

## A New Economy for a New Michigan Initiative

*Build a dynamic workforce of employees who have the talents and skills needed for success in the 21<sup>st</sup> century economy.*

*Double the percentage of citizens who attain post-secondary degrees or other credentials to link them to success in Michigan's economy.*

*Improve the alignment of Michigan's institutions of higher education with emerging employment opportunities in the state's economy.*

*Increase the number of Michigan residents who attend post-secondary institutions.*

*Maximize the benefits that higher education brings to Michigan's economy.*

*—From Gov. Granholm's Charge to the Cherry Commission*

### **Introduction**

Michigan's public universities have never been as important to the state's economic competitiveness and growth as they are now. Nationally, we are seeing a shift from the traditional manufacturing economy to a knowledge-based new economy. There are fewer and fewer jobs to be found in the traditional manufacturing areas that, along with agriculture and natural resources, have historically been the backbone of the Michigan economy.

In the new, international or "multi-shore" economy, the demand for traditional human capital — people who make things with skilled hands—is steadily declining, giving way to the rising demand for "intellectually empowered" human capital — highly educated people who produce things with their brains. The good news is that, because of the strength of our public universities in internationally competitive research and innovative instruction, Michigan is one of a handful of states positioned to take advantage of that shift and to thrive.

Even now, as the new economy heats up, we are seeing a rapidly growing demand for intellectually empowered workers, and competition among the states to attract and retain this talent is becoming increasingly fierce. Our public universities' immediate task, then, is to attract individuals with the potential to be this new workforce to our universities and to provide them with education, training and opportunities to develop their careers, to succeed and to contribute to building Michigan's new economy.

In pursuing that task, Michigan public universities shoulder a heavier burden than do peer institutions across the country as a whole. According to the U.S. Department of Education's "Integrated Postsecondary Education Data System", in fall 2000, 79.1% of all U.S. students in degree-granting institutions were enrolled in public institutions, while the percentage in Michigan was 82.9%. This distinction is further sharpened if comparison is made with neighboring Ohio, where only 76.7% of the enrollments were in public degree-granting institutions. Yet patterns of student attendance exacerbate the challenge to Michigan public universities and their students. According to the same 2000 database, 75.1% of Ohio students at four-year institutions were studying full time, compared to 72.5% nationally and only 67.0% in Michigan.

To transcend its systemic challenges and establish a new benchmark for higher education effectiveness, Michigan must focus on creating the intellectual and cultural climate for the development of “talent centers,” clusters where creativity, innovation and entrepreneurship converge to provide the desired research, instruction, and work environment for these talented, well-educated individuals who will spin off new businesses and create new jobs. This effort will require truly interdisciplinary effort with international credibility and perspective. By combining cutting edge science, engineering, and medicine with a stream of nationally competitive business and law graduates, these talent centers will have a “multiplier effect,” generating new dollars and new hires. They will serve as a catalyst for the state’s continuing economic growth and their own self-sustaining re-invention, as well as facilitating the creation of additional talent centers.

Some U.S. states (such as North Carolina) and foreign countries envisioned a new economy of intellectually empowered workers as early as the 1960s. Those that made significant investments in promoting this vision are recognized leaders today. Their economies already have expanded and their job bases continue to grow. Thus, Governor Granholm’s charge to double the number of individuals in Michigan with the degrees, credentials and skills to make them successful in this new economy mandates an essential step—one that offers Michigan the prospect not only of “catching up” but ultimately of leapfrogging economic competitors elsewhere.

### **A Closer Look at the New Economy and the Role of the Universities**

So what will the new economy look like? In the plainest terms, it still is going to need people, but it’s not going to need as many of the same kinds of people in the same kinds of positions to sustain it as the traditional manufacturing economy. Nevertheless, there will continue to be a need for highly-trained people in high-end manufacturing.

