats, lights or sunroofs – arriving just as they are needed for assembly into new cars. For heavy items, such as engines and seats, close proximity is even more necessary because of freight costs. "One good thing about a lot of product like fenders and doors and modules is that it's hard to ship them," said one raw materials supplier. "So the weight I talk about is an advantage. It would be hard to make everything in China and ship them here because of the weight."

Raw materials suppliers, just like suppliers of finished parts, are feeling drawn to be near the auto assembly plants. One Central Ohio supplier predicted a reverse migration of manufacturing jobs: "As you go around and talk to suppliers, you will find that their loyalty has waned for Michigan and that if they're going to spend extra engineering dollars, they're going to spend it to try to pick up on the Hondas and the Toyotas and the Nissans. The gravitation of this business is to the South." As example, he pointed

Figure 14: LOCATION OF AUTOMOTIVE ASSEMBLY PLANTS IN NORTH AMERICA, 2006



Source: Ohio Department of Development, Office of Strategic Services, Ohio's Motor Vehicle Industry, October 2006, and the Wall Street Journal Interactive

to two new steel mills being built in Alabama and Mississippi. ThyssenKrupp will open a $3.7 billion steel and stainless steel processing plant in Mobile in 2010, bringing 2,700 new jobs to the state. In 2007, SeverCorr began producing steel in its state-of-the-art mill in Mississippi. "The steel processors are following. Why are they following? Class 1 automotive production," the manufacturer noted. "We all have to follow our customers."

ATTRACTING BY RETAINING

Ohio's raw materials and parts suppliers will not need to join the migration south as long as the state continues to hold onto its glue – its auto assembly plants. Manufacturers interviewed were emphatic in their views on the importance of retention to the long-term health of Ohio's economy. Strategies to attract new businesses won't work unless state and local leaders pays more attention to keeping and supporting the employers already here. "We've got a base, and the easiest thing for us to do is to build on it, not go after the next new new," one manufacturer noted, questioning the political wisdom of "trying to make ourselves beautiful" in an attempt to land new businesses while "all around places are dying. People notice manufacturing is leaving Ohio. … I think our focus is sustaining who we have and then we can start focusing on bringing in new manufacturing." **The best attraction strategy may in fact be a healthy, thriving concentration of incumbent employers who believe the area – Central Ohio specifically – adds to their bottom line.** "We want manufacturers to say why would I go anywhere else when I have such a strong resource here? That's something we can control. That's something we can

influence." To have that kind of influence, state and local governments and support organizations need to understand the particular concerns of their incumbent employers and help them seize on emerging opportunities. Public sector policy leaders put undue emphasis on chasing the "silver bullet" of attraction at the expense of retention. In reality Ohio's retention and expansion is the Southeast's attraction. The following list of recommendations provides a good road map for a retention-based strategy for growth.

KEY RECOMMENDATIONS

- Position Ohio as an attractive business environment for OEM retention and expansion. Develop business strategies for keeping OEM plants and their suppliers in Ohio. The best opportunities may be in the area of just-in-time delivery and research, development and production preparation built around facility changes in model design and production processes. Monitoring the level of OEMs' reinvestment in manufacturing plants is a distinct indicator of future plans to stay or leave.
- Facilitate relationship-building among Ohio's OEMs and Ohio-based suppliers. Support collaboration between OEMs and parts manufacturers as OEMs move to more tightly integrate suppliers into their process and jointly train the region's skilled manufacturing workforce.
- Help Ohio companies expand by taking advantage of global opportunities. Support manufacturers, especially small- and mid-sized enterprises, that want to expand into international markets. Current market and tax conditions encourage this direction.

Category	Decision-Making Factors	High	Partial	None
Business Strategic	The company's internal business strategy, such as product mix, margins and sourcing, and other operating decisions			X
Business Strategic: External Influence	Public investments in knowledge, infrastructure and other factors of production		X	
Basic Operating	Skilled workforce, ease of permitting, state and local property taxes	X		

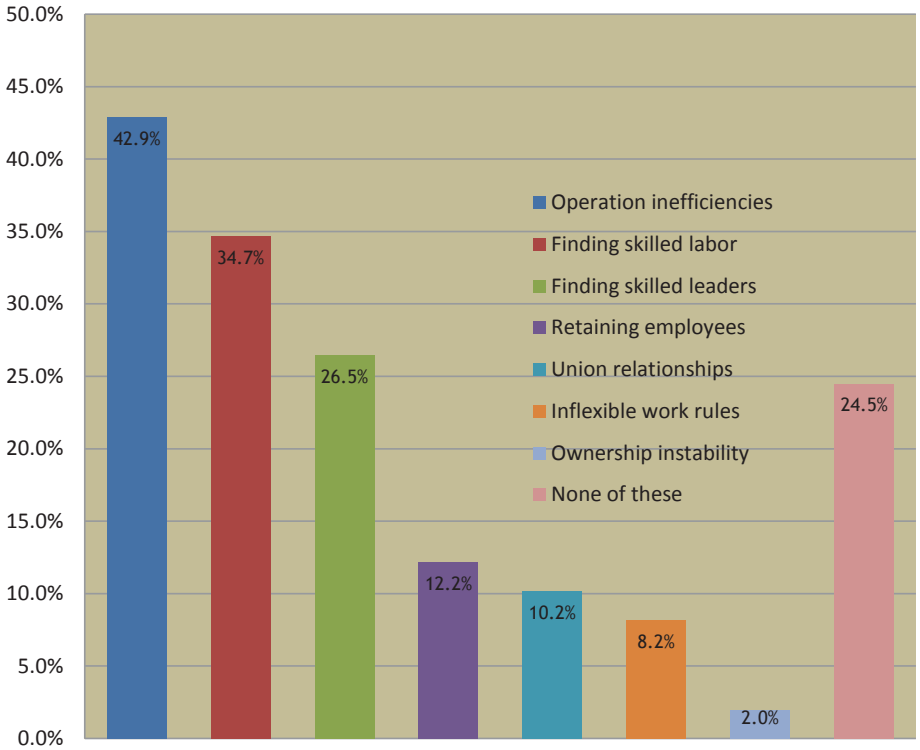
TODAY'S JOB FOR POLICYMAKERS: ADDRESSING WHAT CAN BE CHANGED

State and local policy makers need to understand that there are business environment factors they can influence and factors they can't when manufacturers weigh their abilities to operate efficiently in potential sites. As just-in-time delivery and freight costs continue to pressure suppliers to be physically located near the OEM, state and local entities in Ohio will have little to attract new suppliers or help hold suppliers here if their profitability and viability is dependent on serving an auto assembly plant that locates in the Deep South. As noted earlier, suppliers interviewed spoke of the need to be within an easy and predictable drive of the OEM, and the OEM needs to see the access to a ready and able supply base or the conditions for that to exist. Tax incentives, training programs or infrastructure upgrades will not overcome that physical demand and make it likely that a supplier to an Alabama assembly plant will choose to locate in Ohio. However, there are business operating factors over which state and local entities do have influence. These include workforce development, taxes and ease of permitting. There are also issues of long-term business strategy over which state and local entities may have some influence. The chart above provides examples of where government entities can influence location choices and where they can't.

For government policy makers with a vested interest in making Central Ohio a value-added location for automotive and advanced manufacturing, today's job is to focus on those operating and strategic factors important to manufacturers that are within the power of government to change. Based on the MPI survey, site selector responses and our interviews with manufacturers, issues in which state and local entities would be best served in focusing their efforts are: workforce development and training, workers' compensation, energy and tax policy. Surprisingly, skyrocketing health care costs did not show up as a primary concern that Central Ohio manufacturers would like to see state and local policy makers address. Perhaps this explanation for this is that, while health care is a real concern among manufacturers, those surveyed and interviewed perceive it to be an issue beyond the reach of state and local efforts to control. Addressing the challenges of rising health care costs will require federal-level action. In addition, the North American competitive advantage of Canada's national system of health care is beginning to erode as fees or taxes begin to be imposed to help finance growing health-care demands. Additionally, the increase in the value of the Canadian dollar is beginning to shift the locational cost calculus for some parts of the automotive supply chain.

Figure 15 summarizes the key concerns of manufacturers surveyed by the MPI Group. As can be seen, there is significant room for improvement in the areas of leaning manufacturing and workforce development, including addressing the need for leadership. It should be noted that manufacturers that indicated they were closer to a world-class status were less likely to see significant threats.

Figure 15: PERCEIVED INTERNAL THREATS TO PROFITABILITY



Source: MPI survey, 2007

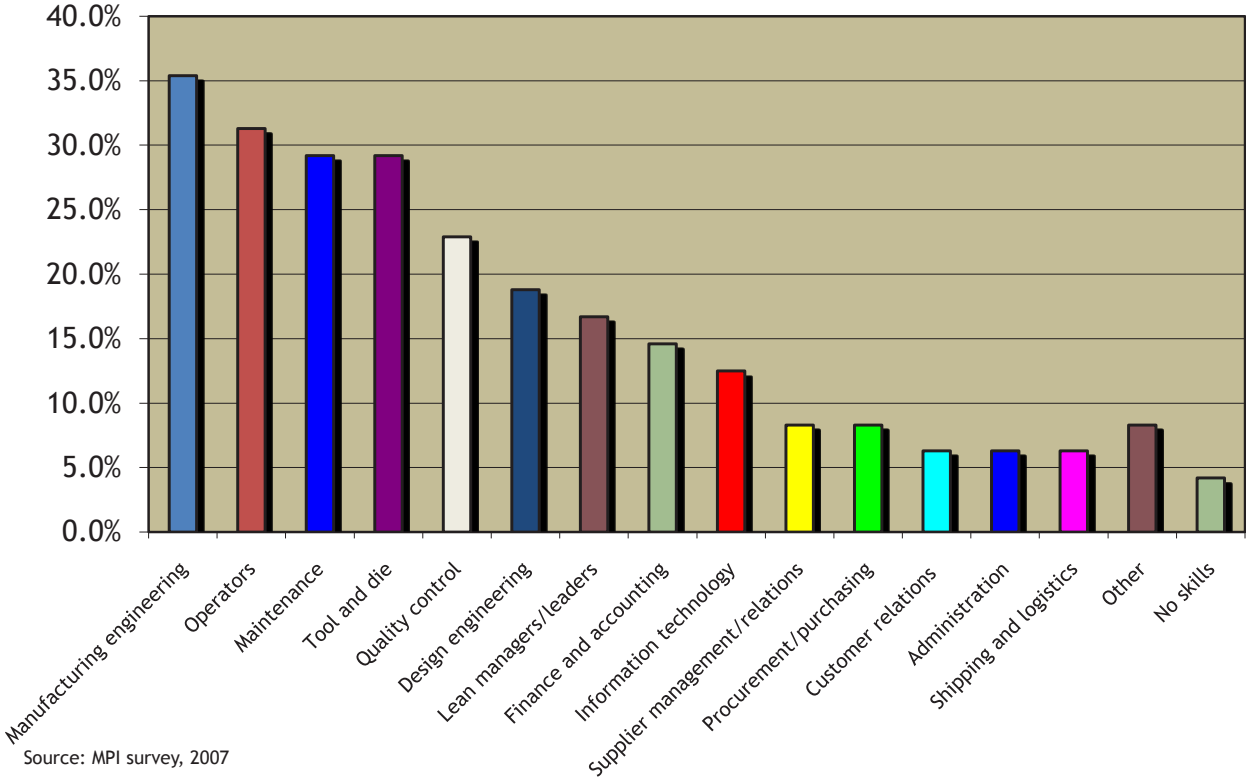
WORKFORCE DEVELOPMENT

Without a doubt, the top-of-mind issue for manufacturers throughout Central Ohio – and across much of the state and nation – is finding workers with the right skills and keeping them. Manufacturers worry about their workforce – up and down pay levels and across both technical and soft skill levels. As Figure 16 shows, the MPI survey found that employers in the automotive supply chain struggle to find workers with skills specific to manufacturing. Although respondents reported having difficulty hiring workers for more generic and technical business positions, such as information technology, customer relations, administration, and procurement and purchasing, it is the manufacturing engineers, the tool-and-die makers, the quality control workers and the lean managers that they cannot find. More than 30 percent of surveyed companies said that finding qualified machine operators was difficult.

