

2004-2005 policy initiatives

The following is a summary of ideas that surfaced within the four standing committees of the Wisconsin Technology Council, which is the independent, non-profit science and technology adviser to the Governor and the Legislature. Those standing committees are Technology Development, Investment Capital, Human Capital and Outreach and Public Policy.

The ideas were offered to Gov. Jim Doyle and leaders in the Wisconsin Legislature for consideration as separate pieces of legislation, administrative action items, or proposals to be contained in the 2005-2007 state budget.

The ideas listed in this report range from the sweeping to the specific. Some may require an investment of state dollars; others would require little, if any, funding – and might even enhance state revenues.

They are not listed in any order of importance to the Tech Council, but grouped somewhat by category for ease of reading.

Human Capital

1. **Invest in seamless K-16 education.** The Wisconsin Technology Council's Vision 2020 report recognizes that all of Wisconsin's public and private educational resources need to be aligned to maximize benefit to students at all levels. We must emphatically reject both rhetoric and policies that would pit one sector of education against another or one level of education against another. The state of Wisconsin should address school funding issues to propel Wisconsin into a leadership position in the Knowledge Economy.
2. **Encourage educational cooperation and coordination.** The Wisconsin PK-16 Leadership Council, co-chaired by the President of the University of Wisconsin System, the President of the Wisconsin Association of Independent Colleges and Universities, the President of the Wisconsin Technical College System, and the State Superintendent of Public Instruction, is a unique, voluntary effort to coordinate educational policy. In a relatively short period of time, the PK-16 Leadership Council has shown itself to be entrepreneurial and has resolved thorny educational issues. The PK-16 Leadership Council has also organized a program to encourage and reward educational collaborations at the local level. The importance of K-12 education to productive postsecondary education is obvious. It should be equally obvious that Wisconsin will not attract and retain brainworkers, who place a high value on the education of their children, unless educational quality is not just keeping pace with Scarsdale or Singapore, but exceeding them in meaningful ways. Moreover, the purely economic return on investment in elementary and secondary education (increased earning power) is best realized if students make seamless transition to and successfully complete postsecondary education. Assume the state invests \$120,000 per student in K-12 education. That investment is repaid (in additional tax revenue) only if the student receives a postsecondary education. Education must be viewed as a single entity and, in addition to its myriad other benefits, be viewed as an investment. The state of Wisconsin should use

the PK-16 Leadership Council to advance seamless education and should avoid inflexible, bureaucratic nostrums for educational advancement.

3. **Continue building an effective college transfer system.** If the Wisconsin Technology Council's goals for increasing the number of individuals with four-year degrees and individuals with graduate degrees are to be achieved, there also must be more investment in postsecondary education, including technical education. In the Knowledge Economy, it is not a case of either/or. There must be investment in both. At the University Research Park in Madison, the largest share of workers are graduates of Madison Area Technical College. Those jobs would not be there without the Ph.D.s in biochemistry and computer science or without the MBAs either. But, then, neither would the Ph.D.s and MBAs be there without the MATC graduates. A comprehensive, effective college transfer model is a cost-effective way to expand educational opportunity and to reinforce the seamless nature of postsecondary education. Although great progress has been made, more needs to be done. This is a challenge which the educational leaders of this state must themselves address. The state of Wisconsin should foster a seamless K-16 education so Wisconsin will have the flexibility and creativity to lead in the Knowledge Economy.
4. **Educate students about entrepreneurialism and the Knowledge Economy.** Efforts are being made at all levels of education to encourage entrepreneurial behavior and to deepen students' understanding of the Knowledge Economy and of the technologies underlying that economy. One notable effort is *Project Lead The Way* (PLTW), a national nonprofit organization preparing students to excel in technical fields. PLTW introduces middle school and high school students to engineering principles through hands-on exercises applying math and science concepts to solving real-world problems. Students who complete the program can receive college credit that gives them a head start toward their degree and a solid background that helps them successfully navigate technological challenges. In March of 2004, the Kern Family Foundation of Waukesha launched *Project Lead The Way* in Wisconsin with a three-year grant to establish pilot programs in 32 middle and high schools around the state. More than 1,700 Wisconsin middle and high school students are expected to enroll in fall 2004; the Foundation's goal is to add 60 more pilot school sites starting in fall 2005. The results of PLTW programs elsewhere have been impressive. Nationwide, 73 percent of PLTW students have entered engineering or technology programs, and 98 percent of them continued to their second year in college, compared to the national persistence rate of 50 percent. In addition, PLTW is inclusive in design, increasingly attracting minority and female students. PLTW has partnered with the Wisconsin Department of Public Instruction and seeks other partners in government and local and state business and industry. Other states, including Illinois, Indiana, and Ohio, are using millions in Perkins and other funds to start and support PLTW schools. The state of Wisconsin should invest in the expansion of *Project Lead the Way* as a model for increasing opportunities and incentives for students to gain an education in highly skilled technical fields.
5. **Encourage more of Wisconsin to participate in postsecondary education.** One of the major impediments facing Wisconsin's citizens' participation in postsecondary education