Consider the automobile industry. Companies in this industry increasingly are moving their manufacturing process toward a new model that uses computerized simulation systems. In this new model, if you buy one of their vehicles, find a problem and complain about it, rather than conduct a mechanical analysis of their production line, their engineers can enter that data into the simulation, which identifies the exact point on the line where the problem occurred, analyzes and corrects it on the spot. While this new model requires far fewer people overall, it still requires highly-skilled and trained individuals at key points, people whose roles and profession will be dramatically redefined.

In short, as companies of all kinds move to comparably sophisticated systems, they still will need highly-trained engineers, programmers and all of the people that support those systems.

These companies will need people who recognize opportunities and generate ideas: ideas for new products, new processes, new markets, new industries, new ways to do business. These people, with the help of a new cadre of intellectually flexible engineers and system analysts, will apply the most current capabilities of technology, business processes, and manufacturing processes to these ideas. Then people with highly entrepreneurial business and legal skills will turn these ideas into new business opportunities, new jobs and economic growth.

The Milken Institute has developed a *State Technology and Science Index* to assess the relative preparedness of the 50 states for the new economy using 75 indicators in five categories to measure how well a state is likely to perform in today's knowledge-based economy. Those five composite categories are: research and development inputs; risk capital and entrepreneurial infrastructure; human capital investment; technology and science workforce; and technology concentration and dynamism. In the 2004 Index, Michigan ranks 25<sup>th</sup> overall, down one position since Milken's first Index in 2002, still ahead of other so-called "Rust Belt" states Indiana and Wisconsin, but behind Ohio, Illinois and Pennsylvania.

The 2004 *Index* is attached as an addendum; the complete report can be found at: <http://www.milkeninstitute.org/publications/publications.taf?cat=ResRep&function=detail&ID=304>

All but one of the top ten states ranked in Milliken's *Index* have both a higher proportion of their populations with at least bachelor's degrees and a higher per capita income than Michigan, according to Dr. Charles Ballard, professor of economics at Michigan State University, who correlated U.S. Census data on the proportion of each state's population holding at least a bachelors' degree with per-capita personal income data from the Commerce Department's Bureau of Economic Analysis.

Ballard found that higher education levels are strongly associated with higher income levels. An increase of one point in the percentage of the population with a bachelors' degree is associated with an increase in income of more than \$700 per year, per capita.

Indeed, there is a strong correlation between the educational level of a state's workforce and its economic vibrancy. States that educate and nurture creative talent and build and maintain the necessary infrastructure within their universities to attract venture capital and research dollars and to create the essential multiplier effects that grow and sustain industries in the new economy will be the likely winners in the competition for jobs and income growth.

The good news is that Michigan already has the single most important asset required to meet this challenge—its higher education institutions. Led by three nationally ranked research institutions, these institutions will play key roles in developing the additional research and development inputs and the technology and science workforce—the “intellectually empowered” human capital—that will fuel Michigan's new economy via their collaborative efforts, both among themselves and with public and private sector partners.

Our state's public universities have a proven record of delivering strong results for Michigan's economy. During the agricultural and industrial revolutions, our universities played a leading role in establishing Michigan as a national leader. We educated our citizens and lent our skills to attracting and educating high-quality workers from across the country to agricultural and manufacturing industries built, in large part, on the research and development conducted at our universities. The result was self-sustaining growth in the form of good-paying jobs, a high standard of living and an enriched quality of life. In the more recent information revolution, the University of Michigan, Michigan State University, and Wayne State University provided a springboard to national leadership through their creation of the Merit Network, and UM and MSU were two of the original 38 members of the Internet2 initiative, which is headquartered in the state. Today, Michigan's research universities are working cooperatively through the

Technology Tri-Corridor to ensure that Michigan possesses the personnel, infrastructure, and public-private collaborations necessary to capitalize on the current post-genomic revolution in the life sciences. Additionally, all of the public universities are participating in new forms of cooperation to transfer technology and intellectual property.

The new economy requires that all of our public universities continue to fulfill their various roles, recognizing that in addition to being knowledge based, the new economy will be much more networked, flexible and entrepreneurial than the economies we contributed to building in the past. These characteristics provide us with a blueprint for the kinds of workforce preparation that we now must offer, if we are to meet Governor Granholm's mandate and provide the intellectual capital to drive it.

