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# WHAT MICHIGAN NEEDS TO COMPETE

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**URO** UNIVERSITY RESEARCH CORRIDOR

Wayne State University  
Michigan State University  
University of Michigan

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# ► The rules have changed.

Welcome to the new economy. The knowledge economy. Global competition. The flat world. It's a bigger playing field, a smaller world. We watch as companies and jobs stream overseas and wonder how we can compete in such a crowded marketplace. Where can Michigan build a foundation?

The rules have changed. The existing strategies will not work. We need new solutions, new modes of thinking, new leadership and a new agenda.

The University of Michigan, Michigan State University and Wayne State University, with a combined history of 478 years of continuous operation, are preparing to meet the challenges of the 21st century head on. We know we have the assets — the knowledge, the talent and the infrastructure — to help Michigan succeed in a global economy.

Low-skill manufacturing jobs will continue to leave the state for places where labor is cheap — or disappear into history books. The state's economic vitality in the coming decades will depend on its ability to develop a highly skilled, trained and educated workforce.

But don't take our word for it. Some of the nation's leading thinkers — including Fortune 500 CEOs, university presidents, politicians, journalists, Nobel Prize-winning scientists and academics — have already studied the issue of global competition at great length and concluded that research universities are a key asset.

None of the experts sees reforming tax codes, regulatory policies or worker benefit packages as a solution to the challenges facing this country. They acknowledge that reforms are needed in each of those areas, for sure, but believe long-term success will require a much broader shift in our approach to economic development.

***"There's an almost perfect correlation between the number of jobs in a region and the strength of the universities."***

***Bill Gates Jr.  
Microsoft founder  
and philanthropist***

In the writings of this expert 'focus group,' eight common themes emerged about the characteristics of successful regions. These regions are places that invest in research, attract talent, adapt to change, innovate, strengthen elementary and secondary schools, welcome the outside world, have strong leadership, and dream.

**"While I understand the need to make hard choices in the face of fiscal constraint, I do not see the wisdom in putting science funding behind other priorities ... This decision shows dangerous disregard for our nation's future ..."**  
**U.S. Representative Vernon Ehlers**

## ► Research

Knowledge is the currency of the new economy, and research is the driving force behind knowledge creation. The greatest technological innovations of the past century have been the results of scientific research. A competitive region recognizes its research infrastructure as a core asset, and makes strengthening that base a priority.

### ► *Invest in basic scientific research*

The United States has enjoyed a competitive edge in the world as the place where innovations happen and new technologies are born. That competitive edge was built inside the laboratories of the nation's research universities and institutes. Instead of renewing the country's commitment to basic science, policymakers have trimmed research budgets in recent years. Meanwhile, the rest of the world is catching up.

More than 88 percent of the grant money allocated in Michigan by the National Science Foundation and the National Institutes of Health in 2005 went to the state's three research universities. In East Lansing, Ann Arbor and Detroit, we are continually growing our research capacity, attracting outstanding faculty, building new research collaborations and investing in world-class facilities and instrumentation.

### ► *Balance the research portfolio with added emphasis on "frontier" research, high-risk research and multidisciplinary research*

Research that pushes the frontiers of our understanding of the universe — the type of research that has led to revolutionary inventions like the microchip and the Internet — has most often come not from corporate R&D labs, but from academic labs, where scientists are allowed to explore their curiosity, free of concerns

for shareholder value and market potential.

Research funding has shifted toward projects with immediate applications. Grantmakers have become more risk-adverse. According to the National Academies, "There is anecdotal evidence that several barriers have reduced the capacity for high-risk, high payoff work."

At the same time, academic researchers are blurring the lines of traditional disciplines, spurring innovation through creative collaborations between researchers in different fields.

Researchers at Michigan universities are on the front lines of this evolving scientific culture, collaborating across institutions and borders as they search for everything from innovative new drugs to theoretical deep-space particles.

## ► Attract Talent

We've seen the world reshaped by two separate technological revolutions in the last 200 years. America has used superior technology to enforce its position as the planet's sole superpower. We understandably place great value on great machines, but the real engines of change in our world have always been bright people. That has never been more true than now.

