

NORTH AMERICA'S HIGH PERFORMANCE HEARTLAND

**Developing Sustainable Economic Advantage
for the Great Lakes Region**

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May 1994

Table of Contents

- 4 Introduction**
 - 6 A Reindustrial Revolution**
 - Good-Bye, Rustbelt
 - High-Performance Manufacturing: Regional Strategy for Reindustrialization
 - High-Performance Production Hubs
 - Information-Based Industrial Processes
 - Increasing Resource Efficiency
 - A New Role for Government
 - 13 Industrial Growth and Environmental Renewal**
 - High-Performance and the Environment
 - Clean Technology for Dynamic Industries
 - Winning the Race to Sustainable Manufacturing
 - 18 Industrial Heartland for a Global Economy**
 - A Global Reorientation
 - New Economy, New Relationships
 - Shaping Economic Destiny in a Borderless Economy
 - Common Priorities for Government Leaders and CEOs
 - 25 Toward Sustainable Prosperity**
 - Changing Rules
 - The High-Performance Infrastructure
 - Education and Information
 - Financing for Dynamic Industries
 - Foundation for a New Great Lakes Infrastructure
 - 31 Reinventing the Regional Economy**
 - Export and Foreign Direct Investment
 - The Race to Clean Production
 - Accelerating the High-Performance Revolution
 - 35 State and Provincial Strategies for Regional Reindustrialization**
 - Responding to the Need for Collective Effort
 - Initiatives to Enhance Collective Competitiveness
 - State Policies
 - Policies of Ontario
 - A Regional Vision
 - 45 Conclusion**
-

Introduction

The research that led to this report was commissioned by the Council of Great Lakes Governors in 1992 to provide a fresh look at the competitiveness of the Great Lakes economy. The goal was to identify strategic areas in which collaboration among business and government leaders could accelerate the economic revitalization that had begun.

The research involved three separate efforts. First, McKinsey and Company consultants conducted and analyzed interviews with five governors and five industrial CEOs regarding the potential for new forms of regional cooperation. Second, a research team from the H. John Heinz III School of Public Policy and Management at Carnegie Mellon University, led by Dr. Richard Florida, studied regional economic trends, using extensive surveys of firms region-wide. Third, insights were provided informally by the Council of Great Lakes Industries; by Earle Goode, president of GTE North; and by Judy Peters of Kodak.

Early on, the project research team recognized that the economic revitalization underway in the region did not represent a return to business as usual. Instead, it was a dramatic departure from the old mass production economy. Mass production is primarily technology based, creating competitive advantage through standardized, volume production. In contrast, the region's revitalized economy creates competitive advantage through flexible production, low cost, continuous improvement, and high quality. Whereas once the region was focused inward, it is now broadly focused, comprising manufacturing hubs and regional supply networks, whose output is nearly as likely to be exported overseas as it is to be marketed domestically.

In short, the Great Lakes region is undergoing a high-performance revolution. Observers who predicted the region would experience a long, steady decline or shift completely away from manufacturing were wrong. The region's emerging economy is robust and industrial. Consider these recent statistics:

- Twelve of the region's 17 industries outperformed their U.S. and Canadian counterparts during the first two years of this decade.
- The Great Lakes states and Ontario currently account for 60 percent of all manufacturing output in North America, including 60 percent

of the steel, 55 percent of the automobiles, and 50 percent of the machine tools produced on the continent.

- The rate of growth in manufacturing exports from Great Lakes companies exceeds both U.S. and Canadian national averages. In 1991, the region shipped more than \$160 billion in manufactured goods to more than 80 countries, including \$9.4 billion to Japan and \$5.6 billion to Germany. The *Wall Street Journal* has called the Great Lakes region the "world's greatest export platform."

Most startlingly, perhaps, researchers recognized that this powerful industrial transformation was occurring without a high cost to the environment. On the contrary, the high-performance revolution in the Great Lakes region is taking place during a period of unprecedented renewal of the region's environment. For example, nutrient imbalances in the Great Lakes, which threatened to destroy their ecosystem two decades ago, have virtually been eliminated. Similar improvements can be measured in other areas of environmental quality throughout the region. High-performance manufacturing strategies, such as total quality management and continuous improvement, are remarkably compatible with environmental protection, particularly where regulatory structures allow flexibility and reward innovation.

Yet the high-performance revolution has not reached every community in the region. It has been led by relatively few firms that have taken outstanding initiative, developing worker training programs, innovating new communications systems, and working with banks and regulators to develop alternative financing and compliance strategies on a case-by-case basis. Before high-performance manufacturing can benefit the entire region, government must work to develop an infrastructure and business climate that can nurture a critical mass of high-performance firms, including smaller companies throughout the region.

This report includes insights into the nature of the high-performance infrastructure and the role provincial and state governments should play to develop it. A committed public/private effort to expand and accelerate the high-performance revolution can yield a tremendous payoff for the region. This is a unique opportunity to realize the region's long-sought vision of economic growth and environmental sustainability. More than anything else, we offer this report as a call to common action.

George V. Voinovich
Chairman

A Reindustrial Revolution

Good-bye, Rustbelt

Between 1977 and 1982, the Great Lakes region lost 15 percent of its manufacturing jobs. During the 1982 recession, 11 of the region's 17 major industrial sectors performed below their U.S. and Canadian counterparts. Unemployment in the Great Lakes states was twice the national average. Most observers predicted that the region would experience a long and steady decline, lagging farther and farther behind a new bicoastal economy.

Their predictions proved false. Consider these recent statistics:

- Twelve of the region's 17 industries outperformed their U.S. and Canadian counterparts during the first two years of this decade.
- The Great Lakes states and Ontario currently account for 60 percent of all manufacturing output in North America, including 60 percent of the steel, 55 percent of the automobiles, and 50 percent of the machine tools produced on the continent.
- When compared to the world's leading industrialized nations, the Great Lakes region showed greater growth in productivity during the 1980s (36 percent) than every nation except Japan.
- The rate of growth in manufacturing exports from Great Lakes companies exceeds both U.S. and Canadian national averages. In 1991, the region shipped more than \$160 billion in manufactured goods to more than 80 countries, including \$9.4 billion to Japan and \$5.6 billion to Germany. The *Wall Street Journal* has called the Great Lakes region the "world's greatest export platform."

These statistics suggest that the manufacturing base of the Great Lakes region has not merely survived hard times, but has undergone a fundamental change—a dramatic reindustrialization—reaffirming its traditional role as the center of the North American economy.

High-Performance Manufacturing: Regional Strategy for Reindustrialization

The revolutionary production strategy driving reindustrialization in the Great Lakes region is called high-performance manufacturing. It is defined by the development and application of information, technology, and supplier relationships, emphasizing quality, efficiency, and

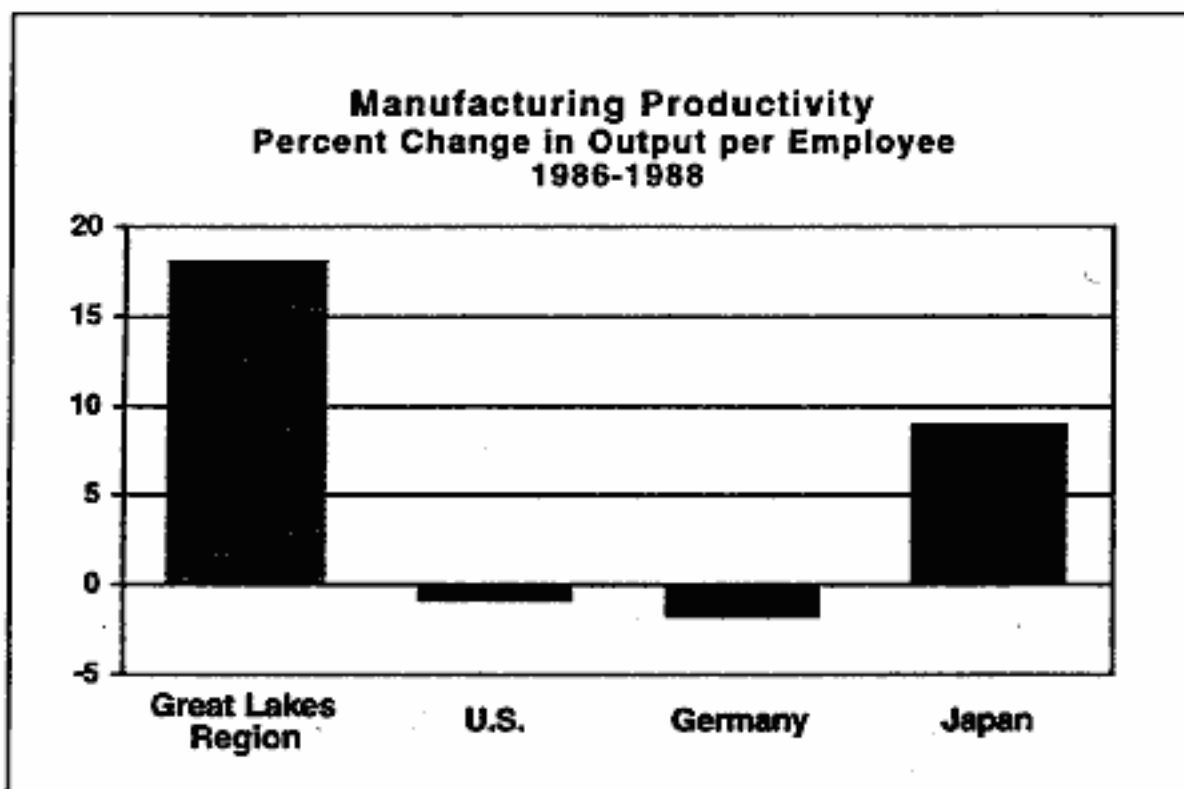


Figure 1.
Recent trends in
manufacturing
productivity,
1986-88.

innovation in response to changing market needs.

High-performance manufacturing differs greatly from the mass production strategies that dominated the regional economy after World War II. Mass production is primarily technology based, creating competitive advantage through standardized, volume production. In contrast, high-performance manufacturing fosters competitive advantage through flexible production, low cost, and high quality.