### **Talent Centers and Their Self-Sustaining Multiplier Effects**

Developing "talent centers" built around Michigan's public universities will create the essential "multiplier effects" that build and sustain economic growth by generating new dollars and new hires that serve, in turn, as catalysts for the creation of additional talent centers and continuing economic growth.

The multiplier effects of talent center expansion in Michigan are vital to the state's future economic prosperity. The short-term effect will be seen in the form of new ventures, new hires and new dollars going directly into local communities. That activity becomes the catalyst for attracting new research dollars and additional new talent. The long-term effect will include a sustained flow of corporate and research dollars that generates the creation of new discoveries and new technologies that, in turn, generate more new businesses and more new jobs. Together, these multiplier effects form the foundation of the talent centers that will attract and retain top talent to Michigan.

### **Focusing Investment for the Greatest Return**

The new economy is driven by ideas. These ideas are stimulated in large part by the teaching and research that is being conducted at our state's universities—ideas that often go directly into creating businesses and jobs. Looking ahead, we see that the main industries on which Michigan's Technology Tri-Corridor is focused are expected to become leading growth and income generators, both nationally and internationally:

1. **Biotechnology**: Including everything from agriculture to medical, particularly anything related to genetics, proteins, etc. The health care industry continues to grow as a meaningful portion of GDP (15+ percent) and is expected to continue to generate significant economic activity, particularly as Baby Boomers age. Growth in this sector also has implications for agriculture, currently Michigan's second largest industry.
2. **Advanced manufacturing and information technology**: Particularly, information technology professionals at the forefront of how to organize and network systems and the transfer of information so it can be used in multiple places at the same time. There will be an increased need for management-savvy technologists who can define, organize, project-manage, and reintegrate the work performed externally back into their organization and enterprise for effective, efficient application by end users.

3. Homeland security: The United States has reached the stage in the evolution of its homeland security strategy where the private sector will play an increasingly major role. More than \$36 billion of federal funding is being made available to develop four key components of effective preparedness to security threats to the nation: prevention, including biometrics, vaccines, intelligent systems and cargo screening systems; detection, including bio and radiation sensors, and training; reaction, including EMS equipment, communications and computer modeling; and recovery, including bioremediation and decontamination.

These and other emerging technologies—notably entertainment, where astounding advances in CGI (computer-generated imagery) and artificial intelligence are being made—have obvious growth potential, a tremendous amount of investment capital available, and the high demand and rapid turnover in research and development activities required to advance new ideas. Michigan’s public universities must examine and target such industries as we begin developing our blueprint for educating and retaining workers in Michigan’s talent centers and new economy.

### **Developing a Strategic Plan**

How do we go about this? The recent experience of Northern Europe is particularly informative to Great Lakes states like Michigan, trying to envision a future that moves us away from a more traditional manufacturing base and toward the knowledge-based new economy.

Countries of Northern Europe have experienced a significant shift in their economies. The manufacturing jobs that once sustained predictable levels of employment, wages and benefits there moved to Eastern Europe and South Africa, as the latter embraced a capitalist economic model. In Northern Europe, very little opportunity remained for even the most educated workers.

In 2000, the European Union laid out its “Lisbon Strategy,” designed to address this sudden shift and to stimulate a transition toward “a competitive job-creating knowledge-based economy characterized by growth, social cohesion and respect for our environment,” in member countries by 2010. According to the EU’s “Report from The Commission to the Spring European Council: Delivering Lisbon Reforms for the Enlarged Union,” more than six million jobs have been created since 1999, long-term unemployment has dropped sharply, and the labor market reforms now under way are starting to bear fruit, with employment holding up relatively well in the face of slower growth. ([http://europa.eu.int/comm/lisbon\\_strategy/pdf/COM2004\\_029\\_en.pdf](http://europa.eu.int/comm/lisbon_strategy/pdf/COM2004_029_en.pdf))

One particularly significant strategy adopted in member countries has been to align universities and employers, large and small, to create an interdependent network, with top universities in the lead in each field or science. The objective is to put the best minds among university researchers into contact with employers in order to develop their ideas in the labs, then transform those ideas into marketable products and services that create jobs and result in new businesses and industries.