has been the relative disinvestment by the state in means-tested student aid. The state also falls short in educating its citizens about the financial aid that is available for its citizens and about the opportunities they have for advancing in the Knowledge Economy through Wisconsin's fine colleges and universities. Another recent study by the Sallie Mae Fund confirms that those with the greatest need for student financial aid have the least knowledge about financial aid and how it works. It also found that those with the most knowledge about financial aid are most likely to attend a college or university.

In order to remedy this situation, Wisconsin has the opportunity to mount a comprehensive Web portal that involves students as early as middle school in looking ahead to postsecondary options, so that all students are well prepared to continue their education after high school. Such a portal would offer information on all types of postsecondary education and would help students and their families learn how to pay for it. Guidance counselors would embrace the portal as a useful tool for course planning while in middle school and high school, and as the main place to go for postsecondary education information. The application process would be streamlined and transparent, transcripts could be sent electronically, and financial aid would be demystified. The site could have sections in Spanish and Hmong for parents who do not speak English and need to understand the process their children are facing. Right now, elementary and secondary students have to visit at least three separate sites (UW HELP, WisconsinMentor.org, and WItechcolleges.com) to learn about the state's three sectors of postsecondary education and about financial aid. Removing barriers to retrieving this information will increase the number of prepared postsecondary applicants who will be more likely to experience success in college and graduate in a timely manner. North Carolina currently operates a portal site at www.cfnc.org that is a model for this proposal; all 8th graders in the state use the site as their official planning tool for college. Great Lakes Higher Education Guaranty Corporation, the current sponsor of WisconsinMentor, has expressed a willingness to sponsor a new site that would include public colleges and universities to form an integrated site, similar to North Carolina's, that would offer the full panoply of Wisconsin postsecondary opportunities. The site should be re-named when it becomes comprehensive (perhaps "ThinkHigherWisconsin.org"). The University of Wisconsin System previously declined to participate in a joint system when invited to do so by Great Lakes, but the time is right to try again. This project has a willing sponsor and promises only positive outcomes for all concerned. The state of Wisconsin should encourage and endorse "ThinkHigherWisconsin.org," a comprehensive statewide Web portal for planning, applying, and paying for college.

6. **Support financial aid to students.** Tuition prices are rising in Wisconsin. However, UW tuition remains at or near the bottom of the list compared to peer institutions, and tuitions at private colleges and universities in Wisconsin are increasing less than the national average. Investing in education is a tripartite responsibility involving the government, the students and their families, and the private sector. As with all investments, the return accrues to those who put up the money. The Wisconsin Technology Council has shown that, in the Knowledge Economy, all investors (government, the students and their families, and the private sector) benefit. If

Wisconsin is going to position itself as a leader in the Knowledge Economy, it must take concrete steps to make sure we increase our supply of brainworkers. There will be an overall decline in the number of high school graduates later this decade, and an increase in the proportion of high school graduates who are low-income and minority. We must especially address these growing populations, who are currently left behind. And the way to do this is through means-tested grant programs for students.

