

Adventures in Higher Education Policy



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Preface

Like most graduates in science and engineering aspiring to academic careers, I viewed my undergraduate degree in electrical engineering at Yale and my doctorate in engineering science and physics as preparation for a lifelong career in teaching and research in nuclear science and engineering. Yet while this was indeed my early experience as a faculty member at the University of Michigan, this faculty career lasted only a decade, as I was caught in the maelstrom of academic administration, first as a dean, then a provost, and finally president of the University of Michigan.

To be sure, during this two-decade long sentence as an academic administrator, I continued to remain engaged in science and engineering, but increasingly at the policy level rather than as a true academician creating original research and training young scientists. In fact, my visibility as the leader of a major university quickly drew me into an array significant public policy roles, with the appointment by President Reagan to the National Science Board in 1984 (which I was later to chair) and election to the National Academy of Engineering in 1987, following by both service and chairing many of its boards and studies through the National Research Council. The visibility of these roles rapidly cascaded into other policy activities with various federal agencies (e.g., National Science Foundation, Department of Energy, Department of Education, NASA, the National Intelligence Community) and nonprofit organizations (e.g., the Brookings Institution, higher education groups such as AAU and APLU, and numerous state-based organizations).

Whether because of my experience as an academic leader, or my eroding capacity as a scientist and engineering, an increasing number of these assignments were concerned with higher education itself. For

example, even while on the National Science Board, I found myself chairing its Committee on Education and Human Resources. Although at first simply a participant as a university president in the Glion Colloquium, a “Davos-like” gathering of university leaders meeting every two years in Glion-above-Monteux in Switzerland to consider major issues in higher education, I soon found myself co-directing its activities. Other assignments in higher education policy followed rapidly, e.g., the major effort launched in the 1990s to address the serious lack of diversity on American college campuses, the Commission on the Future of Higher Education launched by the Bush administration in 2004, serving as leader of a major National Academy of Sciences assessment of the impact of information technology on higher education, a series of studies sponsored by the Association of Governing Boards on university leadership and governance, and even an occasional venture into studies aimed at taming the increasingly commercial character of big-time college sports. In addition, probably because of my Michigan background, I found myself serving on advisory boards and committees to dozens of universities both in the United States and internationally.

In fact, looking back over a career of roughly half-a-century, I suspect that roughly 80% of my activities have involved leading and/or participating in a broad array of policy studies in higher education such as teaching, research, and academic leadership. Indeed, much of my career might well be characterized as a series of adventures in higher education policy.

Hence it seemed an interesting exercise to attempt to look back over these many projects and studies to assess their impact—what was recommended, what gained traction, and what sank beneath the waves without making a ripple—i.e., to assess from this set

of case studies of policy assignments what worked and what failed. Perhaps others can learn from these experiences—what worked, what failed, and what still remains on the table to be considered once again.

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Chapter 1

Introduction

As the author approaches the half-century point of a faculty career at the University of Michigan (a true sign of my mobility impairment), it has become increasingly clear that both my activities and contribution to my institution (and, more broadly, society) has had relatively little impact through the usual faculty activities of teaching and research. To be sure, early research work in nuclear science and engineering in the 1970s did receive recognition, and textbooks written during those years still seem to be in use by many today's students, perhaps more an indication of just how stagnant the development of nuclear power has been in recent years than the lasting quality of my prose.

I suppose one might rationalize this relatively light impact on one's chosen field by explaining that within a decade of arriving as a young faculty member at Michigan, I fell into the swamp of academic administration, first as dean of engineering, then provost, and finally as president of the University itself. Needless to say, the demands of such leadership roles, both of a college with over 5,000 students and 350 faculty and then of a university with 50,000 students, 3,000 faculty, a \$3 B/y budget, and a host of unfamiliar activities such as health care and big-time college sports were certainly distractions from my earlier work (and training) in fields such as nuclear reactor analysis and thermonuclear fusion.

Of course, my visibility as both a scientist and university leader opened up doors to additional activities both while leading the University and afterwards. In 1984 I was appointed by President Reagan to the National Science Board, serving for 12 years and eventually chairing this Board, regarded as one of the nation's leading sources of science policy. In addition, my election in 1985 as a member of the National Academy of Engineering, soon led to

engagement with a large number of policy assignments with organizations such as the National Research Council, the NRC Committee on Science, Engineering, and Public Policy, the Executive Committee and Governing Board of the National Academies, as well as assignments with federal agencies such as the National Science Foundation, the National Aeronautics and Space Administration, the Departments of Energy, Education, and Commerce, and the National Intelligence Community.

My experience as a scientist, engineer, and university academic leader at the University of Michigan led to chairing a broader range of policy activities, from higher education to economic development to global affairs to national security. Indeed, looking back now, I realize that roughly 80% (40 years) of my career has been involved as much in leading a broad array of policy studies as in the more usual activities of the academy (e.g., teaching, research, and leadership). In fact, many of these activities were in the areas of higher education policy.

This is an important point—and also the reason for this book. Although familiar with higher education policy only through experience rather than formal education and training, over the past three decades, I have found myself involved in some of the most important projects involving higher education both in the United States and internationally. Hence it seemed an interesting exercise to attempt to look back over these many projects and studies in higher education policy to assess their impact—what was recommended, what gained traction, and what sank beneath the waves without making a ripple—i.e., to assess from this set of case studies of policy assignments what worked, what failed, and what remains on the shelf that might be deserving of yet another try.



Millennium Project



Chair, National Science Board



National Meetings



University of Vienna



McGill University



Berlin Rectors Meeting



Glion Colloquium, Switzerland



Cyberinfrastructure Meetings



Discovery-Innovation Meetings



Making the Case



Listening to Experts



Guess what!...

The Organization of this Report

In this report, these activities have been organized both by topic, e.g., policies shaping national higher education strategies, those addressing the challenges of particular types of universities such as research intensive institutions or public university systems and even amusing topics such as intercollegiate athletics. In several cases when policy studies of similar issues occurred over a period of time, these were pulled together. In each case, an effort is made to explain the nature of the study and its recommendations (usually quoting directly from the reports), then to add a personal assessment of impact, and finally to end each example with a few lessons learned—perhaps the most valuable contribution of this report.

Examples of Higher Education Policy Activities

National Higher Education Policy

1990s Diversity (Michigan Mandate Leadership)
 1994 Chair, NASULGC Federal Relations Committee
 1994 Direct Student Lending Act
 1995 BHEF Study with Red Poling
 1998 President, Michigan Virtual University
 1998 GUIRR-NSB Stresses on the Academy
 1998 University for 21st Century
 1999 Author, Intercollegiate Athletics
 1999 Director, UM Oberlin Kalamazoo project
 2000 NASULGC White Paper
 2000 ACE Presidency
 2000 EDARPA Letter
 2001 COSEPUP EARPA
 2005 Fixing the Fragmented University
 2005 Framing Paper for Commission on Future of American Higher Education (Spellings Commission), Department of Education
 2005 Spellings Commission Quality Subcommittee
 2005 Member, Spellings Commission, Department of Education
 2005 Member, Association of Governing Board Task Force on State of University Presidency
 2005 Member, University of California Task Force on Compensation, Accountability, and

Transparencies

2005 Member, Tulane University Post-Katrina Planning
 2005 Learn Grant Act
 2005 Diversity in Science and Technology
 2007 Member, Evolution of the Research University Project, National Research Council
 2007 Member, Association of Governing Boards, Miller Center, Public Purpose
 2010 Member, National Academies Study of Research Universities
 2010 Director, Chicago Council Higher Education Master Plan for Great Lakes States
 2010-2016 Chair, Policy and Global Affairs Division, National Academies
 2010-present: Nonresident Senior Scholar, Brookings Institution
 2011 New School Conference
 2011 Lifelong Learning Study, National Academy of Engineering
 2012 De Lange Rice Convocation JJD
 2012 Educate to Innovate, National Academy of Engineering
 2012 National Academies Report on Future of American Research University
 2013 National Academies Research University Project, Phase II, The States
 2013, National Academies Research University National Convocation
 2014, National Academies Research University Project, Phase III
 2015 AAAS Committee on National Science Policy

Economic Development

1999 Ontario Master Plan
 2003 Regional Learning Ecologies
 2004 Member, KC Project Team, Time to Get It Right
 2004 Member, Great Lakes Brookings Project
 2005 Chair, Michigan Energy Research Council
 2005 Gathering Storm
 2005 Michigan Roadmap
 2005 Time to Get It Right KC
 2005 Member, Great Lakes Brookings Study
 2006 Member, Advisory Committee, New Economy

Initiative for Michigan
 2007 Chair, Brookings Next Energy Project
 2007 Member, Chicago Council study of Regional
 Economic Development
 2007 Chicago Midwest Media Project
 2007 Michigan Roadmap Redux
 2008 Chair, Study to Assess Economic Progress of
 Greater KC
 2009 Kansas City–time-to-get-it-right-Update
 2010 Brookings Hubs of Innovation
 2010 Director, Chicago Council HE Master Plan
 2011 Midwest Master Plan Launch
 2011 Midwest Master Plan Heartland Paper

Information Technology and Cyberinfrastructure

1999 Scholarship in the Digital Age
 2001 IT and Future of Research University
 2004 IT Forum
 2003 Preparing for the Revolution
 2005 Cyberinfrastructure Advisory Committee,
 NSF
 2011 Festschrift for Dan Atkins
 2011 NSF Conference on Discovery, Learning, and
 Innovation
 2012 NSF DLI Project

International Issues

1989 UM International Center
 1992 Michigan Tree Tops Strategy for State Support
 2002 JAPAN Revised2
 2002 Nagoya Keynote Lecture
 2003 UM Co-Chair, World University Workshop
 2004 to present, Co-Director, Glion Colloquium on
 International Higher Education
 2005 Canadian Provosts
 2007 Salzburg Paradigms
 2008 Co-Chair, NSF Roundtable for Global
 Sustainability

Glion Colloquium Topics

1999_Glion_I_Challenges_Facing_HE
 2001_Glion_II_University_Governance
 2002_Glion_III_Walls_Come_Tumbling_Down

2003_Glion_IV_Reinventing_the_University
 2005_Glion_V_Universities_and_Business
 2007_Glion_VI_Globalization_of_HE
 2009_Glion_VII_Universities_and_Innovation
 2012_Glion_VIII_Global Sustainability
 2013 Glion IX Sustainability of Research University
 Paradigm

Game-Changers and Paradigm Shifts

1999 Activities of the Millennium Project
 2013: The View from the Oort Cloud
 2013: Game Changers and Paradigm Shifts
 2013: The Third Century

Intercollegiate Athletics

1990 Mainstreaming Athletics
 2003 Sports Book Epilogue

Specific Universities

1997 Georgia Tech Planning
 1997 Iowa State
 1998 Texas A&M ideas
 1999 Henry Lecture
 2002 University of Texas Harrington Program
 2003 U Missouri Strategy
 2003 Ohio State
 2003 UCLA Higher Ed Future
 2003 UNC Chapel Hill
 2003 USC Strategy
 2004 UCSC Accreditation Assessment
 2007 UC Compensation Task Force
 2002 Oberlin COHFE
 2009 Dartmouth Commencement
 2010 ASU Grand Challenges
 2010 U Hawaii Strategy
 2011 UIUC Strategy
 2011 CIC Innovation Conference

Advisory Committees

MIT
 Caltech
 Cornell University



The range of activities in higher education policy can be seen from the publications

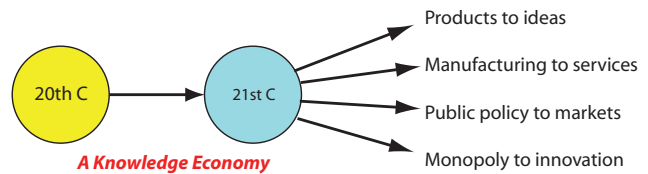
Yale University
 Georgia Tech
 U Texas
 State of Ohio
 U Missouri
 UC System
 UC Davis
 UI Chicago
 SUNY Research Foundation
 Oberlin College
 University of California Davis
 University of Illinois, Chicago
 University of Missouri, KC
 State University of New York Research Council
 Indiana University
 Michigan State University

Chapter 2

An Environmental Scan

All policy studies are clearly shaped by the context of issues characterizing the period during which they were conducted. Since this report is looking back over four decades of such efforts, it seemed appropriate to begin with an “environmental scan” to provide an appropriate framework. Indeed, such an exercise is included as the first step in many of the studies themselves.

Looking back over history, one can identify certain abrupt changes, discontinuities in the nature, the fabric, of our civilization. Clearly we live in a time of such great change, an increasingly global society, driven by the exponential growth of new knowledge and knitted together by rapidly evolving information and communication technologies. It is a time of challenge and contradiction, as an ever-increasing human population threatens global sustainability; a global, knowledge-driven economy places a new premium on technological workforce skills through phenomena such as out-sourcing and off-shoring; governments place increasing confidence in market forces to reflect public priorities even as new paradigms such as open-source software and open-content knowledge and learning challenge conventional free-market philosophies; and shifting geopolitical tensions are driven by the great disparity in wealth and power about the globe, manifested in the current threat to homeland security by terrorism. Yet it is also a time of unusual opportunity and optimism as new technologies not only improve the human condition but also enable the creation and flourishing of new communities and social institutions more capable of addressing the needs of our society.



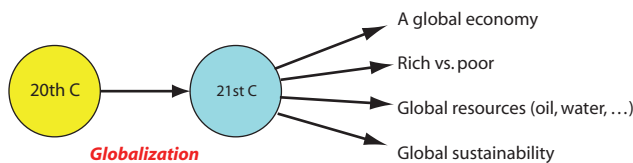
The Age of Knowledge

We are living in a time of very rapid and profound social transformation, a transition from a century in which the dominant human activity was transportation to one in which communication technology has become paramount, from economies based upon cars, planes, and trains to one dependent upon computers and networks. We are shifting from an emphasis on creating and transporting physical objects such as materials and energy to knowledge itself; from atoms to bits; from societies based upon the geopolitics of the nation-state to those based on diverse cultures and local traditions; and from a dependence on government policy to an increasing confidence in the marketplace to establish public priorities.

Today we are evolving rapidly into a post-industrial, knowledge-based society as our economies are steadily shifting from material- and labor-intensive products and processes to knowledge-intensive products and services. A radically new system for creating wealth has evolved that depends upon the creation and application of new knowledge. Unlike natural resources, such as iron and oil, which have driven earlier economic transformations, knowledge is inexhaustible. The more it is used, the more it multiplies and expands. But knowledge can be created, absorbed, and applied only by the educated mind. The knowledge economy is demanding new types of learners and creators and new forms of learning and education.

public concern and concentrated national attention on educating “the best and brightest,” the academically elite of our society. The skills race of the 21st Century will value instead the skills and knowledge of our entire workforce as a key to economic prosperity, national security, and social well-being. The National Governors Association concludes that, “The driving force behind the 21st Century economy is knowledge, and developing human capital is the best way to ensure prosperity.” Some governors are even taking the courageous step of proposing tax increases to fund new investments in higher education, research, and innovation. (NGA, 2007)

Perhaps former University of California president Clark Kerr stated it best a half-century ago: “The basic reality for the university is the widespread recognition that new knowledge is the most important factor in economic and social growth, and since that is the university’s invisible product, it may be the most powerful single institution in our culture.” (Kerr, 1963)



Globalization

Whether through travel and communication, through the arts and culture, or through the internationalization of commerce, capital, and labor, or our interconnectedness through common environmental concerns, the United States is becoming increasingly linked with the global community. The liberalization of trade and investment policies, along with the revolution in information and communications technologies, has vastly increased the flow of capital, goods, and services, dramatically changing the world and our place in it. Today globalization determines not only regional prosperity but also national and homeland security. Our economy and companies are international, spanning the globe and interdependent with other nations and other peoples.



Most policy issues are shaped by their global character.

A truly domestic United States economy has ceased to exist. It is no longer relevant to speak of the health of regional economies or the competitiveness of American industry, because we are no longer self-sufficient or self-sustaining. Our economy and many of our companies are international, spanning the globe and interdependent with other nations and other peoples. Worldwide communication networks have created an international market, not only for conventional products, but also for knowledge professionals, research, and educational services.

As the report of the National Intelligence Council’s 2020 Project has concluded, “The very magnitude and speed of change resulting from a globalizing world—apart from its precise character—will be a defining feature of the world out to 2020. During this period, China’s GNP will exceed that of all other Western economic powers except for the United States, with a projected population of 1.4 billion. India and Brazil will also likely surpass most of the European nations. Globalization—the growing interconnectedness reflected in the expanded flows of information, technology, capital, goods, services, and people throughout the world—will become an overarching mega-trend, a force so ubiquitous that it will substantially shape all other major trends in the world of 2020” (National Intelligence Council, 2004).

In his provocative book *The World Is Flat*, Tom Friedman warns that “Some three billion people who were excluded from the pre-Internet economy have now walked out onto a level playing field, from China, India, Russia, Eastern Europe, Latin American, and Central Asia. It is this convergence of new players, on a new playing field, developing new processes for horizontal collaboration, that I believe is the most important force shaping global economics and politics in the early 21st century” (Friedman, 2005). Or as Craig Barrett, CEO of Intel, puts it: “You don’t bring three billion people into the world economy overnight without huge consequences, especially from three societies like India, China, and Russia, with rich educational heritages.”

Of course, some would contend that rather than flattening, world economic activity is actually becoming more peaked about concentrations of knowledge-workers and innovation centers. Others suggest that rapidly evolving information and communications are enabling the participation of billions “at the bottom of the economic pyramid” through microeconomic transactions (Prahalad, 2005). But whether interpreted as a flattening of the global playing field or a peaking about concentrations of innovation, most nations have heard and understood the message about the imperatives of the emerging global knowledge economy. They are investing heavily and restructuring their economies to create high-skill, high-pay jobs in knowledge-intensive areas such as new technologies, financial services, trade, and professional and technical services. From Dublin to Prague, Bangalore to Shanghai, there is a growing recognition throughout the world that economic prosperity and social well being in a global knowledge-driven economy require public investment in knowledge resources. That is, regions must create and sustain a highly educated and innovative workforce and the capacity to generate and apply new knowledge, supported through policies and investments in developing human capital, technological innovation, and entrepreneurial skill.

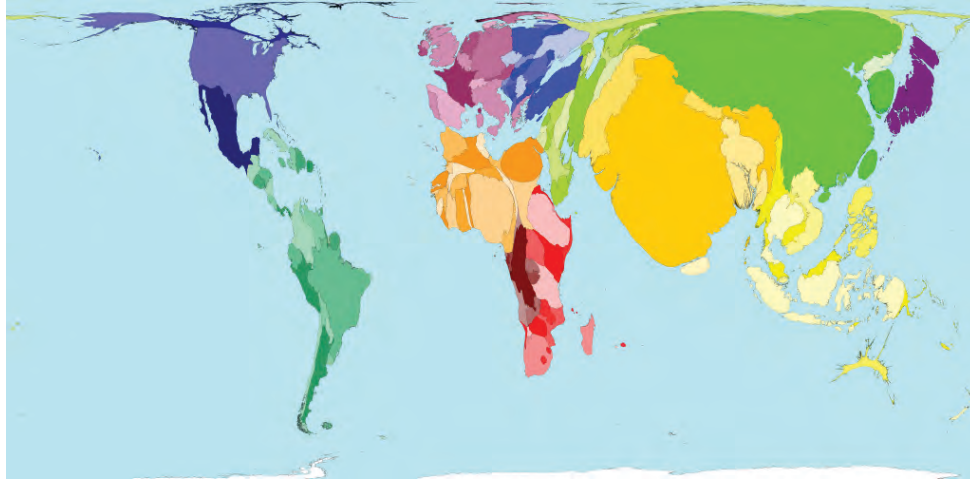
Today’s global corporation conducts its strategy, management, and operations on a global scale. The multinational organization has evolved far beyond a collection of country-based subsidiaries to become instead a globally integrated array of specialized components—procurement, management, R&D,

manufacturing, sales, etc.—distributed through the world, wherever attractive markets exist and skilled workers can be found. Geopolitical borders are of declining relevance to global business practices. Global corporations are showing less loyalty to countries of origin and more to regions in which they find new markets and do business (Palmisano, 2006).

It is this reality of the hyper-competitive, global, knowledge-driven economy of the 21st Century that is stimulating the powerful forces that will reshape the nature of our society and our knowledge institutions. Again to quote Friedman, “Information and telecommunications technologies have created a platform where intellectual work and intellectual capital can be delivered from anywhere—disaggregated, delivered, distributed, produced, and put back together again, or in current business terms and this gives an entirely new freedom to the way we do work, especially work of an intellectual nature”. Today rapidly evolving technologies and sophisticated supply chain management are allowing “global sourcing”, the ability to outsource not only traditional activities such as low-skill manufacturing, but to offshore essentially any form of knowledge work, no matter how sophisticated, to whatever part of the globe has populations most capable and cost-effective to perform it. Put another way, “The playing field is being leveled. Countries like India and China are now able to compete for global knowledge work as never before. And America had better get ready for it” (Friedman, 2005).

Clearly, today’s companies require new skills and competence that address the challenges and opportunities of globally integrated business. This has particularly serious implications for the future of engineering, since not only must engineers develop the capacity to work with multinational teams and be internationally mobile, but they also must appreciate the great diversity of cultures characterizing both the colleagues they work with and the markets they must compete in. Furthermore, the American engineer faces the additional challenge of competing globally with engineers of comparable talents and determination in economies with considerably lower wage structures.

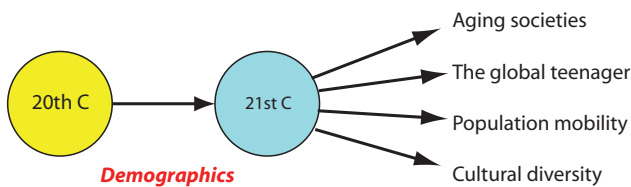
In such a global economy, it is critical that nations not only have global reach into markets abroad, but also have the capacity to harvest new ideas and



The distribution of the world's population represented by the distorted size of nations. (Worldmapper, 2005)

innovation and to attract talent from around the world. Interestingly enough, perhaps the best way to do this is to invest in flagship research universities, since these are truly international institutions. They reflect a strong international character among their students, faculty, and academic programs. These institutions also stand at the center of a world system of learning and scholarship. They are the magnets states use to attract new talent, new industry, and new resources from around the world.

Globalization requires thoughtful, interdependent and globally identified citizens. New technologies are changing modes of learning, collaboration and expression. And widespread social and political unrest compels educational institutions to think more concertedly about their role in promoting individual and civic development.



Demographics

Regions face numerous challenges in positioning themselves for prosperity in the global economy, among them changing demographics, limited resources, and cultural constraints. The populations of most developed nations in North America, Europe,

and Asia are aging rapidly where over the next decade the percentage of the population over 60 will grow to over 30% to 40%. Half of the world's population today lives in countries where fertility rates are not sufficient to replace their current populations, e.g. the average fertility rate in EU has dropped to 1.45, below the 2.1 necessary for a stable population. Aging populations, out-migration, and shrinking workforces are having an important impact, particularly in Europe, Russia, and some Asian nations such as Japan, South Korea, and Singapore. The implications are particularly serious for schools, colleges, and universities that now experience not only aging faculty, but excess capacity that could lead to possible closure.

In sharp contrast, developing nations in Asia, Africa, and Latin America are characterized by young and growing populations in which the average age is less than 20. Here the demand for education is staggering since in a knowledge economy, it is clear to all that this is the key to one's future security. Unless developed nations step forward and help address this crisis, billions of people in coming generations will be denied the education so necessary to compete in, and survive in, the knowledge economy. The resulting despair and hopelessness among the young will feed the terrorism that so threatens our world today.

Today we see a serious imbalance between educational need and educational capacity—in a sense, many of our universities are in the wrong place, where populations are aging and perhaps even declining rather than young and growing. This has already

triggered some market response, with the entry of for-profit providers of higher education (e.g., Laureate, Apollo) into providing higher education services on a global basis through acquisitions of existing institutions or distance learning technologies. It also is driving the interest in new paradigms such as the Open Education Resources movement. (Atkins, 2007) Yet, even if market forces or international development efforts are successful in addressing the urgent educational needs of the developing world, there are also concerns about whether there will be enough jobs to respond to a growing population of college graduates in many of these regions.

Growing disparities in wealth and economic opportunity, frequently intensified by regional conflict, continue to drive population migration. The flow of workers across the global economy seeking prosperity and security presents further challenges to many nations. The burden of refugees and the complexity of absorbing immigrant cultures are particularly apparent in Europe and North America. There is another demographic fact of life that need concern us: The United Nations now projects the Earth's population in the year 2050 as 9.1 billion, 50% larger than today. Which of course raises the logical question: Can we sustain a population of that magnitude on Spaceship Earth? This is an issue to which I will return momentarily.

America's population is changing rapidly today. One of the most significant demographic trends in the country is that our population is getting older; the baby boomers are approaching retirement, and the number of young adults is declining. In the U.S., there are already more people over the age of sixty-five than teenagers in this nation, and this situation will continue for decades to come. In our lifetime the United States will not again be a nation of youth, in sharp contrast to the developing nations in Asia, Africa, and Latin America, where the average age is less than 20.

Immigration is the principal reason why the United States stands apart from much of the rest of the developed world with respect to our demographic challenges. Like Europe and parts of Asia, our population is aging, but our openness to immigration will drive continued growth in our population from 300 million today to over 450 million by 2050. Today differential growth patterns and very different flows of immigration

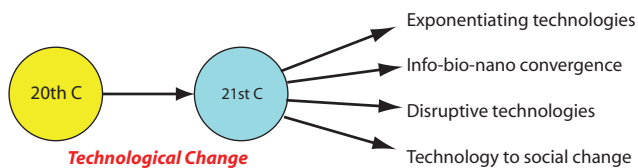
from Asia, Africa, Latin America, the Caribbean, and Mexico are transforming our population. In fact, over the past decade, immigration from Latin America and Asia contributed 53% of the growth in the United States population exceeding that provided by births (National Information Center, 2006). As it has been so many times in its past, America is once again becoming a nation of immigrants, benefiting greatly from their energy, talents, and hope, even as such mobility changes the ethnic character of our nation. By the year 2030 current projections suggest that approximately 40% of Americans will be members of racial or ethnic minority groups. By mid-century we will cease to have any single majority ethnic group. By any measure, we are evolving rapidly into a truly multicultural society with a remarkable cultural, racial, and ethnic diversity. This demographic revolution is taking place within the context of the continuing globalization of the world's economy and society that requires Americans to interact with people from every country of the world.

While such immigrants bring to America incredible energy, talents, and hope, and continue to diversify the ethnic character of our nation, this increasing diversity is complicated by social, political, and economic factors. The full participation of immigrants and other underrepresented ethnic groups continues to be hindered by the segregation and non-assimilation of minority cultures and backlash against long-accepted programs designed to achieve social equity (e.g., affirmative action in college admissions). Furthermore, since most current immigrants are arriving from developing regions with weak educational capacity, new pressures have been placed on U.S. educational systems for the remedial education of large numbers of non-English speaking students.

Largely as a consequence of immigration, the United States is rapidly becoming one of the most pluralistic, multicultural nations on earth. Those groups we refer to today as "minorities" will become the majority population of our nation in the century ahead, just as they are today throughout the world and in an increasing number of states, including California, Arizona, and Texas. The increasing diversity of the American population with respect to race, ethnicity, gender and nationality is both one of our greatest strengths and most serious challenges as a nation. A

diverse population gives us great vitality. However the challenge of increasing diversity is complicated by social and economic factors. Far from evolving toward one America, our society continues to be hindered by the segregation and non-assimilation of minority cultures. Our society is challenging in both the courts and through referendum long-accepted programs such as affirmative action and equal opportunity aimed at expanding access to higher education to underrepresented communities and diversifying our campuses and workplaces. (Economist, 2005)

In this future, the full participation of currently underrepresented minorities will be of increasing concern as we strive to realize our commitment to equity and social justice. The achievement of this objective also will be the key to the future strength and prosperity of America, since our nation cannot afford to waste the human talent presented by its minority populations. If we do not create a nation that mobilizes the talents of all of our citizens, we are destined for a diminished role in the global community and increased social turbulence. Most tragically, we will have failed to fulfill the promise of democracy upon which this nation was founded.



Technological Change

The new technologies driving such profound changes in our world—information technology, biotechnology, and nanotechnology—evolve at an exponential pace. For example, the information and communications technologies enabling the global knowledge economy double in power for a given cost every year or so, amounting to a staggering increase in capacity of 100 to 1,000 fold every decade. Computer scientists and engineers believe this trend will continue for the foreseeable future, suggesting that these technologies will become a thousand, a million, and a billion times more powerful as the decades pass. (Reed, 2005; Kuzweil, 2006)

In particular, the fundamental intellectual activities



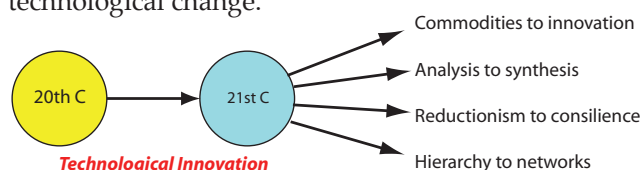
Titan supercomputer (Oak Ridge National Laboratory)

of discovery and learning enabling the knowledge economy are being transformed by the rapid evolution of information and communications technology. Although many technologies have transformed the course of human history, the pace and impact of digital information technology is unprecedented. In little more than half a century, we have moved from mammoth computer temples with the compute power of a digital wristwatch to an ecosystem of billions of microelectronic devices, linked together at nearly the speed of light, executing critical complex programs with astronomical quantities of data. Rapidly evolving digital technology has played a particularly important role in expanding our capacity to generate, distribute, and apply knowledge. It has become an indispensable platform for discovery, innovation, and learning. Information and communications services are increasingly delivered as a utility, much like electricity, from remote data centers and networks. Both hardware and software are now moving into massive network “clouds” managed by providers, such as Microsoft, Google, and Amazon. They provide not only global connectivity to organizations (e.g., corporations, governments, and universities) but also to individuals in rapidly changing forms, such as instant messaging, televideo, crowd sourcing, and affinity communities.

As Brynjolfsson and McAfee suggest, information technology is both quantitatively and qualitatively different in character since it evolves exponentially (Moore’s Law), is easily and cheaply reproduced because of its digital character, and is highly recombinant through networks and ubiquitous access. (Brynjolfsson, 2013) More generally it is becoming increasingly clear that we are approaching an inflection

point in the potential of rapidly evolving information and communications technology to transform how the scientific and engineering enterprise does knowledge work, the nature of the problems it undertakes, and the broadening of those able to participate in research activities. To quote Arden Bement, former director of the National Science Foundation, “We are entering a second revolution in information technology, one that may well usher in a new technological age that will dwarf, in sheer transformational scope and power, anything we have yet experienced in the current information age”. (Bement, 2007)

Beyond acknowledging the extraordinary and unrelenting pace of such exponentially evolving technologies, it is equally important to recognize that they are disruptive in nature. Their impact on social institutions such as corporations, governments, and learning institutions is profound, rapid, and quite unpredictable. As Clayton Christensen explains in his book, *The Innovator’s Dilemma*, while many of these new technologies are at first inadequate to displace today’s technology in existing applications, they later explosively displace the application as they enable a new way of satisfying the underlying need. (Christensen, 1997) If change is gradual, there will be time to adapt gracefully, but that is not the history of disruptive technologies. Hence organizations must work to anticipate these forces, develop appropriate strategies, and make adequate investments if they are to prosper—indeed, survive—such a period. Procrastination and inaction (not to mention ignorance and denial) are the most dangerous of all courses during a time of rapid technological change.



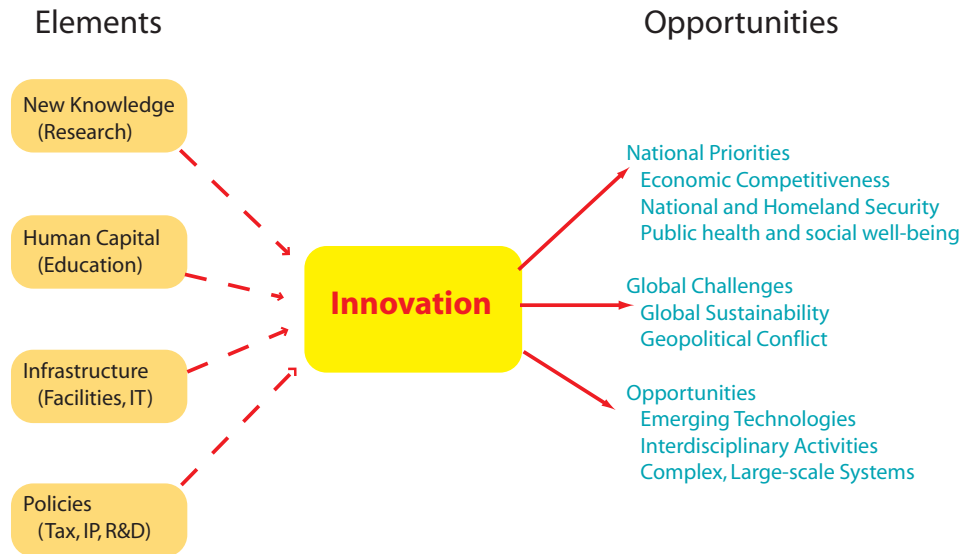
Technological Innovation

In its major study, *Rising Above the Gathering Storm* (Augustine, 2005), the National Academies of Science, Engineering, and Medicine highlight innovation as the single most important factor in determining America’s success throughout the 21st century. “American’s

challenge is to unleash its innovation capacity to drive productivity, standard of living, and leadership in global markets. At a time when macro-economic forces and financial constraints make innovation-driven growth a more urgent imperative than ever before, American businesses, government, workers, and universities face an unprecedented acceleration of global change, relentless pressure for short-term results, and fierce competition from countries that seek an innovation-driven future for themselves. For the past 25 years we have optimized our organizations for efficiency and quality. Over the next quarter century, we must optimize our entire society for innovation” (Council on Competitiveness, 2005).

Of course innovation is more than simply new technologies. It involves how business processes are integrated and managed, how services are delivered, how public policies are formulated, and how markets and more broadly society benefit (Lynn, 2007). However it is also the case that in a global, knowledge-driven economy, technological innovation—the transformation of new knowledge into products, processes, and services of value to society—is critical to competitiveness, long-term productivity growth, and an improved quality of life. The National Intelligence Council’s 2020 Project concludes, “the greatest benefits of globalization will accrue to countries and groups that can access and adopt new technologies” (National Intelligence Council, 2004). This study notes that China and India are well positioned to become technology leaders, and even the poorest countries will be able to leverage prolific, cheap technologies to fuel—although at a slower rate—their own development. It also warns that this transition will not be painless and will hit the middle classes of the developed world in particular, bringing more rapid job turnover and requiring professional retooling. Moreover, future technology trends will be marked not only by accelerating advancements in individual technologies but also by a force-multiplying convergence of the technologies, information, biological, materials, and nanotechnologies that have the potential to revolutionize all dimensions of life.

In summary, the 2020 Project warns that “A nation’s or region’s level of technological achievement generally will be defined in terms of its investment in integrating and applying the new globally available



The role of technological innovation in the knowledge economy

technologies—whether the technologies are acquired through a country’s own basic research or from technology leaders. Nations that remain behind in adopting technologies are likely to be those that have failed to pursue policies that support application of new technologies—such as good governance, universal education, and market reforms—and not solely because they are poor.” (NIC, 2004)

This has been reinforced by a recent study by the National Academy of Engineering that concludes, “American success has been based on the creativity, ingenuity, and courage of innovators, and innovation that will continue to be critical to American success in the twenty-first century. As a world superpower with the largest and richest market, the United States has consistently set the standard for technological advances, both creating innovations and absorbing innovations created elsewhere” (Duderstadt, 2005).

It is certainly true that many of the characteristics of our nation that have made the United States such a leader in innovation and economic renewal remain strong: a dynamic free society that is continually renewed through immigration; the quality of American intellectual property protection and the most flexible labor laws in the world, the best regulated and most efficient capital markets in the world for taking new ideas and turning them into products and services, open trade and open borders (at least relative to most other nations), and universities and research laboratories that

are the envy of the world. If all of this remained in place, strong and healthy, the United States would continue to remain prosperous and secure, even in the face of an intensely competitive global knowledge economy. We would continue to churn out the knowledge workers, the ideas and innovation, and the products and services (even if partially outsourced) that would dominate the global marketplace.

But today many nations are investing heavily in the foundations of modern innovation systems, including research facilities and infrastructure and a strong technical workforce. Unfortunately, the United States has failed to give such investments the priority they deserve in recent years. The changing nature of the international economy, characterized by intense competition coexisting with broad-based collaboration and global supply chains and manifested in unprecedented U.S. trade deficits, underscores long-standing weaknesses in the nation’s investment in the key ingredients of technological innovation: new knowledge (research), human capital (education), and infrastructure (educational institutions, laboratories, cyberinfrastructure). Well-documented and disturbing trends include: skewing of the nation’s research priorities away from engineering and physical sciences and toward the life sciences; erosion of the engineering research infrastructure; a relative decline in the interest and aptitude of American students for pursuing education and training in engineering and

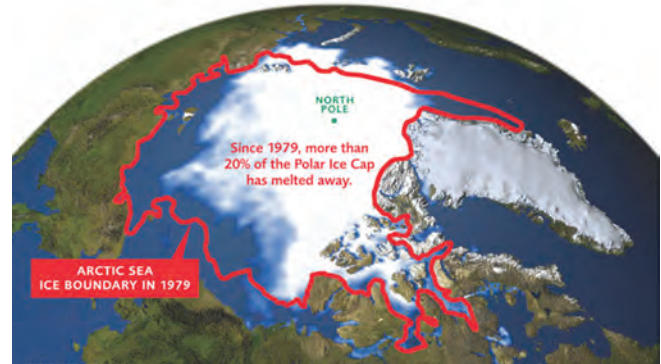
other technical fields; and growing uncertainty about our ability to attract and retain gifted science and engineering students from abroad at a time when foreign nationals constitute a large and productive fraction of the U.S. R&D workforce.

Tomorrow's Possibilities

Global Sustainability

While history has always been characterized by periods of both change and stability – war and peace, intellectual progress and decadence, economic prosperity and contraction – today the pace and magnitude of such changes have intensified, driven by the powerful forces of globalization, changing demographics, rapidly evolving technologies and the expanded flows of information, technology, capital, goods, services and people worldwide. Economies are pushing the human exploitation of the Earth's environment to the limits; the military capacity of the great powers could destroy the world population many times over, business corporations have become so large that they can influence national policies, the financial sector has become so complex and unstable that it has the capacity to trigger global economic catastrophes in an instant, and corrupted regimes leading to failed states still appear in all parts of the world. Many believe that the impact of human activities, ever more intense, globally distributed and interconnected, threatens the very sustainability of humankind on Earth, at least in terms that we currently understand and enjoy.

While the fruits of development and modernity are indisputable, the negative consequences of these recent developments appear to be increasingly serious. For example, there is compelling evidence that the growing population and invasive activities of humankind are now altering the fragile balance of our planet. The concerns are multiplying in number and intensifying in severity: the destruction of forests, wetlands and other natural habitats by human activities, the extinction of millions of species and the loss of biodiversity; the buildup of greenhouse gases and their impact on global climates; the pollution of our air, water and land. We must find new ways to provide for a human society that presently has outstripped the limits of global



The melting of Arctic summer ice is a sign of how serious global warming has become.

sustainability.

So, too, the magnitude, complexity, and interdependence (not to mention accountability) of business practices, financial institutions, markets and government policies now threaten the stability of the global economy, as evidenced by the impact of complex financial instruments and questionable market incentives in triggering the collapse of the global financial markets that led to the "Great Recession" of 2008-2009. Again, the sustainability of current business practices, government policies and public priorities must be questioned.

Of comparable concern are the widening gaps in prosperity, health and quality of life characterizing developed, developing and underdeveloped regions. To be sure, there are some signs of optimism: a slowing population growth that may stabilize during the 21st century, technological advances such as the "green revolution" that have fed much of the world, and the rapid growth of developing economies in Asia and Latin America. Yet it is estimated that one-sixth of the world's population still live in extreme poverty, suffering from diseases such as malaria, tuberculosis, AIDS, diarrhea and others that prey on bodies weakened by chronic hunger, claiming more than 20,000 lives daily. These global needs can only be addressed by the commitment of developed nations and the implementation of technology to alleviate poverty and disease.

The world's research universities have for many years been actively addressing many of the important issues associated with global sustainability. The "green revolution" resulting from university programs in agricultural science has lifted a substantial portion of the world's population from the ravages of extreme

poverty. University scientists were the first to alert the world to the impact of human activities on the environment and climate, e.g., the impact of CFCs on atmospheric ozone depletion; the destruction of forests, wetlands and other natural habitats by human activities leading to the extinction of thousands of biological species and the loss of biodiversity; and the buildup of greenhouse gases, such as carbon dioxide and their impact on the global climate. University biomedical research has been key to dealing with global health challenges, ranging from malaria to Nile virus to AIDS, and the international character of research universities, characterized by international programs, collaboration and exchanges of students and faculty provide them with a unique global perspective.

Universities are also crucial to developing academic programs and culture to produce a new generation of thoughtful, interdependent and globally identified citizens. These institutions are evolving rapidly to accept their global responsibilities, increasingly becoming universities not only “in” the world, in the sense of operating in a global marketplace of people and ideas, but “of” the world, accepting the challenge of extending their public purpose to addressing global concerns. To quote from the 1999 Glion Declaration:

“The daunting complexity of the challenges that confront us would be overwhelming if we were to depend only on existing knowledge, traditional resources, and conventional approaches. But universities have the capacity to remove that dependence by the innovations they create. Universities exist to liberate the unlimited creativity of the human species and to celebrate the unbounded resilience of the human spirit. In a world of foreboding problems and looming threats, it is the high privilege of universities to nurture that creativity, to rekindle that resilience, and so provide hope for all of Earth’s peoples.” (Rhodes, 2009)

Global Poverty and Health

During the past several decades, technological advances such as the “green revolution” have lifted a substantial portion of the world’s population from the ravages of poverty. In fact, some nations once burdened by overpopulation and great poverty such as India

and China, are now viewed as economic leaders in the 21st century. Yet today there remain substantial and widening differences in the prosperity and quality of life of developed, developing, and underdeveloped regions; between the North and South Hemisphere; and within many nations (including the deplorable level of poverty tolerated in our own country).

It is estimated that roughly one-sixth of the world’s population, 1.5 billion people, still live in extreme poverty—defined by Jeffrey Sachs as “being so poor you could die tomorrow”, mostly in sub-Saharan Africa, parts of South America, and much of central Asia. Put in even starker terms, “More than 8 million people around the world die each year because they are too poor to stay alive. Malaria, tuberculosis, AIDS, diarrhea, respiratory infections, and other diseases prey on bodies weakened by chronic hunger, claiming more than 20,000 lives each day” (Sachs, 2004).

These massive global needs can only be addressed by both the commitment of developed nations and the implementation of technology to alleviate poverty and disease. The United States faces a particular challenge and responsibility in this regard. With just 5% of the world’s people, we control 25% of its wealth and produce 25% to 30% of its pollution. It is remarkable that the richest nation on earth is the lowest per capita donor of international development assistance of any industrialized country. As the noted biologist Peter Raven observes, “The United States is a small part of a very large, poor, and rapidly changing world, and we, along with everyone else, must do a better job. Globalization appears to have become an irresistible force, but we must make it participatory and humane to alleviate the suffering of the world’s poorest people and the effective disenfranchisement of many of its nations” (Raven, 2003).

Infrastructure

Engineering of the 20th century was remarkable in its capacity to meet the needs of a rapidly growing global population, building great cities, transportation networks, and economic infrastructure. To be sure, it also developed horrific weapons of mass-destruction that laid to waste entire nations and their populations in global conflict. Yet eventually rebuilding occurred,

and at least in much of the world, the infrastructure is in place to provide for societal well being and security.

Yet much of this infrastructure is aging, already inadequate to meet not simply population growth but growing economic activity. The patchwork approach used all too often to rebuild civic infrastructure e.g., electrical distribution networks, water distribution systems, roads and bridges, has created new complexities poorly understood and even more difficult to address. These infrastructure challenges are intensified by demographic trends toward urbanization, where jobs and resources are found. A recent United Nation's study notes that for the first time in human history, more people are living in cities than rural areas. Over the next 30 years, more than two billion people will be added to the population of cities in the developing world, where within the next decade urban will exceed rural populations.

When combined with the incredible strain on urban systems in developing nations caused by population concentrations in mega-cities of tens of millions or transportation networks overwhelmed by the desire for mobility, it is clear that entirely new technologies and engineering approaches are needed to build and maintain the infrastructure necessary to accommodate a global population of 8 to 10 billion while preserving the capacity of the planet to support humankind.

Clearly U.S. engineering must play a critical role in meeting the most basic needs of the world's population. New technologies are needed to address urgent needs for food, water, shelter, and education in the developing world. Yet even in our own country the increasing complexity of our society requires new levels of reliability and confidence. When levies fail in New Orleans, a bridge falls in Minneapolis, a blackout occurs in the Northeast, or a national computer network goes down under cyber attack, people become not only more aware of the impact of technology on personal safety and public health, but moreover question the competency of American engineering to design and manage such complex systems. Such failures, both unavoidable and yet predictable, diminish our ability to contribute value to society, placing a high premium on reliability and, when necessary, recovery and forthright communication.

As economic activity shifts from exploitation of

natural resources and the manufacturing of material goods to knowledge services, i.e., from atoms to bits, we will need entirely new intellectual paradigms to create value in the global knowledge economy. Just as two decades ago new methods such as total quality management and lean manufacturing reshaped our factories and companies while triggering entirely new forms of engineering, today we need to develop the new methods capable of creating innovation in a services economy characterized by extraordinarily complex global systems. The engineering profession will be challenged to develop new and more powerful approaches to design, innovation, systems integration, and entrepreneurial activities in support of the global knowledge economy (Donofrio, 2005).

Still More Possibilities

There are other possibilities that might be considered for the longer-term future. Balancing population growth in some parts of the world might be new pandemics, such as AIDS or an avian flu virus, that appear out of nowhere to ravage our species. The growing divide between rich and poor, the developed nations and the third world, the North and South hemispheres, could drive even more serious social unrest and terrorism, perhaps armed with even more terrifying weapons.

Then, too, the unrelenting—indeed, accelerating pace—of technology could benefit humankind, extending our lifespan and quality of life (although perhaps aggravating population growth in the process), meeting the world's needs for food and shelter and perhaps even energy, and enabling vastly new forms of communication, transportation, and social interaction. Perhaps we will rekindle our species' fundamental quest for exploration and expansion by resuming human spaceflight and eventually colonizing our solar system and beyond.

The acceleration of technological progress has been the central feature of the past century and is likely to be even more so in the century ahead. But technology will also present new challenges that almost seem taken from the pages of science fiction. Clearly if digital technology continues to evolve at its current pace for the next decade, creating machines a thousand, a million, a billion times more powerful than those which

are so dominating our world today, then phenomena such as the emergence of machine consciousness and intelligence become very real possibilities during this century.

John von Neumann once speculated “the ever accelerating progress of technology and changes in the mode of human life gives the appearance of approaching some essential singularity in the history of the race beyond which human affairs, as we know them, could not continue.” The acceleration of technological progress has been the central feature of the past century and is likely to be even more so in the century ahead. Some futurists have even argued that we are on the edge of change comparable to the rise of human life on Earth. The precise cause of this change is the imminent creation by technology of entities with greater than human intelligence. For example, as digital technology continues to increase in power a thousand-fold each decade, at some point computers (or, more likely, large computer networks) might “awaken” with superhuman intelligence. Or biological science may provide the means to improve natural human intellect. (Kurzweil, 2005).

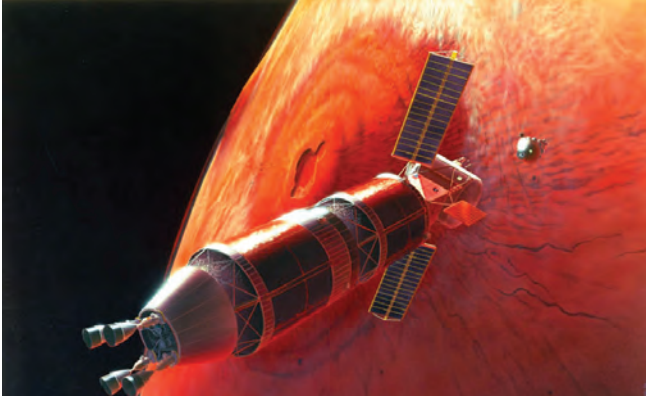
When greater-than-human intelligence drives technological evolution, that progress will be much more rapid, including possibly the creation of still more intelligent entities, on a still shorter timescale. To use Von Neumann’s terminology, at such a technological “singularity”, our old models must be discarded and a new reality appears, perhaps beyond our comprehension. We probably cannot prevent the singularity, driven as it is by humankind’s natural competitiveness and the possibilities inherent in technology, since we are likely to be the initiators. We have the freedom to establish initial conditions, make things happen in ways that are less inimical than others.

Technology could present new challenges that seem almost taken from the pages of science fiction. If digital technology continues to evolve at its current pace for the next decade, creating machines a thousand, a million, a billion times more powerful than those which are so dominating our world today, then phenomena such as the emergence of machine consciousness and intelligence become very real possibilities during this century. In fact some even suggest that we could encounter a “technological singularity,” a point at

which technology begins to accelerate so rapidly (for example, as intelligent machines develop even more intelligent machines) that we lose not only the ability to control but even to predict the future.

Clearly phenomena such as machine consciousness, contact by extraterrestrial intelligence, or cosmic extinction from a wandering asteroid are possibilities for our civilization, but just as clearly they should neither dominate our attention nor our near-term actions. Indeed, the most effective way to prepare for such unanticipated events is to make certain that our descendants are equipped with education and skills of the highest possible quality.

When confronted with these concerns—particularly those associated with the challenge of a global, knowledge-driven economy to our national prosperity and security, some suggest that the emergence of Friedman’s “flat world” is just another one of those economic challenges that arise every decade or so to stimulate American industry to bump up its competitiveness yet another notch. *Hakuna Matata*, not to worry! After all, many predicted doom and gloom in the face of Japanese competition in the 1980s. American industry found a way to adapt and compete. Just look at the difficulties Japan faces today.



Perhaps mankind will once again launch an era of space exploration....to Mars and beyond.



Or perhaps we will encounter a technological singularity such as artificial intelligence

Chapter 3

American Higher Education (The Spellings Commission)

Today the United States faces a crossroads, as a global knowledge economy demands a new level of knowledge, skills, and abilities on the part of our citizens. We have entered an era in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, national security, and social well-being. Hence the strength, prosperity, and leadership of a nation in a global knowledge economy will demand highly educated citizenry and hence upon a world-class system of postsecondary education. It will also require leading research universities, capable of discovering new knowledge, developing innovative applications of these discoveries, transferring them into society through entrepreneurial activities, to educate those capable of working at the frontiers of knowledge and the professions.

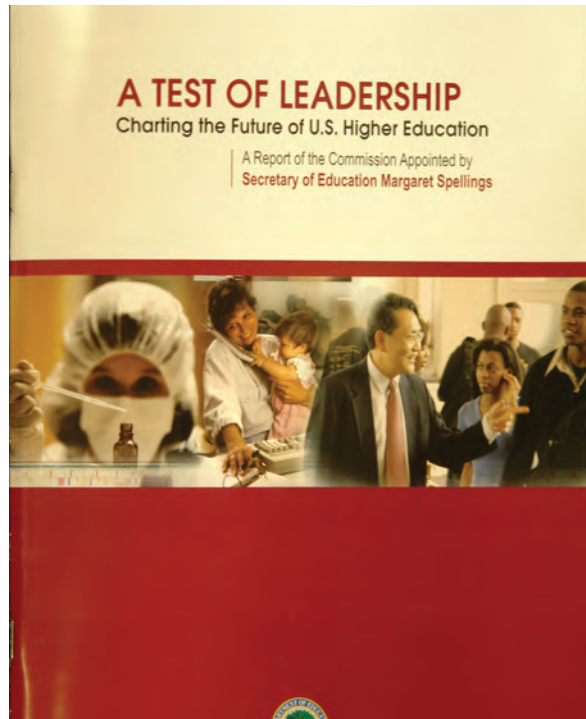
More generally, it is clear that today the United States must demand and be prepared to sustain a world-class system of postsecondary education capable of meeting the changing educational, research, and service needs of the nation. Yet this goal faces many challenges, including an increasing stratification of access to (and success in) quality higher education based on socioeconomic status, questionable achievement of acceptable student learning outcomes (including critical thinking ability, moral reasoning, communication skills, and quantitative literacy), cost containment and productivity, and the ability of institutions to adapt to changes demanded by the emerging knowledge services economy, globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs (e.g., lifelong learning), new providers (e.g., for-profit, cyber, and global universities), and new paradigms (e.g.,

competency-based educational paradigms, distance learning, open educational resources).

It was with these challenges in mind that in 2005 the U.S. Secretary of Education, Margaret Spellings, created a Commission on the Future of Higher Education in America (later known as “The Spellings Commission”). The Commission began with two premises: First the good news: “Whether America’s colleges and universities are measured by their sheer number and variety, by the increasingly open access so many citizens enjoy to their campuses, by their crucial role in advancing the frontiers of knowledge through research discoveries, or by the new forms of teaching and learning that they have pioneered to meet students’ changing needs, these postsecondary institutions have accomplished much of which they and the nation can be proud.”

But it followed this with the bad news: “Despite these achievements, however, the Commission believes U.S. higher education needs to improve in dramatic ways. As we enter the 21st century, it is no slight to the successes of American colleges and universities thus far in our history to note the unfulfilled promise that remains. Our year-long examination of the challenges facing higher education has brought us to the uneasy conclusion that the sector’s past attainments have led our nation to unwarranted complacency about its future.

“We have seen ample evidence that some form of postsecondary instruction is increasingly vital to an individual’s economic security. What we have learned over the last year makes clear that American higher education has become what, in the business world, would be called a mature enterprise: increasingly risk-averse, at times self-satisfied, and unduly expensive. It is an enterprise that has yet to address the fundamental



Report of the Spellings Commission

issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy. It has yet to successfully confront the impact of globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs and new paradigms.”

A Framework for the Commission

As the Commission was being formed, I was asked to provide a series of issues to serve as a “framing document” for its work by the chair, Charles Miller, then Regent of the University of Texas (and instrumental in developing the “No Child Left Behind” philosophy for K-12, working with Margaret Spellings when she was Commissioner of Education in Texas).

I began with a series of premises to set the stage for a deeper discussion of the challenges facing higher education in America:

- The degree to which higher education has become both a key determinant of one’s personal standard of living and quality of life in an increasingly knowledge-intensive society and a critical factor as well in

determining the nation’s economic prosperity, social well being, public health, and security.

- The provision of broad access to quality higher education as a shared responsibility among colleges and universities that seek both quality and efficiency; students and other clients of higher education who act as informed consumers; the availability of private capital; and the commitment of federal, state, and local agencies to provide adequate and equitable financial support.

- The critical role of the nation’s research universities in providing the world-class research and innovation, outstanding scientists, engineers, and other knowledge professionals, and the world-class research and learning infrastructure necessary for the nation to sustain its leadership in a global, knowledge-driven economy.

- The importance of public understanding of higher education as both an individual benefit to students through development of not only skills and knowledge but also the values and discipline of the educated mind and as a public good to society through its broader roles of producing the leaders of our governments, commerce, and professions, defending and propagating our cultural and intellectual heritage, challenging our norms and beliefs, creating and applying new knowledge to serve our society, and preserving those values and principles so essential to academic learning: the freedom of inquiry, an openness to new ideas, a commitment to rigorous study, and a love of learning.

- The capacity of higher education to adapt to changes driven by forces such as the emerging knowledge economy, globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs (e.g., lifelong learning), new providers (e.g., for-profit, cyber universities), and new paradigms (e.g., distance learning, open educational resources).

These provide the framework for a list of the most serious challenges facing higher education.



Secretary of Education Margaret Spellings

The Challenges Facing American Higher Education

1. The changing needs of the nation

"The flattening of the world is moving ahead apace, and nothing is going to stop it. What can happen is a decline in our standard of living if more Americans are not empowered and educated to participate in a world where all the knowledge centers are being connection. We have within our society all the ingredients for American individuals to thrive in such a world, but if we squander these ingredients, we will stagnate." (Thomas Friedman, 2005)

Recent reports raise serious concerns about the implications for national prosperity and security should United States leadership erode in research, innovation, and education, particularly in key strategic areas such as science and engineering and (National Academies' *Rising Above the Gathering Storm Project*, the Council on Competitiveness's National Innovation Initiative, and similar reports from the President's Council of Advisors in Science and Technology, the National Science Board, and the National Academy of Engineering).

Is the nation (government, industry, higher education) prepared to respond to the urgent recommendations of these groups? Is higher education prepared to launch the major transformations of its educational programs necessary to prepare its students for a much different world, e.g. providing them with the knowledge and skills necessary for the jobs?