Reinventing the Heartland, a 1993 study by Carnegie Mellon University, looked at high-performance manufacturing in the Great Lakes region. The study team identified dozens of firms region-wide that exhibited high-performance characteristics, and conducted in-depth surveys of 12 representative firms. Most of these were registered ISO 9000 firms, meaning they met quality process and product standards for export to Europe. Many were winners of the Baldrige Award, which recognizes "best-in-class" business practices. The Carnegie Mellon study suggested that these high-performance firms were changing the economic landscape of the region in at least three important ways:

- They create hubs of production, connected to dense supplier networks throughout the region.
- They rely on information-based manufacturing processes.
- They succeed at doing more—in terms of productive output—with less resource input and waste.

High-Performance Production Hubs

During the boom times of mass production, the Great Lakes region was characterized by massive factories, such as the Rouge River auto plant in Michigan and the huge steel facilities of Hamilton, Ontario, southeast Chicago and Lackawana, New York. The giant Mesabi Tool Plant outside of Pittsburgh was one of two sites Nikita Khrushchev insisted on seeing during his visit to the U.S. in 1959. Today, clusters of hub producers, connected to a dense supplier network throughout the region, are replacing massive factories as the dominant feature of the economic landscape. These hubs act as gateways to capital, new technologies, workforce training, and work organization practices.

The Diamond-Star auto plant in Bloomington, Illinois, exemplifies this new industrial geography. According to research at the Regional Economic Applications Laboratory at the University of Illinois, the state of Michigan has gained the greatest net increase in jobs from

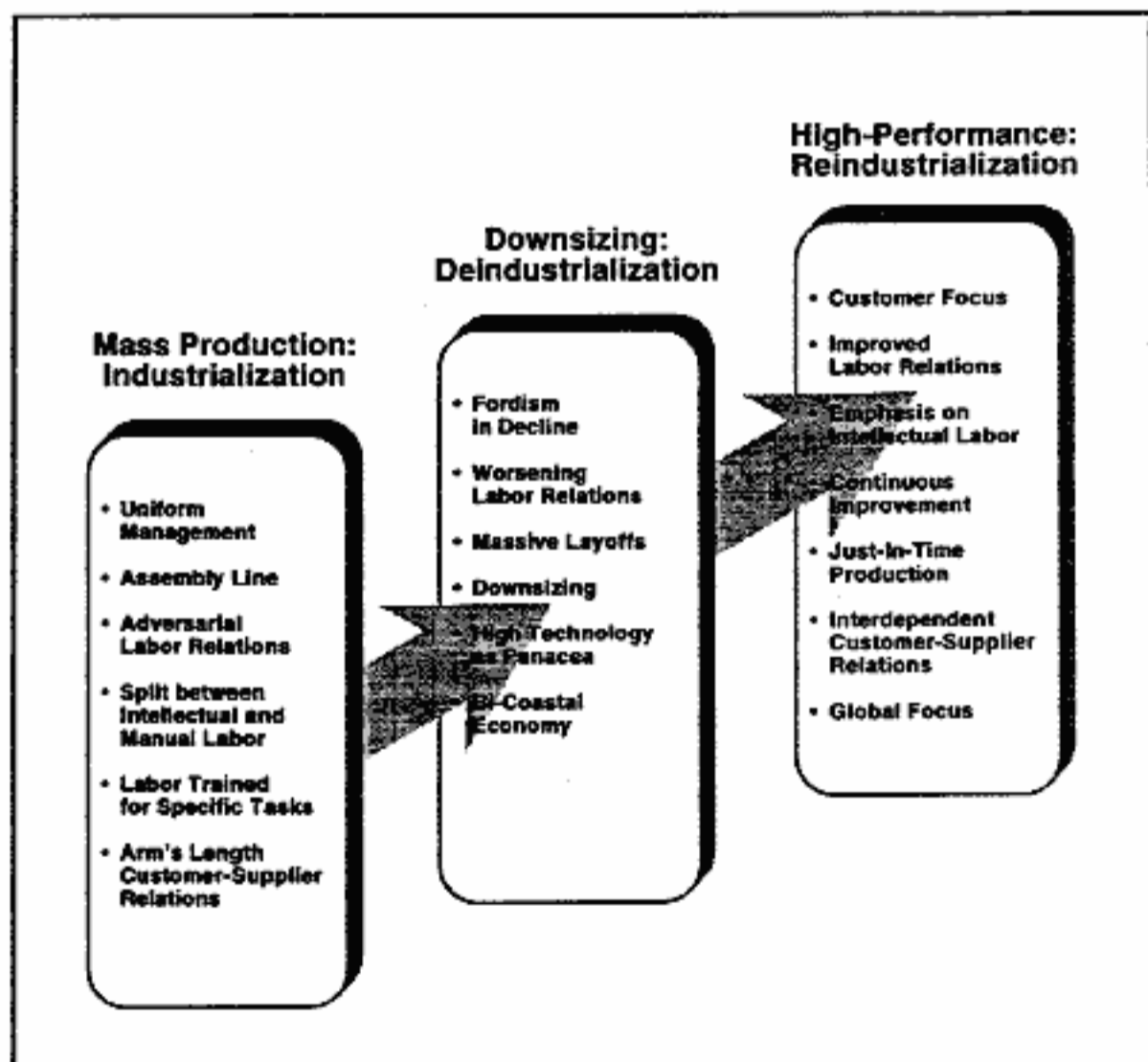


Figure 2.
Evolution of the
production system.

Diamond-Star, due to the plant's relationships with numerous Michigan-based suppliers. Thus, Diamond-Star is not a conventional, centralized mass production plant. Rather, it is the center of a network of firms, including tool and parts makers, engineers, electronic component manufacturers, and marketers, linked tightly in a region-wide research, design and production network.

Because their supplier networks intermesh, the region's high-performance hubs cannot strictly be defined by singular product outputs. Intensive linkages among the auto, steel and electronic

The high-performance revolution has essentially transformed the entire region into a factory without walls.

industries effectively bind the region's production clusters together. The auto and steel belts that reach from Ontario down through Michigan, Indiana, and Illinois, and across to Ohio and Pennsylvania, are increasingly linked through joint production and supplier networks to the electronics concentration that stretches from Pittsburgh through Ohio to Indianapolis and up through Chicago to Minneapolis. Centers for advanced materials production in western New York, Pennsylvania, Ohio, Illinois and Wisconsin are linked inextricably to the auto and electronics clusters. Similarly, the continued expansion of the furniture cluster that rims Lake Michigan and is centered in Grand Rapids depends on close linkages and ventures with the advanced office technology cluster centered around Rochester and Pittsburgh. The high-performance revolution has essentially transformed the entire region into a factory without walls.

Information-Based Industrial Processes

I/N Tek, an Indiana-based joint venture between Inland Steel and Nippon Steel, provides an example of high-performance manufacturing. The company has transformed the process of cold-rolling steel into a continuous process that takes less than one hour from start to finish. This is a tremendous advance over the old way of producing cold-rolled steel in separate batches, which took as long as 12 working days to complete. The key to this transformation was unleashing the collective intelligence of the work force. The company mobilized factory workers, engineers, and R&D scientists to combine the various batch processes one at a time. Workers, engineers, and computer

specialists then worked together to connect the entire cold-rolling process to another process, called electro-galvanizing, which coats steel for corrosion-resistant automobile body parts.

Rather than simply investing in more physical plant, the region's high-performance hub companies are investing in workplace restructuring, total quality management, and supplier modernization at levels that dwarf current or projected government outlays in these areas. High-performance companies have also pioneered new models for investing in education, training, and the broader infrastructure required to support a high-performance economy. To a significant degree, these hub companies also have affected modernization of the region's small- and medium-sized manufacturing base. Thus, high-performance companies have acted as a powerful force in transforming the overall economy of the region.

Increasing Resource Efficiency

The aims of high-performance manufacturing are inherently compatible with the increasingly efficient use of natural resources. Total quality management, an important tool for high-performance operations, stresses maximizing all manufacturing resources, including labor, information, capital, and natural resources. A commitment to continuous improvement encourages efficiency innovations; statistical process control (SPC) and just-in-time inventory systems spot and eliminate waste. Moreover, sensitivity to customer needs and attitudes increasingly directs high-performance firms toward more environmentally desirable, sustainable production strategies.

A New Role for Government

The leadership shown by high-performance hub firms has begun transforming the region, but gradually, affecting supply and distribution firms within their immediate high-performance networks. The recovery is being fueled by "islands" of world class firms and their suppliers, who have internally adopted total quality management, designed new training and education programs, and in many cases also restructured relationships with government. However, too many communities, firms, and workers are still left out of the high-performance revolution, and the regional economy is still unable to reach its full economic potential. Some communities, firms, and workers still face the dislocation and downward economic performance of past decades.