In the more than quarter-century since Honda of America Manufacturing began production in Marysville, the automaker and the many suppliers that have sprouted around it have found fertile ground for recruiting and developing the thousands of associates necessary for making Honda cars and other products. The towns, villages, and farms of rural central Ohio yielded a resourceful, industrious workforce.

However, much has changed since 1979. One automotive supplier on the east side of Columbus described the challenges of managing a changing workforce: "We see a lot of people commute an hour or more from Southeast Ohio, Newark, Athens, Lancaster. We also tend to draw a lot of Somali workers... ... Associates speak over 36 different languages. …" The challenges of filling the workplace have changed, the skills demanded have changed, and the geography of the workforce does not align with municipal or county boundaries. This means that the strategies and approaches to building and retaining a skilled workforce must also change.

Figure 16: SKILLS MANUFACTURERS PERCEIVE AS DIFFICULT TO STAFF



Source: MPI survey, 2007

Among the broader business skills, many manufacturers interviewed admit that pay may be an issue. IT workers often can find higher pay in other fields. "Our largest challenge is competing with the technology businesses in Columbus, especially when it comes to engineering and information systems disciplines," one supplier said. "Our plants are working three shifts, lots of times seven days a week. Our IT has to be able to support that," echoed another Central Ohio supplier. "Typically we hire a non-degreed person and train them ourselves. Lots of times, once they get certified, they move on. Quite honestly, we can't afford to pay what the market pays."

In addition to pay, manufacturers report difficulty attracting highly trained technical workers to Columbus, let alone the outlying communities where many of their plants are located. New graduates are looking for more amenities than what these exurban communities have to offer. Lower cost of living allows them to compete for workers, but that is becoming increasingly harder to do as the boundaries of Greater Columbus – and its elevated housing costs – creep farther and farther out into the counties that abut Franklin County.

The more pressing issue, however, appears to be finding workers who want to learn manufacturing skills. Many we interviewed say fewer and fewer young people seem interested in making a career in manufacturing. "This is not the huge sexy thing to leave school to do anymore. We've had to grow up a lot of our own," one supplier noted. Said another: "The perception is that it's dying."

Another manufacturer interviewed echoed the survey findings: "One of the biggest issues we have is in the tool and die trade. We cannot find those people. We're suffering. We hear complaints about why we're going to low-pay countries for tools, but we can't find those people otherwise. Money doesn't necessarily seem to be the issue. There just are not a lot of those people around so you have to pay more to attract ones you can find. Lots of times, when everyone around understands the value of that person, they're willing to pay to keep him. We're all driving the wage up against the other guy. As far as I know, not a lot of people are developing that skill. Nobody comes out of school with tool and die."

Manufacturers indicated a feeling that schools, government programs, and the media work against their needs by feeding the perception that the days of finding good-paying jobs in manufacturing are long gone. "Certainly, finding, attracting and retaining associates shouldn't have to be so difficult," one manufacturer noted. "You can go to some areas of the country and it seems like there's a wealth of well-educated, well-prepared people coming out of schools to support the manufacturing base."

Although the current focus on encouraging more students to pursue science, technology, engineering and mathematics fields may help provide a larger pool of workers with IT and engineering skills, those interviewed questioned whether the emphasis serves the needs of manufacturers and even of workers. Many manufacturing jobs require technical skills and proficiencies that could be provided through short-term certificate programs, instead of two- and four-year degrees. Technological advancements have transformed manufacturing jobs. Automation has allowed manufacturers to eliminate most low-skilled, repetitive work, however, jobs that remain will increasingly require that workers possess a level of computer expertise. "We've taken a lot of data entry, mundane jobs and automated them," one manufacturer said. "I think the skill level from now on will require they be able to move around in a computer atmosphere, even on the production floor. That skill in the future will be necessary."

The problem that most manufacturers face was summed up when a training provider told us of a comment made by a contact at Toyota: "I don't want people with degrees; I want people with technical skills."

The state is right to promote the need for capable students to pursue advanced science and mathematics skills that make technological improvements possible. However, it is also necessary for curriculums to understand that the skills necessary to operate these new machines are different. "It used to be that finding people with beginning algebra skills was a problem. Now they're just inputting numbers, not figuring out equations," one manufacturer explained, saying that equipment now compensates for weaknesses in geometry, trigonometry, and other math skills. "We try to make our equipment very easy to use. We try to automate to take those things out of the equation."

Promoting a curriculum option that combined training in targeted, in-demand technical skills with an emphasis on the soft skills of communication, teamwork, decision-making and punctuality would create a pool of workers for manufacturers and perhaps provide a better career path for students for whom a four-year college degree is not feasible, whether because of life circumstances or personal interests and abilities. "Not everybody that you end up needing to run [a factory] with needs to have three years of chemistry and calculus," one manufacturer said. "You need people that are committed, work well as a team and can follow directions." A number of the manufacturers interviewed spoke of the difficulty in finding younger workers with the work ethic of showing up on time and the skills needed to communicate effectively, solve problems and get along with their coworkers.

"Sometimes we feel like we're scraping the bottom of the barrel with production workers," one manufacturer reported. "We can't find people even with the basic skills to develop them ourselves. It's difficult to teach the starting point. They don't have the basic math in order to learn." One manufacturer was blunt in assessing the dilemma manufacturers face in relying on low-skilled workers with high-tech machines: "It is scary to run a $500,000 machine with a $250,000 tool inside it and have it run by a guy that doesn't know much."

Manufacturers suggest two key strategies for creating a strong workforce pool that would support existing automotive and advanced manufacturing and create an environment attractive to new opportunities: greater collaboration with universities and two-year colleges targeting in-demand skills and a larger state role in facilitating training. A public-private partnership consisting of manufacturers, government agencies and higher education institutions could create a significant competitive advantage for Ohio by:

- Fostering industrial engineering careers.
- Addressing the need for skilled operators by encouraging people who have mechanical aptitude and an interest in making goods to consider the field.
- Helping reward, train and motivate operators and engineers already on-the-job.

"For any manufacturer, if we had kids coming out of school with a strong interest and desire in this area and an even stronger link with colleges for innovations, that would make the area more attractive," one manufacturer predicted.

According to site selection surveys, and backed up by the manufacturers' observations, Ohio's workforce, built on generations of manufacturing, still has a competitive advantage over southern states. However, those states have been aggressively working to close the gap. Representatives at virtually every manufacturing site visited for interviews pointed to the recruitment and training efforts southern states have effectively used to win auto assembly plants and their suppliers and create thousands of new jobs. In particular, they cited Alabama as an example of effective workforce intervention.

Figure 17: ALABAMA TECHNOLOGY NETWORK CENTER LOCATIONS

The Alabama Industrial Development Training (AIDT) program was established in 1971 by the state legislature and is authorized annually to improve the Alabama economy by developing a skilled workforce. According to its Web site, "the mission of AIDT is to provide quality workforce development for Alabama's new and existing businesses, and to expand the opportunities of its citizens through the jobs these businesses create." AIDT, which consists of three permanent centers around the state and several project-based training facilities, falls under the state's Postsecondary Education Department, and its services are offered free to new and expanding businesses. As an example, AIDT will train the production and maintenance workers needed to operate the new $3.7 billion ThyssenKrupp steel processing plant.

Manufacturers interviewed suggested that Ohio's workforce development efforts, like those of Alabama, should be more responsive to the needs of both new companies and incumbent employers. Instead of helpful and responsive experiences with state and local agencies, many in Ohio reported frustrating encounters with bureaucracy and a decided lack of urgency. "What the AIDT did is they set up training classes that the company would develop," reported one human resources representative with hiring experience in both Ohio and Alabama. "They would have those classes at night, on weekends, in the morning, whenever those people could attend. They would go through the program, we would hire from that pool and then the state would pay for it all. When I was there, it would have been at any time, not just at startup. We actually even held classes in the evening at our facility, but often they were held at a community college or high school. Other facilities might pick up those not hired by [the company being staffed.] Everyone drew from that pool."

Another manufacturer noted: "Alabama actually built a training facility for Honda. The state built a simulated assembly line. Folks from Honda or suppliers could go in and use it. … Then after all the Honda hiring was done, AIDT said we're going to use the facility to continue hiring for other manufacturers."

AIDT is actually one segment of the Alabama Technology Network (ATN). The AIDT focuses primarily

on responding to the pre-employment selection and recruiting needs of companies. However, the ATN provides a cohesive, collaborative network of business, government and educational entities to serve all of Alabama industries, both new and existing. The ATN is Alabama's sole member of the national Manufacturing Extension Partnership, overseeing 10 centers for excellence that had been established at universities and community colleges around the state. Figure 17 shows the location of ATN centers throughout Alabama. In 2004, ATN became a state agency; a board of directors and president now oversee operations and report to the chancellor of the Alabama College System for strategic direction and to the National Institute of Standard and Technology to maintain its MEP status and funding. The vision for ATN, according to its Web site, is to "provide innovative and cost effective solutions" and "enable Alabama's existing industry to be globally competitive." The network attempts to help industry be more efficient, productive and competitive by providing "one-stop" access to technological resources, government programs and other businesses.

Another state to consider for the purpose of benchmarking innovative development efforts is neighboring Indiana. In Indiana, state-supported training funding can come from two main sources: the Indiana Economic Development Corporation and the Indiana Department of Workforce Development. The IEDC Web site features a telling quote from Indiana Gov. Mitch Daniels about the important role of such programs: "Government does not create jobs; it only creates the conditions that make jobs more or less likely." Established in 2005 as a public-private partnership, the IEDC claims to respond to the needs of business by operating "more like a business." The IDWD managed employment programs, unemployment insurance systems and regional economic growth efforts. The two programs combined may pay up to 100 percent of training expenses. However, the maximum incentives package is rarely offered. The full training package appears to be selectively offered to firms that have been attracted to the state and are starting up major new operations.

What other competitor states should Ohio use as benchmarks? Several interviewees identified Kentucky as having a revitalized incumbent workforce training system that is among the best in the nation. The reforms of the training system in Pennsylvania under Governor Edward G. Rendell received high marks from training providers in Ohio. These states should be added to a competitive scorecard that includes Alabama, Indiana, North Carolina, and South Carolina.

Ohio does offer assistance for new and expanding businesses through the Ohio Investment Training Program (OITP), which provides up to 50 percent reimbursement of instructional costs, materials and other training activities. OITP is administered through the Ohio Department of Development. Sophisticated employers – those large enough to have human resource departments – had little trouble working with OITP, and they celebrated the program for its flexibility. But even they had reservations: First, they observed that OITP funds were limited. Second, they perceived that companies entering the state (start-ups) had priority claim on those funds. Third, they said that OITP did not mesh or leverage other education and training funds in the state.