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Members of the Spellings Commission

2. Quality, excellence, and leadership in higher education

"There is no shortage of things to marvel at in America's higher-education system, from its robustness in the face of external shocks to its overall excellence. However what particularly stands out is the system's flexibility and its sheer diversity...it is all too easy to mock American academia. But it is easy to lose sight of the real story: that America has the best system of higher education in the world!" (The Economist, 2005)

While some elements of American higher education are clearly world-class, such as its leading research universities, there are numerous concerns about the quality and performance of the broader higher education system (e.g., graduation rates, learning outcomes, efficiency, cost, innovation).

What is the most effective balance among public policy and market forces necessary to drive the commitment to and achievement of world-class quality throughout the American higher education system? Will the leading American research universities be able to retain their global leadership in the face of international competition from abroad and resource constraints at home (a particular concern for flagship public research universities)? To what degree is the quality of American higher education influenced by the quality of primary and secondary education and what is the responsibility of colleges and universities to address this?



Members of the Spellings Commission with Secretary of Education Spellings

3. Access to higher education

The breakpoint between those who succeed in college and those who fail is perhaps the most critical decision point in one's life. Yet today students from the top economic quartile are three times more likely to attend college and eight times more likely to enroll in selective schools than students from the lowest quartile. (McPherson and Schapiro, 2005)

There is evidence that both the access to and the distribution of students within American higher education are becoming alarmingly stratified based upon economic status, race, and ethnicity. The limited access to the elite elements of American higher education on the part of growing populations in the lowest socioeconomic quartile has serious implications for the future of the nation. Only 8% of the bottom quartile will graduate from a four-year institution, compared to 75% of the top quartile.

The changing nature of students (e.g., more diverse in all dimensions, more adult learners) and their learning experience (e.g., competency-based learning, technology-mediated interaction, asynchronous and ubiquitous learning environments) will require very significant change in both institutions and the higher education enterprise. While there are important actions that can be taken both by colleges and universities and by their patrons (state and federal government, private

support) to improve access at the margin, major gains are not likely without a sustained improvement in secondary education.

4. Affordability of higher education

The traditional model of higher education finance in the U.S. with large state subsidies to public higher education and modest means-tested grants and loans from the federal government is becoming increasingly untenable in the face of unfunded federal mandates such as Medicaid and the priorities of an aging baby boomer population. (Thomas Kane, 2003)

The rapid increase in the price of a college education, is driven in part by cost shifting from tax support to tuition in public institutions, by inefficiency and stagnant productivity gains, and by unbridled competition for the best students, faculty, resources, and reputations, is undermining public confidence in higher education.

As public support of higher education is increasingly limited by the other social priorities (health care, prisons, Social Security, national defense, homeland security), will higher education have the ability to shift to market-driven support from the private sector?

Are colleges and universities paying attention to cost containment, productivity, and efficiency in higher



Meetings at the Watergate

education? Do they have the mechanisms (including governance, leadership, and culture) to achieve these goals?

Do current financial aid programs conducted by the federal government, the states, and individual institutions adequately address the goals of increased access by those students who would otherwise be unlikely to attend, increased retention or graduation by those who might otherwise drop out because of cost, and reduced debt burdens that might otherwise prevent lower-income students from pursuing low-paying and socially beneficial areas?

Will a further shift from public funding and public policy to private sector funding and market forces erode still further higher education's character as a public good (i.e., its broader public purpose)?

5. Accountability of higher education

"The university is the custodian, not only of knowledge, but also of the values on which that knowledge depends; not only of professional skills, but of the ethical obligations that underlie those professional skills; not only of scholarly inquiry, disciplined learning and broad understanding, but also of the means that make inquiry, learning and understanding possible. In its institutional life and its professional activities, the university must reaffirm that integrity is the requirement, excellence the standard, rationality the means, community the context, civility the attitude, openness the relationship, and responsibility to society the obligations upon which its own existence and knowledge itself depend." (Glion



Meetings of the Spellings Commission

Declaration, 1999)

It is difficult to get the data to measure the accountability of higher education. For example, performance of much of the higher education enterprise is measured by graduation rates, time to degree, learning outcomes, and even literacy. There is lack of transparency in providing public information about costs, prices, and value. There is a reluctance of many higher education institutions to recognize their public purpose and respond to the changing needs of the nation.

6. The erosion in public trust and confidence in American higher education

"A significant gap has developed between the public purposes of higher education, the needs of society that should be met by universities, and the actual performance of these institutions. The growing power of market forces will, in the absence of skilled intervention in the functioning of the market, make a difficult situation worse." (Frank Newman, 2004)

For higher education to play the role it should in the nation's future prosperity and security, it must earn an adequate degree of public trust and confidence. Yet like many other social institutions, the perception of the American university today suffers from many public concerns including about, questions about values and integrity, and the eroding credibility of university

leaders.

The shift in public perception of higher education from a public good for all of society instead to primarily a private benefit to students threatens to erode support for the broader roles of the university, e.g., defending and propagating our cultural and intellectual heritage while challenging our norms and beliefs; producing the leaders of our governments, commerce, and professions; and preparing the educated citizenry necessary for a democracy.

7. Education for an Unknowable Future

“Colleges have their indispensable office, to teach elements. But they can only serve us when they aim not to drill but to create, when they gather from afar every ray of various genius to their hospitable halls, and by the concentrated fires, set the heart of their youth aflame.” (Ralph Waldo Emerson)

Global connectivity has enabled easy access to information and knowledge by a significant part of the global population. The ability to integrate that information to create value by solving problems with greater speed, reduced resources, and greater application is the new competitive discriminator for individuals, companies, communities, and nations. Yet we must also preserve traditional objectives such as ethics and moral reasoning as well as an understanding of culture and human values.

The higher education system must transform itself to develop new teaching pedagogies and educational paradigms that will ensure students have the capacity and capability not just as ones who can recount information, but as ones who can apply that information through complex critical thinking. The challenge to higher education today is no less than redefining the nature of a liberal education for a 21st century global society.

The Report of the Spellings Commission

In summary, the Commission found ample evidence to suggest two areas of particular concern: social justice and global competitiveness:

Social Justice: For close to a century now, access to higher education has been a principal – some would say the principal – means of achieving social mobility. Much of our nation’s inventiveness has been centered in colleges and universities, as has our commitment to a kind of democracy that only an educated and informed citizenry makes possible. Yet today too many Americans just aren’t getting the education that they need – and that they deserve.

Global Competitiveness: The world is becoming tougher, more competitive, less forgiving of wasted resources and squandered opportunities. In tomorrow’s world a nation’s wealth will derive from its capacity to educate, attract, and retain citizens who are able to work smarter and learn faster – making educational achievement ever more important both for individuals and for society writ large. Yet again numerous recent studies suggest that today’s American college students are not really learning what they need to learn. As Derek Bok summarized it, the education provided today by many of our colleges and universities is “not good enough and getting worse.”

To address these concerns, the Commission set as its goals the following:

1. A world-class higher-education system that creates new knowledge, contributes to economic prosperity and global competitiveness, and empowers citizens.
2. A system that is accessible to all Americans, throughout their lives.
3. Postsecondary institutions capability of providing high quality instruction while improving their efficiency in order to be more affordable to the students, taxpayers, and donors who sustain them.
4. A higher-education system that gives Americans the workplace skills they need to adapt to a rapidly changing economy.
5. Postsecondary institutions capable of adapting to a world altered by technology, changing demographics

and globalization, in which the higher-education landscape includes new providers and new paradigms, from for-profit universities to distance learning.

For much of its work the Commission held hearings across the nation to hear from many constituencies—students and parents, business and industry, leaders of college and universities, and many others with strong interest or concerns. A series of background papers were prepared by consultants on many topics such as the cost of higher education, student learning outcomes, and student financial aid, while many individuals and organizations provided their own thoughtful analysis. In early spring the commissioners moved into their own deliberations to begin to converge on key findings and possible recommendations.

However, the study suffered a bit of a setback when a group of consultants was asked to prepare an early draft of the report of the Commission without adequate consultation. This report, which bore little relation to the views of the commissioners or the hearings that had conducted, for that matter, largely reflected the highly negative and opinionated views of the consultants and unfortunately set higher education on edge when it was released prematurely.

After a minor revolt, in which the commissioners essentially repudiated the consultant draft, the Commission resumed its work and eventually came up with its own findings and recommendations, at least at the 100,000 foot level. Of course, the devil is always in the details, and the final draft of the report represented considerable negotiation and word-smithing. While all of the commissioners supported the final recommendations at the broadest level, each could point to areas of the report where there was still disagreement.

Findings of the Spellings Commission

In today's knowledge-driven society, higher education has never been more important. America's national capacity for excellence, innovation and leadership in higher education will be central to our ability to sustain economic growth and social cohesiveness. Our colleges and universities will be a key source of the human and intellectual capital needed to

increase workforce productivity and growth. They must also continue to be the major route for new generations of Americans to achieve social mobility. The benefits of higher education are significant both for individuals and for the nation as a whole. Over a lifetime, an individual with a bachelor's degree will earn an average of \$2.1 million – nearly twice as much as a worker with only a high school diploma. Furthermore, the transformation of the world economy increasingly demands a more highly educated workforce with postsecondary skills and credentials. Ninety percent of the fastest-growing jobs in the new information and service economy will require some postsecondary education.

Too few Americans prepare for, participate in, and complete higher education – especially those underserved and nontraditional groups who make up an ever-greater proportion of the population. The nation will rely on these groups as a major source of new workers as demographic shifts in the U.S. population continue.

The Commission found that access to higher education in the United States is unduly limited by the complex interplay of inadequate preparation, lack of information about college opportunities, and persistent financial barriers. While the proportion of high school graduates who immediately enter college has risen in recent decades, unfortunately, it has largely stalled at around 60 percent since the late 1990s. The national rate of college completion has also remained largely stagnant. Most important, and most worrisome, too many Americans who could benefit from postsecondary education do not continue their studies at all, whether as conventional undergraduates or as adult learners furthering their workplace skills. While there are important actions that can be taken both by colleges and universities and by their patrons (state and federal government, private support) to improve access at the margin, major gains are not likely without a sustained improvement in secondary education. Dismal high school achievement rates nationwide have barely budged in the last decade. Close to twenty-five percent of all students in public high schools do not graduate – a proportion that rises among low income, rural, and minority students.

We are especially troubled by gaps in college access for low-income Americans and ethnic and racial

minorities. Notwithstanding our nation's egalitarian principles, there is ample evidence that qualified young people from families of modest means are far less likely to go to college than their affluent peers with similar qualifications. Only 8% of the bottom quartile will graduate from a four-year institution, compared to 75% of the top quartile. To quote Chuck Vest: "In American higher education today it is better to be dumb and rich than to be smart and poor."

Shortly after our report, the Education Trust, headed by Commissioner Kati Haycock, released a scathing report labeling flagship public research universities as "Engines of Inequality" by "choking off college access and upward mobility for the poor by shifting away from the traditional need-based financial aid to merit-based programs that heavily favor affluent students, thereby abandoning their historical role as engines of social mobility through providing educational opportunities to students from low-income and minority populations." (The words were taken from a NYT editorial condemning this practice.) Nearly 40 percent of today's postsecondary students are self-supported; more than half attend school part-time; almost one-third work full-time; 27 percent have children themselves. But we are not expanding capacity across higher education to meet this demand. Just as dismaying, low-income high school graduates in the top quartile on standardized tests attend college at the same rate as high-income high school graduates in the bottom quartile on the same tests. Only 21 percent of college-qualified low-income students complete bachelor's degrees, compared with 62 percent of high-income students. (Haycock, 2010)

Our higher-education financing system is increasingly dysfunctional. State subsidies are declining; tuition is rising; and cost per student is increasing faster than inflation or family income. Affordability is directly affected by a financing system that provides limited incentives for colleges and universities to take aggressive steps to improve institutional efficiency and productivity. Public concern about rising costs may ultimately contribute to the erosion of public confidence in higher education.

There is no issue that worries the American public more about higher education than the soaring cost of attending college. Yet because students and

families only pay a portion of the actual cost of higher education, affordability is also an important public policy concern for those who are asked to fund colleges and universities, notably federal and state taxpayers, but also private donors. The rapid increase in the price of a college education, driven in part by cost shifting from tax support to tuition in public institutions, by inefficiency and stagnant productivity gains, and by unbridled competition for the best students, faculty, resources, and reputations, is undermining public confidence in higher education. From 1995 to 2005, average tuition and fees at private four-year colleges and universities rose 36 percent after adjusting for inflation. Over the same period, average tuition and fees rose 51 percent at public four-year institutions and 30 percent at community colleges.

One of the reasons tuition and fees have increased is that state funding has fallen to a 25 year low, dropping to less than 20% of the operating costs of the nation's public colleges and universities, on the average. Although the Commission strongly encouraged states to continue their historic and necessary commitment to the support of public higher education, it realized that this could prove difficult in view of the priorities of an aging baby boomer population, which will emphasize health care, retirement, safety from crime, and tax relief rather than education with their tax dollars. The bottom line is that state funding for higher education was not likely to grow enough to support enrollment demand without higher education addressing issues of efficiency, productivity, transparency, and accountability clearly and successfully.

College and university finances are complex and are made more so by accounting habits that confuse costs with revenues and obscure production costs. The lack of transparency in financing is not just a problem of public communication or metrics. It reflects a deeper problem: inadequate attention to cost measurement and cost management within institutions. Next to institutional financial aid, the greatest growth has been in administrative costs for improvements in student services. A significant obstacle to better cost controls is the fact that a large share of the cost of higher education is subsidized by public funds (local, state and federal) and by private contributions. These third-party payments tend to insulate what economists would

call “producers” – colleges and universities – from the consequences of their own spending decisions, while “consumers” – students – also lack incentives to make decisions based on their own limited resources. In addition, colleges and universities have few incentives to contain costs because prestige is often measured by resources, and managers who hold down spending risk losing their academic reputations. Another little-recognized source of cost increases is excessive state and federal regulation. Specifically, institutions of higher education must comply with more than 200 federal laws – everything from export administration regulations to the Financial Services Modernization Act.

The entire financial aid system – including federal, state, institutional, and private programs – is confusing, complex, inefficient, duplicative, and frequently does not direct aid to students who truly need it. Need-based financial aid is not keeping pace with rising tuition.

There are at least 20 separate federal programs providing direct financial aid or tax benefits to individuals seeking postsecondary education. The system is overly complicated and its multitude of programs sometimes redundant and incomprehensible to all but a few experts. This complexity has the unfortunate effect of discouraging some low-income students from even applying to college. Unmet financial need among the lowest-income families (those with family incomes below \$34,000 annually) grew by 80 percent from 1990 to 2004 at four-year institutions, compared with 7 percent for the highest-income families. The Advisory Committee on Student Financial Assistance estimates that in the first decade of the new century, financial barriers will keep nearly 2 million low- and middle-income college qualified high school graduates from attending college. Nearly three-quarters of undergraduate students in private, non-profit institutions graduate with some debt, compared with 62 percent in public institutions. According to the most recent College Board figures, median debt levels among students who graduated from four-year institutions were \$15,500 for publics and \$19,400 for private, non-profits.

At a time when we need to be increasing the quality of learning outcomes and the economic value of a college education, there are disturbing signs that

suggest we are moving in the opposite direction. As a result, the continued ability of American postsecondary institutions to produce informed and skilled citizens who are able to lead and compete in the 21st century global marketplace may soon be in question.

While U.S. higher education has long been admired internationally, our continued preeminence is no longer something we can take for granted. The rest of the world is catching up, and by some measures has already overtaken us. When compared to the 30 OECD nations, the U.S. has fallen to 9th in higher education attainment, 16th in high school graduation rates, and 24th in learning proficiency for 15 year olds. It has dropped to 12th in the fraction of its population with college degrees. It is also notable that U.S. public expenditures per student have been flat at about the OECD average, while most other nations have been increasing their investment in recent years (although strong private support keeps the U.S. at the head of the pack in 2.5% of GDP spent on higher education).

There is inadequate transparency and accountability for measuring institutional performance, which is more and more necessary to maintaining public trust in higher education. Traditionally, institutional quality is measured primarily through financial inputs and resources. In today’s environment, these measures of inputs are no longer adequate, either within individual institutions or across all of higher education. Despite increased attention to student learning results by colleges and universities and accreditation agencies, parents and students have no solid evidence, comparable across institutions, of how much students learn in colleges or whether they learn more at one college than another. Colleges and universities can also use more comparable data about the benchmarks of institutional success – student access, retention, learning and success, educational costs (including the growth in administrative expenses such as executive compensation), and productivity – to stimulate innovation and continuous improvement. Accreditation, the large and complex public-private system of federal, state and private regulators, has significant shortcomings.

There was some disagreement among the commissioners on the prospects for enhanced public support. Some believed that an aging population

will simply have higher priorities—e.g., health care, retirement, safety from crime, national security, tax relief. Others believed that in the knowledge economy, since education determines these other goals, the public will support further investment. However, most believed it was only prudent to expect that markets will increasingly drive (if not dominate) public policy.

The likelihood that the private sector will be the primary source of additional resources to meet the growing higher education needs of the nation, coupled with the highly decentralized and competitive nature of the postsecondary education enterprise, suggest that market forces will be more effective than public policy and regulation in stimulating and enabling higher education to respond to the needs of the nation. Moreover, market pressure and competition should drive not only quality and productivity but also stimulate innovation and responsiveness. The challenge therefore is to enable the postsecondary education market to function efficiently and effectively, by empowering more informed consumers of educational services, eliminating unnecessary market constraints and monopolies, and providing the additional incentives and investments necessary for innovation and change. Key in this effort will be the adoption of standards for institutional disclosure and transparency of information such as learning outcomes, student flows (unit record tracking), financial data, and other measures of institutional impact (R&D, public service) aimed at providing both consumer information and evidence of public accountability.

American higher education has taken little advantage of important innovations that would increase institutional capacity, effectiveness and productivity. Government and institutional policies created during a different era are impeding the expansion of models designed to meet the nation's workforce needs. In addition, policymakers and educators need to do more to build America's capacity to compete and innovate by investing in critical skill sets and basic research.

Institutions as well as government have failed to sustain and nurture innovation in our colleges and universities. Reports from those working at the grassroots level in fields such as teacher preparation and math and science education indicate that the results of scholarly research on teaching and learning are

A Summary of the Key Objectives
Proposed for the Future of Higher Education in America

The United States must demand and be prepared to support a world-class system of higher education capable of meeting the changing educational, research, and service needs of the nation.

American higher education must re-establish through its quality, nimbleness, innovation, efficiency, responsiveness and accountability its fundamental purpose as a public good, serving all of society, in addition to the private benefits it provides its students and other patrons.

It must sustain and enhance the world's leading system of research universities, capable of attracting and educating the world-class scientists, engineers, and other knowledge professionals while providing and applying the new knowledge necessary for national prosperity and security through basic research, development, and innovation.

The nation must address and correct those factors that have created a strong dependence of access to and success in higher education upon socioeconomic status.

The United States should embrace and achieve the objective of providing all of its citizens with universal access to lifelong learning opportunities at the post-secondary level—the appropriate goal for achieving economic prosperity, social well being, and national security in a global, knowledge-driven economy.

rarely translated into practice. Little of the significant research of the past decade in areas such as cognitive science, neurosciences, and organizational theory is making it into American classroom practice, whether at the K-12 level or in colleges and universities. With the exception of several promising practices, many of our postsecondary institutions have not embraced opportunities for innovation, from new methods of teaching and content delivery to technological advances to meeting the increasing demand for lifelong learning. Accreditation and federal and state regulations, while designed to assure quality in higher education, can sometimes impede innovation and limit the outside capital investment that is vital for expansion and capacity building. It is fundamental to U.S. economic interests to provide world-class education while simultaneously providing an efficient immigration system that welcomes highly educated individuals to our nation.

Recommendations of the Spellings Commission

While there was unanimous agreement on the general recommendations, there was more diversity of

opinion on their many details.

1. REMOVING THE BARRIERS TO ACCESS AND SUCCESS: Every student in the nation should have the opportunity to pursue postsecondary education. The Commission recommended, therefore, that the U.S. commit to an unprecedented effort to expand higher education access and success by improving student preparation and persistence, addressing non-academic barriers and providing significant increases in aid to low-income students.

While there are important actions that can be taken both by colleges and universities and by their patrons (state and federal government, private support) to improve access at the margin, major gains are not likely without a sustained improvement in secondary education. A high school degree should signify that a student is college and/or work ready. States must adopt high school curricula that prepare all students for participation in postsecondary education and should facilitate seamless integration between high school and college.

2. RESTRUCTURE FINANCIAL AID: To address the escalating cost of a college education and the fiscal realities affecting government's ability to finance higher education in the long run, it was recommended that the entire student financial aid system be restructured and new incentives put in place to improve the measurement and management of costs and institutional productivity.

Here the key is to focus financial aid at the national, state, and institutional level primarily to address need, rather than subsidize the well-to-do (as much of it does today through "merit" aid and tax benefits). The Commission proposed replacing the current maze of financial aid programs, rules and regulations with a system more in line with student needs and national priorities. That effort would require a significant increase in need-based financial aid and a complete restructuring of the current federal financial aid system. The recommendations call for consolidating programs, streamlining processes, and replacing the FAFSA with a much shorter and simpler application.

The federal government, states and institutions should significantly increase need-based student aid. To accomplish this, the present student financial

aid system should be replaced with a strategically oriented, results-driven system built on the principles of (i) increased access, or enrollment in college by those students who would not otherwise be likely to attend, including non-traditional students; (ii) increased retention, or graduation by students who might not have been able to complete college due to the cost, (iii) decreased debt burden, and (iv) eliminating structural incentives for tuition inflation. Federal grant programs should be consolidated to increase the purchasing power of the Pell Grant. Whatever restructuring of federal financial aid takes place, the Pell Grant will remain the core need-based program.

Policymakers and higher education leaders should develop, at the institutional level, new and innovative means to control costs, improve productivity, and increase the supply of higher education. At the same time, the Commission opposes the imposition of price controls. Federal and state policymakers and accrediting organizations should work to eliminate regulatory and accreditation barriers to new models in higher education that will increase supply and drive costs down. Federal and state policymakers should relieve the regulatory burden on colleges and universities by undertaking a review of the hundreds of regulations with which institutions must comply and recommend how they might be streamlined or eliminated.

3. TRANSPARENCY, ACCOUNTABILITY, AND PUBLIC PURPOSE: To meet the challenges of the 21st century, higher education must change from a system primarily based on reputation to one based on performance. The Commission urged the creation of a robust culture of accountability and transparency throughout higher education. Every one of its goals, from improving access and affordability to enhancing quality and innovation, will be more easily achieved if higher education institutions embrace and implement serious accountability measures.

To restore public trust and confidence, it suggest that higher education should emulate the capital markets through transparency and accountability that demonstrates their public purpose, e.g., agreeing on how to measure costs, prices, and values (analogous to FASB) and full public disclosure of both learning outcomes and financial performance (analogous to Sarbanes-

Oxley). To this end the Commission recommended the creation of a consumer-friendly information database on higher education with useful, reliable information on institutions, coupled with a search engine to enable students, parents, policymakers and others to weigh and rank comparative institutional performance. In addition to this new consumer-oriented database, more and better information on the quality and cost of higher education is needed by policymakers, researchers and the general public.

The faculty must be at the forefront of defining educational objectives for students and developing meaningful, evidence-based measures of their progress toward those goals, but the philanthropic community and other third-party organizations are urged to invest in the research and development of instruments measuring the intersection of institutional resources, student characteristics, and educational value-added. Furthermore, accreditation agencies should make performance outcomes, including completion rates and student learning, the core of their assessment as a priority over inputs or processes.

4. INVESTING IN INNOVATION: With too few exceptions, higher education has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing needs of a knowledge economy. The Commission recommended that America's colleges and universities embrace a culture of continuous innovation and quality improvement by developing new pedagogies, curricula, and technologies to improve learning, particularly in the area of science and mathematical literacy.

It encouraged broad federal support of innovation in higher education from multiple agencies (Departments of Education, Energy, Labor, Defense, and Commerce; the National Science Foundation; the National Institutes of Health; and the National Aeronautics and Space Administration) in order to align and coordinate federal investment of innovation in higher education. The Commission encourages the creation of incentives to promote the development of information-technology-based collaborative tools and capabilities at universities and colleges across the United States, enabling access, interaction, and sharing of educational materials from a variety of institutions, disciplines, and educational

**A Summary of the Key Recommendations
for Higher Education in America**

- To utilize public-private partnerships to unleash and shape market forces to drive world-class quality, performance, efficiency, and public purpose in postsecondary education.
- To support American innovation, by stimulating a more innovative culture in American colleges and universities in developing new learning paradigms, academic programs, and institutions.
- To refocus public subsidies at the state and federal level to enable access.
- To achieve better coordination within the higher education system and better alignment with K-12 and employer needs.
- To enhance and rebalance the federal support of R&D and graduate education to better serve national priorities such as economic competitiveness and national security.
- To commit the nation to providing universal access to lifelong learning opportunities.
- To retain the public good nature of American higher education by re-earning the public trust and confidence necessary for it to serve its public purposes

perspectives. Both commercial development and new collaborative paradigms such as open source, open content, and open learning will be important in building the next generation learning environments for the knowledge economy.

5. LIFELONG LEARNING: America must ensure that our citizens have access to high quality and affordable educational, learning, and training opportunities throughout their lives. The Commission recommended the development of a national strategy for lifelong learning that helps all citizens understand the importance of preparing for and participating in higher education throughout their lives.

Just as in earlier critical moments in our nation's history when federal initiatives expanded the role of education, e.g. the Land Grant Acts in the 19th century to provide higher education to the working class, universal access to secondary education in the early 20th century, and the G. I. Bill enabling the college education of the returning veterans of World War II, today a major expansion of educational opportunity could have extraordinary impact on the future of the nation. The Commission believes it is time for the United States to take bold action, completing in a sense the series of these earlier federal education initiatives, by providing all American citizens with universal access to lifelong learning opportunities, thereby enabling participation

in the world's most advanced knowledge and learning society. The Secretary of Education, in partnership with state and other federal agencies, should develop a national strategy to develop such an effort.

6. RESPONDING TO THE IMPERATIVES OF A GLOBAL, KNOWLEDGE ECONOMY: The United States must ensure the capacity of its universities to achieve global leadership in key strategic areas such as science, engineering, medicine, and other knowledge-intensive professions. We recommend increased federal investment in areas critical to our nation's global competitiveness and a renewed commitment to attract the best and brightest minds from across the nation and around the world to lead the next wave of American innovation.

The Commission supports increasing federal and state investment in education and research in critical areas such as the STEM fields, teaching, nursing, biomedicine, and other professions along the lines recommended by the American Competitiveness Initiative, Rising Above the Gathering Storm, and the National Innovation Initiative. Moreover, in an effort to retain the best and brightest students and professionals from around the world, the federal government must address immigration policies specifically aimed at international students. It recommended that these international students who graduate with an advanced STEM degree from a U.S. college or university should have an expedited path to an employer-sponsored green card and also be exempted from the numerical cap for green cards.

To summarize these recommendations:

1. Demand (and assist) K-12 education in preparing every student for post-secondary education.
2. Refocus federal, state, and institutional financial aid programs on need-based aid.
3. Disclosure and transparency requirements.
4. Stimulate more innovation in higher education.
5. Make a national commitment to lifelong learning.
6. Endorse other major federal initiatives aimed at creating a knowledge economy.

The Quality Subcommittee of the Spellings Commission

Much of the work of the Commission occurred through various subcommittees, comprised of a subset of Commission members and staffed by the Department of Education. Of particular importance here was the work of the Subcommittee on Quality in American Higher education. (Membership: James Hunt, former Governor of NC; Rick Stephens, Senior VP, Boeing; Nicholas Donofrio, Executive VP, IBM; Robert Mendenhall, President, Western Governors University; Charles Vest, President, MIT; James Duderstadt, President Emeritus, University of Michigan, Chair) Although the conclusions of this subcommittee were similar in many ways to those of the full Commission, there were some significant differences. Like the Commission's Report, the Quality Subcommittee agreed with the goals of demanding, building, and sustaining a truly world-class system of higher education by achieving an optimum balance between market forces and public policy; addressing those factors that have created a strong dependence of access and success in higher education upon socioeconomic status; shifting the education paradigm to stress the critical thinking and lifelong learning skills necessary to cope with uncertainty and change; stressing the importance of measuring, characterizing, and coordinating the activities of the postsecondary education enterprise in the United States; stimulating and sustaining the knowledge creation role of higher education (research and innovation); and engaging with the public to re-establish an adequate understanding of the public purpose of higher education in America while earning its understanding, trust, and confidence through bold initiatives aimed at addressing public concerns.

Yet it added to these one more objective. Today the United States faces a crossroads, as a global knowledge economy demands a new level of knowledge, skills, and abilities on the part of our citizens. Just as in earlier critical moments in our nation's history when federal initiatives expanded the role of education, e.g. the Land Grant Acts in the 19th century to provide higher education to the working class, universal access to secondary education in the early 20th century, and the G. I. Bill enabling the college education of the

returning veterans of World War II, today a major expansion of educational opportunity could have extraordinary impact on the future of the nation. The Commission believes it is time for the United States to take bold action, completing in a sense the series of these earlier federal education initiatives, by providing all American citizens with universal access to lifelong learning opportunities, thereby enabling participation in the world's most advanced knowledge and learning society. Most important, our group recommended the following statement for the Commission:

The Commission recommends that the nation accept a responsibility as a democratic society to enable all of its citizens to take advantage of the educational, learning, and training opportunities they need and deserve, throughout their lives, thereby enabling both individuals and the nation itself to prosper in an ever more competitive global economy. While the ability to take advantage of educational opportunity always depends on the need, aptitude, aspirations, and motivation of the student, it should not depend on one's socioeconomic status. Access to lifelong learning opportunities should be a right for all rather than a privilege for the few if the nation is to achieve prosperity, security, and social well-being in the global, knowledge- and value-based economy of the 21st century.

The Issues

The Quality Committee began by pulling together a list of issues that frame the development of more ambitious goals and actions:

1. We have entered an era in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, national security, and social well-being. Hence the strength, prosperity, and leadership of a nation in a global knowledge economy will demand highly educated workforce and hence upon a world-class system of postsecondary education. An increasingly technology-dependent nation will require as well world-class research universities, capable of discovering new knowledge, developing innovative applications of these discoveries through entrepreneurial activities,

and educating those capable of working at the frontiers of knowledge and the professions.

2. The core competency of the American economy is its capacity to innovate. While the characteristics of the American culture—a diverse population, democratic values, free-market practices, a predictable legal system—provide a fertile environment for innovation, history has shown that significant public and private investment is necessary to produce the key ingredients of innovation: new knowledge (research), world-class human capital (education), infrastructure (institutions, facilities, networks), and policies (tax, investment, intellectual property). And, of course, the capacity to innovate depends on more than technological leadership, as the impact of American arts and culture and the broad nature of liberal arts education have clearly demonstrated.

3. Education has become a key determinant of one's personal standard of living and quality of life. The breakpoint between those who succeed in college and those who fail is perhaps the most critical decision point in one's life! In today's knowledge economy, it has become the responsibility of democratic societies to provide all of their citizens with the educational and learning opportunities they need, throughout their lives, whenever, wherever, and however they need it, at high quality and at affordable costs.

4. Many studies have revealed the degree to which access to higher education in America has become increasingly stratified according to student financial circumstances, thereby undercutting the fundamental principles of equity in providing educational opportunities for a democratic nation. A key public policy issue is how public funds for higher education should be allocated among students from differing socioeconomic circumstances and among institutions of differing missions. Today a very significant fraction of public funds, whether allocated directly to public institutions to enable low tuition, through state and federal financial aid programs, or indirectly through tax policy go primarily to benefit affluent students with modest economic needs, at a time when close to a quarter of Americans are disproportionately and

severely deprived of higher education opportunities, particularly at our best colleges and universities.

5. The current labyrinth of federal, state, and institutional financial aid programs has evolved over the years more as a consequence of the political process than any defined purpose or accountability with respect to impact or efficiency in achieving student access or success in higher education. There has been inadequate effort to integrate and restructure the system into a cohesive policy-driven program, despite the obvious benefits and cost savings. As a consequence, while the current system does benefit affluent students, the lending industry, and political objectives, it is both extraordinarily inefficient and ineffective with respect to key objectives such as higher education access, retention, and debt burden. It needs to be replaced with a strategically-oriented, results-driven, and greatly simplified program of grants, loans, and tax benefits that demonstrably works to serve clearly-articulated goals.

6. While American research universities, both individually and as a group, are clearly the best in the world, they face considerable challenges both because of increasing competition for the best students and faculty from abroad and because of inadequate federal and state investment in basic research and facilities (particularly in the physical sciences and engineering.) For example, over the past three decades, federal support of research and development has declined from 2% to less than 0.8% of GDP. Furthermore, the highly skewed nature of the federal research portfolio, in which 62% of campus-based research is now in the biomedical sciences, threatens the long-standing national leadership in key areas of physical science and engineering (e.g., computer science, nanotechnology, engineering systems) and the national priorities based on these technologies (e.g., national defense, economic competitiveness, public health).

7. Furthermore, there are growing concerns about the nation's supply of scientists, engineers, and other knowledge-intensive professionals both because of declining student interest (due in part to the weakness of K-12 education, the obsolete nature of university

science curricula, and inadequate support of graduate education), anticipated retirements, and declining immigration (due to visa restrictions) at a time when other nations are rapidly increasing human capital in these areas.

8. While some elements of American higher education are clearly world-class, such as its research universities, we should be less sanguine about the quality and performance of our total postsecondary education enterprise. As noted earlier in this report, there are numerous valid concerns about student access, affordability, quality, performance, and responsiveness of various elements of postsecondary education in America that could threaten its capacity to serve the needs of the nation. Furthermore, many of the best of America's research universities are characterized by complacency engendered by past reputation that could erode future innovation and excellence.

9. Too much of American postsecondary education is not well positioned to meet the changing needs of the nation. American higher education is a mature industry that has become increasingly risk adverse, frequently complacent, not very nimble, and increasingly expensive. It is an enterprise that has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy.

10. Public policy alone is unlikely to be effective in stimulating higher education to become more responsive to national needs. Public funds at both the state and federal level will be limited for at least a generation by the priority given the needs of an aging population, national security, and tax relief, and will likely be insufficient to meet the growing need for lifelong access to postsecondary education for the majority of our population. Traditional policy tools such as regulation have proven relatively ineffective in driving substantive change in the American higher education system.

11. Unlike most other nations, American higher education is supported by a comparable balance of public and private resources (roughly 45% public

and 55% private). While public funds are likely to be constrained, the resources available in the private sector through capital markets and intergenerational wealth transfer will be very substantial, likely intensifying even further the market forces on colleges, universities, and other elements of the postsecondary education sector.

12. History has demonstrated that change in education is driven far more effectively by incentives and opportunities than by regulation (e.g., the Land-Grant Acts, the G. I. Bill, the Vannevar Bush government-university research partnership, and the National Defense Education Act). Hence it is likely that limited incentives coupled with strong institutional flexibility to respond to market forces are far more likely to achieve systemic change in higher education, aligning it better with national need, than top-down regulation.

13. More specifically, the likelihood that the private sector will be an essential source of additional resources to meet the growing higher education needs of the nation (already at almost 55%) coupled with the highly decentralized and competitive nature of the postsecondary education enterprise suggest that market forces will be more effective than public policy and regulation in stimulating and enabling higher education to respond to the needs of the nation. Moreover, market pressure and competition not only provide the resources for quality, but also stimulate the innovation and build the experience. The challenge therefore is to enable the postsecondary education market to function efficiently and effectively, by empowering more informed consumers of educational services, eliminating unnecessary market constraints and monopolies, and providing the additional incentives and investments necessary for innovation and change.

14. Despite the rapidly changing needs of the nation for new educational and training programs (e.g., knowledge services) and the great progress in areas such as brain research, cognitive science, and information technology, neither universities nor the federal government invest significant resources in

R&D concerning learning, pedagogy, and curriculum development.

15. Even though it is only prudent to facilitate the ability of American postsecondary education enterprise to face the challenge and opportunity presented by strong market forces, as a nation we must resist the tendency to portray higher education primarily as a private benefit rather than a public good. Restoring public trust and confidence in higher education is essential for it to play the role our colleges and universities must play in the nation's future. This will require re-establishing its public purpose, both through the commitments of institutions and through the education and greater understanding of the American public and its leaders.

General Goals for the Quality and Leadership of American Higher Education

The Quality Committee then suggested a series of challenging goals to enhance the quality and leadership of American higher education:

1. To demand and sustain a higher education system characterized at all levels by world-class quality, nimbleness, innovation, efficiency, and the capability of providing our citizens with the higher order intellectual skills (critical thinking, moral reasoning, an appreciation of cultural and human values, commitment to lifelong learning, adaptive to change, tolerance of diversity) necessary for achieving national prosperity, security, and social well-being in a global, knowledge-driven society.

2. To sustain and enhance the world's leading system of research universities, capable of attracting and educating the world-class scientists, engineers, and other knowledge professionals while providing and applying new knowledge necessary for national prosperity and security through basic research, development, and innovation of world-class quality.

More Specific Goals

1. The nation should demand that all elements of its higher education enterprise (e.g., colleges and universities, proprietary schools, industry education training programs, and new paradigms such as distance learning and global universities) achieve world-class standards in all important areas, e.g., quality, access, learning outcomes, efficiency, and relevance. While setting quantitative objectives for such a highly decentralized enterprise runs the risks of creating unrealistic expectations, it is important to acknowledge and strive to improve performance in those metrics that will be used in international benchmarks (e.g., fraction of secondary school students continuing on to college, graduation rates of enrolled students, fraction of the population achieving various degree levels, learning outcomes including literacy and higher order cognitive processes, the cost of education relative to GDP per capita, and return on investments in higher education in earning capacity and economic impact).

2. The nation must address and correct those factors that have created a strong dependence of access and success in higher education upon socioeconomic status. America should aspire to the ideal where family income is nearly irrelevant to the ability of a student to attend the college or university best matched to his or her talents, objectives, and motivation.

3. While colleges and universities should be responsive to the projected needs of students, their employers, and the nation, it is essential that they should also strive to prepare their graduates for the unknown challenges of careers and citizenship of tomorrow by providing the higher order intellectual skills necessary to cope with a future of continual yet unpredictable change (e.g., critical thinking ability, a commitment to lifelong learning, the ability to adapt to change, and the capacity to thrive in a world of increasing diversity).

4. Colleges and universities should develop and demonstrate the ability (through the necessary changes in governance, leadership, management, and culture) to control costs, focus resources on well-defined missions, and achieve new levels of efficiency while enhancing

both quality and capacity.

5. The post-secondary enterprise should develop and demonstrate the capacity for continuous innovation and quality improvement at both the institution and enterprise level. In particular, American higher education should commit itself to developing new pedagogies, curricula, and technologies to solving major problems like the near absence of scientific and mathematical literacy among today's college generation. It should also embrace and apply to learning the rapidly growing knowledge generated areas such as neuroscience, cognitive science, and organizational sciences. This will require not only seed funding for new initiatives, but a greater tolerance for experimentation and risk taking.

6. While the United States currently has many of the leading research universities in the world, along with demonstrated leadership in key academic disciplines such as science, engineering, medicine, and other knowledge-intensive professions, sustaining this leadership in the face of growing international competition will require both sustained public and private investment and institutional change. The strength and contribution of U.S. research universities will depend on their capacity to attract the very best faculty and students from our nation and abroad while earning the public understanding, trust, and confidence in their increasingly central role in a knowledge economy.

7. While academic reputation will continue to be an important factor in driving institutional competition, of far more importance to the nation is global leadership by our entire research enterprise (including research universities, corporate R&D organizations, and national laboratories) in various academic disciplines of key strategic importance to the welfare of the nation (e.g., information technology, nanotechnology, mathematics, materials science, brain science, genomics, proteomics, and knowledge services).

8. Research universities, government, and industry should develop and implement effective mechanisms for ensuring that the new knowledge developed on the

campuses serves society through technology transfer, innovation, and entrepreneurial activities.

9. Both public and private research universities should embrace a social contract that establishes their public purpose and responsibility to society as their highest priority, enabled through a competitive spirit that strives to enhance excellence and institutional reputation.

Strategic Intent (Stretch Goals)

1. It is time to challenge American higher education to redefine the purpose and nature of a college education in today's (and tomorrow's) world and develop methods to assess whether these objectives are being achieved. This will require the development of more sophisticated tools to assess the achievement of the more abstract goals of a college education (e.g., critical thinking, communication skills, inductive/deductive reasoning, quantitative skills, cultural appreciation, systems thinking).

2. To play the role it must in America's future, higher education must continually earn a high level of public trust and confidence by doing in the future what it is not doing today. This will require the postsecondary education enterprise both to address its current challenges and demonstrate its responsiveness to public needs and concerns. It will also require a very substantial effort to build the necessary public understanding of higher education's essential role in contributing to economic prosperity, public health, national security, and social well-being, hence re-establishing higher education as a public good to all of society rather than simply a private benefit to students and their employers.

3. Earlier federal initiatives to expand access to educational opportunities have had great impact on this nation, e.g., the Land-Grant acts, universal access to secondary education, and the G.I. Bill. It is our belief that the logical goal for a 21st century global, knowledge driven economy would be universal access to lifelong learning opportunities at the post-secondary level. The nation should embrace this challenge and develop and

implement measures to achieve it.

Recommendations and Strategies

Finally, the Quality Committee provided a series of bold recommendations and strategies to achieve these goals:

It is clear that today the United States must demand and be prepared to support a world-class system of postsecondary educational institutions capable of meeting the changing educational, research, and service needs of the nation.

Yet this goal faces many challenges, including an increasing stratification of access to (and success in) quality higher education based on socioeconomic status, questionable achievement of acceptable student learning outcomes (including critical thinking ability, moral reasoning, communication skills, and quantitative literacy), cost containment and productivity, and the ability of institutions to adapt to changes demanded by the emerging knowledge services economy, globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs (e.g., lifelong learning), new providers (e.g., for-profit, cyber, and global universities), and new paradigms (e.g., competency-based educational paradigms, distance learning, open educational resources).

While there is strong evidence that American research universities continue to provide the nation with global leadership in research, advanced education, and knowledge-intensive services such as health care, technology transfer, and innovation, this leadership is threatened today by rising competition from abroad, by stagnant support of advanced education and research in key strategic areas such as physical science and engineering, and by the complacency and resistance to change of the American research university.

To address these issues, the Commission proposed a vision, identifies challenges, and suggested possible strategies in each of seven areas: quality, innovation, access, coordination, research and graduate education, lifelong learning, and public purpose.

1. Quality

The United States must demand and be prepared to support a world-class higher education system, utilizing market forces shaped by incentives, public-private partnerships, and requirements for evidence-based assessment of educational effectiveness to drive all elements of postsecondary toward higher quality, efficiency, innovation, and nimbleness.

Vision: The nation must demand that its postsecondary education enterprise (e.g., colleges and universities, proprietary schools, industry education training programs, and new paradigms such as distance learning and global universities) achieve world-class standards in all important areas, e.g., quality, learning outcomes, access, efficiency, innovation, and responsiveness to changing societal needs. While colleges and universities should be responsive to the projected needs of students, their employers, and the nation, it is also essential that they launch the major transformations of educational programs necessary to prepare students for a much different world, providing them with the knowledge and skills necessary for the jobs of tomorrow and the abilities to face future problems not yet even identified.

Challenges: While some elements of American higher education are clearly world-class, such as its research universities, the Commission is less sanguine about the quality and performance of our total postsecondary education enterprise. There are numerous valid concerns about graduation rates, time to degree, learning outcomes, performance, and responsiveness of various elements of postsecondary education in America that could threaten its capacity to serve the needs of the nation. The limited capacity of the enterprise to innovate and adapt to changing needs and conditions, coupled with the lack of transparency concerning costs, prices, and value also raise concerns about quality.

Part of the challenge is the reluctance of higher education to accept accountability for learning outcomes. Few institutions provide clear and measurable educational objectives for their academic programs. Even less effort is demand evidence-based assessment of educational effectiveness, although some

accreditation agencies are moving in this direction. While there are numerous tools available for such assessment, including comprehensive examinations, capstone courses, senior portfolio and dissertation requirements, and recent developments in testing deeper cognitive abilities (e.g., the Collegiate Learning Assessment tests developed by the RAND Corporation), there is limited incentive for faculties to develop and apply such assessment methods. Hence, current measures of academic quality tend to focus more on inputs such as student selectivity, resource expenditure, or reputation than on the value-added provided by an academic program.

Public policy alone is unlikely to be effective in stimulating higher education to become more responsive to national needs. Traditional policy tools such as regulation have proven relatively ineffective in driving substantive change in the American higher education system. Furthermore public funds at both the state and federal level may be limited for at least a generation by the priority given the needs of an aging population (Medicaid, Medicare, Social Security), national security, and tax relief and will likely be insufficient to meet the growing need for lifelong access to postsecondary education for the majority of our population. Unlike most other nations, American higher education is supported by comparable balance of public and private resources (roughly 45% public and 55% private). Although strong public support of higher education from both the states and the federal government will be essential in maintaining broad access to quality postsecondary education, the possibility of new resources available in the private sector through capital markets and intergenerational wealth transfer will likely intensify even further the market forces on colleges, universities, and other elements of the postsecondary education sector.

Beyond this, academia and government must be open to new ways of leveraging industry and private-sector resources to address national priorities. Business experience with open source, standards-based methods and service-oriented architectures could prove invaluable to universities in developing new approaches to enhancing institutional performance and standards for learning outcomes. New partnerships among higher education, business and industry, and

state and federal government should be established and sustained to achieve world-class quality in the American postsecondary education enterprise.

Yet it is also clear that if markets are allowed to dominate and reshape the higher education enterprise without constraint, some of the most important values and roles of the university will likely fall by the wayside. Creating an effective market requires thoughtfully structured strategic interventions and enlightened public policy to ensure that the market is a force supporting the broader public purposes of higher education.

Possible Strategy: In its pursuit of the vision of a world-class system of postsecondary education better aligned with national needs, the United States should rely heavily upon market forces shaped by public policy and investment and public-private sector partnerships rather than government regulation. This is consistent with our assumption of constrained public funding and the long and effective decentralization and diversity in American higher education. It is our belief that if market constraints such as unnecessary regulation at the state and federal level, monopoly and predatory practices, and inadequate consumer information are addressed, then market forces will drive institutions toward best practices in educational quality, cost containing, productivity, and innovation. Market competition within higher education should be strongly encouraged and facilitated by removing unnecessary regulation and bureaucracy at the state and federal level, challenging monopolistic practices, providing information to better educate consumers of educational services, and providing incentives for institutions to develop or adopt best practices in areas such as cost containment, productivity, the assessment of student learning outcomes, and innovative academic programs.

However for market forces to be effective in driving quality improvement, we believe it essential to challenge institutions (and their faculty) to develop clear objectives for their academic programs and then provide to the marketplace (students, parents, employers, governments, media) evidence-based assessment of how well their educational programs are performing in achieving these goals. While federally or state-

mandated use of specific assessment mechanisms such as standardized tests is unlikely to be effective because of the great diversity of the American higher education system, we do believe that the broad requirement of evidence-based assessment of educational effectiveness through processes such as accreditation could trigger not only institution-based efforts to measure learning outcomes but also stimulate the development and implementation of new assessment tools.

New partnerships among higher education, business and industry, and government will be important in developing best practices in achieving learning performance objectives, quality, and cost-effectiveness (e.g., student unit records systems to track student access and progress, consumers reports on institutional quality and performance, and more sophisticated mechanisms to measure student learning outcomes). Moreover such partnerships will be important in identifying changing educational needs (e.g., the skills required by a services economy or by globalization) and restructuring academic programs accordingly. However such a market-focused approach to the achievement of quality and responsiveness will also require enlightened public policies and investment to ensure that the market forces do not distort the broader public purposes of higher education.

More specifically, institutions should be provided with the flexibility to compete for students, faculty, and resources from both public and private sources on the basis of quality, price, and value. Consumers of educational services (students, employers, governments) should be provided with sufficient information to readily make comparisons among and between institutions (e.g., prices, benefits, job placements, quality of learning, socioeconomic distribution of students, student learning outcomes, and the scale and scope of other activities such as research and public service. Both industry and the federal government could provide assistance in collecting and distributing such information.

2. Innovation

To support American innovation, the nation's colleges and universities must embrace innovation themselves, by developing new learning pedagogies, academic paradigms,

and educational forms that are more responsive to national priorities. This will require a very substantial increase in the support of research and development associated with learning and education by the federal government and higher education institutions.

Vision: Leadership in innovation—the transformation of knowledge into products, processes, and services—is critical to competitiveness, long-term productivity growth, and the generation of wealth and hence to United States prosperity and security. Institutions of higher learning must collaborate with industry and government to create a national educational climate and culture that enables innovation to thrive. Not only is this a challenge to our colleges and universities to provide the graduates capable of innovation and adaptation to change, but it also demands that American higher education also develop and demonstrate the capacity for continuous innovation and quality improvement at both the institution and enterprise level. In fact, we believe that innovation (in the use of technology, learning paradigms, organization of learning institutions and systems, financing, and governance) will be both the strongest driver and enabler of change in higher education in the years ahead.

Challenge: There is increasing agreement that the prosperity and security of all Americans will depend on our nation's enduring and evolving capacity to learn, inspire, create, and innovate. Today American leadership in innovation is challenged not only by a global, knowledge-driven economy, but by the need for college graduates capable of applying technology, talent, and capital in new ways, with deep analytical skills and the ability to manage ambiguity, to meet business and societal demands. Here part of the challenge is the changing nature of innovation itself; it is far more open; it spans virtually all disciplines; and it is increasingly global. And it arises not in the isolated laboratory but in the marketplace, the workplace, the community, and the classroom. It requires the development of new academic disciplines such as services systems management, increasingly multidisciplinary research and instruction across the traditional disciplines, and continual learning opportunities to keep abreast of the fast-changing dynamic nature of work. Clearly,

sustaining the nation's leadership in innovation will require institutions of higher learning capable of embracing innovation as key both to their quality and capacity to serve the changing needs of our society.

Yet today many segments of American postsecondary education are currently not well positioned to meet the changing needs of the nation. Although there are bright spots of innovation, by and large American higher education is a mature industry that has become increasingly risk-adverse, and frequently complacent and ponderous. Furthermore, much of the enterprise has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy. It is not enough simply to intensify current stimuli, policies, and management strategies and make incremental improvements to organizational structures and curricula.

Changing market pressures such as the high cost of education and the educational needs of adults, coupled with the rapid evolution of information and communications technology stimulating new forms of higher education such as virtual universities, e-learning, and distributed learning models. New paradigms such as open-source and open-content, as manifested in initiatives such as Open CourseWare, the Open Knowledge Initiative, the Sakai Project, and the Google Book project, hold out the potential of providing universal access to both knowledge and higher education. Furthermore, the considerable progress in cognitive and neurosciences research over the past two decades holds great promise for very significant improvements in learning methods and productivity. Yet this will only occur with adequate investment at both the federal and institutional level in R&D concerning learning, pedagogy, technology, and curriculum development.

Possible Strategy: Working closely with business and industry, higher education must give greater priority to the support of the nation's leadership in innovation through new academic programs in areas such as services science, greater multidisciplinary instruction and research, and key involvement in regional innovation economies. To stimulate the necessary level of innovation and institutional transformation within

higher education, the federal government should launch a major interagency federal R&D program concerning learning and education, comparable in both approach and funding level to DOD's DARPA, capable of tapping the new knowledge (brain research, cognitive science, organizational science) and technologies (information, communications, and systems technology) capable of stimulating innovation in learning methods, pedagogy, and educational institutions. Key would be efforts to stimulate similar commitments on the part of colleges and universities to substantial internally funded R&D activities associated with improving learning, scholarship, and institutional performance.

To enable such innovation, an effort should be made to remove all barriers (accreditation, state and federal regulations) to experimentation in higher education in an effort to unleash an era of creativity and innovation (e.g., distributed learning, global universities, hybrid for-profit/non-profit enterprises, university-industry collaborative academies, new K-16 paradigms). Strongly encourage both public and private investment in these investments, tapping not only federal and state investment through efforts such as the American Competitiveness Initiative and new R&D programs in federal agencies, but also private investment through philanthropy and the capital markets. Provide strong incentives for propagating successful experiments (reducing regulatory barriers, public-private investments, high visibility awards and prizes, etc.).

3. Access

Access to higher education should receive the highest priority for public funding, whether through financial aid, state appropriations to colleges and universities, or tax policy (e.g., "tax expenditures"). Public funds should be targeted to those students with greatest need.

Vision: The nation and the states must address and remove those factors that have created a strong dependence of access and success in higher education upon socioeconomic status. We should aspire to the ideal where family income is nearly irrelevant to the ability of a student to attend the college or university best matched to his or her talents, objectives, and motivation.

Challenges: Education has become a key determinant of one's personal standard of living and quality of life. The breakpoint between those who succeed in college and those who fail is perhaps the most critical decision point in one's life. Yet many studies have revealed the degree to which access to higher education in America has become increasingly stratified according to student financial circumstances, thereby undercutting the fundamental principles of equity in providing educational opportunities for a democratic nation. Today even the most academically talented students in the lowest economic quartile are significantly less likely to have access to the benefits of higher education than the least qualified students in the top quartile—a situation clearly intolerable for a democratic society. Furthermore, more students are borrowing larger amounts at higher interest rates to pay for college than ever before, with debt burdens that are not only influencing student career choices (e.g., high paying rather than socially-beneficial careers) but discouraging many low income students from even attempting a college education.

Part of the challenge arises from the patchwork character of current federal, state, and institutional financial aid programs, designed more to address political objectives and benefit the commercial loan industry than address the needs of students in a strategic fashion. Here a key public policy issue is how public funds for higher education should be allocated among students from differing socioeconomic circumstances and among institutions of differing missions. Today a very significant fraction of public funds, whether allocated directly to public institutions to enable low tuition, or through state and federal financial aid programs, go primarily to benefit affluent students with modest economic needs, at a time when close to a quarter of Americans are disproportionately and severely deprived of educational opportunity at colleges and universities.

Possible Strategies: Although both the states and the federal government have many objectives in providing public funding to higher education, e.g., regional economic development, public health, national security, or, more pragmatically, voter support, the widening

gap between the educational opportunities available to affluent students and those of modest means compels the Commission to recommend that access to higher education, regardless of socioeconomic circumstance, should receive the highest priority for public funding. While the principle of low tuition in public institutions has a long-standing precedence, this subsidy of the educational costs for affluent students should not come at the expense of adequate financial aid programs for those of modest means.

Furthermore, while merit scholarship programs may be appropriate for stimulating student interest in key strategic areas (e.g., science, engineering, and mathematics), these must not come at the expense of need-based financial aid programs. Publicly funded financial aid should rely primarily on need-based rather than merit-based programs, with grants as the preferred mechanism for the lowest income quartile of students, while loans and tax benefits are the preferred mechanisms to assist students from more affluent backgrounds with access to postsecondary education and lifelong learning opportunities (“higher and further education”).

In particular, the current system of federal financial aid programs requires major overhaul—if not total replacement—to achieve a strategic program of grants, loans, and tax benefits that adequately and efficiently addresses in an accountable and transparent fashion goals such as enhanced student access, retention, and reduced student debt burden. Such a program should be strategically-oriented, results-driven, efficient in the utilization of taxpayer dollars, and demonstrably effective.

4. Coordination

Mechanisms such as a federally managed student record system and more direct involvement by colleges and universities in education at the secondary level should be used to achieve greater coordination both within the higher education system and the broader American education enterprise to better serve students and society.

Vision: Both students and the nation could be well served by a higher degree of coordination, particularly in facilitating the transition among various levels (e.g.,

K-12, community college, undergraduate, graduate, professional, lifelong learning) and elements (public, private, for-profit, corporate training) of higher education. Key to this effort will be the development of a federally managed student record system capable of statistically tracking the flow and progress of students throughout postsecondary education, as well as the development of incentives at the state and federal level for institutional coordination and cooperation among all elements of the American education sector.

Challenge: The Commission strongly agrees with the recent survey in *The Economist* that concluded, “America’s system of higher education is the best in the world. That is because there is no system!” Yet it is also the case that the absence of coordination and articulation agreements can be a serious hurdle to students attempting the transition from one education level or institution to another. While competition among institutions is important, particularly in a marketplace increasingly funded from private sources, so too is sufficient coordination to allow a smooth, transparent transitions from one stage or institution to the next in a future increasingly dependent upon lifelong learning. Put another way, postsecondary education needs to be better coordinated and integrated vertically, while preserving the strong market competition horizontally.

Furthermore, higher education needs to be far more tightly coupled to primary and secondary education. Recent studies have revealed the ill-preparedness of high school graduates for college work, along with poor success of higher education in addressing student deficiencies in written and quantitative literacy.

Possible Strategies: The federal government, working closely with the higher education community, should develop and maintain a student unit record system capable of describing the general flow of students throughout the postsecondary education enterprise. There is also a need on the part of students for more specific and confidential information about their own standing and academic progress, particularly should a lifelong education system become available. However this objective requires further study to design a system with appropriate protection of confidential

information and privacy rights.

Colleges and universities need to work closely with K-12 education, aligning high school curricula with college standards and providing feedback to prospective students about their readiness for college work. In particular, the senior year of high school (12th grade), currently regarded as an educational wasteland by many, should be used by colleges and secondary schools both to introduce advanced students to college-level work while providing the remedial education necessary to repair deficiencies in student preparation for further study. It should also be observed here that the commitment to lifelong learning (Recommendation 6) could provide yet additional opportunities for addressing the diversity in K-12 learning experiences and student learning readiness that today leads to all-too-frequent failure at the college level.