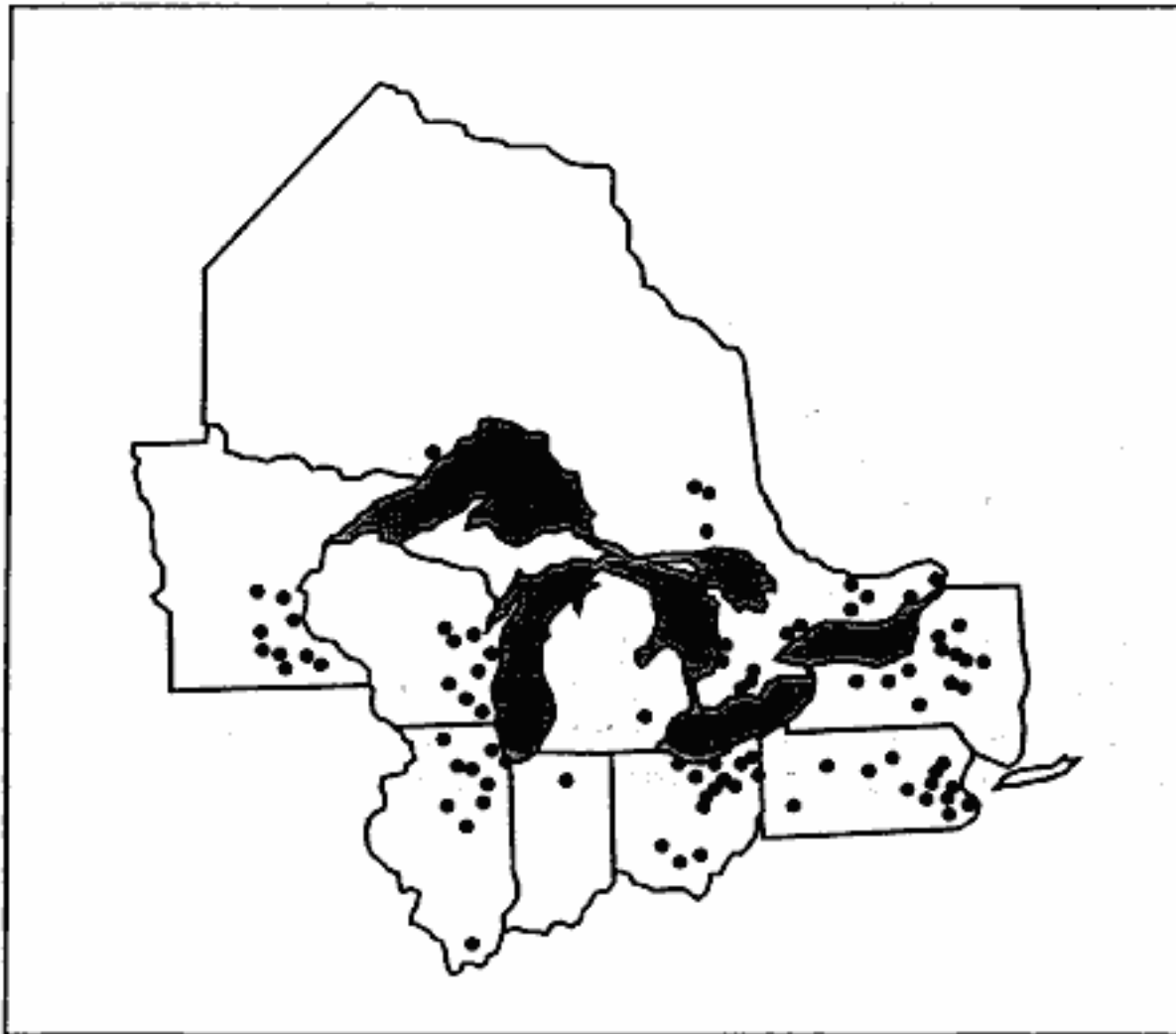


Figure 3.
High-performance
companies in the
Great Lakes region.

A region-wide transformation to a high-performance economy requires a transformation of economic development policy, within as well as among the region's provincial and state governments. The Great Lakes states and Ontario have always been interdependent, but increasingly they are becoming interactive. The focus of development policies must shift from attracting and retaining specific plants to creating an infrastructure for region-wide high-performance production networks.

There is evidence that the strategy for creating this infrastructure must depart from the norm of creating specific government services for specific towns and industries. A more effective approach would identify strategies to transform the overall business climate, eliminating barriers and creating incentives for the adoption of high-performance practices. In short, high-performance firms must be encouraged to continue doing what they have been doing—taking the initiative to identify programs and services that meet their needs. In order to succeed, these firms require communities primed and responsive to

the dynamic nature of new and expanding high-performance production clusters.

The Nippondenso plant in Battle Creek, Michigan, provides an example of how the high-performance infrastructure is being built today. Battle Creek's existing manufacturing infrastructure, including the base of high skilled labor and transportation services, attracted the auto parts maker to the region. However, Nippondenso found that the local education system lacked the capacity to provide the lifelong learning and skills necessary for working in teams. Nippondenso essentially adopted the local community college, developing new curricula and training techniques. The firm also developed a partnership with the local school district.

Before economic renewal can reach all corners of the region, high-performance firms must be freed from such extensive responsibility for developing the basic, public resources they require. The challenge to government is to revise education, regulatory, and infrastructure policies and investments to mirror the dynamics of high-performance production. Restructuring the business climate enables firms that cannot establish their own workforce training programs or create private data networks and other services to adopt high-performance strategies.

Economic vitality for the Great Lakes region depends upon transforming a business climate that was crafted for the age of mass production into one that can support high-performance production, region-wide. Through the initiative of high-performance hub firms and local officials working on a case-by-case basis, the region has begun a dramatic reindustrialization. By all indications, reindustrialization and the new prosperity it brings should spread region-wide. But it cannot, so long as outdated business, financial, transportation, environmental, and education regulations, services, and policies create barriers to new high-performance development. Government in the Great Lakes region must face this new leadership challenge.

Chapter Two:

Industrial Growth and Environmental Renewal

High Performance and the Environment

In light of the past, it is difficult to imagine a powerful industrial transformation not exacting a serious toll from the environment. Nevertheless, the high-performance revolution in the Great Lakes region has occurred during a period of unprecedented renewal of the region's environment. For example, nutrient imbalances in the Great Lakes, which threatened to destroy their ecosystem two decades ago, have virtually been eliminated. In addition, while persistent toxins are still the fundamental threat to the Lakes, the loading rates for key toxins have either dropped or leveled off. Sport fishing in the Great Lakes has grown from nearly zero in 1970 to a \$2 billion annual industry. Recreational use of the Lakes is now a \$6 billion industry. In northwest Indiana, where steel remains the prime industry, marina facilities now generate \$7.2 million in local and state tax revenue, and extensive partnerships for continued renewal are in place. Similar improvements have occurred in other aspects of environmental quality throughout the region.

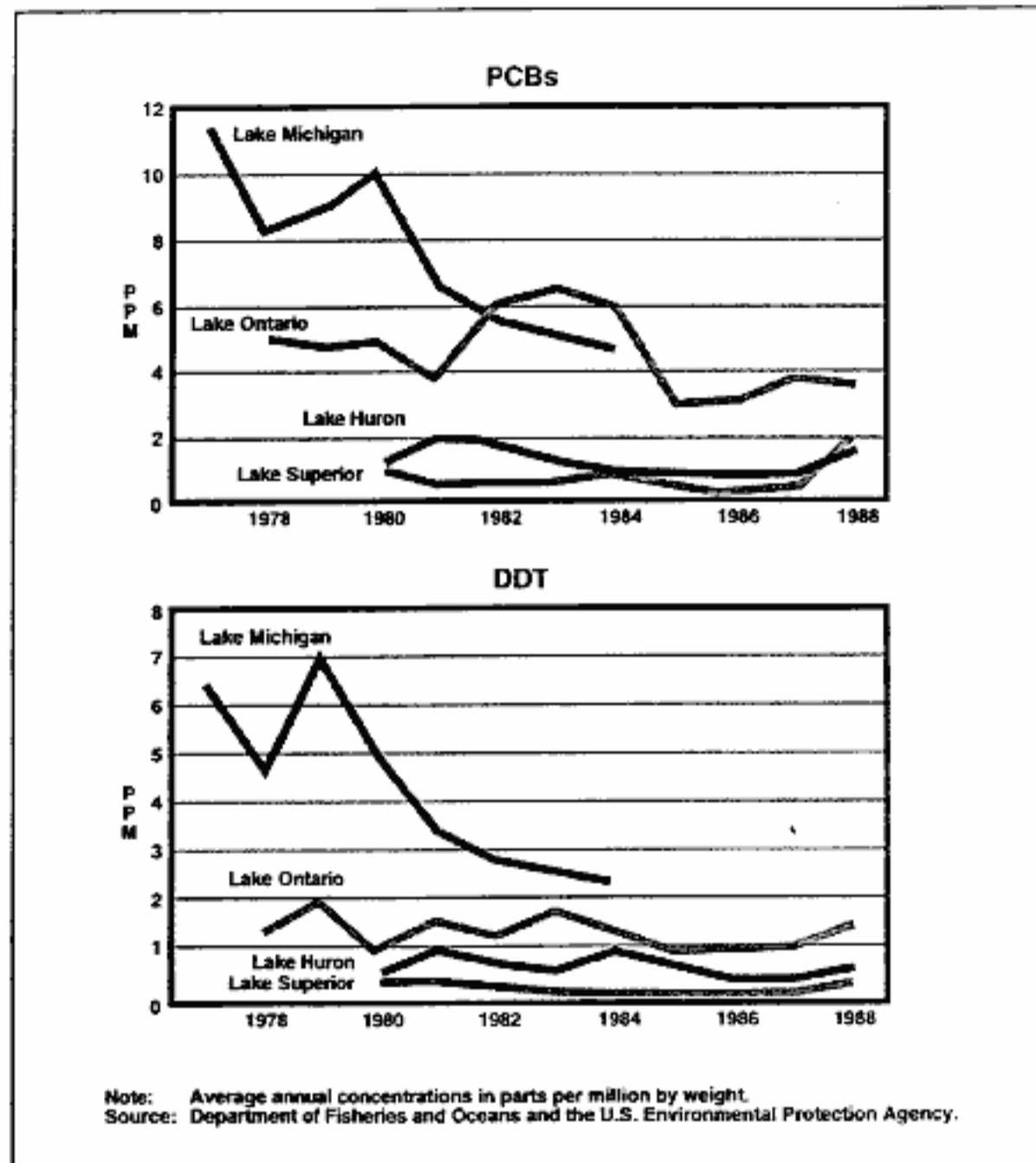
The relationship between these concurrent developments is not strictly one of cause and effect. Nevertheless, high-performance manufacturing strategies, such as total quality management,

High-performance manufacturing strategies are remarkably compatible with environmental protection.

continuous improvement, and process innovation, are remarkably compatible with environmental protection. From the outset, an improving or stable environment attracts high-performance industrial growth. Investments, such as the development of the Kobe steel facility in Lorain, Ohio, would not have occurred had the Cuyahoga River and the city of Cleveland remained a symbol of environmental decline, rather than a site for urban and environmental rebirth.