A region that aspires to be successful in the knowledge economy must do three things well: attract new talent, retain the talent it already has and prepare the next generation of talented people.

"Quite simply, in a knowledge-driven and entrepreneurial economy, the places with the greatest concentrations of talent win," the members of Michigan Future Inc. write in "A new agenda for Michigan."

**"U.S. technological leadership, innovation, and jobs of tomorrow require a commitment to basic research funding today."**

**Craig Barrett  
CEO, Intel Corp.**

**"(The best employees have) a combination of experience, skill set, raw intelligence and energy. The most important thing is to be somewhere where you have a pool of people to draw that."**

**Robert Nunn, CEO of ADD Semiconductor**

► *Create an environment that attracts and retains talent*

Talented people do not gather by chance or accident. Communities can, and do, actively take steps to make their regions more attractive to members of the "Creative Class," as author Richard Florida has termed the group of talented individuals who are contributing to the knowledge economy.

A critical mass of knowledge workers needs to be supported by companies that can provide them with jobs. But the experts have found that jobs follow people, not the other way around. "Instead of people moving to jobs ... companies were moving to or forming in places that had skilled people," Florida writes.

Regions that can offer amenities and communities conducive to a creative lifestyle give talented people incentive to come and incentive to stay.

Universities are magnets for talented people. Beyond the role they play in recruiting the brightest students and faculty, they cultivate creative environments by acting as centers of culture, intellectual discourse and the arts. "Universities help to establish the broader quality of place of the communities in which they are located," Florida writes.

► *Prepare tomorrow's talent*

The right talent might be irreplaceable, but, to some extent, talent is renewable. Talent can be grown.

**"Michigan has spent decades building a world-class system of higher education, both universities and community colleges. They are arguably the most important assets we have in developing the concentration of talent we need to be successful in a knowledge-based economy. That is particularly true of our major research universities."**  
**Michigan Future Inc.**

Regions benefit from being the place where young talent is nurtured and trained. In the short run, young people contribute their creativity and energy to an area as they develop their talent. In the long run, they are more likely to settle and reinvest their resources in that area.

Within a 50-mile radius, Michigan's three major research institutions enroll more than 100,000 students and confer tens of thousands of undergraduate, masters and doctoral degrees each year. In a recent study by Richard Florida, both the Ann Arbor and Lansing regions ranked near the top of the nation in per capita student and faculty populations.

tion in per capita student and faculty populations.

► *Provide incentives for students to pursue science and engineering degrees*

America will need a strong corps of scientists and engineers if we hope to maintain a competitive advantage in the world. We are losing the recruitment battle.

**"Together, we must ensure that U.S. students and workers have the grounding in math and science that they need to succeed and that mathematicians, scientists and engineers do not become an endangered species in the United States."**

**Business Roundtable**

"The generation of scientists and engineers who were motivated to go into science by the threat of Sputnik in 1957 and the inspiration of JFK are reaching their retirement years and are not being replaced in the numbers that they must be if an advanced economy like that of the United States is to remain at the head of the pack," Thomas Friedman writes in *The World is Flat*.

Michigan's international competitors, most notably China and India, have been ramping up their efforts in higher education with special emphasis on math and science.

If we do not reverse the current trend, we are likely to find ourselves at a serious competitive disadvantage in the coming years.

Michigan's research institutions are encouraging students to pursue mathematics, engineering and science with a variety of approaches at all levels of the universities. Efforts to stimulate interest in the sciences range from providing scholarships and financial aid to faculty outreach at local schools.

## ► Adapt

Job security is probably a thing of the past. If our region is to succeed in a hyper-competitive global market, we must not cling to the notion that we are entitled to low-skill, high-paying, dependable work. We must instead train a workforce that is skilled, flexible and adaptable.

For Michigan workers to survive in the new economy, they will need a means of acquiring and maintaining the necessary skills.