The average indebtedness of a four-year student in Wisconsin on graduation is \$16,700. Given the subsidized interest rates on many student loans and the boost in income that a college degree yields, and comparing this to what the same student would pay for a loan on a rapidly depreciating car, this level of borrowing is manageable for most—but not for all. For low-income individuals, any loans (if they can secure them) are out of the question. And without financial support, they will not attend a postsecondary institution. A recent study found that grant aid—not elaborate programs at institutions—was the best way to increase enrollment and persistence by students at colleges and universities.

Yet, here again, Wisconsin is currently falling short. Recent data from the Higher Educational Aids Board (HEAB) show that financial assistance for students eligible for the state's major means-tested financial aid programs leaves more than 33 percent of Wisconsin students' documented need unmet. In other words, more than \$242 million would have to be added to the state's total appropriations for need-based financial assistance in order to fully meet this need. It's notable that Minnesota, which is leading Wisconsin in brain gain strategies, provides nearly twice the Wisconsin appropriation for need-based financial aid to its students.

It is interesting to note that Minnesota, like Wisconsin, has not been immune to the recent downturn in the economy, and reduced support to higher education by 2.8 percent between FY 2003 and 2004. However, at the same time, Minnesota *increased* funding for its financial aid programs by almost 12 percent. Minnesota recognized that as tuition increased, financial aid had to be increased to allow continued access to higher education by lower-income students and to finance continuous quality improvements. In contrast, when Wisconsin cut appropriations for higher education by 7.8 percent between 2003 and 2004, it increased financial aid by only 1 percent. Another measurement is grant dollars provided by states per unit of population. In 2002-2003, Minnesota's grants divided by its population were \$27.18 per person, while Wisconsin's comparable amount was only \$14.48 -- barely more than half of Minnesota's. Wisconsin devotes only 6 percent of all its higher education dollars to student aid, whereas Minnesota targets 10 percent. The skewing of the investment has skewed the results.

Minnesota, so close geographically and with a slightly smaller population, enjoys a higher standard of living (a median family income of \$60,000 compared to Wisconsin's \$45,000) that, not coincidentally, is tied to its higher percentage of adults with bachelor's degrees or higher (Minnesota ranks 10th nationally in that category, compared to Wisconsin's 36th place position). And Minnesota helps its low-income students afford college through the Minnesota State Grant Program. In Fiscal Year 2003 (school year 2002-2003), Minnesota provided \$136.6 million in state grants to 72,396 low- and

moderate-income students. In that same year, Wisconsin's state need-based aid was \$72.3 million, spread among 57,622 students. Dwindling funds for financial aid programs, which lag behind exploding tuition costs, only exacerbate the problem.

Wisconsin has long pursued a low-tuition policy for its public universities. The net result has been that, even when resources are scarce (as they are now), subsidies go to those who would attend college in any event. This is economically inefficient and will not move Wisconsin one step closer to achieving its goals for increasing the educational level of our population. At the same time, keeping tuition low makes the University of Wisconsin subject to countercyclical pressures because low tuition requires excessive dependence on taxpayer support. This policy is countercyclical because, just when the state's revenues are likely to be constrained, the state's economy most needs the boost that education would give it. Tuition flexibility is essential for Wisconsin's economic future. Increases in financial aid must accompany any tuition system that is reflective of ability to pay or proportionate to the benefit to the investor. To this end, a strategic link between tuition increases and increases in financial aid should be enacted. A partial link was established in 2001.

Even though UW tuition is among the lowest in the Midwest, the percentage of low-income students enrolled still dropped over the past few years. In 2001-2002, the percentage of Pell Grant recipients (those with the lowest income) in the University of Wisconsin System was 19.3 percent -- down 6.6 percent from a decade earlier. There was also a 3 percent drop in Pell grant recipients in the public two-year institutions in the state, to 22.2 percent. The 4-year private colleges and universities saw a 3.8 percent drop in their Pell Grant recipients, to 21.6 percent during that same period.