5. Research and Graduate Education

The United States should implement strategies such as the American Competitiveness Initiative proposed by the President to enable higher education to increase the talent pool and knowledge base in key strategic disciplines such as the physical sciences, mathematics, and engineering.

Vision: The United States must sustain the capacity of its research universities to achieve global leadership in key strategic areas such as science, engineering, medicine, and other knowledge-intensive professions and attract talented students and faculty from across America and around the world through adequate public and private investment and stimulating institutional innovation and change. Research universities, government, and industry should strive to create effective mechanisms for ensuring that the new knowledge developed on the campuses serves society through technology transfer, innovation, and entrepreneurial activities.

Challenges: There are growing concerns that the scientific and technological building blocks of the nation's economic leadership and national security are eroding at a time when many other nations are gathering strength. Federal support of R&D as a fraction of GDP has dropped in half over the past three

decades (from 2% to less than 0.8% of GDP), while the nation's research portfolio has become heavily skewed in favor of biomedical research at the expense of research in physical science and engineering, keys to the nation's technological strength. Numerous studies have suggested that the nation's strategic and economic security is threatened by its current course, living on incremental improvements to past developments and gradually conceding technological leadership to international competitors. Instead it is critical the United States invest in the necessary research, producing the world-class graduates, stimulating the innovation, and creating the high-skill, high-value jobs that define a prosperous nation in a knowledge-driven global economy.

Possible Strategy: The federal government must restore a level of research funding adequate to support its most urgent priorities including national defense, homeland security, health care, energy security, and economic competitiveness, with special attention directed to physical science and engineering. Federal and state governments and industry should invest in upgrading and expanding university laboratories, equipment, and information technologies and meeting other infrastructural needs of research universities such that the national capacity to conduct world-class research in key strategic disciplines is sufficient to address national priorities. Government and industry should also invest in scholarships, fellowships, curriculum development aimed at enhancing student interest in science, mathematics, engineering, and technology at all educational levels, with particular attention given to encouraging the participation of women and underrepresented minorities, while recruiting talented students from around the world.

6. Lifelong Learning

The nation should commit itself to the goal of providing universal access to lifelong learning opportunities for all citizens, thereby enabling participation in the world's most advanced knowledge society. This will not only require a significant increase in the capacity and quality of postsecondary education in America, but also the development of new types of institutions, funding mechanisms, and

public-private partnerships.

Vision: Today the United States faces a crossroads, as a global knowledge economy demands a new level of knowledge, skills, and abilities on the part of our citizens. In earlier critical moments in our nation's history federal initiatives aimed at expanding the role of education had great impact on America, e.g. the Land Grant Acts in the 19th century to provide higher education to the working class, university access to secondary education in the early 20th century, and the G. I. Bill enabling the college education of the returning veterans of World War II. Today, as our nation undergoes a transition from an industrial to a knowledge-based economy, the Commission believes it is time for the United States to take bold action, completing in a sense the series of these earlier federal education initiatives, by providing all American citizens with universal access to lifelong learning opportunities, thereby enabling participation in the world's most advanced knowledge society. The nation would accept its responsibility as a democratic society in an ever more competitive global, knowledge driven economy to provide all of its citizens with the educational, learning, and training opportunities they need, throughout their lives, whenever, wherever, and however they need it, at high quality and affordable costs, thereby enabling both individuals and the nation itself to prosper.

Challenge: The needs for lifelong learning opportunities in a knowledge society are manifold. The shelf life of education early in one's life, whether K-12 or higher education, is shrinking rapidly in face of the explosion of knowledge in many fields. Today's students and tomorrow's graduates are likely to value access to lifelong learning opportunities more highly than job security, which will be elusive in any event. They understand that in the turbulent world of a knowledge economy, characterized by outsourcing and off-shoring to a global workforce, employees are only one paycheck away from the unemployment line unless they commit to continuous learning and re-skilling to adapt to every changing work requirements. Furthermore, longer life expectancies and lengthening working careers create additional needs to refresh one's knowledge and skills through. Even today's college

graduates expect to change not simply jobs but entire careers many times throughout their lives, and at each transition point, further education will be required—additional training, short courses, degree programs, or even new professions. And, just as students increasingly understand that in a knowledge economy there is no wiser personal investment than education, many nations now accept that the development of their human capital through education must become a higher priority than other social priorities, since this is the only sure path toward prosperity, security, and social well-being in a global knowledge economy.

Of course, establishing as a national goal the universal access to lifelong learning would require not only a very considerable transformation and expansion of the existing postsecondary education enterprise, but it would also require entirely new paradigms for the conduct, organization, financing, leadership, and governance of higher education in America. For example, most of today's colleges and universities are primarily designed to serve the young—either as recent high school graduates or young adults early in their careers. Yet achieving the objective of universal access to lifelong learning would expand enormously the population of adult learners of all ages. Traditional university characteristics such as residential campuses designed primarily to socialize the young with resources such as residence halls, student unions, recreational facilities, and varsity athletics would have marginal value to adult learners with career and family priorities. Such universal lifelong learning could change dramatically the higher education marketplace, providing for-profit institutions already experienced in adult education with significant advantages. Furthermore it seems likely that the only way that such ubiquitous access can be provided to lifelong learning to adults with career and family responsibilities will be through technology-mediated distance learning.

Possible Strategies: One approach would be to utilize a combination of transportable education savings accounts and loans, perhaps indexed to future earnings much like Social Security by mandatory earmarking of a portion of an individual's earnings over their careers as a source of funds for their education. Here, in contrast to Social Security that amounts to saving over

a career for one's relatively unproductive golden years, instead one would be borrowing and investing on the front-end to enhance their personal productivity and hence prosperity throughout their lives through future education. By making such education savings accounts mandatory, again like Social Security, one would create a sense of ownership on the part of the students, thereby making it more likely that they would seek to take advantage of the educational opportunities provided by their account. A variation on this theme would be to access the capital markets by using the government (either federal or state) to borrow money at low interest rates to be loaned to students, and then provide strong tax incentives to employers to assist students in paying off these loans during employment. Note employer participation would bring another very important consumer to the table, since clearly employers (private or public) would want to demand high quality learning experiences in disciplines of importance to their enterprise if they are going to pay off the student loans of their employees.

A second approach would be an analog to the Land Grant Acts of the 19th Century that assisted the nation in evolving from an agrarian frontier society into an industrial nation. One might imagine a Learn Grant Act for the 21st Century to assist the United States in evolving still further to respond to the challenges of a global knowledge economy. It would focus on developing our most important asset, our human resources, as its top priority, along with the infrastructure necessary to sustain a knowledge-driven economy. Patterned after the Land Grant Acts, the Learn Grant Act would involve a partnership among the federal government, the states, and the higher education enterprise in which the federal government would provide assets comparable to the land grants (e.g., the funds resulting from the sale or lease of the digital spectrum), the states would commit to providing base support necessary to ensure access to postsecondary education for their populations, and higher education institutions would commit to the major transformations necessary to provide life-long learning opportunities of high quality, affordable cost, and necessary flexibility (asynchronous and ubiquitous learning), along with the other knowledge services needed by our society. However, since the growth in the learning population enabled by universal access

to lifelong learning would be financed primarily from private sources, this would also require a partnership among students (learners and borrowers), employers (financiers), and government (facilitator).

7. Public Purpose

Higher education must take decisive action to address current concerns about quality, efficiency, capacity, and accountability if it is to earn the necessary level of public trust and confidence to enable it to pursue its public purpose.

Vision: While higher education provides important private benefits to graduates, clients, and industry, in reality it is primarily a public good, created and supported by society to serve a public purpose.

Challenges: Like so many other institutions in our society, higher education today finds itself roundly criticized from the right, the left, and the center—indeed, even from within by many of our own faculty, students, and staff—for flaws large and small, fundamental and trivial, real and imagined. Little wonder that at times the academy feels under siege: criticized by parents and students for the uncontrolled escalation of tuition; attacked by state legislators and governors for insufficient attention to state needs; criticized by Washington and indeed our own faculties for rising administrative costs; challenged across the political spectrum for the quality and nature of undergraduate education; and generally blasted by the media in essentially any and all of our activities, from teaching to health care to intercollegiate athletics.

Among this array of criticisms, there is one that stands out in particular: the growing frustration of society with the hesitancy or reluctance of the university to face up to the challenge of change. A rapidly evolving world has demanded profound and permanent change in most, if not all, social institutions. Corporations have undergone restructuring and reengineering. Governments and other public bodies are being overhauled, streamlined, and made more responsive. Individuals are increasingly facing a future of impermanence in their employment, in their homes, and even in their families. The nation-state itself has become less relevant and permanent in an ever more

interconnected world.

Unlike many other institutions, at least according to our critics, the university has responded to the needs of a changing society largely by defending the status quo. To be sure, change has always occurred in higher education on glacial time scales—not surprising since the typical career of a tenured faculty member spans three or more decades. But at a time when our society, our nation, and the world itself are changing rapidly, the university still tends to frame its contemporary roles largely within traditional paradigms. It resists major changes in curricula or pedagogy. Students continue to be evaluated and credentialed relative to “seat time” rather than learning outcomes. The technology that is revolutionizing our world has largely bypassed the classroom, which continues to function largely as it has for decades, if not centuries. Tenure is seen not as a protection for academic freedom but rather as a perquisite that shields the faculty from accountability and change. And higher education tends to respond to resource constraints by raising funds from other sources rather than prioritizing programs or increasing productivity.

Possible Strategies: While market forces are likely to dominate public investment and public policy, at least for the foreseeable future, it is essential for higher education to retain its public purpose rather than simply responding to the market demands of the moment. After all, it has been a public good of immense importance throughout the history of the nation, and it must remain so. Here, however, it should be recognized and acknowledged that for higher education to regain the necessary degree of public trust and confidence, institutions will have to first listen more attentively to the concerns of its various and diverse constituencies (e.g., students, parents, employers, public and private patrons) and then respond to these concerns through bold institutional actions and transformation consistent with their public purpose.

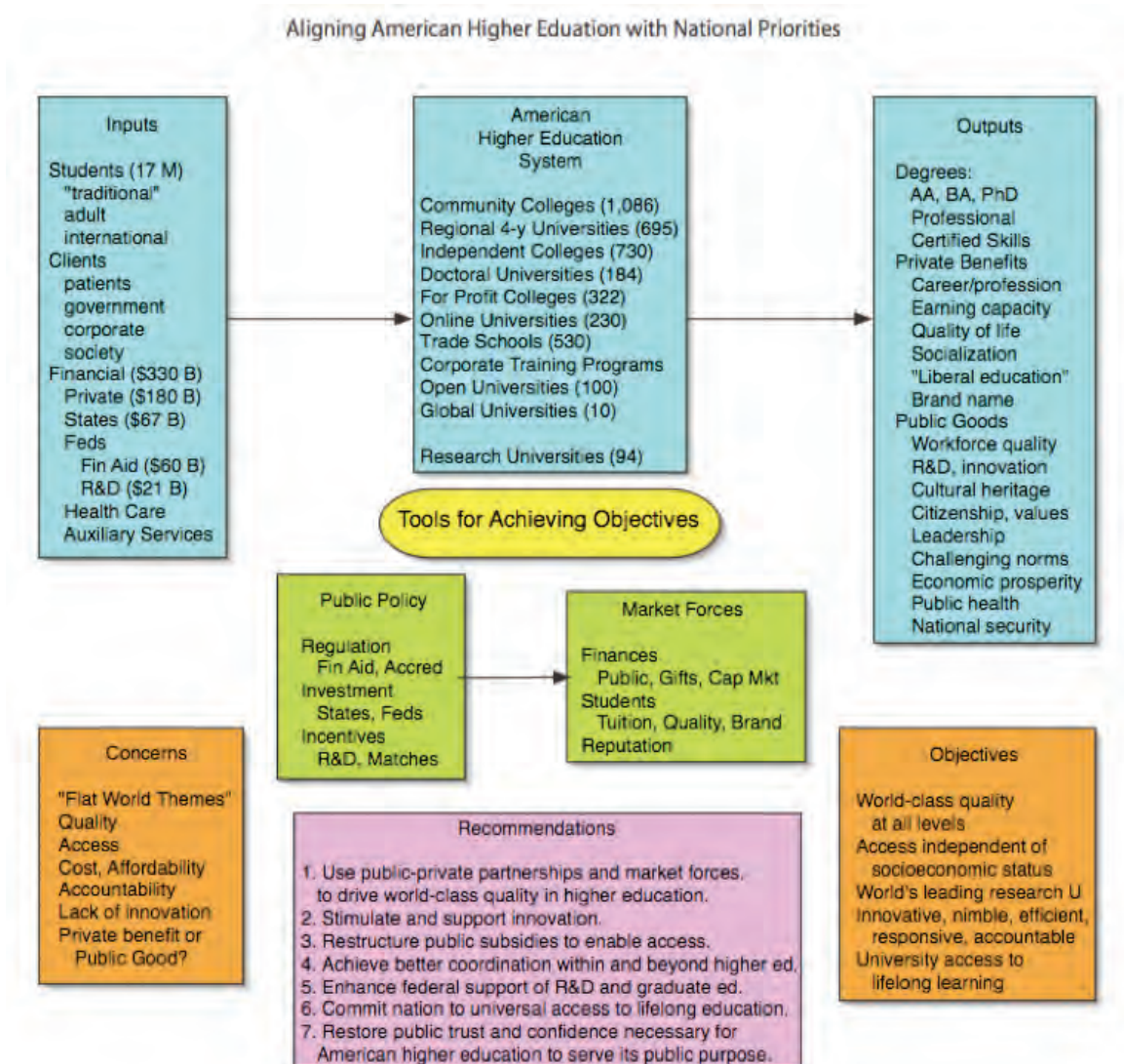
8. A New Federal Agenda

The future of public higher education is of immense importance to the United States. Beyond the fact that three-quarters of all college students are enrolled

in public universities, the increasing dependence of our nation on advanced education, research, and innovation compel efforts to both sustain and enhance the quality of our public colleges and universities. Yet, as this book suggests, the traditional structure for financing public higher education may no longer be viable. Traditionally, this has involved a partnership among states, the federal government, and private citizens (the marketplace). In the past the states have shouldered the lion's share of the costs of public higher education through subsidies, which keep tuition low for students; the federal government has taken on the role of providing need-based aid and loan subsidies. Students and parents (and to a much lesser extent donors) pick up the rest of the tab.

Yet this system has become vulnerable as the states face the increasing Medicaid obligations of a growing and aging uninsured population, made even more difficult by the state tax-cutting frenzy during the boom period of the late 1990s. This is likely to worsen as a larger percentage of young people and working adults seek higher education while the tax-paying population ages and health care costs continue to escalate. As Kane and Orzag conclude, “the traditional model of higher education finance in the U.S. with large state subsidies to public higher education and modest means-tested grants and loans from the federal government is becoming increasingly untenable.” (Kane, 2003).

Little wonder then that many are calling upon national leaders to articulate a national agenda for higher education in America, similar to other national agendas in K-K-12 education such as “A Nation At Risk” and “No Child Left Behind”. Of course, we have had such national higher education agendas before during times of major national challenge and opportunity. The Land-Grant Acts of the 19th century addressed the needs of an emerging industrial nation and the importance of education to the working class. The government-university research partnership, proposed by Vannevar Bush in 1944 and implemented following WWII, along with the G.I. Bill and the recommendations of the Truman Commission, established the principle of federal support of research and graduate education on the campuses while launching the massification of higher education in America. The National Defense Education Act of the late 1950s and 1960s established



The recommendations of the Spellings Quality Subcommittee for the nation

investments in higher education as critical to national security during the height of the Cold War.

Yet since that time, for almost four decades, the nation really has had no agenda for higher education in America. Little wonder that at times we appear to be drifting aimlessly, with changing social priorities putting at great risk that the very institutions that earlier generations built and supported so strongly as key to the future of a great nation. Here part of the challenge is a profound misunderstanding of the relationship among the cost, price, and value of a college education by both students and parents and by elected public officials. The funding of higher education by state and federal government support (including

tax benefits), philanthropy, and other various revenue streams not only disguise true costs but make pricing, e.g., tuition, largely fictitious, since all students, rich and poor, in public and private institutions receive very substantial subsidies. In some ways the financing of higher education is reminiscent of health care, where third-party payers (insurance companies, Medicare and Medicaid) also decouple the consumer from the marketplace. However in health care, at least one can estimate the costs of medical treatment and patients can assess the value of their health care, in contrast to higher education where true costs are difficult to estimate and the benefit of a college education is usually assessed only many years later.

One might approach this as an appropriate challenge to the federal government. After all, in some ways it was federal inaction that created the current dilemma, crippling state budgets with unfunded federal mandates such as Medicaid, through federal inaction on national priorities such as universal health care, and shifting philosophies of federal financial aid programs. It is also the federal government's responsibility to invest adequately in providing for economic prosperity and national security, particularly in the new flat world characterized by phenomena such as outsourcing and off-shoring characterizing a hypercompetitive, global, knowledge-driven economy increasingly dependent upon knowledge workers, research, and technological innovation. (Friedman, 2005).

Perhaps it would be more constructive, however, to present this as an opportunity: We have entered an age of knowledge in a global economy, in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, social-well being, and national security. Moreover, education, knowledge, innovation, and entrepreneurial skills have also become the primary determinants of one's personal standard of living and quality of life. Democratic societies—and state and federal governments—must accept the responsibility to provide all of their citizens with the educational and training opportunities they need, throughout their lives, whenever, wherever, and however they need it, at high quality and at affordable prices.

Government leaders could define and embrace a vision for the nation's future that provides citizens with the lifelong learning opportunities and skills they need to live prosperous, rewarding, and secure lives in this world. Perhaps it is time to create an analog to the Land Grant Act or G I Bill for the 21st century—perhaps a Learn Grant Act that would provide every citizen with an entitlement for as much education as they need, wish, or are capable of, throughout their lives. For example, a combination of federal and state programs could provide vouchers or education accounts that could be redeemed at accredited institutions for partial support of education with amounts adjusted to levels (community college, undergraduate degrees, workplace training, professional and graduate degrees, lifelong

enrichment) and available at anytime throughout one's life.

This could be financed through mechanisms similar to pensions and health care, e.g., Social Security and Medicare, creating legal and institutional frameworks for universal portability. The key would be to create transparent and transportable benefits and opportunities to enable sufficient mobility and agility to adapt to a changing economy. For example, one could image tax-deferred education savings accounts or perhaps even education accounts paid for through payroll taxes similar to Social Security. In fact, in contrast to paying a tax to support one's retirement (and relatively unproductive) years as in Social Security, the Learn Grant program would instead finance one's capacity to be even more productive through further education and enhanced skills. The use of such accounts would correspond to investing directly in the marketplace rather than in institutions, thereby minimizing public bureaucracy and exerting strong market pressures on educational institutions to align themselves with national needs. The key would be to provide portable benefits and opportunities for lifelong learning so that

While the startup costs of such a program would be considerable (perhaps one-third of the costs of health care), the impact of creating a truly world-class workforce—or better yet a society of learning—capable of competing in a global, knowledge-driven economy would be extraordinary.

Remaining Issues and Questions

The Quality Committee concluded its report with an array of remaining questions and issues that should be addressed in moving toward a national plan:

1. Is it time to launch a major conversation both within the academy and across society more generally about the nature of the college education appropriate to prepare citizens for a 21st century world? Are the objectives of those currently in leadership positions in our society who were educated in a century past, valuing traditional paradigms such as liberal learning or more focused professional training, relevant to the challenges and opportunities of a rapidly changing world faced by the new generations of students?

How would one go about launching, sustaining, and harvesting ideas from this conversation?

2. What are the best quantitative goals to set out for the U.S. postsecondary education enterprise as a whole? Fraction of population with college educations? Degrees? Graduation rates? Participation based on socioeconomic status? Literacy measures? More sophisticated measures of learning value-added from higher education?

3. What are the best performance measures for individual institutions? Success (graduation rates, placement statistics)? Educational “value-added” (e.g., evidence-based measures of educational effectiveness or student acquisition of cognitive skills)? Cost-productivity-efficiency measures? Innovation measures? How would one collect and compare this information?

4. How should the quality and performance of colleges and universities be assessed and certified? Through traditional institutional accreditation processes? Through the certification process of professional organizations (e.g., law, business, medicine, engineering)? Through popularity contests such as those conducted by US News & World Report? Or through a new and far more rigorous public process that provides evidence-based assessments of educational effectiveness on a student-by-student basis?

5. Are there specific actions that could be taken to stimulate the market pressures necessary to drive change in the university culture in areas such as cost-containment, productivity, and innovation, beyond simply creating better-educated consumers (students, employers, public agencies)?

6. American higher education is highly bimodal, characterized by a small number of extremely expensive institutions attracting the best students and faculty with little incentive to become more efficient, and a very large number of more modestly supported colleges and universities attempting to educate the bulk of college students with increasingly limited resources that tend

to erode quality rather than stimulate productivity. The challenge is to provide stronger incentives to wealthy institutions to stimulate greater efficiency, while providing the resources (financial, expertise, leadership) to enable productivity enhancement across the broader higher education enterprise. Possibilities include greater cost-sharing requirements for federal grants, restructuring tax policy to shift the tax expenditures associated with charitable giving and endowment earnings to priorities such as student financial aid, and disentangling the cross-subsidies of the various missions of higher education to better identify where to demand cost containment and productivity.

7. By developing recommendations based on the pessimistic assumption of seriously constrained public resources, will we, in effect, undercut the possibility of making a strong case for enhanced public support?

8. What are the best ways to tap capital markets? For example, the success of for-profit postsecondary education companies (e.g., University of Phoenix) in highly selective markets (adults, professional training, etc.) will almost certainly be a growth area. Could for-profit enterprises be created that serve as human capital brokers by supporting workforce development in key disciplines of particularly high need (e.g., info-bio-nanotechnology, knowledge services management) and then becoming a supplier of these graduates to employers? How could conventional universities more effectively tap the capital markets? (Perhaps they also could become compensated suppliers of human capital to employers...)

9. Since many of the proposed objectives are strongly dependent upon the quality of K-12 education, how do we better use the resources of American higher education to dramatically improve the quality of primary and secondary education? To what degree should higher education take on other major social challenges such literacy?

10. The Commission has approached its task (and this report) with a broad swath encompassing all elements of the American postsecondary education enterprise. However an alternative would be to

provide a more detailed analysis and recommendations for each component of the American higher education enterprise that acknowledges the distinct missions, challenges, and opportunities of each tier.

Caveats

We also suggested several caveats that should guide further efforts on this agenda:

Caveat 1: The strength of American higher education depends upon characteristics such as:

- The great diversity among institutions and missions.
- The balance among funding sources (private vs. public, state vs. federal).
- The influence of market forces (for students, faculty, resources, reputation).
- Its global character (attracting students and faculty from around the world)
- The absence of a centralized system that leads to highly decentralized, market-sensitive, and agile institutions, students, and faculty.
- Supportive policies (academic freedom, institutional autonomy, tax and research policies).
- The research partnership between universities, the federal government, and industry.

These characteristics must be preserved in any effort to better align higher education with the changing needs of the nation.

Caveat 2: As the nation pursues the objective of building and sustaining a world-class system of postsecondary education capable of meeting its changing education, research and service needs in an ever more competitive world, it is also important that it bear in mind the long-standing history and purpose of higher education in western societies. As Frank Rhodes has observed,

“For a thousand years the university has benefited our civilization as a learning community where both the young and the experienced could acquire not only

knowledge and skills, but also the values and discipline of the educated mind. It has defended and propagated our cultural and intellectual heritage, while challenging our norms and beliefs. It has produced the leaders of our governments, commerce, and professions. It has both created and applied new knowledge to serve our society. And it has done so while preserving those values and principles so essential to academic learning: the freedom of inquiry, an openness to new ideas, a commitment to rigorous study, and a love of learning.” (Rhodes, 1999).

There seems little doubt that these broader roles of higher education will continue to be needed by our nation. Hence, while responsiveness to the needs of a 21st nation in an intensely competitive global, knowledge economy, so too is the need to preserve these more fundamental roles, values, and public purposes of higher education in America.

Caveat 3: *Primum non nocere* or from the physician’s Hippocratic Oath: first, do no harm!!!

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Chapter 4

Research Universities

The crucial importance of the research university as a key asset in achieving economic prosperity and security is widely understood, as evidenced by the efforts that nations around the globe are making to create and sustain institutions of world-class quality. Yet while America's research universities remain the strongest in the world, they are threatened by many forces: the economic challenges faced by the nation and the states, the emergence of global competitors, changing student demographics, and rapidly evolving technologies. And even as other nations have emulated the United States in building research universities to drive economic growth, America's commitment to sustaining the research partnership that built a great industrial nation seems to have waned.

During past eras of challenge and change, our national leaders have acted decisively to enable universities to enhance American prosperity and security. While America was engaged in the Civil War, Congress passed the Morrill Land-Grant Act of 1862 to forge a partnership between the federal government, the states, higher education, and industry aimed at creating universities that could extend educational opportunities to the working class while conducting the applied research that would enable America to become a world leader in agriculture and industry. Eighty years later, emerging from the Great Depression and World War II, Congress acted once again to strengthen that partnership by investing heavily in basic research and graduate education to build the world's finest research universities, capable of providing the steady stream of well-educated graduates and scientific and technological innovations central to our robust economy, vibrant culture, vital health enterprise, and national security in a complex, competitive, and challenging world.

Today, our nation once again faces a period of rapid and profound economic, social, and political transformation driven by the growth in knowledge and innovation. Educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, and national security. As President Obama stated the challenge in his 2011 State of the Union Address:

"The world has changed. In a single generation, revolutions in technology have transformed the way we live, work and do business. The competition for jobs is real. But this shouldn't discourage us. The future is ours to win. But to get there, we can't just stand still. We need to out-innovate, out-educate, and out-build the rest of the world."

Investing in *innovation* creates the jobs of the future. Investing in *education* prepares our citizens to fill these jobs. Building the *infrastructure* for a knowledge-based economy will ensure prosperity and security for our nation.

Key to the achievement of all three of these goals is the American research university, which, through its research, creates the new knowledge required for innovation; through its advanced graduate and professional programs, produces scientists, engineers, physicians, and others capable of applying innovation to create economic value; and through its development and deployment of advanced infrastructure, such as information and communications technology, provides the foundation for the knowledge economy.

Economists estimate that 40 to 60 percent of economic growth each year is due to research and development activity. Another 20 percent of the increased resources each year are based upon the rising skill levels of our



Several of the leading American research universities

Top 50 Research Universities, Academic Ranking of World Universities 2010

1	Harvard University	19	University of California, San Francisco	35	Duke University
2	University of California, Berkeley	20	The University of Tokyo	36	University of British Columbia
3	Stanford University	21	University College London	37	University of Maryland, College Park
4	Massachusetts Institute of Technology	22	University of Michigan - Ann Arbor	38	The University of Texas at Austin
5	University of Cambridge	23	Swiss Federal Institute of Technology Zurich	39	Pierre and Marie Curie University - Paris 6
6	California Institute of Technology	24	Kyoto University	40	University of Copenhagen
7	Princeton University	25	University of Illinois at Urbana-Champaign	41	University of North Carolina at Chapel Hill
8	Columbia University	26	The Imperial College of Science, Technology and Medicine	42	Karolinska Institute
9	University of Chicago	27	University of Toronto	43	Pennsylvania State University - University Park
10	University of Oxford	28	University of Minnesota, Twin Cities	44	The University of Manchester
11	Yale University	29	Northwestern University	45	University of Paris Sud (Paris 11)
12	Cornell University	30	Washington University in St. Louis	46	University of California, Davis
13	University of California, Los Angeles	31	New York University	47	University of California, Irvine
14	University of California, San Diego	32	University of California, Santa Barbara	48	University of Southern California
15	University of Pennsylvania	33	University of Colorado at Boulder	49	The University of Texas Southwestern Medical Center at Dallas
16	University of Washington	34	Rockefeller University	50	Utrecht University
17	University of Wisconsin - Madison				
18	The Johns Hopkins University				

The United States has 35 of the world's leading research universities.

population. When asked to identify the one federal policy that could most increase the long-term economic growth rate, economists put further investment in education and research at the top of the list.

Despite the fact that in the past United States built the world's leading research universities, today our nation is not adequately investing in its research universities, nor has it developed a national strategy to support them. For many years, public universities have seen steep reductions in state appropriations per student. Federal support for university research has also been declining in real terms, at the same time that other countries have increased funding for research and development. Meanwhile, American business and industry have not fully partnered with research universities to create the industrial leadership that was found in the past in large corporate research labs, such as Bell Labs.

The unfortunate consequence of the low priority given to support the unique missions of the research university by the states, the federal government, and the public puts not only the leadership of higher education at risk, but also threatens the economic prosperity and security of the nation.

A Request from Congress

To address these concerns, in 2010 Congressional leaders (including Senators Lamar Alexander and Barbara Mikulski and Representatives Bart Gordon and Ralph Hall) made the following request to the National

ARE AMERICAN RESEARCH UNIVERSITIES RIDING ON THIN ICE?



The NRC Committee agreed with Congress that the nation's research universities were at some risk.

Academies of Science and Engineering and the Institute of Medicine:

"America's research universities are admired throughout the world, and they have contributed immeasurably to our social and economic well-being. Our universities, to an extent unparalleled in other countries, are our nation's primary source of long-term scientific, engineering, and medical research. We are concerned that they are at risk.

"We ask the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine to assemble a distinguished group of individuals to assess the competitive position of American research universities, both public and private, and to respond to the following question:

"What are the top 10 actions that Congress, state governments, research universities, and others can take to maintain the excellence in research and doctoral education needed to help the United States compete, prosper, and achieve national goals for health, energy, the environment, and security in the global community of the 21st Century?"

COMMITTEE ON RESEARCH UNIVERSITIES

Chad Holliday, *Chair*, Chairman of the Board, Bank of America, and Chairman and CEO, E. I. du Pont de Nemours and Company (DuPont) (retired) [NAE]
 Peter Agre, University Professor and Director, Johns Hopkins Malaria Research Institute, Department of Molecular Microbiology and Immunology, Bloomberg School of Public Health, Johns Hopkins University [NAS/IOM]
 Enriqueta Bond, President, Burroughs Wellcome Fund (retired) [IOM]
 C. W. Paul Chu, T. L. L. Temple Chair of Science and Professor of Physics, University of Houston, and Former President, Hong Kong University of Science and Technology [NAS]
 Francisco Cigarroa, Chancellor, The University of Texas System [IOM]
 James Duderstadt, President Emeritus and University Professor of Science and Engineering, University of Michigan [NAE]
 Ronald Ehrenberg, Irving M. Ives Professor of Industrial and Labor Relations and Economics, and Director, Cornell Higher Education Research Institute, Cornell University
 William Frist, Distinguished University Professor, Owen Graduate School of Management, Vanderbilt University, and United States Senator (retired)
 William Green, Chairman and CEO, Accenture
 John Hennessy, President and Bing Presidential Professor, Stanford University [NAS/NAE]
 Walter Massey, President, School of the Art Institute of Chicago, and President Emeritus, Morehouse College
 Burton McMurtry, Former Silicon Valley Venture Capitalist and Former Chair, Stanford University Board of Trustees
 Ernest Moniz, Cecil and Ida Green Professor of Physics and Engineering Systems, Director of the Energy Initiative, and Director of the Laboratory for Energy and the Environment at the MIT Department of Physics, Massachusetts Institute of Technology
 Heather Munroe-Blum, Principal (President) and Vice Chancellor, and Professor, Faculty of Medicine, McGill University
 Cherry Murray, Dean, Harvard School of Engineering and Applied Sciences, John A. and Elizabeth S. Armstrong Professor of Engineering and Applied Sciences, and Professor of Physics, Harvard University [NAS/NAE]
 Hunter Rawlings, President Emeritus and Professor of Classical History, Cornell University*
 John Reed, Chairman of the MIT Corporation and Chairman and CEO, Citigroup (retired)
 Teresa Sullivan, President, University of Virginia
 Sidney Taurel, Chairman and CEO, Eli Lilly & Company (retired)
 Lee T. Todd, Jr., President, University of Kentucky
 Laura D'Andrea Tyson, S. K. and Angela Chan Chair in Global Management, Haas School of Business, University of California Berkeley
 Padmasree Warrior, Chief Technology Officer, Cisco Systems



The report of the National Academies Committee

In response, the National Academy leadership recruited an extraordinary group of participants in this effort, roughly balanced between leaders of American research university, industry, government, and science, with an exceptional chairman, Chad Holliday, former CEO of Dupont and current nonexecutive chair of the Bank of American board of directors. (I served both as a member of the committee and, as chair of the Policy and Global Affairs Division of the National Research Council, which hosted the study, helped to organize, keep on track, and developed following activities for the study.)

Findings of the National Academies Study

The Key Concerns

While America's research universities remain the strongest in the world, they are threatened today by many forces:

The economic challenges faced by the nation and

the states,

The emergence of global competitors competing for the best students, faculty, resources, and impact on the global economy.

Changing demographics,

Rapidly evolving technologies,

Inadequate investment, and

The absence of a bold national strategy.

Of particular concern were the following issues:

1. Federal policies no longer place a priority on university research and graduate education (basic research funding has dropped off roughly 20% over the past decade...and with the current meat-axe approach to the economy, could well decline another 20% in the next several years).

2. In the face of economic challenges and the priorities of aging populations, states no longer are either capable or willing to support their public research universities at world-class levels. They have lost roughly 35% of their state support since 2000. In

fact, state support on an inflation adjusted basis is now back to the levels of the 1960s. (At Michigan, our state support is now only 8% of our academic budget and 4% of our total budget...including hospitals, housing, and football teams...)

3. Business and industry have largely abandoned the basic and applied research that drove American industrial leadership in the 20th century (e.g., Bell Labs), largely ceding this responsibility to research universities but with only minimal corporate support.

4. Research universities themselves have failed to achieve the cost efficiency and productivity enhancement in teaching and research required of an increasingly competitive world. There is great public concern and misunderstanding about the rising “price” of higher education in America, although equal misunderstanding of its value to the nation.

While in the wake of the 2008 meltdown of the equity markets and subsequent recession, all research universities were facing challenges, there was general agreement that perhaps the more serious challenges were faced by the nation’s public research universities as the states withdrew support. As John Hennessy put it looking across San Francisco Bay at the damage the State of California was doing to UC-Berkeley, “The states are methodically destroying the world-class quality and capacity of our leading public research universities, putting the nation at great risk. Endowments will recover rapidly, but state support is unlikely to recover for at least a generation!!!”

The Key Themes

In various breakout groups we began to converge on a framework of themes for various stakeholders:

To the Public: Update Vannevar Bush’s *Science the Endless Frontier* themes for 21 century (economy, health, and security) We are still fundamentally strong, but threatened.

Federal Government: We are seriously under investing in this key asset necessary for economic prosperity, national security, and social well-being, putting the nation at considerable risk. However

we recognize current economic constraints and are prepared to work with you to address our common problems, restructuring our activities and sacrificing as necessary.

States: In a global economy increasingly driven by knowledge and innovation, your public research universities are not only a critical asset to your citizens but also to the nation.

Business: We stressed the role of the research university as a key source of intellectual and human output and the importance of building business university-government-partnerships.

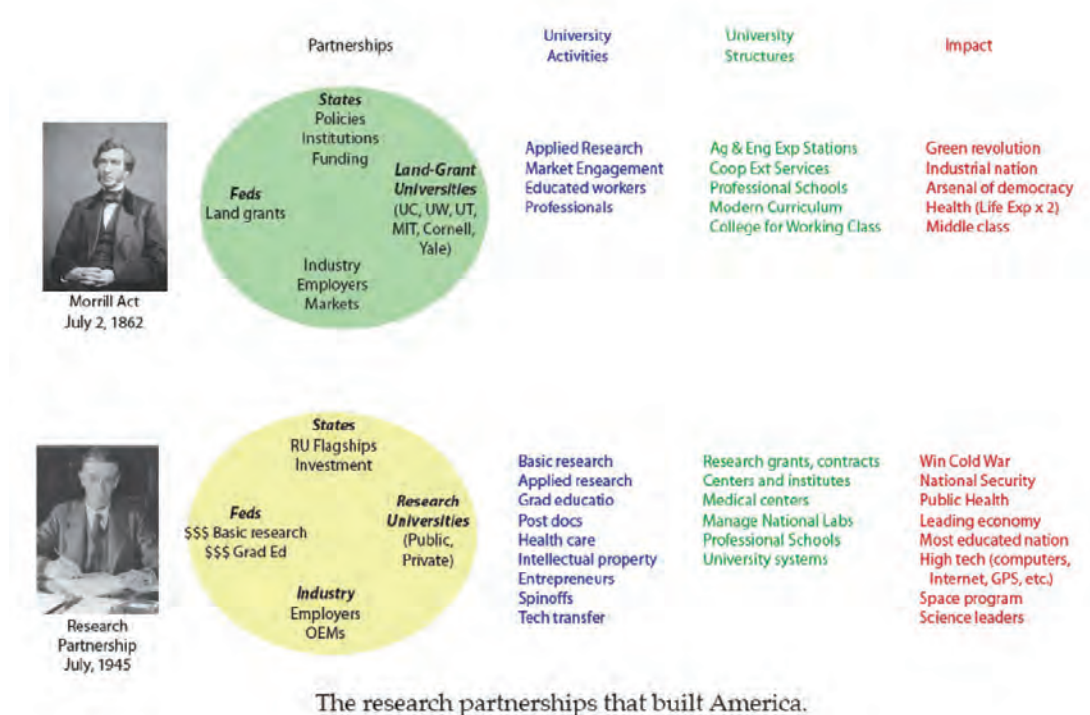
Universities: Stop whining and agree to “man up”! Accept fact that significant restructuring will be necessary to address growing concerns, including transforming the faculty culture. Look at every activity to see how it can be done more efficiently and at higher quality.

More specifically, the Committee decided to frame its recommendations with the theme of partnership among universities, federal and state governments, and stakeholders such as business and industry that has been key to the evolution and leadership of the American research university.

Here the committee stressed that America’s research universities did not become the best in the world just by accident but by deliberate, visionary policy choices made by our political leadership, even during the most difficult of times, as evidenced by the Morrill Act 150 years ago during the early years of the Civil War and the research policies drafted by Vannevar Bush in the last years of World War II!

During past eras of challenge, our national leaders have acted decisively to create innovation partnerships to enable the nation’s universities to enhance American security and prosperity. Today our nation faces new challenges, a time of rapid and profound economic, social, and political transformation driven by the growth in knowledge and innovation.

A decade into the 21st century, a resurgent America must stimulate its economy, address new threats, and position itself in a competitive world transformed by



It was the federal government (and Congress) that created the partnership among the federal government, the states, industry, and higher education that built the world's leading research universities.

technology, global competitiveness, and geopolitical change. In this milieu, educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess, particularly in the fields of science and engineering, have become the keys to America's future. Therefore it is essential that as a nation we both reaffirm and revitalize the unique partnership that has long existed among the nation's research universities, the federal government, the states, and business and industry.

The Ten Recommendations

The approach taken by the Research University Committee was framed by several key principles:

1. A balanced set of commitments by each of the partners--federal government, state governments, research universities, and business and industry--to provide leadership for the nation in a knowledge-intensive world and to develop and implement enlightened policies, efficient operating practices, and necessary investments.
2. Linkages and interdependencies among these commitments that provide strong incentives for participation at comparable levels by each partner.
3. Sufficient flexibility to accommodate the differences among research universities and the diversity of their various stakeholders. While merit, impact, and need should continue to be the primary criteria for awarding research grants and contracts by federal agencies, investment in infrastructure should consider additional criteria such as regional and/or cross-institutional partnerships, program focus, and opportunities for building significant research capacity.
4. A recognition of the importance of supporting the comprehensive and interdependent nature of research university, spanning the full spectrum of academic and professional disciplines including the arts and humanities
5. A commitment to a decade-long effort when both challenges and opportunities are likely to change,

evolving from an early emphasis on more efficient policies and practices to later increases in investment as the economy improves.

The actions we called for were organized to accomplish three broad goals. The first four recommendations will strengthen the partnership among universities, federal and state governments, philanthropy, and the business community in order to revitalize university research and speed its translation into innovative products and services.

Recommendation 1: Within the broader framework of United States innovation and research and development (R&D) strategies, the federal government should adopt stable and effective policies, practices, and funding for university-performed R&D and graduate education.

Over the next decade as the economy improves, Congress and the administration should invest in basic research and graduate education at a level sufficient to produce the new knowledge and educated citizens necessary to achieve national goals. As a core component of a national plan to raise total national R&D funded by all sources (government, industry, and philanthropy) to 3 percent of GDP, Congress and the administration should provide full funding of the amount authorized by the America COMPETES Act. That would double the level of basic research conducted by National Science Foundation, the National Institute of Standards and Technology, and the Department of Energy Office of Science, as well as sustain our nation's investment in other key areas of basic research, including biomedical research. Note that this recommendation is not calling for new programs, but rather asking the Congress to achieve funding goals authorized earlier for various federal research agencies.

Recommendation 2: The states should strive to restore appropriations for higher education to levels that allow public research universities to operate at world-class levels while providing them with greater autonomy to enable them to compete strategically and respond with agility to new opportunities.

Over the past two decades, in the face of shifting public priorities and weak economies, states have

decimated the support of public higher education, cutting appropriations per enrolled student by an average of 30 percent, or more than \$15 billion each year nationally. Yet even as the states have been withdrawing the support necessary to keep these institutions at world-class levels, they have also been imposing upon them increasingly intrusive regulation. As the leader of one prominent private university put it, "The states are methodically dismantling their public universities where the majority of the nation's campus research is conducted and two-thirds of its scientists, engineers, physicians, teachers, and other knowledge professionals are produced."

Hence, we challenge the states to recognize that the devastating cuts and meddlesome regulations imposed on their public research universities is not only harming their own future, but also putting at great risk the nation's prosperity, health, and security.

Recommendation 3: The role of business in the research partnership must be strengthened to facilitate the transfer of knowledge, ideas, and technology to society and accelerating "time to innovation" in order to achieve our national goals.

We recommend strongly that the relationship between business and higher education should shift from that of a "customer-supplier"—of graduates and intellectual property—to a "peer-to-peer" nature, stressing collaboration in areas of joint interest. Strong support of a permanent federal R&D tax credit and more efficient management of intellectual property by businesses and universities to improve technology transfer are also needed. Such a tax credit would stimulate new research partnerships, new knowledge and ideas, new products and industries in America, and new jobs. Better management of intellectual property would result in more effective dissemination of research results, thus also generating economic growth and jobs.

Recommendation 4: Universities must increase cost-effectiveness and productivity in order to provide a greater return on investment for taxpayers, philanthropists, corporations, foundations, and other research sponsors.

It is essential that the nation's research universities strive to address the American public's concern that

their costs are out of control. To this end, universities should set and achieve bold goals in cost-containment, efficiency, and productivity. They should strive to constrain the cost escalation of all continuing activities—academic and auxiliary—to the national inflation rate (not the higher education price index) or less through improved efficiency and productivity. That will require the development of powerful and strategic tools for financial management and cost accounting, tools that better enable universities to determine the most effective methods for containing costs and increasing productivity and efficiency. It is essential that universities, working together with key constituencies, intensify efforts to educate people about the distinct character of American research universities and cease promoting activities that create a public sense of unbridled excess on campuses.

The next three actions are intended to streamline and improve the productivity of research operations within universities.

Recommendation 5: Create a *Strategic Investment Program* that funds initiatives at research universities that are vital to advancing education and research in areas of key national priority.

We recommend that the program begin with two 10-year initiatives. The first would be an endowed faculty chairs program to facilitate the careers of young investigators. During a time of economic difficulty and limited faculty retirements, it would help ensure that America is developing the research faculty we need for the future. We also call for a research infrastructure program that is initially focused on advancement of campus cyberinfrastructure, but perhaps evolves later to address as well emerging needs for the physical research infrastructure as they arise. Matching grant requirements would generate additional funds from private or state support.

Recommendation 6: Strive to cover the full costs of research projects and other activities they procure from research universities in a consistent and transparent manner.

Today, many research universities are forced to subsidize underfunded sponsored research grants from

resources designated for other important university missions such as undergraduate tuition and patient fees for clinical care. This is no longer acceptable and must cease. If the federal government and other research sponsors would cover the full costs, research universities could hold steady or reduce the amount of funding from other sources like tuition that they have had to provide for research procured by the federal government. Universities should be able to allocate their various resources more strategically for their intended purpose. Both sponsored research policies and cost recovery negotiations should be applied in a consistent fashion across all academic institutions.

Recommendation 7: Reduce or eliminate regulations that increase administrative costs, impede research productivity, and deflect creative energy without substantially improving the research environment.

Federal and state policymakers and regulators should review the costs and benefits of federal and state regulations, eliminating those that are redundant, ineffective, inappropriately applied to the higher education sector, or impose costs that outweigh the benefits to society. Furthermore, the federal government should also harmonize regulations and reporting requirements across federal agencies. Reducing and eliminating regulations could trim administrative costs, improve productivity, and increase the nimbleness of American universities. With greater freedom, they will be better positioned to respond to the needs of their constituents and the larger society.

The final three recommendations will ensure that America's pipeline of future talent in science, engineering, and other research areas remains creative and vital, leveraging the abilities of all of its citizens and attracting the best students and scholars from around the world.

Recommendation 8: Improve the capacity of graduate programs to attract talented students by addressing issues such as attrition rates, time to degree, funding, and alignment with both student career opportunities and national interests.

Research universities should restructure doctoral education to enhance pathways for talented



Today it is time to recommit once again to this research partnership, rebuilding it for a new century.

undergraduates, improve completion rates, shorten time-to-degree, and strengthen the preparation of graduates for careers both in and beyond the academy. To this end, the federal government should achieve a better balance of fellowships, traineeships, and research assistantships. Both universities and research sponsors should address the many concerns characterizing postdoctoral research appointments including the excessive length and low compensation of such service and the misalignment of these experiences with career opportunities. Such efforts would increase cost-effectiveness and ensure that we can draw from the “best and brightest” for our nation’s future doctorates.

Recommendation 9: Secure for the United States the full benefits of education for all Americans, including women and underrepresented minorities, in science, mathematics, engineering, and technology.

Research universities should intensify their efforts to improve science education throughout the education ecosystem, including primarily, secondary, and undergraduate education. Furthermore, all research partners should take action to increase the participation and success of women and underrepresented minorities across all academic and professional disciplines and especially in science, mathematics, and engineering. As careers in STEM fields continue to expand, recruiting more underrepresented minorities and women into those fields is essential in order to meet the workforce needs of our nation and to secure economic prosperity and social well-being.

Recommendation 10: Ensure that the United States will continue to benefit strongly from the participation of international students and scholars in our research enterprise.

Federal agencies should make visa processing for international students and scholars who wish to study or conduct research in America as efficient and effective as possible, consistent also with homeland-security considerations. That should include the possibility of granting residency to each foreign citizen who earns a doctorate in an area of national need from an accredited research university (“attaching a green card to each diploma”).

These recommendations reflect the consensus of extensive testimony before the National Academies committee, both oral and written, from many constituencies including federal agencies, business leaders, state governments, and, of course, leaders of American higher education. While sometimes bold and ambitious, we believed our recommendations and actions were necessary to preserve one of the nation’s most important assets: its world-class research university. While achieving these goals would be challenging, particularly in a rapidly changing economic environment, we believe that it is important to state what we think is needed and then to develop implementation strategies in collaboration with the various constituencies that are key to achieving these goals.

It is important to keep the recommendations and the report sufficiently flexible to adapt to unforeseen

Summary of Investment Goals
(Annual Growth Targets Achieved by 2022)

New Investments Requested in Report (\$B / y)

Federal Support for Research Universities

Full Funding of the American COMPETES Act (RU share)	\$6	
Full-cost funding of research grants (no net increase)	0	
Reduction of regulatory burdens	0	
Strategic Investment Fund (requiring matching grants)		
Junior faculty chairs	2	
Cyberinfrastructure / research infrastructure	5	
Graduate fellowships and traineeships	2	
STEM programs for women and minorities	1	
R&D Tax Credits for industry-university research partnerships	2	
Total new federal support		\$18
State support		
Restoration of appropriations per student to 1990 levels		\$15
Private Sector		
Strategic Investment Fund Matching Grants	9	
Industry-University research partnerships (R&D Tax Credit)	6	\$15
Research university productivity and cost reduction (20%)		\$15
Total Investment Requested from All Sources		\$63 B / y

Implications for Research Universities (\$B / y)

Impact of Federal Actions

Full funding of American COMPETES Act (RU share)	\$6	
Relief from full-cost funding of research grants (20% of \$30 B / y)	6	
Relief from reduction of regulatory burdens (5% of \$30 B / y)	1.5	
Strategic Investment Fund	7	
Graduate fellowships and traineeships	2	
STEM programs	1	23.5

State Support 15

Private Sector

Strategic Investment Fund matching grants	9	
Industry-University research partnerships (R&D Tax Credit)	6	15

Research university funds available for reallocation through
productivity and cost-containment 15 15

Total new resources available to research universities \$68 B / y

challenges and opportunities as they arise. For example, the staging of implementation steps will depend significantly upon economic circumstances. During the current economic recession, most of the focus should probably be on those federal and state policies and university practices designed to improve cost-containment and productivity. As the current economic crisis recedes and the economy improves later in the decade, attention should turn to restoring or increasing investments in research and graduate education.

The Next Steps

The National Academies viewed this report as the launch of a decade-long (or longer) effort involving many constituencies, much like the Rising Above the Gathering Storm effort. It is important to keep the recommendations and the report sufficiently flexible to adapt to unforeseen challenges and opportunities as they arise. (Recall here that in the case of RAGS, this led to the initial American Competitiveness Initiative of the White House followed by the American COMPETES Act passed by Congress.)

For example, the staging of implementation steps will depend significantly upon economic circumstances. During the current economic recession, most of the focus will likely be on those federal and state policies and university practices designed to improve cost-containment and productivity. As the economy improves later in the decade the current economic crisis recedes, attention will turn to restoring or increasing investments in research and graduate education.

The actions recommended in the research university study will require significant policy changes, productivity enhancement, and investments on the part of each member of the research partnership. However the National Academies believe these recommendations comprise a fair and balanced program for each of America's research partners—research universities, the federal government, the states, and business and industry—that will generate significant returns to the nation. We also believe such commitments are necessary for the future prosperity, health, and security of America!

Regional Meetings

Following the release of the National Academies report on the future of the American research university in June, 2012, a series of meetings were held at the state level involving governors, state legislators, business leaders, and university presidents"

- Pittsburgh (11/19/12): Successfully focused its meeting on the role of Carnegie Mellon University, the University of Pittsburgh, and the Pitt Medical Center in re-building the Pittsburgh economy over the last several decades.

- Nashville (1/16/13): Focused on how the state of Tennessee could borrow ideas from its neighbors -- Ohio, North Carolina, and Georgia -- to enhancing the role of its universities in technological development, innovation, and economic growth. Vanderbilt used the forum to discuss how it might develop a university-state-business partnership to enhance Nashville's role as a drug development center.

- Tucson (2/25/13): Enumerated a list of actions that Arizona universities might take to better facilitate research partnerships with local industry. These included reforming ITAR (International Traffic in Arms Regulations) regulations and developing new intellectual property and tenure advancement paradigms to make industry and university reward systems more complementary.

- Ann Arbor (4/12/13): Discussed ways that Michigan business leaders can spur investment in higher education and develop linkages between their companies and state higher education institutions. Specific suggestions included a tax incentive model that encourages industry to invest in higher education or research, improve tech transfer by opening dialogues between research faculty and industry, and industry programs that help recruit and retain top talent (e.g. loan repayment assistance).

- Morgantown (4/26/13): Reviewed the actions that West Virginia University has taken to implement



James Duderstadt and Chad Holliday interviewed by Judy Woodruff at the Time Summit

recommendations from the report. These include developing a website to track costs and improve productivity, and launching a campus-wide initiative that outlines areas for strategic investment in which WVU has potential for growth and a high return on investment.

- Boulder (5/29/13): Discussed threats to Colorado's research ecosystem and identified best practices for bridging the cultural divide between industry and universities. These include a New Technology Meetup program that links that link entrepreneurs, attorneys, scientists, and investors, and CU Boulder's new Office for Industry and Special Opportunity.

- Dallas (6/4/13): Enumerated a list of actions that universities might take to improve productivity and efficiency and contain costs. These include better asset utilization, increased revenue generation (not tuition-based), and strategic deployment of administrative services. Discussed the importance of strategic investments and the large benefits that can come from strategic public-private partnerships.

- San Diego (6/6/13): Identified key challenges and opportunities in broadening participation in STEM fields. These include the need to formalize educational and career pathways and refocus efforts on scaling best practices and programs. San Diego's excellent research and innovation ecosystem may be a model for other regions.



Speaking at the National Convocation on the future of research universities

- Baltimore (6/20/13): Enumerated a list of actions that universities and industry leaders might take to better facilitate research partnerships and develop Maryland's entrepreneurial infrastructure. These included expanding Entrepreneur-in-Residence programs, developing a strategic working group composed of federal agency and university leaders to develop and promote a cohesive and consistent set of research priorities, and persuading top science advisory panels like PCAST and NSTC to engage with regulatory burden issues.

A National Convocation

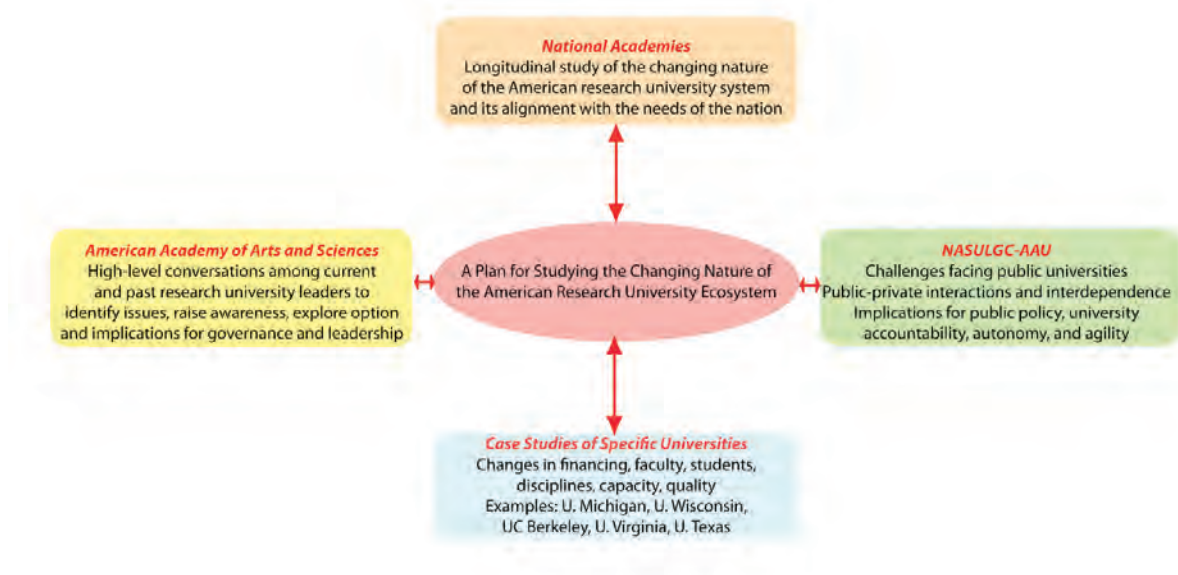
In October, 2013, a major national convocation was held at the National Academy of Sciences to evaluate both feedback and possible follow through to gain traction for the recommendations of the report.

There was a strong consensus that this project was of sufficient importance that it should continue to be a priority for the National Academies for the next decade. Among the suggested next steps were:

Revitalizing the Partnership

Create a more unified voice portraying the long-term damage of sequestration to university R&D and hence to the nation's prosperity and security.

Build a coalition capable of convincing Congress to address the emerging "innovation deficit" by providing



Key participants in the next phase of the American research university project

for real and sustained growth in the budgets in the key federal research agencies, in keeping with the vision set forth in the America COMPETES Act.

Create a 501(c) 3 organization similar to Research America that could implement a sustained lobbying effort on behalf of broad national research policy.

Encourage the federal government to create matching grant programs for R&D investment that stimulate matching support from states and other stakeholders (industry, foundations, philanthropy). Perhaps early authorization of the Strategic Initiative Fund (matching grants for junior faculty endowments and cyberinfrastructure investments) for now, then seeking funding as the economy improves.

Support university efforts to launch an effective PR campaign that stresses the damage states are causing not only to themselves but also to national prosperity and security by inadequate investments in education and workforce development in an increasingly competitive world.

Developing a model "social contract" for the states that provides more agility and autonomy to universities, to protect the world-class quality of their research universities until adequate state support is restored. (Note: Avoid the term "privatization" but rather stress that these must be provided with great agility if they are to become more "self-sufficient".)

Establish clear intellectual property policies at

research universities consistent with the policies recommended by the recent 2010 NRC study on "Managing University IP in the Public Interest." Hold regional workshops to promote implementation of the reports recommendations

Create models for peer-to-peer relationships between universities and industry and establish, support and utilize mechanisms such as the University-Industry Partnership as a mechanism to share these models. Promote deeper relationships with a problem focused basis, such as discussed in the ARISE II report.