**"The evidence is clear: the most reliable path to economic success is post-secondary education. Those with at least a four-year degree are earning a higher premium today than ever before."**

**Michigan Future Inc**

### ► *Provide widespread access to a college education*

Marketable skills aren't acquired overnight. The jobs of the future will be held by educated individuals with the training and background to succeed. Increasingly, all but the lowest-paying and least desirable jobs will require a college degree.

If we don't want to risk leaving an entire segment of the population behind, we must work to make a four-year college education accessible to everyone.

Providing abundant access to quality education is not just a goal of the state's research universities, it is central to our mission. As public institutions, our first responsibility is to the people of Michigan.

### ► *Encourage lifelong learning*

**"The creative process flourishes in places that provide the broad ecosystem which nurtures and supports creativity and channels it into innovation, new firm formation and ultimately economic growth and rising living standards."**

**Richard Florida, author, *The Rise of the Creative Class***

If jobs are becoming less stable, workers will not be able to depend on one set of skills for employment. They will have to continually update their skill sets and learn new skills. Unskilled workers will have to be educated as more unskilled jobs move overseas.

**"We cannot turn back the clock on technology, nor begrudge other nations' drive to compete and improve living standards. We can, however, make choices about how to help ... U.S. workers prepare for and adapt to changes in technology or competition that adversely affect them."**

**National Innovation Initiative**

All of this means that an individual's status as a student doesn't end on graduation day. Successful regions will need to develop an infrastructure that allows workers to continue learning throughout their careers and supports nontraditional students.

At Michigan's research universities, we understand that not all of our students are coming from the same background or enrolling for the same reasons. Many of our students have families, full-time jobs or homes in other cities. Many aren't seeking degrees. We've built programs for continued and lifelong education to meet the varying needs of the people we serve.

## ► Innovate

Our hope is that if we find talented people and give them the resources they need, innovation will happen. But the recipe for innovation requires more than the right ingredients. Innovation is a culture and a mindset.

Competitive regions seek out new ideas and take risks. They nurture innovators and form coalitions. They are ambitious and willing to change.

**"Leaders must re-kindle the American spirit of adventure and be willing to start down a path even if we can't see the endpoint."**

**Charles M. Vest, MIT president emeritus**

► *Encourage risk-taking and entrepreneurship*

America's greatest innovators have also been our greatest risk-takers. In today's economic climate, we are increasingly worried about short-term impacts. We think in quarters. Without a willingness to risk in the short-term, we will not see long-term rewards.

An entrepreneurial spirit has been the foundation of American prosperity. We must encourage our innovators to take their ideas beyond the drawing board, giving them the tools and incentives to turn concepts into realities.

A university setting provides scientists with a level of freedom to explore and test boundaries seldom found in other arenas. When that freedom leads to discovery, Michigan's research universities are providing faculty with assistance in commercializing their work.

► *Encourage multidisciplinary collaborations*

Great innovations are happening in the areas where traditional disciplines intersect. As the authors of the National Innovation Initiative's "Innovate America" report write, "Advances in medical technologies integrate biology with physics, mathematics, materials sciences and software engineering. Innovation in the IT sector is built on research that spans a range of sciences, including solid-state physics, chemistry, mathematics and language theory ..."

We must develop methods of encouraging students and scholars to think across disciplines, and supporting partnerships between researchers in a wide range of fields.

Those collaborations and exchanges are already common in Michigan's research universities, where faculty connect with colleagues to take advantage of each other's expertise, and both undergraduate and graduate students are presented with opportunities for multidisciplinary learning.

► *Link intellectual, financial and human capital*

Great innovations are the great ideas that get off the ground. Many talented people with good ideas lack the resources to capitalize on them. We need to create methods and networks to link start-up companies to investors and skilled workers to start-up companies. We need to provide assistance — with both finances and planning — to entrepreneurs.

The pieces of the puzzle are all around us. We have the intellectual, financial and human resources. The regions that will be most successful in the new economy are the ones that most effectively collect and mobilize those resources to drive development.