The state of Wisconsin should increase funding for student aid programs to maximize participation of all Wisconsin citizens in the Knowledge Economy.

7. **Enact an Education Tax Credit.** Maximizing educational opportunity for Wisconsin citizens is clearly important, but it is not enough. Business leaders have long recognized that immigration is essential for Wisconsin to become a player in the Knowledge Economy. For example, a few years back, Metavante (formerly M&I Data), paid for 30 students from India to study at Marquette University. All but one of those students ended up employed in Wisconsin at Metavante. In other words, the corporate world already recognizes that the way to address worker shortages is immigration plus expanded investment in education.

Given the culture and the state's fiscal straits, it is not realistic to expect our elected leaders to invest Wisconsin taxpayer dollars in students (future brainworkers) from Illinois, much less from India. This is where the tripartite responsibility of government, students and their families, and the private sector for investment in education comes into play. The task, then, is to devise a politically viable incentive to promote the attraction of workers, whether they be from Illinois, India, or Iola, Wisconsin. An Education Tax Credit is the answer.

An Education Tax Credit has been introduced in the Wisconsin Legislature twice before and passed the Assembly with near unanimous support by Republicans and Democrats, only to fail to be scheduled in the state Senate. An Education Tax Credit has been endorsed not only by the Technology Council, but also by Wisconsin Manufacturers and Commerce, the University of Wisconsin System, University of Wisconsin students (United Council), the Wisconsin Association of Independent Colleges and Universities, and the Wisconsin Technical College System. As originally drafted, the legislation would provide employers a credit equal to 50 percent of tuition paid at any Wisconsin college, university, or technical college. Tuition could be paid for current or prospective employees. The credit would rise to 75 percent of tuition paid for individuals at 185 percent of poverty.

The five principal advantages of the Education Tax Credit are:

- It shifts the locus of decision making to the marketplace (the employer) rather than to academics (colleges and universities) or a governmental bureaucracy.
- It short-circuits the political obstacles to funding immigration.
- It leverages private investment in education, especially for those in low-income groups who are now shut out of the Knowledge Economy.
- It does not discriminate among associate, baccalaureate, or graduate programs.
- It involves real economic incentives and is much more likely to stimulate immigration than, for example, a new Web site or a mailing to alumni.

The State of Wisconsin should enact an Education Tax Credit to encourage more private investment in education and immigration of brainworkers to position Wisconsin to be a leader in the Knowledge Economy.

Investment capital

1. Improve upon the solid foundation of Act 255

The \$35 million in tax credits for early-stage seed investment contained in Act 255 will require \$140 million of investment in Wisconsin companies to be fully utilized. Few venture capital funds limit their investments to a single state, and the imposition of arbitrary constraints at the state border is a deterrent to investment commitments because they eliminate attractive investments from consideration. As a result, it is reasonable to expect that the funds that invest the \$140 million in Wisconsin companies will raise additional money (perhaps double that amount) and maintain the flexibility to also invest elsewhere in the region. This should act in the best interest of Wisconsin because it will enable the certified fund managers to build the co-investor relationships that will attract additional money to Wisconsin companies through syndicated transactions. However, the size of the total investment needed to make full use of the credits will test Wisconsin's capacity to raise

sufficient capital. Such fundraising will not be successful if investors believe the program will not offer long-term possibilities for credits. It will be necessary to monitor Act 255 to ensure that administrative rules allow maximum flexibility and attract a broad class of investors. In addition, investor confidence in their ability to recoup credits will be reinforced if it is made clear that a breadth of follow-on investments will be allowed, so long as they meet with basic eligibility requirements.