Industry should make strong use of its influence on government policies at the national and state level in areas of mutual interest (e.g., STEM immigration, support of R&D in key strategic areas)

Broaden new paradigms to promote economic development such as DOC's "regional innovation clusters" and DOE's "energy innovation hubs" capable of rebuilding the nation's capacity for translational research through peer-to-peer relationships among industry, national labs, and research universities.

Support the creation of innovative new government programs and approaches to supporting early stage proof-of-concept and market analysis work at universities. The recently introduced TRANSFER Act, which would allow for agencies to devote a small percentage of their STTR funds to develop and support new proof-of-concept programs at universities is one

such example that should be supported.

Encourage membership organizations such as AAU and APLU to set and achieve broad goals in cost-containment, efficiency, and productivity.

Launch a major National Academy effort to document the relationship between the cost, price, and value of a college education and make this analysis broadly available to the American public (using standing boards such as NRC's BHEW and STEP).

Publicize the very significant efforts of public research universities to stabilize the actual costs of education and research driven by the dramatic decline in state support. Encourage wealthy private universities to demonstrate their capacity control cost escalation and avoid competition by outspending other institutions.

Launch a campaign to better explain the complexities of financing higher education and research to policy makers, business leaders and to the general public. This includes highlighting what has already been done by both public and private universities to contain costs and stabilize tuition. Another key component of this campaign should be to educate key audiences about the importance of American research universities rather than simply compete for visibility with one another.

Working closely with industry, develop and implement more powerful strategic tools for financial management and cost accounting in ALL activities, e.g., business, instructional, and auxiliary (i.e., hospitals, housing, athletics) operations.

Seek agreement among institutions to better constrain the excessive cost increases in high visibility auxiliary activities such as intercollegiate athletics, which are damaging the credibility of the cost containment in academic programs.

Research universities, together with key stakeholders, should mount a major campaign to educate key audiences about the importance of American research universities rather than simply compete for visibility with one another.

Strengthening Research Universities

Seek Congressional legislation that would initially authorize these programs as multi-agency efforts, selling this as a way for the federal government to use

matching grants (some requiring a 2 to 1 match) from other stakeholders such as states and philanthropy, but possibly delaying funding of these federal programs until more favorable economic conditions are achieved.

Universities should identify other sources of potential support, such as crowd funding for research. Though in its infancy, such solicitations by institutions might be used to enhance visibility and understanding of the exciting and worthy research underway, even if they do not immediately yield significant funding.

Work with OMB and COFAR to establish an effective mechanism for ongoing dialogue and discussion surrounding issues related to paying for the real and necessary costs associated with research conducted by universities on behalf of the federal government. This will include discussing the implementation of new guidance expected to be issued later this year by OMB relating to this matter.

Seek agreement from the membership of AAU and APLU to work together to convince other stakeholders (e.g., industry and foundations) of the importance of providing full support the costs associated with sponsored research.

Conduct a study, similar to the 1996 study conducted by Arthur Andersen at the request of the Government, University, Industry Research Roundtable, that provides a dollar to dollar comparison on how university expenditures and federal reimbursement of F&A expenses compares those of National Laboratories, non-profit research institutes and private industry.

Conduct specific studies to determine the actual amount of university subsidy required for research grants characterized by excessive cost-sharing and inadequate indirect cost recovery from each federal agency and private sponsor, along with data identifying where the funds for these subsidies come from as well as their impact on other activities of the university (e.g., undergraduate tuition?).

Since Congress has already expressed an interest in this subject, including hearings, efforts should be made to conduct the study requested by Congress in the most recent reauthorization of the higher education act of the need (if any), the effectiveness, and the burden of existing and all future federal regulations pertaining to both higher education and research. Similar efforts should be undertaken at the state level.

Unnecessary regulations should be eliminated or appropriately changed so that ensure accountability, but do not provide for excess regulatory or cost burden. A primary target for immediate reform is current requirements for university effort reporting.

The White House should task the research business models working group to engage the university research community in a dialogue about which regulations could be modified in a way that would both ensure accountability but also reduce cost and burden.

Congress should examine the current auditing practices of inspector generals to see if they are excessive, unwarranted and thus resulting in overly conservative and costly compliance measures being taking by universities.

Building Talent

Organizations such as AAU, APLU, AGS, and NRC should explore the possibility of a “Flexner Report” approach to doctoral education that recognizes the unique character of particular disciplines (e.g., natural sciences, social sciences, humanities, engineering, biomedical, etc.) and both document and address serious issues such as attrition rates, time-to-degree, and future employment objectives.

Efforts should be made to implement recommendation made by the CGS in its report titled: *The Path Forward: The Future of Graduate Education in the United States*.

Better data should be collected by U.S. research universities to better document, understand and address issues such as attrition rates, time-to-degree, and future employment opportunities.

Working with the NRC, major federal agencies should assess the impact of particular forms of graduate student support (e.g., fellowships, traineeships, research assistantships, teaching assistantships) on time-to-degree, attrition rates, and career preparation.

A concerted effort should be made by both research universities and federal agencies to address the plight of postdoctoral scholars. In particular, the recommendations of NRC COSEPUP studies of postdoctoral education (both those of 2000 and the current study) should be seriously considered for immediate implementation by lead federal agencies such as NSF and NIH.

Higher education organizations such as AAU and APLU should request that each of their members provide a detailed plan for their engagement with K-12 education as part of a study of both the level of commitment and effectiveness of this mission (perhaps supported through a grant from DoEd or foundations).

Higher education organizations such as AAU and APLU, working with disciplinary societies, should continue their efforts to improve the quality of undergraduate STEM education at their universities by promoting the usage of evidence based teaching practices by faculty.

The federal government should collect and publish detailed annual comparisons of the participation of women and underrepresented minorities for each of the nation’s research universities at all levels (e.g., undergraduate, graduate, professional)

Research universities, working closely with industry, should strongly push for immigration reform policies that not only streamline visa policies for international students and faculty but go further by enabling residency for each non-U.S. citizen who earns a doctorate from a regionally accredited university, subject to homeland security concerns.

Both public and private universities should better stress the importance of their impact on regional economic prosperity through their unique access to both global economic and talent markets.

The Path Ahead

The National Academies research university agenda continued throughout the next several years, with leadership from the Policy and Global Affairs Division of the National Research Council (which I chaired) along with the participation of key higher education organizations (e.g., the Association of American Universities and the American Association of Public and Land-Grant Universities). In 2015 a key effort was made both to analyze and address through legislation the burdens of excessive federal regulation on university research. Successful efforts by universities to better control costs were identified and promoted. The Council of Graduate Schools launched a series of projects to address the limitations of the current models for graduate education. And the National Academies

Committee on Science, Engineering, and Public Policy conducted yet another study of the serious flaws in the current models of postdoctoral studies, urging a series of changes both in compensation and duration of appointments.

Additional efforts to achieve the objectives of the research university studies will continue for the next decade.

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A FRAMING PAPER
Time Summit on Higher Education
October 10, 2014

SOME PREMISES

- Congressional Premise: “America’s research universities are admired throughout the world, and they have contributed immeasurably to our social and economic well-being. Our universities, to an extent unparalleled in other countries, are our Nation’s primary source of long-term scientific, engineering, and medical research. We are concerned that they are at risk.”

- National Academies Premise: Research universities provide the new knowledge and train the researchers necessary to sustain an innovation-driven and globally competitive national economy. As a follow-up to the Rising Above the Gathering Storm, the National Academies propose to undertake a study of the competitive position of U.S. research universities, public and private, and assess their ability to maintain the quality work needed to drive economic growth and competitiveness and advance the nation’s goals in health, environmental quality, energy, and national security.

- Jonathan Cole: “Within the past century, and especially within the past 60 years, the United States has built the greatest system of higher learning in the world. What has made our universities so distinguished is not the quality of our undergraduate education. Other systems of higher learning, including our own liberal-arts colleges, compete well against research universities in transmitting knowledge to undergraduates. While such transmission of knowledge is a core mission of our universities, it is not what makes them the best. Our finest universities have achieved international pre-eminence because they produce a very high percentage of the most important fundamental and practical discoveries in the world. That is true across the board: in the sciences and engineering, the social and behavioral sciences, and the humanistic disciplines.”

- One of the great strengths of American higher

education is the presence of a system of world-class public and private research universities, sustained by public policies that ensure sufficient balance in financial assets, flexibility, and quality to serve the diverse needs of the nation. It is essential that federal policies in areas such as tax benefits, student financial aid, research funding, and regulation sustain quality, diversity, and balance in the research university system rather than threaten competitive balance and drive predatory behavior.

- For the past century American research universities have served as both the stepping stone for members of an increasingly diverse population to move into the knowledge professions (including science and engineering) and as a magnet to attract outstanding international students and faculty members to America as immigrants who have played critical roles in achieving national prosperity and security.

- The core educational and research activities of research universities require subsidies from an array of patrons—federal and state governments, students, and the private sector (foundations, corporations, donors). Yet the current model for financing world-class education and research appears to be increasingly unsustainable from all sources: federal support (threatened by growing federal debt), state support (collapsing with state budgets and shifting priorities), corporate support (declining for both research and employee education), tuition (approaching a market ceiling), gifts and endowments (sufficient for only a small number of institutions), and clinical income (threatened by new health legislation).

- Both public and private universities have an obligation to serve the public purpose and meet the needs of the nation, since all benefit from public support, and while characterized by different legal status and governance, are in fact public bodies.

SOME QUESTIONS CHARACTERIZING U.S. RESEARCH UNIVERSITIES

What is a research university?

Defined by their role in creating new knowledge and educating those capable of generating new knowledge, e.g., a *Universitas Magistrorum et Scholarium*.

The roughly 100 U.S. institutions that have achieved international pre-eminence in producing a very high percentage of the most important fundamental and practical discoveries in the world. They are the engines of our prosperity.

(Note Jonathan Cole: "What has made these universities so distinguished is NOT the quality of their undergraduate programs. While such transmission of knowledge is a core mission of our universities, it is now what makes them the best.")

Why are they important?

Congress: America's research universities are admired throughout the world, and they have contributed immeasurably to our social and economic well-being. Our universities, to an extent unparalleled in other countries, are our Nation's primary source of long-term scientific, engineering, and medical research.

National Academies: Research universities provide the new knowledge and train the researchers necessary to sustain an innovation-driven and globally competitive national economy.

Glion Declaration: For a thousand years the university has benefited our civilization as a learning community where both the young and the experienced could acquire not only knowledge and skills, but the values and discipline of the educated mind. It has defended and propagated our cultural and intellectual heritage, while challenging our norms and beliefs. It has produced the leaders of our governments, commerce, and professions. It has both created and applied new knowledge to serve our society. And it has done so while preserving those values and principles so essential to academic learning: the freedom of inquiry, an openness to new ideas, a commitment to rigorous

study, and a love of learning.

Whom do they serve?

The nation? The states? The world?
The public? Industry? Students?

How many "world-class" research universities do we need?

Currently less than 100

30 private

60 public

(use David Ward's estimate that it takes 5 M citizens to support one world-class public research university)

Do we need more?

Who should support the core functions of the research university?

Old model:

Privates supported by tuition, philanthropy, endowment

Publics supported by states and tuition

New model: Graduate education and research supported primarily by federal government? (Just as they are in most other nations?)

How should they be governed?

Old model: Privates by trustees. Publics by political governing boards.

New model: Hybrid boards representing multiple constituencies?

How diverse should the U.S. research system be?

Comprehensive Universities?

Specialized (MIT, Caltech?) Liberal Arts (Princeton?)

Graduate only (Rockefeller?)

Geographical distribution?

What is the balance among their roles?

Knowledge generation (research and scholarship)

Human resources (graduate education, professional

education)
 Knowledge diffusion (innovation, tech transfer)
 Undergraduate education
 Service missions
 Health care
 Economic development
 International development
 Entertainment (e.g., college sports???)

How should the research university ecosystem evolve?

Intensely competitive vs. highly coordinated
 (market-driven or policy-driven)
 Entrepreneurial
 Federal policies
 State policies

Patrons and missions

UG education (parents, states, endowment)
 Graduate education (feds)
 Professional education (students)
 Research and scholarship (feds)
 Culture, values, humanities (private, foundations)
 Knowledge diffusion (entrepreneurial, private sector, states, feds)
 Other patrons (investment community, international)
 Financed from “value” of degree (e.g., income-contingent loans)

To what degree do we need to address the internal character of the American research university, e.g., graduate education, research culture (e.g., its feudal nature of exploiting young scholars), challenges to academic integrity and values from forces such as commercialization, anti-intellectualism, etc.

TODAY’S CHALLENGES

Unsustainable financial models since graduate education and research requires subsidy

Ivy Model: Focus on a small, high quality UG college for future leaders who will then pay back through philanthropy resources sufficient to build a massive endowment that can be used to sustain graduate

education and scholarship (Yale, Harvard, Stanford)

UC Model: Exceptionally generous state support, part of which is designed to finance world-class graduate education and scholarship (UC, UNC, UT)

Today the Ivy Model is available only to a handful of elite private universities whose endowments have reached a level of \$1 M/student or higher. With tuition levels now approaching a ceiling, it is unlikely that many other private institutions will be able to create the required endowments.

The UC Model looks increasingly problematic in the face of anticipated erosion of state support of public research universities over the next several decades as aging populations give highest priority for tax dollars to retirement security, health care, and tax relief rather than education.

In real dollars, our nation’s investment in basic research peaked earlier this decade, then dropped and has remained flat in recent years. Federal policymakers have expressed a desire to bolster research funding but they have not yet followed through. Corporate support of both campus-based research and employee education has also dropped over the past decade. Furthermore, other resources that have subsidized graduate education and research such as clinical income are likely to decline in view of current federal policies (health care legislation, federal debt reduction).

In the current difficult financial climate, many private universities are facing challenging times as their endowments have seriously eroded. A few private research universities have endowments large enough to emerge strong from the current economic situation in the long-run. Smaller privates, however, may face a decade or more with depleted resources.

State appropriations, which are cyclical in nature to be sure, have over the long term declined relative to total state expenditures, personal income, and university instructional costs and operating budgets. This has had an important negative impact on public research universities with regard to faculty hiring, faculty-student ratios, research quality, and student learning outcomes even while public institutions also face growing expectations for broadening access, providing new knowledge, and meeting demands for transparency and accountability.

The outlook for improving this financial trend

would have been cloudy at best given the competition for state resources from unfunded federal mandates (e.g., Medicaid) and the policy priorities of an aging population (e.g., tax reduction, health care, retirement, and security). With the current deep recession and financial storm, the outlook is even grimmer. Indeed, the sources that universities would have turned to help with difficult budget situations—state appropriations, tuition, private philanthropy, and clinical revenue—will all be constrained for the foreseeable future.

Federal policies

Inadequate support of existing federally procured research (ICR rates, cost-sharing) (roughly 25% of costs of federal research born by institutions)

Imbalance of federal research support among the disciplines (e.g., NIH at \$32 B/Y, NSF at \$6 B/y, DOE Energy R&D at \$3 B/y)

1970s policy shift in grad support, away from fellowships/traineeships to research assistantships (creating a feudal system)

Shifting balance from PhD students to postdocs (to avoid tuition costs)

The degree to which shifting state and federal policies (e.g., tax policy, financial aid policies, tuition constraints, sponsored research policies, affirmative action constraints) differentially affect various elements of the U.S. research university enterprise.

Absence of coherent federal policy aimed at sustaining research universities (and instead focusing on individuals, e.g., student financial aid and faculty research grants but NOT on institution building) in contrast to most other nations.

State policies

This is a time when the strength, prosperity, and welfare of a nation demand a highly educated citizenry and institutions with the ability to discover new knowledge, develop innovative applications of discoveries, and transfer them to the marketplace through entrepreneurial activities. Yet such vital national needs are no longer top state priorities.

Highly trained and skilled labor has become more mobile and innovation more globally distributed. Many

of the benefits from graduate training—like the benefits of research—are public goods that provide only limited returns to the states in which they are located. The bulk of the benefits is realized beyond state boundaries. Hence, it should be no surprise that many states have concluded that they cannot, will not, and probably should not invest to sustain world-class quality in graduate and professional education— particularly at the expense of other priorities such as broadening access to baccalaureate education. Today, not only is state support woefully inadequate to achieve state goals, but state goals no longer accumulate to meet national needs.

The declining priority that states have given to public higher education makes sense for them but is a disaster for the nation. The growing mismatch between state priorities and national needs suggests that it's time once again to realign responsibilities between the state and the nation for higher education and provide adequate resources to sustain American leadership.

Global competition

"The U.S has reason to worry about the competitive position of its research universities. In the Times Higher Education ranking of the world's top 100 universities, the U.S. and Europe have equal numbers and there are strong and emerging institutions from Japan, Australia, China and South Korea. Across the world, other nations are taking steps to strengthen higher education generally and to advance their research capabilities. Meanwhile, our research universities are facing critical concerns

The rapid economic development of Asia since World War II -- starting with Japan, South Korea, and Taiwan, then extending to Hong Kong and Singapore, and finally taking hold powerfully in India and mainland China -- has forever altered the global balance of power. These countries recognize the importance of an educated work force to economic growth, and they understand that investing in research makes their economies more innovative and competitive.

Today, China and India aspire to create a limited number of world-class universities. In China, the nine universities that receive the most supplemental government funding recently self-identified as the

C9 -- China's Ivy League. In India, the Ministry of Human Resource Development recently announced its intention to build 14 new comprehensive universities of "world-class" stature"

Such initiatives suggest that governments in Asia understand that overhauling their higher-education systems is required to sustain economic growth in a postindustrial, knowledge-based global economy. They are making progress by investing in research, reforming traditional approaches to curricula and pedagogy, and beginning to attract outstanding faculty from abroad. Many challenges remain, but it is more likely than not that by midcentury the top Asian universities will stand among the best universities in the world."

To this one should add the growing quality of European research universities, both because of major regional efforts such as the Bologna Process, and the commitment of nations to focus resources to build a small number of world-class universities.

The changing environment for education and research

Changing role and character of the faculty

Major responsibility for revenue generation added to traditional roles of teaching, research, and scholarship have overloaded many faculty members, particularly at the junior level.

The use of non-tenure track instructors and lecturers that now provide the majority of undergraduate instruction in many institutions

Increasing mobility among institutions (including international mobility)

Graduate students are supported by research assistantships rather than fellowships/trainingships creates a feudal culture. Time to degrees and permanent positions are lengthening with postdoc requirements

Research paradigms are shifting; in physical and biomedical science to "big science" paradigm in which hundreds (at LHC thousands) work together on massive projects, cyberinfrastructure paradigms, augmenting theory and experiment with simulation and data mining, functionally complete research environments in cyberspace, and social networking and immersive technologies,

Winner-take-all competition: The changing nature

of the interdependence of various elements of the American research university enterprise, both through competition and cooperation. The degree to which shifting state and federal policies (e.g., tax policy, financial aid policies, tuition constraints, sponsored research policies, affirmative action constraints) differentially affect various elements of the U.S. research university enterprise. Today serious imbalances have arisen in available funding, policy restrictions, and political constraints that are transforming beneficial competition into a predator-prey relationship that threatens not only numerous institutions but puts at risk the quality of the entire American research university ecosystem and hence the national interest.

Mission distraction: pressures to expand undergraduate enrollments ("Massification"), mission creep of auxiliary activities (inability to say "no" to increasing revenues), growth (budgets, facilities, enrollments, football stadiums...), imbalance between UG, grad, and prof education

Governance, Management, and Leadership: The complexity, scale, impact, and importance of contemporary research universities may have outstripped the capacity of lay boards to govern them with competence and accountability.

Inadequate understanding by the American public (anti-intellectualism, costs)

While public understands UG education, they have little understanding of the role of the "universitas" in creating new knowledge (and stimulating innovation).

Recent university behavior has undermined public confidence: research integrity (e.g., conflict of interest), intercollegiate athletics, executive compensation.

Intellectual challenges (Jonathan Cole): I believe that the chief threats to our standing come from within the United States rather than from foreign competition."

- Threats to the values of free inquiry and open communication (both political and misguided national security restrictions).

- Erosion of state support (with UC as poster child).
- Commercialization of intellectual property undermining core values of open communication.
- Intolerance of views that challenge orthodoxy.
- Impact of anti-intellectual forces on structure and values of higher learning.'

SWOT ANALYSIS

(STRENGTHS, WEAKNESSES, OPPORTUNITIES,
THREATS)

Strengths

National Priorities Requiring Research Universities

- Security (Defense, Terrorism)
- Economic Prosperity
- Public Health
- Preservation and Transmission of Culture
- Citizens for a Democratic Society
- Enlightened Criticism

Unique Contributions of Research Universities

- New knowledge (basic and applied R&D)
- Scholars, scientists, researchers
- Knowledge-intensive professionals
- Knowledge-intensive services
- Knowledge/culture repositories
- Social criticism, leadership

Weaknesses

- Obsolete financial models
- Obsolete public policies (both federal and state)
- Inadequate alignment with U.S. priorities
- Mission creep
- Institutional competition (“winner take all”)
- STEM pipeline
- Obsolete governance, management, leadership
- Inadequate capacity for change
- Changing professoriate
- Obsolete doctoral/postdoc training (feudal system)

Threats

- Globalization
- Human capital (changing demographics)
- Financial sustainability (particularly of flagship public universities)
- Technological change
- Public/political awareness
- Challenges to academic freedom and integrity
- Lack of a national strategy

Opportunities

- Use crisis to stimulate change
- Develop new financial models for 21st Century
- Restructure graduate education (“Flexner Report”

for the PhD)

- Rebalance competition and cooperation
- Redefine core mission (“core-in-cloud”)
- Explore new paradigms (e.g., global, open-source, ecology)

TOMORROW’S POSSIBILITIES

Driving Forces

- Knowledge Economy
- Globalization
- Demographics
- Technology
- Innovation
- Global sustainability

Game Changers

- The Need for Lifelong Learning
- The Globalization of Higher Education
- The Changing Nature of Discovery, Learning, and Innovation
- Universal Connectivity
- Technological Singularities (e.g., sentient artificial intelligence)

Paradigm Shifts

- Restructuring of higher education “industry”
- Global knowledge and learning industry
- Continued growth of for-profit sector
- Mergers and acquisitions
- Commodity products
- Unbundling of missions of universities
- Open knowledge and learning paradigms (digital libraries, OCW, MOOCs)
- Learning ecologies and ecotones (intelligent tutors, immersive learning)
- Renaissance (“maker” societies)
- Enlightenment (providing the “light of knowledge and learning” to the world)
- Globally connected, knowledge and learning enabled civilization

Chapter 5

Public Universities

America's public research universities are the backbone of advanced education and research in the United States today. They conduct most of the nation's academic research (62%) while producing the majority of its scientists, engineers, doctors, teachers, and other learned professionals (70%). They are committed to public engagement in every area where knowledge and expertise can make a difference: basic and applied research, agricultural and industrial extension, economic development, health care, national security, and cultural enrichment (McPherson, 2009).

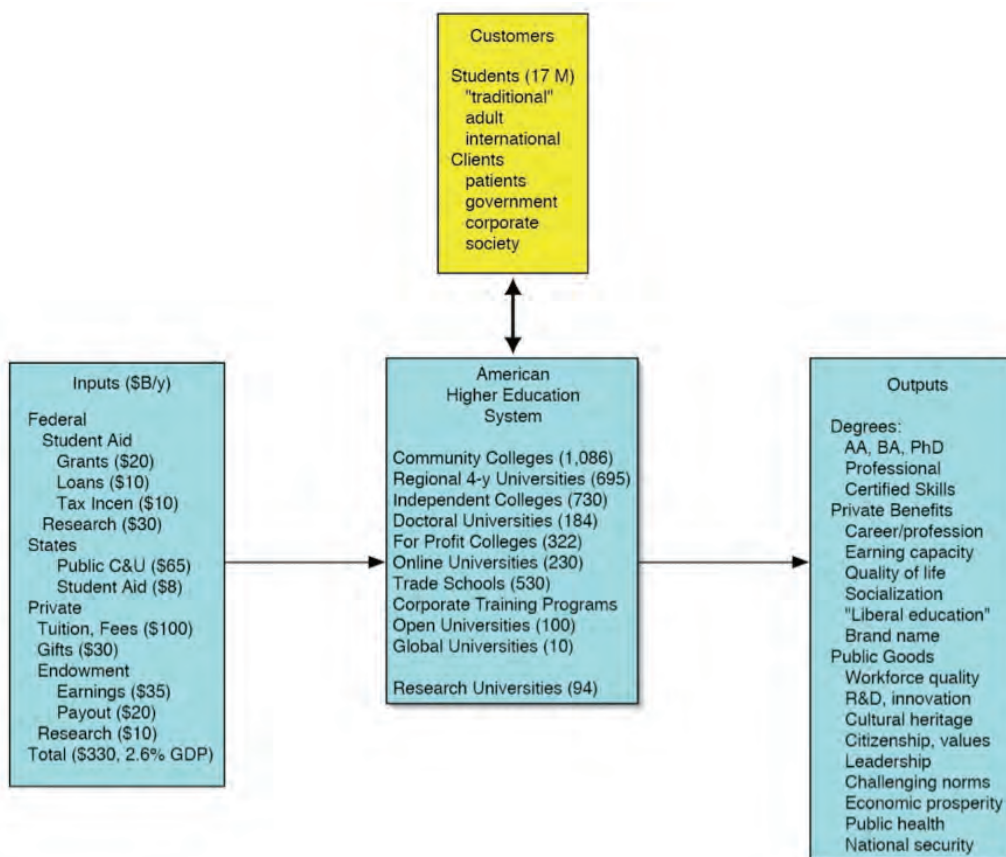
Ironically, America's great public research universities were not created by the states themselves but instead by visionary federal initiatives. During the early days of the Civil War, Congress passed the Morrill Land Grant Act (1862) that provided revenues from the sale of federal lands to forge a partnership between the states and the federal government aimed at creating public universities capable of extending higher education opportunities to the working class while conducting applied research to enable American agriculture and industry to become world leaders.

Some eighty years later, in the closing days of World War II, a seminal report, drafted by wartime research director Vannevar Bush persuaded the nation to invest heavily in campus-based research and graduate education through new federal agencies such as the National Science Foundation (Bush, 1945). Once again, the key theme was sustaining a close partnership between the federal government, the states, universities, and industry for the conduct of research in the national interest. This shaped the evolution of the American research university as we know it today (Cole, 2009).

The public research universities created by these two federal initiatives have become key assets in providing the steady stream of well-educated people,

scientific knowledge, and technological innovations central to our robust economy, our vibrant culture, our vital health enterprise, and our security in a complex, competitive, and challenging world. In fact, it was the public research university, through its land-grant tradition, its strong engagement with society, and its commitment to educational opportunity in the broadest sense, that was instrumental in creating the middle class, transforming American agriculture and industry into the economic engine of the world during the 20th century, and defending democracy during two world wars. Today, public research universities must play a similarly critical role in enabling America to compete in an emerging global economy in which educated citizens, new knowledge, and innovation are key.

Yet today, despite their importance to their states, the nation, and the world, America's public research universities are at great risk. Many states are threatening both the quality and capacity of their public research universities through inadequate funding and intrusive regulation and governance. Rising competition from generously endowed private universities and rapidly evolving international universities threaten their capacity to attract and retain talented students and faculty. While the current budget difficulties faced by the states are painfully apparent, and the highly competitive nature of American higher education is one of its strongest features, it is also important to recognize that public research universities are critical national assets, key to the nation's economic strength, public welfare, and security. It would be a national disaster if the crippling erosion in state support and predatory competition among institutions were to permanently damage the world-class quality of the nation's public research universities.



U.S. Higher Education by the numbers

Today's Challenges Facing Public Research Universities

Challenge 1: Shifting Public Priorities

Today the nation's public research universities face urgent and at times contradictory marching orders. They are challenged by their states to expand participation in higher education significantly and to increase baccalaureate degree production in an effort to enhance workforce quality. At the same time, the nation depends upon them to produce both the world-class research and the college graduates at all levels necessary to sustain an innovation-driven and globally competitive national economy. Aging populations are increasingly dependent upon the clinical services of their medical centers. Local economies depend both on their talented graduates and their entrepreneurial spinoff of companies to market their research achievements. In an increasingly fragmented and hostile world, the nation continues to depend, for its security, on the science

and technology developed on their campuses. Meeting these myriad challenges is increasingly difficult as state support of higher education erodes and political constraints on public institutions multiply.

There is ample evidence from the past three decades of declining support that the states are simply not able—or willing—to provide the resources to sustain growth in public higher education at the rate experienced in the decades following World War II. Despite the growth in enrollments and the demand for university services such as health care and economic development, most states will be hard pressed to sustain even the present capacity and quality of their institutions. In the wake of the recent global financial crisis, many states have already enacted drastic cuts in state appropriations, ranging from 20% to 50% (SHEEO, 2016). In this budget-constrained climate, public support of higher education and research is no longer viewed as an investment in the future but rather as an expenditure competing with the other priorities of aging populations, e.g., health care, retirement security, safety from crime,

	Research and Doctoral Universities			Other Four-Year Institutions (Master's and Bachelor's Degrees)	Two-Year Institutions (Associate Degree)	Flagship ÷ Two-Year Subsidy
	Flagships	Non-Flagships	All Research/ Doctoral			
1988	\$12,007	\$10,086	\$10,717	\$7,379	\$4,895	2.45
1993	\$10,899	\$8,632	\$9,470	\$6,319	\$4,075	2.67
1998	\$11,833	\$9,756	\$10,125	\$7,084	\$4,898	2.42
2003	\$11,269	\$8,968	\$9,599	\$6,885	\$4,353	2.59
2008	\$11,073	\$9,303	\$9,558	\$6,916	\$4,781	2.32
2013	\$8,362	\$6,117	\$6,717	\$5,006	\$3,409	2.45
Percentage Change: 1988 to 2013	-30.4%	-39.4%	-37.3%	-32.2%	-30.4%	

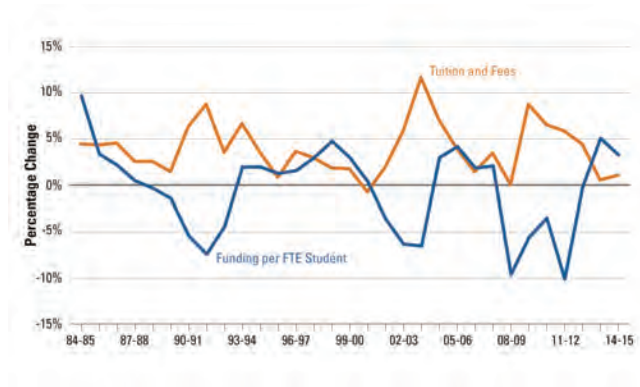
Median State Support per Student

and tax relief. Instead, state governments are urging their research universities to wean themselves from state appropriations by developing and implementing strategies to survive what could be a generation-long period of state support inadequate to maintain their capacity, quality, and reputation.

Challenge 2: The Changing Relationship between Universities and Government

Ironically, even as state support has declined, the effort to regulate universities and hold them accountable has increased. To some degree, this is evidence of governments attempting to retain control over the sector through regulation even as their financial control has waned. Most state governments and public university governing boards tend to view their primary roles as oversight to ensure public or political accountability rather than as stewardship to protect and enhance their institutions so that they are capable of serving both present and future generations. Furthermore, many public research universities today find themselves constrained by university systems, characterized both by bureaucracy and system-wide policies for setting tuition levels and faculty compensation that fail to recognize the intensely competitive environment faced by research universities.

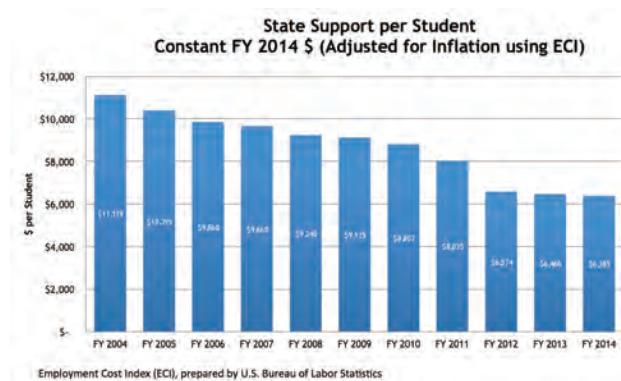
Yet something more fundamental is occurring. While it was once the role of governments to provide for the purposes of universities, today it is now the role of universities to provide for the purposes of



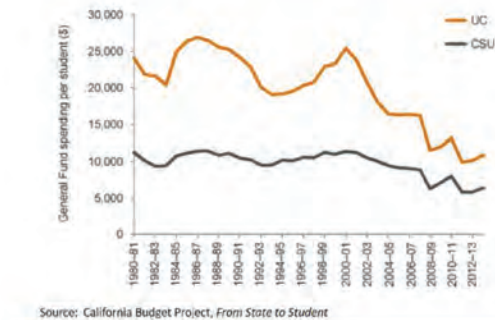
The Correlation between state funding and tuition

government. As costs have risen and priorities for tax revenues have shifted to accommodate aging populations, governments have asked more and more stridently, what are universities for? The imperatives of a knowledge-driven global economy have provided a highly utilitarian answer: to provide the educated work-force and innovation necessary for economic competitiveness. Governments, in other words, increasingly regard universities as delivery agencies for public policy goals in areas such as economic development and workforce skills that may be tangential to their primary responsibilities of education and scholarship (Newby, 2011).

While it is certainly true that cost-containment and accountability are important issues, it is also the case that most public universities can rightly argue that the main problems for them today is that they are both seriously underfunded through state appropriations and seriously overregulated by state policies in areas such as employment, financial affairs, tuition control, and open meetings requirements. Little wonder that public university leaders are increasingly reluctant to cede control of their activities to state governments. Some institutions are even bargaining for more autonomy from state control as an alternative to restoration of adequate state support, arguing that if granted more control over their own destiny, they can better protect their capacity to serve the public.



State Support for UC and CSU has Declined Dramatically Since 1980-81



Examples of the collapse in state funding in Michigan and California

Challenge 3: A Rapidly Changing Competitive Environment

The highly competitive nature of higher education in America, where universities compete aggressively for the best faculty members, the best students, resources from public and private sources, athletic supremacy, and reputation, has created an environment that demands achievement. However, while competition within the higher education marketplace can drive quality, if not always efficiency, it has an important downside. When serious imbalances arise in available funding, policy restrictions, and political constraints, such competition can deteriorate into a damaging relationship that not only erodes institutional quality and capacity, but also more seriously threatens the national interest. It can create an intensely Darwinian winner-take-all ecosystem in which the strongest and wealthiest institutions become predators, raiding the best faculty and students of the less generously supported and more constrained public universities and manipulating federal research and financial policies to sustain a system in which the rich get richer and the poor get devoured (Duderstadt, 2005).

This ruthless and frequently predatory competition poses a particularly serious challenge to the nation's public research universities. These institutions now find themselves caught with declining state support and the predatory wealthy private universities competing for the best students, faculty, and support. Of course, most private universities have also struggled

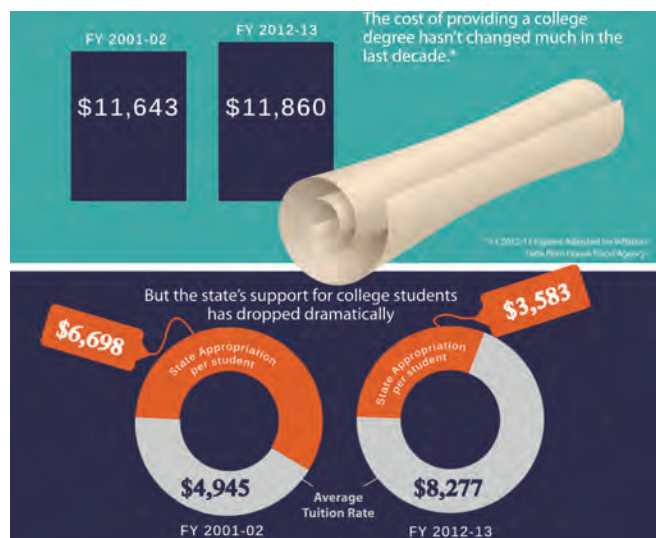
through the recent recession, though for some elite campuses this is the first time in decades they have experienced any bumps in their financial roads. Yet their endowments and private giving will recover rapidly with a recovering economy, and their predatory behavior upon public higher education for top faculty and students will resume once again.

What to Do? Institutional Strategies for the Near Term

Streamlining, Cost-Containment, Productivity Enhancement

Clearly, in the face of the impact of aging populations and the global financial crisis on state and federal budgets and hence on support for higher education, the nation's public research universities must intensify their efforts to increase efficiency and productivity in all of their activities. In particular, they should set bold goals for reducing the costs of their ongoing activities. Many companies have found that cost reductions and productivity enhancement of 25% or greater are possible with modern business practices such as lean production and total quality management. While universities have many differences from business corporations—for example, cost reductions do not drop to the bottom line of profits—there is likely a very considerable opportunity for process restructuring in both administrative and academic activities (ITS, 2010).

Of course, in the face of deep cuts in state

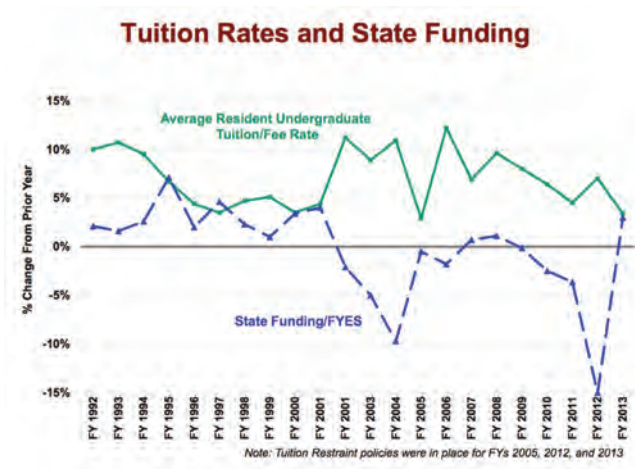


The actual costs of higher education in Michigan have been constant since the 1980s.

appropriations, most public research universities have already been engaged in intense cost-cutting efforts, particularly in non-academic areas such as financial management, procurement, energy conservation, competitive bidding of services, and eliminating unnecessary regulation and duplication. They have cut hundreds of millions of dollars of recurring costs from their budgets. But it is now time to consider bolder actions that require restructuring of academic activities as well. Some obvious examples include:

- Moving to year-round operation to maximize use of campus facilities
- Working with peer institutions to develop better metrics and accounting practices to achieve efficiency and productivity
- Making more extensive use of information technology (e.g., online learning, research collaboration among institutions, and sharing of expensive research facilities)
- Exploring model programs to reduce time to degree (e.g., three-year BA/BS and five-year PhD)
- Developing new models for junior faculty development and senior faculty retirement

In fact, it might even be time to take on third rail issues such as faculty tenure by reconsidering the appropriate balance between the role of tenure in protecting academic freedom and providing the security of career-long employment, particularly in professional schools such as medicine and engineering



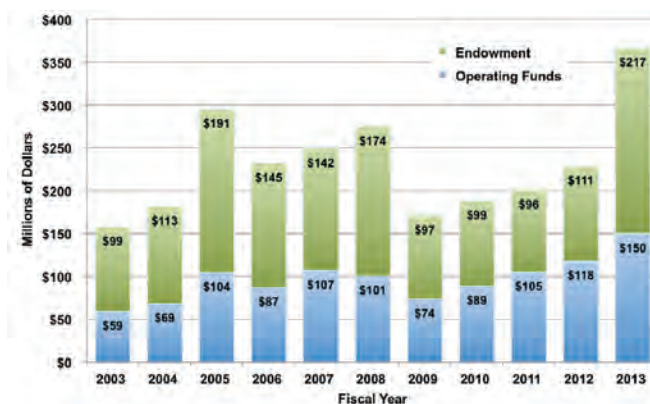
However the declining state support has pushed the tuition up to cover the constant costs

where professional practice is comparable to faculty scholarship in determining both faculty contributions and compensation.

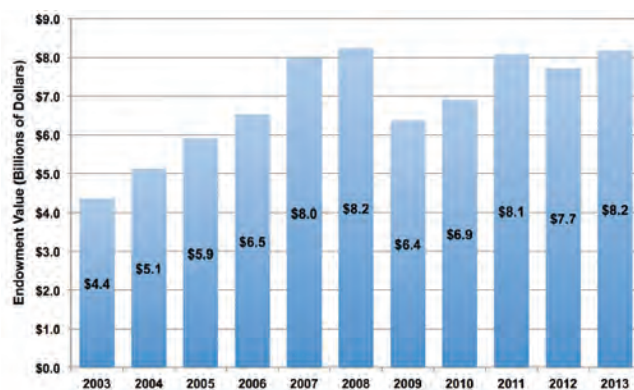
Clearly, current financial models for most American research universities are unsustainable and must be restructured (Zemsky, 2005, 2009). Yet, while efficiency, streamlining, cost reductions, and productivity enhancement are all necessary, eventually stakeholders of American higher education must address the dramatic decline in research university support through investments from all sources—federal government (particularly for graduate education), states, private sector, and students (tuition). As any business executive knows all too well, relying entirely on cost-cutting and productivity enhancement without attention to top line revenue growth eventually leads to Chapter 11!

Privatizing the Public University

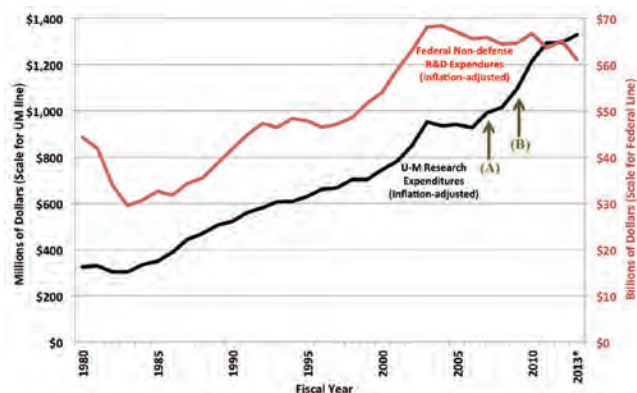
Declining state support is driving many public research universities to emulate their private counterparts in the development of an entrepreneurial faculty culture and in the manner in which priorities are set and assets are managed (Ehrenberg, 2006). In such universities, only a small fraction of operating or capital support comes from state appropriation. Like private universities, these institutions depend on tuition, federal grants and contracts, private gifts, and revenue from auxiliary services such as health care for



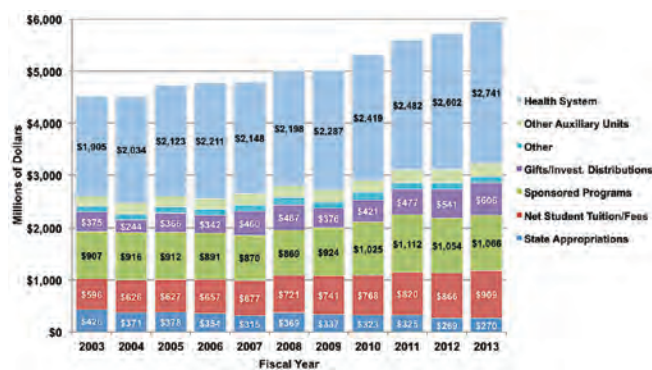
Gifts to the University



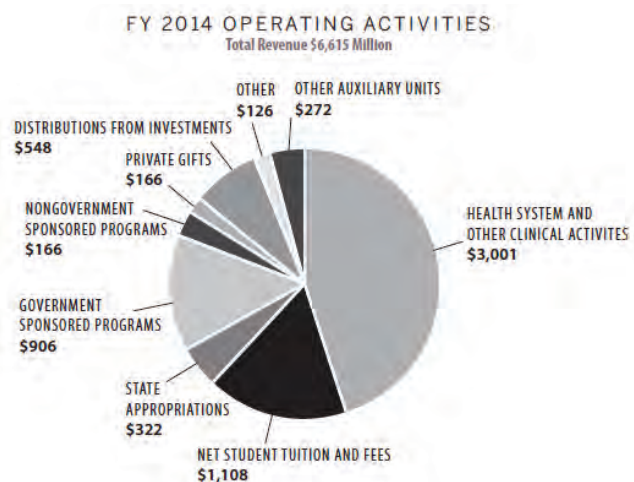
Endowment Growth



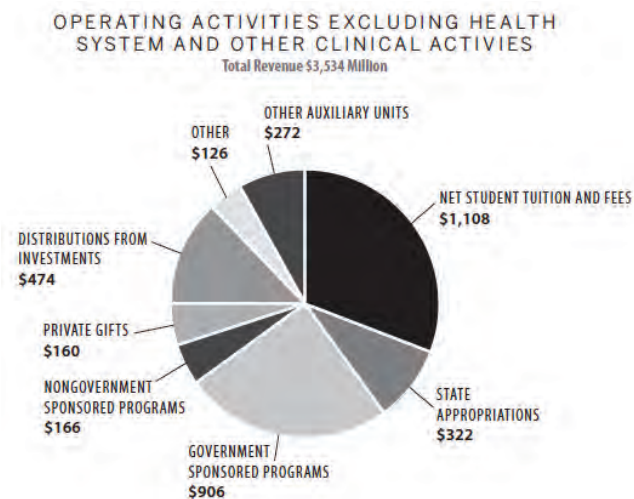
Growth in research expenditures



Operating Revenues (inc Hospitals)



UM Total Budget (including hospitals)



UM Academic Budget (without hospitals)

The University of Michigan provides an example of a privately supported but publicly committed institution.

most of their support.

In fact, many states are encouraging their public universities to reduce the burden of higher education on limited state tax revenues by diversifying their funding sources, e.g., by becoming more dependent upon tuition—particularly that paid by out-of-state students—by intensifying efforts to attract gifts and research contracts, and by generating income from intellectual property transferred from campus laboratories into the marketplace. Some states are even encouraging experimentation in creating a more differentiated higher education structure that better aligns the balance between autonomy and accountability with the unique missions of research universities. Examples include Virginia’s effort to provide more autonomy in return for accountability for achieving negotiated metrics, Colorado’s voucher system, performance funding in South Carolina, and cohort tuition in Illinois (Breneman, 2005).

Yet, such efforts to “privatize” the support of public universities through higher tuition or increasing out-of-state enrollments can also encounter strong public and political opposition, even though there is ample evidence that to date tuition increases at most public institutions have not been sufficient to compensate for the loss in state appropriations (Desrochers, 2011). Furthermore, since state support is key to the important public university mission of providing educational opportunities to students regardless of economic means, shifting to high tuition funding, even accompanied by increased financial aid, usually leads to a sharp decline in the socioeconomic diversity of students (Haycock, 2008, 2010).

The privatizing strategy is flawed for more fundamental reasons. The public character of state research universities runs far deeper than financing and governance and involves characteristics such as their large size, disciplinary breadth, and deep engagement with society through public service. These universities were created as, and today remain, public institutions with a strong public purpose and character. Hence the issue is not whether the public research university can evolve from a “public” to a “private” institution, or even a “privately funded but publicly committed” university. Rather, the issue is a dramatic broadening of the “publics” that these institutions serve, are supported

by, and become accountable to, as state support declines to minimal levels.

Extending the Land-Grant Paradigm to a New Century

The success of the land-grant university suggests that this model could serve as the platform for the further evolution of the public research university. For example, both the role of research universities in contributing to the innovation necessary to compete in a knowledge-driven global economy and the changing nature of the research necessary to stimulate breakthrough discoveries and transfer into the marketplace may require new research paradigms. In particular, with the disappearance of many of the nation’s leading industrial research laboratories (e.g., Bell Labs), there is a need for new university-based paradigms to conduct translational research, capable of building the knowledge base necessary to link fundamental scientific discoveries with the technological innovation necessary for the development of new products, processes, and services.

To fill this gap, the federal government has recently launched a series of “innovation hubs” involving research universities, national laboratories, and industry designed to link fundamental scientific discoveries with technological innovations (Duderstadt, 2010). However, in reality, this is simply the repurposing of the land-grant agricultural and industrial experiment stations established by the Hatch Act of 1887, a partnership involving higher education, business, and state and federal government that developed and deployed the technologies necessary to build a modern industrial nation for the 20th century while stimulating local economic growth. The highly successful model of land-grant experiment stations and cooperative extension services can clearly be broadened beyond agriculture and industrial development as an expanded mission for land-grant and other public universities to address major national challenges such as building a sustainable energy infrastructure, providing affordable health care for aging populations, and developing new, globally competitive manufacturing industries. In fact, one might even imagine shifting the 19th and 20th century land-grant priorities from developing the vast

natural resources of a young nation to instead focusing on the key resources of the 21st century knowledge economy: the skills, knowledge, innovation, and entrepreneurial spirit of our people. The field stations and cooperative extension programs—perhaps now as much in cyberspace as in a physical location—could be directed to regional learning and innovation needs.

The land-grant model of linking federal and state investment and interest with higher education and business to serve national and regional needs, while initially intended for agriculture and industry, remains a very powerful paradigm for the conduct of both basic and applied research aimed at a very broad range of contemporary needs and priorities.

What to Do? The State Role

Balancing Governance, Autonomy, and Accountability

Many of the most powerful forces driving change in higher education come from the marketplace, driven by new societal needs, the limited availability of resources, rapidly evolving technologies, and the emergence of new competitors such as for-profit ventures. Clearly, in such a rapidly changing environment, agility and adaptability become important attributes of successful institutions.

Unfortunately, the governance of public universities, whether at the level of state government or institutional governing boards, is more inclined to protect the past than prepare for the future. Furthermore, all of higher education faces a certain dilemma related to its being far easier for a university to take on new missions and activities in response to societal demand than to shed missions as they become inappropriate, distracting, or too costly. This is a particularly difficult matter for public universities because of intense public and political pressures that require these institutions to continue to accumulate missions, each with an associated risk, without a corresponding capacity to refine and focus activities to avoid risk. Examples here would include pressures to launch expensive new academic programs in areas such as medicine or engineering without adequate resources or to embark on high-risk economic development activities through university-

business partnerships that may be incompatible with the academic culture. Furthermore there are many demands from state and federal government, governing boards, and public opinion for increasing accessibility, decreasing costs, and accountability for learning outcomes. All of these forces have long constrained the agility of public universities (Miller, 2006).

Little wonder that one finds an increase in the efforts of public research universities to free themselves from the constraints of politically-determined governing boards, the tyranny of university systems, and the intrusive regulation of state government in the hope of achieving the autonomy and agility to adapt to a future with limited state support. Steps should be taken to ensure that during a time of great financial stress on flagship public universities, they are provided with the autonomy and agility to restructure their operations to enable them to survive with their quality intact what is likely to be a generation-long period of inadequate state support. After all, should the states intentionally allow their public research universities to decline significantly in quality and capacity, it would be a major blow to the nation's prosperity and security since public universities are the primary source of advanced degrees and basic research for the United States. Put another way, states should be warned not to add insult to injury by strangling their research universities with unnecessary regulation or intrusion on sensitive political issues such as climate change or gay rights, even as they starve them with inadequate support.

Mission Differentiation and Profiling

It is apparent that the great diversity of higher education needs, both on the part of diverse constituencies (young students, professionals, adult learners) and society more broadly (teaching, research, economic development, cultural richness), demands a diverse higher education ecosystem of institutional types. Key is the importance of mission differentiation, since the availability of limited resources will allow a small fraction of institutions to become globally competitive as comprehensive research institutions (Duderstadt, 2009).

Although most states have flagship state research universities, they also have many other public colleges

and universities that aspire to the full array of missions characterizing the comprehensive public research university. Community colleges seek to become four-year institutions; undergraduate colleges seek to add graduate degree programs; and comprehensive universities seek to become research universities. Since all colleges and universities generally have regional political representation, if not statewide influence, they can frequently build strong political support for their ambitions to expand missions. Even in those states characterized by “master plans” such as California, there is evidence of politically driven mission creep, leading to unnecessary growth of institutions and wasteful overlap of programs.

A differentiated system of higher education helps to accomplish the twin goals of enhancing educational opportunity and conducting research of world-class quality. But it assigns different roles in such efforts for various institutions. Clearly, limited resources will allow only a small fraction of institutions to become globally competitive as comprehensive research institutions.

So how many world-class research universities can a state—or the nation, for that matter—really afford? This is a highly charged question that usually engenders strong political rhetoric. But perhaps here we can rely upon (or blame) a calculation once made by David Ward, former president of the American Council of Education and chancellor of the University of Wisconsin, Madison. He estimated that supporting a public world-class research university with an annual budget in excess of \$1 billion or more requires the tax base of a population of five million or greater. Ward’s calculation would suggest that nationwide we could probably afford 60 of these comprehensive flagships. But here it is also very important to add the caveat that many a university that possesses neither the resources nor the scale to become a comprehensive research university has demonstrated the capacity to mount world-class research and graduate programs in more narrowly defined areas. By focusing resources, many regional universities and independent colleges have managed to create peaks of excellence that make significant contributions in particular areas of scholarship.

What to Do? The Federal Role

The Importance of a National Strategy

Nations around the world have recognized the importance of world-class research universities and are rapidly strengthening their institutions to compete for international students and faculty, resources, reputation, and the impact of university-driven research and advanced education on economic prosperity (Weber, 2008, 2010). Yet currently the United States stands apart with no comprehensive policy for enhancing and sustaining its research universities in the face of growing international competition from abroad. In fact, many current federal policies and practices actually harm the competitiveness of American universities, e.g., the failure to cover the full costs of federally-funded research projects (indirect cost recovery, cost sharing requirements), a research appropriations process that favors political influence rather than national priorities, and regulatory constraints that discourage the recruiting of international students and faculty. There is an urgent need to develop a framework of national policies and funding goals capable of sustaining the nation’s research universities at world-class levels, embedded in a broader federal R&D policy that addresses national priorities (Augustine, 2005).

Within the broader framework of United States innovation and R&D policies, it is essential that the nation develop specific goals for sustaining the strong academic research, doctoral education, and research universities key to the nation’s capacity to compete, prosper, and achieve national goals for health, energy, the environment, and security in the global community of the 21st Century. These goals should include a framework of supportive federal funding and public policies adequate to maintain university research and graduate education at world-class levels (Berdahl, 2010; McPherson, 2010).

Fixing the Flaws

While the federal government continues to be the key sponsor of campus-based research, there is an urgent need for the federal government to end damaging fluctuations in research appropriations and

research policy and instead provide steady, sustainable, predictable support for university research over the longer term. This would enable universities to plan their own investments in research facilities and staffing, and it would enable federal research expenditures to become more effective and efficient.

During the past two decades, an era during which external support of campus-based research by federal and industrial sponsors remained at relatively constant levels (at \$32 B/y and \$2.5 B/y, respectively), there has been a very significant growth in research supported from internal university funds that now amounts to over \$10 B/y (Berdahl, 2010). While some of this university-sponsored research has supported scholarship in important areas such as the humanities and social sciences where external sponsorship is limited, much of the growth in university research expenditures has also been driven by the serious underfunding, cost-sharing requirements, and regulatory burden of the research grants and contracts commissioned from universities by government, industry, and foundations. In fact, the present financial burden associated with research grants from federal agencies is estimated by some universities to be as much as 25% of the grant amount. Since the only way for most institutions to subsidize such unsupported costs of federal and industrial research grants is through the reallocation of student tuition revenue or clinical income from patients, universities have been forced into a very awkward and politically volatile position by current federal research policies.

There is an urgent need for federal government to move over the next several years to cover the full cost of the research projects it funds at academic institutions, and it should do so across all federal agencies and universities in a consistent and transparent manner. Private foundations and industrial sponsors should also be advised not to pressure universities to waive or reduce administrative cost rates below actual expenses. In fact, research universities should actively discourage research grants and contracts characterized by inadequate funding or excessive cost-sharing that would require unreasonable subsidies from other university revenue sources such as tuition, clinical income, or donor-specified gifts.

Earlier it was noted that a serious competitive imbalance has arisen in the marketplace for the best

faculty, students, and resources, with private research universities now spending almost three times as much to educate each student and 30% more for faculty salaries (McPherson, 2009). This is due, in part, to the degree to which current federal and state policies in areas such as tax benefits, student financial aid, research funding, and regulation tend to preferentially benefit and subsidize the high-cost nature of private institutions. Since one of the great strengths of American higher education is the presence of a balanced system of world-class public and private research universities, it is important that federal and state policies treat both public and private universities in an equitable manner to achieve quality, diversity, and balance in America's higher education system rather than drive damaging predatory behavior.

Restructuring the Support and Conduct of Graduate Education

The erosion of state support of graduate education and research, particularly in areas of science and technology critical to national interests, suggest that the federal government must play a more significant role in graduate student support. In particular, the federal government should become the primary patron of advanced education in areas key to national priorities such as economic prosperity, public health, and national security, just as it accepted this responsibility for the support of campus-based research in the decades following WWII. Federal support of graduate education should be allocated to universities based on a combination of merit and impact. For example, competitive graduate traineeship programs might be used in some disciplines, while grants for other fields might be based on graduation rates or the size of graduate faculties or student enrollments (much like the capitation grants used in the health sciences). Other grants could be designed to stimulate and support newly emerging disciplines in areas of national priority such as nanotechnology or sustainable energy. A key objective would be a better balance in the support among student fellowships, traineeships, and research assistantships.