The leaders of our universities are reaching out to business and government, and are playing a more active role in regional and statewide economic development than at any time in the past.

► *Build 21st century infrastructure*

A globally-competitive economy cannot thrive without the appropriate infrastructure in place. This means investing not only in physical infrastructure like high-speed Internet connections and research facilities, but also creating policies, systems and support networks designed to deal with 21st century challenges.

Michigan campuses are hotspots of technology, and university leaders are making the intellectual investment to modernize outdated policies and procedures.

**"A major key to a robust 21st century economy will depend on policy and physical infrastructure that enhances innovation."**

**National Innovation Initiative**

**"Places where new knowledge is being created have a big edge in being the places where new technologies are being commercialized."**

**Michigan Future Inc.**

**"We should be embarking on an all-hands-on-deck, no-holds-barred, no-budget-too-large crash program for science and engineering education immediately. The fact that we are not doing so is our quiet crisis. Scientists and engineers don't grow on trees. They have to be educated through a long process, because, ladies and gentleman, this really is rocket science."**

**Thomas Friedman, author, *The World is Flat***

## ► **Strengthen Schools**

Any effort to build a skilled, educated workforce has to begin in our primary and secondary schools. We have thrown massive amounts of energy and money into reforming education, yet we still have schools and students who are lagging behind.

If we expect to improve learning, we have to improve teaching. The best way to build good schools is to fill them with good teachers.

### ► *Offer additional training for K-12 teachers*

Our teachers must be equipped with the skills and knowledge to prepare students for the reality of a global economy. The National Academies point out that "improvements in student achievement are solidly linked to teacher excellence."

Teachers need to be provided with quality opportunities for continuing education and keeping up-to-date with current teaching methodologies.

Michigan's research universities offer some of the nation's top education programs and specialized teacher training. We are focused on preparing the state's next generation of educators, without forgetting our responsibility to ensure that today's teachers are equipped with the skills they need. Our unique dedication to graduate education and faculty research allows us to study and assess current teaching practices while developing new models.

**"Laying a foundation for a scientifically literate workforce begins with developing outstanding K-12 teachers in science and mathematics."**

**The National Academies**

### ► *Encourage more teachers to specialize in math and science*

The shortage of qualified teachers is particularly severe in mathematics and the sciences. Many elementary and high school students are taught math or science by a teacher who does not have a degree in the discipline.

Since American students are falling behind their international peers in math and science proficiency by middle school, and losing interest in the subjects by high school, it is critically important to train teachers who can stimulate and inspire students to stay involved in math and science.

The need has not escaped the attention of the state's university leadership. Through our colleges and school of education, we are conducting innovative studies and outreach programs aimed at

**"We now spend more per capita on education than just about any other country on earth, and the results are mediocre ... The only things that work are local, human-to-human immersions that transform the students down to their very beings ... Extraordinary teachers, who inspire students to transform their lives, work."**

**David Brooks,  
*The New York Times***

bolstering student and teacher competencies in the sciences. Our faculty partner with elementary and secondary schools around the state in an effort to improve curricula and teaching practices. We place K-12 teachers in university labs, giving them firsthand exposure to scientific research. Subject-specific degrees prepare our students to translate their math and science knowledge to the classroom.

## ► **Welcome**

An American man videoconferences with a Russian friend in real time. Families in Turkey watch American television programs, beamed in by satellite. Teens in China and Japan buy into American materialism and popular culture. Thanks to technology, the other side of the world isn't so far away anymore. We are truly living in a global community that is globally competitive. Bristling at this new reality will not do us much good. We can close our minds, but we can no longer close our doors. The world is at our doorstep. If we hope to be an important player in this global landscape, we must invite the world in.

► *Engage the global community*

There are two ways Michigan can effectively engage the world. The first is to bring the world inside our borders, acting as a sort of global commons, a place where people meet to share ideas and perspectives. This is a role our country, at least in the past, has played particularly well. As Thomas Friedman writes, “The United States has become one of the great meeting points in the world, a place where lots of different people bond and learn to trust one another.”