Few of the smaller manufacturers interviewed reported having much experience with OITP. Instead, they conveyed a sense that other state assistance programs they had dealt with seemed not to understand or truly care about their needs. "We have tried to work through [the Ohio Department of] Job and Family Services. They are not timely in their response," recounted one human resources representative. "They don't realize we can't wait a week. We've had a couple of tax abatements in which we negotiated as part of the deal that we would let [ODJFS] send candidates. But it's a very bureaucratic system and there's not a lot of flexibility in their system. It's mostly that we are both going through the motions." Those who did have experience with the state's OITP applauded its lack of restraints but said the program fell short of the reimbursement rate in other states and was highly bureaucratic in it paperwork requirements (i.e., individual tracking and reporting of each employee trained.)

So what would manufacturers like to see from government entities and programs in the area of workforce development? First would be to distinguish between the needs of new and existing employers and understand that both need assistance. Start-up companies need help in identifying and building a workforce from scratch to handle initial production. Incumbent employers need ongoing support to maintain self-reliant and efficient operations. Currently, the state's workforce development efforts look more like a patchwork quilt than a cohesive blanket of coverage. Two Manufacturing Extension Partnerships, 23 community colleges and 14 major universities operate as independent entities and compete for training customers and sales dollars. Various state agencies may provide grants for up to 50 percent of training costs. This amorphous reality presents a number of identifiable gaps:

- Lack of coordination forces a business to contact multiple locations to find needed training resources.
- Facilities, programs, staff and other resources are poorly utilized.
- Complex granting systems require knowledge of individual resources, instead of a providing an option for "one-stop shopping."
- Some courses, particularly those at state universities, are cost prohibitive for many small- to mid-sized manufacturing companies, which may have limited financial resources to allocate toward training.
- The various pieces of the Ohio system compete with each other rather than work together as a seamless web.

Employers were confused by the competition and overlap among training providers. OITP was celebrated but confused with the Ohio Board of Regents' Enterprise Ohio Network. Employers were further confused by competition among affiliates of that network. They also tended to be wary of public training providers who did not have open scorecards or transparent customer satisfaction or impact evaluations of training modules and instructors. They expected what was termed as "Ebay- level accountability" as a minimum requirement. Employers also noted competition between Enterprise Ohio Network members and the two Manufacturing Extension Partnership affiliates in the state. Manufacturers are asking for single point of contact or sales presence across all publicly affiliated programs, transparency in quality evaluations, accountability though impact evaluations, the ability to use training modules and trainers anywhere in the state, and the ability to measure learning outcomes. Some enlightened manufactures would like to see training modules be eligible for higher education credit and be portable through a training portfolio. The final request was to emphasize, where available, industry-standard training with objective outcomes.

Employers are supportive of competition that weeds out low-quality service providers, but they are very wary about a system that does not provide objective data on the quality of trainers, service providers, or individual training modules. The most caustic of interviewees perceived the training system in the state as putting the revenue needs of service providers first and the employment needs of the employer a distant third, with the employee placed somewhere in the middle. The manufacturing employers in Central Ohio distanced themselves from the placement activities of ODJFS and its county affiliates. Of particular concern, several of those interviewed reported expending a great deal of effort with their county workforce boards before eventually giving up on their involvement.

The goal for the state should be a well-coordinated network of training resources and flexible grants that may cover up to 100 percent of costs. Instead of the current focus on job creation and retention, government agencies should allow funding to be used to help small- and mid-sized manufacturers improve efficiency and maintain long-term stability. Such targeted training efforts could help avoid the need for reactionary job retention efforts when faced with plant closures, relocations and other crisis situations.

One promising example of how public-private workforce initiatives can work to provide better solutions in Ohio is the Lean/Six Sigma training program led by Cincinnati-based TechSolve. The $2.4 million workforce initiative – $1.5 million from the U.S. Department of Labor and $900,000 from the state – provides shop-level training focusing on supply chain efficiency. Columbus State Community College and Honda are partners in the effort. A second example of a coordinated, employer-responsive program in Central Ohio is the nurse training program run by Columbus State Community College.

RECOMMENDATIONS FOR BUILDING A BETTER WORKFORCE

- At the time interviews were conducted in the fall of 2007, Ohio's workforce training was a system that merged the needs of the hard-to-employ (people in need of soft-skills training coupled with literacy and numeracy education in the context of sheltered work experience) with the needs of incumbent employees. The "system" is highly fragmented, and its goals are unclear. The perception of employers we interviewed is that county-based Workforce Investment Boards cannot respond to the demands imposed by a fluid regional labor market. What follow are comments and observations on how to improve the system: There is pessimism about the ability to reform the system through the Workforce Investment Boards (WIBs). They are viewed as parochial creatures of county government, responsive to the needs of their employees and their service providers but unresponsive to employers. One human resource professional was blunt and reflected a number of conversations we had when she said that "the WIBs are the wrong vehicle, if you run workforce training through them, nothing will change. They are caught in the welfare system mentality. WIBs don't know employers. You cannot run changes through a system that is broken."
- The workforce system has two clients: the employers and the people in the system. Working with each requires two different skill sets.
- Services that are targeted toward the hard-to-employ should **not** be provided where employer services are provided. These are two different client populations, with different problems and different solutions. The demands of employers and their incumbent workforces are economic development problems. The challenges of the hard-to-employ population are human and community development and social work problems.
- No large or sophisticated employer in the state draws workers from only one county. The workforce training system should have regional structure while operating with best practice operating principles that have been developed with, and vetted by, private-sector human resource professionals. This could be accomplished through structural change or, at the least, through leadership-level cooperative agreements.
- Forms, applications, requirements and general employer "burdens" should be minimized and standardized from region to region. Today, requirements can be different over a county line but within the same metro area (i.e., differences exist between Franklin and Delaware counties as to the reporting requirements for incumbent worker training.)

So what is the solution to having an employer-responsive workforce training system that is the best in the nation? Recognize that there is confusion about the dual-customer nature of the workforce training system in Ohio. The comments and suggestions that follow do not respond to the training and employment needs of the hard-to-employ.

The core of a system that responds to the training needs of incumbent employers and employees should respond to the demands of employers and work with individuals who are literate and numerate and who have a history of work. It should be a seamless blend of the state's vocational education and 2-year community and technical college systems, with the structure of county government being invisible to

employers.

From the perspective of the worker:

- The system should be built around employer-specified and customized training modules that teach objective skill sets and are subject to outcome-based evaluation. Recognized, objective skill certification is desirable.
- All training should be able to answer two questions: What can employees do after the training that they could not do before? How well can the trainees perform the skill or task?
- It is desirable that each training component be placed in a fully portable educational portfolio that can be applied to two-year and four-year degree programs.
- Training should be provided as close to the place of work as possible.

From the perspective of the state:

- Subsidy for technical and community education should **not** be restricted to enrollment in a formal 2-year, post-high-school degree program. Subsidy should be granted by the credit hour as long as credit can be assigned through a student's educational portfolio. The state needs to separate the traditional 2 + 2 mission of the two-year college system from its economic development, or workforce training, mission. They are not the same.
- The Ohio Department of Jobs and Family Services should operate a statewide clearinghouse, with consistent paperwork and funding that follows the worker, and break the county-based model of service provision and payment.
- The Enterprise Ohio Network (the workforce training providers of the state's 2-year post-high-school institutions) and the two Manufacturing Extension Program participants (TechSolve and MAGNET) need to achieve a systemwide clarification of roles, develop better knowledge of each other's products, and work better at offering non-competitive solutions to manufacturing companies. Ohio's employers do not care about the funding streams or business models of intermediary organizations. They are searching for solutions to problems.
- Contacts with customers cannot be sales-based, but should be solution- or problem-solving-based.
- There needs to be a common, valid, accepted diagnostic tool that all service providers of training and efficiency (process) improvement services can use with employers to identify competitiveness problems.

Employers want a seamless system that is of no cost to them. Employees want an educational system that provides tangible skills valued in the workplace and that is of no cost to them. The state must confront the reality of its own limited financial resources and a federal workforce system that is geared toward the needs of low-income, low-skilled workers. At the same time, competition for new employers through economic development attraction and retention activities means that first call on funds will go to companies being recruited to enter the state or to companies with credible claims that they may leave the state.

The only way to cut through this Gordian knot is by using leverage. Everyone has to invest something.

- State higher education subsidy funds to 2-year institutions should be placed in a budget separate from that of 4-year institutions and awarded to education providers based on both enrollment in credit-bearing degree programs as well as training modules that award credit through an educational portfolio. The economic development mission of these institutions should be recognized in state subsidy formulas.
- The state should provide financial incentives for local governments to support the training of incumbent employees at their 2-year institutions with their own local tax base. One possible model is to tilt state subsidy to reward counties that provide local tax resources to their

community and technical colleges or vocational schools.

- Employees should be eligible for an income tax credit or deduction for investments they make in their professional education and training.
- The state should significantly increase the OITP funding with federal funds.
- Educate the educators that manufacturing is not dead and that its needs are now much more high-tech.
- Address soft skills and culture issues in elementary and secondary grades.
- OITP is targeted at job creation. It should be merged with programs designed to invest in the incumbent workforce. After this is done, the pool of funding for incumbent employee training needs to be expanded.
- Requirements to track the post-training of individual workers are the subject of complaints on the part of employers. Work with human resource professionals to design a responsible but efficient post-training accountability and evaluation process.
- Pursue OEM-driven "master OITP" grants similar to the collaboration between Boeing, the state and TechSolve to improve supply chain development.
- Remove funding barriers that discourage vocational, community colleges and universities from responding to the needs of employers by developing skill-based training programs that may or may not lead to degrees or certificates.
- Expand cooperative education programs and encompass all employment levels, from the shop floor to management.
- Allow employers and employees greater flexibility in defining "success." A successful training outcome doesn't always involve the granting of a degree.

WORKFORCE FLEXIBILITY, UNIONS & FMLA

Many of the manufacturers interviewed run non-union operations, and a few ran both union and non-union shops. The primary concern about having an organized workforce was not the union wage differential or union wage premium. The manufacturers interviewed insisted that the dominant concern was workforce flexibility and adaptability. Most of the employers stated that a union wage premium either did not exist or was being eroded by the closure of plants with uncompetitive high wages. A few claimed that they paid wages that were either comparable or even higher than those paid at union shops, but they said they repeatedly needed to confront a "union mentality" that maintains certain expectations about wages, benefits and work rules. "We are a just-in-time supplier," one explained. "With unions, come contracts and lack of flexibility. We need to be able to react to customer demands and market fluctuation. The way that we have avoided layoffs in 20 years here is by handling that with a temp workforce, which we wouldn't be able to do with a union workforce."

One manufacturer said that a union environment did not need to stand in the way of being competitive. "Being able to share and create an environment where people can [contribute] and take pride in what they're doing generates an ability to be competitive." Better management and leadership training could help companies mobilize Ohio's union workers to collaborate on product and productivity enhancements. "You can't run away from a union environment and just go to Mexico," he said. "So what you have to do is … teach management how to cope with and create an environment where you can work together." Others went further to point to union shops that were as effective as any other, but the differentiators were leadership and the culture within the organization.