For their part, research universities should commit to correcting the current flaws in doctoral education and postdoctoral training. Numerous studies confirm

a strong consensus that by conducting graduate education in the same institutions where a large portion of the nation's basic research is done, our research universities have created a research and training system that is one of the nation's greatest strengths—and the envy of the rest of the world. Yet it is not surprising that during these times of challenge and change in higher education, the nature and quality of graduate education have also come under scrutiny. The current highly specialized form of graduate education no longer responds to the needs of many students nor of society, as evidenced by the difficulty many recent PhDs have in finding employment. Attrition in many graduate programs has risen to intolerable levels, with more than 50% of those who enroll in PhD programs failing to graduate (compared to attrition rates in law and medicine of less than 5%), while time to degree has lengthened beyond five years, only to be followed by required post-doctoral service for many disciplines. These factors have eroded the attractiveness of further graduate study for many talented undergraduates who now prefer to enroll in professional programs such as law, medicine, and business characterized by more predictable duration, completion, and compensation. It is time to launch a serious reform of graduate education in American universities comparable to those occurring in other areas of graduate and professional education (e.g., the Flexner Report in medicine).

Jump-Starting the Rebuilding of the Nation's Research Faculty During a Time of Financial Stress

There are compelling needs to replenish the faculties of the nation's research universities with new perspectives and capabilities. Yet it is also the case that many institutions are limited in their ability to add young faculty members by serious financial constraints, particularly in public universities now experiencing serious reductions in state appropriations. Furthermore, the recent recession has shaken the confidence of senior faculty enrolled in defined contribution retirement programs, delaying their decision to retire and resulting in a rapidly aging and heavily tenured faculty cadre without the turnover necessary to open up positions for new junior faculty hires. To address this current

challenge, likely to last for the next decade, the National Academies has recently proposed a federal program of matching grants to establish endowments for the support of faculty positions, modeled after highly successful programs at the University of California Berkeley and in Canada (Birgeneau, 2009; Canada Research Chairs, 2011).

For the Longer Term: Broadening the Concept of the Public Research University

The American university has changed quite considerably over the past two centuries and continues to evolve today. Colonial colleges have become private research universities; religious colleges formed during the early 19th century gradually became independent colleges; junior colleges have evolved into community colleges and then into regional universities. Today public research universities continue to evolve to adapt to changes in students (from state to national to global), support (from state to national, public to private), missions (from regional to national to global), and perception (from education as a public good to a private benefit). They are rapidly expanding their public purpose far beyond the borders of their states since the more mobile the society and global the economy, the broader the "publics" served by the university.

This broadening of the public purpose of the public research university is not only mandated by national and global needs for its services, but is also a consequence of the changing motivation of the states to invest in world-class institutions. At a time when the strength, prosperity, and welfare of nations demand a highly educated citizenry and institutions with the ability to discover new knowledge, develop innovative applications of discoveries, and transfer them into the marketplace through entrepreneurial activities, such vital national needs are no longer top state priorities (Courant, 2010). The model of state-based support of graduate education and research made sense when university expertise was closely tied to local natural resource bases such as agriculture, manufacturing, and mining. But today's university expertise has implications far beyond state borders. Highly trained and skilled labor has become more mobile and innovation more globally distributed. Most

of the benefits from the graduate training and research conducted at state research universities are public goods that provide only limited returns to the states in which they are located.

Hence it should be no surprise that today many states, caught between the financial pressures of weakened economies and the political pressure of Tea Party activists, have concluded that they cannot, will not, and probably should not invest to sustain world-class quality in graduate education and research, particularly at the expense of other priorities such as broadening access to baccalaureate education or addressing the needs of aging populations. Unfortunately, today not only is state support woefully inadequate to achieve state goals, but state goals no longer accumulate to meet national needs.

While the declining priority that states have given to public higher education may be politically acceptable in the near term, though not certainly for their long-term prosperity, such a strategy could have disastrous consequences for the nation. The scientists and engineers, physicians and teachers, humanists and artists, and designers, innovators, and entrepreneurs produced by public research universities are absolutely vital to national prosperity, security, health, and quality of life in the global, knowledge-driven economy. It is clear that the production of these critical assets can no longer be left dependent on shifting state priorities and declining state support. It is essential to realign responsibilities for support of America's public research universities such that advanced graduate and research programs of major importance to the nation are both supported by and held accountable to the needs of key stakeholders beyond state borders. Here it should be noted that both the unusually broad intellectual needs of the nation and the increasing interdependence of the academic disciplines provide compelling reasons why such federal support should encompass all areas of scholarship including the natural sciences, the social sciences, the humanities, the arts, and professional disciplines such as engineering, education, law, and medicine.

More specifically, one might consider a hybrid structure for the public research university that is better distributed for both support and governance among the states, students, the federal government, industry,

and private donors:

- The states, consistent with their current priorities for enhancing workforce quality, would focus their limited resources on providing access to quality education at the associate and baccalaureate levels, augmented by student tuition and private philanthropy.

- Students (and parents) would continue to provide support through tuition and fees, although perhaps increasingly augmented by need-dependent financial aid grants and income-contingent student loans.

- The federal government, in addition to being the leader in supporting university research, would become the primary patron of advanced education at the graduate level (i.e., master's and doctoral degree programs) across all academic disciplines (natural and social sciences, humanities, and the arts) through a coordinated system of fellowships, traineeships, and graduate student assistantships.

- Professional schools enabling high-income careers such as law, business administration, and medicine would become predominantly privately supported through high tuition (enabled by strong financial aid/loan programs) and private giving, similar to private universities.

- Foundations and individual donors would continue to play a major role in the support of both education and scholarship in selected areas while enabling the broader roles of the university such as the preservation of knowledge and culture and serving as an informed critic of society. Yet it should also be acknowledged that while such private support will become increasingly important, for most public institutions it will provide only the margin of excellence on a funding base primarily dependent upon state support and student tuition.

Of course, such an approach would require a new social contract to reflect not only the interests of the states but those of the expanding array of stakeholders providing support for such hybrid institutions. Clearly, not only the governance but the statutory responsibility and authority of these emerging institutions would need to be renegotiated. In view of the likely inability of the states to sustain the essential contributions of their research universities at a world-class level, such an evolutionary path seems not only possible but perhaps inevitable.

The Future of the Public Research University in America

An important theme throughout the history of American higher education has been the evolution of the public university. The nation's vision and commitment to create public universities competitive in quality with the best universities in the world were a reflection of the democratic spirit of a young America. With an expanding population, a prosperous economy, and imperatives such as national security and industrial competitiveness, the public was willing to make massive investments in higher education. While elite private universities were important in setting the standards and character of higher education in America, it was the public university that provided the capacity and diversity to meet our nation's vast needs for post-secondary education and research.

Today, however, in the face of limited resources and the pressing social priorities of aging populations, this expansion of public support of higher education has slowed. While the needs of our society for advanced education and research will only intensify as we continue to evolve into a knowledge-driven global society, it is not evident that these needs will be met by further expansion of our existing system of state universities. The terms of the social contract that led to these institutions are changing rapidly. The principle of general tax support for public higher education as a public good and the partnership between the states, the federal government, and the universities for the conduct of basic research and education, established in 1862 by the Morrill Act and reaffirmed a century later by post-WWII research policies, are both at risk.

These forces are already driving major change in the nature of the nation's public research universities. One obvious consequence of declining state support has been the degree to which many leading public universities may increasingly resemble private universities in the way they are financed, managed, and governed, even as they strive to retain their public character. Public universities forced to undergo this privatization transition—or, in more politically acceptable language, “self-sufficiency”—in financing must appeal to a broader array of constituencies at the national—indeed, international—level, while continuing to exhibit a

strong mission focused on state needs. In the same way as private universities, they must earn the majority of their support in the competitive marketplace, that is, via tuition, research grants, and private giving, and this will require actions that come into conflict from time to time with state priorities. Hence, the autonomy of the public university will become one of its most critical assets, perhaps even more critical than state support for many institutions.

In view of this natural broadening of the institutional mission, coupled with the increasing inability (or unwillingness) of states to support their public research universities at world-class levels, it is even possible to conclude that the world-class “state” research university may have become an obsolete concept. Instead, many of America's leading public research universities may evolve rapidly into “regional,” “national,” or even “global” universities with a public purpose to serve far broader constituencies than simply the citizens of a particular state who no longer are able or willing to provide sufficient support to sustain their programs at world-class levels. In fact, one might well argue that states today would be better off if they encouraged their flagship public research universities to evolve into institutions with far broader missions (and support), capable of accessing global economic and human capital markets to attract the talent and wealth of the world to their regions.

How might institutions embark on this path to serve far broader public constituencies without alienating the people of their states—or risking their present (albeit low) level of state support? One constructive approach would be to attempt to persuade the public—and particularly the media—that public research universities are vital to states in a far more multidimensional way than simply education alone—through health care, economic development, pride (intercollegiate athletics), the production of professionals (doctors, lawyers, engineers, and teachers), and so forth. The challenge is to shift the public perception of public research universities from that of a consumer to that of a producer of state resources. One might argue that for a relatively modest contribution toward their educational costs, the people of their states receive access to the vast resources, and benefit from the profound impact, of some of the world's great universities. It seems clear

that we need a new dialogue concerning the future of public higher education in America, one that balances both its democratic purpose with economic and social imperatives.

Today we face the challenges of a hypercompetitive global, knowledge-driven society in which other nations have recognized the positive impact that building world-class public universities can have. America already has them. They are one of our nation's greatest assets. Preserving their quality and capacity will require not only sustained investments but also significant paradigm shifts in university structure, management, and governance. It also will likely demand that public research universities broaden their public purpose and stakeholders far beyond state boundaries. Preserving the quality and capacity of the extraordinary resource represented by our public research universities must remain a national priority, even if the support required to sustain these institutions at world-class levels is no longer viewed as a priority by our states.

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Chapter 6

Financing Higher Education

The Myth¹

As fall approaches, the headlines of newspapers across the states join the din of politicians complaining about the increases in tuition at public universities. "Tuition to soar for state undergraduate students, with increases of 12%, 13%, and 18% respectively at UM, MSU, and WSU". The Governor joins in, "These increases are unacceptable. Universities must figure out a way to streamline, to tighten their belts the way the state has done." And parents and students worry about whether they will be able to afford a college education.

In Michigan, a state cursed with a weak economy, a dysfunctional state budget, and a state government that ranks higher education at the bottom of its priority list, this feeding frenzy has become an annual occurrence. Of course it is rarely mentioned that the proposed tuition increases are far below what would be necessary to compensate for the loss of state support, roughly 25% over the past several years. The cacophony of complaints also ignores the fact that the tuition cost net financial aid born by most families has actually decreased at many public universities over the past decade. But newspapers and politicians adhere to the same dictum: "Never let the truth stand in the way of a good story...or a possible vote!"

The real issue here is way that public policies and market pressures are reshaping the relationship among the cost, price, and value of a college education. It is important to distinguish myth from reality to understand the current plight of public higher education in America.

¹ This was a study conducted in 2005-2006. To maintain the proper context, the data has been left intact for those years rather than updated.

The Reality

Let's begin with a few interesting facts. First, the good news:

1. The actual cost of a college education at public universities has remained remarkably stable over the past 30 years.

2. Nationwide tuition covers, on the average, only one-third of the costs of a college education in a public university.

3. When financial aid is taken into account, many students (and parents) pay only a fraction of the stated tuition, the sticker price—about 45% on the average in Michigan, for example.

4. Access to higher education today is greater than ever before in our nation's history, both because of the availability of financial aid programs and the great multiplicity and diversity of colleges and universities, ranging from local community colleges and regional four-year institutions to small liberal arts colleges and proprietary (for-profit) institutions to elite private universities and massive public research universities. A larger proportion of the population goes on to higher education than in most other countries including a greater share of nontraditional students (adults, women, minorities), although this ranking is eroding today with declining public support.

5. American higher education remains the envy of the rest of the world, both as measured by the preference of international students to seek education in the United States and by the reputation of our top universities. As a recent major study by *The Economist* put it, "America's system of higher education is the bet in the world. It has the monopoly on the world's best universities and also provides access to higher education to the bulk of those

who deserve it." In international rankings, 17 of the top 20 universities (and 35 of the top 50) are American, employing 70% of the world's Nobel Prize winners. (The Economist, 2005)

Again to quote *The Economist*, "The main reason for America's success lies in organization. The federal government plays a very limited role. America does not have a central plan for its universities. Instead universities have a wide range of patrons, from state governments to religious bodies, from fee-paying students to generous philanthropists. Universities compete for everything, from students to professors to basketball stars."

More specifically, in the United States, the relationship among the cost of educating college students (to the institution), the price charged to students (tuition), and the value of a college degree (to the student) is determined by three key players: Universities determine both the cost and the value of a college education. States, either directly through regulation or indirectly through subsidy, determine the tuition or sticker price. And the federal government, usually in concert with the universities, determine the real cost to students through financial aid programs that provide "rebates" from the sticker price, based on either student merit or economic need.

In the simplest sense, today the United States spends roughly 2.6% of its GDP on higher education (\$330 billion), with 55% of this (\$180 B) coming from private support (e.g., tuition payments, philanthropic gifts, or revenue from auxiliary activities such as college athletics) and 40% from government; the states provide 20% (\$72 B), primarily through appropriations directly to institutions; and the federal government provides the remaining 25% (\$81 B), through federal financial aid and subsidized loans and tax benefits to students (\$60 B), research grants and contracts to universities (\$21 B), and other support for specific activities such as health care and agricultural extension. Here, it should be noted that this very large dependence on private support—and hence the marketplace—is unique to the United States since in most other nations, higher education is primarily supported (and managed) by government (90% or greater). It is the major reason why on a per student basis, higher education in America is supported at about twice the level (\$20,545 per year) as it is in

Europe. (OECD, 2005) There is a caveat here, however, since roughly half of this cost is associated with non-instructional activities such as research, health care, agricultural extension, and economic development—missions unique to American universities.

Yet another complexity arises from the hidden subsidies of higher education by both state and federal government through the foregone tax revenues arising from the treatment of university gifts and endowment earnings as charitable gifts and nontaxable income, respectively. To be more specific, when a university receives gifts that are deducted as charitable contributions, other taxpayers subsidize, in effect, these foregone taxes. Similarly, the nonprofit nature of endowment income also makes them exempt from the taxes that would apply to for-profit company revenues. It is estimated that foregone tax revenues or "tax expenditures" from charitable gifts and endowment earnings amount roughly \$16 B per year (assuming an average 30% tax rate on the \$25 B of gifts and \$27 B of endowment earnings), which amounts to a federal government subsidy of as much as \$40,000 per student at well-endowed private colleges and universities, leading to the ironic situation that when all support, public and private, is accounted for, several of these institutions are among the most "publicly supported" universities in the nation. Of course, one can make a strong case for the appropriateness of some degree of public support of private higher education. Yet these "tax expenditures", while very real and perhaps appropriate burdens on state and federal tax revenues, are rarely included in the total picture of cost, price, and value of a college education, although they would significantly modify the true costs and public subsidy picture of American higher education.

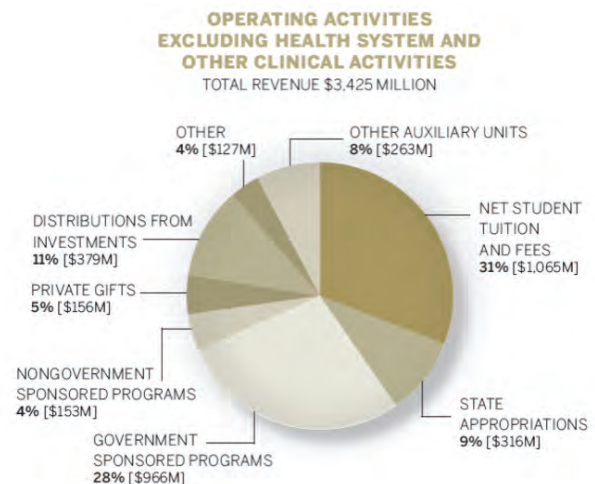
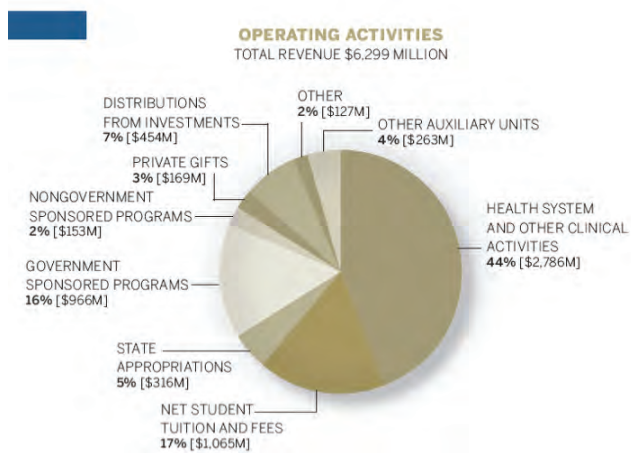
Setting the public subsidy of private higher education in America by beneficial tax policies aside for the moment, let us return to the specific case of public higher education. Recall, that students pay a sticker price, tuition, which is only about one-third of the actual cost of their education, and, in reality, when financial aid is taken into account, pay on the average about one-sixth of the tuition price. In good times, the states provide the appropriations from tax revenues that support this rather substantial price discount from the actual costs of education experienced by

Funding of US Higher Ed

- Total: \$344 B/y (2.6% of GDP)
- Private Support: \$190 B/y (55%)
 - Tuition: \$95 B/y
 - Gifts: \$30 B/y
 - Endowment: Earnings: \$35 B/y; Payout: \$20 B/y
 - Auxiliary (clinics, athletics): \$30 B/y
- State Government: \$72 B/y (21%)
- Federal Government: \$82 B/y (24%)
 - Student Financial Aid: \$50 B/y
 - Research Grants, Contracts: \$32 B/

Public Funding

- State Government: \$72 B/y (24%)
 - Public Colleges & Universities: \$60 B/y
 - Student Aid: \$10 B/y
- Federal Government: \$82 B/y (21%)
 - Student Financial Aid: \$50 B/y
 - Grants: \$35 B/y
 - Tax Benefits: \$15 B/y
 - Research Grants, Contracts: \$32 B/
- Tax Expenditures (Gifts, Endowment): \$30 B/y



Funding breakdown both for the nation and for the University of Michigan

institutions. But in hard times, when the states cut back their appropriations, then the discount shrinks, and students either have to pay more or universities have to cut programs. Actually, both usually happen.

Although most public (and political) attention is focused on tuition (price) as the key concern, in reality this has very little to do with either the access or affordability of public higher education. Put most simply, in public universities, the system works as follows:

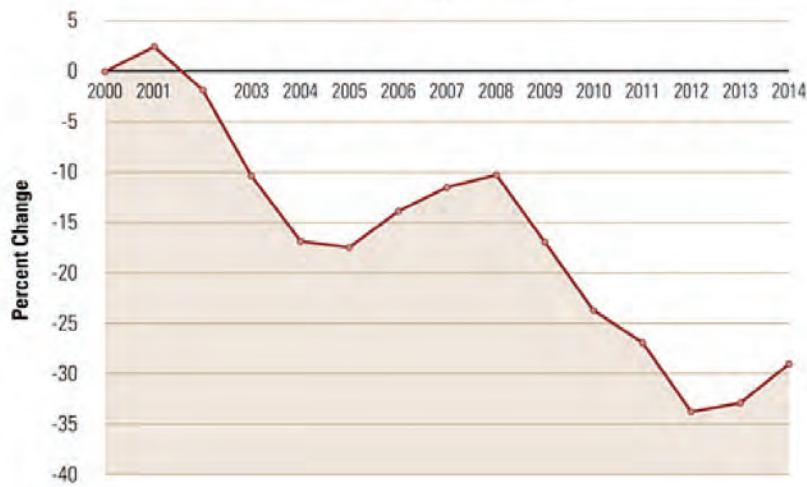
State government determines the price (tuition).

Governing boards determine the value (quality).

Need-based student financial aid determines the access (affordability).

More specifically, state government determines the price discount from the true cost of education through appropriations and hence the tuition (typically about one-third of the actual cost and usually less than the cost of room and board). If the state cuts appropriations per student, then tuition must rise to replace the lost discount. The governing board determines the quality of the university through its ability to acquire sufficient resources, either through its effectiveness in attracting adequate state appropriations or its willingness to support necessary tuition levels. Need-based financial aid is the key to student access, since this provides not only further discounting of tuition, usually eliminating it all together for students with significant need, but it also helps to cover other costs such as room and board, books, travel, and other expenses. Ironically,

**Percent Change in State Support for Public Higher Education
(All Colleges and Universities) per Full-Time Equivalent Student,
in Constant 2014 \$, since 2000**



Despite modest increases in 2013 and 2014, state support for public higher education per full-time equivalent student remains nearly 30 percent below spending in 2000, after adjusting for inflation using the State Higher Education Finance cost adjustment. **Source:** State Higher Education Executive Officers (SHEEO) Association, *SHEF: FY 2014—State Higher Education Finance* (Boulder, Colo.: State Higher Education Executive Officers Association, 2015).

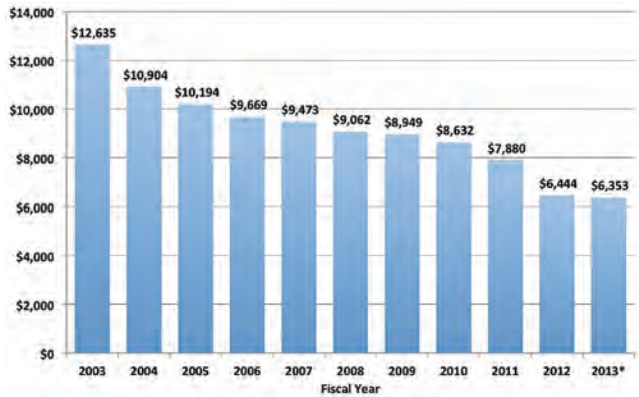
failure to set tuition sufficiently high to compensate for inadequate state support can erode both quality and access, since it constrains the resource base necessary for both quality academic programs and adequate financial aid, while providing unnecessary educational subsidies to students from more affluent backgrounds.

Now for the bad news: Public support of higher education has been dropping for the past three decades. The State of Michigan provides an excellent example of the dilemma faced by public universities. Over the past decade years, Michigan's public universities have suffered massive cuts in state appropriations, with most universities seeing reductions in state support per student over 50% during this period, ironically at a time when enrollments have been increasing. More specifically, appropriations to Michigan's public universities have declined from \$1.62 billion in FY2002 to \$1.43 billion in FY2005, with further budget cuts on the horizon in FY2014. State appropriations per students have dropped from \$7,000 to \$4,500 over this period, amounting to a 50% loss in state support when inflation adjusted. In fact, over the past two years alone, the state has cut \$260 million from the higher-education budget, an amount equal to the combined support of

seven state universities, forcing the elimination of 2,000 university jobs and denying the opportunity for a college education to many thousands of students.

During much of this period, state universities strained to hold tuition increases in check. Unfortunately state government abrogated an earlier agreement to restore funding cuts if the universities would hold tuition increases below inflation. The universities honored their end of the bargain; the state did not and cut appropriations still further, amounting over a four-year period to 25% to 40% on an inflation-adjusted, per student basis. Hence the universities had no choice in 2005 but to begin to raise tuition levels at double-digit rates.

At the national level, state appropriations have fallen from \$8.50 per \$1,000 of personal income to \$7,000, a decline of 20% during the 1980s and 1990s. Funding of higher education dropped from 7.2% of state expenditures in 1977 to 5.3% in 1997, a 27% drop (Kane, 2003). The share of public university budgets provided by the states have dropped from 50% in 1979 to 35% in 2000, and in the wake of a weak economy, have dropped even further. Among Big 10 universities, state support now covers less than 20% of operating costs, and at the



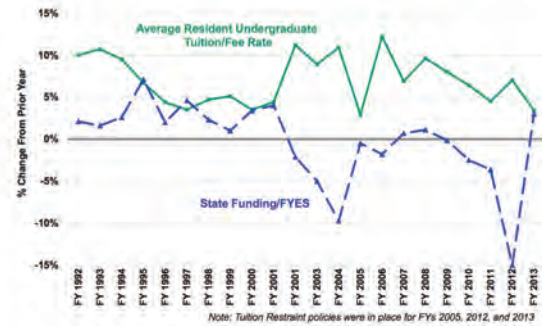
UM state support received per student

University of Michigan, state appropriations now have dropped below 7% of the total operating budget and 12% of its academic budget.

In fact, the National Conference of State Legislatures reports that between 2002 and 2014 higher education was the ONLY major function of state government that took such large cuts in state funding. Although universities have had no alternative but to increase tuition as state support has dropped—at least if they had the opportunity—this has NOT been sufficient to cover the reduction in state funding. The combination of the decline in state appropriations and the political restrictions on raising tuition at public institutions has produced a particularly marked decline in educational and general spending per student at public relative to private colleges and universities.

Today there are many signs that the quality of public higher education in America is beginning to suffer, at just that moment when the challenges of a global, knowledge-driven economy have positioned our universities as among our most important assets in securing economic prosperity, social well-being, and national security. Student-to-faculty ratios and workloads have been increasing, eroding not only the quality of classroom instruction but also constraining research university faculty from conducting the research critical to economic development in a knowledge economy increasing dependent upon technological innovation. Faculty salaries at public universities have fallen 20% behind those at private universities (compared to 1980 when they were roughly even),

Tuition Rates and State Funding



UM tuition is determined largely by state support...

leading to a migration of some of the best professors from public to private institutions. Other erosion has occurred in the value of pension plans, medical benefits, life insurance, housing, and other benefits key to faculty recruiting and retention. The number of public universities listed among the top 25 national universities in U.S. News & World Report's rankings has declined from 7 in 1987 to 3 in 2004 (and these three, UC-Berkeley, U Michigan, and U. North Carolina are ranked 23rd, 24th, and 25th !)

There are also growing concerns about eroding access, as dollars that should be going into need-based financial aid are going instead to compensate for declining state support. Returning to Michigan as our case study, the actual estimated cost of undergraduate education at the University of Michigan is about \$28,000 per year, which also happens to be the tuition charged to students from out-of-state. The University charges an average tuition of about \$9,000 to undergraduate Michigan residents, a discount of roughly \$19,000. Unfortunately, even if all of UM's state appropriation of \$300 million were allocated to support Michigan students (leaving none for research, public service, or other state-related activities), this would amount to only \$12,000. Hence the University has to compensate for about \$9,000 of unsubsidized costs for each Michigan undergraduate. Where do we get this? From the same discretionary dollars that it would normally use for priorities such as need-based financial aid.

Note here that it has long been a UM policy that the University will provide sufficient financial aid to meet

the full need of all Michigan undergraduates. But this policy is now at some risk, in view of the declining state subsidy. There is already some evidence that this is affecting the socioeconomic character of our student body, since the average family income of UMAA undergraduates is now well above \$100,000, with more students from high income (> \$250,000) than low income families (>\$50,000).

As Stanley Ikenberry, the former president of the University of Illinois and the American Council on Education, summarizes the current plight of public higher education in America: "The severity of current cuts, coming after more than two decades of slow but steady relative decline in state support, has forced many education leaders to conclude that the old, often implicit, compacts between the states and their universities—such as ensured access to affordable public universities to the states' high school graduates—have been abandoned." (Ikenberry, 2005).

A recent New York Times editorial put it well: "The United States has moved entire generations into the middle class and beyond by subsidizing public colleges, putting higher education within the reach of many deserving low-income students. The public college system is in steep decline, however, because of decades of declining support from states that historically kept educational quality high and tuition low." (NYT, 2004).

By way of comparison, the federal government spends \$45 billion (8.2%) of the \$550 billion the nation will invest this year in K-12 education.

Why Is This Happening?

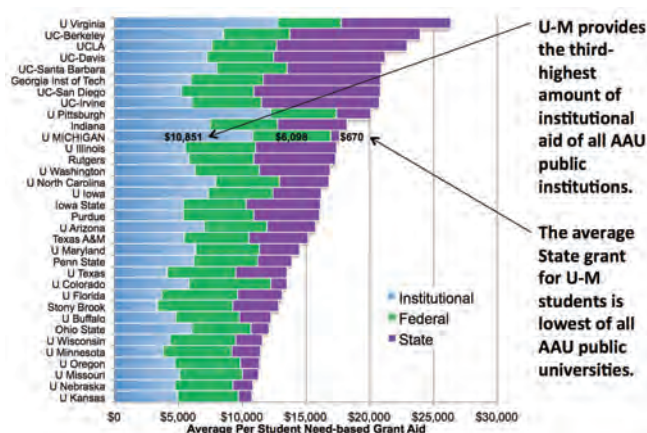
So why is this happening? Why have the states been methodically disinvesting in public higher education over the past two decades? In part it has to do with other competing priorities for state tax dollars. Most states launched massive prison construction programs during the 1980s in response to polling suggesting voter concerns with crime and mandatory sentencing guidelines, without thinking much about long term costs. Today the state budget for prisons has surpassed the higher education budget in most states. In fact, at an average inmate cost of \$30,000 per year, with prisons populated primarily by first-offenders incarcerated for nonviolent offenses such as drug trafficking or petty

theft, the corrections system has become a de facto "higher education system" in many states, turning petty crime offenders into hardened criminals at a cost comparable to the tuition charged for a Harvard education.

The blame for myopic planning goes well beyond the states. Unfunded federal mandates have decimated state budgets, diverting dollars for these obligations from discretionary funds used for priorities such as higher education. Of particular concern is the rapidly growing burden of Medicaid, a consequence largely of the federal government's inability to come to grips with a growing uninsured population and the urgent need for universal health care in our nation. As recent studies have suggested, the economic burdens of the unfunded Medicaid mandates passed onto the states by the federal government have now surpassed the entire public education budget (both K-12 and higher education) in the majority of the states. (Kane, 2003).

Tax policy is also a big part of the problem. In the past, the support of public universities always followed the ebb and flow of economic cycles. In bad economic times, state governments and donors cut support, hoping to restore it once again in good times. But during the late 1990s, as the dot-com frenzy drove boom times in the stock market and state tax revenues, state governments chose to cut taxes rather than restore earlier cuts in higher education. A few even locked in these cuts through constitutional amendments such as Colorado's Tax-Payer Bill of Rights (TABOR), restricting not only tax revenues but even the costs of state services such as higher education (e.g., tuition). As one state budget officer observed: "College leaders are fooling themselves if they think the end of this recession will be like all the others. What we're seeing is a systematic, careless withdrawal of concern and support for advanced education in this country at exactly the wrong time." (Selingo, 2003)

This is compounded by the obsolete structure of most state tax structures, still designed for a 20th century industrial economy, e.g., taxing manufacturing, rather than for a 21st century knowledge economy increasingly dependent upon knowledge services such as legal, financial, and information services that largely go untaxed. As the boom economy cycled into the post-dot-com bust, state budgets collapsed under



...and absence of state-based financial aid programs.

the structural deficits created by tax cuts and their inability to tax the economic activities of increasingly knowledge-intensive service economies. Since cutting K-12, corrections, or federal mandates such as Medicaid was politically impossible, the only remaining sacrificial lamb was public higher education.

Finally, many states aggravated this situation even further with misguided higher education policies such as merit scholarship programs that primarily benefited well-off students attending high quality K-12 schools, who needed neither the assistance or incentives to attend college, at the expense of need-based financial aid aimed at those less fortunate students from impoverished backgrounds and weak schools. As we noted earlier, this was also compounded by tuition constraints that required universities to subsidize low prices for affluent students at the expense of need-based financial aid programs. In this sense, low tuition and state-funded merit scholarship programs are highly regressive social policies, in effect providing welfare for the rich at the expense of educational opportunity for the poor.

Once again, the federal government has contributed to this shift away from providing support to those students with financial need to subsidizing the college education of more affluent students. As recent studies have indicated, over the past three decades the federal government has provided a disproportionately large share of federal aid to well-endowed private colleges rather than to public colleges, which enroll about

80% of the nation's college students. (Winter, 2004). Federal financial aid programs favor institutions that rely heavily on student tuition, covering about 40% of the costs of high tuition private institutions, allowing them to increase tuition substantially in recent years. In contrast, political constraints and public perceptions have limited most public colleges and universities from taking full advantage of such financial aid programs. (Alexander, 2000). This has been aggravated by the shift in federal financial aid away from need-based grants such as the Pell Grant program to subsidized loans and tax benefits that increasingly benefit middle and upper income students.

But there was an even deeper issue. The American university has long been seen as an important social institution, created by, supported by, and accountable to society at large. The key social principle sustaining the university has been the perception of education as a public good—that is, the university was established to benefit all of society. Like other institutions such as parks and police, it was felt that individual choice alone would not sustain an institution serving the broad range of society's education needs. Hence public policy dictated that the university merited broad support by all of society, rather than just by the individuals benefiting from its particular educational programs, through direct tax subsidy or indirect tax policies (e.g., treatment of charitable giving or endowment earnings).

Yet, today, even as the needs of our society for postsecondary education intensifies, we also find an erosion in the perception of education as a public good deserving of strong societal support. State and federal programs have shifted from investment in the higher education enterprise (appropriations to institutions) to investment in the marketplace for higher education services (subsidized loans and tax benefits to students and parents). Whether a deliberate or involuntary response to the tightening constraints and changing priorities for public funds, the new message is that education has become a private good that should be paid for by the individuals who benefit most directly, the students. Government policies that not only enable but encourage the capacity of universities to capture and market the commercial value of the intellectual products of research and instruction represent additional steps down this slippery slope.

All of this points to an alarming shift in public priorities, away from accepting stewardship for the sacrifices of past generations by investing to support future generations. The cavalier disregard for investments in higher education, regarding it as a lower priority, expendable during hard times, is not only irresponsible but foolish in view of the importance of advanced education, research, innovation to economic competitiveness and security in a hypercompetitive global, knowledge-driven economy. But perhaps this is not so surprising, in view of the fact that the baby boomers, who have usually followed the adage "Eat dessert first; life is uncertain!" are now approaching retirement. The aging "me generation" that now dominates public policy demands expensive health care, ever more prisons, homeland security, reduced tax burdens—and apparently to hell with the kids and the future. If this is indeed a consequence of the priorities of a governing generation, then it is also possible that the current inadequacy tax support for public colleges and universities is not a temporary affliction; it is likely to last for several decades!

What To Do?

Little wonder that after the cavalier treatment public higher education has received from state leaders over the past several years, the governing boards with fiduciary responsibility for the welfare of public universities have begun to lose confidence in state government as a reliable partner in providing adequate support for this critical state and national asset. Term-limited legislators and governors, political parties controlled by narrow special interest groups, and a body politic addicted to an entitlement economy simply cannot be trusted. Instead, governing boards are relying more heavily on the autonomy provided by the state constitution, which gives them control over decisions such as admission, tuition and fees, faculty and staff compensation, procurement, and other areas sometimes micromanaged by state government.

Across the nation numerous experiments are appearing to redefine the nature of public education. Some states such as Virginia and Colorado have created new types of public universities that function more as public corporations or authorities rather than state

agencies, allowing universities greater flexibility to draw support from the private marketplace, in return for more visible measures of accountability in areas such as graduation rates and technology transfer. In fact, Colorado has even implemented a voucher system to fund higher education, in which students are provided grants taken with them to the institution of their choice. Other states including South Carolina and also Virginia have allowed the privatization of selected higher education programs, e.g., professional schools such as law and business, or even entire universities. Several states such as Pennsylvania and Washington have moved to performance contracting, in which universities are redefined as state-related rather than state-owned and negotiate a contractual relationship with state government receive state funds for specific services, e.g., educating a certain number of state residents. Perhaps the most interesting experiment is in Ohio, where Miami University has been allowed to set tuition levels for Ohio residents at private levels, then discount it by the state appropriation per student, and still further with need-based financial aid, thereby making quite transparent the relative dependence of tuition on state support. (Breneman, 2005).

In fact, this last approach is increasingly finding favor in many quarters. As an 2004 editorial in the New York Times explained, "With government support so shaky, state colleges are gong to need to raise their rates. A more moderate approach might be to permit tuition to rise to the levels now charged to out-of-state students, while protecting those with less ability to pay [with need-based financial aid programs]." The NYT editorial concludes: "State colleges must find a way to fulfill the mission they were crated to perform. Since the government has taken to starving them, their best hope is to increase tuition for those who can afford to pay." (NYT, 2004)

In rummaging through my old notebooks, I found an interesting idea several of us dreamed up in 1995 to address the regressive nature of our current approach to instate tuition within a politically acceptable framework. Even our government relations team viewed this alternative approach to the state appropriation, tuition, and financial aid just might work, particularly at a time when the state would be hard pressed to provide adequate support for higher education. The basic idea

is to earmark a part of the state appropriation for need-based financial aid and use the real cost/market pricing for tuition.

More specifically, the University would announce that we intend to restructure the way we finance the University to better serve the citizens of the state and make certain they get their money's worth by adopting a more transparent pricing and insisting on cost containment:

- i) Restructuring budgeting (the responsibility center budgeting model)
- ii) Implementing cost/market-based pricing (tuition)
- iii) Restructuring financial aid to maximize access for state residents

We would announce that henceforth we will set our tuition at only one rate—that for outstate students—and this would be determined by our real costs and the national market for each of our programs. (Here we could use the Michigan private colleges such as Kalamazoo or national peers such as Cornell and Penn to set our base UG price at \$40,000 or so, with comparable tuition levels for our graduate and professional schools.)

We would then use the state appropriation to provide discounts for all Michigan residents enrolled in our programs, but with two types of discounts being provided:

- i) First, an across-the-board discount provided to ALL state residents, regardless of need;
- ii) Second, a need based discount for those students that need additional assistance to attend Michigan.

In this effort we would first determine the amount of the state appropriation that would be earmarked for research, public service, and financial aid (say, \$100 million). The remaining state appropriation (\$220 million) would be spread over all resident students to determine some appropriate discount, say, \$10,000 per student, from the retail nonresident price.

Note that this accomplishes a number of objectives:

i) It allows us to get instate tuition up to more realistic levels (my target estimate is 50% of nonresident tuition levels).

ii) It reflects the fact that ALL Michigan residents benefit from a substantial discount because of the state appropriation.

iii) However it also reflects the University's strong commitment to access by allocating a substantial portion of the state appropriation to need-based financial aid, much in the same way that the private colleges in Michigan have gouged \$120 million of state tax dollars to do the same for their students.

iv) It would make it clear that we are NOT asking rich families to pay for the support of poor students, since ALL students receive substantial discounts because of state appropriations (and other University funds). Rather we use the state appropriation to provide this financial aid, in the same spirit as the private colleges in the state.

v) This would establish a clear relationship between the state appropriation and our pricing that we could explain. We could even share our calculations with the Legislature and the media, so they could see directly how much an increase in appropriations will affect the discount given to instate state students.

vi) Since the increase of the retail price (nonresident tuition) will be determined by the cost and the marketplace, once we have made this adjustment, we will be back to more moderate tuition increases each year (e.g., the CPI plus 1-2%), thereby avoiding the annual tuition bashing.

This approach would give us a solid moral ground for asking more affluent families to pay more of their fair share of the cost of the education for their children, since we could demonstrate directly what discount from the real (retail) tuition their state appropriation dollars are getting for them. If they want a greater discount, they will either have to pay higher taxes or insist that their legislators allocate more of their existing tax dollars to higher education.

Note that a variation on the theme would be to work backward and first subtract from the state appropriation the amount we need for sufficient need-based financial aid to make certain that any Michigan resident accepted to the University can attend, regardless of financial

circumstances. Then the remaining appropriation (minus research and public service) would be spread over all students to get to the standard discount. It would be hard for legislators to argue against this, since to do so would put them in the position of publicly supporting subsidy of the rich at the expense of the poor. (Note that the taxes paid by the rich families are only a small fraction of the discount they would receive in any case, most of which comes from all of those citizens who are not participating in higher education.)

In summary, this approach might sweep the tuition debate permanently off the table. The fundamental principles are hard to argue with:

i) We set our “prices” (namely, tuition) based on cost, value, and market—and NOT on politics or necessary budget plugs. More precisely, since the value of a Michigan education is comparable to that of leading private universities such as Cornell and Penn and local privates such as Kalamazoo and Calvin, and since our costs are comparable, our retail price should be similar (about \$25,000 in today’s market).

ii) We set as a first priority the long-standing principle that no Michigan resident, who qualifies academically and who is admitted will be denied the opportunity for a Michigan education because of financial need. We will meet this need with the first dollars off the top of the state appropriation (plus our own internal financial aid resources).

iii) Since the state created us to do research and public service, in addition to educating Michigan citizens, a portion of the state appropriation should be earmarked for these purposes.

iv) The remaining dollars will be spread across Michigan resident students to provide a net discount in price.

One can almost imagine a tuition bill reading as follows:

UM Undergraduate Tuition	\$40,000
State resident discount	\$ 6,000
Financial aid discount	\$14,000
Balance due	\$20,000

(Note, from a public relations point of view, one could also advertise an “average” instate tuition, taking

into account the average financial aid discount, along with a range, e.g.,

Average instate tuition: \$20,000 (with a range from 0 to \$15,000, based on need)

Finally, note that this approach would also address the instate/outstate enrollment issue, since if the state wanted us to educate more Michigan residents, we would simply spread the state appropriation dollars over more students, thereby providing them with less of a discount (unless the state increased the appropriation). If we enrolled fewer residents, they would each get a larger discount.

A rather simplistic approach, but still worth thinking about...

Although some are concerned that these experiments could lead to a transformation of public higher education in a piecemeal fashion, campus by campus and state by state, without any overarching design (Ikenberry, 2005), in reality they represent highly pragmatic approaches to two important realities: First, it is unlikely that public higher education will command sufficient priority to an aging baby boomer population to merit adequate tax support. Two, we have entered an era in which the marketplace is viewed as a far more accurate reflection of public priorities than the ballot box or public policy. Together these imply that some radical restructuring of public higher education may be in order.

A National Agenda for Higher Education

The future of public higher education is of immense importance to the United States. Beyond the fact that three-quarters of all college students are enrolled in public universities, the increasing dependence of our nation on advanced education, research, and innovation compel efforts to both sustain and enhance the quality of our public colleges and universities. Yet, as this paper suggests, the traditional structure for financing public higher education may no longer be viable. Traditionally, this has involved a partnership among states, the federal government, and private citizens (the marketplace). In the past the states have shouldered the lion’s share of the costs of public higher education through subsidies, which keep tuition low

for students; the federal government has taken on the role of providing need-based aid and loan subsidies. Students and parents (and to a much lesser extent donors) pick up the rest of the tab.

Yet this system has become vulnerable as the states face the increasing Medicaid obligations of a growing and aging uninsured population, made even more difficult by the state tax-cutting frenzy during the boom period of the late 1990s. This is likely to worsen as a larger percentage of young people and working adults seek higher education while the tax-paying population ages and health care costs continue to escalate. As Kane and Orzag conclude, “the traditional model of higher education finance in the U.S. with large state subsidies to public higher education and modest means-tested grants and loans from the federal government is becoming increasingly untenable.” (Kane, 2003).

Little wonder then that many are calling upon national leaders to articulate a national agenda for higher education in America, similar to other national agendas in K-12 education such as “A Nation At Risk” and “No Child Left Behind”. Of course, we have had such national higher education agendas before during times of major national challenge and opportunity. The Land-Grant Acts of the 19th century addressed the needs of an emerging industrial nation and the importance of education to the working class. The government-university research partnership, proposed by Vannevar Bush in 1944 and implemented following WWII, along with the G.I. Bill and the recommendations of the Truman Commission, established the principle of federal support of research and graduate education on the campuses while launching the massification of higher education in America. The National Defense Education Act of the late 1950s and 1960s established investments in higher education as critical to national security during the height of the Cold War.

Yet since that time, for almost four decades, the nation really has had no agenda for higher education in America. Little wonder that at times we appear to be drifting aimlessly, with changing social priorities putting at great risk that the very institutions that earlier generations built and supported so strongly as key to the future of a great nation. Here part of the challenge is a profound misunderstanding of the relationship among the cost, price, and value of a

college education by both students and parents and by elected public officials. The funding of higher education by state and federal government support (including tax benefits), philanthropy, and other various revenue streams not only disguise true costs but make pricing, e.g., tuition, largely fictitious, since all students, rich and poor, in public and private institutions receive very substantial subsidies. In some ways the financing of higher education is reminiscent of health care, where third-party payers (insurance companies, Medicare and Medicaid) also decouple the consumer from the marketplace. However in health care, at least one can estimate the costs of medical treatment and patients can assess the value of their health care, in contrast to higher education where true costs are difficult to estimate and the benefit of a college education is usually assessed only many years later.

One might approach this as an appropriate challenge to the federal government. After all, in some ways it was federal inaction that created the current dilemma, crippling state budgets with unfunded federal mandates such as Medicaid, through federal inaction on national priorities such as universal health care, and shifting philosophies of federal financial aid programs. It is also the federal government’s responsibility to invest adequately in providing for economic prosperity and national security, particularly in the new flat world characterized by phenomena such as outsourcing and off-shoring characterizing a hypercompetitive, global, knowledge-driven economy increasingly dependent upon knowledge workers, research, and technological innovation. (Friedman, 2005).

Perhaps it would be more constructive, however, to present this as an opportunity: We have entered an age of knowledge in a global economy, in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, social-well being, and national security. Moreover, education, knowledge, innovation, and entrepreneurial skills have also become the primary determinants of one’s personal standard of living and quality of life. Democratic societies—and state and federal governments—must accept the responsibility to provide all of their citizens with the educational and training opportunities they need, throughout their lives, whenever, wherever, and

however they need it, at high quality and at affordable prices.

Government leaders could define and embrace a vision for the nation's future that provides citizens with the lifelong learning opportunities and skills they need to live prosperous, rewarding, and secure lives in this world. Perhaps it is time to create an analog to the Land Grant Act or G I Bill for the 21st century—perhaps a Learn Grant Act that would provide every citizen with an entitlement for as much education as they need, wish, or are capable of, throughout their lives. For example, a combination of federal and state programs could provide vouchers or education accounts that could be redeemed at accredited institutions for partial support of education with amounts adjusted to levels (community college, undergraduate degrees, workplace training, professional and graduate degrees, lifelong enrichment) and available at anytime throughout one's life.

Another Approach: Learn Grants

The Challenge: Education has become a key determinant of one's personal standard of living and quality of life. The breakpoint between those who succeed in college and those who fail is perhaps the most critical decision point in one's life. Yet many recent studies have revealed the degree to which access to higher education in America has become increasingly stratified according to student financial circumstances, thereby undercutting the fundamental principles of equity and social justice. Today even the most academically talented students in the lowest economic quartile are significantly less likely to have access to the benefits of higher education than the least academically qualified students in the top quartile—a situation clearly intolerable for a democratic society.

Part of the challenge arises from the patchwork character of current federal, state, and institutional financial aid programs, which have evolved over the years more as a consequence of the political process than any defined purpose or accountability with respect to impact or efficiency in achieving student access or success in higher education. Today a very significant fraction of public funding for post-secondary education go primarily to benefit affluent students with modest

economic needs, at a time when close to a quarter of Americans are disproportionately and severely deprived of educational opportunity at colleges and universities.

There has been inadequate effort to integrate and restructure the system into a cohesive policy-driven program, despite the obvious benefits and cost savings. As a consequence, while the current system does benefit affluent students, the lending industry, and political objectives, it is both extraordinarily inefficient and ineffective with respect to key objectives such as higher education access, retention, and debt burden. It needs to be replaced with a strategically-oriented, results-driven, and greatly simplified program of grants, loans, and tax benefits that demonstrably works to serve clearly-articulated goals.

As a consequence of both the inadequacy and complexity of existing financial aid programs, many economically disadvantaged students (and parents) no longer see higher education as an option open to them but rather as a privilege for the more affluent. As a result, these students do not have the incentive to perform well in K-12 (nor do their parents have the incentive to support them), hence falling behind early or dropping out of the college-bound ranks.

The Proposal: To address this alarming injustice and provide strong incentives for college preparation, the idea would be to provide every student with a "529 college savings account", a "Learn-Grant" when they begin kindergarten. Although this account would be owned by the students (although invested in the equity market by the federal government or its agents), its funds could only be used for post-secondary education upon the successful completion of a high school college-preparatory program. Each year students (and their parents) would receive a statement of the accumulation in their account, with a reminder that this is their money, but it can only be used for their college education (or other post-secondary education). An initial contribution of, say, \$10,000 (e.g., \$5,000 from the federal government with a \$5,000 match from the states) would accumulate over their K-12 education to an amount that when coupled with other financial aid would likely be sufficient for a four-year college education at a public college or university.

Beyond serving as an important source of financial aid, the Learn Grants would provide a very strong incentive for succeeding in K-12 and preparing for a college education, since the account would be something students own but would lose if they did not continue their education beyond secondary school (after some appropriate grace period). The program might be funded from any of a number of sources, e.g., from a federal plus state match, the revenue from the auction of the digital spectrum (most analogous to the Land Grant Act), etc. Although the Learn Grants would be provided to all students when entering K-12 (in order to earn broad political support), they could be augmented with additional contributions from public, private, or parental sources during their pre-college years, based on need and/or performance.

As to cost, if we assume roughly 4.5 million children enter K-12 each year (the estimate for 2010), then at \$10,000 per student, this would cost \$40 billion (\$20 billion each to the states and the feds). While this seems immense, it is about the cost of one year of K-12 education (or college education, on the average). It also should be compared to other public expenditures (Medicaid/Medicare, corrections, defense, and even student financial aid). From this broader perspective, it really doesn't seem excessive when viewed both as an investment in social justice and the future of the nation!

It is imperative both as a matter of social justice and economic competitiveness that the nation and the states address and remove those factors that have created a strong dependence of access and success in higher education upon socioeconomic status. America should aspire to the ideal where family income is nearly irrelevant to the ability of a student to attend the college or university best matched to his or her talents, objectives, and motivation. The proposed Learn Grant program would provide a powerful stimulus to building the world-class workforce necessary for America's prosperity and security in an ever more competitive global, knowledge-driven economy.

This could be financed through mechanisms similar to pensions and health care, e.g., Social Security and Medicare, creating legal and institutional frameworks for universal portability. The key would be to create transparent and transportable benefits and opportunities to enable sufficient mobility and agility to adapt to a

changing economy. For example, one could imagine tax-deferred education savings accounts or perhaps even education accounts paid for through payroll taxes similar to Social Security. In fact, in contrast to paying a tax to support one's retirement (and relatively unproductive) years as in Social Security, the Learn Grant program would instead finance one's capacity to be even more productive through further education and enhanced skills. The use of such accounts would correspond to investing directly in the marketplace rather than in institutions, thereby minimizing public bureaucracy and exerting strong market pressures on educational institutions to align themselves with national needs. The key would be to provide portable benefits and opportunities for lifelong learning so that

While the startup costs of such a program would be considerable (perhaps one-third of the costs of health care), the impact of creating a truly world-class workforce—or better yet a society of learning—capable of competing in a global, knowledge-driven economy would be extraordinary.

Assessment of Impact

The efforts to counter the myths characterizing the cost of a college education have long been a priority of university leaders, economists, and educational organizations such as the American Council on Education and the Association of Public and Land Grant Universities. Unfortunately, for every speech or op-ed attempting to explain the costs of higher education there are generally two more propagating the usual myths.

Similarly the particular proposals suggested for addressing the costs and pricing of higher education are also not original. Miami University of Ohio adopted the approach of using a transparent formula to discount the actual cost of a college education by a combination of subsidy by state appropriations and additional need-based financial aid, only to have the Ohio governor respond by attempting to freeze tuition.

Even the "learn grant" proposal is not entirely new, since such investments have long been made to young children through so-called "baby bonds" in the United Kingdom..

Hence, while studies such as those in this chapter

are important, they remain only brief skirmishes in a long war to balance “who benefits” with “who pays” in American public higher education.

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Chapter 7

Public Purpose

Today the United States faces the challenge of achieving prosperity and national security in a hypercompetitive global economy driven by knowledge and innovation. We have entered an era in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, national security, and social well being. To provide our citizens with the knowledge and skills to compete on the global level, the nation must broaden access to world-class educational opportunities at all levels: K-12, higher education, workplace training, and lifelong learning. It must also build and sustain world-class universities capable of conducting cutting-edge research and innovation; producing outstanding scientists, engineers, physicians, teachers, and other knowledge professionals; and building the advanced learning and research infrastructure necessary for the nation to sustain its leadership in the century ahead.

In 2008 the Miller Center for Public Affairs of the University of Virginia and the Association of Governing Boards hosted a national conference to discuss how one would define the public agenda for American higher education in a rapidly changing world. Numerous questions were raised, such as: Who should define such an agenda? The public? The taxpayers? Political leaders? Students and other clients of the university? The academy? Society in general? The states, the nation, or the world? And for what purpose? To respond to the needs and desires of the present? To be responsible stewards of institutions built through investments and sacrifices of past generations? Or to secure and protect opportunities for future generations? What framework of policy, governance, leadership, public trust, and support will be necessary to align our colleges and universities with such an agenda? Will substantial

evolution and transformation of our institutions be necessary? What about their governance and leadership?

The material below was taken from a keynote address given at the conference.

Defining a 21st Century Public Agenda for American Higher Education

There are several approaches one might take in identifying an appropriate public agenda for American higher education. Of course we could rely on public opinion, as expressed by our political leadership, the media, or more rigorously through surveys. We could also draw from several important studies conducted by government commissions, foundations, and higher education associations. Or we could take a more strategic approach by considering an environmental scan of the changing world in which we live and which higher education must serve. Let us consider possible elements of an agenda arising from each approach.

Although one commonly hears strong criticism of higher education from both the media and political front on issues such as cost and performance, recent opinion surveys actually reveal remarkably strong public support for higher education. (Callan and Immerwahr, 2008) Public attitudes remain favorable toward characteristics such as the quality of our colleges and universities and their contributions through teaching, research, and public service. Both the social and economic values of a college education are perceived as high and increasing. Yet there are clouds on the horizon with concerns about rising costs that could place a college education out of the reach of many students and families. Furthermore the credibility and integrity of higher education have been jeopardized by

occasionally flagrant abuses of the public trust such as the recent scandals in the student loan industry, fraud and other episodes of scientific misconduct, and the excessive commercialization of big-time college sports programs that exploit students while enriching coaches.

While public surveys still suggest strong support of higher education, numerous studies sponsored by government, business, foundations, the National Academies, and the higher education community have suggested that the past attainments of American higher education may have led our nation to unwarranted complacency about its future. Of particular importance here was the National Commission on the Future of Higher Education—the so-called Spellings Commission—launched by the Secretary of Education to examine issues such as the access, affordability, accountability, and quality of our colleges and universities. (Miller, 2006) This unusually broad commission, comprised of members from business, government, foundations, and higher education, concluded “American higher education has become what in the business world would be called a mature enterprise, increasingly risk-averse, at times self-satisfied, and unduly expensive. It is an enterprise that has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy. It has yet to successfully confront the impact of globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs and new paradigms.”

More specifically, the Commission raised two areas of particular concern about American higher education: “Too few Americans prepare for, participate in, and complete higher education. Notwithstanding the nation’s egalitarian principles, there is ample evidence that qualified young people from families of modest means are far less likely to go to college than their affluent peers with similar qualifications. America’s higher-education financing system is increasingly dysfunctional. Government subsidies are declining; tuition is rising; and cost per student is increasing faster than inflation or family income.” (Miller, 2006) Furthermore, at a time when the United States needs to be increasing the quality of learning outcomes and the economic value of a college education, there are

disturbing signs that suggest higher education is moving in the opposite direction. Numerous recent studies suggest that today’s American college students are not really learning what they need to learn. (Bok, 2006)

As a result, the continued ability of American postsecondary institutions to produce informed and skilled citizens who are able to lead and compete in the 21st century global marketplace may soon be in question. Furthermore, the decline of public investment in research and graduate education threatens to erode the capacity of America’s research universities to produce the new knowledge necessary for innovation. (Augustine, 2005)

The Commission issued a series of sweeping recommendations to better align higher education with the needs of the nation, including 1) reaffirming America’s commitment to provide all students with the opportunity to pursue postsecondary education; 2) restructuring student financial aid programs to focus upon the needs of lower income and minority students; 3) demanding transparency, accountability, and commitment to public purpose in the operation of our universities; 4) adopting a culture of continuous innovation and quality improvement in higher education; 5) greatly increasing investment in key strategic areas such as science, engineering, medicine, and other knowledge-intensive professions essential to global competitiveness; and 6) ensuring that all citizens have access to high quality educational, learning, and training opportunities throughout their lives through a national strategy to provide lifelong learning opportunities at the postsecondary level.

Actions have been launched by government and the higher education community at the federal and state levels to implement these recommendations over the next several years. Yet, because of the cacophony of criticism and speculation following the release of the Commission’s report, it is also important to note here what were NOT included as recommendations: no standardized testing, no tuition price fixing, no national (federal) accreditation process, and no federalization of American higher education, which constitutionally remains the responsibility of the states and the private sector. From this latter perspective, it is not surprising that similar conclusions have been

reached by groups at the state level such as the National Conference of State Legislators (NCSL, 2006), the State Higher Education Executive Officer's National Commission on Accountability in Higher Education (SHEEO, 2005), and the National Center for Policy and Higher Education's Measuring Up report cards (NCPHE, 2008). For example, the NCSL report begins with the premise: "There is a crisis in American higher education. It has crept up on us quickly. It has become clear that the states and the federal government have neglected their responsibilities to ensure a high-quality college education for all citizens. Too many students are falling through the cracks. As a result, U.S. citizens are not achieving their full potential, state economies are suffering, and the United States is less competitive in the global economy."