This strategy, one component of establishing a network-based economy, is informative in two ways: it provides a model for what must continue to happen in Michigan, involving

all Michigan public universities, large and small; and it indicates the level of international new-economy competition already developing for our state and our nation.

An excellent example of a long-standing Michigan-centered network-based economy is the linkage developed among production agriculture and Michigan State University's Michigan Agricultural Experiment Station and Extension Service, a strategic partnership between government, university and industry leading to the creation of new products, new markets, new jobs and new income. Although disparate endeavors at first glance, Michigan's public-private strategic partnership in production agriculture and North Carolina's Research Triangle share some noteworthy characteristics. Both have enjoyed bipartisan support. Both have harnessed major institutional capacity, with size and scope commensurate to their respective missions. Both have sustained their fundamental mission commitments and essential resources, despite their internal technological re-inventions and external changes in political climate and patronage. Michigan's new strategy of a network-based economy of intellectually empowered workers should seek to replicate such recognizable success factors.

### **Multipliers: Work Underway at Michigan's Universities**

By partnering among themselves and in collaboration with key industries, Michigan's 15 public universities will be able to foster the development of skills and capabilities that will form the foundations of Michigan's new economy. Each of those universities will be able to play a distinct, important role.

It is informative to take a moment to review one component of our state's public university system, the research intensive university. Michigan's three research intensive universities and their world-class faculty researchers and teachers conduct much of the research and development that will drive the new economy and the economic outcomes of the state. Consider the following achievements and the positive impact of these powerful economic engines that are Michigan State University, Wayne State University and the University of Michigan-Ann Arbor:

- A. Approximately 90 percent of all public university-based research and development and outreach is conducted by MSU, WSU and UM-AA. This amounts to \$1.3 billion annually in R&D and research, much from federal and private funding. The three institutions are home to the public universities' MacArthur Fellows and members of the National Academy of Sciences, as well as to the state's colleges of medicine.
- B. MSU, WSU and UM-AA granted a total of 1,767 undergraduate engineering degrees in 2002-03, or 57.4 percent of total in Michigan public universities; the same institutions granted 1,627 graduate degrees in engineering, or 72.9 percent of the total for the same years.
- C. In the area of technology (including agriculture, computer sciences, engineering technology, physical and biological sciences, and math), MSU, WSU and UM-AA produced 2,193 undergraduate degrees in 2002-03, or 47.8 percent of the total granted in public universities statewide, along with 964 graduate degrees, or 57.1 percent of that total.
- D. Michigan research universities are the only institutions in the state granting the MD, DO and DVM degrees, producing 100 percent of the medical doctors, doctors of osteopathy and doctors of veterinary medicine who receive those degrees statewide. In 2003-04, the total number was 852.

- E. MSU, WSU and UM-AA grant some 44 percent of the total number of M.B.A.s awarded by Michigan public universities, or 1,714 in 2002-03.
- F. MSU, WSU and UM-AA account for 100 percent of the law degrees granted by Michigan public universities, which totaled 794 in 2002-03.
- G. MSU, WSU and UM-AA confer 44.5 percent of all degrees from public universities in Michigan and 54.3 percent of all advanced degrees statewide.
- H. According to a report published in 2002 by the Michigan Economic Development Corporation (MEDC), entitled "The Economic Impact of Michigan's Public Universities," for every dollar of state support provided to universities, our universities collectively generated \$26 of economic impact. The state's investment of \$1.5 billion in 1999 had a net impact of \$39 billion, representing 12.6 percent of Michigan's gross state product for the year.
- I. The MEDC study also noted the substantial impact of licensing of university intellectual property. Although information was incomplete for this aspect of the study, it noted that most of the licensees are not located in Michigan and that revenue from out-of-state licensees was considered a significant source of revenue to universities and faculty inventors.

