

To understand the future, it is sometimes useful to remember the past...

Recall 15 years ago when Michigan was in the midst of a deep recession:

More specifically, the worrisome statistics for Michigan during the 1980s included:

- 30th in per capita income
- 37th in child well being
- 39th in housing affordability
- 41st in overall employment
- 8th in business climate
- 48th in high school graduation rates
- 50th in return of federal tax dollars

Furthermore, in categories where high rankings only hurt, we stood:

- 14th in teenage unemployment rate
- 13th in incarceration rate (and rising rapidly)
- 13th in percentage of children in poverty
- 12th in property tax burden
- 10th in infant mortality
- 4th in public aid recipients
- 1st in mortality from major disease

The situation was particularly alarming for Michigan's children:

- One-third of Michigan's children lived in poverty
- One-sixth lived on public assistance
- In Wayne County, one-third of all infants lived in foster care, casualties of the drug culture that had taken over our cities

A bleak picture to be sure. And, this tragic litany of statistics represented only the symptoms of the broader dimensions of Michigan's failing fiscal health.

The decline in the quality of life in our state reflected a fundamental structural change that was occurring in the economic base--a change that began in the late 1970s and was likely to continue for several more decades. In the past our industrial base and our economy had relied on the fortunes of a few large companies--in fact, one large industry. For most people, there was never any reason to be particularly entrepreneurial or to worry about anything more than occasional uptakes and downturns in the economy. Only during the last decade had many of us begun to understand that the old economy would never return, that even if our traditional industries became more successful, the huge economic base upon which all of our policies were formed would never return.

Michigan was midway through a several-decade-long transition from a state dominated by a single industry and a few large companies to one dependent upon tens of thousands of small, dynamic companies competing in a broad spectrum of world markets. We were experiencing a shift from low-skill, high-pay jobs to high-skill, high-pay jobs (or, tragically, low-skill, "no" pay jobs); from a transportation-industry state to an information-industry state; and from the Industrial Age to the Age of Knowledge, in which educated people and ideas had become the key strategic commodities determining economic prosperity, national security, and quality of life.

Until recently Michigan was not well-positioned to make this difficult transition since over the years our state tax policy, regulatory policy, social services, public investment strategy, and politics had evolved primarily to serve big business, big labor, and big government. During the past several years, our state, led by Governor Engler and his colleagues in the Michigan Legislature, has taken important steps to break the stranglehold of the past and begin to prepare Michigan to face the future.

Step 1: Restructuring

It was clear that the first challenge was to *restructure* our state to create, attract, and support the tens of thousands of new companies on which our future would depend. We had to create an economic environment capable of enabling them to function in a rapidly changing, frighteningly competitive, and knowledge-intensive world marketplace. Michigan's challenge was not dissimilar to that faced by

industrial corporations. We had to restructure ourselves to serve the future rather than simply perpetuate the past.

Michigan's problems were not partisan. Nor were they political. Michigan's problems were *structural*. Our political and economic system were no longer capable of producing the revenues needed to meet the demands placed upon it. As a result of this fundamental structural inadequacy, we were being forced to meet our urgent current needs, to protect invaluable resources such as our schools, and to balance our current budget by shifting burdens to future budgets, where they would become even more painful.

We were held hostage by outdated tax and regulatory policies and a disturbing lack of understanding of what knowledge could do in creating economic growth. In this state, we simply were not increasing our base of knowledge quickly enough nor were we investing adequately in funding knowledge creation.

Like much of American industry, state government had become too large and bureaucratic, no longer responsible to its citizens. In his first term as Governor, John Engler took the very difficult and painful steps to turn that around. In this effort, Governor Engler and his colleagues cut away much of the undergrowth that was clogging government and the economy. While it has been painful, over the last several years Michigan has indeed been unique among the states in its capacity to eliminate a massive funding deficit while holding the line on taxes, downsizing unnecessary government, and protecting education as its highest priority.

However, restructuring state government, its institutions, policies, and laws, while necessary, was not enough. The state also needed to take a hard look at its investment strategy, to achieve a better balance between meeting the costs, needs, and desires of the present and making the necessary investments in Michigan's future. And among these investments, perhaps none has greater priority than education.

Step Two: Education

It is becoming increasingly clear that the key to long-term economic growth involves the development of our human resources through

education. Education is the only enterprise that can save us from becoming a backwater economy. It is a point of "lift off" from which we can create new markets, processes, and skills.

In an age of knowledge it has become the skills of a region's work force and the quality of its infrastructure that give it the capacity to compete in the new world economy. Once again Michigan had made very considerable progress in recent years. The state has restructured and reformed the way we finance our schools, reformed the policies that constrained them, and created remarkable opportunities for innovation and experimentation through the charter schools program. As a result, today we find ourselves closer to designing a system that lets students, teachers, and parents know what is expected of them—one that uses international benchmarks to compare our schools.

True, many challenges remain. But so, too, are there many opportunities. For example, the technology now exists to build a statewide learning environment that would make it possible for students and teachers to be connected to the rich knowledge resources of our state--and, indeed, the world--regardless of where they are located. Such a learning resource could truly ignite a renaissance in public education in Michigan.

Step Three: Knowledge-Driven Economic Development

While current industry strives to improve competitiveness to increase market share and retain jobs, it is important to realize that in an age of knowledge, new knowledge itself is necessary to create new jobs. Many of the new jobs for Michigan's future will be spawned by entirely new fields such as biotechnology, software engineering, multimedia, and knowledge-based manufacturing. And even those jobs in established industries will require ever-increasing levels of training and skills.