2. **Work with Wisconsin’s tribal nations on an investment program that would focus on technology-based companies and innovation.** This would be consistent with the stated intent of the tribal nations to diversify. It could represent a large pool of capital that could be harnessed for the good of the tribal nations – and tech-based companies.
3. **Provide adequate staff support for the SBIR-STTR program.** In the reporting period most recently completed, Wisconsin had more SBIR-STTR grants (45) than in any previous period. The state continues, however, to lag behind most states in obtaining these research-oriented grants from federal agencies such as the National Institutes of Health and the National Science Foundation. The recent departure of an SBIR-STTR expert at TechStar in the Milwaukee area raises the possibility that Wisconsin could lose some ground in a geographic location that could benefit from more federal research grants.
4. **Examine a SWIB “checkoff.”** The state should discuss with the independent State of Wisconsin Investment Board the merits of giving public employees the option of investing some limited portion of their retirement accounts in a fund that is primarily focused on investing in Wisconsin and/or Upper Midwest technology companies.
5. **Build an angel capital network.** Through the state Department of Financial Institutions, the state Department of Commerce, the Tech Council, the WIN Foundation and other partners, the state can build angel capital capacity. It can increase the amount of angel investments in Wisconsin companies by creating a sustainable umbrella organization of angel investors and networks. The project will focus around four key components:
 - Enhancing deal flow for angel investors
 - Building the capacity of angel / seed dollars available by connecting investors
 - Providing needed resources for angel networks, including start up assistance, research, due diligence, administrative services, educational and networking programs
 - Establishing metrics to strengthen data on angel investing activity

Outreach and Public Policy

1. **Adopt new taxation rules for revenue from software, intellectual property, intangible property and services.** Under current Wisconsin law, home-grown software

companies ranging from sole proprietorships to large firms face the threat of double taxation when they make sales outside Wisconsin. Wisconsin currently uses a three-factor approach to compute taxes on software and other IP companies – payroll, property and sales. By changing the rules for such “tangible personal property” to reflect the destination of the goods, Wisconsin would be joining a growing number of states that tax gross receipts from intellectual property, software and services based on the “destination state.” Minnesota, Iowa, Texas and Ohio are good examples of this trend. If the Wisconsin rules are not changed, Wisconsin-based tech companies will be doubly taxed on each sale – by Wisconsin, which will treat out-of-state sales as Wisconsin sales, and by the destination state. By moving to destination state sourcing rules, Wisconsin can shift some tax burden to out-of-state and foreign sources without losing state revenue. In fact, it may increase tax revenues. Part of this change can be accomplished through the Department of Revenue’s oversight of the administrative code. Further changes may require legislative action, but would be consistent with the state’s phase-in of the “single sales factor” approach for other sectors of the economy.

2. **Restructure existing technology tax credit programs.** Many credits go unused, especially when start-up companies aren’t profitable and cannot put the credits to work. Converting such programs to cash payments, where possible, may provide more immediate help to such firms. It would also reduce administrative burdens at the Department of Revenue and increase utilization of such programs. The chief disadvantage is political: Policymakers sometimes create tax credit programs knowing actual use will be far less than the budgeted amount. The exception could be tax credits to business that are specifically interested in creating new institutions, such as the Institute for Interdisciplinary Research. *(Please see the Technology Development section in this report.)*
3. **Consider bidding preferences for state firms.** Wisconsin should examine the pros and cons of giving some preference to Wisconsin-domiciled companies in state bidding processes if, for all practical purposes, bids by Wisconsin companies are of equal quality to vendors outside the state.
4. **Work to attract federal dollars for homeland security R&D.** The state should continue to support efforts by the Wisconsin Technology Council, the UW System and the UW-Madison, among other groups, to attract additional federal funding (\$500,000) for R&D projects, especially in classified or sensitive research that could be conducted “off-campus” by University of Wisconsin professors.
5. **Advertise the “I-Q Corridor” through signs on Wisconsin’s interstate highway system.** Over the past two years, the Tech Council has developed The “I” in the I-Q Corridor refers to the ideas, intellectual property, investment and innovation produced by Wisconsin researchers and companies who live and work along the interstate corridors that connect Chicago and the Twin Cities. The “Q” stands for quality of life, quality of education, quality of workforce and quality of environment. Other states have engaged in similar branding campaigns. The use of strategically located signs on the I-System would enhance the brand in the minds of Wisconsin citizens and visitors alike.
6. **Explore a regional tax-base sharing system.** In Minnesota, such a system has led to greater regional cooperation in the pursuit of large companies that may choose to locate

in one political jurisdiction over a neighboring jurisdiction. By enacting a formula to share the increased property taxes, all jurisdiction within a given district could benefit.