**Licensing Revenues & Patent Activity, Fiscal Year 2002 <sup>(A)</sup>**

	MSU UM-AA & WSU	U.S. Total	% of U.S. Total	MSU	UM-AA	WSU	Michigan Tech
Licensing income	\$37,298,103	\$959,027,454	3.9%	\$29,758,071	\$5,345,576	\$2,194,456	\$470,014
Licenses & options executed	93	3,739	2.5%	22	61	10	8
Start up companies	5	364	1.4%	0	5	0	0
U.S. patent applications filed	203	10,632	1.9%	60	124	19	19
U.S. patents issued	112	3109	3.6%	43	56	13	5

<sup>(A)</sup> Responses to the AUTM Survey as reported in *The Chronicle of Higher Education*

**Multipliers: Physical Capacity & Investing in Michigan's Public Universities**

To advance Michigan's economy and to prepare capable workers at the rate envisioned in Governor Granholm's mandate—doubling the number of postsecondary degree holders in 10 years—requires dramatic growth. It requires a strategy that fosters a multiplier effect. We must focus on investing in those activities that not only grow but speed the growth in the number of degree holders, number of new ventures in new-economy industries, number of new jobs, new talent centers, new ideas and new economic growth.

It is a challenge that Michigan's public universities have faced historically and, in partnership with state government, business and nonprofit organizations, have addressed with great success. For decades, new ideas from Michigan—new agricultural products and processes, new automobile designs, new furniture designs and more—have been visual icons recognized by all Americans as symbolizing the advancement and economic growth of our nation. We can do this again. In fact, we are working on it now.

However, doubling the number of graduates from our state's higher education institutions and achieving the economic multiplier effects that will come from the new energy, ideas and talent it will bring to the state will require investment. Most of our public universities have experienced significant enrollment growth and are currently operating at or near capacity, particularly in the more specialized science and technology programs that produce the talent for the new industries with high-growth opportunity described above.

Expanding these programs will further challenge our physical capacity. They require, in most cases, specialized teaching facilities—specially equipped classrooms, laboratories and technological infrastructure. These facilities are required, not only to educate the new talent, but to enable faculty and students to perform the research and development that will produce the multiplier effect of new products and services, new businesses and new jobs in Michigan.

### **Multipliers: Intellectual Capacity, New-Economy Educated Workers and Degrees**

What we're really talking about is making an immediate strategic investment in both our intellectual and physical capacity. As noted above, the migration of students toward the specialized programs that build the talent needed in the new economy is already underway. So besides investing in specialized classrooms and laboratories, doubling participation also will require more professors, particularly those who can teach and conduct interdisciplinary competitive research in the specialized programs related to economic growth.

We need to attract the next generation of university professors who will teach the next generation of degree-seekers. To do this, we need to concentrate on developing a strong cohort of graduate and professional students who will become that next generation of professors, taking posts not only at their own universities, but across all of the four-year institutions and community colleges in Michigan.

In order to attract and retain the greatly increased number of degree seekers, this new faculty will need to be new-economy oriented, not only in the leading-edge knowledge of their fields, but in their teaching methods, pursuing new approaches to curriculum, learning activities and preparation of students to meet employers' constantly advancing competency expectations.