As high-performance firms have developed in the region, their commitment to quality, resource efficiency, and global leadership has

Figure 4.
PCB and DDT levels
in lake trout from
the Great Lakes,
1977-1988.



already yielded results. For example, a number of companies in the region—Kodak, Dow, Mead, 3M, and Ford, to name just a few—have faced the need to comply with tough environmental standards as a challenge to develop new, more resource-efficient and cost-effective production strategies. In many cases, these firms have emerged as world leaders in clean technology.

Clean Technology for Dynamic Industries

New approaches to regulation and incentives that enhance this natural compatibility between high-performance strategies and

environmental protection enable high-performance firms to lead a broad movement toward environmentally sustainable economic development.

Though the region takes pride in the environmental accomplishments of the last two decades, the next step toward ensuring environmental quality may require new strategies. Prescriptive regulations are most effective with standardized mass production industries, not with dynamic high-performance systems. Tough environmental rules and standards may contribute to a climate of investment and innovation, but usually only within a narrowly focused range—for example, to reduce specific kinds of point-source pollution. Some existing environmental policies may actually deter high-performance companies from taking on broader environmental responsibilities and from true innovation in clean technology.

The reach of high-performance production hubs into region-wide supply networks makes imperative the development of a truly regional environmental strategy. State and provincial governments face the need to reach consensus on regional strategies for competition and environmental renewal to ensure their collective future.

Winning the Race to Sustainable Manufacturing

While the region's economic and environmental future depends upon forging sustainable production strategies, reliance on pollution control standards is increasingly a barrier to sustainability. Three features of control standards weaken their ability to go the final mile to environmental recovery:

- They permit allowable levels of emissions.
- They focus on point-source controls.
- They may differ greatly among state and provincial jurisdictions.

Control standards effectively produce large initial reductions in pollution emissions, but they are less effective as the goal moves toward the virtual elimination of toxins. Control standards fix allowable levels of emission and often specify control technology. This approach rewards investment in managing, rather than eliminating, these toxins.

Control standards have focused on pollution emissions at the point-source, such as the pipe or stack, often missing more complex forms of pollution and environmental degradation. As Table 1 indicates, a major fraction of new loadings for most of the critical toxins entering the Great Lakes comes from other sources, including air, run-off,

Table 1.

Estimated Loadings of Key Pollutants from Point-Sources (1992)	
Pollutant	Point-Source Contribution to New Loadings
Chlordane	43.6%
DDT	51.4%
Dieldrin	32.8%
Dioxin	97.9%
PCBs	25.8%
Cadmium	23.8%
Copper	unknown
Mercury	10.1%

and sediments. Point-source controls, which yielded dramatic results during the first and second environmental decades, now offer significantly fewer results per dollar of investment.

Further, variations in the legal frameworks among state and provincial jurisdictions represent an increasingly difficult challenge. Efforts to harmonize environmental regulations between the states and Ontario have been less productive than any of the participants would like. As the economy of the region continues to evolve into a single North American production complex, variations in environmental regulations will pose a significant hurdle to regional competitiveness as well as to ecosystem protection.

What will effective environmental policies for the future look like? If these policies are to build upon the natural compatibility between new high-performance manufacturing strategies and sustainability, they must shift the focus from pollution control to clean production. High-performance manufacturing achieves its competitive advantage from the flexibility to customize products and respond rapidly to changing markets. The number of permit modifications frequently required by today's high-performance manufacturers reflects the growing potential for problems. Under high-performance conditions, firms are better suited to innovate methods that meet overall clean production goals than to focus on specific, complex regulations.

Market forces are contributing to the development of clean production methods. Consumers are demanding a higher degree of en-

vironmental responsibility from manufacturers. For example, Earth Day 1990 spawned a consumer information service called Green Seal, through which manufacturers could earn recognition for eco-friendly production methods and materials. The Green Seal label is recognized worldwide and adds considerable value to products that carry it. By the end of the decade, this designation will cover intermediate goods as well as consumer products. In coming years, manufacturers' ability to produce "clean products" may shape market share and competitiveness as dramatically as the introduction of total quality awareness did in the 1980s. Companies that emerge as world leaders in clean technologies will dominate the economy, as will the regions they produce in.

During the next century, the need for environmental protection and resource efficiency is sure to increase in every region of North America and worldwide. The emergence of high-performance economic strategies in the Great Lakes region gives this region a great advantage: High-performance manufacturing, with its emphasis on continuous improvement and "doing more with less," potentially represents a sustainable approach to economic development. The challenge for leaders in the Great Lakes states and Ontario is to develop this potential, effectively and quickly, without losing ground won through environmental control standards approaches. The region must use tough standards as a foundation for developing a new environmental policy framework, employing market forces and performance incentives to achieve the virtual elimination of toxins.

The region's public and private leaders must work together, articulating a vision that brings the region's economic and environmental goals into one strong focus. This endeavor is as global as creating the world's first sustainable manufacturing economy, as local as determining whether communities can continue to provide high-wage jobs, and as personal as assuring that our children and grandchildren can enjoy the pleasures of the Great Lakes.

Industrial Heartland for a Global Economy

A Global Reorientation

For decades, the Great Lakes economy was among the most inwardly focused in North America, rising and falling cyclically with U.S. consumer demand for durable goods. This inward focus contributed to the wrenching dislocation of the 1970s and early 1980s, as foreign producers made inroads into U.S. and Canadian markets. Recovery is due, in large part, to the broadening regional economic focus that has accompanied the high-performance revolution. Over the past decade, the Great Lakes region has become one of the most international in North America—a pacesetter in the movement toward a truly global economy.

The region's place as world-class industrial heartland is indicated by four measures:

- Net regional exports
- Level and composition of foreign direct investment
- Level and composition of joint ventures and alliances
- Leadership by high-performance firms, linking their regional supply networks to broader, global trade networks.

The Great Lakes region is experiencing significant net export growth. The region currently exports more than \$100 billion worth of goods per year. Export trade from the Great Lakes states for 1989 to 1990 grew twice as fast as the U.S. national rate of export growth. Export trade is critical to the region's wealth and employment generation. For example, more than 40 percent of the manufacturing jobs in Grand Rapids, Michigan—a major hub of high-performance manufacturing—are tied to exports.

Furthermore, production within the region is internationally integrated. The region is a center for multinational production, with 30 percent of the U.S. manufacturing employment created by foreign investment, and with countless ventures and alliances linking Great Lakes companies to Canada, Europe, Mexico, and Asia.

The revitalization of steel serves as a key example. The region benefited from \$19 billion of foreign investment in steel facilities in the 1980s, one-third of this from Japan. Contrary to fears about possible negative impacts from foreign investment, this investment

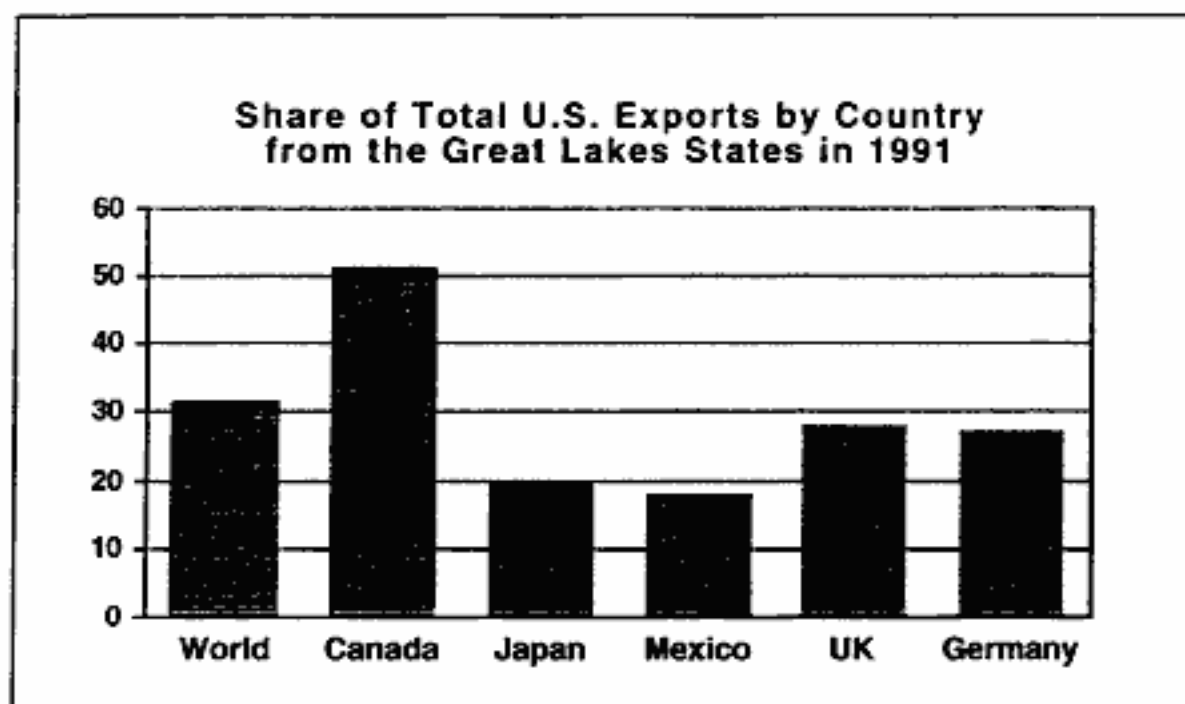


Figure 5.
U.S. exports from
the Great Lakes
states in 1991.

helped maintain the Great Lakes region as a center for steel production and has resulted in significant steel exports. International joint-venture strategies are especially successful in creating mutual benefits. For example, I/N Tek, the joint venture between Inland Steel and Nippon Steel, has made the region home to the most advanced cold-rolling facility in the world. The I/N Tek facility exemplifies the region's emergence as an advanced manufacturing melting pot—where the best global technologies, strategies, and work practices come together.