The second step Michigan can take is to look outside our borders and become more involved in the wider world. Not only must we be good neighbors and offer our assistance where it is needed, we must be eager to learn from other cultures and to build relationships from the ground up.

Michigan’s research universities are already committed to this task. We have always been centers of intellectual dialogue for scholars and students from around the planet. Each year, we are sending more of our students to study and work abroad — MSU has one of the largest foreign study programs in the nation. Our faculty and administrators are building relationships and working partnerships in countries all over the globe.

► *Embrace outsiders*

Imagine visiting a country where you had to struggle just to get in, and once inside, you were mostly ignored and sometimes mistreated. Would you want to visit again? Would you recommend it to your friends?

Too often, our knee-jerk reaction is to keep anything foreign away in an effort to feel safe. What

we fail to realize is that when we put up walls, we keep out all the good along with the bad, and create an appearance of hostility to anyone viewing those walls from the outside.

Michigan’s research universities prominently include foreign students and scholars. The benefits these outsiders provide not only to the institutions, but to the country as a whole, was perhaps put best by Yale University president Richard Levin in a recent *Newsweek* article:

“Most Americans recognize that universities contribute to the nation’s well-being through their scientific research, but many fear that foreign students threaten American competitiveness by taking their knowledge and skills back home. They fail to grasp that welcoming foreign students to the United States has two overriding positive effects: first, the very best of them stay in the United States and — like immigrants throughout history — strengthen the nation; and second, foreign students who study in the United States become ambassadors for many of its most cherished values when they return home.”

► *Promote diversity and tolerance*

There’s a big difference between letting outsiders in and making them feel welcome. If Michigan wants to attract the best and brightest, we need to foster communities and cultures where newcomers feel at home, no matter who they are. We must view differences of color, creed, background and lifestyle as not only allowed in our communities, but as adding value to them.

Our campuses are neither exclusive clubs nor ivory

**“The bottom line: the flow of students across national borders — students who are disproportionately likely to become leaders in their home countries — enables deeper mutual understanding, tolerance and global integration.”**  
*Richard Levin, president Yale University*

**“It is imperative that we be the best global citizens that we can be — because in a flat world, if you don’t visit a bad neighborhood, it might visit you.”**  
*Thomas Friedman*

**“The places that do the best in attracting talent from anywhere on the planet win. This means building a culture that condemns rather than tolerates discrimination and segregation, as well as welcoming, with open arms, talented people from outside Michigan.”**  
*Michigan Future Inc.*

***"Openness to ideas — to creativity — is crucial in both attracting talent and succeeding economically. Talented and creative people vote with their feet, and they tend to move away from communities where their ideas and identities are not accepted."***  
**Richard Florida**

towers. On our sidewalks and in our classrooms, diversity is the reality and tolerance is the rule. We are microcosms of the diversity present in our state and in the world at large. We act as testing grounds for multicultural communities and promote tolerance through integration.

## ► Lead

We cannot, and will not, make the needed adjustments to succeed in the global economy without inspired

***"New leadership should be organized on a metropolitan area basis with the groups networked for state action. The most likely place to start building a new leadership is with leaders of those enterprises that are competing nationally or, better yet, internationally for talent."***  
**Michigan Future Inc.**

people to lead the way. We need people to steer the ship in the right direction, to bring the crew on board and keep them on task. Our leadership must be committed to embracing new opportunities and making sometimes difficult changes.

The leaders of our research universities are responding to the call, stepping beyond their traditional roles as creators of knowledge to take leadership roles in fostering regional economic development and building global partnerships.

## ► Dream

We are a nation of dreamers, looking to the horizon. At the core of the American spirit is the belief that we can improve our own destinies. Our greatest strength has always been our unfailing capacity to imagine a better tomorrow.

For much of our history, we have been a beacon of hope to the world, and our chief export has been the American Dream. We cannot lose track of that sense of hope within ourselves.