7. **Provide regulatory certainty in telecom issues:** To provide more certainty in regulatory issues affecting telecommunications companies doing business in Wisconsin, the state should seek tighter timelines on review periods by the state Public Service Commission. This could speed the introduction of new technologies and reduce the costs of providing such technologies. Such a change would be consistent with recent regulatory changes in the natural resources area. In addition, state laws governing broadband investment and the “unbundling” of services should more closely mirror those in surrounding states as well as federal requirements. Significant departures from laws in other jurisdictions could slow the deployment of broadband, especially in rural areas. To expedite improved cell phone coverage in rural Wisconsin, the state should encourage local governments streamline the approval process for installation of towers.
8. **Strengthen Wisconsin’s air connections.** The Dane County Regional Airport is seeking more non-stop connections to the southeast (Atlanta) and the west (the Los Angeles area) as a way of meeting customer demands. The state should work with airport management to help provide incentives to carriers, which are unlikely to add routes without having a support system in place. The state should also act to take advantage of improved Amtrak connections to Milwaukee’s Mitchell Field (effective early 2005) to advertise to Chicago O’Hare passengers who may otherwise be subject to delays and flight cancellations.
9. **Remain open to high-speed rail development.** One way of better linking the “I-Q Corridor” would be the addition, over time, of high-speed passenger rail linking Madison, Milwaukee and Chicago. This is a costly endeavor that must be justified by passenger loads. However, with federal investment in such a plan, a more seamless transportation system could be created.

Technology Development

1. Support creation of the Institute for Interdisciplinary Research (IIR). The IIR will initially be a virtual “think tank” focused on best practices in using technology as an economic engine for the economy of the state. It would include thought leaders from around the state familiar with technological evolution (futurists), entrepreneurialism, business organizations and operations, government, finance, law and economics. The IIR would focus on technology arising from academic and industrial laboratories in Wisconsin against the backdrop of global technological demand and evolution. It would use an interdisciplinary viewpoint and personnel to foster and promote Wisconsin’s technological revolution. This institute would advise the Tech Council on technology policy and application of limited state resources. It would also serve as a resource for the Research Centers of Excellence and the regional and statewide technology clusters.

2. Support creation of Research Centers of Excellence (RCE). RCEs may be regional or virtual and are the functioning arms and hands of the IIR. An RCE is organized around large-scale opportunities to build high-technology Wisconsin businesses. The RCE focus is applied research that transfers new, public sector science and technology to the private sector to solve unique problems of a particular industry. The RCE combines the resources of industry with the resources of the public sector. One goal is to target disruptive technologies that force changes in the competitive landscape providing an advantage to Wisconsin's leading industries.

3. Continue support for regional and statewide technology clusters. A cluster occurs when related technology-based businesses cluster in close proximity to an RCE. The technology cluster would include companies engaged in commercialization of the technology spun off from the RCE. The cluster would also include supply chain companies that provide the infrastructure needed for the technology cluster to efficiently and quickly commercialize the particular technology. Clusters are commonly regional but like RCEs can also be statewide. Various technology clusters already exist in Wisconsin. Examples include the computer software and hardware industry in the Eau Claire area and the printing industry in the southeastern part of the state. Where such clusters already exist, it may merit the establishment in the region of the cluster of an RCE to help feed and further develop the growth of the cluster.

Here is a summary of the possible structure and operation of these technology institutions, although a goal of the upcoming Science and Technology Summit would be to seek industry input on their structure and operation.