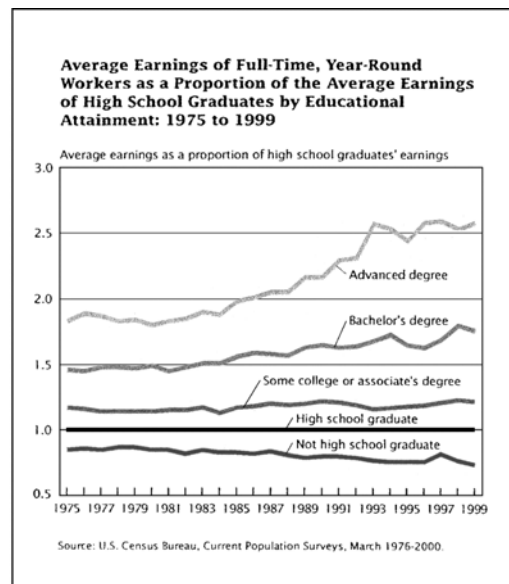
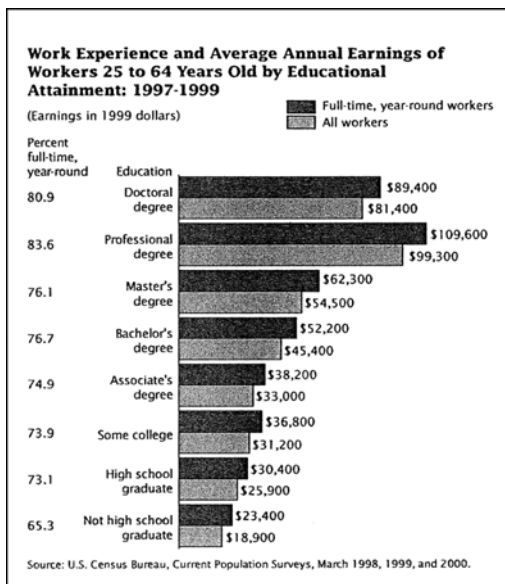
We also need the same kind of research faculty in the labs, teaching and directing undergraduate and graduate students and conducting key research. In the new economy, our universities will serve as the catalysts for generating new knowledge; knowledge that will inevitably spawn new businesses and new jobs.

In the new economy, the multiplier effect also will apply to college degrees. For decades, the bachelor's degree has been the minimum expectation for many careers. In the new economy, the Master's degree is likely to become the new minimum for many occupations, and even higher levels of education will be desired and pursued by knowledge workers. That's where the multiplier effect accelerates, in the creative, sophisticated work of highly educated, highly skilled advanced degree holders in the sciences, engineering, business, law and medicine—Ph.D.s, M.D.s, D.O.s, D.V.M.s, M.B.A.s, J.D.s. Their work—and their networks—will drive the development of

Michigan's new economy. Their research and development and talent at technology transfer will launch new industries and businesses and fuel the multiplier effects that create new high-paying jobs and that attract federal and corporate research dollars to our communities.

An additional consideration, the earning power of today's advanced degree holders—above bachelor's—far exceeds others, and the gap is growing. A recent article in The New York Times noted U.S. Census figures that show the median annual income for American men with graduate degrees is more than \$66,300, more than double the \$31,600 for someone with only a high school degree. Median annual income for an undergraduate degree is about \$52,200 or 60 percent higher than a high school degree alone. On average, incomes of those with only a high school degree have not grown since the 1970's.

The charts below illustrate the growing gap between the income earned by those with advanced degrees and the rest of the workforce. Source: U.S. Census Bureau, July 2002, "The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings," Jennifer Cheeseman Day and Eric C. Newburger.



**Multipliers: Universities as “Preferred Providers” to Employers**

Major universities with leading-edge programs and reputations for producing employment-ready graduates attract the attention and recruiting efforts of companies of all sizes, from major corporations to smaller companies in specialized, sophisticated industries. The multiplier effect public universities gain through their relationships with employers is particularly powerful. Universities produce the employees to meet the employers' growing demand for new-economy-ready workers.

Kathleen Barclay, Vice President for Global Human Resources for General Motors, pointed out in a recent speech that the number of bachelor's degrees being awarded nationally in engineering is dropping, from more than 95,000 in 1985 to fewer than 65,000 in 2000. With advanced automotive technologies as a focus of Michigan's

Technology Tri-Corridor initiative, this is an area where Michigan's public universities could partner with industry to address a specific need.

Through such partnerships with employers, public universities increase the quality and availability of experiential learning opportunities for their students, such as co-op programs, internships, and real-work projects. These experiences prepare students to excel in the work place and in many instances lead directly to full-time jobs, with employers typically aiming to convert 50-85 percent of their interns and co-ops into full-time hires.