Our universities are the "dream factories" Thomas Friedman writes about. They are refuges for dreamers, places where students are encouraged to explore possibility and equipped with the tools to realize their ambitions. We must not discount the value of our ability to spread wonder, and to empower new generations with the belief that they can change their lives, their communities, their world, for the better. ◀

***"If we go dark as a society, if we stop being the world's 'dream factory,' we will make the world not only a darker place but a poorer place ... We must address people's fears, but we must also nurse their imaginations."***  
**Thomas Friedman**

***"America, in the end, is all about hope ... If America were a company, freedom and exploration would be our core competencies."***  
**National Innovation Initiative**

## ► The Focus Group

A wide range of individuals and groups have already undertaken efforts to understand the impacts of an evolving global economy and what regions must do to stay competitive. They have written extensively on the topic. Their observations and recommendations, which often bear striking similarities, served as the direct sources from which we developed our criteria for success.

### Business Roundtable

An association of more than 160 corporate CEOs, Business Roundtable published “Tapping America’s Potential: The Education for Innovation Initiative,” in July 2005 in conjunction with more than a dozen other industry associations. The report recommends education reforms with the goal of doubling the number of engineering, science and technology graduates by the year 2015. To read the full report, visit [www.businessroundtable.org](http://www.businessroundtable.org).

### Richard Florida

Author of *The Rise of the Creative Class*, the George Mason University professor has redefined our concept of regional economic development, and his ideas have been a driving force in many municipal planning strategies and statewide policy efforts like Gov. Jennifer Granholm’s “Cool Cities” initiative. In 2006, he published “The University and the Creative Economy,” a report discussing the importance of universities in regional economies. To read the full report, visit [www.creativeclass.org](http://www.creativeclass.org).

### Thomas Friedman

A New York Times columnist and author, his best-selling book, *The World is Flat*, is widely recognized as one of the most forward-looking and important examinations of the emerging global economy.

### Lou Glazer and Donald Grimes

Glazer, president of Michigan Future Inc., and Grimes, a researcher at the University of Michigan, authored “A New Path to Prosperity?” in 2004. The study compared the impacts of manufacturing and knowledge-based industries on job growth. To read the full report, visit [www.cherrycommission.org/resources.htm](http://www.cherrycommission.org/resources.htm).

***“As never before in their long history, universities have become instruments of national competition as well as instruments of peace. They are the locus of the scientific discoveries that move economies forward, and the primary means of educating the talent required to obtain and maintain competitive advantage.”***

***Richard Levin***

### Richard Levin

Levin is the president of Yale University. In August 2006, *Newsweek* magazine published his article “Universities Branch Out,” detailing the steps universities have taken to become leaders in the global community. To read the full article, visit [www.msnbc.msn.com/id/14320413/site/newsweek](http://www.msnbc.msn.com/id/14320413/site/newsweek).

### Michigan Future Inc.

A nonprofit, nonpartisan organization, Michigan Future Inc. is seeking ways to strengthen Michigan’s competitive abilities. The group’s most recent report, “A New Agenda for Michigan,” suggests six strategic priorities to better position the state and its cities for success in the Information Age. To read the full report, visit [www.michiganfuture.org](http://www.michiganfuture.org).

### The National Academies

In 2006, the National Academy of Sciences, National Academy of Engineering and Institute of Medicine published “Rising Above the Gathering Storm.”

***“Research universities may be the most important assets Michigan has in creating a vibrant knowledge economy. We can’t emphasize enough, in a knowledge economy, the strategic importance of our major research universities ... Michigan policy makers have never viewed major research universities as a key economic resource. This needs to change!”***

***Michigan Future Inc.***

***"In my view, the presence of a major research university is a basic infrastructure component of the Creative Economy — more important than the canals, railroads and freeway systems of past epochs — and a huge potential source of competitive advantage."***

**Richard Florida**

The study recommended concrete steps policymakers should take to enhance science and technology, allowing the United States to compete in the global economy. To read the full report visit [www.nap.edu](http://www.nap.edu).