The Great Lakes region was primed for the development of a truly global economy by its long experience with bi-national trade between the Great Lakes states and the provinces of Canada. Today, the region is literally the gateway for U.S./Canadian trade, worth more than \$50 billion per year. Now, Canadian and U.S. policy leaders can build on the region's existing bi-national economy to strengthen export and investment competitiveness worldwide. As high-performance reindustrialization demands an increasingly global perspective, the opportunity both nations share to build supportive, compatible trade policies becomes less an option and more an imperative.

New Economy, New Relationships

The Great Lakes economy traditionally has been relatively self-sufficient. For example, a 1975 study found that 74 percent of the goods produced in six Great Lakes states (Minnesota, Wisconsin,

Illinois, Indiana, Michigan, and Ohio) were intended for sale in the region. Although there was a significant level of trade within the region, the states and provinces shared virtually identical industrial composition. Over the last decade, the Great Lakes region has begun to evolve from a collection of similar industries producing goods for shipment to one another into a single high-performance production system, with global economic impact.

Under high-performance conditions, the region is made up increasingly of firms linked together in supply networks, leading to 40 percent of final, value-added products heading overseas. In many

The economic linkages fostered by high-performance production offer unprecedented opportunities...

instances, a firm may supply goods as part of a venture or strategic alliance with other suppliers. Day-to-day interaction among multi-firm research, design, assembly, and marketing teams has replaced the limited interaction that once took place between purchasing departments of buyer and supplier firms. Whereas interaction used to take place by mail, it now takes place instantaneously, through telecommunications and computer network links.

The economic linkages fostered by high-performance production create unprecedented opportunities for regional collaboration and strategic development of infrastructure, human resources, and regulations. However, new supportive economic policies are required.

The transformation of Republic Engineered Steels illustrates the impact of high-performance manufacturing on regional connectedness. The firm operates plants in Ohio, Indiana, and Pennsylvania. During past decades, under mass production conditions, all three Republic plants produced similar, but separate, products. Little interaction occurred among the plants. Little interaction occurred with local communities, either; good roads and acceptable high schools were all Republic needed from the region.

Then, in the 1980s, Republic made a painful but successful transition from a traditional industrial firm to an employee-owned, high-performance firm. Today, the three Republic plants function as a single production system, interacting at every stage of production.

Republic's basic concerns for roads and high schools have vastly expanded. Republic now needs a range of cost-effective transportation options and high-tech information services. With employees

responsible for overall quality management in three plants, Republic needs access to basic management training and enhanced education in math, science, and communication skills, including team-building. And as Republic seeks to lower environmental compliance costs through innovative pollution-prevention strategies, the firm seeks flexible relationships with regulators in each state.

To serve this new economy, the region must develop a common base of what Harvard economist Michael Porter terms specialized factors of production. These factors include advanced skills, technological resources (particularly information technologies), and regulatory standards that stimulate innovation. These are the same services and programs Republic Steel now requires. In a highly interconnected high-performance economy, variations among public services and regulations can erode performance and job opportunities as certainly as barriers to Great Lakes shipping would have limited the old mass production economy.

The need to coordinate economic policies and infrastructure is especially important in fostering U.S./Canadian production relationships. Countless companies throughout the region are engaged in a transformation from separate Canadian and U.S. divisions to fully integrated North American firms. The elimination of unnecessary barriers between the U.S. and Canada demands collaborative efforts among all the Great Lakes states and Ontario. The integration that Republic Engineered Steels sought for its three state operations provides a model for the kind of policy integration that states and provinces themselves must seek. This is not a call to resurrect plans for a regional economic coordinating body. The high-performance economy creates imperatives for collaboration, but it defies coordination at any level. Regional policy strategies must leverage and augment private sector, grass-roots initiatives.

Shaping Economic Destiny in a Borderless Economy

The emerging high-performance economy challenges the Great Lakes region to assume a greater role in directing its own economic future. Since World War II, national macroeconomic policies—such as policies impacting the demand for durable goods, federal labor policies, and federal trade policies—have been the dominant levers in regional economic change. In essence, the old economy placed the Great Lakes states and provinces in the same boat, while offering them little access to the rudder.

The high-performance economy fractures this dynamic. The shift to a high-performance, export-oriented economy renders microeconomic conditions and policies—which shape productivity and the quality of production—more powerful than macroeconomic policies. In fact, state and local policies that affect microeconomic conditions can make or break a global high-performance firm.

Consider a few of the factors that foster industrial profitability in the 1990s:

- Building advanced transportation and communications systems
- Removing regulatory barriers that increase transport costs
- Developing lifelong learning systems that fundamentally integrate traditional education with work-based learning
- Instituting labor and corporate regulations designed to support joint ventures
- Harmonizing key health, safety and packaging regulations with international standards
- Supporting energy deregulation and incentives for prevention-based environmental protection.

These are all examples of microeconomic factors, largely within the domain of state, provincial, and local governments.

At the same time as regional and local factors have become increasingly important, global economic trends also have become powerfully influential in the regional economy. The last recession graphically illustrates this. Strong export trade from the Great Lakes region to Mexico in 1991 and 1992 was responsible for sustaining unemployment in the region at 2 percent below the U.S. average. The concept of “national economies” holds little currency anymore.

This breakdown of national economies is global in nature and creates opportunities for exercising greater local influence on economic performance. Other industrial regions worldwide are recognizing and acting on this dynamic. Led by the Baden-Wurtemberg region of Germany, the four major industrial regions of Europe have organized as the “Four Engines.” Strategies for collaborative technology and export development enable these regions to improve their economic competitiveness. Similarly, the southern province of Japan, given responsibility for its own economic performance by the Japanese government, has forged an infrastructure development program with Korean port provinces. Both the European and Japanese initiatives recognize that in a global economy, the development of partnerships between trading regions is as important as looking for national macroeconomic stimulants.

Common Priorities for Government Leaders and CEOs

The challenge of assuring a sustainable economic resurgence for the Great Lakes region can be summed up as a need to achieve scale. There are plentiful examples of both economic and environmental resurgence, due to outstanding private and public sector initiatives. The challenge now is to extend this experience from corridors and clusters to communities region-wide.

The governors and premier must play a lead role in expanding the region's young, high-performance economy. Remaining pockets of decline ultimately weaken the conditions for recovery everywhere. The region's governors and premier struggle to address problem areas at the same time as they must nurture existing successes, with the hope of ensuring that cases of pollution prevention and sustainable production, now the subject of special awards, will become common practice.

Industry leaders must identify opportunities to replicate the high-performance strategies implemented in a single firm or plant, extending these to a broad base of suppliers and customers, including government. This dissemination is crucial if they are to realize a full return on their investment in restructuring. The Carnegie Mellon study, *Reinventing the Heartland*, found that the extension of high-performance practices to supply firms was the single greatest determinant of return on investment in high-performance hub restructuring. Companies that have succeeded in involving suppliers and customers in high-performance production report returns on investment in excess of 20 percent.

High-performance firms that have recognized the importance of restructuring throughout their market networks have virtually made

Common interests constitute a strong bond between the public stewards and corporate leaders of the region.

their workers missionaries for high-performance. Leading high-performance companies loan employees to suppliers and customers and to universities and trade schools. One firm reports that it has transformed its sales staff into workforce trainers to assist potential customers in learning to use the state-of-the-art equipment that it produces.

The rapid design and deployment of lifelong learning systems is a priority among both government leaders and high-performance CEOs. Similarly, the development of advanced information systems and of an overall high-performance infrastructure is in the common interest of corporate leaders, the governors of the Great Lakes states, and the premier of Ontario. These common priorities and interests constitute a strong bond between the public stewards of the region's natural and economic resources and the corporate leaders who have made an investment in the region. It represents the starting point for a powerful, far-reaching public/private partnership.

Chapter Four:

Toward Sustainable Prosperity

Changing Rules

Until the late 1970s, the Great Lakes economy grew by developing its natural resources, such as coal and iron ore, to make steel and durable goods, including automobiles, appliances, and industrial equipment. The region prospered in part because its natural comparative advantage helped lower the costs of mass production. Public policies emphasized financial incentives, reduction of the marginal costs of operation, and—at the state level—recruitment of branch plant firms.

Over the past two decades, the economic rules have changed in the Great Lakes region and worldwide. Global competition has made available a wide range of lower-cost products to challenge those historically produced in the Great Lakes region. Global markets demand increasingly sophisticated, high value-added products and services, not just mass produced commodities. Further, the sheer magnitude of the global market raises questions about sustainability: The successful economy in the long run will be one that can support high-paying jobs while preserving its own production capability and regional quality of life.

Sustainable economic advantage rests upon the ability to harness knowledge and creativity in new product design and production, with emphasis on quality and continuous improvement. These qualities are required throughout high-performance production networks. Moreover, the region must help develop these qualities and offer a broader infrastructure on which producers and production networks of firms can draw, similar to the way producers once drew on the natural resources of the region.

The High-Performance Infrastructure

In any regional economic system, industry relies on the region for trained labor, communication and transportation infrastructure, a strong technology base, market access and feedback, and government support for industry. In a high-performance economic system, all these factors must be finely tuned and available through an integrated system of business and government institutions.

This puts the burden on regional leadership to transform the

manufacturing infrastructure into an attractive, supportive environment for high-performance production networks. The role of public policy is not only to facilitate the shift to high-performance production systems, but also to eliminate outdated public and regulatory policies that could undermine the new infrastructure. New public policies and strategic investments must simultaneously shape and leverage high-performance reindustrialization. The characteristics of a regional high-performance infrastructure include

- A manufacturing component, consisting of interconnected vendors and suppliers
- A labor component, consisting of qualified workers, engineers, and researchers
- A communications and transportation component, to facilitate the constant sharing of information and timely delivery of goods and services
- A capital allocation and financing system attuned to the needs of high-performance companies.