In many cases, employers will choose to locate near "preferred provider" universities which serve as a source for skilled workers and provide a concentration of research and development expertise in their field. This multiplier effect is what led to development of the nation's earliest talent centers—Silicon Valley, Research Triangle Park and Route 128. Likewise, Michigan's universities, through their collaboration in the Technology Tri-Corridor, have the potential to become preferred providers of employees, to attract corporate and federal research and development funds and to provide the intellectual and cultural environment—Cool Cities—for talent centers and economic growth.

## **Conclusion**

Michigan's public universities have a long tradition of strengthening the economic and social fabric of the state. Our public and political leaders have created an exceptional public higher education system, and the academic leaders guiding our public universities have been diligent and effective stewards of the public's resources. While we all have different roles, we must work together to build on the synergy of our collaborative efforts.

We share a mandate to build and maintain the intellectual capital that will assure Michigan's academic and economic future. Gov. Granholm and Lt. Gov. Cherry have challenged us to once again assume and sustain that position of leadership.

Michigan is positioned to lead the way in the new economy because our K-12 education system is well respected and supported. We have the foundation to attract top quality people to the state and to create jobs *if* we are willing to make the vital investment in our public universities' physical and intellectual capacity.

We have much to do and these challenges do not lend themselves to simple or short-term solutions. It is going to take extraordinary effort and collaboration. We must take the next step and formulate a coordinated strategy today that builds on our history and that demonstrates our commitment to strengthen Michigan's role as a place where the rest of the nation—perhaps even the world—comes to receive a world-class education, to find good-paying jobs and to enjoy a high standard of living and quality of life.

It is in our collective interests to immediately set about the task of determining how best to invest in the physical and intellectual capacity of our public universities that will in turn generate the multiplier effect necessary to increase the number of postsecondary degree-holders residing in Michigan. We must stimulate the powerful multiplier effects that will drive Michigan's economic development by creating the jobs, the businesses and the talent centers that will attract and retain the highly-skilled, new-economy workforce that we educate. We must foster and embrace that future.

### **Review of the Charge and Recommendations**

- *Build a dynamic workforce of employees who have the talents and skills needed for success in the 21<sup>st</sup> century economy.*
- *Double the percentage of citizens who attain post-secondary degrees or other credentials to link them to success in Michigan's economy.*
- *Improve the alignment of Michigan's institutions of higher education with emerging employment opportunities in the state's economy.*
- *Increase the number of Michigan residents who attend post-secondary institutions.*
- *Maximize the benefits that higher education brings to Michigan's economy.*
- Create the "New Economy for a New Michigan Initiative"

### **Recommendation 1: Redouble the state's commitment to the Technology Tri-Corridor.**

It's central; it's the future. Michigan was in the vanguard when this project was initiated; we need to remain there. We know what our strengths are, we were on that path, and even now are ahead of most.

Investing in life sciences is investing not just in research but in the multipliers it will bring, not just in the research findings it will generate but in the employment and the talent centers that will result.

The Tri-Corridor's reliance on nationally credible, disinterested peer review as the sole basis for allocating its funds should be maintained.

This grant funding best belongs in the MEDC budget.

### **Recommendation 2: Create a new, emerging-technology initiative.**

State incentives are needed to aid the creation of talent centers, building on existing university strengths in nationally-competitive science, engineering, and medicine, plus graduate level business and law. Building in emerging areas like nanotechnology and information technology where development of dynamic networking along highways is clearly important, but just one aspect of a needed shift is also important. World renowned teachers and researchers will be required to attract the best graduate students and sponsored external research to Michigan universities. Partnerships with state government, corporations and employers must be formed to identify strategic emerging fields. The pay-off:

- Immediate "brain gain" and income growth
- Long term attraction of research funding "imported" from federal and corporate partners and growth of the next generation of researchers for Michigan
- Discoveries that advance new or emerging technologies and industries.

This grant funding best belongs in the MEDC budget.