IIR. Ultimately, the IIR will be a bona fide research institute funded from a variety of sources including government grants, gifts from industry, and benefactors interested in using high technology to stimulate economic development. The institute would have endowed positions and staff sufficient to support a variety of research efforts targeted at maximizing high technology growth in Wisconsin. Once established, the IIR may also support post-doctoral fellows and graduate students and perhaps even offer advanced degrees in technology policy. As stated above, the IIR would be the research arm of the Tech Council. It would also provide needed advice and guidance to the RCEs and TCs. The institute would also act as a resource for Wisconsin public and private sector participants interested in technology policy, such as WARF, WiSys, Medical College of Wisconsin Foundation, the Marshfield Clinic Foundation, TechStar, the licensing offices of Wisconsin high technology businesses.

Until adequate funds are obtained, it is necessary that the IIR operate as a virtual center. There are Wisconsin people and businesses in the private sector that are skilled and interested in technology policy. There are also academic researchers in Wisconsin universities and colleges who are already researching issues that complement the goals of IIR. At UW-Madison for example, there is a multidisciplinary organization called Initiative for Studies in Technology Entrepreneurship (INSITE). This program was started by individuals from the sciences, law, economics, business, finance and entrepreneurialism. We propose to start off the IIR by inviting INSITE and other interested public and private sector persons to assist in further refining the goals, priorities and action steps for the IIR. Associated with these planning exercises, early activities would include a lecture series of nationally prominent futurists and thought leaders on the topic of technology development.

One early priority of the IIR is to inventory the technology strengths of Wisconsin. The creation of a Wisconsin technology database would be very helpful to the Tech Council and other policy makers in government. Another priority would be to use the database in identifying technology for use with SBIR and STTR grants with the goal of increasing the proportion of such grants awarded to Wisconsin companies.

RCE. RCEs will be located around the state. Local community and business leaders will work with the IIR to select areas of research that are most beneficial for their situation. Each RCE will focus on a significant opportunity to foster and create high technology Wisconsin businesses through the application of public sector science and technology. Transfer of public sector technology to the private sector will give private sector actors the tools and motivation to solve problems unique to those industries around which an RCE is organized. The intellectual property rights to be transferred from RCE research would be determined up front and managed jointly by industry and the technology transfer arms of the participating institutions. WARF has significant experience in developing and implementing technology transfer programs that benefit all of participants in the collaborative effort.

Examples of this already exist at the University of Wisconsin-Madison and the Medical College of Wisconsin in the medical imaging area. Both institutions have broad joint research programs with GE Health Care targeted at developing the next generation imaging technology. As these programs progress, some of the technology discovered may be more suitable to further development in a start-up company than in a large on-going corporation like GE Health Care. It is worth exploring with GE Health Care and similar companies, the incentives for sponsoring start-up companies that may either license developed technology to GE or be an acquisition target. Recently, GE Health Care has been approached regarding the establishment of a RCE targeting IT/Mass Data Storage/Communications Systems. This RCE would involve collaborations between the Medical College of Wisconsin, the University of Wisconsin-Milwaukee and the University of Wisconsin-Madison. A third RCE involves the Biotech/Genetics/Proteomics/Stem Cell fields. Strengths in these areas exist at Marshfield, Medical College of Wisconsin, University of Wisconsin-Madison and a number of small to mid-size biotechnology companies in Wisconsin.

All of Wisconsin will benefit from the work of the RCEs by furthering its economic development goals and transforming its economy into a knowledge-based, technology-driven engine for increasing wages and the standard of living. RCEs would be funded jointly by the private sector business participants and the collaborative efforts of state and local government. The investments in RCEs will be returned many times over to private industry, the RCE itself, and local and state economies. RCEs will benefit the state by: being economic development engines for local economies; attracting and retaining world-class researchers to serve companies and RCEs; attracting federal research funds; producing quality employees for local companies; and increasing incentives for companies to retain current and develop new facilities.