Part of the reported decline in manufacturing employment is due to the widespread use of temporary workers. Temporary workers may be physically present in a manufacturing plant, but they work for a temp agency that is classified as being a service industry and a supplier to the auto parts plant. Many firms use workers hired and managed by temp agencies to respond to either seasonal or cyclical spikes in

production activity. Every plant that we visited used temp-to-hire in their hiring pan. These manufacturers use one or more temp agencies to staff the entry-level positions in their internal job ladders. There are two reasons for doing this: The manufacturer gets to observe the soft skills and work ethic of the temp worker before offering to make the worker a "permanent" employee of the company. The temp agencies also get the headache of dealing with the turnover that is endemic among semiskilled entry-level workers.

Although Ohio and other northern manufacturing states are often viewed as being union environments, a ranking of site-selection factors by the January 2008 issue of *Area Development Magazine* found that highway accessibility, energy costs, skilled labor, taxes, available land, and proximity to market were more important location factors than a union-free environment. Although perhaps not directly seen as a major obstacle for locating new business, historical union activity tends to increase overall wages for an area, and labor costs were second only to highway accessibility among the top site-selection factors.

Other workforce-related issues that manufacturers viewed as threatening their flexibility and predictability are the Family and Medical Leave Act (FMLA) and the Employee Free Choice Act, which passed the U.S. House of Representatives in 2007 but was filibustered in the Senate.[11] One manufacturer referred to the FMLA as a "nightmare." This report takes no stand on whether FMLA is good social policy or desirable in concept. It is important, however, to convey the depths of frustration manufacturers feel for this and other mandates. "Family leave doesn't require pay, but that isn't the issue. Having them out of the shop is the issue. We estimate the cost at $14 million a year due to absenteeism." Another manufacturer talked of the challenge FMLA presents in managing the workforce due to "the lack of predictability, making sure you have people on the line when you need." It has safety, quality and morale implications for the workforce. In Ohio, targeted efforts to expand, mandate or redefine benefits related to maternity and sick leave are viewed by employers as state-level expansions of the federally mandated FMLA, potentially putting Ohio at a competitive disadvantage compared to other states.

ENERGY

Although all of the manufacturers interviewed cited workforce issues among their primary concerns, labor is only one component of the formula for being globally competitive. "Labor is becoming an increasingly smaller component of cost," one manufacturer noted. "Transportation is becoming a bigger piece, and it's somewhat unmanageable. We're looking at a 60 percent fuel cost increase over the past few years."

Everyone – from manufacturers needing to move parts around the nation and state on down to commuting shop-floor workers – is feeling the pinch of high fuel costs. However, soaring gas prices are only part of manufacturers' energy worries. As state legislators debate proposed electricity rate plans, manufacturers watch with a wary eye: It takes a lot of electricity to run a manufacturing plant.

According to *Area Development Magazine*'s rating of site-selection factors, energy availability and costs ranked third among companies looking to locate a new facility. Manufacturers interviewed indicated that reliability should be added to that mix. In terms of manufacturing operations, energy costs and reliability are critically important to both the production line and the bottom line. Ideally, manufacturers should be able to count on a stable system with predictable, and preferably low, rates. However, the current situation in Ohio is far from that ideal. As rate stabilization plans in the state near an end and are to be replaced by a fully competitive market, manufacturers worry about wildly unpredictable cost increases. They also are concerned about aging infrastructure that is in need of upgrades to ensure reliability.

As Table 5 indicates, electricity rates for industrial use in Ohio, at the time this report was written, currently stand below the national average. At 5.35 cents per kilowatt hour, Ohio's rate is below those of neighboring manufacturing states Pennsylvania and Michigan. However, Ohio's industrial rate is higher than that of Indiana and significantly more than in neighboring Kentucky and West Virginia.

Manufacturers interviewed worried that their prices are bound to increase – or at least fluctuate unpredictably – as the state transitions from rate stabilization plans to a competitive market. "We've been blessed with [our electric supplier] being one of the lower-cost utilities so that's only going to go up," one manufacturer predicted. Another was even blunter: "We have got to control energy costs here. We thought deregulation would be good [indicating that they were mistaken]. Energy is critical to keep industry here."

Incumbent manufacturers need the ability to expand infrastructures, with state assistance when necessary, to meet new demands. One Central Ohio manufacturer told of frustrating and disheartening efforts to obtain government assistance to expand capacity. "We were told if we were going to expand, we would have to add an electrical substation in the neighborhood of $1 million. We met with state and [local utility] officials to see what was available. Even though they knew the consequences were —that we might leave the state, the answer was that they couldn't help us. … In our current plant we have a substation that is owned by [our electric supplier] and we operate at 75 to 80 percent so we were told that we would have to have another one and, with deregulation, we would have to buy our own. … That was a very sour note. I had some bad feelings about that. Five years prior to that, we had heard about opportunities in Alabama and Mississippi where they would give land and training to just come there. Here we're trying to stay in our home state but because we couldn't say for sure we would be adding jobs, [the state wouldn't help us]. Our goal is to remain constant. Even though we're remaining constant, there was nothing the state would do to help us." In short, there is little leverage the state or others can bring to bear in support of incumbent manufacturers when it comes to utility costs and infrastructure at the plant level.

Table 5: A LOOK AT ELECTRICITY RATES

	Retail	Residential	Commercial	Industrial
NJ	12.64	13.51	11.93	11.44
NY	15.09	17.39	15.79	8.89
PA	8.75	10.55	9.03	6.80
IL*	8.11	9.31	8.36	5.34
IN*	6.42	7.96	7.23	5.02
MI*	8.73	10.25	8.92	6.62
OH*	**7.45**	**9.19**	**8.22**	**5.35**
WI*	8.72	10.9	8.58	6.12
MD	12.51	12.91	12.9	10.17
VA	6.58	8.11	6.05	4.48
WV	5.05	6.34	5.54	3.74
KY	5.74	6.46	6.22	4.64
TX	8.18	10.17	8.91	6.20
CA	13.75	15.41	13.81	9.78
*****	**7.82**	**9.43**	**8.34**	**5.61**
USA	**9.08**	**10.8**	**9.46**	**6.08**

Source: Edison Electric Institute: Typical Bills and Average Rates Report, Summer 2007

Interviews and surveys identified several gaps in the area of energy rates and reliability in order to better serve the needs of existing and new manufacturers:

- Rates are about to become very unpredictable and have the potential to come with rate-shock increases at the conclusion of rate stabilization plans, which begin in 2009.
- Reliability of power needs to be improved to eliminate any risk of another blackout similar to the one in 2003.
- Transmission and distribution systems need to be upgraded.
- Aging and costly infrastructure is an impediment to economic development expansions and attraction efforts.

- Economic development programs, rates and/or cash offsets are, at best, not consistent across the state and vary greatly rating period to rating period; – that is, where any programs or dollars exist.

Currently, efforts are under way to address these gaps, but the results are far from being known as the legislative process plays out. The Ohio Senate passed legislation, which as of March 2008, is currently under consideration in the House. The legislation, which attempts to bring predictability to rates while maintaining a market option, is supported by manufacturers and Governor Ted Strickland. The Public Utilities Commission of Ohio, working with the utilities and the manufacturing community, have moved to address issues of supply diversification and support distributed generation and alternative and advanced energy proposals in other legislation. Additional legislation has been introduced that would provide state assistance for utility infrastructure upgrades through a utility infrastructure development fund. At the time this report was written, funding would be limited to natural gas lines. However, the infrastructure development fund should be expanded to include electric power. Under the plan, the development fund would be financed by dedicating utility-generated state tax receipts, in excess of budgeted amounts, to utility infrastructure upgrades and expansions that are directly associated with economic development projects. The funding source would provide revenues that increase with usage, thus expanding the infrastructure and delivery system in conjunction with economic growth.

ENERGY RECOMMENDATIONS

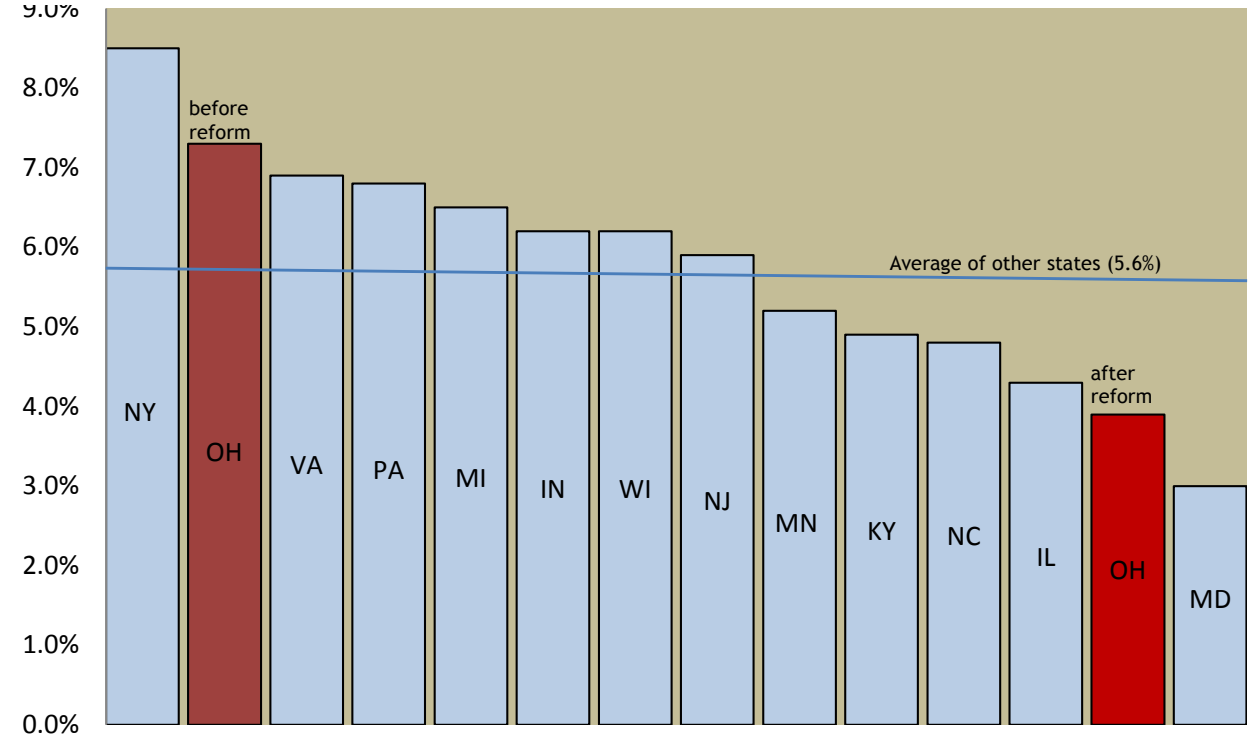
- Support passage of legislation seeking to ensure reliability standards, establish long-term predictability in pricing, and keep market options available.
- Support passage of legislation with the intent to create a utility infrastructure development fund and seek to expand provisions that apply to the state's electricity infrastructure, as well as to the natural gas infrastructure.
- Support supply diversification and energy conservation by helping manufacturers overcome the cost hurdles of both.
- Seek regulatory or legislative approval to create a statewide fund that would help defray a portion of energy costs directly related to key economic development projects.