### National Governors Association

Arizona Gov. Janet Napolitano, the 2006-2007 chair of the National Governors Association, is spearheading an effort to foster innovation around the country. The goals of the initiative are outlined in "Innovation America," a concept paper describing the challenges America faces in the 21st century and calling for gubernatorial leadership in spurring economic growth. To read more about the initiative, visit [www.nga.org](http://www.nga.org).

### The National Innovation Initiative

The Council on Competitiveness gathered more than 400 leading thinkers — including top industry CEOs, university presidents and labor leaders — to spend 15

***"Universities have always protected and encouraged inspired individuals to expand and share humankind's basic scientific knowledge base. Their ideas represent some of our strongest national assets, and we must safeguard the mechanisms that fund and promote them."***

**National Innovation Initiative**

months studying the challenges facing America. Those efforts culminated in 2004's National Innovation Initiative Summit in Washington D.C. and the publication of "Innovate America," a sweep-

ing strategy to jump-start American innovation and a call to action. To read more about the initiative, visit [www.innovateamerica.org](http://www.innovateamerica.org).

### The National Summit on Competitiveness

At the request of Congress, the leaders of major corporations, universities and industry associations hosted a conference on "Investing in U.S. Innovation" in Washington D.C. in December 2005. The summit statement recognized three primary actions needed to maintain the country's competitive advantage — revitalize research, expand the talent pool and lead the world in developing new technologies. To learn more about the summit, visit [www.usinnovation.org](http://www.usinnovation.org).

### Selected Members

The people endorsing these reports and quoted in these books include a veritable "who's who" of American business leaders, politicians, journalists, university presidents and researchers.

Bill Gates, Microsoft  
Craig Barrett, Intel Corporation  
Richard K. Templeton, Texas Instruments  
Thomas Friedman, The New York Times  
Richard Florida, George Mason University  
Richard Levin, Yale University  
John Engler, National Association of Manufacturers  
Norman R. Augustine, Lockheed Martin Corporation  
Steven Chu, Lawrence Berkeley National Laboratory  
Shirley Ann Jackson, Rensselaer Polytechnic Institute  
Dan Mote Jr., University of Maryland  
Lee R. Raymond, Exxon Mobil Corporation  
F. Duane Ackerman, BellSouth  
Samuel J. Palmisano, IBM Corporation  
G. Wayne Clough, Georgia Institute of Technology  
Gerard J. Arpey, AMR and American Airlines  
Robert M. Gates, Texas A&M University  
Lee C. Bollinger, Columbia University  
Ivan G. Seidenberg, Verizon  
Molly Corbett Broad, University of North Carolina  
John L. Hennessy, Stanford University  
Charles M. Vest, Massachusetts Institute of Technology  
Mary Sue Coleman, University of Michigan  
G. Richard Wagoner Jr., General Motors Corporation  
Denis A. Cortese, Mayo Clinic  
Steven S. Reinemund, PepsiCo Inc.  
Robert D. Ballard, Sea Research Foundation's Institute for Exploration  
Arden Bement, National Science Foundation  
Samuel W. Bodman, U.S. Secretary of Energy  
John J. Castellani, Business Roundtable  
U.S. Rep. Sherwood L. Boehlert, New York  
U.S. Rep. Vern Ehlers, Michigan  
Thomas Cech, Howard Hughes Medical Institute  
Elaine L. Chao, U.S. Secretary of Labor  
Carlos M. Gutierrez, U.S. Secretary of Commerce  
Martin C. Jischke, Purdue University  
U.S. Rep. Donald Manzullo, Illinois  
Lou Glazer, Michigan Future Inc.  
Daniel Mote, University of Maryland  
Alan G. Merten, George Mason University  
Lou Anna K. Simon, Michigan State University  
Margaret Spellings, U.S. Secretary of Education  
U.S. Rep. Frank Wolf, Virginia  
Gov. Janet Napolitano, Arizona  
Ralph J. Cicerone, National Academy of Sciences  
Wm. A. Wulf, National Academy of Engineering  
Harvey Fineberg, Institute of Medicine

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## what michigan needs

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