**Recommendation 3: Realize that this is going to take collaboration.**

Michigan's public universities are not in competition with one another. They are in competition with the universities of the world to assume a leadership position for the state and themselves in the new economy. We must work together, we must link. We must identify and embrace tomorrow's technological and economic successes and -- equally -- identify and avoid tomorrow's failures, even though the former may appear outlandish while the latter are currently popular or effective. We need to build and support a networked base. A number of strong alliances already exist between the state's three primary research-intensive universities, as well as among the other public universities, but even stronger partnerships can be realized.. We've got to stress collaboration among all of our public institutions of higher learning, because that's where our future will be.

This is an activity best managed by the Presidents Council of the State Universities of Michigan in partnership with MEDC "incentive grants." Developing networks and collaboration will be essential.

**Recommendation 4: Create regional entrepreneurial centers and provide incentives to medium and small cutting-edge Michigan companies to form internship relationships with them.**

Focus on funding regional entrepreneurial centers where undergraduates can get specialized hands-on training and certifications to complement their degrees at the same time they are enrolled in a Michigan college or university. If our goal is not only to increase but to retain degree-holders in Michigan, then we must develop curricular alternatives that attract and retain the increasing number of students with two primary learning styles: hands-on learners and active learners. These groups continue to grow as high schools adopt more hands-on learning curricula. We need to engage these students at a higher, more active level, earlier in the course of their post-secondary educational experiences.

**Recommendation 5: Make a new funding stream available to the state universities to build on key disciplines important to the new economy.**

The new economy will rely on an ample supply of advanced degree-holders in strategic academic areas, engineering and biotechnology, among others. Yet due to tuition restraint, state appropriation reductions and enrollment increases, enrollment capacity has been reached in many of these fields.

In order to meet the needs of Michigan's employers and potential employers, a new funding stream enabling universities to expand existing capacity in targeted areas is essential. This would be accomplished by providing additional faculty focused on expanding the number of "seats" available to our students and building on existing specialized programs and (expensive) laboratory capacity.

Funding for additional key faculty positions is recurring, so funding should be located in the Higher Education Appropriations bill.

**Recommendation 6: Make new funding streams available for capital investments to public universities.**

Physical capacity “bottlenecks” currently prevent growth in key new-economy disciplines. The specialized classrooms and laboratories necessary to prepare and equip undergraduate and graduate degree candidates are operating at capacity now, severely limiting the production of talent in the sciences, engineering, and technology fields that can create new industries, jobs and income in Michigan. A separate white paper on this issue in support of this recommendation is attached.

This funding best belongs in the Capital Outlay Appropriations bill.

**Recommendation 7: Fund targeted incentives to foster the development of “Cool Cities” and communities.**

Regularize recurring provision of non-recurring funds for “high risk, high creativity” experiments in economic development, in-state retention and employment of alumni, and development of exemplary “new economy” communities. Establish a process (perhaps akin to that for capital outlay requests) to receive and evaluate university funding requests.

Sometimes, a city or University-assisted community may be perceived as “cool” by the intellectually empowered workers Michigan wants to retain, not because of its established characteristics but because of what it is willing newly to attempt, on an experimental or ephemeral basis. For example:

- Does it make sense to grant some form of tax credit, either to businesses or individuals, to incentivize faculty technical consulting at regional business start-ups?
- Does it make sense to promote student ownership of condominiums, on either an individual or co-op basis, rather than renting? (E.g., does it promote responsible treatment of property? Does it promote local post-graduate retention of highly educated workers?)
- Should university placement offices or officers be incentivized for local or in-state job placement of university graduates in high value or high demand programs?
- Can universities find effective ways to deploy the tremendous skills of their *emeritus* faculty members, in order to assist local start-up businesses?
- Can university libraries be helped to arrange and pay for commercial database access rights for knowledge workers in local start-up businesses?

The point here is not whether any of the examples above is either attractive or unworkable, but rather that such ideas are much more likely to be formulated for review and possible trial if some likelihood of experimental funding support exists for those judged worthy of testing.

It may be that a small portion of revenue sharing dollars could be invested to support this initiative.