The core of the high-performance region consists of a variety of firms whose structure, production processes, and delivery systems

The Shape of a New Infrastructure	
Mass Production Economy	High-Performance Economy
Separate college and vocational tracks	Lifelong learning for all workers: "knowledge, not college" focus
Separate education and job training systems	Close ties between classroom and workplace
Transportation geared toward bulk shipments	Transportation geared toward just-in-time delivery
Command and control environmental regulations	Market-based environmental regulations
Telecommunications treated as a utility	Advanced information services are a component of production
Regulations geared to the domestic market	Regulations harmonized with international standards to encourage exports
Capital tied to inventories	Capital markets support low-inventory production
Collaboration regulated	Joint ventures encouraged

Table 2.

represent a radical departure from mass production. Larger high-performance manufacturers play the role of a hub, surrounding themselves with a spoked network of customers and suppliers. In this way, they push innovative capabilities and costs as far down and away from the top of the institutional hierarchy as possible. Within company walls, one finds not only the most advanced technologies and monitoring systems, but also self-managed, cross-functional work teams of managers, engineers, and production employees that seek continuous process and quality improvements. The high-performance hub system is based on interdependent customer-supplier relations; these firms focus on delivering what the product users need, rather than on selling whatever products come off the assembly line.

Education and Information

High-performance regions have a human infrastructure—a labor market from which firms draw able-minded and able-bodied workers. This infrastructure is built of an educational and training system that is carefully tuned to the technical and managerial requirements of high-performance manufacturing. Workers generally must be better trained than in the past, and they must be prepared for lifelong learning and on-the-job problem-solving, as products and processes continue to change.

Communities that have been fostered by leading high-performance firms typically display higher student proficiency across all grade levels. With the cooperation of high-performance industry and government, high school students in these communities may enroll in vocational apprenticeships that expose them to state-of-the-art manufacturing and management systems. Once such multi-skilled students join the full-time workforce, they are prepared to participate in cross-functional work teams and high-tech, continuous improvement environments.

Extending high-performance educational opportunities region-wide will require cooperation among firms, educational institutions, and governments. Essentially, firms must define their workforce requirements and solicit the cooperation of educational institutions to develop and deploy desired skills. Government can facilitate this process, and even initiate it, to provide firms that are engaged in high-performance reindustrialization with more ready resources.

The Baden-Wurttemberg region of Germany provides an example

of how new educational strategies might work. Almost half of the workforce of 3.4 million in Baden-Wurttemberg is employed in manufacturing. The region's key industries include automotive production, electronics, machine tools, and textiles. Baden-Wurttemberg has developed close links with leading multinational firms and to other major production regions. It has a large base of Japanese and American multinational firms such as IBM, Hewlett-Packard, Sony, and SEL, as well as leading German corporations such as Daimler-Benz, Audi, and Robert Bosch. The region is closely connected to other production regions throughout Europe. Baden-Wurttemberg is a recognized leader in work-related training and education. Vocational high schools that once provided apprentices with rudimentary skills now teach at a level comparable to the advanced engineering polytechnic schools. The regional Chamber of Industry and Commerce is integrally involved in developing and assessing vocational training.

All regional economies deliver their goods and services and communicate via a transportation and telecommunications infrastructure. High-performance economies require finely-tuned transportation systems and instantaneous information transfer among manufacturers, suppliers, and customers. For charting production schedules, analyzing cost data, coordinating marketing strategies, and performing scores of other tasks, advanced communications systems are crucial. Properly designed and financed telecommunications networks increase competitive advantage, especially in a global marketplace.

Financing for Dynamic Industries

Capital allocation systems and financial markets impact the growth of existing firms and the birth of new ones. High-performance firms are vulnerable in these areas, because they have little control over the financial infrastructure, and because the existing infrastructure often suits outdated mass production industrial strategies. For example, the results of field research indicate that banks in the Great Lakes region often require inventory as collateral; high-performance firms seek to limit holding costs to a bare minimum and may not meet inventory requirements even when they are robust.

Consider one example of successful partnership between high-performance manufacturing and banking. The Nagoya region, in the heart of Japan, accounts for about 12 percent of that country's GDP and leads the country in industrial goods production. Home to Toyota

Motor Corporation, Nagoya is the center of Japan's automotive industry. It has Japan's largest concentration of machine tool manufacturers and advanced mechatronic producers, including Okuma Machinery, Yamazaki Kogyo, and Toyota Machine Works. Nagoya is also a center for high-tech industries such as robotics, aerospace, industrial ceramics, and new materials. Close network relationships exist between Japanese financial institutions and this manufacturing base. Japanese banks have a long-standing tradition of serving medium- and small-sized businesses as well as large corporations. To support corporations seeking new export opportunities, they may establish overseas operations and develop useful relationships with foreign firms. Tokai Bank, the region's largest, supports major infrastructure projects and provides expert advice to the city of Nagoya on effective strategies for fund management.

Foundation for a New Great Lakes Infrastructure

The Great Lakes region already exhibits many of the characteristics of a high-performance region. Along with its emerging core of high-performance firms and production networks, the region possesses extensive resources to build a new, high-performance infrastructure. These resources include human resources—people, currently among

The Great Lakes region possesses extensive resources to build a new high-performance infrastructure.

the leaders in industrial and environmental research and development, engineering, and trades. In addition, many of the region's companies and workers are accustomed to three-shift, around-the-clock production, which is becoming an important feature of high-performance production.

Leadership in building high-performance capabilities has come not only from industry in the region; private-public partnerships have already been initiated. The Great Lakes region has traditionally invested more in public education than the nation as a whole, and it consistently has a higher percentage of high school graduates. The region is home to ten of the top twenty engineering schools in the U.S. and to two of the top five programs in industrial and manufacturing engineering. Many educational institutions have put priority on manufacturing specialties; many have developed close ties with

industry and have restructured curricula toward developing innovative, cost-competitive manufacturing strategies.

The Great Lakes region also has begun to address other components of the high-performance infrastructure. In transportation, the region hosts a vast trucking and air transport network; new high-speed rail projects are expected to serve mid-distance travel. Efforts to expand communications capabilities have been spearheaded in many cases through partnerships involving industry, research institutions, and government. But new partnerships among industry, labor, educational institutions, and government from the U.S. and Canada will be required to ensure development of the broader political economy that can support the complete and successful transformation of the Great Lakes regional economy.

Chapter Five:

Reinventing the Regional Economy

Three Steps to a Sustainable High-Performance Economy

The unmatched strength of the old Great Lakes mass production economy was bolstered by a broader political economy. It provided resources—including roads, rails, and ports—the land-grant university system, and financing strategies focused on mass production needs. Unfortunately, when the mass production economy faltered, this policy framework was undermined.

Today, the region can and must invent the world's first sustainable high-performance economy. This economy will be dramatically different from the one that preceded it. Nevertheless, it will require the same level of commitment, vision, and broad-based expertise.

In order to achieve the goal of a sustainable high-performance economy for the Great Lakes region, three steps are crucial:

The region must maintain its current advantages for export and foreign direct investment.

The region's emergence as a manufacturing "melting pot," consisting of joint ventures, North American companies infused with foreign investment, and participants in global production networks, has been the primary catalyst to stimulating exports and investment in new technologies and work practices. State and provincial cross-border initiatives to advance the region's standing as a production center for North America will be especially important in developing the region's high-performance potential. The region's current export boom reflects its emergence as a North American production center. The rebirth of the Great Lakes region as a center for off-road machinery production by companies such as Caterpillar, and the region's leadership in developing high-definition television both exemplify the potential power of U.S./Canadian continental production networks.

Strategies and policies that protect and build on these trends will be pivotal to maintaining the upward, high-performance curve of the Great Lakes economy.

The region must reinvent environmental regulatory policies to win the race to clean production.

In the early 1980s, the ability of firms to offer greater quality and expanded customer options produced rapid shifts in market share and, subsequently, slowdowns and shutdowns of noncompetitive plants. By the year 2000, the ability of firms to demonstrate that products—ranging from slabs of steel to autos, paper, and consumer electronics—are made with non-polluting or zero discharge processes will have an equally dramatic impact on profitability. The worldwide “Green Seal” program marks the advent of this shake-out.

In the conclusion to *Beyond Compliance*, author Bruce Smart suggests that early efforts toward achieving clean production already have established a climate of mutual trust: on the part of industry, that pollution prevention can be compatible with improved competitiveness, and on the part of environmentalists, that such efforts can yield real benefits. Demonstration projects and voluntary partnerships already underway range from U.S. EPA’s 33/50 program to the voluntary pollution prevention projects sponsored by

The Market-Based Approach to Environmental Protection	
Strategies	
<ul style="list-style-type: none"> • Pollution taxes • Tradable pollution permits • Deposit refund systems • Performance bonds • Resource-saving credits 	<ul style="list-style-type: none"> • Differential prices • Special depreciatory provisions • Tax provisions for life-cycle design • Certification for “green” products
Advantages	
<ul style="list-style-type: none"> • Lowers industry compliance costs by up to 20% • Encourages innovation by offering financial awards for pollution reduction • Greater opportunity for bi-national harmony • Lower governmental regulatory costs 	

Table 3.

U.S. and Canadian firms. One voluntary partnership, involving the printing industry, U.S. EPA, and Environmental Defense Fund, is a national model for designing prevention-based regulations. Another voluntary partnership, involving the region's major petroleum firms, is replicating the lessons of an advanced demonstration of performance-based environmental protection, first introduced by Amoco.

The challenge is to make the next leap. Demonstration projects and experimental initiatives must nurture development of a new regulatory system that balances regulatory flexibility against more vigorous pollution reduction goals. The continuing economic recovery of the Great Lakes region and the ultimate protection of the Great Lakes ecosystem demand that this region be the first to take such a leap.

A comprehensive strategy to encourage sustainability and ensure that Great Lakes firms are world leaders in clean technologies should have the following elements:

- A clear and comprehensive emphasis on stimulating investment in eliminating toxins through process innovations rather than through control technologies
- A strategy for using energy less intensively
- Policies that stimulate life-cycle design
- Policies that recognize both local and regional environmental needs and trends in global markets.

The region must identify strategies for accelerating the high-performance revolution.