TAXES

Ohio is commonly considered a high tax state. One manufacturer interviewed listed "the whole tax situation" as one of the top three issues standing in the way of the state attracting advance manufacturing. "They've [state government] made some improvement, but still we're a high tax state and you can look at any survey and we're 47th or 48th when you look at all taxes." As can be seen by the following chart, Ohio's average effective rate of more than 7 percent on new investment – before reforms were enacted in 2005 – was high when compared to other states, even neighboring manufacturing states such as Michigan and Pennsylvania. Given that *Area Development* magazine's ranking of site-selection factors lists three tax policy issues among the top 10 attributes to be considered, being perceived as a high-tax state would put Ohio at a disadvantage in efforts to lure new businesses. However, after the business tax reforms enacted in 2005 are fully phased in by 2010, the landscape will have changed dramatically, with taxes for businesses in Ohio being *considerably lower* than nearly all other benchmark states. At an effective tax rate of roughly 4.5 percent on new investment, Ohio may then in fact serve as the benchmark by which all other states measure tax reform. Only Maryland, at an average business tax rate of about 3 percent, is lower.

It's not surprising that manufacturers interviewed applauded the state reforms and urged lawmakers to keep them in place. However, despite the welcomed changes at the state level, there is still room for

Figure 18: AVERAGE EFFECTIVE TAX RATES ON NEW INVESTMENTS BY STATE



Source: Provided by the Ohio Business Development Coalition, www.ohiomeansbusiness.com

reform in the arena of local taxes. A March 2008 report released by the Federation of Tax Administrators, indicates that Ohio's per capita tax burden has fallen since 2005, with the state ranking 38th in the nation in 2007. However, it is important to note that this is a state-level analysis; it does not include taxes that are assessed by local and county governments. According to the U.S. Census Bureau, the number of general government taxing entities has shrunk by 25 percent in the past 50 years, falling from 116,805 in 1952 to 87,900 in 2002. However, Ohio appears to have a much greater share of taxing entities than most other states. Consider Ohio's 2,338 taxing entities compared to Michigan's 1,858 and New York's 1,602.

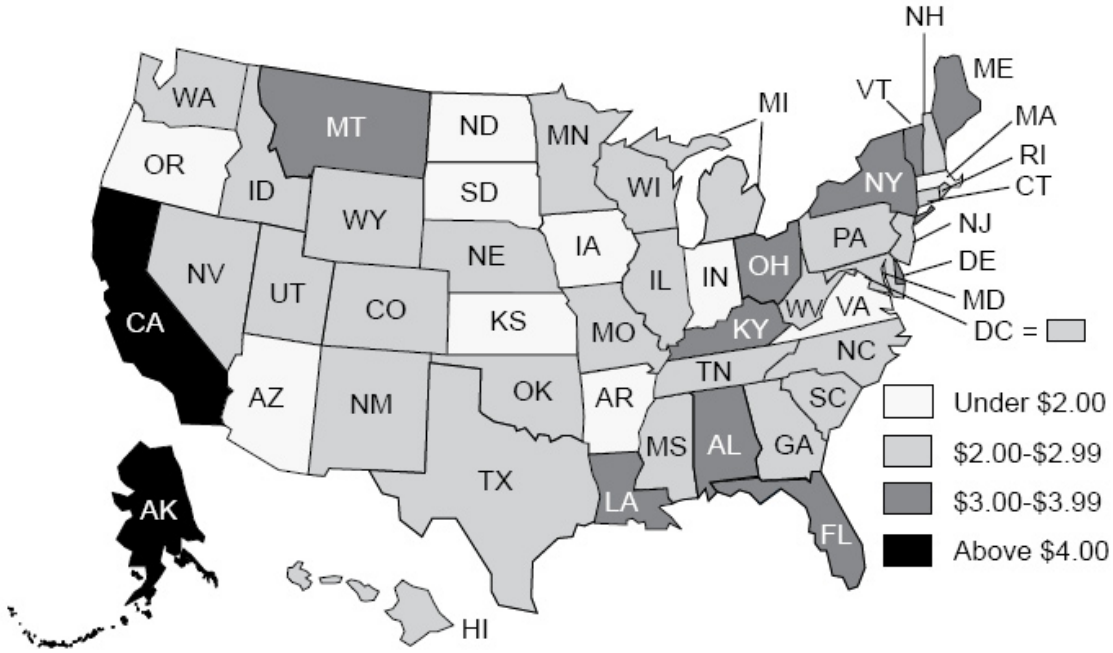
TAX POLICY RECOMMENDATIONS

- Continue support for the full implementation of the comprehensive tax reforms passed in 2005. Protect against erosion of the Commercial Activity Tax (CAT).
- Explore specific regional issues related to local taxing jurisdictions and, where possible, advocate for change.
- Work with the ODOD to link local tax issues, such as tax sharing and governmental operating efficiencies, to state-level incentive packages currently under study by the department.
- Support regional cooperation and tax-base sharing.

WORKERS' COMPENSATION

Manufacturers interviewed were mixed in their assessment of Ohio's workers' compensation program. One representative stated forcefully: "The Industrial Commission is the best recruiting tool for China." Her frustration and hyperbole, however, were countered by the experiences of other manufacturers that had managed to devise workable solutions to the challenges of workers' comp.

Figure 19 : WORKERS' COMPENSATION RATES BY STATE



Source: Oregon Department of Consumer and Business Service

Ohio's workers' compensation system is considered a monopolistic, or exclusive, state fund system. Although many public and private entities impact the system, it consists of four primary entities that are all public bodies:

- The Ohio Bureau of Workers' Compensation (BWC) is the administrative arm of the system and acts as the "insurance company." The BWC collects payments from policyholders (Ohio employers), provides coverage policies and services, and administers the claims process for injured workers, including making initial claim determinations and issuing payments for medical and rehabilitation services and payments to injured workers for lost wages.
- The Industrial Commission of Ohio (IC) is the adjudicatory arm of the workers' compensation system. If BWC is the "insurance company," then the IC is the "judicial system."
- The Ohio Workers' Compensation Oversight Commission (OC) serves as an advisory board and is charged with making recommendations regarding agency policy, investments and premium rates; reviewing the effectiveness of policies and operations; and reviewing independent financial audits of BWC.
- The Ohio Attorney General's Office acts as the legal representative of all three entities and serves as collections agent for outstanding workers' compensation premiums.

The major complaints were that costs and rulings by Industrial Commission hearing officers seem to be arbitrary and unpredictable. Similar to the earlier discussion of energy costs, manufacturers interviewed seemed to worry less about the actual costs than their inability to predict what the costs would be. Unpredictability presents a difficult challenge in a low-margin environment. The manufacturers also questioned whether maintaining excessively large surpluses in the State Insurance Fund actually defeated the purpose of a monopolistic state fund. Ohio's system is fully reserved and, by law, maintains a surplus large enough to fund 100 percent of current liabilities (claims filed), thus protecting the benefits of the injured worker. While maintaining a surplus above this benchmark is desirable and affords flexibility in tight economic times, an excessively large surplus only serves to bleed dollars directly from the employers who fund the system. Private insurers often maintain a larger surplus in order to "smooth"

costs and keep clients from jumping to another insurer due to a rate increase. Ohio's system is monopolistic; there is no other option for an Ohio manufacturer to purchase insurance from a lower-cost competitor.

Among the manufacturers who did not consider Ohio's workers' comp program to be of major concern, most were self-insured. "Workers' comp, if you're self insured, is really pretty straightforward," one manufacturer noted. "[C]ompared to what we deal with in Nebraska, our workers' comp in Ohio is easier to deal with from my standpoint."

Other manufacturers reported diligent efforts to reduce the number of injuries and improve workplace safety overall. The time and money they spent had paid off in fewer claims, they said. "It's gotten better," one manufacturer said. "We've gotten a little smarter about premiums. If it's gotten better it's because it's been internally driven, not due to help from the state." Another echoed the effectiveness of company-driven changes: "We are doing things internally. We are playing the game to lower our rates. We're being more aggressive with primary care physicians, working closely with them …. We're trying to bring people back to work more quickly, giving them things to do so they don't get used to sitting at home. We pay associates directly from payroll to lessen the impact of reserving. As a result we've been group rated and hope to continue to enjoy that."

Table 6: WORKERS' COMPENSATION COSTS BY STATE

2006 Ranking	2004 Ranking	State	Index Rate	Percent of Study Median	Effective Date
1	2	Alaska	5.00	201%	January 1, 2006
2	1	California	4.13	166%	January 1, 2006
3	7	Delaware	3.91	158%	December 1, 2005
4	6	Kentucky	3.78	152%	October 1, 2005
5	8	Montana	3.69	149%	July 1, 2005
6	3	Florida	3.32	134%	January 1, 2006
7	17	Vermont	3.24	130%	April 1, 2005
8	13	Maine	3.21	129%	January 1, 2006
9	19	Alabama	3.17	128%	March 1, 2005
10	18	New York	3.15	127%	October 1, 2005
11	9	Louisiana	3.10	125%	September 1, 2005
12	5	Ohio	3.00	121%	July1, 2005
13	15	Oklahoma	2.96	119%	2/1/06 State, 7/1/05 Private
14	11	Connecticut	2.90	117%	January 1, 2006
15	4	Hawaii	2.89	116%	January 1, 2006
16	10	District of Columbia	2.86	115%	November 1, 2005
17	14	Texas	2.84	114%	January 1, 2006
18	20	Pennsylvania	2.80	113%	April 1, 2005
19	12	New Hampshire	2.75	111%	January 1, 2006
20	23	Illinois	2.69	108%	January 1, 2006
21	21	Minnesota	2.69	108%	January 1, 2006
22	16	Rhode Island	2.68	108%	January 1, 2006
23	29	New Jersey	2.52	102%	January 1, 2006
24	22	Missouri	2.50	101%	January 1, 2006
25	39	South Carolina	2.50	101%	July 1, 2004
26	25	Tennessee	2.48	100%	July 1, 2005
27	27	New Mexico	2.41	97%	January 1, 2006
28	28	Wyoming	2.40	96%	January 1, 2006
29	31	Colorado	2.40	96%	January 1, 2006
30	26	Nevada	2.36	95%	January 1, 2005
31	36	Mississippi	2.29	92%	March 1, 2005
32	34	Idaho	2.29	92%	January 1, 2006
33	38	Nebraska	2.25	91%	February 1, 2005
34	24	West Virginia	2.20	88%	January 1, 2006
35	33	Wisconsin	2.18	88%	October 1, 2005
36	35	Washington	2.17	88%	January 1, 2006
37	32	North Carolina	2.17	87%	April 1, 2005
38	46	Utah	2.06	83%	December 1, 2005
39	30	Michigan	2.05	82%	January 1, 2006
40	40	Maryland	2.03	82%	January 1, 2006
41	37	Georgia	2.02	82%	July 1, 2005
42	42	Oregon	1.97	79%	January 1, 2006
43	44	Kansas	1.84	74%	January 1, 2006
44	41	South Dakota	1.83	74%	July 1, 2005
45	43	Iowa	1.75	71%	January 1, 2006
46	49	Arizona	1.73	70%	October 1, 2005
47	45	Massachusetts	1.70	68%	September 1, 2005
48	48	Arkansas	1.59	64%	July 1, 2005
49	47	Virginia	1.52	61%	November 1. 2005
50	50	Indiana	1.24	50%	January 1, 2006
51	51	North Dakota	1.10	44%	July 1, 2005

Source: Research and Analysis Section, Information Management Division, Oregon Department of Consumer and Business Services, September 2006

Based solely on premium cost, Ohio looks uncompetitive, compared to surrounding states, but this is a case of examining the list price and not seeing the net price after premium rebates are applied. Figure 19 provides a state-by-state comparison of "list price" premium costs. Premiums in neighboring Indiana are less than half the cost of those in Ohio. Indiana's system, which is fully privatized, may in fact serve as a benchmark for possible reform efforts. However, North Dakota, one of three states with a monopolistic system similar to Ohio's, is an extremely low cost state. Based on Table 6, which ranks states from most to least costly, Ohio's premiums are among the nation's highest.