By leveraging the knowledge already within our state to develop synergies under the guidance of the IIR, RCEs will help drive our state's technology-based economy by applying that knowledge in a concerted, strategic manner.

Technology clusters. New clusters are the ultimate beneficiaries of the activities of the IIR and RCE. Clusters are the commercial enterprises that will create the knowledge-based jobs that provide a high standard of living to Wisconsin citizens. As stated earlier, clusters already exist at various places throughout Wisconsin. Where these clusters exist, we should consider establishing an affiliated RCE. The RCE will aid its affiliated clusters by performing the applied research that brings technology into the commercial realm. This symbiosis will create an environment for rapid prototyping of new ideas, rapid build up of resources and rapid roll out of new products. This accelerated development and commercialization cycle will enable companies within the clusters to enjoy an early-mover advantage over competitors and capture a greater share of the market.

The composition, size, and structure of each cluster will vary by industry. The establishment and development of clusters will be driven by the demands of each industry. Those demands are, in part, logistical. Consequently, clusters may be local, regional, or statewide, and may include international participants. Technology and people will move from RCEs to clusters as research becomes commercialized and the private sector enterprises need help implementing the new technology. This flow of human and intellectual capital will attract knowledge workers who seek opportunities and career advancement possibilities. Thus, the cycle of growth, innovation, and development will sustain itself and fuel growth of the high-tech economy of the future.

What is the state of Wisconsin's role?

1. Helping to establish the institutions. The state of Wisconsin has a critical role in helping start the IIR and RCEs. It is beyond doubt that market-driven, coordinated research of the type described above will accelerate the cycle of technology innovation and application and product development. Private sector institutions often fund narrow research. But those efforts will not bring together the critical mass of resources necessary to start institutions like IIR that will identify and solve technological problems to create new opportunities across industries. Narrow research efforts also will not seek coordinated applied research opportunities like those fostered in RCEs. Consequently, the state has a role as an angel investor in creating these institutions.

2. R&D tax credits. Like any good investor, the state must require exceptional return on its investments. Those returns will be realized by investment in research and development. Public support of research and development is justified by its ultimate effect on living standards. Research and development investment of the type suggested within IIR and RCEs is the major factor contributing to long-term productivity growth, which in turn enables growth of real wages. The ancillary benefits of research and development to the economy as a whole greatly exceed privately appropriable returns, leading to private underinvestment in a publicly beneficial activity.

Despite strong academic R&D rankings (No. 15 nationally), Wisconsin still ranks in the middle of the pack on per capita research and development expenditures, according to the State Science and Technology Institute. This means the level of per capita research outside of UW-Madison is substantially below the national average. Wisconsin's existing research expenditures tax credit and research facilities tax credit are both modest. Maine, for example, has substantially increased research and development incentives by implementing a Super R&D Tax Credit giving a 50 percent tax credit for expenditures that exceed 150 percent of the prior year's expenditures.

A state investment in the creation of IIR and RCEs coupled with an ambitious increase in research and development tax credits would bring substantial momentum to the development of coordinated, applied research and greater weight to the furtherance of TCs.

3. Tax credit for industry support for IIR. Industry support for both IIR and RCEs will be critical to their long-term success. IIR will eventually become funded through government grants, gifts from industry, and benefactors interested in using high technology. To incent private sector institutions to support and make direct gifts to IIR, the state should authorize an IIR Tax Credit. The credit could have a sunset provision to reflect that IIR will eventually have a more balanced source of funding via federal grants and gifts from industry and other private benefactors.

4. Increase funding for innovation and economic development grant program. This program, funded by the state and administered by the UW System, provides seed grants to enterprises seeking to perform applied research on technologies that have the potential to improve state's economy. Grants have typically ranged from \$35,000 to \$40,000. The program has been well used and it has served to leverage private funds many times greater than the initial grant. Many promising technologies do not get funded due to the programs limited resources. Increasing funding from \$1 million to \$2 million would provide significant opportunities for proponents of promising technologies to seek leverage from other sources and continue their commercialization process.