From this perspective, it is clear that Michigan's major research laboratories, both on our university campuses and in our corporations, may become among our most powerful economic engines. Why? The key ingredients in technology-based economic

development are technological innovation, technical manpower, and entrepreneurs. Research universities and corporate R&D laboratories produce all three. Through their research, they generate the creativity and ideas necessary for innovation. Through their faculty and staff efforts, they attract the necessary "risk capital," much of it through massive federal R&D support. Through their education programs they produce the scientists, engineers, and entrepreneurs to implement new knowledge. And they are also the key to knowledge transfer, both through traditional mechanisms, such as graduates and publications, as well as through more direct contributions such as faculty / staff entrepreneurs, the formation of start-up companies, strategic partnerships, and so on.

The impact of this new knowledge on economic strength in a knowledge-driven society cannot be overstated. Economic studies have noted that, while the average rate of return on capital investment in the United States today ranges from 10 percent to 14 percent, the private rate of return of R&D investment is estimated to be 25 percent to 30 percent, and the social rate of return, that is, the rate that accrues to society more generally, is estimated to be as high as 50 percent to 60 percent—roughly four times the rate for other types of investment.

But is this enough?

Consider what else has happened during the past 15 years:

We are living in the most remarkable of times. Consider some of the changes that have occurred in our world within the past decade:

- The Cold War has ended, and Communism has been rejected around the world, swept away by the winds of freedom and democracy.
- The Berlin Wall has fallen, Germany is now reunited, and Eastern Europe has broken away from the Soviet Bloc to seek democracy.
- The Soviet Union has collapsed into chaos, torn apart by the forces of freedom, nationalism, and ethnic tensions.

- Many of America's largest and most powerful corporations have been reeling from the rapid changes occurring in the world marketplace.
- Asia is emerging as a powerful economic force, with Japan and China now ranked as the second and third largest economies in the world.
- During the past five years, the top ten companies receiving U.S. patents were Hitachi, Toshiba, Canon, Fuji, Philips, Siemens, Mitsubishi, IBM, GE, and Bayer.
- We are now manipulating the human gene directly to cure disease, and we may soon be doing so to create new life forms and influence the evolution of the human species.
- Computing power—speed, memory, communication rates—has increased by a factor of 100 over the past decade, with world-wide networks connecting hundreds of millions of people, enabling them to communicate with ease and sophistication.
- The computer and television are merging in a so-called “digital convergence,” triggering a similar merger of telecommunications companies and the entertainment industry to create a new multimedia communications medium. Indeed, sales volume of computer games now exceeds that of the motion picture industry.

Yet the changes thus far are only the tip of the iceberg. We have seen a worldwide explosion of ideological fervor and ethnic tensions, even as the nation-state has become less relevant to the world economy and security. Many of our traditional social structures have disintegrated, from our cities to our neighborhoods to the family itself. The explosion of new communication and transportation technologies has not only given us new mobility, but it has also linked us in ways we never dreamed possible.

What is driving this? A remarkable period of technological evolution...or perhaps revolution:

A Possible Strategy for Michigan's Future

Unusual resources:

- MVAC → Michigan Virtual University
- Technology Infrastructure (Cyberstate.Org)
- University Consortium for Advancement of Internet Development

But something else is needed...

A Technology Strategy for Michigan

America is not alone in recognizing the importance of knowledge and education to economic prosperity and social well-being. Throughout the world, nations are creating the institutions and making the investments necessary to provide both knowledge and learning services to their citizens. In fact, there are many signs that a global knowledge industry is beginning to form. With the emergence of new competitive forces and the weakening influence of traditional regulations, it is evolving like other "deregulated" industries, e.g., communications or energy. It is strongly driven by changing technology. And, as our society becomes ever more dependent upon new knowledge and educated people, upon "knowledge workers," the knowledge business clearly must be viewed as one of the most active "growth industries" of our times.

In a time in which knowledge has become not only the wealth of nations but also the key to one's personal quality of life, it has become the responsibility of democratic societies to provide their citizens with the education and training they need throughout their lives, whenever, wherever, and however they desire it, at high quality and at a cost they can afford. Lifelong learning has become not just a possibility but a necessity for all members of our society. Michigan faces the challenge of making learning available for anyone who wants to learn, at a time and place of their choice, without great personal sacrifice or cost.

To prepare Michigan for *an age of knowledge*, perhaps we should aspire to build *a culture of learning*, in which people are continually

surrounded by, immersed in, and absorbed in learning experiences. Actually, this is not far from the environment experienced by a very young child, in which every stimulus becomes a learning opportunity. Information technology has now provided us with a means to create learning environments throughout one's life. These environments are able not only to transcend the constraints of space and time, but they, like us, are capable as well of learning and evolving to serve our changing educational needs.

To respond both to this challenge and this opportunity, we propose that the State of Michigan develop and execute an aggressive strategy to achieve leadership in this emerging enterprise, based upon the following themes:

- Developing the knowledge and learning infrastructure necessary to link together the state's assets with its people, its communities, and its institutions.
- Accelerating the transfer of knowledge—ideas, technology, and skills—to the marketplace.
- Providing state government with an ongoing source of counsel concerning the role of science and technology in Michigan's future.

The Importance of the Vision Thing

Refer to Ray Kurzweil's book...