Yet, while such studies are extremely important and set both the framework and tone for policy development with their stress on performance, transparency, and accountability, they also are limited in scope to present-day concerns. Perhaps a more visionary perspective is provided by an environmental scan that considers the changing public agenda for higher education implied by phenomena such as the emergence of a knowledge and innovation intensive economy, globalization, changing demographics, and powerful market forces. (Glion, 2008) More specifically, today we are evolving rapidly into a post-industrial, knowledge-based society as our economies are steadily shifting from material- and labor-intensive products and processes to knowledge-intensive products and services. A radically new system for creating wealth has evolved that depends upon the creation and application of new knowledge. But knowledge can be created, absorbed, and applied only by the educated mind. Hence schools in general, and universities in particular, play increasingly important roles as our societies enter this new age.

Our economies, companies, and social institutions have become international, spanning the globe and interdependent with other nations and other peoples. Markets characterized by the instantaneous flows of knowledge, capital, and work unleashed by lowering trade barriers are creating global enterprises based upon business paradigms such as out-sourcing and off-shoring, a shift from public to private equity investment, and declining identification with or loyalty to national

or regional interests. Market pressures increasingly trump public policy and hence the influence of national governments. As the recent report of the National Intelligence Council's 2020 Project has concluded, "The very magnitude and speed of change resulting from a globalizing world—apart from its precise character—will be a defining feature of the world out to 2020. Globalization—growing interconnectedness reflected in the expanded flows of information, technology, capital, goods, services, and people throughout the world will become an overarching mega-trend, a force so ubiquitous that it will substantially shape all other major trends in the world of 2020." (National Intelligence Council, 2005)

It is this reality of the hyper-competitive, global, knowledge-driven economy of the 21st Century that is stimulating the powerful forces that will reshape the nature of our society and that pose such a formidable challenge to our nation and our states and cities. Today, a college degree has become a necessity for most careers, and graduate education is desirable for an increasing number. In the knowledge economy, the key asset driving corporate value is no longer physical capital or unskilled labor. Instead it is intellectual and human capital. This increasingly utilitarian view of higher education is reflected in public policy. The National Governors Association notes that "The driving force behind the 21st Century economy is knowledge, and developing human capital is the best way to ensure prosperity." (NGA, 2004) Education is becoming a powerful political force. Just as the space race of the 1960s stimulated major investments in research and education, there are early signs that the skills race of the 21st Century may soon be recognized as the dominant domestic policy issue facing our nation. But there is an important difference here. The space race galvanized public concern and concentrated national attention on educating "the best and brightest," the academically elite of our society. The skills race of the 21st Century will value instead the skills and knowledge of most of our workforce as a key to economic prosperity, national security, and social well-being.

As Tom Friedman stresses in his provocative book, *The World is Flat*, "The playing field is being leveled. Some three billion people who were out of the game have walked and often have run onto a level playing

field, from China, India, Russia, and Central Europe, from nations with rich educational heritages. The flattening of the world is moving ahead apace, and nothing is going to stop it. What can happen is a decline in our standard of living if more Americans are not empowered and educated to participate in a world where all the knowledge centers are being connected. We have within our society all the ingredients for American individuals to thrive in such a world, but if we squander these ingredients, we will stagnate.” (Friedman, 2005).

Here we face the challenge of rapidly changing demographics. The populations of most developed nations in North America, Europe, and Asia are aging rapidly. In our nation today there are already more people over the age of 65 than teenagers, and this situation will continue for decades to come. Over the next decade the percentage of the population over 60 will grow to over 30% to 40% in the United States, and this aging population will increasingly shift social priorities to the needs and desires of the elderly (e.g., retirement security, health care, safety from crime and terrorism, and tax relief) rather than investing in the future through education and innovation.

However, the United States stands apart from the aging populations of Europe and Asia for one very important reason: our openness to immigration. In fact, over the past decade, immigration from Latin America and Asia contributed 53% of the growth in the United States population, exceeding that provided by births (National Information Center, 2006). This is expected to drive continued growth in our population from 300 million today to over 450 million by 2050, augmenting our aging population and stimulating productivity with new and young workers. As it has been so many times in its past, America is once again becoming a nation of immigrants, benefiting greatly from their energy, talents, and hope, even as such mobility changes the ethnic character of our nation. By the year 2030 current projections suggest that approximately 40% of Americans will be members of minority groups; by mid-century we will cease to have any single majority ethnic group. By any measure, we are evolving rapidly into a truly multicultural society with a remarkable cultural, racial, and ethnic diversity. This demographic revolution is taking place within the context of the

continuing globalization of the world’s economy and society that requires Americans to interact with people from every country of the world.

The increasing diversity of the American population with respect to culture, race, ethnicity, and nationality is both one of our greatest strengths and most serious challenges as a nation. A diverse population gives us great vitality. However, the challenge of increasing diversity is complicated by social and economic factors. Today, far from evolving toward one America, our society continues to be hindered by the segregation and non-assimilation of minority and immigrant cultures. If we do not create a nation that mobilizes the talents of all of our citizens, we are destined for a diminished role in the global community and increased social turbulence. Higher education plays an important role both in identifying and developing this talent. Yet many are challenging in both the courts and through referenda long-accepted programs such as affirmative action and equal opportunity aimed at expanding access to higher education to underrepresented communities and diversifying our campuses and workplaces.

These economic, geopolitical, and demographic factors are stimulating powerful market forces that are likely to drive a massive restructuring of the higher education enterprise, similar to that experienced by other economic sectors such as banking, transportation, communications, and energy. We are moving toward a revenue-driven, market-responsive higher education system because there is no way that our current tax system can support the degree of universal access to postsecondary education required by knowledge-driven economies in the face of other compelling social priorities (particularly the needs of the aging). This is amplified by an accelerating influence of the market on higher education and a growing willingness on the part of political leaders to use market forces as a means of restructuring higher education in order to increase the impact of the competition. Put another way, market forces are rapidly overwhelming public policy and public investment in determining the future course of higher education.

Yet the increasing dominance of market forces over public policy raises two important challenges. Whether a deliberate or involuntary response to the tightening fiscal constraints and changing priorities

for public funds, the long standing recognition that higher education is a public good, benefiting all of our society, is eroding. Both the American public and its elected leaders increasingly view higher education as a private benefit that should be paid for by those who benefit most directly, namely the students. Without the constraints of public policy, earned and empowered by public investments, market forces could so dominate and reshape the higher education enterprise that many of the most important values and traditions of the university could fall by the wayside, including its public purpose. As the late Frank Newman concluded: "A significant gap has developed between the public purposes of higher education, the needs of society that should be met by universities, and the actual performance of these institutions. The growing power of market forces will, in the absence of skilled intervention in the functioning of the market, make a difficult situation worse." (Newman, 2006)

Furthermore, while the competition within the higher education marketplace can drive quality, if not always efficiency, there is an important downside. The highly competitive nature of higher education in America, where universities compete for the best faculty, the best students, resources from public and private sources, athletic supremacy, and reputation, has created an environment that demands excellence. However, it has also created an intensely Darwinian, 'winner-take-all' ecosystem in which the strongest and wealthiest institutions have become predators, raiding the best faculty and students of the less generously supported and more constrained public universities and manipulating federal research and financial policies to sustain a system in which the rich get richer and the poor get devoured. (Duderstadt, 2005)

This ruthless and frequently predatory competition poses a particularly serious challenge to the nation's public research universities. These flagship institutions now find themselves caught between the rock of declining state support and the hard-place of the predatory rich private universities. As we have noted earlier, aging populations are not likely to give higher education a priority for state tax dollars for perhaps a generation or longer. Hence even as states are depending more on their public universities—expanding access to underserved communities, achieving world-

class performance in research and graduate studies key to regional economic competitiveness—state appropriations are declining while demands for higher efficiency and accountability are intensifying.

In sharp contrast, due both to booming financial markets and favorable federal financial aid and tax policies, many private universities have managed to build endowments so large (at least on a per student basis) that they have become independent of the education marketplace (e.g., student tuition, R&D grants, even private support). This creates a serious competitive imbalance in the marketplace for the best faculty, students, and perhaps resources, since the wealth gap between the rich privates and flagship publics is growing ever larger. This is aggravated by the political constraints on public universities that not only limit their flexibility and agility, but also hinder their capacity to compete (e.g., constraints on tuition, affirmative action, technology transfer, and globalization). The plight of the public research university is not only a serious challenge to the states but as well as to the nation, since these institutions represent the backbone of advanced education and research, producing most of the scientists, engineers, doctors, lawyers, and other knowledge professionals, conducting most of the research, and performing most of the public service sought by states. It would be a national disaster if the public research university were to deteriorate to the point in which research and advanced education of world-class quality could only occur in the 20 to 30 wealthiest private universities.

Finally, in our efforts to identify a suitable public agenda for higher education by assessing concerns of today or scanning challenges and opportunities of tomorrow, we must also look to the past to remember and preserve those enduring characteristics and contributions of the university. For a thousand years the university has benefited from our civilization as a learning community where both the young and the experienced could acquire not only knowledge and skills, but also the values and discipline of the educated mind. It has defended and propagated our cultural and intellectual heritage, while challenging our norms and beliefs. It has produced the leaders of our governments, commerce, and professions. It has both created and applied new knowledge to serve our society. And it has

done so while preserving those values and principles so essential to academic learning: the freedom of inquiry, an openness to new ideas, a commitment to rigorous study, and a love of learning.

Beyond the triad mission of teaching, research, and service, universities are the chief agents of discovery, the major providers of basic research that underlines new technology and improved health care. As Frank Rhodes has observed, "Universities are the engines of economic growth, the custodians and transmitters of cultural heritage, the mentors of each new generation of entrants into every profession, the accreditors of competency and skills, and the agents of personal understanding and societal transformation." (Rhodes, 1999) There seems little doubt that these roles will continue to be needed by our civilization. There is little doubt as well that the university, in some form, will be needed to provide them. The university of the twenty-first century may be as different from today's institutions as the research university is from the colonial college. But its form and its continued evolution will be a consequence of transformations necessary to provide its ancient values and contributions to a changing world.

Today's Challenges

The American university has long been seen as an important social institution, created by, supported by, and accountable to society at large. The key social principle sustaining the university has been the perception of education as a public good—that is, the university was established to benefit all of society. Like other institutions such as parks and police, it was felt that individual choice alone would not sustain an institution serving the broad range of society's education needs. Hence public policy dictated that the university merited broad support by all of society, rather than just by the individuals benefiting from its particular educational programs, through direct tax subsidy or indirect tax policies (e.g., treatment of charitable giving or endowment earnings).

Yet, today, even as the needs of our society for postsecondary education intensifies, we also find an erosion in the perception of education as a public good deserving of strong societal support. State and federal programs have shifted from investment in the higher

education enterprise (appropriations to institutions) to investment in the marketplace for higher education services (subsidized loans and tax benefits to students and parents). Whether a deliberate or involuntary response to the tightening constraints and changing priorities for public funds, the new message is that education has become a private good that should be paid for by the individuals who benefit most directly, the students. Government policies that not only enable but encourage the capacity of universities to capture and market the commercial value of the intellectual products of research and instruction represent additional steps down this slippery slope.

All of this points to an alarming shift in public priorities, away from accepting stewardship for the sacrifices of past generations by investing to support future generations. The cavalier disregard for investments in higher education, regarding it as a lower priority, expendable during hard times, is not only irresponsible but foolish in view of the importance of advanced education, research, innovation to economic competitiveness and security in a hypercompetitive global, knowledge-driven economy. But perhaps this is not so surprising, in view of the fact that the baby boomers, who have usually followed the adage "Eat dessert first; life is uncertain!" are now approaching retirement. The aging "me generation" that now dominates public policy demands expensive health care, ever more prisons, homeland security, reduced tax burdens—and apparently to hell with the kids and the future. If this is indeed a consequence of the priorities of a governing generation, then it is also possible that the current inadequacy tax support for public colleges and universities is not a temporary affliction; it is likely to last for several decades!

This shift from the perception of higher education as a public good to one that can best be described as an individual benefit has yet another implication. To the degree that higher education was a public good, benefiting all (through sustaining democratic values, providing public services), one could justify its support through taxation of the entire population. But viewed as an individual benefit, public higher education is, in fact, a highly regressive social construct since, in essence, the poor subsidize the education of the rich, largely at the expense of their own opportunities.

The implications are that the marketplace coupled with a commitment to provide educational opportunities to all, regardless of economic ability, will increasingly drive many of the best public universities toward high-tuition, high financial aid policies in which state support becomes correctly viewed as a tax-supported discount of the price of education. Reputations earned using public funds become the key to winning a fair share of the revenues the market is now expected to provide: student tuitions and government grants along with the philanthropic largesse of foundations, corporations, and individuals of substantial wealth. The consequence is the rise in the number of public “flagship” universities that now seek to become privately financed all at the expense of their once dominant public characters.

In this process of responding to the market place by privatizing public higher education the nation is in the process of diminishing the importance of the university as a place of public purpose. History demonstrates that markets are inexorable; it is both fruitless and dangerous to pretend they are not. At best, markets can be shaped by informed consumers and guided by government regulation meant to constrain the most egregious effects of unchecked competition. At the moment higher education in the United States has few informed consumers—what most students and their families seek is a competitive edge for themselves and their children, an outcome that can best be secured by focusing on institutional prestige rather than educational quality. Nor have governments demonstrated either the skill or inclination to enter the arena as regulators—in part because most public officials have been persuaded that universities are complex enterprises that, for the most part, can only be understood by those steeped in the traditions of the academy; and in part because these same public officials now have a vested interest in having public institutions succeed as market enterprises.

What is at stake are those core values and traditions that have afforded the research university its historic standing. Will the university retain its special role and responsibilities, its privileged position in society? Will it continue to prepare young students for roles as responsible citizens? Will it provide social mobility through access to education? Will its scholarship in pursuit of truth and openness continue to challenge

society? Or will the university become, both in perception and reality, just another interest group defined largely by market forces?

What to Do?

Higher education must take decisive action to address current concerns about quality, efficiency, capacity, and accountability if it is to earn the necessary level of public trust and confidence to enable it to pursue its public purpose.

Vision: While higher education provides important private benefits to graduates, clients, and industry, in reality it is primarily a public good, created and supported by society to serve a public purpose.

Challenges: Like so many other institutions in our society, higher education today finds itself roundly criticized from the right, the left, and the center—indeed, even from within by many of our own faculty, students, and staff—for flaws large and small, fundamental and trivial, real and imagined. Little wonder that at times the academy feels under siege: criticized by parents and students for the uncontrolled escalation of tuition; attacked by state legislators and governors for insufficient attention to state needs; criticized by Washington and indeed our own faculties for rising administrative costs; challenged across the political spectrum for the quality and nature of undergraduate education; and generally blasted by the media in essentially any and all of our activities, from teaching to health care to intercollegiate athletics.

Among this array of criticisms, there is one that stands out in particular: the growing frustration of society with the hesitancy or reluctance of the university to face up to the challenge of change. A rapidly evolving world has demanded profound and permanent change in most, if not all, social institutions. Corporations have undergone restructuring and reengineering. Governments and other public bodies are being overhauled, streamlined, and made more responsive. Individuals are increasingly facing a future of impermanence in their employment, in their homes, and even in their families. The nation-state itself has become less relevant and permanent in an ever more

interconnected world.

Unlike many other institutions, at least according to our critics, the university has responded to the needs of a changing society largely by defending the status quo. To be sure, change has always occurred in higher education on glacial time scales—not surprising since the typical career of a tenured faculty member spans three or more decades. But at a time when our society, our nation, and the world itself are changing rapidly, the university still tends to frame its contemporary roles largely within traditional paradigms. It resists major changes in curricula or pedagogy. Students continue to be evaluated and credentialed relative to “seat time” rather than learning outcomes. The technology that is revolutionizing our world has largely bypassed the classroom, which continues to function largely as it has for decades, if not centuries. Tenure is seen not as a protection for academic freedom but rather as a perquisite that shields the faculty from accountability and change. And higher education tends to respond to resource constraints by raising funds from other sources rather than prioritizing programs or increasing productivity.

Possible Strategies: While market forces are likely to dominate public investment and public policy, at least for the foreseeable future, it is essential for higher education to retain its public purpose rather than simply responding to the market demands of the moment. After all, it has been a public good of immense importance throughout the history of the nation, and it must remain so. Here, however, it should be recognized and acknowledged that for higher education to regain the necessary degree of public trust and confidence, institutions will have to first listen more attentively to the concerns of its various and diverse constituencies (e.g., students, parents, employers, public and private patrons) and then respond to these concerns through bold institutional actions and transformation consistent with their public purpose.

There are an array of remaining questions and issues that should be addressed in moving toward a national plan:

1. Is it time to launch a major conversation both

within the academy and across society more generally about the nature of the college education appropriate to prepare citizens for a 21st century world? Are the objectives of those currently in leadership positions in our society who were educated in a century past, valuing traditional paradigms such as liberal learning or more focused professional training, relevant to the challenges and opportunities of a rapidly changing world faced by the new generations of students? How would one go about launching, sustaining, and harvesting ideas from this conversation?

2. What are the best quantitative goals to set out for the U.S. postsecondary education enterprise as a whole? Fraction of population with college educations? Degrees? Graduation rates? Participation based on socioeconomic status? Literacy measures? More sophisticated measures of learning value-added from higher education?

3. What are the best performance measures for individual institutions? Success (graduation rates, placement statistics)? Educational “value-added” (e.g., evidence-based measures of educational effectiveness or student acquisition of cognitive skills)? Cost-productivity-efficiency measures? Innovation measures? How would one collect and compare this information?

4. How should the quality and performance of colleges and universities be assessed and certified? Through traditional institutional accreditation processes? Through the certification process of professional organizations (e.g., law, business, medicine, engineering)? Through popularity contests such as those conducted by US News & World Report? Or through a new and far more rigorous public process that provides evidence-based assessments of educational effectiveness on a student-by-student basis?

5. Are there specific actions that could be taken to stimulate the market pressures necessary to drive change in the university culture in areas such as cost-containment, productivity, and innovation, beyond simply creating better-educated consumers (students,

employers, public agencies)?

6. American higher education is highly bimodal, characterized by a small number of extremely expensive institutions attracting the best students and faculty with little incentive to become more efficient, and a very large number of more modestly supported colleges and universities attempting to educate the bulk of college students with increasingly limited resources that tend to erode quality rather than stimulate productivity. The challenge is to provide stronger incentives to wealthy institutions to stimulate greater efficiency, while providing the resources (financial, expertise, leadership) to enable productivity enhancement across the broader higher education enterprise. Possibilities include greater cost-sharing requirements for federal grants, restructuring tax policy to shift the tax expenditures associated with charitable giving and endowment earnings to priorities such as student financial aid, and disentangling the cross-subsidies of the various missions of higher education to better identify where to demand cost containment and productivity.

7. By developing recommendations based on the pessimistic assumption of seriously constrained public resources, will we, in effect, undercut the possibility of making a strong case for enhanced public support?

8. Are there more creative ways to tap capital markets? For example, the success of for-profit postsecondary education companies (e.g., University of Phoenix) in highly selective markets (adults, professional training, etc.) will almost certainly be a growth area. Could for-profit enterprises be created that serve as human capital brokers by supporting workforce development in key disciplines of particularly high need (e.g., info-bio-nanotechnology, knowledge services management) and then becoming a supplier of these graduates to employers? How could conventional universities more effectively tap the capital markets? (Perhaps they also could become compensated suppliers of human capital to employers...)

9. Since many of the proposed objectives are strongly dependent upon the quality of K-12 education, how do we better use the resources of American

higher education to dramatically improve the quality of primary and secondary education? To what degree should higher education take on other major social challenges such as literacy?

The Commission has approached its task (and this report) with a broad swath encompassing all elements of the American postsecondary education enterprise. However an alternative would be to provide a more detailed analysis and recommendations for each component of the American higher education enterprise that acknowledges the distinct missions, challenges, and opportunities of each tier.

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Chapter 8

Governance and Leadership

The importance of the university to our society, its myriad activities and stakeholders, and the changing nature of the society it serves, all suggest the importance of experienced, responsible, and enlightened university leadership, governance, and management. Here we should distinguish between leadership and management at the institution or academic unit level, as exercised by administrative officers such as presidents, deans, and department chairs, and the governance of the institution itself as exercised by governing boards, statewide coordinating bodies, or state and federal government. The governance of public colleges, universities, and higher education systems is particularly complex, involving the participation and interaction of many organizations with responsibilities for not only the welfare of the institution but also for funding and regulating its activities and ensuring its public accountability. At the most basic level, the principles embodied in the Constitution make matters of education an explicit state assignment. State governments have historically been assigned the primary role for supporting and governing public higher education in the United States. The states have distributed the responsibility and authority for the governance of public universities through a hierarchy of governing bodies including the legislature, state executive branch agencies, higher education coordinating boards, institutional governing boards, and institutional executive administrations.

American colleges and universities have long embraced the concept of institutional governance involving public oversight and trusteeship by lay boards of citizens. Although these boards have both a legal status as well as fiduciary responsibility, their limited knowledge of academic matters leads them to delegate much of their authority to the university's

administration for executive leadership and to the faculty for academic matters. Because of their lay character university governing boards face a serious challenge in their attempts to understand and govern the increasingly complex nature of the university and its relationships to broader society. They must be attentive to the voluntary culture (some would say anarchy) of the university that responds far better to a process of consultation, communication, and collaboration than to the command-control-communication process familiar from business and industry. This is made even more difficult by the politics swirling about and within governing boards, particularly in public universities, that not only distract boards from their important responsibilities and stewardship, but also discourage many experienced, talented, and dedicated citizens from serving on these bodies. The increasing intrusion of state and federal government in the affairs of the university, in the name of performance and public accountability, but all too frequently driven by political opportunism, can trample upon academic values and micromanage institutions into mediocrity. Furthermore, while the public expects its institutions to be managed effectively and efficiently, it weaves a web of constraints through public laws that make this difficult. Sunshine laws demand that even the most sensitive business of the university must be conducted in the public arena, including the search for a president. State and federal laws entangle all aspects of the university in rules and regulations, from student admissions to financial accounting to environmental impact.

Governance and Leadership

Despite dramatic changes in the nature of scholarship, pedagogy, and service to society,

American universities today are organized, managed, and governed in a matter little different from the far simpler colleges of a century ago. We continue to embrace, indeed, enshrine, the concept of shared governance involving public oversight and trusteeship by governing boards of lay citizens, elected faculty governance, and experienced but generally short-term and usually amateur administrative leadership. Today, however, the pace of change in our society is exposing the flaws in this traditional approach to university governance.

University governing boards comprised of lay citizens face a serious challenge in their ability to understand and govern the increasingly complex nature of the university and its relationships to broader society. This is made even more difficult by the politics swirling about and within many governing boards, particularly those characterizing public universities, that not only distract boards from their important responsibilities and stewardship, but also discourage many of our most experienced, talented, and dedicated citizens from serving on these bodies.

While faculty governance continues to be both effective and essential for academic matters such as curriculum development, faculty hiring, and tenure evaluation, it is increasingly difficult to achieve true faculty participation in broader university matters such as finance, capital facilities, and external relations. When faculty members do become involved in university-wide governance and decision-making, all too often they tend to become preoccupied with peripheral matters such as the “p-issues”—pay, parking, and the plant department—rather than strategic issues such as the protection of academic values or the proper balance among undergraduate, graduate, and professional education. The faculty traditions of debate and consensus building, the highly fragmented and compartmentalized organization of academic departments, and the faculty’s primary loyalty to their academic discipline and the marketplace rather than to their institution seem increasingly incompatible with the breadth and rapid pace required to keep up with today’s high momentum, high risk university-wide decision environment.

University presidents and other academic administrators are all too frequently caught between

these opposing forces, between external pressures and internal campus politics, between governing boards and faculty governance, between a rock and a hard place. Moreover, the imbalance between responsibility (considerable) and authority (modest) characterizing the contemporary university presidency inhibits strong, visionary leadership in higher education at a time when it is desperately needed. Little wonder that most university administrators keep their heads low, avoid making waves, and polish their resume for their next career step.

Today it is appropriate to question whether the key participants in shared governance—the lay governing board, elected faculty governance, and academic administrators—have the expertise, the discipline, the authority, and the accountability necessary to cope with the powerful social, economic, and technological forces driving change in our society and its institutions. More specifically, is it realistic to expect that the shared governance mechanisms developed decades ago can serve well the contemporary university or the rapidly changing society dependent upon its activities? Can boards comprised of lay citizens, with little knowledge either of academic matters or the complex financial, management, and legal affairs of the university be expected to provide competent oversight for the large, complex institutions characterizing American higher education? What is the appropriate role for the faculty in university governance and is this adequately addressed by the current determination and conduct of faculty governing bodies? Can academics with limited experience in management serve as competent administrators (e.g., as deans, provosts, and presidents)? And, finally (and most speculatively), what works, what does not, and what to do about it?

Before examining these issues, it is important first to stress a very important caveat. There is remarkable diversity in the forms of governance used by American colleges and universities, since these have evolved from the history and traditions of a highly diverse collection of institutions. Beyond the obvious differences between public and private universities, liberal arts colleges and research universities, and those with organized (unionized faculties) and those with traditional faculty anarchies, there are other strong differences even among institutions of quite similar academic characteristics.

Some institutions such as the University of California have long traditions of strong faculty governance at the campus-wide or system-wide level, while others such as the University of Michigan stress this role at the level of the academic unit through faculty executive committees, relying upon deans to address academic concerns at the university level. Some states such as Ohio and North Carolina have statewide governing boards determining educational policy and funding priorities; others such as California rely on governing boards at the university system level working within the framework of carefully negotiated master plans; and some such as Michigan recognize through state constitution or state the autonomy of a unique governing board for each college and university. Although this paper attempts to identify and address issues common to most colleges and universities, it is clearly influenced by the author's experience with large, public research universities such as the University of Michigan.

It is interesting to note that both the report of the Spellings Commission, *A Test of Leadership: Charting the Future of U.S. Higher Education*, and the report of the AGB Task Force on the State of the University Presidency, *The Leadership Imperative*, stressed the importance of "leadership". Both recognized that for higher education to play the role it must during a period of challenge, opportunity, and responsibility, it must establish a stronger sense of trust and confidence on the part of the American public. Key in earning and sustaining this trust and confidence are university presidents, working in concert with their governing boards and faculties. No leader comes to personify an institution in the way a president does. A president must provide academic leadership at the same time he or she must assimilate and tell the institution's story to build pride internally and support externally. The president has primary responsibility for increasing public understanding and support for the institution as a contributor to the nation's continued vitality and well being. (AGB, 2006)

Yet the ability to be an effective spokesperson for higher education in America is strongly dependent upon the support provided by governing boards and faculties (or at least their tolerance) for the voice of the president. Many universities find that the most formidable forces controlling their destiny are political

in nature—from governments, governing boards, or perhaps even public opinion. Unfortunately, these bodies are not only usually highly reactive in nature, but they frequently either constrain the institution or drive it away from strategic objectives that would better serve society as a whole and in the long run. Many university presidents—particularly those associated with public universities—believe that the greatest barrier to change in their institutions lies in the manner in which their institutions are governed, both from within and from without. Universities have a style of governance that is more adept at protecting the past than preparing for the future. An earlier AGB effort highlighted these concerns when it concluded that the governance structure at most colleges and universities is inadequate. "At a time when higher education should be alert and nimble, it is slow and cautious instead, hindered by traditions and mechanisms of governing that do not allow the responsiveness and decisiveness the times require." (AGB, 1996) The Commission went on to note its belief that many university presidents were currently unable to lead their institutions effectively, since they were forced to operate from "one of the most anemic power bases of any of the major institutions in American society."

A decade later the AGB Task Force on the university presidency found that the presidents of American colleges and universities continue today to face impediments in their efforts to provide capable leadership, particularly on important national issues. (AGB, 2006) The university presidency is all too frequently caught between these opposing forces, between external pressures and internal campus politics, between governing boards and faculty governance. Today there is an increasing sense that neither the lay governing board nor elected faculty governance has either the expertise nor the discipline—not to mention the accountability—necessary to cope with the powerful social, economic, and technology forces driving change in our society and its institutions. The glacial pace of university decision-making and academic change simply may not be sufficiently responsive or strategic enough to allow the university to control its own destiny.

In summary, today there remain many concerns about the governance and leadership of higher

education, particularly for public colleges and universities. Many governing boards have become overly politicized, focusing more on oversight and accountability than on protecting and enhancing the capacity of their university to serve the changing and growing educational needs of our society. While faculty governance is critical in sustaining the consultative character of the university, it can also become cumbersome and possibly even irrelevant to either the nature or pace of the issues facing the contemporary university. University leadership, whether at the level of chairs, deans, or presidents, has insufficient authority to meet the considerable responsibilities engendered by powerful forces of change on higher education. And nowhere, either within the academy, at the level of governing boards, or in government policy, is there a serious discussion of the fundamental values so necessary to the nature and role of the public university.

To be sure, the contemporary university has many activities, many responsibilities, many constituencies, and many overlapping lines of authority, and from this perspective, shared governance models still have much to recommend them: a tradition of public oversight and trusteeship, shared collegial internal governance of academic matters, and, experienced administrative leadership. But it also seems clear that the university of the twenty-first century will require new forms of governance and leadership capable of responding to the changing needs and emerging challenges of our society and its educational institutions. Governing board members should be selected for their expertise and commitment and then held accountable for their performance and the welfare of their institutions. Faculty governance should focus on those issues of most direct concern to academic programs, and faculty members should be held accountable for their decisions. Our institutions must not only develop a tolerance for strong presidential leadership; they should demand it.

The Way Things Are Supposed to Work

Perhaps the most authoritative description of how the shared governance model of the university is supposed to work was articulated in 1967 in a joint statement formulated by the American Association of University Professors (AAUP), the American Council

on Education (ACE), and the Association of Governing Boards of Universities and Colleges (AGB). In theory, shared governance delegates academic decisions (e.g., criteria for student admissions, faculty hiring and promotion, curriculum development, awarding degrees) to the faculty and administrative decisions (e.g., acquiring resources and planning expenditures, designing, building, and operating facilities) to the administration, leaving the governing board to focus on public policy and accountability (e.g., compliance with federal, state, and local laws; fiduciary responsibilities; and selecting key leadership such as the president). Put another way, shared governance allocates public accountability and stewardship to the governing board, academic matters to the faculty, and the tasks of leading and managing the institution to the administration.

Of course, from a legal perspective, “shared governance” is a misnomer. By law or by charter, essentially all of the legal powers of the university are held by its governing board, although generally delegated to and exercised by the administration and the faculty, particularly in academic matters. The function of the lay board in American higher education is simple, at least in theory: the governing board has final authority for key policy decisions and accepts both fiduciary and legal responsibility for the welfare of the institution. But because of its very limited expertise, it is expected to delegate the responsibility for policy development, academic programs, and administration to the faculty and other professionals with the necessary training and experience. In the case of private institutions, governing boards are typically elected by alumni of the institution or self-perpetuated by the board itself. In public institutions, board members are determined by political mechanisms, either appointed by governors or determined through popular election.

There are actually two levels of faculty governance. The key to the effective governance of the academic mission of the university, e.g., who gets hired, who gets promoted, what gets taught, and how funds are allocated and spent, involves an array of faculty committees (e.g., promotion, curriculum, and executive committees) at the level of the academic unit, typically at the department or school or college level. Although the administrative leader, a department chair or dean, may have considerable authority, he or she is generally

tolerated and sustained only with the support of the faculty leaders within the academic unit.

The second level of faculty governance occurs at the university level and usually involves an elected body of faculty representatives, such as an academic senate, that serves to debate institution-wide issues and advise the university administration. In sharp contrast to faculty governance at the unit level that has considerable power and influence, the university-wide faculty governance bodies are generally advisory on most issues, without true power. Although they may be consulted by the administration or the governing board on important university matters, they rarely have any executive authority.

Actually, there is a third level of informal faculty power and control in the contemporary research university, since an increasing share of institutional resources flow directly to faculty entrepreneurs as research grants and contracts from the federal government, corporations, and private foundations. These research programs act as quasi-independent revenue centers with very considerable influence, frequently at odds with more formal faculty governance structures such as faculty senates.

Like other complex organizations in business or government, the university requires competent management and administration. While perhaps long ago universities were treated by our society--and its various government bodies--as largely well-intentioned and benign stewards of truth, justice, and the American way, today we find the university faces the same pressures, standards, and demands for accountability characterizing any other public corporation. Of course, the term "university administration" sometimes conveys a sinister connotation to both faculty and governing boards alike, akin to the terms "federal government", "bureaucracy", or "corporate organization." In reality, however, the university administration is simply a leadership network that extends throughout the university. As a general practice, those administrative officers responsible for academic programs (e.g., department chairs, dean, provosts) are selected from among the faculty and continue to have academic rank. Those responsible for various administrative, support, and business functions of the university such as finance, physical plant, and government relations generally

have experience and training in these latter areas.

At the helm (on the bridge) of the American university is the president (or chancellor). University presidents are expected to develop, articulate, and implement visions for their institution that sustain and enhance its quality. Through their roles as the chief executive officers of their institutions, they also have significant management responsibilities for a diverse collection of activities, ranging from education to health care to public entertainment (e.g., intercollegiate athletics). Since these generally require the expertise and experience of talented specialists, the president is the university's leading recruiter, identifying talented people, recruiting them into key university positions, and directing and supporting their activities. Unlike most corporate CEOs, the president is expected to play an active role generating the resources needed by the university, whether by lobbying state and federal governments, seeking gifts and bequests from alumni and friends, or clever entrepreneurial efforts. There is an implicit expectation on most campuses that the president's job is to raise money for the provost and deans to spend, while the chief financial officer and administrative staff watch over their shoulders to make certain they all do it wisely.

The presidency of an American college or university is an unusual leadership position from another interesting perspective. Although the responsibility for everything involving the university usually floats up to the president's desk, direct authority for university activities almost invariably rests elsewhere. There is a mismatch between responsibility and authority that is unparalleled in other social institutions. As a result, there are many, including many university presidents, who have become quite convinced that the contemporary university is basically unmanageable and unleadable, at least from the office of the president.

Challenges

Challenges to Effective University Governance

The modern university is comprised of many activities, some nonprofit, some publicly regulated, and some operating in intensely competitive marketplaces. It teaches students; it conducts research for various

clients; it provides health care; it engages in economic development; it stimulates social change; and it provides mass entertainment (e.g., college sports). The organization of the contemporary university would compare in both scale and complexity with many major global corporations. The very complexity of the university has made substantive involvement in the broader governance of the university problematic for all of the participants in shared governance.

The increased complexity, financial pressures, and accountability of universities demanded by government, the media, and the public at large have required stronger management than in the past. Yet as universities have developed the administrative staffs, policies, and procedures to handle such issues, they have also created a thicket of paperwork, regulations, and bureaucracy that has weakened the authority and attractiveness of academic leadership. Broad participation in university governance is hampered by bureaucratic policies and procedures and practices, along with the anarchy of committee and consensus decision-making.

The pace and nature of the changes occurring in our world today also pose formidable challenges to tradition-bound institutions such as the university. In business, management approaches change in a highly strategic fashion, launching a comprehensive process of planning and transformation. In political circles, sometimes a strong leader with a big idea can captivate the electorate, building momentum for change. The creative anarchy arising from a faculty culture that prizes individual freedom and consensual decision-making poses quite a different challenge to the university. Most big ideas from top administrators are treated with either disdain (this too shall pass...) or ridicule. The same usually occurs for formal strategic planning efforts, unless, of course, they are attached to clearly perceived budget consequences or faculty rewards. The academic tradition of extensive consultation, debate, and consensus building before any substantive decision is made or action taken poses a particular challenge in this regard, since this process is frequently incapable of keeping pace with the profound changes swirling about higher education.

The character of the participants in shared university governance seem increasingly incompatible

with the challenges the university faces in serving a rapidly changing society. Many university presidents believe—although they are understandably discrete in stating—that one of their greatest challenges is protecting their institution from the deteriorating quality of their governing board. In theory, members of governing board are expected to serve as stewards for their institutions, advocates for higher education, and defenders of academic values. In practice there has been a pronounced shift in board roles in recent years toward a greater emphasis on oversight and public accountability. This is particularly the case with the governing boards of public universities. As the politics of board selection have become more contentious, board members have increasingly advocated strong political agendas, e.g., to restructure the curriculum to stress a specific ideology or eliminate social commitments such as affirmative action. Instead of buffering the university from various political forces, some boards have become conduits for many of the political issues swirling beyond the campus.

A recent 1998 study commissioned by the Association of Governing Board concluded that many university trustees lack both a basic understanding of higher education and a significant commitment to it. Too much time is spent concentrating on administrative matters rather than the urgent questions of educational policy. Inexperienced boards all too often become captivated by the illusion of the quick and easy fix, believing that if only the right strategic plan is developed, or the right personnel change is made, then everything will be fine, their responsibilities will be met, and their personal influence over the university will be visible.

There is little doubt that the deterioration in the quality of governing boards, the confusion concerning their roles, and the increasingly political nature of their activities has damaged many public universities and threatens many others. There used to be an old saying that no institution can be better than its governing board. Today, however, the counterpoint seems to apply to many universities: A governing board is rarely as good as the institution it serves.

While faculty involvement in academic matters is essential for program quality and integrity, faculty participation in university-wide governance and leadership is problematic for many reasons. First,

as we have noted, the complexity of contemporary university hinders substantive faculty involvement in the broader governance of the university. On most campuses faculty suffer from a chronic shortage of information—and hence understanding—about how the university really works. In part, this arises because university administrations have attempted to shield the faculty and the academic programs from the forces of economic, social, and technology change raging beyond the campus. But there are deeper issues.

The faculty culture typically holds values that are not necessary well aligned with those required to manage a complex institution. For example, the faculty values academic freedom and independence, while the management of the institution requires responsibility and accountability. Faculty members tend to be individualists, highly entrepreneurial lone rangers rather than the team players required for management. They tend to resist strong, visionary leadership and strongly defend their personal status quo. It is frequently difficult to get faculty commitment to—or even interest in—broad institutional goals that are not necessarily congruent with personal goals.

Beyond the fact that it is frequently difficult to get faculty committed to—or even interested in—broad institutional goals, there is an even more important element that prevents true faculty governance at the institution level. Responsibility and accountability should always accompany authority. Deans and presidents can be fired.

Trustees can be sued or forced off governing boards (at least in private universities). Yet the faculty, through important academic traditions such as academic freedom and tenure, are largely insulated from the consequences of their debates and recommendations. It would be difficult if not impossible, either legally or operationally, to ascribe to faculty bodies the requisite level of accountability that would necessarily accompany executive authority.

Of course many of the most outspoken critics of faculty governance come from within the faculty itself. They note with dismay that many of those elected to faculty governance seem more interested in asserting power and influence on matters of personal interest such as compensation and staff benefits. Tragically it has been difficult to get faculty governance

to focus on those areas clearly within their unique competence such as curriculum development, student learning, academic values, and ethics. Little wonder that many of the most active faculty members are reluctant to become involved in the tedious committees and commissions generated by shared governance.

The contemporary university is buffeted by powerful and frequently opposing forces. The marketplace demands cost-effective services. Governments and the public demand accountability for the expenditure of public funds. The faculty demands (or at least should demand) adherence to long-standing academic values and traditions such as academic freedom and rigorous inquiry. Power in a university is broadly dispersed and in many cases difficult to perceive. Although the views and roles of each of the players in shared university governance are highly diverse, most groups do share one common perspective: that they all believe they need and deserve more power than they currently have. The long-standing tradition of shared governance, in which power is shared more or less equally among all potential decision makers, is cumbersome and awkward at best.

Part of the difficulty with shared governance is its ambiguity. The lines of authority and responsibility are blurred, sometimes intentionally. Although most members of the university community understand that the fundamental principals of shared governance rest upon the delegation of authority from the governing board to the faculty in academic matters and to the administration in operational management, the devil in the details can lead to confusion and misunderstanding. Turf problems abound. One of the key challenges to effective university governance is to make certain that all of the constituencies of shared governance—governing boards, administrations, and faculty—understand clearly their roles and responsibilities.

The Changing Relationship with Government

Ironically, even as state support has declined, the effort to regulate universities and hold them accountable has increased. To some degree, this is evidence of governments attempting to retain control over the sector through regulation even as their financial control has waned. Most state governments and public university governing boards tend to view their primary roles as

oversight to ensure public or political accountability rather than as stewardship to protect and enhance their institutions so that they are capable of serving both present and future generations. Furthermore, many public research universities today find themselves constrained by university systems, characterized both by bureaucracy and system-wide policies for setting tuition levels and faculty compensation that fail to recognize the intensely competitive environment faced by research universities.

Yet something more fundamental is occurring. While it was once the role of governments to provide for the purposes of universities, today it is now the role of universities to provide for the purposes of government. As costs have risen and priorities for tax revenues have shifted to accommodate aging populations, governments have asked more and more stridently, what are universities for? The imperatives of a knowledge-driven global economy have provided a highly utilitarian answer: to provide the educated workforce and innovation necessary for economic competitiveness. Governments, in other words, increasingly regard universities as delivery agencies for public policy goals in areas such as economic development and workforce skills that may be tangential to their primary responsibilities of education and scholarship (Newby, 2011).

While it is certainly true that cost-containment and accountability are important issues, it is also the case that most public universities can rightly argue that the main problems for them today is that they are both seriously underfunded through state appropriations and seriously overregulated by state policies in areas such as employment, financial affairs, tuition control, and open meetings requirements. Little wonder that public university leaders are increasingly reluctant to cede control of their activities to state governments. Some institutions are even bargaining for more autonomy from state control as an alternative to restoration of adequate state support, arguing that if granted more control over their own destiny, they can better protect their capacity to serve the public.

An Outdated System

The quaint tradition inherited from the colonial

colleges of governing universities with boards comprised of “lay” members, e.g., with no experience in the fundamental activities of the academy, teaching and research, is not only obsolete but also irresponsible in an era in which these institutions are among the most complex (far more than most multinational corporations) and important of our times (not only contributing the new knowledge and graduates driving an estimate 60% of America’s economic growth but essential contributors to public health and national security. To insist on maintaining lay university governance demonstrates not only a serious misunderstanding of the nature and importance of the modern university but the extraordinary ignorance and arrogance of those unfamiliar with its activities.

The growing tendency of university governing boards to seek university presidents from non-academic backgrounds such as the corporate sector or political leadership is extraordinarily dangerous. It is an example of the blind attempting to recruit the blind, e.g., lay governing boards with little experience with the core activities of the university, i.e., teaching, research, and professional services, deciding to recruit leadership with even less experience. Imagine a corporate board of directors recruiting a professor of philosophy as a CEO. Not only would this be highly irresponsible but also such a clear violation of their fiduciary duties that directors would almost certainly face not only shareholder rejection but also likely litigation.

Ask any group of university presidents about the greatest challenges to university leadership, and rapidly the issue of university governance emerges, whether internal through the shared governance of lay governing boards and faculty senates, or external through the complex web of political and regulatory forces exerted on their institutions by state and federal governments. Despite dramatic changes in the nature of scholarship, pedagogy, and service to society, American universities today are organized, managed, and governed in a manner little different from the far simpler colleges of a century ago. We continue to embrace, indeed, enshrine, the concept of shared governance involving public oversight and trusteeship by governing boards of lay citizens, elected faculty governance, and experienced but generally short-term and usually amateur administrative leadership.

Today, however, the pace of change in our society and the growing complexity and accountability of our universities are exposing the flaws in this traditional approach to university governance.

Of course, from a legal perspective, “shared governance” is a misnomer. By law or by charter, essentially all of the legal powers of the university are held by its governing board, although they are generally delegated to and exercised by the administration and the faculty, particularly in academic matters. When it works well, shared governance delegates academic decisions (e.g., criteria for student admissions, faculty hiring and promotion, curriculum development, awarding degrees) to the faculty and administrative decisions (e.g., acquiring resources and planning expenditures, designing, building, and operating facilities) to the administration, leaving the governing board to focus on public policy and accountability (e.g., compliance with federal, state, and local laws; fiduciary responsibilities; and selecting key leadership such as the president). Put another way, shared governance allocates public accountability and stewardship to the governing board, academic matters to the faculty, and the tasks of leading and managing the institution to the administration.

Like many other university presidents, I gradually reached the conclusion that the complexity of the contemporary university and the forces acting upon it had outstripped the ability of the current shared governance system of lay boards, elected faculty bodies, and inexperienced academic administrators to govern, lead, and manage these important institutions. Many of the most formidable forces shaping the future of our universities have become political in nature—from governments, governing boards, public opinion, and, at times, even faculty governing bodies—rather than reflecting both the long-standing academic values and traditions that have sustained our institutions and the changing needs of the society they were created to serve.

To be sure, most of those citizens and faculty members serving on various governing bodies do so with the best of intentions, loyal to the institution and committed to its welfare and capacity to serve. Yet all too frequently they do so within an awkward structure of shared governance that allows political

forces to inhibit access to both adequate information and communication. It is also a structure that can easily be hijacked by those with strong personal or political agendas that could harm the university.

As these concerns grew, my administration set out on a dangerous course to attempt to improve the quality of our governance. We attempted to restructure the meetings of our governing board to allow more discussion of key strategic issues facing the university rather than allow the agenda to be dominated by the usual flow of routine business decisions. We tried to help the board develop internal leadership and discipline so that the occasional antics of maverick board members would not hold it hostage. Although we explored with state government the possibility of modifying the laws requiring popular (and partisan) election of regents, in the end their constitutional nature proved too difficult to amend, and instead we focused our attention on using our political contacts (particularly alumni) to improve the quality of candidates nominated by the political parties, although this ran the risk of retaliation by some of the current board members.

A similar effort was directed at improving faculty governance. We encouraged the deans to urge their faculties to nominate strong candidates for the university’s faculty senate. My executive officers and I met regularly and frequently with the leadership of the faculty senate and most faculty advisory committees. We attempted to engage the executive committees of the university’s schools and colleges in university-wide strategic issues. To facilitate interactions with faculty, we brought into the President’s Office former leaders of faculty governance to serve both as liaison and Secretary of the University.

The contemporary American university presidency also merits a candid reappraisal and likely a thorough overhaul. The presidency of the university may indeed be one of the more anemic in our society, because of the imbalance between responsibility and authority, the cumbersome process used to select university leaders, and the increasing isolation of “professional” academic administrators from the core teaching and scholarship activities of the university. Yet it is nevertheless a position of great importance, particularly from the perspective of the long-term impact a president can have on an institution.

Universities have a style of governance that is more adept at protecting the past than preparing for the future. All too often shared governance tends to protect the status quo—or perhaps even a nostalgic view of some idyllic past—thereby preventing a serious consideration of the future. During an era characterized by dramatic change, we simply must find ways to cut through the Gordian knot of shared governance, of indecision and inaction, to allow our colleges and universities to better serve our society. Our institutions must not only develop a tolerance for strong leadership; they should demand it.

The complexity of the contemporary university and the forces acting upon it have outstripped the ability of the current shared governance system of lay boards, elected faculty bodies, and inexperienced academic administrators to govern, lead, and manage. It is simply unrealistic to expect that the governance mechanisms developed decades or even centuries ago can serve well either the contemporary university or the society it serves. To blind ourselves to these realities is to perpetuate a disservice to those whom we serve, both present and future generations.

Flawed Approaches to Management

The contemporary university finds itself increasingly compartmentalized by the specialization of academic departments and faculty interests, the decentralization of budgets and resources, the nomadic character of the faculty in a highly competitive marketplace, technologies allowing the creation of scholarly communities detached from campuses and academic institutions, and by the ever more numerous and complex missions demanded by a diverse multiplicity of clients and stakeholders. While this increasingly decentralized nature of the university allows it to function as a loosely coupled adaptive system, evolving in a highly reactive fashion to its changing environment, it can also undermine the ability of the university to respond effectively to the broader needs and demands of society, particularly in its core missions of student learning and social engagement.

While management tools and governance structures provide useful tools in unifying the university, budgets and organization can only accomplish so much. Far

more important is leadership, particularly from the president, capable of embracing those values that pull a fragmented community together to address a common and public purpose.

The intellectual fragmentation of the university was driven very much by the rapid evolution of the scientific method in the late 19th century, as specialization and new disciplines were necessary to cope with the explosion of knowledge. Academic disciplines began to dominate the university, developing curriculum, marshaling resources, administering programs, and doling out rewards. Both the organization and the resource flows of the university became increasingly decentralized to adapt to the ever more splintered disciplinary structure. The increasingly narrow focus of scholarship created diverse faculty subcultures throughout the university—humanities, the natural and social sciences, professional schools—widening still further the gap among the disciplines and shifting faculty loyalties away from their institutions and toward small peer communities that became increasingly global in extent.

Decentralization has also been driven by the rapidly changing nature of how universities are financed. In earlier times, the responsibility for generating the resources necessary to support the activities of the university was highly centralized. Public institutions were primarily supported by state appropriations, while private institutions were supported by private giving and student fees. Since these resources usually increased from year to year, institutions relied on incremental budgeting, in which the central administration simply determined how much additional funding to provide academic units each year. In today's brave new world of limited resources, battered by seriously strained state budgets and turbulent financial markets, the resources supporting most public and private universities are no longer collected centrally through appropriations or gifts. Rather they are generated locally at the level of academic units and even individual faculty members, competing in the marketplace for students (and hence tuition dollars), research grants and contracts (which flow to principal investigators), gifts (which are given to particular programs or purposes), and other auxiliary activities (clinical care, executive management education, distance learning, and entertainment—e.g., football). Little wonder that most universities are

moving toward highly distributed budget models, in which authority and accountability for revenue generation and cost containment are delegated to individual academic and administrative units, further decentralizing the university. (Duderstadt and Womack, 2003).

The growing pressures on faculty not only to achieve excellence in teaching and research but also to generate the resources necessary to support their activities are immense. Today's faculty members are valuable and mobile commodities in a highly competitive marketplace that enables them to jump from institution to institution in search of an optimal environment to conduct their research, teaching, and other professional activities. They are well aware that their careers—their compensation, promotion, and tenure—are determined more by their research productivity, publications, grantsmanship, and peer respect, than by other university activities such as undergraduate teaching and public service. This reward climate helps to tip the scales away from teaching and public service, especially when quantitative measures of research productivity or grantsmanship replace more balanced judgments of the quality of research and professional work. Little wonder that faculty loyalties have shifted from their institutions to their disciplinary communities. Faculty careers have become nomadic, driven by the marketplace, hopping from institution to institution in sea. As one junior faculty member exclaimed in a burst of frustration: "The contemporary university has become only a holding company for research entrepreneurs!"

The academic organization of the university is sometimes characterized as a creative anarchy. Faculty members possess two perquisites that are extraordinary in contemporary society: academic freedom, which allows faculty members to study, teach, or say essentially anything they wish; and tenure, which implies lifetime employment and security. Faculty members do what they want to do, and there is precious little administrators can do to steer them in directions where they do not wish to go. More abstractly, the modern university has become a highly adaptable knowledge conglomerate, both because of the diversity of the needs of contemporary society and because of the varied interest, efforts, and freedom of its faculty. It is characterized by a transactional

culture, in which everything is up for negotiation. The university administration manages the modern university as a federation. It sets some general ground rules and regulations, acts as an arbiter, raises money for the enterprise, and tries—with limited success—to keep activities roughly coordinated.

Although this frequently resembles organizational chaos to outsiders, in reality the entrepreneurial university has developed an array of structures to enable it to better interact with society and pursue attractive opportunities. Yet, while this organization has proven remarkably adaptive and resilient, particularly during periods of social change, it all too frequently tends to drift without the engagement or commitment of its faculty, students, and staff to institution-wide priorities.

For example, many contend that today's university has diluted its core mission of learning, particularly undergraduate education, with a host of entrepreneurial activities. It has become so complex that few, whether on or beyond our campuses, can comprehend its reality. Even in the face of serious constraints on resources that no longer allow it to be all things to all people, the university continues to have great difficulty in allowing obsolete activities to disappear. It has become sufficiently encumbered with processes, policies, procedures, and past practices so that its best and most creative people are frequently disengaged from institution-wide priorities.

More fundamentally, there is a growing concern that the fragmented university has lost the coherence of its educational, scholarly, and service activities. Clearly the undergraduate curriculum has acquired a shopping mall character, reflecting more what faculty are interested in teaching than what our students need to learn. Universities offer far too many courses and majors, again reflecting the deification of the disciplines at the expense of the more coherent objectives of a college education.

The integration of knowledge is not only key to the vitality of scholarship, but also to fulfilling the public purpose of the university. Perhaps E.O. Wilson put it best in his provocative book, *Consilience*, "Most of the issues that vex humanity daily cannot be solved without integrating knowledge from the natural sciences with that of the social sciences and humanities. Only fluency across the boundaries will provide a clear view of the

world as it really is, not as seen through the lens of ideologies and religious dogmas or commanded by myopic response to immediate needs.” (Wilson, 1998).

Erosion of Faculty Influence

Looking back over the past 50 years, it is clear that the career trajectories of the faculty have changed significantly. No longer do young faculty expect to pursue their career at a single institution but anticipate more of a nomadic path moving from institution to institution in order to rise up the promotion ladder. Yet even more seriously, the opportunities for establishing an academic career are dwindling, with non-tenure track appointments as post-doctoral scholars, lecturers, and adjunct faculty now providing the majority of lower division instruction, a feature driven by the efforts of universities to cut costs and improve productivity with a more flexible faculty workforce. As a consequence, today less than 25% of the instructional faculty is comprised of tenured professors.

Such corporate approaches to university management and leadership, coupled with the nomadic life it imposes upon today’s faculty members, has also seriously damaged faculty loyalty to institutions. Here, Michigan provides a disturbing example of the impact of the increasingly “corporate” nature of large research university, with an increasing fraction of its central administration comprised of staff with little if any experience in higher education, and decision making largely detached from academic considerations (e.g., the efforts to recentralize resource control, weakening the power of deans and directors, launching new initiatives from the central administration rather than harvesting them from faculty and students, and imposing upon faculty and academic programs a corporate bureaucracy that is orthogonal to the spirit of academic freedom and creativity).

Noted scholar Cathy Davidson puts it well: “The distress in higher education today, our adjunct crisis, our overstuffed lecture halls, and our crushing faculty workloads, is a product of 50 years of neoliberalism, both the actual defunding of public higher education by state legislatures and the magical thinking that corporate administrators can run universities more cost-effectively than faculty members. They don’t.

The major push to “corporate” higher education has coincided with a rise, not a decrease, in costs. The greedy, corporate brutality of far too many contemporary universities is reminiscent of medieval monasteries of old. Let’s call it “turf and serf”: real-estate land grabs, exploitation of faculty labor, and the burdening of students with crushing debt.”

Little wonder that many of Michigan’s most accomplished and distinguished faculty members have largely stepped back from efforts to influence the future of the University through service in a faculty governance role with little power or through initiatives that are usually ignored or overwhelmed by the public relations efforts of the central administration. In a very real sense, perhaps one of the greatest challenges to the University of Michigan today, as it is to other great public research universities, is to find a way to empower once again those faculty members whose contributions in teaching, scholarship, and service have been the key factor in establishing and sustaining the reputation of the University.

But perhaps most important has been the weakening of the voice and influence of the University’s deans in recent years. The University of Michigan has long been known as a “deans’ university”, in which the authority and responsibility of deans as academic leaders is unusually strong. Deans are the key academic leaders most responsible for the priority, quality, and integrity of the University’s academic programs. They select department chairs, recruit and evaluate faculty, seek resources for their school both within the university (arguing for their share of university resources) and beyond the campus (through private fundraising or research grantsmanship). As the key line officers for the faculty of the university, they have rather considerable authority that usually aligns well with their great responsibilities. Good things happen in the University’s academic programs because of good deans, at least over the long term—and vice-versa, of course.

What to do?

So, what to do? In the spirit of stimulating debate and fully aware that this may be simply tilting with windmills, it seems appropriate to offer several suggestions. Here the key theme will be the importance

of infusing more expertise and accountability into university governance while preserving those important traditions and values critical to the academy.

Some Fundamental Principles

First, it is useful to begin with several key principles. University leadership and governance, management and decision-making should always reflect the fundamental values of the academy, e.g., freedom of inquiry, an openness to new ideas, a commitment to rigorous study, and a love of learning. Yet, these processes should also be willing to consider and capable of implementing institutional change when necessary to respond to the changing needs of our society.

Restructuring Governing Boards

Nothing is more critical to the future success of higher education than improving the quality and performance of boards of trustees. Today during an era of rapid change, colleges and universities deserve governing boards comprised of members selected for their expertise and experience and who are capable of governing the university in ways that serve both the long term welfare of the institution as well as the more immediate interests of the various constituencies it serves.

For public boards the need is particularly urgent. As long as the members of the governing boards of public universities continue to be determined through primarily political mechanisms, without careful consideration or independent review of qualifications or institutional commitment, and are allowed to pursue political or personal agendas without concern for the welfare of their institution or its service to broader society, the public university will find itself increasingly unable to adapt to the needs of a rapidly changing society.