However, premium cost is only one factor to consider. Overall, the state's workers' compensation program appears to effectively serve the needs of manufacturers and employees. Premium costs are only part of the impact on employers' bottom line. Lost time and productivity are also burdensome in a lean manufacturing environment where there is not a deep bench of highly skilled employees. The goal of the program is to ensure that injured workers receive quality care and appropriate rehabilitation so that they can quickly and effectively return to work. Add to that goal a predictable system at a reasonable cost to employers. In addition to the frustrating unpredictability of Ohio's system, manufacturers indicated a number of gaps in the program that should be addressed:

- A lack of consistency and predictability in how claim disputes are resolved.
- Private-sector insurance practices, such as large surpluses and dividends, seem inconsistent with the purpose of a monopolistic state fund.
- Government-controlled system, one of only four in the nation, makes Ohio seem uncompetitive and not market friendly.
- States competing for new investment and jobs have the advantage of being able to "advertise" cheaper costs to business.
- Self-insured employers are forced to contribute to a reserve fund that covers other self-insured companies that default on their obligations.

A note of caution and interest: Many policymakers assume that a jump from a monopolistic system to a fully privatized system would be the best approach to reform the workers' compensation system. However, a quick look at the basic cost data provided in the earlier charts reveals that the nature of the system does not directly result in lower costs. The two lowest-cost states, Indiana and North Dakota, are vastly different. Indiana is a fully privatized system with no state-funded option, and North Dakota is a monopolistic state, similar to Ohio. The majority of states have some type of hybrid system in between monopolistic and fully privatized. Although many states (Nevada and West Virginia, most recently) have moved to privatize their workers' compensation insurance systems, they have done so in times of massive deficits with nearly insurmountable unfunded liabilities. In contrast, Ohio's system is fully funded. It should also be noted that some states that were fully privatized have created state-fund options (most recently Hawaii, Kentucky and Missouri). Furthermore, Ohio has a very favorable rating for its cost of insurance overall and has a strong in-state presence of domestic insurers. A radical shift to open a market as large as Ohio's workers' compensation system would surely affect the state's overall insurance market and could have a negative impact on Ohio's domestic insurers. By many accounts, Ohio's domestic insurance market is one of the strongest in the country, bringing favorable rates for Ohio business and employees. According to the Ohio Department of Insurance (ODI), which does not regulate workers' compensation insurance in Ohio: "Ohio boasts some of the most affordable insurance premiums in the country. The state has the 7th and 14th lowest average homeowners and auto insurance premiums, respectively." In addition, ODI reports that, "Ohio's competitive marketplace helps to attract more insurers, expanding investment and adding insurance jobs to the economy."

More than 260 insurance companies are domiciled in Ohio, and Ohio is considered one of the most attractive states to locate and domicile an insurance company. A fully privatized workers' compensation system would have unknown impact on Ohio's current domestic insurance industry, both in terms of consumers' cost and the viability of domestic insurance companies. Although this could be considered and dismissed as a seemingly protectionist position, it is a valid point of public policy consideration. The role of this public policy debate is to improve the workers' compensation system to the benefit of Ohio and to give Ohio more of a competitive advantage in the national and international economy. Ohio's domestic insurance market, by many accounts, is a pillar of strength within Ohio's current business climate and should not be unduly threatened or weakened in an effort to bolster other sectors.

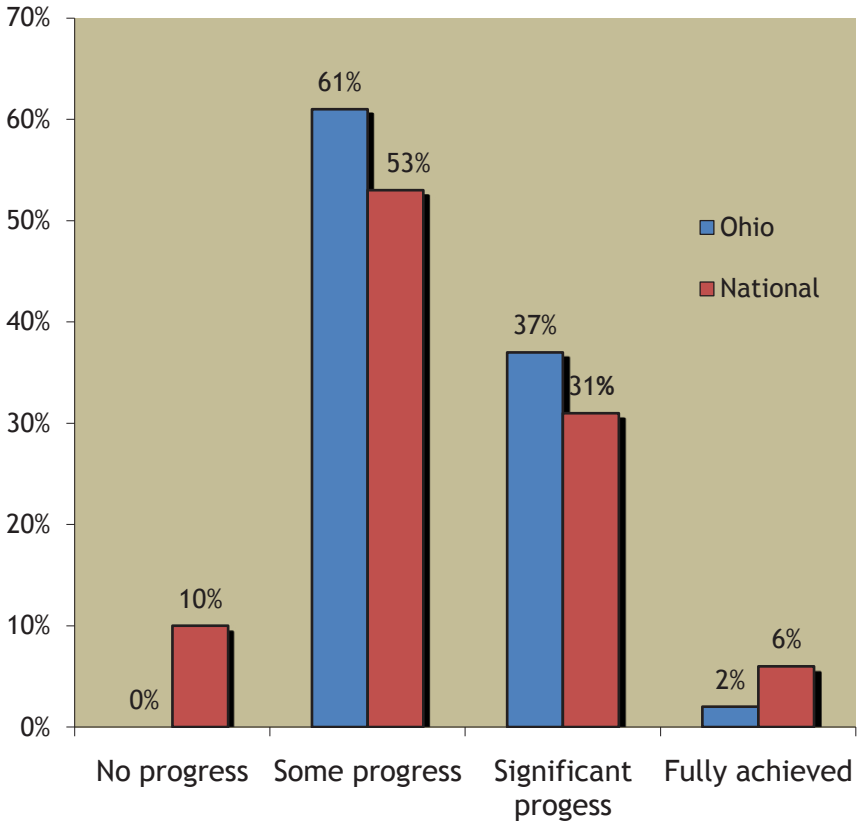
WORKERS' COMPENSATION RECOMMENDATIONS

- Explore an "Ohio model" – maximize the benefits of both a monopolistic and privatized system;
    - Bring more private-sector influences to the system.
    - Maximize the current benefits of a fully reserved state insurance fund.
- Explore a mutual insurance company model.
- Maintain a high level of appropriate care for injured workers to ensure a quick return to work.
- Limit direct oversight of the system by governmental or political forces.
- Provide greater uniformity of hearing decisions to ensure adherence to commission policy and Ohio workers' compensation statues.
- Remove hearing officers from protected classifications and put in place prescribed terms of service during which reviews are performed.

TOMORROW'S JOB: CONTINUOUS IMPROVEMENT

The previous section focused primarily on steps state and local governments can begin taking to nurture a better business environment for automotive and advanced manufacturing today. This section will examine strategic moves that may better position Central Ohio to seize on future manufacturing opportunities. The point has been made already but is worth restating: Many state and local leaders seem to be ready to write off Ohio's manufacturing might as yesterday's news, the lingering byproduct of an old economy; however, such views vastly underestimate the continued importance of Ohio's manufacturing base to the state's overall economic well-being today and fails to grasp the opportunities that lie ahead. In a two-job strategy for growing the value of automotive and advanced manufacturing, tomorrow's job centers on the need for continuous improvement. By supporting manufacturers in their struggles to add value and improve productivity, state and local leaders can foster a vibrant, dynamic environment for business.

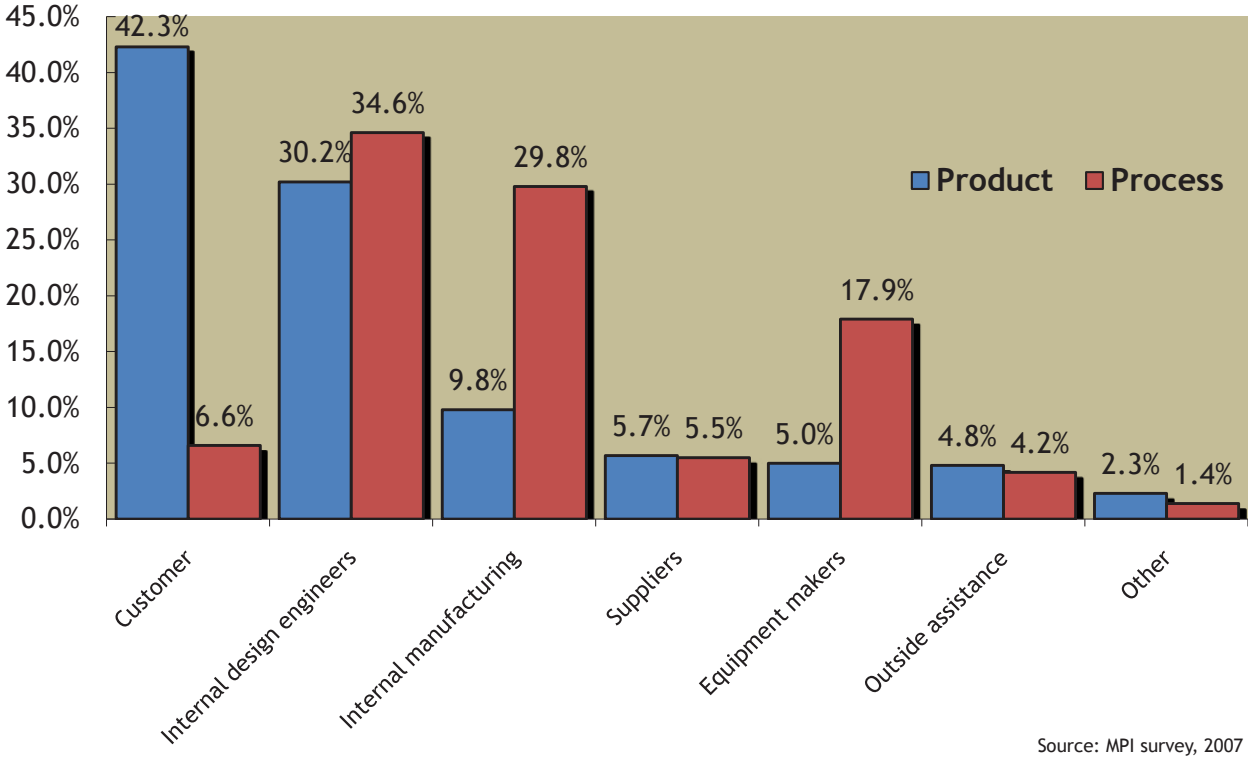
Figure 20: MANUFACTURERS' PROGRESS TOWARD WORLD-CLASS STATUS



Source: MPI survey, 2007

The MPI survey and interviews with manufacturers suggest that there are many opportunities for improvement. As can be seen in Figure 20, only 2 percent of suppliers surveyed reported having achieved the status of being a world-class manufacturer. Nationwide, only 6 percent of suppliers reported achieving world-class status. On a positive note, all Ohio suppliers surveyed indicated making at least some progress