Currently, the region is being revitalized by "high-performance islands." Too many communities, workers, and firms are not yet making the transition to high-performance reindustrialization. The region must help enlarge high-performance networks to encompass the entire region.

The traditional approach to economic recovery focuses on national leadership. In fact, proposals are currently being offered at the national level to create government services to assist firms directly in adopting new technologies, reorganizing production, or financing innovation. Nevertheless, high-performance reindustrialization may require more. A Carnegie Mellon University survey of 2,000 Great Lakes manufacturers suggested that companies did not want government intervention in the production process, preferring new regulatory and infrastructure investment policies to reduce the cost of a business-led transition.

On the surface, this sentiment seems to be at odds with the increasing success of state-based technology programs in serving business clients. Yet the discrepancy may only be apparent. Effective development and deployment of technology on the scale required by the high-performance economic revolution must be based on priorities set by the transforming industries. Federal and state efforts must be coordinated, not in opposition, with one another and with the needs of industry. Government efforts may need to help build technology partnerships within regional industry clusters and among larger and smaller firms.

The appearance throughout the region of high-performance companies in overlapping industries with common technological problems and the complex relations among these companies make regional cooperation on technology imperative. The Great Lakes Science and Technology Partnership, initiated by Governor George Voinovich of Ohio on behalf of the Great Lakes governors, is creating a regional technology strategy to meet the needs of an emerging, interactive regional economy. Other regional strategies must be developed through similar partnerships to address all the issues challenging the growth of the Great Lakes high-performance economy.

Chapter Six:

State and Provincial Strategies for Regional Reindustrialization

Responding to the Need for Collective Effort

The Council of Great Lakes Governors was created in 1983 as a forum through which the region's governors could address common economic and environmental challenges. The governors of the Great Lakes states—Illinois, Indiana, Michigan, Minnesota, Ohio, New York, Pennsylvania, and Wisconsin—direct Council staff and personally establish the agenda of the Council through informal consensus voting. Over the last two and a half years, the Council has focused its efforts on creating linkages between individual state policies related to building high-performance manufacturing infrastructure. The Council also has developed a highly effective relationship with the Canadian province of Ontario. The Council's goal is to foster regionwide collaboration, representing more than the sum of individual state and provincial policies.

The members of the Council have identified six areas for collective effort. These include

- Telecommunications
- Workforce quality
- Educational technology
- Pollution prevention
- Recycled product market development
- Regional tourism.

In each of these areas, partnerships between the public and private sector provide a foundation for the region-wide transition to a sustainable, high-performance economy.

Initiatives to Enhance Collective Competitiveness

Under the leadership of the region's governors, the Council has initiated a number of successful programs oriented toward building an effective high-performance infrastructure. A new regional collaborative, the Great Lakes Pollution Prevention Challenge, seeks to change the focus of environmental management from regulating wastes at the end of the pipe to encouraging pollution prevention at the source. Source reduction can be achieved by reducing the number

and concentration of toxic materials in production processes. This approach achieves greater economic efficiency and offers greater protection to the environment. Moreover, a company that uses high-performance, clean production technology is likely to become more competitive in the global marketplace.

The Challenge encourages pollution prevention in two specific ways. First, it builds public/private partnerships, focused on specific industries; second, it provides a way for individual businesses to evaluate their own environmental performance. The Great Lakes Governors have established voluntary clean production partnerships with the Big Three auto-makers and with the major trade association of the printing industry. These innovative partnerships are creating a new environment, supporting the productivity and environmental sustainability of Great Lakes businesses.

The Governors also have worked with the Council of Great Lakes Industries to create a Total Quality Environmental Management Matrix. Companies can use this management tool to enhance environmental protection and efficiency. Leading industries within the region have been recruited to demonstrate this matrix and to improve on a continuing basis its applicability and use.

An initiative called Great Lakes Recycle employs collective market power to improve economic development and environmental protection in the region. Through a coordinated effort, the states purchase quality recycled products at volume prices. The effect is to increase both materials recycling and recycled products manufacturing, thus decreasing the flow of materials to regional landfills. To date, this award-winning program has coordinated the nation's largest joint bids for recycled products, including more than 60 million pounds of recycled copy paper. Re-refined oil, soft paper products, computer forms, and retread tires are also being purchased.

Great Lakes Recycle has established a regional Materials Board, which includes representatives of industry, government, and the environmental community, to ensure that the state procurement activities strategically expand and strengthen the market for recycled and recyclable products.

As the marketplace changes, workers must adapt their skills to remain in tune with internationally competitive, high-performance strategies. The Council's Workforce Quality Initiative creates a new model for meeting this challenge. In partnership with the National Tooling and Machining Association, the Council received a major grant from the U.S. Department of Labor to develop and implement

new occupational standards for the metalworking industry. A similar partnership has been established with the Printing Industries of America. In each case, industry identifies the skills that its workers need, while the states collaboratively create a skills certification "passport" that is accepted throughout the Great Lakes region. Thus, skilled workers can easily move across state borders and regional labor markets.

The Great Lakes Information Highway will link the Great Lakes states' research, education, and computer networks to the rest of the country and to the world via the Internet. This effort creates a backbone for growth of the regional economy. It builds a common

The Council has initiated a number of programs aimed at building an effective high-performance infrastructure.

regional resource and creates access to the global marketplace for individuals, governments, educators, and industry. The Information Highway will be to the 21st century what railroads and canals were to the 19th century: a means through which businesses communicate with customers, suppliers, and designers. It is also a delivery system for new, information-based products and services. It has two components: first, a short-term strategy to provide "gateways" to the Internet for state government agencies in partnership with education and research networks; and second, a broader, long-term, multi-million-dollar partnership to deliver advanced information infrastructure, services, and specific user applications.

Access to technology can become an important educational tool to make the teaching and learning processes more effective. In addition to enhancing the educational process, technology-based education prepares students to use technology in the workplace. Pioneering Partners, a cooperative partnership between the Council and GTE North, is one example. This initiative has invested over \$3 million in regional schools to support innovative applications of education technology, including computer-aided teaching. Pioneering Partners has created a core group of more than 100 teachers, linked electronically, who are willing to share with surrounding schools the lessons and skills they have acquired through the program.

In a high-performance, clean production economy, industry and tourism can flourish together. Recognizing this, the region's governors recently launched a tourism campaign, The Great Lakes of North

America, geared to attract a world-wide market. The campaign organized the first-ever Great Lakes World Tourism and Trade Show in Detroit, Michigan, in September 1993. The show was designed to build excitement and momentum for the World Cup soccer matches that would be held in the region in 1994. The show brought together 200 tour operators from the region with over 100 travel buyers from at least 20 countries. The region welcomes world travelers to enjoy the beauty of the Lakes, as well as to see that the Great Lakes region is open for international high-performance business.

State Policies

Each of the Great Lakes Governors has developed policies to foster high-performance economic development. Their strategies emphasize developing the infrastructure and climate for business success rather than simply using tax incentives and abatements to bring in new businesses. Over the long term, well-educated workers, advanced transportation systems, utilities, and telecommunications, and a supportive business climate can help industry more than quick-fix strategies can.



Illinois

Illinois Governor Jim Edgar's strategy focuses on highlighting and developing the state's industrial, transportation, and human infrastructure, to help existing Illinois businesses to grow and to attract new, high-performance industry. This strategy includes helping companies train and retrain workers for increasingly efficient, quality production. A component of this plan is called COMPETE: Coalition for Manufacturing Performance Through Technology. It is a partnership of universities, trade associations, and manufacturers that will give even the smallest factories access to world-class technical talent. Governor Edgar also has initiated a pilot student apprenticeship program modeled after the German system that combines classroom education and hands-on experience. His administration is organizing a school-to-work task force to determine how education and training programs can be applied more effectively in the workplace. To take advantage of the information revolution, the Governor has launched a major distance-learning telecommunications program to link Illinois schools with expert instruction that might be located in other schools, institutions, or industrial settings statewide.

Indiana



Indiana Governor Evan Bayh focuses his attention on job creation and ensuring that Indiana workers have the skills required by high-performance industry. Under his leadership, Indiana has set world-class education standards, defining what every student must know in science, math, reading, and writing. In 1995, Indiana students will take a new generation of achievement "exit" exams to demonstrate their proficiency. Students who do not pass the exam will receive intensive remedial instruction and additional opportunities to pass. To ensure that these skilled students can find suitable jobs, the Indiana legislature passed Governor Bayh's Economic Development for a Growing Economy (EDGE) program, an initiative that targets quality jobs in manufacturing and non-manufacturing industries.

Michigan



In the past seven months, Michigan has added nearly 40,000 new manufacturing jobs. The economic downswing of the 1980s has reversed dramatically. To maintain this trend, Michigan Governor John Engler created the Michigan Jobs Commission, a new agency that consolidates 35 worker training programs from eight agencies. The Commission facilitates school-to-work transition, welfare-to-work, and dislocated worker training. It is the largest state-run program of its kind in the nation. The Commission aims to give workers the advanced skills needed in high-performance manufacturing jobs. The result is enhanced business retention and expansion. The responsibility for business attraction is placed with a private sector, non-profit organization, Michigan First. In addition, the Governor has developed an initiative that looks toward future job development by giving young people advanced skills in technology and telecommunications. To accomplish this, an agreement has been negotiated that will lead to an investment in excess of \$25 million for distance-learning networks in Michigan. The funds become available under terms of a settlement between the Michigan Public Service Commission and the Michigan Bell Telephone Company, which allowed excess profits to be invested in projects that would deliver high-performance training opportunities to schools, colleges, and universities, as well as to the general public.



Minnesota

Minnesota Governor Arne Carlson is working to promote high-performance development through a strong education system, small business initiatives, and a positive business climate. In education, Governor Carlson offers different models for delivering training. He has proposed increasing the number of charter schools, emphasizing youth apprenticeship and school-to-work programs, and he supports establishing graduation standards with measurable, quantitative outcomes. Entrepreneurial small and minority-owned businesses are targeted through loans. He is proposing a capital equipment sales tax exemption on equipment replacement costs, to increase investment in equipment that increases efficiency and productivity. He is maintaining current tax levels, which allows business to focus their spending on upgrading equipment, processes, and worker skills. Further, workers compensation reform would protect individuals on the job while lowering costs for businesses.