As the contemporary university becomes more complex and accountable, it may be time to set aside the quaint American practice of governing universities with boards comprised of lay citizens, with their clearly inadequate expertise and all too frequent political character, and instead shift to true boards of directors similar to those used in the private sector. Although

it may sound strange in these times of scandal and corruption in corporate management, it is nevertheless my belief that university- governing boards should function with a structure and a process that reflects the best practices of corporate boards. Corporate board members are selected for their particular expertise in areas such as business practices, finance, or legal matters. They are held accountable to the shareholders for the performance of the corporation. Their performance is reviewed at regular intervals, both within the board itself and through more external measures such as company financial performance. Clearly directors can be removed either through action of the board or shareholder vote. Furthermore, they can be held legally and financially liable for the quality of their decisions—a far cry from the limited accountability of the members of most governing boards for public universities.

Every effort should be made to convince leaders of state government that politics and patronage have no place in the selection of university governing boards or efforts to determine their administrative leadership. Quality universities require quality leadership. Even as public university governing boards have become increasingly political and hence sensitive to special interests, they have also become increasingly isolated from accountability with respect to their quality and effectiveness. Not only should all university governance be subject to regular and public review, but also the quality and effectiveness of governing boards should be an important aspect of institutional accreditation.

The Association of Governing Boards took an important first step toward addressing this issue in 1995 through a series of recommendations. First, they recommended that the size of public boards be increased to fifteen or more members to minimize the vulnerability of small boards to the behavior of maverick members. The boards should include a majority of carefully selected members who have demonstrated experience with large organizations, their financing, and their complex social and political contexts. Some experience with and interest in higher education was also considered a desirable criterion, of course.

As the AGB demonstrates in its report, there is little positive evidence to support the partisan election of governing boards. But since total reliance on gubernatorial appointment also has problems, the

wisest course may be to use a variety of mechanisms to determine the composition of a given board. For example, one might imagine a board comprised of twenty-four members: eight members nominated by the governor and approved by the legislature, eight members elected at large on a nonpartisan basis, and eight representing certain constituencies such as alumni, students, business, and labor. With overlapping terms, such a board would be highly representative and yet stable against the dominance of any political or special-interest group.

While it is important to provide board members with sufficient tenure to develop an understanding of the university, it is also important to avoid excessively long tenures. It is probably wise to limit university board service to a single term, since this would prevent members from “campaigning” during their tenure for future appointment or election to additional terms.

Again drawing on the experience of corporate boards, let me make the more radical suggestion that university presidents in universities should have some influence over the selection of board members, just as their colleagues in private universities and CEOs in the corporate sector. Here I am not proposing that university presidents actually nominate or select board members. But consideration should be given to their right to evaluate and possibly veto a proposed board member if the individual is perceived as unduly political, hostile, or just simply inexperienced or incompetent.

Strengthening Faculty Governance

Perhaps the simplest approach to identifying possible reforms in faculty governance is to examine where it seems to work well and why. From my own experience—as a faculty member, a former member of faculty governance at both the academic unit and university level, and a has-been university president—faculty governance seems to work best when focused upon academic matters such as faculty searches, promotion and tenure decisions, and curriculum decisions. Why? Because the rank and file faculty members understand clearly that not only do they have the authority to make these decisions, but that these decisions are important to their academic departments and likely to affect their own teaching and research

activities. As a result, the very best faculty members, namely those with strongest reputations and influence, are drawn into the academic governance process, either through formal election or appointment to key committees (hiring, promotion, tenure, curriculum, executive) or at least consulted for influential opinions in their role as department “mandarins”.

In sharp contrast, most active faculty members view university-wide faculty governance bodies such as faculty senates as primarily debating societies, whose opinions are invariably taken as advisory by the administration and the governing board. Hence, rare is the case when a distinguished faculty member will spare the time from productive scholarship, teaching, or department matters for such university service. Of course there are exceptions, but more common is the squeaky wheel syndrome, where those outspoken faculty members with an axe to grind are drawn to faculty politics, frequently distracting faculty governance from substantive issues to focus instead on their pet agendas.

Hence a key to effective faculty governance is to provide faculty bodies with executive rather than merely advisory authority, thereby earning the active participation of the university’s leading faculty members. Advisory bodies, paid only lip service by the administration or the board of trustees, will rarely attract the attention or engage the participation of those faculty most actively engaged in scholarship and teaching.

Furthermore, the process of graduate education through which we prepare the next generation of faculty should be restructured to produce not just scholars and, hopefully, teachers, but as well citizens of the university community who recognize and accept their responsibility to participate in governance activities. We should seek a change in the current faculty culture by reestablishing institutional loyalty and service as valued and rewarded activities.

Balancing Responsibility with Authority

The academic tradition of extensive consultation, debate, and consensus building before any substantive decision can be made or action taken is yet another challenge. To be sure, the voluntary culture (some

would say anarchy) of the university responds better to a process of consultation, communication, and collaboration than to the command-control-communication process familiar from business and industry. However this process is simply incapable of keeping pace with the profound changes facing effective governance of the public university. Not everything is improved by making it more democratic. A quick look at the remarkable pace of change required in the private sector—usually measured in months, not years—suggests that universities must develop more capacity to move rapidly. This will require a willingness by leaders throughout the university to occasionally make difficult decisions and take strong action without the traditional consensus-building process. Universities need to better define those areas where the special competence of the faculty requires their consent (e.g., academic programs and policies); those areas where faculty advice will be sought and considered, but not considered authoritative (e.g., funding priorities), and those areas where faculty need not be consulted (parking?)

The leadership of the university must be provided with the authority commensurate with its responsibilities. Academic leaders, whether at the level of department chairs, deans, vice-presidents, or even the president, should have the same degree of authority to take actions, to select leadership, to take risks and move with deliberate speed, that their counterparts in both the corporate world and government enjoy. The challenges and pace of change faced by the modern university no longer allow the luxury of “consensus” leadership, at least to the degree that “building consensus” means seeking the approval of all concerned communities before action is taken. Nor do our times allow the reactive nature of special interest politics to rigidly moor the university to an obsolete status quo, thwarting efforts to provide strategic leadership and direction.

While academic administrations generally can be drawn as conventional hierarchical trees, in reality the connecting lines of authority are extremely weak. In fact, one of the reasons for cost escalation in higher education is the presence of a deeply ingrained academic culture in which leaders are expected to “purchase the cooperation” of subordinates, to provide

them with positive incentives to carry out decisions. For example, deans expect the provost to offer additional resources in order to gain their cooperation on various institution-wide efforts. Needless to say, this “bribery culture” is quite incompatible with the trend toward increasing decentralization of resources. As the central administration relinquishes greater control of resource and cost accountability to the units, it will lose the pool of resources that in the past was used to provide incentives to deans, directors, and other leaders to cooperate and support university-wide goals.

Hence, it is logical to expect that both the leadership and management of universities will need increasingly to rely on lines of true authority just as their corporate counterparts. That is, presidents, executive officers, and deans will almost certainly have to become comfortable with issuing clear orders or directives from time to time. So, too, throughout the organization, subordinates will need to recognize that failure to execute these directives will likely have significant consequences, including possible removal from their positions. Here I am not suggesting that universities adopt a top-down corporate model inconsistent with faculty responsibility for academic programs and academic freedom. However, while collegiality will continue to be valued and honored, the modern university simply must accept a more realistic balance between responsibility and authority.

Clearly an effort must be made to rebuild leadership strength at middle levels within the university, both by redesigning such positions to better balance authority and responsibility, and by providing leadership development programs. This may involve some degree of restructuring the organization of the university to better respond to its responsibilities, challenges, and opportunities. In this regard, there should be more effort made to identify “the administration” as a broader body than simply the executive officers of the university, including deans, chairs, and directors. It is also critical to get this broader group to be perceived—and to perceive themselves—as spokespersons for university objectives.

Structural Issues

While it is probably impolitic to be so blunt, the

simple fact is that the contemporary university is a public corporation that must be governed, led, and managed with competence and accountability to benefit its various stakeholders. To be sure, the presence of lay citizens on governing boards is useful in representing the myriad views of the society served by our universities. So too, the complexity and importance of the contemporary university requires capable management and administration provided by trained professionals. Yet I believe it absolutely essential that experience with both academic values and the activities of teaching and scholarship must permeate all levels of university governance. Furthermore, it is also my view that this experience can only be provided by those who have toiled in the vineyards of teaching and research as faculty members.

Put another way, the key to achieving adequate competence and accountability in the governance of the contemporary university is to infuse in all of its components the perspectives of practicing faculty members. As we noted earlier, this has long been accomplished at the level of individual academic units through the use of various faculty committees to address key academic issues such as faculty hiring and promotion, student admission and performance, and curriculum and degree program development. It can be achieved in the management of the university by the appointment of faculty members to key administrative positions, provided, of course, that they are provided the training necessary to manage complex organizations and functions in a competent and accountable fashion.

It is also my belief that all university governing boards, both public and private alike, would benefit greatly from the presence of distinguished faculty members from other institutions and either active or retired university presidents or other senior administrators among their membership. Since the experience of most lay board members is so far removed from the academy, it seems logical to suggest that boards would benefit from the experience such seasoned academicians might bring. After all, most corporate boards find it important to have experienced business leaders, either active or retired, among their membership. University boards should do the same.

An equally controversial variation on this theme would be to provide faculty with a stronger voice in

true university governance by appointing faculty representatives as members of the governing board. This would be similar to the practice in many other nations of governing universities with unicameral bodies consisting of a balanced composition of lay citizens, faculty members, administrators, and perhaps even students. It may be time to explore this approach in American colleges and universities.

A Balance of Interests and Influence

Shared governance is, in reality, an ever-changing balance of forces involving faculty, trustees, and administration.⁹ Yet at a deeper level, it represents the effort to achieve a balance among academic priorities and values, public responsibility and accountability, and financial, management, and political realities. But different universities achieve this balance in quite different ways. For example, at the University of California a strong tradition of campus and system-wide faculty governance is occasionally called upon to counter the political forces characterizing the governing board, examples being the loyalty oath controversy of the 1950s, the Reagan takeover of the UC Board of Regents in the 1960s, and the debates over the use of affirmative action in student admission during the 1990s.

In contrast, at the University of Michigan, campus-wide faculty governance has historically been rather weak, at least compared to faculty influence through executive committee structures at the department, school, and college level. Hence the tradition has been to develop a strong cadre of deans, both through aggressive recruiting and the decentralization of considerable authority to university's schools and colleges, and then depend upon these academic leaders to counter the inevitable political tendencies of the university's regents from time to time.

Where is the influence of the university administration—and particularly the president—in this balancing act? Usually out of sight or perhaps out of mind. After all, senior administrators including the president serve at the pleasure of the governing board and are also mindful of faculty support since they may be only one vote of no confidence away from receiving their walking papers. While it has always been

necessary for the American university president to champion the needs of the academic community to the board and the broader society while playing a role in ensuring that the academic community is in touch with society's interests and needs, it is also not surprising that the administration is usually quite reticent to get caught publicly in skirmishes between the governing board and the faculty.

The danger of such a bilateral balance of power arises when one party or the other is weakened. When the faculty senate loses the capacity to attract the participation of distinguished faculty members, or when a series of poor appointments at the level of deans or executive officers weaken the administration, a governing board with a strong political agenda can move into the power vacuum. Of course there have also been numerous examples of the other extreme, in which a weakened governing board caved into unrealistic faculty demands, e.g. by replacing merit salary programs with cost-of-living adjustments or extending faculty voting privileges to part-time teaching staff in such a way as to threaten faculty quality.

Leadership

The role of leaders in a major public research university such as Michigan is complicated by its scale and diversity, comparable to that of global corporations or government agencies. Today's university conducts many activities, some nonprofit, some publicly regulated, and some operating in intensely competitive marketplaces. Universities teach students, conduct research for various clients, provide health care, engage in economic development, stimulate social change, and provide mass entertainment (e.g., college sports). Of course the university also has higher purposes such as preserving our cultural heritage, challenging the norms and beliefs of our society, and preparing the educated citizens necessary to sustain our democracy.

Few university leaders are powerful enough to change the culture of their, much less its institutional saga, since both have evolved over generations of students, faculty, staff, and leaders. Indeed, institutions such as Michigan tend to shape its leadership rather than vice versa, and if leaders fail to adjust to its culture, they are usually repelled or at least sequestered so they

can do little harm.

To be sure, it is important to seek a balance in leadership, bringing in leaders from outside for new ideas and energy while relying on internal appointments to sustain important traditions and values. When this balance is distorted, perhaps due to complacency with the status quo, or more serious, an effort by newcomers, frustrated with the University's resistance to change, to bring in too many outsiders in key roles as deans or executive officers in an effort to change the culture of the institutions. Fortunately, the decentralized organization of the University is not only capable of responding to a changing environment but also repelling invasive species that attempt dramatic change.

So what balance should be sought? Certainly the majority of deans should be chosen from inside, perhaps in a ratio of two to one over outsiders. To be sure this is difficult in an era in which universities are increasingly dependent upon executive search consultants, tempted to push their existing stable of external candidates and motivated by compensation indexed to the compensation negotiated by selected candidates. At the executive officer level, perhaps a balance closer to 50%-50% seems best, balancing internal and external experiences.

Finally, it is important, particularly in these days of increasing public concerns about the costs of higher education, that the role of the university president be clearly defined as one of public service rather than corporate leadership and compensated accordingly. Leading an academic institution should be characterized as a duty similar to those of other public leadership roles such as mayors, governors, and, indeed, United States presidents. It is a high calling to service, and to allow aggressive search consultants, ambitious candidates, or inexperienced boards to suggest otherwise in determining excessive compensation puts American higher education at considerable risk. Instead presidential and executive compensation should be closely linked to faculty salaries. (And eventually the same can be recommended for coaches and athletic directors...)

Finally it is very important to view leadership development as a strategic issue for the University. Every effort should be made to encourage and support

such activities, providing opportunities for further leadership development, albeit with strong evaluation of leadership ability. Interestingly enough, since national leadership usually requires not only time and effort, but also sacrificing one's scholarly activity, such willingness to participate in faculty service or even governance should be recognized as a sign of possible leadership interest.

It is interesting to note that both the report of the Spellings Commission, *A Test of Leadership: Charting the Future of U.S. Higher Education*, and the report of the AGB Task Force on the State of the University Presidency, *The Leadership Imperative*, stressed the importance of "leadership". Both recognized that for higher education to play the role it must during a period of challenge, opportunity, and responsibility, it must establish a stronger sense of trust and confidence on the part of the American public. Key in earning and sustaining this trust and confidence are university presidents, working in concert with their governing boards and faculties. No leader comes to personify an institution in the way a president does. A president must provide academic leadership at the same time he or she must assimilate and tell the institution's story to build pride internally and support externally. The president has primary responsibility for increasing public understanding and support for the institution as a contributor to the nation's continued vitality and well being. (AGB, 2006)

Yet the ability to be an effective spokesperson for higher education in America is strongly dependent upon the support provided by governing boards and faculties (or at least their tolerance) for the voice of the president. Many universities find that the most formidable forces controlling their destiny are political in nature—from governments, governing boards, or perhaps even public opinion. Unfortunately, these bodies are not only usually highly reactive in nature, but they frequently either constrain the institution or drive it away from strategic objectives that would better serve society as a whole and in the long run. Many university presidents—particularly those associated with public universities—believe that the greatest barrier to change in their institutions lies in the manner in which their institutions are governed, both from within and from without. Universities have a style of governance that is

more adept at protecting the past than preparing for the future. An earlier AGB effort highlighted these concerns when it concluded that the governance structure at most colleges and universities is inadequate. "At a time when higher education should be alert and nimble, it is slow and cautious instead, hindered by traditions and mechanisms of governing that do not allow the responsiveness and decisiveness the times require." (AGB, 1996) The Commission went on to note its belief that many university presidents were currently unable to lead their institutions effectively, since they were forced to operate from "one of the most anemic power bases of any of the major institutions in American society."

A decade later the AGB Task Force on the university presidency found that the presidents of American colleges and universities continue today to face impediments in their efforts to provide capable leadership, particularly on important national issues. (AGB, 2006) The university presidency is all too frequently caught between these opposing forces, between external pressures and internal campus politics, between governing boards and faculty governance. Today there is an increasing sense that neither the lay governing board nor elected faculty governance has either the expertise nor the discipline—not to mention the accountability—necessary to cope with the powerful social, economic, and technology forces driving change in our society and its institutions. The glacial pace of university decision-making and academic change simply may not be sufficiently responsive or strategic enough to allow the university to control its own destiny. To strengthen the voice of the presidency and secure the ability to provide the necessary leadership during a period of considerable change, challenge, and opportunity, the task force set out three imperatives:

1. To reconnect the president with the core academic mission of the university, i.e., learning and scholarship. It is important to resist the tendency to view the presidency as simply just another CEO role, dominated by fund-raising or lobbying, and instead re-establish academic leadership as a president's highest priority.

2. To urge boards, faculties, and presidents themselves to view the university presidency not as a career or a profession in and of itself, but rather as a

calling of immense importance, similar to those of other forms of public service, rather than seeking personal compensation and benefits far removed from the academy.

3. To seek to establish what the AGB Task Force termed integral leadership: "A new style of collaborative but decisive leadership. A president must exert a presence that is purposeful and consultative, deliberative yet decisive, and capable of midcourse corrections as new challenges emerge. Integral leadership succeeds in fulfilling the multiple, disparate strands of presidential responsibility and conceives of these responsibilities as parts of a coherent whole. Leadership of this sort links the president, the faculty, and the board together in a well-functioning partnership purposefully devoted to a well-defined, broadly affirmed institutional vision." (AGB, 2006)

Management

So how should university administrations—and particularly university presidents—approach the challenge of taming this fragmentation and unifying the university into a more coherent focus on its fundamental values, mission, and public purpose? First it is important to acknowledge several realities of the contemporary university.

Clearly no president nor executive team nor governing board can span the range of expertise and experience to manage in detail such an array of activities. Most knowledge and experience in universities resides at the grassroots level, as does creativity and value-added. Even when augmented by knowledgeable executives, the central administration really doesn't understand the details of much of the "business" of the university. Beyond the disciplinary expertise of academic leadership at the level of departments, schools, and colleges, other activities such as federally sponsored research, clinical programs, student services, information technology, investment management, and even intercollegiate athletics require highly specific, competent, and experienced management. Hence delegation of authority and decentralization of responsibility become essential.

Second, despite the fact that university presidents

have executive responsibilities for all of these activities and purposes, the position itself has surprisingly little authority. The president reports to a governing board of lay citizens with very limited understanding of academic matters and must lead, persuade, or consult with numerous constituencies such as faculty and students that tend to resist authority. Hence the university presidency requires an extremely delicate and subtle form of leadership, sometimes based more on style than substance, and usually more inclined to build consensus rather than take decisive action.

Third, universities are quite unusual social institutions in the priority they give to individual over institutional achievement. Their culture is a highly competitive meritocracy, in which students and faculty are encouraged—indeed, expected—to push to the limits of their ability. While the sum of these individual activities can have great impact, the university itself is simply not designed to optimize institutional agendas.

Recognizing the importance of this great diversity in character and mission is essential to developing effective approaches to addressing the fragmentation characterizing particular institutions. While striving to tame the anarchy of disciplinary fragmentation may be an appropriate strategy for some institutions such as liberal arts colleges, for others such as the comprehensive public research university, engaged in not only undergraduate, graduate, and professional education and basic and applied research and scholarship, but as well in activities such as clinical care, technology transfer, international development, and social welfare, one must take great care that initiatives aimed at responding to the demands of the moment for public (and political) accountability and focus do not trample upon the complex intellectual structures for generating knowledge and serving civilization that have taken centuries to evolve.

At the University of Michigan, both because of the institution's size and its strong tradition of decentralization, we found the traditional tools used to pull together and steer the fragmented university feeble and inadequate, particularly during a time of significant change (e.g., social diversity, globalization, and knowledge-intensive economies). In developing new approaches to unifying the fragmented university, we accepted at the outset two important assumptions.

First, we believed that the decentralized organization of the institution was a positive and valuable characteristic capable of unleashing great creativity and achievement and should not be abandoned. As Susan Lohmann suggests, the structures of the western university have evolved over a millennium “to do some very heavy lifting, and they produce a public good of great value. They enable the specialized and creative inquiry of individuals; the collective vetting, pooling, and accumulation of research results; the posting of research results on a global information commons; the protection of the university from the outside world and the inhabitants of the university from each other; and the underpinning of the scientific process, allowing scientific progress. The structures that do all of this hard and hidden work should not be given up lightly.” (Lohmann, 2005). We saw our challenge as university leaders as harvesting the good that bubbles up from the grassroots activities of the faculty, students, and staff, not to corral or dictate their behavior from above.

Second, rather than adhere to the traditional missions of higher education such as teaching, research, and service, we sought instead to protect what we viewed as the unique role of the University of Michigan. In this sense, we attempted to define and sustain Michigan’s institutional saga, a term that noted higher education scholar Burton R. Clark used to refer to those longstanding characteristics, values, traditions, and practices evolving over many generations to determine the distinctiveness of a university. (Clark, 1970). Clark’s view is that “Universities develop over time an intentionality about institutional life, a saga, which then results in unifying the institution and shaping its purpose. While all colleges and universities have social roles, some have purposively reshaped these into compelling missions that over time achieve sufficient success and acclaim that they become an embracing saga.”

This is an important point for those attempting to address challenges such as the fragmentation of the contemporary university. If such efforts are carefully aligned with the institutional saga of a university, for example, its particular style of pedagogy or its approach to social engagement (e.g., the land-grant mission), then there is hope of success. However actions taken in ignorance or disregard of an institution’s saga are likely

to bounce off without making a dent—or worse, cause considerable damage.

University leaders face a quandary similar to other organizations in business and government: Should we centralize management to take advantage of economies of scale, standardization, and globalization? Or should we decentralize, seeking autonomy, empowerment, and flexibility at the level of unit execution, while encouraging diversity, localization, and customization? Our experience suggests both ... and neither. There is no unique way to organize knowledge-based activities, although it is likely that most colleges and universities are currently far from an effective or optimal configuration. Furthermore, flexibility and adaptability are the watchwords for any such organization during a time of extraordinarily rapid technological change. The challenge is to orchestrate and coordinate the multiple activities and diverse talent on campus.

The key to achieving this is to build layered organization and management structures. At the highest, centralized level one should seek a clear institutional vision, driven by broadly accepted values, guided by common heuristics, and coordinated through standard protocols. Below this at the level of execution one should encourage diversity, flexibility, and innovation. In a sense, institutions should seek to centralize the guiding vision and strategy, that is, determining “where” the institution should head, while decentralizing the decision process and activities that determine “how” to achieve these institutional goals. Put another way, universities should seek to synchronize rather than homogenize their activities. Rather than obliterating silos of activity, one should use standard protocols and infrastructure to link them together, creating porous walls between them. (Sawney, 2000).

Like other universities that have existed for centuries (Oxford, Cambridge, Harvard, Yale) Michigan has developed a unique culture, a saga, that tends to shape (or possibly reject) its leadership so that it aligns with its loosely coupled grassroots culture. We began to articulate a description of UM as a biological system, evolving as a loosely coupled adaptive system in response to external challenges and opportunities as sensed at the grass roots level, increasing in scale and complexity much like a tropical rain forest. While

leadership for such decentralized organizations is important, its primary role should be to identify areas of opportunity and direct resources to those parts of the University capable of responding.

Beyond placing control and accountability at the level where are generated, e.g., with the deans and directors, such a decentralized organizational ecosystem rapidly begins to develop mechanisms to defend itself against both threats from without and within, e.g., antibodies that attack invasive species. Of course these threats to the academic enterprise might include presidents, governing boards, and even athletic directors (as evidenced in a recent incident at Michigan...)

While such a culture has long existed at Michigan, it was a more clearly identified and nurtured ("fertilized"...) during the 1980s and 1990s, stimulated in part by the dramatic loss of state support. The fact that UM was able to thrive during this period was evidence that the decentralized culture, always present to some degree in the institution, was best capable of responding to these threats and challenges.

Remaining Questions

Today American higher education faces many challenges, including an increasing stratification of access to (and success in) quality higher education based on socioeconomic status; questionable achievement of acceptable student learning outcomes (including critical thinking ability, moral reasoning, communication skills, and quantitative literacy), cost containment and productivity; and the ability of institutions to adapt to changes demanded by the emerging knowledge services economy, globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs (e.g., lifelong learning), new providers (e.g., for-profit, cyber, and global universities), and new paradigms (e.g., competency-based educational paradigms, distance learning, open educational resources). Furthermore, while American research universities continue to provide the nation with global leadership in research, advanced education, and knowledge-intensive services such as health care, technology transfer, and innovation, this leadership is threatened by rising competition from abroad, by stagnant support of advanced education

and research in key strategic areas such as science and engineering, and by the complacency and resistance to change of the academy.

Yet there remain many questions for those responsible for governing, supporting, leading, and providing higher education services to society. For example:

- What do people expect from higher education? Are these reasonable expectations or do they arise from a lack of understanding of the broad role of higher education? Perhaps more germane to a public agenda is the question of what people really need from higher education—including roles such as social criticism that are rarely valued at the time.

- To whom is the university responsible? To whom should it be held accountable? Students? The public? The taxpayer? The politicians? The media? How about responsibility and accountability to society at large? States? The nation? The world? Or framed in a different way, how would one prioritize accountability to respond to the needs of the present with being a responsible steward for past investments and commitments or the responsibilities to preserve and enhance our college and universities to serve future generations?

- Who should be held accountable for the performance and quality of higher education? Elected public officials such as governors and legislators? Governing boards? University faculties? University presidents? Football coaches (at least at some institutions...)?

- How does one persuade an aging population, most concerned with issues such as retirement security, health care, safety from crime and terrorism, and tax relief, that both their own welfare and their legacy to future generations depends on investing public resources in the strong support of higher education?

- In recent years there has been a trend toward expanding the role of state governments in shaping the course of higher education. Many of these accountability movements call on universities to narrow their goals to focus on near-term imperatives, e.g., more efficient

classroom instruction, increased undergraduate enrollments, limiting tuition increases even as state support deteriorates. Rarely are the broader purposes of higher education—e.g., creating the educated citizenry necessary for a democracy, preserving cultural assets for future generations, enabling social mobility, and being a responsible social critic—acknowledged as public priorities by state leaders.

- The eroding support and increasingly intrusive regulation directed toward public higher education raises a serious question as to whether state government can continue as a responsible steward for public colleges and universities, which are also critical assets for broader society and the nation itself. Term-limited legislators and governors, political parties controlled by narrow special interest groups, and a body politic addicted to an entitlement economy have ceased to be reliable patrons of higher education in several states. Little wonder that governing boards are seeking more autonomy over decisions such as admission, tuition and fees, faculty and staff compensation, procurement, and other areas sometimes micromanaged by state government.

- What role should the federal government play in setting and achieving the public agenda for American higher education? While the states have primary responsibility for sustaining public higher education, federal policies have frequently provided the primary stimulus for change through initiatives such as the Land Grant Acts, the GI Bill, the government-research partnership, and the extension of educational opportunities through the Higher Education Acts. What is a national agenda for higher education appropriate to prepare America for tomorrow?

So what are state governments, boards of trustees, and university leaders to do, as their academic institutions are buffeted by such powerful forces of change, and in the face of unpredictable futures? It is important to always begin with the basics, by considering carefully those key roles and values that should be protected and preserved during a period of transformation. For example, how would an institution prioritize among roles such as educating

the young (e.g., undergraduate education), preserving and transmitting our culture (e.g., libraries, visual and performing arts), basic research and scholarship (e.g., graduate and professional education), and serving as a responsible critic of society? Similarly, what are the most important values to protect? Clearly academic freedom, an openness to new ideas, a commitment to rigorous study, and an aspiration for the achievement of excellence would be on the list for most institutions. But what about values and practices such as lay governing boards, shared governance, and tenure? Should these be preserved? At what expense?

Of course, we all aspire to excellence, but just how do we set our goals? There is an increasing sense that the paradigm characterizing many elite institutions, which simply focuses more and more resources on fewer and fewer, does not serve the broader needs of our society. Rather, the premium will be on the development of unique missions for each of our institutions, missions that reflect not only their tradition and their unique roles in serving society, but as well their core competency. If such differentiation occurs, then far greater emphasis should be placed on building alliances with other institutions that will allow them to focus on core competencies while relying on alliances to address the broader and diverse needs of society.

It is important for university leaders to approach those issues and decisions concerning institutional transformation not as threats but rather as opportunities. True, the status quo is no longer an option. However, once we accept that change is inevitable, we can use it as a strategic opportunity to control our destiny, while preserving the most important of our values and our traditions. Creative, visionary leaders can tap the energy created by threats such as the emerging for-profit marketplace and technology to engage their campuses and to lead their institutions in new directions that will reinforce and enhance their most important roles and values.

It All Comes Back to Values

There are many lessons, both good and bad, to be learned from the many efforts, both successful and failed, to lead a university toward common goals and a public purpose. Beyond the obvious challenges

(build on institutional history; keep your eyes on the goals; be candid, demanding, and evidence-based in your appraisal of progress), there are other important aspects of any successful effort that relate more to the unique nature of academic communities.

First, it is important that since such efforts frequently involve institutional transformation, one should always begin with the basics, by launching a careful reconsideration of the key roles and values that should be protected and preserved during a period of change. After all, the history of the university in America is that of a social institution, created and shaped by public needs, public policy, and public investment. It is the role of the president to stimulate this dialog by raising the most fundamental issues involving institutional values.

It is critical that the senior leadership of the university buy into the effort and fully support it. This includes not only the executive officers and deans, but also key faculty leaders. It is also essential that the governing board of the university be actively involved in the effort.

It is important to provide mechanisms for active debate concerning the objectives and process by the campus community. Effective communication throughout the campus community is absolutely critical for the success of the institution-wide efforts. In this regard it is important to identify individuals at all levels, and in various units of the university, who will buy into the agenda and become active agents on its behalf. In some cases, these will be the institution's most influential faculty and staff. In others, it will be a group of junior faculty or perhaps key administrators.

To be sure, significant resources are required to fuel such efforts process, probably at the level of 5 percent to 10 percent of the academic budget. During a period of limited new funding, it takes considerable creativity (and courage) to generate these resources. As we noted earlier, since the only sources of funding at the levels required for such major initiatives are tuition, private support, and auxiliary activity revenues, reallocation becomes an important component of any strategies.

Large decentralized organizations such as universities will resist change. They will try to wear leaders down, or wait them out. Here one should heed the warning from Machiavelli: "There is no more

delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful of success, than to step up as a leader in the introduction of change. For he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm support in those who might be better off under the new." The resistance can be intense, and the political backlash threatening.

Yet it is also clear that the task of leading the fragmented university toward institutional objectives cannot be delegated. Rather, the university president must play a critical role both as a leader and as an educator in such efforts to unify the campus community.

The decentralized structure of the university as a complex adaptive system has evolved over the centuries to solve extremely complex problems. Ironically fragmentation sometimes serves a useful purpose, since within the confines of the institution it allows people to apply themselves to solve problems that are impossibly difficult for individuals or groups working in an institution-free environment. Again quoting Lohmann, "In its ideal form, the university will remain precariously poised between powerful academic, bureaucratic, political, and market forces, servant to none. On the one hand, the university must preserve a free space in which specialized and creative inquiry can flourish. On the other hand, it must be responsive to social and technological change." (Lohmann, 2005).

What may appear to critics—particularly those from outside academe—as a badly flawed institutional structure is, in reality, one of the most valuable characteristics of the contemporary university. Comprehending the complex workings of this knowledge ecology is difficult for outsiders (and even those within academe). Over the century powerful walls have sprung up (e.g., university autonomy, academic freedom, tenure) to prevent outsiders from tampering with the university's affairs.

While university leaders should seek to pull together the fragmented academic communities to address many of the public purposes of higher education, they should also bear in mind an important caveat: It could well be that the contemporary university is so resistant to efforts to fix its fragmentation not because remedies are insufficiently strategic and robust or leadership is inadequate, but rather because the contemporary

university, evolving as it has over many centuries, has acquired the optimal configuration of a complex adaptive system as the natural and logical organization of a knowledge institution.

The history of the university in America is one of a social institution, created and shaped by public needs, public policy, and public investment to serve a growing nation. Yet in few places within the academy, at the level of governing boards, or in government higher education policy, does there appear to be a serious and sustained discussion of the fundamental values so necessary to the nature and role of the university at a time when it is so desperately needed.¹⁰ Instead the future of higher education in America has increasingly been left to the valueless dynamics of the marketplace.

But then perhaps this is not so surprising since for much of the last century the college curriculum has been largely devoid of any consideration of values. While some might date this abdication to campus disruptions of the 1960s, in truth it extends over much of the twentieth century, as scholarship became increasing professionalized and specialized, fragmenting any coherent sense of the purposes and principles of a university. Values such as tolerance, civility, and personal and social responsibility have been largely absent from the academic curriculum. Most of our undergraduates experience little discussion of values in their studies. Our graduate schools focus almost entirely on research training, with little attention given to professional ethics or even preparation for teaching careers, for that matter. Our faculties prefer to debate parking over principles just as our governing boards prefer politics over policy. And, in this climate, our university leaders keep their heads low, their values hidden, and prepare their resume for their next institution.

In any consideration of how our universities are governed and led, it is important to always begin with the basics, to launch a careful reconsideration of the key roles and values of the university that should be protected and preserved during a period of change. For example, how would an institution prioritize among roles such as educating the young (e.g., undergraduate education), preserving and transmitting our culture (e.g., libraries, visual and performing arts), basic research and scholarship, and serving as a responsible critic of

society? Similarly, what are the most important values to protect? Clearly academic freedom, an openness to new ideas, a commitment to rigorous study, and an aspiration to the achievement of excellence would be on the list for most institutions. But what about values and practices such as shared governance and tenure? Should these be preserved? At what expense? We need to act in such a way as to preserve our core missions, characteristics, and values. Only a concerted effort to understand the important traditions of the past, the challenges of the present, and the possibilities for the future can enable institutions to thrive during a time of such change.

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Chapter 9

Academic Issues

“Colleges have their indispensable office, to teach elements. But they can only serve us when they aim not to drill but to create; when they gather from far every ray of various genius to their hospitable halls, and by the concentrated fires, set the hearts of their youth aflame..”.

Ralph Waldo Emerson

The most important mission of the university in America has been education. In a general sense, the university plays a role in providing each new generation of students with the opportunity to better understand themselves, to discover and understand the important traditions and values of our past, and to develop the capacity to cope with the complexity and change characterizing the world of their future. In this way the university has a civic purpose, to provide students with the knowledge and understanding to be good citizens and lead meaningful lives.

Beyond formal education in the traditional academic disciplines and professional fields, the university has been expected to play a broader role in the maturation of young students. The college campus provides a structured, secure environment where students can spend their first years away from home, both learning and preparing for life in a complex society. Yet, while two-thirds of high school graduates attend college, most do so not as residents but as commuters or correspondents (increasingly via the Internet). Only one-sixth of today’s college students is enrolled in undergraduate programs on residential campuses.

We generally think of the education mission of the university as focused on undergraduate education. Yet the evolution of the educational mission of the American university during the past century has seen an increasing level of activity focused on graduate and professional education, and extension and continuing

education. In fact, a quick glance at the balance sheet for any major university reveals that the majority of its resources—its faculty, its facilities, and its expenditures—are directed at the education, training, research, and professional services associated with graduate and professional degree programs.

Undergraduate Education

Perhaps because college has such a formative experience of our lives, coinciding with our intellectual and emotional maturation, we tend to view contemporary undergraduate education through the rose-colored glasses of our own experiences. The traditional image depicts college students as young adults, roughly between eighteen and twenty-two years of age, enrolled either in academic degree programs such as history or science or in professional programs such as engineering and business. They learn by going to classes, listening to lectures by professors, studying in libraries, writing papers, and taking examinations. They live in either campus-based residence halls or fraternities and sororities, participate actively in social and athletic activities, and are preparing themselves for “good jobs” while searching for mates.

Little wonder then that the range of concerns about undergraduate education can be disturbing. Have faculty really abandoned the classroom for their personal research agendas, subjecting students to unprepared teaching assistants, many of whom can barely speak English? Are students on our campuses out of control, overindulging in alcohol, drugs, and political activism? Are our young undergraduates subjected to indoctrination in the latest fads of political correctness and intolerance? And, perhaps of most concern, has a quality college education become so

expensive that it is now priced out of reach of all but the privileged few—unless one is fortunate enough to be subsidized by a government-sponsored financial aid program?

What should be the purpose of undergraduate education? Should we aim toward the lofty goals stated in the quote from Emerson at the beginning of this chapter. Or perhaps as Derek Bok, former President of Harvard, put it, the most important product of an undergraduate education in a changing, fragmented society may be “a critical mind, free of dogma but nourished by humane values.” To achieve this, we need a spirit of liberal learning, one that strives not just to impart the facts but to encourage and support our students in developing a philosophy of life.

A concept still quite relevant to undergraduate education but usually misunderstood is that of a liberal education. Today educators and others use the term to refer to everything from an education based on “the great books” to a broad but superficial survey of all of the liberal arts. Harold Shapiro defines a liberal education as “The need to better understand ourselves and our times, to discover and understand the great traditions and deeds of those who came before us, the need to free our minds and our hearts from unexamined commitments, in order to consider new possibilities that might enhance both our own lives and build our sympathetic understanding of others quite different from us; the need to prepare all thoughtful citizens for an independent and responsible life of choice that appreciates the connectedness of things and peoples.”

Although such a liberal education might be regarded as preparation for more specialized or professional studies—and, in fact, the role for providing such general education is assigned to secondary schools in Europe—it is actually available or sought by only a small fraction of college students, those who are fortunate enough to experience the intense intellectual environment of elite colleges and universities, where the shaping of mind and character dominates the educational philosophy. The college experience of most students tends to rely on mass-education methods, in which the transmission of knowledge and preparation for professional careers take precedence over the shaping of character.

To most students and parents, the purpose of a college education is to earn the college degree necessary

for a good job, for personal economic security and well-being. Many of today’s students approach their college education with very definite career goals in mind. They enroll with plans to become doctors or engineers or lawyers or teachers. While many will change their minds during their undergraduate years, almost all will emerge with quite specific career goals still uppermost in mind.

Employers reinforce this utilitarian approach. The recruiters companies send to campus are looking for very definite skills. Perhaps they seek something highly specific such as a particular undergraduate major or Internet navigation skills. Or perhaps they seek some evidence that the student can communicate well and work comfortably in a diverse environment. Students are extremely sensitive to these signals from the employment marketplace, and the experience other students have with job interviews and placements can have a very significant impact on their own educational plans. In sharp contrast, however, surveys of business leaders suggest that they seek something quite different than practical knowledge or utilitarian skills from college graduates. They seek graduates who exhibit strong communication skills, a capacity for and commitment to lifetime learning, a tolerance for diversity, and an ability to adapt to change—characteristics more associated with a liberal education than a professional program of study.

In fact, today’s companies see the valuable resource of talented college graduates largely as a free good, since in the past it has been paid for by taxes that today go instead to health care, prisons, or are dodged by off-shore corporate headquarters. So, the days of corporate philanthropy to colleges and universities by industry seem also to have vanished, replaced instead by the priorities (some might say whims) of the massive wealth of the founders of companies such as Apple, Facebook, and Google. Indeed the priorities for the vast wealth generated by today’s high-tech companies seem to ignore entirely investment in their most valuable resource, the highly educated technology graduates of our universities, putting this source of their company wealth at great risk.

In a sense, the university is caught between the contradictory forces of responding to more pragmatic goals of students and employers while providing the

liberal education that equips a student with the broader skills important for good citizenship and a meaningful life. Furthermore, in a world of ever-changing needs, one objective of an undergraduate education certainly must be to prepare a student for a lifetime of learning. The old saying that the purpose of a college education is not to prepare a student for their first job but rather their last job still has a ring of truth.

To be sure, the notion of a liberal education for the twenty-first century will be different than that characterizing our times. There has already been a radical change in undergraduate majors over the past several decades. For example, today only 13% of undergraduates major in the humanities, 7% in the sciences, and 15% in the social sciences. Perhaps this is a reflection of the belief that students view today's post-modernized and deconstructed humanities programs as largely irrelevant to their lives: the sciences are far more relevant, but also far too difficult for those increasingly ill-prepared by their K-12 education; and the social sciences are seen as somewhat relevant and suitably soft. Most of today's undergraduates prefer instead more professional and marketable majors such as business, accounting, and engineering. And the cafeteria curriculum favored by most universities provides them with the opportunity to cascade through a jumble of courses during their undergraduate studies without structure, rigor, or liberal purpose.

Where do we find Newman's classic vision of a college education that "includes the great outlines of knowledge, the principles on which it rests, the scale of its parts, its light and its shades, its great points and its little, so that it produces an inward endowment, a habit of mind of which the attributes are freedom, equitableness, calmness, moderation and wisdom". Certainly not in the undergraduate curriculum as taught and experienced on most campuses.

As difficult as it is to define and as challenging as it is to achieve, perhaps the elusive goal of liberal learning remains the best approach to prepare students for a lifetime of learning and a world of change. After all, a college education should prepare one for life, and a career is only one of life's experiences.

Graduate Education

It is not surprising that during these times of challenge and change in higher education, the nature and quality of graduate education has also come under scrutiny. Traditionally the faculty and their universities prefer to focus concerns on the adequacy and nature of financial support for graduate education. Graduate students are more concerned with the job market for graduates and the time to obtain a degree. The federal government has expressed concerns about the number of advanced degrees relative to market needs and the high percentage of foreign graduate students.

But there are deeper and more troubling concerns. The current highly specialized form of graduate education may no longer respond to the needs both of our students and our society. The attrition in many graduate programs has risen to unacceptable levels, with more than 50% of those who enroll in PhD programs failing to graduate (compared to attrition rates in law and medicine of less than 5%). Tragedies such as graduate student suicides and emotional instability suggest that the relationship between student and advisor may need to be reexamined. The increasing trend toward unionization of graduate student assistants on many of our larger university campuses suggests we may need to reconsider their broader role in supporting our university teaching and research.

Studies both by the national academies and government agencies confirm a strong consensus that graduate education in America represents the world's leading effort for producing the next generation of researchers. By conducting graduate education in the same institutions where a large portion of the nation's basic research is done, our research universities have created a research and training system that is one of the nation's great strengths—and the envy of the rest of the world.

Most faculty members strongly believe that graduate education is essential to the research enterprise. It is through the process of graduate students working closely with faculty in collaborative research partnerships that we educate and train the next generation of teachers in how to create new knowledge. Some even suggest that the most important role of the federal government in graduate education is its support through research

assistantships, since this provides the most direct link between education and research.

But there seems to be a growing sense that it may be time to rethink the way we are preparing a generation of students whose career paths may look very different than did the career paths of their mentors. Related, but not identical, is concern for the employment dilemma facing graduate students and the need to revise graduate education in accordance with the current and future job market. In fact, one might well suggest that doctorate education today is facing a dilemma similar to medical education in the early 1900s, when the obsolete approach of lectures was replaced by laboratories and clinical practice by the famous Flexner Report of 1910.

Today Ph.D. students are expected to focus on a very narrow slice of disciplinary investigation in their studies and their dissertation. Although graduate students are expected to explore thoroughly and deeply a narrow intellectual area in their dissertation research, the hope is that in this process, they will acquire a powerful methodology for formulating and solving broader problems. In this sense, the purpose of doctoral education is to learn how to learn at a very sophisticated level. In a paradoxical sense, through such specialized inquiry, Ph.D. students acquire training that is well suited to broader investigation. Ironically, it is this specialist experience of the Ph.D. that provides training for a later role as an advanced generalist. Unfortunately, few Ph.D. students recognize this feature of graduate education, perhaps because few faculty members acknowledge or value it.

Many new Ph.D.s have far too narrow a set of personal and career expectations. They think that their graduate training has prepared them to solve certain highly technical and specialized problems. Of course, what they actually know that is of lasting value is how to formulate questions and partially answer them starting from powerful and fundamental points of view. Most do not understand that this is what gives them any edge they may have over young people of their own age who are already out in the workplace without Ph.D.s but with a several-year head start in experience.

Yet today's research problems are becoming increasingly complex, and their solution requires interdisciplinary teamwork. The training of new Ph.D.s currently is often too narrow intellectually,

too campus centered, and certainly too long. The acceptance of overspecialization can result in a lack of both perspective and self-confidence. New Ph.D.s often believe themselves ill prepared to venture outside their specialty. This is due in part to the lack of serious requirements for breadth in the typical graduate curriculum. It is also due to the fact that there is little or no encouragement and a lot of implicit discouragement for one who wants to depart from the straight and narrow.

The success of the United States basic research endeavor has relied to a large extent on individual effort, as reflected in the investigator-initiated grant process. This emphasis on individuals is strongly reflected in the promotion and tenure system at research universities. It is also reflected in our approach to graduate education, which has acquired a decidedly feudal character. Ph.D. training is best described as an apprenticeship. Graduate students are expected to attach themselves early and tightly to individual professors. In fact, since many are supported by research grants, they are required to work on problems relevant to their faculty advisor's research grant with little opportunity to broaden their studies or their interests. In most universities, the faculty supervisor of a graduate dissertation becomes the primary determinant of the intellectual content, the duration, and the financing of the remaining education of the Ph.D. student, until the dissertation is written and the final dissertation defense is completed. In the best of circumstances, this final phase of graduate study can be very rewarding, since under the supervision of a skilled dissertation advisor, the graduate student learns the intricacies not only of basic research but also the trade of a faculty member. But this is also the point at which many of the problems arise.

Many faculty members have little experience in supervising graduate students, and abuses frequently occur. In some cases, faculty members are simply not adequately concerned about or attentive to a student's progress. In other cases they may even wish to prolong a student's studies so that he or she can continue to contribute to a key research project of the faculty member. There are also great differences in the nature of the relationship between graduate student and dissertation advisor among the disciplines. For example, in science and engineering, graduate students

generally work side by side in the laboratory with faculty advisors, interacting with them almost on a daily basis. By way of contrast, in the humanities, it is not uncommon for a graduate student to meet with a dissertation advisor only a few times a year, clearly receiving very little guidance.

While the vast majority of faculty members regard the supervision of graduate students as both a significant privilege and sacred responsibility, there are inevitably cases of exploitation. Some faculty members adopt almost a feudal attitude, in which graduate students are regarded first and foremost as serfs to work on their research projects rather than as students seeking an education and a degree. As a result, some graduate students are seriously abused, required to perform menial tasks unrelated to their education, spending unnecessary years to get their degree, and tolerating the most excessive examples of faculty irresponsibility.

Little wonder students do not complain, since in most graduate programs, the faculty supervisor has ultimate control over the graduate student's ability to complete the degree and find employment. Universities have been extremely reluctant to interfere with this relationship between student and faculty supervisor, even when there is strong suspicion or possible evidence that significant mistreatment has occurred. Clearly there is a need to change the current model for graduate education, even if this encounters serious faculty resistance to keep the status quo.

Postdoctoral Education. Of course, graduate education does not end with the Ph.D. In many fields, an appointment as a postdoctoral fellow in a university research laboratory has become not only commonplace but effectively a requirement for a later academic position. To be sure, there are strong intellectual reasons for postdoctoral appointments in some fields. Perhaps this level of advanced training and specialization simply cannot be achieved within a conventional Ph.D. program. Or an individual may need the experience of working with a senior scientist to learn not only advanced research techniques but also the ropes of grantsmanship. Postdoctoral appointments also allow young scholars to accumulate the publication record necessary for a more permanent appointment.

There are other reasons for the rapid increase in postdoctoral appointments seen in many fields over the

past two decades—from 16,829 in 1975 to 35,379 in 1995. We have already noted that in some fields such as the life sciences there is a current glut of Ph.D. production. As a result, although postdocs are supposed to be temporary, they have become a holding pattern for many young Ph.D.s who are unable to find permanent jobs in research or who need more time to assemble the kind of publishing record that such jobs now require. Many scholars spend five or more years in postdocs, frequently moving from one appointment to the next, in their unsuccessful search to find a more permanent appointment. This leads to what one scientist has called “the Laguardia effect, in which many recent graduates are circling in postdoctoral positions, burning up very important and useful intellectual fuel, and waiting for their turn to land in a permanent academic or research position.”

More significant, perhaps, is the role postdoctoral fellows play in the research enterprise. Unlike graduate students, postdocs have the sophistication to be highly productive in the laboratory or in a research group of senior scientists. They are highly motivated and work extremely hard, since they realize that their performance as a postdoc may be critical in attaining the faculty references necessary for further employment. And they are cheap, typically working at only a small fraction (20 to 30 percent) of the salary of a faculty member or research scientist. In fact, since most postdocs are not assessed tuition for their advanced training, in many institutions postdoctoral appointments are less expensive to support than graduate students.

Hence, it is not surprising that in many fields, the postdoctoral student has become the backbone of the research enterprise. In fact, one might even cynically regard postdocs as the migrant workers of the research industry, since they are sometimes forced to shift from project to project, postdoc to postdoc appointment, even institution to institution, before they find a permanent position. And, as with graduate students, they are all too frequently at the mercy of their faculty supervisor, with little university oversight or protection.

Most institutions make little effort to control the number or quality of postdocs, since these are identified, recruited, and supported through the efforts of individual faculty. (In fact, in recent surveys, some institutions did not even know the number of postdocs

on their campuses.) There are few institutional policies governing postdocs, such as compensation or benefit policies or time limits on appointments. Few institutions have job placement services for postdocs, aside from the efforts of their faculty supervisors. The lack of institutional oversight of postdocs, coupled with the evolution of postdoc education in a number of disciplines into a virtual requirement for a tenure-track faculty appointment, has created an unacceptable degree of variability and instability in this aspect of the academic enterprise.

The key issues swirling about graduate education can be summarized in a series of questions. First, what is the purpose of graduate education? Is it to produce the future researchers needed by our nation? Clearly, the current system of graduate education does this quite well. What about the role of graduate education in producing the future faculty needed by higher education? Some suggest that the current graduate education paradigm of the research university does not serve the majority of colleges and universities, which place far more emphasis on teaching than research. And what about the production of the next generation of scientists, engineers, and other disciplinary specialists? Or providing the educational background needed for other key professions in areas such as medicine, business, and law? There is a sense that an increasing number of students with advanced training in science and engineering are moving into other professional careers such as medicine, law, and business. Should our graduate programs be responsive to this?

Beyond the production of human resources, what role should graduate studies play in providing the labor necessary to sustain the research and teaching mission of the university through graduate research or teaching assistantships? Unfortunately, the size of many graduate programs in science and engineering seems to be determined less by national need or employability than by the graduate assistant needs of local research projects or instructional programs.

The majority of Ph.D. programs have traditionally seen their role as training the next generation of academicians, that is, self-replication. The process of graduate education is highly effective in preparing students whose careers will focus on academic research. But more than half of new Ph.D.s will find work in

nonacademic, nonresearch settings, and our graduate programs must prepare them for these broadened roles. Most academic positions will be in colleges and universities that do not stress research.

How appropriate is the current graduate education paradigm for the broader range of careers available to graduates? The current graduate education paradigm can be characterized best as an apprenticeship in which the dissertation advisor has significant responsibility for not only the content but the duration of the program. The current system, stressing specialization and depth of investigation, is frequently accused of cloning the current cadre of research faculty. In particular, the specialized training provided their graduate students leaves them ill prepared for the broader teaching responsibilities of colleges primarily focused on undergraduate education.

Third, what is the best way to fund graduate education? The research assistantship is clearly the preference from the faculty perspective, since it provides the principal investigator maximum control over graduate students. Yet, one might well argue that the fundamental purpose of graduate research assistantships should not be to provide cheap labor for research projects but to support graduate education.

The graduate fellowship has been the traditional alternative to research assistantships, although there have been concerns. These include whether graduate fellows are too disconnected from the research interests of faculty and whether the portable nature of these fellowships tends to benefit the most prestigious institutions (not to mention those with warm climates).

An interesting alternative is provided by the graduate traineeship. Here the principal distinction between traineeships and fellowships is that traineeship grants are made to university programs and departments for a specified purpose or program and then assigned to graduate students by the institutions. While traineeships have not been a major component of the portfolio in science and the humanities, they have been the dominant form of graduate student support in other areas, such as the health sciences, since they can allow a more carefully designed graduate experience.

Finally, what is the relationship of graduate education in research universities to the rest of the higher education enterprise? There is a sense among

many that the research university—where most graduate education is conducted—is becoming increasingly detached from the rapidly changing higher education enterprise both in this country and abroad. In the past these universities have provided not only most of the faculty but most of the pedagogical models and curriculum content for higher education in America. Today, the relevance of the research university paradigm to the learning needs of our society is being seriously questioned.

Professional Education

One of the most important missions for the American university involves providing the advanced education necessary to prepare students for professional careers. Whereas the early colonial colleges stressed preparation primarily for the clergy or government service, an ever-increasing number of professional education programs have appeared as society has become more complex. Familiar professions such as medicine, law, and engineering now coexist with emerging professional areas such as knowledge management or health systems administration.

Although undergraduate education in the liberal arts remains the core mission of most universities, their commitment to professional education is considerable. In fact, because of the very large size of many professional schools (notably engineering, business, law, and medicine) most research universities devote a significant fraction, and in many cases the majority, of their faculty and financial resources to education in the professions.

Despite their central role, both undergraduate education and graduate education in the academic disciplines have strong professional characteristics in the modern university. This is true for those undergraduate degree programs intended to prepare students for professional careers, such as engineering, nursing, teaching, or business. It is also the case for “preprofessional” undergraduate majors designed to prepare students for professional programs at the graduate level such as premed or prelaw. Even traditional disciplinary majors are based on sequences of courses designed to prepare students for further graduate study in the field, that is, for possible

careers as academicians or scholars. In this sense the contemporary university is strongly engaged in professional education and training. In reality, this is nothing new, since even the medieval university was based on the learned professions of theology, law, and medicine.

But there are some important differences. Because most professional education requires an ongoing relationship with the world of professional practice, professional schools tend to be closely coupled to the needs of society. Professional practice and service are usually expected components of the activities of both students and faculty. Further, since professional schools are so tightly coupled to practice, these schools tend to respond much more rapidly to changes in society. Good examples are provided by the dramatic changes that have occurred in medical and business schools in recent years.

The relationship between students and faculty is also somewhat different in most professional schools. Most professional school faculties take their responsibilities in preparing the next generation of professional practitioners very seriously. This provides these schools with a coherent intellectual focus, but beyond that, an esprit de corps that pulls students and faculty into tightly knit professional communities. This stands in sharp contrast to the loosely coupled enterprise characterizing the academic disciplines of an undergraduate college. As a result, surveys usually indicate that students enrolled in professional schools tend to be not only more highly motivated but more satisfied with their educational experience.

However, there are drawbacks to professional education as well. For example, the pressure on faculty to balance professional practice with teaching and scholarship can create unusual stress, particularly during the pretenure probation period. This is particularly pronounced in the health professions such as medicine, where there are intense pressures for faculty in clinical specialties to generate financial resources through their clinical activity.

So too the rapid growth of knowledge required for professional practice has overloaded the curricula of many professional schools. This has been particularly serious in undergraduate professional degree programs such as engineering, since the tendency is to include

more and more specialized material at the expense of the liberal arts component of an undergraduate education. The knowledge overload has led to major restructuring of the curricula in many professional schools, notably medicine and business administration.

Today's college graduate will face a future in which perpetual education will become a lifetime necessity since they are likely to change jobs, even careers, many times during their lives. To prepare for such a future, students need to acquire the ability and the desire to continue to learn, to become comfortable with change and diversity, and to appreciate both the values and wisdom of the past while creating and adapting to the new ideas and forms of the future. These objectives are, of course, those that one generally associates with a liberal education.

Unfortunately many students are rapidly channeled into specialized studies and training even as undergraduates because they choose to major in those professional programs conducted at the undergraduate level, for example, engineering, education, nursing, business administration, art, and music. And though many such undergraduate professional programs attempt to broaden the educational experience of their students through distribution requirements in the liberal arts, it is also the case that the rapidly expanding knowledge base of these professions adds more and more material to the professional training component of the curriculum.

Our graduate and professional schools are skillful in producing specialists of various kinds. While it is true that our knowledge-intensive world will need highly focused specialists, our ability to access specialized knowledge on worldwide knowledge networks, perhaps with the assistance of intelligent software agents, will likely allow breadth of education to become more valuable than depth in many professions. The age of knowledge will need broadly educated problem solvers who move easily across professional disciplines. Clearly, this will place a premium on a liberal education as preparation for further professional study.

One approach would be to simply shift all professional education and training to the graduate level, so that students would first be required to complete a liberal arts degree before entering a professional school. But such an approach faces obstacles. First, it would place

a very substantial additional financial burden on the student. Second, such a shift would probably not be accompanied by a significant increase in the value of the professional degree as seen by employers, at least as measured by starting salaries.

The current approach to professional education requires the student to acquire a portfolio of knowledge that, it is hoped, will be useful later in professional practice. Certainly some level of basic training is necessary in order to be able to practice in highly skilled professions such as medicine or engineering. But what about business administration? Most entry-level positions in business will require few of the skills learned during an M.B.A. degree program and instead are frequently provided through on-the-job training programs. To be sure, the more formal knowledge and skills provided by a university education may well be valuable later in one's career, but perhaps it would be more efficient, both from the student's and the employer's perspective, to wait until certain skills are needed before acquiring the necessary education.

In a world of continual change, we should no longer assume that a professional education can provide sufficient knowledge to suffice for a substantial portion of a career. Perhaps we should rely more heavily on "just in time" education, practical knowledge provided in modules and perhaps even through distance learning paradigms to practitioners when and where they need it.