Figure 21: DRIVERS OF INNOVATION



Source: MPI survey, 2007

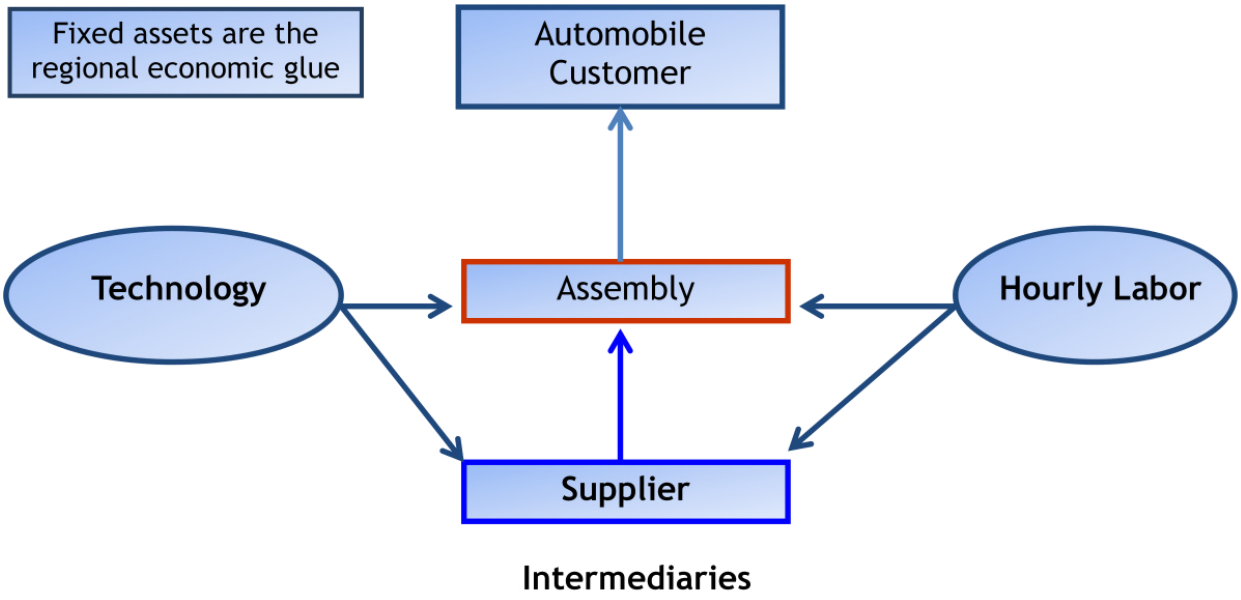
toward world-class manufacturing status. What steps can state and local policy makers take to support manufacturers in their efforts to succeed on the world stage?

In some sense, the basic strategic plan for manufacturers now competing in a global economy is simple: Innovate or die. Suppliers are under constant pressure to improve productivity, incorporate new technologies, and reduce costs. For so long, many Ohio manufacturers have been focused simply on surviving the rapidly changing marketplace. Survival mode has meant doing more with fewer workers and at less cost. However, those companies that are succeeding are the ones that have been able to innovate and add value to their products. "We've got to work awfully hard at it," one Central Ohio supplier said. "We've tried to decommoditize but it's tough. We've introduced new products …" When the OEMs his company supplied moved to China, freight costs priced him out of his old market. Instead, the manufacturer found a way to "convert the channel." "Our sale went from the OEM to the logistics management retailer. The sale's still there, it's just not going to production. It's going to the retailer," the supplier explained. "You have to be smart enough to know where to go."

Given that many suppliers, particularly those lower down the supply chain, are simply focused on survival in this fast-paced environment of shrinking margins, few have had time to formulate plans for process and product innovation. As can be seen in Figure 21, suppliers report that most product innovation – nearly 60 percent – is driven by external sources, such as customers, suppliers, and equipment makers. For process innovation, the suppliers are largely on their own, with 64 percent of changes and improvements driven internally. This suggests an opportunity for state intervention to help stretched-thin manufacturers invest in process innovation. In particular, Tier 3 suppliers could benefit from such state support.

The speed in which change has been occurring on the shop floor is staggering. One supplier illustrated this point by recounting six-month productivity gains in manufacturing drum brakes: The part originally required 16 workers per shift to process 1,113 pieces; six months later, 12 workers per shift were handling 1,466 pieces. The 32 percent productivity increase in pieces processed means less capital equipment

Figure 22: OEM ASSEMBLY AS INDUSTRY CLUSTER DRIVER



is needed, freeing up funds for future growth. Improved use of existing capital and skilled workforce enhances the supplier's ability to compete and increase sales.

Another supplier described other efforts to add value: "We do have a metallurgist at all the plants. That's really one way we try to decommoditize ourselves. We actually sit down with customer with our metallurgist to try to take costs out through different alloys and with softness so we can provide them with lower-cost steel. The cost pressure in the industry, particularly in the auto industry, is huge. And you've got the supply chain operating at very low margins."

The above figure shows the role of OEM assembly as an industry cluster driver. As stated earlier, assembly plants and other fixed assets form the economic glue to make Central Ohio sticky. Other attributes, such as infrastructure, energy, water, educational resources and workforce development, combine to make the region even stickier. Adhering to a strategy designed to support process innovation will allow Central Ohio and the state as a whole to enhance these bonds.

Doing tomorrow's job around the production process means continuing and executing better the delivery of best-practice shop-floor production techniques.

Getting there requires leadership and coordination. There are two types of leadership involved in making continuous improvement a reality in the second and third tiers of Ohio's automotive supply chain. The first is to develop a suite of shop-floor leadership training interventions so that the current, aging, set of shop-floor leaders can be replaced and those who continue can meet the challenges of global competition. Nearly 27 percent of suppliers surveyed considered a lack of skilled leaders to be a threat to profitability.

The second leadership challenge is to galvanize support for a seamless system for disseminating best-practice production techniques. The pieces and parts are available in Central Ohio, at a scope and scale that is rare in the nation, but they operate independently and currently the whole is less than the sum of its parts. The foundation consists of the two members of the National Institute of Science and Technology's Manufacturing Extension Partnership, TechSolve and MAGNET, both of which are active in Central Ohio. Training in lean manufacturing, continuous improvement and other modern production practices are available from Ohio State University's Center for Continuous Improvement. Columbus

State Community College's Enterprise Ohio Network affiliate, Business and Industry Training Services, offers manufacturing training at price points far below that of the MEP affiliates and state's research universities. Immediate problem-solving capacity exists in the Edison Welding Institute, in the numerous research centers at the Ohio State University's College of Engineering and at a unique resource managed by the College of Engineering, the Transportation Research Center. But these parts of a "manufacturing extension service" frequently sell against each other, their products are undifferentiated, there is no coordinated sales force or a consistent attempt to provide the right product to a client company, and open evaluations of their product offerings are hard to find. We cannot say that a system is broken – at this point in time, there is no system in place to break. Central Ohio needs to lead the state in solving the problem of bringing best practices to companies in a cost-effective manner.

CONTINUOUS IMPROVEMENT RECOMMENDATIONS

- Form an Incumbent Employers Program within the Ohio Department of Development that combines the three elements of doing today's job better:
  - Seamless workforce training that combines OITP, EON, MEP and educational portfolios that are recognized by the community college system. The new training is paid with a combination of increased state funding, state income tax credits for the employee, job training tax credits for the employer and a state funding mechanism in the economic development portion of the community college budget that gives extra funding to counties that spend local tax dollars on workforce training – preferably in consortia. The system would be reinforced with an aggressive cooperative education program for community college and technical college students.
  - An energy policy that can finance "last mile" energy infrastructure through one of two mechanisms: direct payments made from overages of state utility tax payments or direct amoritized payments made by private businesses over the lifetime of the infrastructure but secured by a statewide energy infrastructure insurance pool. This would allow either utilities or port authorities to finance the last mile of energy infrastructure.
  - Regionalized economic development representatives that combine regional economic development staff and state economic development professionals so that there is a clear one point of contact for incumbent employers when they seek to expand or find business assistance from the public.
  - All departments of the state that regionalize their service provision and affect economic development should use the same district boundaries and there should be interagency economic development cabinets. At a minimum, this should include the Ohio Departments of Development, Environmental Protection and Transportation. An interagency Workforce Investment Board that represents the Department of Development and the University System of Ohio and their intermediaries should also participate.
- Leverage technological innovations that are deployed in the automobile industry for use in Ohio's aerospace supply chain and other areas of advanced manufacturing, such as food processing and alternative energy production.

TOMORROW'S JOB: THOUGHT LEADERSHIP

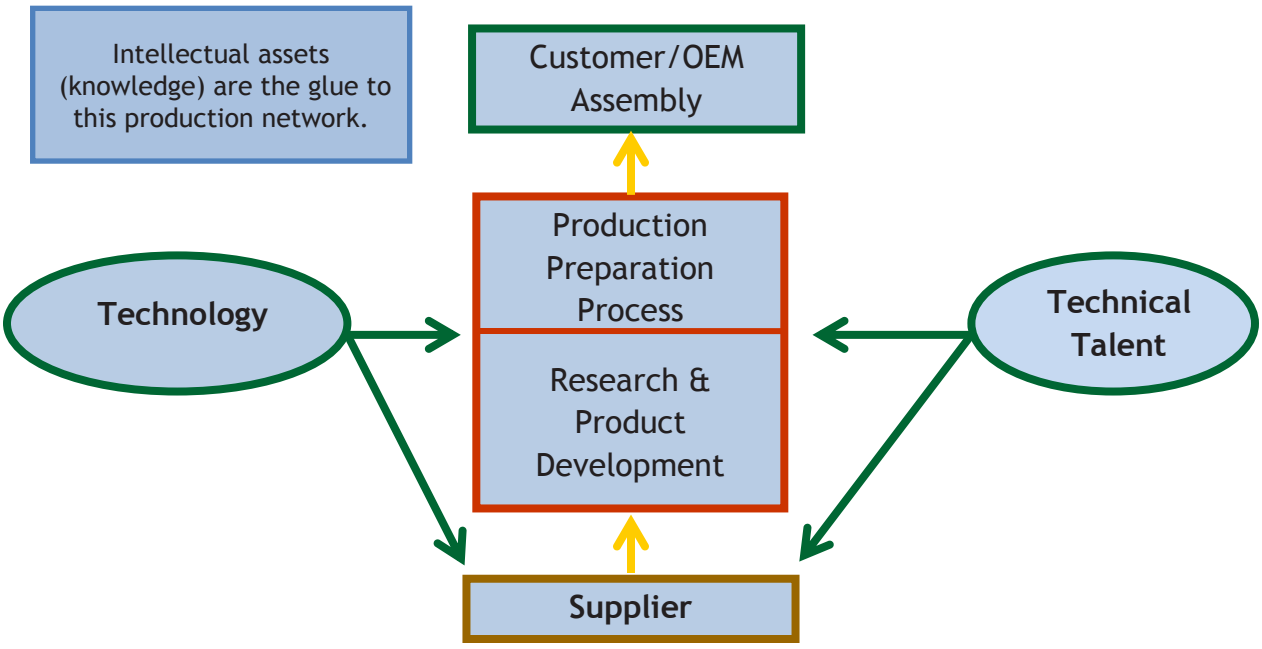
Competitive pressure has accelerated the speed of change in the automotive industry, presenting Central Ohio with an opportunity for adding value to the automotive cluster. Parts manufacturers, as noted earlier, are challenged in the area of product development and innovation. State and local leaders can assist suppliers by building on Ohio's strengths in research and development to create and apply new technologies in advanced manufacturing, with a focus on automotive assembly. Figure 23 breaks down

the primary components of OEM product development. Technology and technical talent feed product development. Suppliers need access to both in order to meet the needs of their customers, the OEMs. What is missing is identifying the areas in which the region can become a global thought leader under the umbrella of a Manufacturing Institute.