New York

New York Governor Mario Cuomo is working to create a regulatory environment that is conducive to high-performance industrial development and job creation. His administration is organizing a top-down review of all substantial business regulations, to eliminate those that are unnecessary or outdated. Just as businesses must adapt to the new economy, so must the government's regulatory system. Like many of his fellow Great Lakes governors, Governor Cuomo has also focused state efforts on assisting smaller companies to become more productive. In his 1994 State-of-the-State Address, he proposed establishing five new Centers for Advanced Technology at universities around the state. These Centers would help develop agile young companies to specialize in evolving technologies. New York state government is establishing a high-tech "incubator" in Rochester to encourage local start-up firms. Planning for development of the Buffalo Metro Medical Corridor builds upon the success of the existing Rosewell Park Cancer Center. In the area of education, the proposed Excelsior High Schools each would be associated with a state university campus, offering gifted student the chance to excel in math, science, and technology.



Governor George V. Voinovich outlined his economic plan in *Ohio 2000/Ohio First: A Practical Vision for Ohio's Future*. The plan focuses on four major areas of public policy concern: management of state government, improvement of educational results, renewal and expansion of the state's economy, and improvement of key quality-of-life indicators, including environmental quality, crime-free communities, and access to affordable health care. At its heart, *Ohio 2000* is designed to give Ohioans and their children the opportunity and ability to find quality jobs in the high-performance workforce of the 21st century. Toward this goal, the plan outlines four strategies. The first is focused on increasing productivity through advancing new technologies and products. The second strategy is focused on developing a coordinated, market-sensitive training environment. Existing training programs will be evaluated, modified, and, in some cases, consolidated. New programs and approaches will be added, too, based on changing market needs. The third strategy involves minimizing or eliminating government disincentives to business development. This includes the recent reform of Ohio's workers compensation laws. The fourth strategy calls for expanding markets for Ohio-made products. State government is committed to working with the business community to encourage existing Ohio companies to take advantage of new opportunities for business expansion. Governor Voinovich addressed this objective through two jobs bills. Jobs Bill I, enacted in 1992, provides tax credits for research and development, export expansion, and investment in new equipment. The recently enacted Jobs Bill II provides both existing businesses and emerging industries and trades with a variety of tools, such as tax credits for training, a sales tax exemption for agricultural structures, defense conversion assistance, and investment tax credits. A study of assessment rates in the telecommunications industry is underway, geared to promote investment in the development of an advanced communications infrastructure that is at once competitive and equitable. Lastly, Governor Voinovich supports Ohio's participation in a regional approach to economic development, working through the Council of Great Lakes Governors and other cooperative forums with state and provincial partners within the region.



Pennsylvania

Pennsylvania Governor Robert P. Casey's policies for advancing the high-performance economy begin with reorganizing how the commonwealth directs its economic development efforts. He created a Governor's Response Team of interdepartmental economic development specialists. The Team expedites assistance to companies that are expanding or relocating in Pennsylvania. Governor Casey's administration also oversaw the creation of an Economic Development Partnership Board, a group including leaders from business, labor, academia, and government, which recommends practical, long-term economic development goals. In support of its long-term vision, Pennsylvania is building industrial research centers to help small manufacturing and service industries access technical aid and assistance. Governor Casey also has launched an accelerated infrastructure construction program, to build highways, bridges, and improved water and sewer systems. This program is creating jobs now and as it prepares the physical foundation for long-term industrial growth.



Wisconsin

Wisconsin Governor Tommy G. Thompson has focused his attention on infrastructure development and job creation. Recently, job opportunities, particularly in manufacturing and construction, have increased in Wisconsin at almost twice the rate of the rest of the nation. One of the major reasons for this growth has been Wisconsin's success in implementing strong workforce development programs, including some based on the German apprenticeship model. These programs emphasize workplace applications of classroom learning. To better prepare Wisconsin to compete in the world market, Governor Thompson introduced legislation based on the recommendations of his Blue Ribbon Task Force on telecommunications. The task force identified three key strategic areas for action: managing the transition to a competitive communications marketplace, removing barriers to the effective use of telecommunications, and stimulating private-sector deployment of an enhanced telecommunications infrastructure. Its recommendations include having the Public Service Commission expand its traditional role to facilitate more competition in telecommunications; funding the delivery of univer-

sal service and new service features; eliminating rules, statutes, and tax codes that inhibit competition; and having the state sponsor pump-priming applications and training programs. Distance-learning, rural health care delivery, public safety, environmental protection, and industrial systems improvements should be stimulated through the development of Wisconsin's telecommunications infrastructure.

Policies of Ontario



In partnership with the Great Lakes governors, Ontario Premier Bob Rae is actively pursuing regional reindustrialization. Creating jobs and putting Ontario back to work through a range of jobsOntario program initiatives are cornerstones of his approach to economic renewal and to competing in a global economy. The Ontario government is committed to investing in the province's infrastructure, which includes education and training, technology, and telecommunications, as well as roads, buildings, and bridges.

During the past year, the government has invested nearly \$4 billion in this infrastructure, including more than \$600 million invested through the jobsOntario Capital program. For example, at Lambdon College, \$4 million in jobsOntario Capital funding is helping to establish a new center for advanced process technology, which will provide skills training in the local petrochemical industries.

The government recently announced \$350 in jobsOntario funding over the next two years for more than 190 water and sewage projects across Ontario. These projects will create more than 13,000 jobs, as well as improving Ontario's environment, including its drinking water and its lakes and rivers. Ontario also has joined the Canadian federal government in funding the two-year Canada-Ontario infrastructure program. In addition to improving infrastructure, this program will create 20,000 to 25,000 jobs.

The government of Ontario has played a direct role in protecting or creating 300,000 jobs. The \$1.1 billion three-year jobsOntario Training Fund program is creating opportunities for an estimated 100,000 people. At the same time it helps Ontario industries increase employment and upgrade the skills of their new and existing workers. Ontario believes that its workforce is its greatest resource. In order to compete with the best, it must continue to invest in that resource through lifelong education and training.

Recognizing that local communities drive economic growth, Ontario has recently established the jobsOntario Community Action program. This program brings community resources and knowledge into action to create jobs and long-term economic opportunities. To date, Community Action has helped create more than 2,400 jobs by providing over \$48 million in assistance to 360 communities in the province. Contributions from these communities bring the total investment to about \$145 million.

The Ontario Investment Service promotes Ontario as a good place in which to do business. The \$150 million Sector Partnership Fund has been established to bring together business, labor, and others in various sectors to strengthen their industry. A telecommunications strategy already has been adopted. Considerable work is underway in tourism, aerospace, auto parts, computing, and plastics.

The information highway is under construction in Ontario. The province has set aside \$100 million for the Ontario Network Infrastructure Program (ONIP) to support the development of information networks, with participation from the private sector. A feasibility study on using advanced fiber optics technology to create a network linking leading telecommunications companies and government and academic institutions in the Ottawa area will be the first of its kind in Canada.

A Regional Vision

Each of the Great Lakes governors and the premier of Ontario has a vision for transforming his state or province to a high-performance economy. These visions are similar in many ways. All build on strengths shared regionwide, including workforce resources, cutting-edge technology development, and a core of high-performance industries and supply networks. All seek to bring the high-performance infrastructure to scale, to benefit the communities they serve. The projects that the Great Lakes governors and the premier of Ontario have selected for collective action demonstrate the nexus among individual policies. Working individually and together, they have taken strides to support and hasten the full development of a sustainable high-performance economy for the entire region.

Conclusion

Since the early 1980s, various explanations have been offered to describe the transformation of the Great Lakes economy. Most of these explanations have proved inaccurate. For example, some predicted a shift from basic manufacturing to high-technology and service industries. A Brookings Institute analysis went so far as to argue that the region could never again be a profitable center for steel production. However, no grand sectoral shift has occurred. In 1992 the region produced more autos and steel than it had a decade before.

The shift that is presently underway is returning the Great Lakes region to its historic place as a major manufacturing center. The region's economic revolution is not defined so much by what is produced as by how it is produced. The region is experiencing a dramatic and promising shift from mass production to high-performance manufacturing. The region's current export boom, its emergence as a center for the world's best companies, its strides toward environmental quality, and its ability to outperform the rest of the U.S. economy are all closely related to this high performance revolution.

Indeed, one of the most exciting aspects of the transition to high-performance manufacturing is the movement "to do more with less." High-performance manufacturing focuses on quality and continuous process improvements, including increased resource efficiency. Companies engaged in high-performance manufacturing are problem-solvers, more capable than their predecessors of meeting clean-production goals and of ensuring long-term prosperity and quality of life.

The Great Lakes region can create the world's first sustainable high-performance economy, but it will take public and private leadership. Three key needs are singled out for immediate action:

- Shifting to market-based environmental regulation
- Formulating a regional North American development strategy
- Investing in infrastructure and business climate improvements.

A special brand of leadership is needed to seize the opportunities presented by the high-performance revolution. While bold initiatives tend to develop during a time of crisis, this is not a time of crisis. It is a time of opportunity. The challenge facing regional leaders is to build on the progress initiated by core high-performance companies

and demonstration projects, to ensure that high-performance activity reaches critical mass—a scale necessary for long-term success. Regional leaders also must respond collaboratively to the need for a shared vision of economic and environmental improvements suited to this unprecedented time of borderless economic networks.

One hundred years ago, the Columbian Exposition in Chicago showcased to the world the flowering of an industrial economy in the Great Lakes region. The region is still dotted with public and private facilities constructed for the benefit of international visitors to that exhibition. Today, world trade is woven into the economic fabric of the region, and the region is dotted with new manufacturing facilities developed through joint ventures with Japanese and European partners. Yet the region still is unique—incomparably rich with natural, human, and technical resources, and poised to become the high-performance industrial heartland of North America.