The scaffolding on which to build such an effort already exists: Educational resources at state universities and community and technical colleges, business relationships between OEMs like Honda and their suppliers that encourage input into the production process, the state's strategic location as the home to one growing foreign-owned automaker and its close proximity to another, the Toyota plant and product development center in Georgetown, Kentucky. As the Detroit Three automakers lose market share and Japanese-owned automakers gain share, an opportunity exists for Ohio to capture a portion of the automotive production preparation process (the act of moving an automobile from an artistic design to a set of engineering specifications), research and design activities that are now concentrated in southeastern Michigan and southern California. Ohio already has claim to two world-class design schools in the Cleveland Institute of Art and University of Cincinnati's Design, Art and Architecture Program. Last fall, UC receive a $420 million in-kind contribution gift of computer hardware and software from the Partners for the Advancement of Collaborative Engineering Education (PACE), making UC one of just 21 PACE institutions nationwide and the only one in Ohio. The partnership, between General Motors, EDS, Hewlett-Packard, Siemens and Sun Microsystems, is targeted at developing future designers, engineers, researchers and leaders for the automotive industry.

Moving from the design stage to actual production requires what Honda calls the "seven flows": engineering, information, specification equipment, major subassemblies, parts, raw material and people. The more the state can facilitate these "flows," the stronger the bridge it creates between design and manufacturing. A strong bridge helps to ground these activities in the state. The fact that Ohio is already home to auto assembly plants strengthens the structure even more. Proximity plays a role in how quickly and efficiently designs cross over into production. Ohio already offers strength in parts, raw materials and skilled workers. Ensuring that those areas remain responsive to the needs of incumbent automakers and

Figure 23: OEM PRODUCT DEVELOPMENT AS INDUSTRY CLUSTER DRIVER

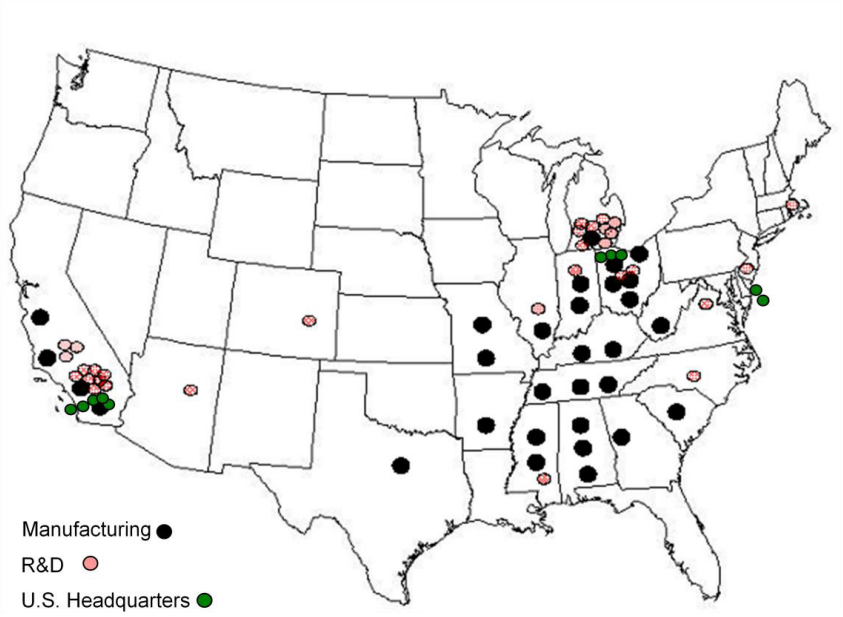


suppliers is a job for today. The future course – tomorrow's job – is to facilitate growth in engineering, information and specification equipment to make Ohio *the* destination for automotive and advanced manufacturing.

THOUGHT LEADERSHIP RECOMMENDATIONS

- Grow the intellectual property component associated with Ohio auto plants. This provides Ohio manufacturers an edge because it is difficult to offshore parts if the intellectual property link is embedded.
- Identify where investments should be made to ensure thought leadership in the production process. Ohio State University's College of Engineering is a global leader in the field of workplace ergonomics or biodynamics, and the Edison Welding Center is considered a major source of innovation in joining technologies. Areas where knowledge gaps have been identified but where research strength exists in the state are in materials science, especially lightweight metals and composites, metals forming, and advanced machining. Ohio can also become a knowledge center in the integration of global production and production management systems.

Figure 24: R&D AND MANUFACTURING SITES OF JAPANESE-OWNED FACILITIES



Source: Japanese Automobile Manufacturers' Association

- Leverage Ohio's deep industrial design talent that staffs automotive design studios throughout the world. Can industrial designers at the Cleveland Institute of Art, the University of Cincinnati, the Columbus College of Art & Design and The Ohio State University be combined in teams with engineers to create new and better products and new and better production systems? And can Central Ohio anchor this thought leadership, where it has its greatest synergies?
- Aggressively recruit local headquarters, design and R&D functions of non-U.S.-based auto parts suppliers.
- Align academic and applied technology resources to support innovation in advanced manufacturing. Research capabilities are needed in advanced production techniques and in the global integration of manufacturing processes.• Work with universities to fill a growing national knowledge gap in metallurgy (especially lightweight metals and materials), metal forming, and nondestructive materials testing.
- Continue investments in alternative fuel and propulsion systems. Given that Ohio is an engine state, any shift away from traditional gasoline engines toward other propulsion systems is a statewide competitive threat.

These recommendations are an indication that Ohio can become a global thought leader in the automotive industry. Michigan's Center for Automotive Research is the thought leader in the economics and market analysis of the automotive industry. Ohio should establish an integrated research and thought leadership capacity on the technical aspects of advanced manufacturing and global integrated manufacturing production. It is not critical that every engineering technique or technology be invented in the state; it is critical that they be applied in the state. Competitive advantage is derived if Central Ohio is the place where knowledge on how to integrate these technologies is developed

CONCLUSION & OVERALL RECOMMENDATIONS

Ohio has to do both today's job and tomorrow's job. Today's job is to meet customers' demands. Tomorrow's job is to innovate new products and continuously improve on today's products and processes. If both are done, then Ohioans will begin becoming globally competitive locally. World-class automotive products can be designed, engineered, produced and sold. This is an easy slogan, but behind that slogan lies a path of hard work, careful investment, and respectful collaboration.

In executing today's job of meeting customer's demands, the governments of Central Ohio, in partnership with the state and the region's deep automotive complex, need to improve their processes and improve Central Ohio as a product. The state can have the largest impact on its incumbent employers in the automotive cluster by improving the basic operations of the economy itself. Through interviews, employers actually laid out a road map for product improvement.

Undertaking tomorrow's job of continuous innovation will require a task force led by industry, with the full cooperation of the intermediaries who service the industry, to focus relentlessly on product innovation and pursue a clear mission of moving the state toward the goal of being a global leader in advanced manufacturing processes.

Today's Job: Improve the Business Environment

- Focus on retaining OEM assembly plants and their supply chains.
- Work on maintaining state business tax reforms and incentives.
- Support collaboration between OEMs and parts manufacturers.
- Address uncompetitive aspects in workers' compensation system.

Today's Job: Support Incumbent Manufacturers

- Ensure long-term energy price stability & reliability and help finance "last mile" energy infrastructure.
- Regionalize and integrate state & local economic development retention and expansion activities.
- Provide seamless processes and best-practice improvement services.

Today's Job: Focus on Workforce Improvement

- Focus and invest in the incumbent manufacturing worker in a demand-driven system.
- Make all training and funding outcome-based and customized.
- Base the subsidy for workforce training, which is a recognized focus of Ohio's two-year college system, on credit hour provided, not on student enrollment in degree-granting programs.
- Establish one source of contact across all service providers.

Tomorrow's Job: Develop Thought Leadership

- Recruit Tier 1 & 2 headquarters and research and development functions.
- Become a thought leader in global integrated manufacturing production (global process improvement.
- Build on existing leadership in manufacturing ergonomics and joining technologies.
- Develop leadership in the areas of lightweight metals, composites, forming technologies, alternative fuels and related propulsion systems, and non-destructive materials testing.

ACKNOWLEDGMENTS

Guiding this research effort has been a highly valued steering committee representing automotive OEMs, Tier 1 and 2 automotive and truck suppliers, as well as Central Ohio's academic, non-profit, research communities and local government. The steering committee worked in close collaboration with the board of CompeteColumbus.

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END NOTES

1. There were 54 complete surveys covering all 61 questions asked. This is twice the number required for statistical validity. However, we believe that the responses are not a random sample of all automotive suppliers in the state. The response was skewed toward companies with superior operating characteristics. We were informed that plants and companies that were being reorganized under the supervision of the courts were not allowed to respond. We also noted that the response was more heavily weighted toward Tier 1 suppliers located in Central Ohio and that Tier 3 firms are underrepresented.

2. The Transportation Research Center (TRC) operates the nation's second-largest test track on the Marysville campus as well. Although Honda of America owns the test track and land, the TRC's operations are independent of Honda and contracted to the Ohio State University's College of Engineering.

3. This is known as free-on-board, or FOB, pricing. The quoted price is just the price of the good. The customer pays all costs associated with landing the product at the customer's site, including freight, customs, and forwarding fees.

4. The two sources for state GDP data produce different estimates for the state of Ohio. Moody's Economy.com estimates GDP from Ohio's auto assembly and parts industry in 2005 at $11.9 billion accounting for 15.7% of US GDP from that industry. The U.S. Bureau of Economic Analysis (BEA) estimates Ohio's GDP at $17.4 billion accounting for 13.9% of the U.S. total. The BEA estimate is for motor vehicle, body, trailer and parts manufacturing while Economy.com's estimate is for automotive assembly and automotive parts. The advantage of using the Economy.com data is that it projects values to 2007, while the BEA data stop in 2005. The advantage of BEA's data lies in its access to deeper state data and a more transparent estimating methodology. The 2007 estimated GDP from automotive assembly and parts from Economy.com, expressed in 2000 constant dollars, is $11.4 billion and 15.9% of U.S. GDP from this industry. Central Ohio accounts for $2.0 billion and 2.8% of U.S. GDP.

5. Both numbers are in real (inflation-adjusted) dollar terms, using year 2000 constant dollars. The data source is the U.S. Bureau of Economic Analysis, Real GDP by State, from http://www.bea.gov/regional/gsp. The data were obtained on March 20, 2008.

6. These data are from Moody's Economy.com.

7. There is a long list of Tier 1 auto parts companies that are either operating under the protection of the courts, recently emerged from protection, or have been purchased by a "vulture fund" that is set to reorganize the businesses and reduce their cost structure. Most of these companies are under pressure because of their wage and benefit costs and staffing levels. The list includes: Blackhawk Automotive Plastics of West Salem, Collins & Aikman, Toledo's Dana Corp., Delphi, Dura Automotive, Plastech, Tower Automotive and Visteon. All of these companies have operating histories in Ohio.

8. "Honda in Ohio: The Economic Impact of the First 25 years," (Columbus, OH: Levin, Driscoll, & Fleeter, June 2004).

9. This is especially true for assembled wheels and tires, engines, transmissions, and seats.

10. Industry-based Competitive Strategies for Ohio: Managing Three Portfolios, Ohio Department of Development, May 2005. Available: http://www.ohiochannel.org/content_files_system/default/your_state/third_frontier_project/ODOD_051005.pdf

11. If enacted, the Employee Free Choice Act would make it easier for workers to unionize.


Driving
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