Such just-in-time education is becoming increasingly common in many professions. For example, many business schools now find their faculty more heavily involved in nondegree continuing education programs such as executive education than in traditional B.B.A. or M.B.A. programs. They find that learning in such programs is more efficient—the students are more mature and highly motivated. Furthermore, since both the students and their employers know more accurately the value of the program, they are far more willing to pay tuition levels that reflect the true cost.

One of the most significant implications of the age of knowledge is the need to continue to learn throughout one's life. Without such perpetual learning, many graduates will be swept aside by the rapid changes occurring in our world. This need for lifelong learning poses great challenges to higher education,

since it is becoming increasingly clear that our old paradigms of campus-based degree programs will not serve this emerging need. Although many institutions have created separate educational divisions to serve adult learners—for example, extension, continuing education, lifelong learning—these have been viewed traditionally as lower priority activities.

Even today we see that the forces of change in our world will demand a perpetual commitment to learning, along with a merging of various educational levels and objectives—from broad general education to professional education to specialized training. In a very real sense, learning, working, and living will become increasingly woven together, inseparable in character and content. In this culture of learning, degrees as we currently understand and value them—particularly as tickets to opportunity—could well be replaced by more instantaneous measures of knowledge and skills. Instead the educational activities of the university would need to be more distributed over the careers and lifetimes of their students.

The Changing Nature of the Liberal Arts

So where do the liberal arts fit into discussions of the future of higher education? Of course, for the medieval university they comprised the curriculum for free men (from the Latin *liberalis*) rather than those skills characterizing the servile arts (like masonry and engineering). Although, originally identified by the disciplines of the *trivium* (grammar, logic, and rhetoric) and later the *quadrivium* (geometry, arithmetic, astronomy, and music) that comprised the curriculum of the medieval university.

Each age has added further to the liberal arts, e.g., the humanities, the physical and biological sciences, and the social sciences in the 19th and 20th century. Still excluded from the liberal arts are topics that are specific to the professions such as medicine, pedagogy (i.e., education), business, and of course, engineering! As Shapiro notes, additional objectives have also been added to the concept of a liberal education, such as freeing of the individual from previous ideas, the disinterested search for truth, the pursuit of alternative ideas, the development and integrity of the individual, and the power of reason.

Here it is important to acknowledge that the content of a liberal education for the 21st Century continues to evolve. Yet, as difficult as it is to define and as challenging as it is to achieve, perhaps the elusive goal of liberal learning remains the best approach to prepare students for a lifetime of learning and the capacity to both adapt to and occasionally drive change.

What is the place of the liberal arts and basic sciences in the research university, which has much to do with disciplinary organization as philosophical objectives. The usual Copernican view of the solar system of the university would place the liberal arts college and its core academic disciplines as the sun, the four inner planets as the most powerful professional schools—Medicine, Engineering, Law, and Business—and then a series of elliptical orbits for the remaining professional schools, depending upon their quality and priority within a particular institution. (Actually, some universities have evolved almost into a binary star system in which the medical center has assumed a size and financial importance almost comparable to that of the rest of the university. Some of my liberal arts colleagues suggest that a more appropriate astronomical metaphor would be that of the university as a star orbiting about a large black hole . . .)

Of course, while universities such as Yale, Virginia, and Michigan are still deeply committed to the importance of the liberal arts and sciences as the core of an undergraduate education, what about the rest of American higher education? To be sure, there is growing pressure to refocus college education more on preparing students for the job market (although most of us always used to warn freshman that the purpose of college was not to prepare you for your first job but rather for your last job).

In fact, many who should know better seem to think that universities should focus their programs on meeting contemporary workforce needs. The current governor of Michigan has 4 degrees from UM and made many millions from high tech enterprises, and yet a few weeks back I argued with him for over an hour about his premise that we should be turning out experts on big-data and analytics rather than broadly educated citizens capable of adapting to a world of rapid change.

Yet here there are several datapoints we might consider:

Datapoint 1: MIT: For a number of years MIT has been doing careful studies of the experiences of their students following graduation. Despite MIT's reputation as the source of the nation's ultimate gearheads, they find that their students intentionally pursue a decade or more of career exploration following graduation, intentionally shifting not only jobs but careers...not only from various engineering activities to startups to graduate education to public service (Teach for America, Peace Corps) to international experiences to find out what they really like to do. Only when they begin to acquire the responsibilities of a family do they narrow down on a career. In reality, the MIT faculty is beginning to realize that at least for their students, the undergraduate experience lasts well over a decade beyond the campus curriculum.

Datapoint 2: Lifelong learning: Remember that during the 20th century, human life-expectancy essentially doubled! While biologists suggest that there may be fundamental limits on human life, it is certainly the case that today's graduates are likely to have much longer careers than we have had, in an environment of rapid change that is likely to require continuous learning and upgrading of skills as they shift careers many times. Hence the old saying that many of us used to quote at freshman convocation seems even more true today: "The goal of a college education is not to prepare you for your first job but instead for your last job!"

Datapoint 3: Most of you are aware of the major study that Congress asked the National Academies to perform concerning the future of the American research university. This study, released 2012 involved has launched an unusually broad agenda that will keep the National Academies busy for the next decade, with recommendations such as fully funding the American Competes Act (now in the President's budget recommendation), reforming immigration policy to allow international students with advanced degrees to remain in this country (now part of the proposals in Congress), challenging the states to restore their support to public research university, addressing those factors such as excessive time-to-degree and unacceptable attrition rates characterizing doctoral

education, ramping up investments in both campus research infrastructure and the creation of endowed chairs for junior faculty.

But although the National Academies consist of the disciplines of science, engineering, and medicine, our report stated in strong terms the importance of including the liberal arts in this agenda, and here I quote:

"A recognition of the importance of supporting the comprehensive and interdependent nature of research university, spanning the full spectrum of academic and professional disciplines including the arts and humanities. Research universities and federal agencies should ensure, as they implement the above measures, that they improve education across the full spectrum of research university graduate programs, because of the increasing breadth of academic and professional disciplines necessary to address the challenges facing our changing world, including the social and behavioral sciences, the humanities, and the arts."

But what about other university programs, particularly in the professional disciplines? Despite the central role of the liberal arts, both undergraduate education and graduate education in the academic disciplines have strong professional characteristics in the modern university. In this sense the contemporary university is strongly engaged in professional education and training. In reality, this is nothing new, since even the medieval university was based on the learned professions of theology, law, and medicine.

The rapid growth of knowledge required for professional practice has overloaded the curricula of many professional schools. This has been particularly serious in undergraduate professional degree programs such as engineering and nursing, since the tendency is to include more and more specialized material at the expense of the liberal arts component of an undergraduate education.

New Paradigms for Learning and Teaching

So, what are the opportunities presented by cyberinfrastructure for learning and teaching, for example, Massively Open Online Courses (MOOCs), cognitive tutor systems, or Carnegie Mellon's Open

Learning Initiative. Some believe that today higher education is on the precipice of an era of extraordinary change as such disruptive technologies challenge the traditional paradigms of learning and discovery. (Friedman, 2011) They suggest that new technologies could swamp the university with a tsunami of cheap online courses from name-brand institutions, or adaptive learning using massive data gathered from thousands of students and subjected to sophisticated analytics, or even cognitive tutors that rapidly customize the learning environment for each student so they learn most deeply and efficiently, entirely without the involvement of faculty.

But are these really something new or rather simply old wine in new bottles? After all, millions of students have been using online learning for decades (estimated today to involve over one-third of current students in the United States). There are many highly developed models for online learning, including the UK Open University, the Western Governor's University in the United States, and the Apollo group's global system of for-profit universities. Adaptive learning has been used in Carnegie Mellon's cognitive tutor software for years in secondary schools and more recently in the Open Learning Initiative. Many of the buzzwords used to market these new technologies also have long established antecedents: Experiential learning? Think "laboratories" and "internships" and "practicums"... and even "summer jobs"! Flipped classrooms? Think "tutorials" and "seminars" and "studios". Massive markets of learners? Many American universities were providing free credit instruction to hundreds of thousands of learners as early as the 1950s through live television broadcasts!

Of course, today's MOOCs do have some new elements, aside from the massive markets they are able to build through the Internet and their current practice of free access. (Waldrop, 2013) They augment online broadcasts of canned lectures and automated grading of homework with social networks to provide teaching support through message boards and discussion groups of the students themselves. Their semi-synchronous structure, in which courses and exams are given at a specific time while progress is kept on track, allow them to augment online broadcast of canned lectures and automated grading of homework with social networks

to provide free teaching assistants through message boards and discussion groups. Here one might think of MOOCs as a clever combination of UK's Open University (online education) and Wikipedia (crowd sourcing of knowledge)! Furthermore, MOOCs, like the far-more sophisticated Open Learning Initiative, are able to use data mining (analytics) to gather a large amount of information about student learning experiences. When combined with cognitive science, this provides a strong source of feedback for course improvement.

Certainly the MOOC paradigm is characterized by a powerful delivery mechanism. But it is just one model. It is much more important to focus on improving learning by integrating emerging technology with research about how people learn. There are also other models to explore and much richer collaboration opportunities to share. Through knowledge creation, we need to embrace new paradigms as a community. Automated assessment and evaluation could turn the whole education business upside down because we will have access to massive data sets that potentially will give us some insight in not how we deliver content but rather how people learn.

Of course, many of these efforts are driven by the exploding global needs for higher education that creates gigantic markets. For example, to meet the needs of its population, India would have to build thousands of new universities just to handle its current number of secondary school graduates. But here is where new paradigms such as MOOCs come in, since these can handle courses for 100,000 or more students at a time by using a combination of online and social networking technology. Of course, there remains the need for rigorous assessment of learning effectiveness, but some of the efforts to apply data mining and analytics to the massive data collected by these online efforts may be a key to evaluation.

What about the role of credentials? While there has been recent exploration of providing college credit for MOOCs on a highly selective basis, it is more likely that an alternative certificate or badge system will be used to certify that learning goals have been achieved. One might even consider micro-credentials with a time value, that is, a student would receive a certificate that would be valid until they take the next test. But

students who might like a MOOC may be different than those who respond to tutor or that pedagogy or certain structure on content. Customization for individual need is required to meet huge opportunity space in this knowledge area. The learner is the customer. It is not just about the learning or how to push it out but rather how will they learn with this technology? How can this be structured to address different learning styles since good classroom teachers have this capacity to adapt teaching methods to the students?

It is likely that MOOCs are a disruptive technology, and that analytics on learning data holds considerable promise. But it is also very important to separate the fundamental character of a college education from the specific resources used to achieve that, e.g., courses and curricula, textbooks and course notes, faculty and laboratory staff, and, of course, the complex learning communities that exist only on university campuses. After all, MOOCs are marketed as courses, not as a college education. We must remember that the current university paradigm of students living on a university campus, completely immersed in an exciting intellectual and social physical environment and sophisticated learning communities, provides a very powerful form of learning and discovery. MOOCs are interesting, but they are far from the vibrant, immersive environment of a college education, at least as we understand it today. (Brown, 2000)

There is also a big difference between the perspective of the providers of MOOCs and the students who are their consumers. Right now, we are watching the providers figure out what they are going to do, with strong investments from the venture capital community and for-profit education providers suggesting that at least some people believe they might become very rich from these gigantic educational markets. Furthermore, today's MOOCs are aimed primarily at individuals, not communities. There is a huge challenge thinking about what they will mean in the university, and whether the second tier institutions can use off-the-shelf MOOC courses and do something with them to reduce cost or bring in new kinds of students. But there are many questions. What happens to faculty governance issues? What about copyright issues? Who owns these courses? Are all of the professors going away, replaced by MOOC broadcasts from star teachers and using

crowd sourcing to grade and answer questions?

Finally, we should remember that this new paradigm is being launched by several of the most elite and expensive private universities in America (e.g., Stanford, Harvard, and MIT) using both the Internet and social media as well as their powerful brand names to build mammoth markets for their MOOC companies (Udacity, Coursera, EdX) in an effort to eventually create new revenue streams to subsidize the rapidly rising costs of more traditional, highly expensive education on their own campuses. A related concern is that the intense media hype given these new learning paradigms has put enormous pressure on public colleges and universities from governing boards and state governments attempting to reduce the costs of college education, even at the sacrifice of educational equality. It would be tragic if technology-based paradigms such as MOOCs were to drive even greater inequities in higher education.

Are the paradigms characterizing research and scholarship paradigms also shifting with emerging technologies? Certainly the language of research is changing to embrace concepts such as clouds, data mining, convergence, etc. If you subscribe to view that there is a paradigm shift from hypothesis-driven to data-correlation-driven discovery, then the culture of scientific and engineering discovery and innovation is changing as a result of access to data, computational technology, and social networks. We are going to need new models for sharing data, software, and resources such as computational technology

But is the way in which research is conducted changing? What about global competition? Is the world of facilities-intensive big science, such as high-energy physics, sustainable when it requires sending faculty and students to the only places capable of conducting the research (e.g., CERN), resulting in a list of authors longer than substance of the papers? Are we moving to a wiki world where crowd sourcing of amateurs becomes important for scientific research? How important is the role of research and scholarship within universities? Do we need to tweaking of tax laws so the translational research characterizing earlier paradigms, such as Bell Laboratories, begin to reappear as part of the knowledge ecosystem?

Ironically, while we generally think of

cyberinfrastructure in terms such as terabit/sec networks and petaflop supercomputers, the most profound changes in our institutions may be driven not by the technology itself but rather by the philosophy of openness and access it enables—indeed, imposes—on its users. Of particular importance are efforts to adopt the philosophy of open source software development to create new opportunities for learning and scholarship for the world through open educational resources by putting previously restricted knowledge into the public domain and inviting others to join in both its use and development. (Atkins, 2007)

MIT led the way with its OpenCourseWare (OCW) initiative, placing the digital assets supporting almost 2,000 courses into the public domain on the Internet for the world to use. (Vest, 2004) Today, hundreds of universities have adopted the OCW paradigm to distribute their own learning assets to the world, with over 15,000 courses now available online. New resources, such as Apple's iTunes U, are providing global access to such open educational resources.

To this array of open educational resources should be added efforts to digitize massive quantities of printed material and make it available for search and eventual access. For example, the Google Book project is currently working with a number of leading libraries (26 at last count in 35 languages) around the world to digitize a substantial portion of their holdings (22 million volumes in 2013, with a goal of 30 million by 2020), making these available for full-text searches using Google's powerful internet search engines. (Google, 2004) A number of universities (84 thus far) have pooled their digital collections to create the Hathi Trust ("Hathi" means "elephant" in Hindi), adding over 400,000 books a month to form the nucleus (currently at 17 million books, with 6 million of these already open for full online access) of what could become a 21st century analog to the ancient Library of Alexandria. (HathiTrust, 2009; Kelly, 2006) While many copyright issues still need to be addressed, it is likely that these massive digitization efforts will be able to provide full text access to a significant fraction of the world's written materials to scholars and students throughout the world within a decade.

We should add into this array of ICT-based activities a few more elements: mobile communication, social

computing, and immersive environments. We all know well the rapid propagation of mobile communications technology, with over 4 billion people today having cell-phone connectivity and 1.2 billion with broadband access. It is likely that within a decade the majority of the world's population will have some level of cell-phone connectivity, with many using advanced 3G and 4G technologies.

Finally, the availability of new learning resources, such as massively open online learning (MOOC) consortia (Udacity, Coursera, and EdX), cognitive AI-based tutor software (Carnegie Mellon's Open Learning Initiative), and immersive learning environments similar to those developed in the massively player gaming world (World of Warcraft and Second Life) are providing resources that not only open up learning opportunities for the world but furthermore suggest new learning paradigms that could radically challenge and change existing higher education paradigms.

What do we know about the effectiveness of these technology-based approaches? Where are the careful measurements of learning necessary to establish the value of such forms of pedagogy? Thus far, promoters have relied mostly on comparisons of performances by both conventional and online students on standard tests. The only serious measurements have been those that Ithaka has conducted on the learning by cognitive tutor software in a highly restricted environment. (Bowen, 2012)

Of course, it eventually comes back to the questions of "What is the most valuable form of learning that occurs in a university...and how does it occur?" Through formal curricula? Through engaging teachers? Through creating learning communities? After all, the graduate paradigm of *Universitas Magistrorum et Scholarium* involving the interaction of masters and scholars will be very hard to reproduce online...and least in a canned video format!!!

As William Bowen, former president of Princeton and the Mellon Foundation and a founder of Ithaka suggests, it is time to "Walk, Don't Run" toward the use of cyberlearning. We need lots of experimentation, including rigorous measurement of education—before we allow the technology tsunami to sweep over us! (Bowen, 2013)

However...imagine that during the lifetime

of today's students: The majority of the world's population will have connectivity to both people and resources. Essentially all of the knowledge from human history will be digitized, with most of it both open and searchable in the cloud. The continued evolution of learning resources, whether through social networks, cognitive tutors, or new learning paradigms a la cognitive implants!!! (As Bell Labs used to conjecture, "fiber to the forehead")

How do we prepare our students for this cyber-connected world? Perhaps only through continuing to stress the objectives of a liberal education based on the liberal arts, appropriately updated to the *trivium* and *quadrivium* of a new age!!!

Fortunately, universities have been able to adapt to such rapid technological change in the past because they have functioned as loosely coupled adaptive systems with academic units given not only the freedom, but also the encouragement, to experiment to try new things. It is at the level of academic units rather than the enterprise level where innovation and leadership will occur. Why? Because academic programs are driven by learning and discovery, by experimentation, by tolerance for failure, and by extraordinarily talented faculty, students, and particularly, staff. Most academic institutions have intentionally avoided the dangers of centralizing these activities and instead focused maintaining a highly adaptive academic culture.

Renewing the University's Commitment to Education

The university faces the challenge of resolving several paradoxes related to its educational mission. Its primary mission should be developing human potential. Yet all too often it focuses on selecting rather than developing talent, designing its admissions policies and even its curriculum as a gauntlet to weed out and filter rather than develop the capacity of students to enroll in certain programs. Most universities are committed to creative scholarship and public service, yet few institutions have integrated these activities into undergraduate education.

Furthermore, the academy tends to reject scholarship or technology that might improve learning, particularly

if this threatens familiar pedagogical paradigms. For all of the emphasis on research, universities have been reluctant to investigate their own educational activities with the rigor they focus on their research interests. And while they have played leading roles in developing the information technology that is now transforming our society, they have been slow to apply this to their own educational efforts. When finally challenged to address undergraduate education, the faculty tends to do so through arcane debates over curricular minutiae rather than addressing the total student experience that provides the lasting value of a college education.

To be sure, the faculty must recapture control of the undergraduate curriculum, wresting it away from the Balkanized tyranny of individual departments, and instead basing it on what students need to learn rather than what faculty members prefer to teach. While the liberal arts in general and the humanities in particular will be important contributors to such an effort, they have no monopoly on wisdom in the contemporary universities. Many of the purposes of an undergraduate education—critical thinking, communication skills, judgment, and tolerance—can also be achieved through professional courses.

Yet the value of a college education extends far beyond the curriculum. It involves a complex set of experiences in a learning community, among students, faculty, and staff, supported by the rich array of intellectual resources and opportunities provided by the university. It depends upon personal relationships, some formal through academic programs, many informal through extracurricular or community experiences. And at the heart of the experiences and relationships offered by the university is a deep commitment to learning, a recognition that inquiry, discovery, and creativity should be the foundations for a university education at all levels, and that all members of the university community, whether students, faculty, or staff, are learners.

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Chapter 10

Diversity

Today civilization is in danger by reason of a perversion of doctrine concerning the social character of humanity. The worth of any social system depends on the value experience it promotes among individual human beings. There is no one American value experience other than the many experiences of individual Americans or of other individuals affected by American life. A community life is a mode of eliciting value for the people concerned.

Alfred North Whitehead

A distinguishing characteristic and great strength of American higher education is its growing commitment over time to serve all segments of our pluralistic society. Higher education's broadening inclusion of talented students and faculty of diverse ethnic, racial, economic, social, political, national, or religious background, has allowed our academic institutions to draw on a broader and deeper pool of talent, experience, and ideas than more exclusive counterparts in other places and times. This diversity invigorates and renews teaching and scholarship in American universities, helping to challenge long-held assumptions, asking new questions, creating new areas and methods of inquiry, and generating new ideas for testing in scholarly discourse.

We have never needed such inclusiveness and diversity more than today when differential growth patterns and very different flows of immigration from Asia, Africa, Latin America, the Caribbean, and Mexico are transforming our population. By the year 2030 current projections indicate that approximately 40 percent of all Americans will be members of minority groups, many—even most—of color. By mid-century we may cease to have any one majority ethnic group. By any measure, we are evolving rapidly into a truly multicultural society with a remarkable cultural, racial,

and ethnic diversity. This demographic revolution is taking place within the context of the continuing globalization of the world's economy and society that requires Americans to interact with people from every country of the world. These far reaching changes in the nature of the people we serve and the requirements of global responsibility demand far-reaching changes in the nature and structure of higher education in America.

Our rapidly diversifying population generates a remarkable vitality and energy in American life and in our educational institutions. At the same time, it gives rise to conflict, challenging our nation and our institutions to overcome at last our long history of prejudice and discrimination against those groups who are different, particularly and most devastatingly, those groups identified by the color of their skin. Tragically, race remains a significant factor in our social relations that profoundly affects the opportunities, experiences, and perspectives of those discriminated against as well as those who discriminate. To change this racial and cultural dynamic, we need to understand better how others think and feel and to learn to function across racial and cultural divisions. We must replace stereotypes with knowledge and understanding. Slowly, we Americans are learning, but there remains a great distance to go.

The final century of the second millennium, for all its advances in learning and technology, is likely to be most remembered for the horrors unleashed by racial, religious, and ethnic prejudice and discrimination. If anyone should doubt the urgency of our task in seeking to overcome this evil heritage, they have only to recall the Holocaust or to look around the world today at the religious, racial, and ethnic conflicts that have killed millions of innocents, made millions of others refugees, ripped nations asunder, set neighbor against neighbor,

and poisoned the minds and hearts of generations. From Rwanda to Timor, from Kosovo to the Middle East, the endless toll of violence and suffering rises unabated. Some see this as evidence that the ideal of tolerance and understanding is impossible to achieve. We cannot accept such defeatism. We must meet this challenge to overcome prejudice and discrimination here and now. America's colleges and universities have a critical part to play in this struggle.

This means we must not falter in our national commitment to ending discrimination and achieving the promise of equal opportunity. In recent years academia has made a dedicated effort to make progress towards diversity. It can point to significant gains as a result of these efforts. Unfortunately, but perhaps not surprisingly, this progress has given rise to a growing backlash. An increasing number of Americans oppose our traditional approaches to achieving diversity such as affirmative action. Federal courts are pondering cases that challenge racial preference. In state after state, voters are taking aim through referenda at an earlier generation's commitment to civil rights. At such a time, it seems particularly important that we in academe talk openly, with boldness, about the need for more, not less, diversity. There is plenty of room to debate the merits of various methods of achieving our ends, but as our nation and our world become ever more diverse, ever more interdependent and interconnected, it is vital that we stand firm in our fundamental commitment to our diversity.

The Case for Diversity

When one discusses the topic of diversity in higher education, it is customary to focus on issues of race and ethnicity, and we shall do so in much of this chapter. But it is also important to recognize that human diversity is far broader, encompassing characteristics such as gender, class, national origin, and sexual orientation. These, too, contribute to the nature of an academic community. In both the narrow and broader sense, it is important to set out a compelling rationale for seeking diversity in American higher education. First and foremost, the case rests on moral responsibility and democratic ideals, based on our social contract with society. I would also contend that diversity is a critical

element in sustaining the quality and relevance of our education and scholarship. Our nation's campuses have a unique opportunity to offer positive social models and provide leadership in addressing one of the most persistent and seemingly intractable problems of human experience—overcoming the impulse to fear, reject, or harm the “other.” In addition, there are persuasive pragmatic reasons for academia to pursue diversity.

Social and Moral Responsibility

American colleges and universities are founded on the principle that they exist to serve their society through advancing knowledge and educating students who will, in turn, apply their knowledge for their own advancement but also to serve others. Hence, higher education, indeed all educational institutions, are responsible for modeling and transmitting essential civic and democratic values and helping to develop the experience and skills necessary to put them into practice. In this sense, then, higher education's commitment to reflect the increasing diversity of our society in terms of both our academic activities and the inclusiveness of our campus communities is based in part on the American university's fundamental social, institutional, and scholarly commitment to freedom, democracy, and social justice.

To further these lofty goals, our colleges and universities must overcome inequities deeply embedded in our society by offering opportunity to those who historically have been prevented from participating fully in the life of our nation. Over the years our universities have broadened their commitment to providing equal opportunity for every individual regardless of race, nationality, class, gender, or belief. They have done so as part of their basic obligations to serve those who founded and support us, to serve as models of social interaction, and to serve as a major source of leaders throughout society. This is a fundamental issue of equity and social justice that must be addressed if we are to keep faith with our values, responsibilities, and purposes.

Educational Quality

Nevertheless, universities are social institutions of the mind, not of the heart. While there are compelling moral and civic reasons to seek diversity and social equity on our campuses, the most effective arguments in favor of diversity to a university community tend to be those related to academic quality.

Perhaps most important in this regard is the role diversity plays in the education of our students. We have an obligation to create the best possible educational environment for the young adults whose lives are likely to be significantly changed during their years on our campuses. Their learning environment depends on the characteristics of the entire group of students who share a common educational experience. Students constantly learn from each other in the classroom and in extracurricular life. The more diverse the student cohort, the more opportunities for exposure to different ideas, perspectives and experiences and the more chances to interact, develop interpersonal skills, and form bonds that transcend difference.

There is ample research to suggest that diversity is a critical factor in creating the richly varied educational experience that helps students learn. Since students in late adolescence and early adulthood are at a crucial stage in their development, diversity (racial, demographic, economic, and cultural) enables them to become conscious learners and critical thinkers, and prepares them to become active participants in a democratic society. Students educated in diverse settings are more motivated and better able to participate in an increasingly heterogeneous and complex democracy.

We must accept as a fact of life in contemporary America that the persistence of separation by race and ethnicity, past and present, has shaped the life experiences and attitudes of whites and minorities in fundamental ways. Americans of different races and ethnicities live in worlds that have a long history of separation and are still, to a great extent, separate. Indeed, in many regions, we are more sharply segregated than ever. Too few Americans of different racial and ethnic backgrounds interact in a meaningful way on a daily basis. A racially and ethnically diverse university student body has far-ranging and significant benefits for all students, non-minorities, and minorities

alike. Students learn more and think in deeper, more complex ways in a diverse educational environment. Racial diversity in a college student body provides the very features that research has determined are central to producing the conscious mode of thought educators demand from their students.

Intellectual Vitality

Diversity is similarly fundamental for the vigor and breadth of scholarship. Unless we draw upon a greater diversity of people as scholars and students, we cannot hope to generate the intellectual vitality we need to respond to a world characterized by profound change. The burgeoning complexity and rapidly increasing rate of change forces us to draw upon a broader breadth and depth of human knowledge and understanding. Perhaps our society could tolerate singular answers in the past, when we could still imagine that tomorrow would look much like today. But this assumption of stasis is no longer plausible. As knowledge advances, we uncover new questions we could not have imagined a few years ago. As society evolves, the issues we grapple with shift in unpredictable ways. A solution for one area of the world often turns out to be ineffectual or even harmful in another. The dangers of unanticipated consequences of our actions multiply as we take on ever more complex social problems. Many academic and professional disciplines have found their very foundations radically transformed as they grapple with the impact of new perspectives, revolutionary technologies, and the exponential growth of knowledge.

For universities to thrive in this age of complexity and change, it is vital that we resist any tendency to eliminate options. Only with a multiplicity of approaches, opinions, and ways of seeing can we hope to solve the problems we face. Universities, more than any other institution in American society, have upheld the ideal of intellectual freedom, open to diverse ideas that are debated on their merits. We must continually struggle to sustain this heritage and to become places open to a myriad of experiences, cultures, and approaches.

In addition to these intellectual benefits, the inclusion of underrepresented groups allows our institutions to tap reservoirs of human talents and experiences

from which they have not yet fully drawn. Indeed, it seems apparent that our universities could not sustain such high distinctions in a pluralistic world society without diversity and openness to new perspectives, experiences, and talents. In the years ahead we will need to draw on the insights of many diverse perspectives to understand and function effectively in our own as well as in the national and world community.

Serving a Changing Society

Our nation's ability to face the challenge of diversity in the years ahead will determine our strength and vitality. As I mentioned at the beginning of this chapter, our culture needs to come to grips with the fact that those groups we refer to today as minorities will become the majority population of our nation in the century ahead, just as they are today throughout the world. For instance, as we enter the next century, one of three college-age Americans today is a person of color, and roughly 50 percent of our school children (K-12) are African American or Hispanic American. By 2020, the American population, which now includes 26.5 million African Americans and 14.6 million Hispanic Americans, will include 44 million African Americans and 47 million Hispanic Americans. By the late 21st century, some demographers predict that Hispanic Americans will become the largest ethnic group in America.

The truth, too, is that most of us retain proud ties to our ethnic roots, and this strong and fruitful identification must coexist with—indeed enable—our ability to become full participants in the economic and civic life of our country. Pluralism poses a continuing challenge to our nation and its institutions as we seek to build and maintain a fundamental common ground of civic values that will inspire mutually beneficial cohesion and purpose during this period of radical transformation of so many aspects of our world.

Human Resources

The demographic trends we see in our future hold some other significant implications for national economic and political life and especially for education. Our clearly demonstrated need for an educated

workforce in the years ahead means that America can no longer afford to waste the human potential, cultural richness, and leadership represented by minorities and women. Our traditional industrial economy is shifting to a new knowledge-based economy, just as our industrial economy had evolved from an agrarian society in an earlier era. Now, since people and knowledge are the source of new wealth, we will rely increasingly on a well-educated and trained workforce to maintain our competitive position in the world and our quality of life at home.

Higher education will play a particularly important role in this regard. For example, in the 1960s barely 1 percent of law students and 2 percent of medical students in America were black. Through the use of affirmative action, financial aid programs, and aggressive recruiting, universities were able to attract more minorities into their professional programs, and by 1995, 7.5 percent of law school students and 8.1 percent of medical school students were black. Hence, it is clear that higher education can open the doors of opportunity to under-served components of our society. Our universities must make special efforts to expand educational achievement and workforce participation by minorities and women not just because that is good social policy, but because we cannot afford to waste their talents. America will need to call on the full contribution of all of its citizens in the years ahead.

The Challenges of Diversity

Although American higher education has long sought to build and sustain diverse campuses, this is a goal that has faced many challenges. Our nation continues to be burdened by prejudice and bigotry that plague our neighborhoods, our cities, and our social institutions. Although we think of America as a melting pot in which diverse cultures come together in common purpose, in reality, most among us seek communities of like rather than diverse colleagues. All too frequently we define ourselves in terms of our differences from others, and we have great difficulty in imagining the world as others see it. And, although change is always a difficult task for tradition-bound institutions such as universities, it has proven particularly so in the areas of diversity.

The Challenge of Racism

Prejudice and ignorance persist on our nation's campuses as they do throughout our society. American society today still faces high levels of racial segregation in housing and education in spite of decades of legislative efforts to reduce it. Furthermore, most students complete their elementary and secondary education without ever having attended a school that enrolled significant numbers of students of other races and without living in a neighborhood where the other races were well represented.

Yet, because of the distinctly different historical experiences of white and non-white Americans, race continues to affect outlook, perception, and experience. For example, most white Americans tend to think that race has only a minor impact on the daily experiences and future expectations of Americans whatever their background and that blacks receive the same treatment as they do both personally and institutionally. Most non-whites, in contrast, feel that race still matters a great deal, and considerable numbers report having experienced discriminatory treatment in shops and restaurants or in encounters with the public. Whether explicit or more subtly, our society continues to perpetuate stereotypes which reinforce the idea that one race is superior to another.

Not surprisingly, new students arrive on our campuses bringing with them the full spectrum of these experiences and opinions. It is here that many students for the first time have the opportunity to live and work with students from very different backgrounds. In many ways our campuses act as lenses that focus the social challenges before our country. It is not easy to overcome this legacy of prejudice and fear that divides us. Not surprisingly, our campuses experience racial incidents, conflict, and separatism. When these occur, we must demonstrate clearly and unequivocally that racism on our campuses will not be tolerated. Programs are also needed to promote reflection on social values and to encourage greater civility in social relations. It is also critical to develop new networks and forums to promote interaction and open discussion among campus groups.

The Challenge of Community

In an increasingly diverse country, deep divisions persist between whites, blacks, Hispanics, Native Americans, and other ethnic groups. There is nothing natural about these divisions. They are not immutable facts of life. Rather they are a consequence of a troubled and still unresolved past. Racial and ethnic groups remain separated by residence and education. There are unfortunately few places in American society where people of different backgrounds interact, learn from each other, and struggle to understand their differences and discover their commonality. The fundamental issue that we face at the end of the 20th Century is to work to overcome our divisions in the spirit of the venerable American motto, *E Pluribus Unum*. To build unity from pluralism, to recognize diversity and learn from it, to fashion a democracy of many voices, is still an unfinished project. Its success is vital to our nation's future.

As a social institution, the university can find direction in its history and tradition of openness. We must set forth a vision of a more varied and tolerant environment—a more pluralistic, cosmopolitan community. We have to become a community in which all barriers to full participation of all people in the life of our institution are removed; a place where we can all draw strength from the richness of our human variety; but also a place where we can work constructively together as a community of scholars and as citizens of a democratic society. This is the challenge before us. As citizens we have to reaffirm our commitment to justice and equality. As scholars we have to support unwaveringly our shared commitment to academic freedom and the pursuit of excellence.

Seeing Difference Differently

We need to work diligently to transform our campuses, encouraging respect for diversity in all of the characteristics that can be used to describe our human species: age, race, gender, disability, ethnicity, nationality, religious belief, sexual orientation, political beliefs, economic background, and geographical origin. Yet, in doing so, we will have to move in two directions at once. We have to set aside the assumption

that people from groups different from ours necessarily have the same needs, experiences, and points of view that we do. At the same time, we cannot succumb to the equally pernicious assumption that “they” are all the same. Real barriers, experiences, and culture may be shared by many in a group, but that does not give us permission to treat people as though they conform to some stereotyped image of “white,” “gay,” or “Latino.” We seek a community where various cultures and ethnicity are valued and acknowledged, but where each individual has the opportunity to find her or his own path.

At the same time, we should recognize that not everyone faces the same consequences for their differences. The experience of an Asian American student on our campus is not the same as that of an African American student or a white woman or a person with a disability. We should not forget that issues of difference are inextricably intertwined with issues of power, opportunity, and the specific histories of groups and of each individual. As we pursue a pluralistic campus, we should realize that equality will require effort, resources, and commitment to both structural change and education. We must learn to see difference differently. The multicolored skein that would be a multicultural university has to be woven together, becoming a tapestry, with each thread retaining its unique character while part of a larger design.

The Challenge of Change

It is important not to delude ourselves. Institutions do not change quickly and easily any more than do the societies of which they are a part. Achieving our democratic goals of equity and justice for all often requires intense struggle, and we remain far from our goals as a nation. In confronting the issues of racial and ethnic inequality in America we are probing one of the most painful wounds of American history.

Throughout the latter half of the 20th Century, progress towards greater racial equity in our society and our social institutions has been made, in part, through policies and programs that recognize race as an explicit characteristic. For some time, universities with highly selective admissions have used race as one of several factors (e.g., special athletic, artistic, scientific

or leadership talent, or geographic origin; status as children of alumni; or unique qualities of character or experience) in determining which students to admit to their institutions. Special financial aid programs have been developed to address the economic disadvantages faced by underrepresented minority groups. Minority faculty and staff have been identified and recruited through targeted programs.

Yet, despite its utility, the use of race as an explicit factor in efforts to achieve diversity or address inequities is being challenged with great force through popular referenda, legislation, and by the courts. For example, actions taken in several states now prohibit the consideration of race in college admissions. In such instances, it is sometimes suggested that other approaches such as admitting a certain fraction of high school graduates or using family income could be used to achieve the same diversity objectives. Yet, the available evidence suggests such alternatives may not suffice. Income based strategies are unlikely to be good substitutes for race-sensitive admissions policies because there are simply too few Black and Latino students from poor families who have strong enough academic preparation to qualify for admission to highly selective institutions. Furthermore, standardized admissions tests such as the SAT, ACT and LSAT are of limited value in evaluating “merit” or determining admissions qualifications of all students, but particularly for underrepresented minorities for whom systematic influences make these tests even less diagnostic of their scholastic potential. There is extensive empirical data indicating that experiences tied to one’s racial and ethnic identity can artificially depress standardized test performance.

Hence, progress toward diversity will likely require some significant changes in strategy in the years ahead. Unfortunately, the road we have to travel is neither frequently walked nor well marked. We can look to very few truly diverse institutions in American society for guidance. We will have to blaze new trails, and create new social models.

At Michigan we saw that we needed both a commitment and a plan to achieve diversity. We took the long view, one that required patient and persistent leadership, as well as the commitment and hard work of people throughout our community and beyond.

The Michigan Mandate

It may be useful to consider the University of Michigan's experience in its effort to achieve diversity because it led to measurable progress and because, since it happened on my watch, I can describe some of the victories and pitfalls that occurred along the way. Like most of higher education, the history of diversity at Michigan has been complex and often contradictory. There have been too many times when the institution seems to take a step forward, only to be followed by two steps backward. Nonetheless, access and equality have always been a central goal of our institution. We are proud that the University has consistently been at the forefront of the struggle for inclusiveness in higher education.

From our earliest beginnings in 1817, the University of Michigan focused on making a university education available to all economic classes. This ideal was stated clearly by an early Michigan president, James Angell, when he said the goal of the University was "to provide an uncommon education for the common man." At our founding, we attracted students from a broad range of European ethnic backgrounds. In the early 1800s, the population of the state swelled with new immigrants from the rest of the country and across the European continent. By 1860, the Regents referred "with partiality," to the "list of foreign students drawn thither from every section of our country." Forty-six percent of our students then came from other states and foreign countries. Today more than one hundred nations are represented at Michigan.

The first African American students arrived on our campus in 1868. In the years after Reconstruction, however, discrimination increased. Black students joined together to support each other early in the century and staged restaurant protests in the 1920s. It was not until the 1960s that racial unrest finally exploded into campus-wide concerted action. Although the University had made efforts to become a more diverse institution, both black and white students, frustrated by the slow movement, organized into the first Black Action Movement (BAM) in 1970. The central administration building was occupied, and students boycotted classes. Many positive advances came from this outpouring of student solidarity. The number of African American

faculty and students on campus increased; new goals and programs were established and old programs were funded. Yet only a few years later, enrollments began to fall again and funding waned. By the early 1980's, black enrollment began to increase but still fell short of the goals set a decade before.

It would take two more student uprisings (BAM II and III), several disturbing racial incidents, negative national media attention, mediation with Jesse Jackson, and powerful legislative political pressure before the University again took a systematic look at the difficult problems of race on campus. To put it mildly, it was a time of ferment built on the Michigan tradition of activism. In this instance, our students recalled us to our commitment and held us to our promises.

Demands for change came not only from black students. These protests were joined by Latino students, who had been involved in the BAM struggles from the beginning, but now raised their voices as a separate group to demand greater visibility and attention to their agenda.

The University had a disappointing record with respect to Native Americans, and they also began to protest as well. Ironically, in 1817 local tribes ceded 1,920 acres of land to the Northwest Territory to establish the "University of Michigania." Yet the Native American enrollments remained quite low, less than 0.5 percent, throughout most of the University's history.

Michigan's record is somewhat better with respect to inclusion of Asian and Asian Americans. Historically, the University played a major role in expanding the opportunities for students from Asia. In the late 1800s, Michigan became one of the first universities to admit foreign Asian students. It was the first university in the United States to award a doctoral degree to a Japanese citizen. Michigan eventually became a major center for Asian education. In recent years, the number of Asian American students has grown more quickly than any other group, and during the protests of the 1980s Asian Americans also made their voices heard.

By the late 1980s it had become obvious that the University had made inadequate progress in its goal to reflect the rich diversity of our nation and our world among its faculty, students and staff. As we learned from our minority and female constituencies, simply providing access to our institution was not



Increasing activism concerning UM racial diversity

sufficient to provide full opportunity for those groups that continued to suffer from social, cultural, and economic discrimination in our society. People from underrepresented groups who did manage to find their way here faced serious barriers to their success and advancement in a University (and national) culture still largely dominated by a white, male majority.

We also faced a particular challenge because of our geographic location. As a state university, we draw roughly two-thirds of our undergraduates from Michigan, with almost one-half of these from the metropolitan Detroit area. Unfortunately, Michigan ranks among the top four states in the nation in the degree of black/white school segregation: 82 percent of black students attend schools in all black school districts, while more than 90 percent of white students attend schools with a black enrollment of less than 10 percent. Furthermore, Detroit is the second most segregated metropolitan area in the country (following only Gary, Indiana), and the rates of residential segregation in Detroit were higher in 1990 than in 1960. Many suburban communities on the borders of Detroit have remained almost completely white despite their proximity to adjoining minority-dominated city neighborhoods. Drawing a significant fraction of our undergraduate enrollment from such a racially segregated environment presented a particularly serious challenge and responsibility for the University.

To address these challenges we knew that the University would have to change dramatically to achieve diversity. Our first step was to convene a group of faculty with direct experience in organizational change and multicultural environments. We drew upon the expertise of faculty from the social sciences, management, law, and social work along with selected administrators. We wanted a free-wheeling, sky's-the-limit planning group. It took more than a year of intense discussion and study to arrive at the first outline of goals and a plan for increasing diversity, which was announced in 1987. Based on the experience of other strategic planning efforts, we knew that the plan would need to be strategic and long term, leaving operational details to be developed through extensive consultations. The plan was really only a road map. It set out a direction and pointed to a destination. It offered incentives for achieving goals but disbursed

responsibility authority and accountability for many of the specific steps to be taken by individual academic and administrative units. As the plan evolved, we took care to retain the difficult but essential requirements of community building and pluralism.

It was also essential to engage as many of our constituents as possible in a dialogue about the plan's goals and strategies with the hope of gradually building widespread understanding and support inside and beyond our campus. Early drafts of the plan, in outline form and expressed in general terms, were circulated to ever widening circles of administration and faculty, and their useful comments were incorporated. The plan evolved daily and was seen as organic and evolving in such a way as to facilitate open exchange of views. The challenge was to construct a process that would engage the various constituencies of the institution, reflecting in the plan's text their ideas and experiences. The plan would provide the framework for a continuing dialogue about the very nature of the institution. In this sense, we wanted to engage in a dynamic process rather than delivering commandments from on high.

Over the first two years, hundreds of discussions with groups both on and off campus were held. We reached out to alumni, donors, and civic and political leaders and groups and met with countless student faculty and staff groups. Great care was taken to convey the same message to everyone as a means of establishing credibility and building trust among all constituencies. Meetings were sometimes contentious, often enlightening, but rarely acrimonious. Gradually understanding increased and support grew. Although the plan itself came from the administration, it would be individuals and units that would devise most of the detailed plans for carrying it forward. University publications, administrators' speeches and meetings, Faculty Senate deliberations, all carried the message: Diversity would become the cornerstone in the University's efforts to achieve excellence in teaching, research, and service in the multicultural nation and world in which it would exist.

The initial planning process and early promulgation of the diversity initiative began when I served as University Provost with the full support of then President Harold Shapiro. When I was named to succeed him in 1987, I seized every opportunity to reiterate my



Charles Moody



Mark Chesler



Harold Johnson



John D'Arms



Niara Sudarkasa



Joseph White



Rhetaugh Dumas



Charles Vest



Shirley Clarkson

three strategic goals: Make Michigan a national leader in achieving diversity, internationalizing education and research, and building a knowledge infrastructure for a twenty-first century learning institution. I wanted to leave no doubt about what our priorities should be in the years ahead.

It was the long-term strategic focus of our planning that proved to be critical because institutions do not change quickly and easily any more than do the societies of which they are a part. It is easy to falter, to become discouraged or distracted. The University would have to leave behind many reactive and uncoordinated efforts that had characterized its past and move toward a more strategic approach designed to achieve long-term systemic change. Sacrifices would be necessary as traditional roles and privileges were challenged. In particular, we foresaw the limitations of focusing only on affirmative action; that is, on access, retention, and representation. We believed that without deeper, more fundamental institutional change these efforts by themselves would inevitably fail—as they had throughout the 1970s and 1980s.

The plan would have to build on the best that we already had. The challenge was to persuade the community that there was a real stake for everyone in seizing this moment to chart a more diverse future. More people needed to believe that the gains to be achieved through diversity would more than compensate for the necessary sacrifices. The first and vital step was to link diversity and excellence as the two most compelling goals before the institution, recognizing that these goals were not only complementary but would be tightly linked in the multicultural society characterizing our nation and the world in the future. As we moved ahead, we began to refer to the plan as *The Michigan Mandate: A Strategic Linking of Academic Excellence and Social Diversity*. But it continued to be modified as discussions broadened and experience was gained.

The early steps in developing the Michigan Mandate were to: 1) develop a carefully designed strategic process for achieving, using, and valuing diversity; 2) achieve a community strongly committed in philosophy to our goals and objectives; and 3) allocate the necessary resources to accomplish this task. Based on strategic models from other spheres, the plan featured clear, concise, and simple goals; proposed specific actions

and evaluation mechanisms; and reflected extensive interaction with and direct comment from a variety of constituencies and individuals to assure responsiveness of the plan.

The mission and goals of the Michigan Mandate were stated quite simply:

Philosophy: To recognize that diversity and excellence are complementary and compelling goals for the University and to make a firm commitment to their achievement.

Representation: To commit to the recruitment, support, and success of members of historically underrepresented groups among our students, faculty, staff, and leadership.

Environment: To build on our campus an environment that seeks, nourishes, and sustains diversity and pluralism and that values and respects the dignity and worth of every individual.

Associated with these general goals were more specific objectives:

Faculty recruitment and development: To substantially increase the number of tenure-track faculty in each underrepresented minority group; to increase the success of minority faculty in the achievement of professional fulfillment, promotion, and tenure; to increase the number of underrepresented minority faculty in leadership positions.

Student recruitment, achievement, and outreach: To achieve increases in the number of entering underrepresented minority students as well as in total underrepresented minority enrollment; to establish and achieve specific minority enrollment targets in all schools and colleges; to increase minority graduation rates; to develop new programs to attract back to campus minority students who have withdrawn from our academic programs; to design new and strengthen existing outreach programs that have demonstrable impact on the pool of minority applicants to undergraduate, graduate, and professional programs.

Staff recruitment and development: To focus on the achievement of affirmative action goals in all job categories; to increase the number of underrepresented minorities in key University leadership positions; to

strengthen support systems and services for minority staff.

Improving the environment for diversity: To foster a culturally diverse environment; to significantly reduce the number of incidents of racism and prejudice on campus; to increase community-wide commitment to diversity and involvement in diversity initiatives among students, faculty, and staff; to broaden the base of diversity initiatives; to assure the compatibility of University policies, procedures, and practice with the goal of a multicultural community; to improve communications and interactions with and among all groups; and to provide more opportunities for minorities to communicate their needs and experiences and to contribute directly to the change process.

A series of carefully focused strategic actions was developed to move the University toward these objectives. These strategic actions were framed by the values and traditions of the University, an understanding of our unique culture characterized by a high degree of faculty and unit freedom and autonomy, and animated by a highly competitive and entrepreneurial spirit.

The first phase of the Michigan Mandate from 1987 to 1990 was focused on the issue of increasing the representation of minority groups within the University community. Primarily our approach was based on providing incentives to reward success, encouragement of research and evaluation of new initiatives, and support for wide-ranging experiments. The plan very emphatically did not specify numerical targets, quotas, or specific rates of increase to be attained.

To cite just one highly successful example, we established what we called the Target of Opportunity Program aimed at increasing the number of minority faculty at all ranks. Traditionally, university faculties have been driven by a concern for academic specialization within their respective disciplines. This is fundamentally laudable and certainly has fostered the exceptional strength and disciplinary character that we see in universities across the country; however, it also can be constraining. Too often in recent years the University had seen faculty searches that were literally "replacement" searches rather than "enhancement" searches. To achieve the goals of the Michigan Mandate, the University had to free itself from the constraints of this traditional perspective. Therefore, the central

administration sent out the following message to the academic units: be vigorous and creative in identifying minority teachers/scholars who can enrich the activities of your unit. Do not be limited by concerns relating to narrow specialization; do not be concerned about the availability of a faculty slot within the unit. The principal criterion for the recruitment of a minority faculty member is whether the individual can enhance the department. If so, resources will be made available to recruit that person to the University of Michigan.

From the outset, we anticipated that there would be many mistakes in the early stages. There would be setbacks and disappointments. The important point was to make a commitment for the long range and not be distracted from this vision. This long-range viewpoint was especially important in facing up to many ongoing pressures, demands, and demonstrations presented by one special interest group or another or to take a particular stance on a narrow issue or agenda. This was very difficult at times as one issue or another each became a litmus test of university commitment for internal and external interest groups. While these pressures were understandable and probably inevitable, the plan would succeed only if the University leadership insisted on operating at a long-term strategic rather than on a short-term reactive level. It was essential to keep our eyes firmly focused on the prize ahead resisting the temptation to react to every issue that arose. Commitment and support within and outside the University community were necessary ingredients for success, but as the University had learned over the past two decades, it would take more than this to succeed. It was essential to have a strategy, a plan designed to guide institutional change.

Over the next several years, through this and many other programs, the diversity of the campus changed dramatically, with the numbers of underrepresented minority students and faculty members roughly doubling. But increasing the numbers was the relatively easy part of the plan. Institutions can have a great many different people living in the same locale, working side-by-side, going to the same classes, but that will not mean that one has a community. Just increasing the numbers and mix of people will not provide one with a sense of mutual respect and a cohesive community. To achieve this, the University faced the challenge of creating a

Student Access and Success

Undergraduate Student Access

- Wade McCree Incentive Scholarship
- King/Chavez/Parks Program
- Summer programs (e.g., DAPCEP)
- College Day visitation for families
- Tuition grants to all Native American students from Michigan.

Special Undergraduate Programs

- Undergraduate Research Opportunity Program
- 21st Century Program
- CRLT Programs
- Leadership 2017
- Office of Academic Multicultural Initiatives

Graduate Student Support

- Fully funding minority graduate support
- Rackham Graduate Merit Fellowship Program

Special Programs

- Tapped grass-roots creativity and energy using \$1 M/y Presidential Initiatives Funds for competitive proposals from faculty and student groups.

Results

Enrollments:

- 83% increase in students of color (to 28%)
- 90% increase in underrep min (to 15%)
- 57% increase in AA (to 2,715 or 9.1%)
- 126% increase of Latinos (to 4.3%)
- 100% increase in Native Americans (to 1.1%)

Graduation rates for African Americans highest among public universities.

UM ranked 27th in nation in minority BA/BS

8th for M.S. degrees, 7th for PhD degrees

1st in African American PhDs (non HBCU's)

Graduate education

- Increased minority fellowships by 118%
- Of 734 Rackham Fellows in 1994,
- 51% were African American,
- 29% were Latino

Professional Schools:

Business: 12% AA, 28% color

Medicine: 11% AA, 39% color

Law: 10% AA, 21% color

Faculty

Target of Opportunity Program

Faculty Development (Faculty Awards Program for minority faculty)

Cluster hiring

Creating a welcoming and supportive culture (networks, centers, surveys)

Enlarging candidate pool by increasing PhD enrollments

Results

+62% for African Americans (128)

+117% for Latinos (52)

+75% for Native Americans (7)

Senior academic leadership (URM): from 14 to 25

Staff

Demanded accountability in hiring and promotion

Human Resources and Affirmative Action programs

Consultation and Conciliation Services

Results

Top managers: +100% (to 10% of management)

P&A: +80 (from 449 to 816)

More Generally

Building University-wide commitments

Office of Minority Affairs, Vice-Provost for Minority Affairs

Demanding accountability

Included in compensation review

Included in budget review

Included in appointment review

Leadership

Half of Executive Officers were African American

Executive VP Medical Center (Rita Dumas)

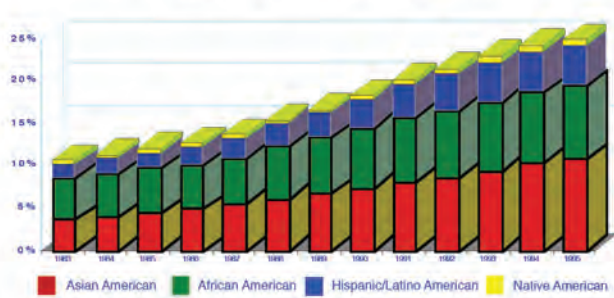
Secretary of University (Harold Johnson)

VP Research (Homer Neal)

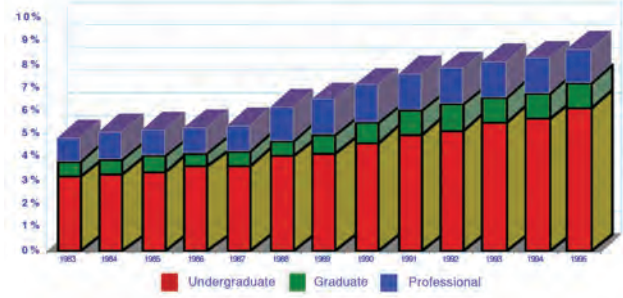
UM Flint Chancellor Charlie Nelms

UM Dearborn Chancellor James Renick

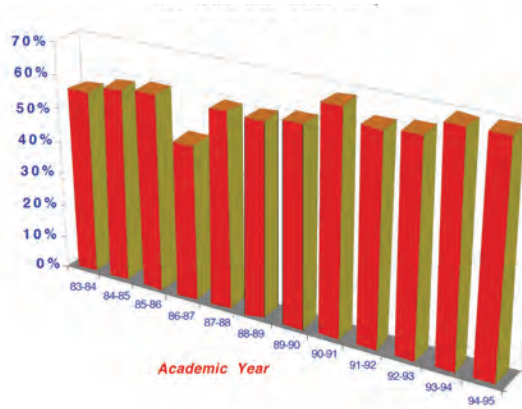
JJD's Successor was African American (Homer Neal)



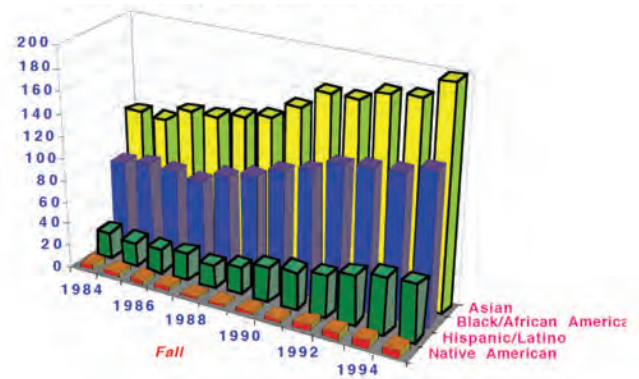
Minority student enrollments (percentages)



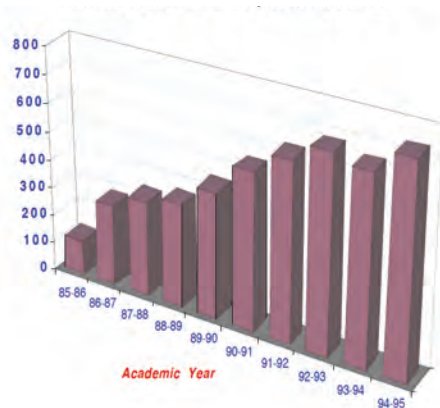
African-American student enrollments (percentages)



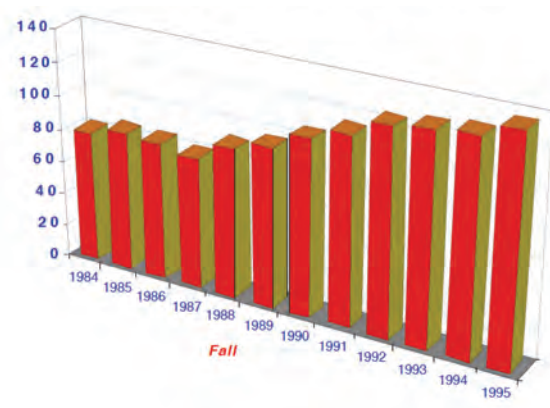
Graduation rates of African-American student cohorts six years after initial entry



Number of minority tenured and tenure-track faculty



Number of university minority graduate fellowships



Number of African-American faculty



The Michigan Mandate: MLK Day Unity March, addressing student and alumni groups, Professor Bunyon Bryant, Professor Charles Moody (with President Ford), Dean Rhetaugh Dumas, Associate Vice Provost Lester Monts, toasting the heros of the successful Michigan Mandate.

new kind of community—a community that drew on the unique strengths and talents and experiences of all of its members. And this was felt to be the important challenge of the second phase of the Michigan Mandate. More specifically, it was recognized that the traditional institutions of our society—our communities and neighborhoods, our churches and public schools, our business and commerce—all had failed to create a sense of community or to provide the models for creative interactions that were needed to build a new kind of society based on a general mutual dependence, trust, and respect. It was recognized that in America today it is on our college campuses that many students come together for the first time with students of other races nationalities, and cultures in an environment in which they are expected to live, work, and learn together.

It was therefore not surprising that in our existing university structure there was a good deal of tension and frequent separatism among groups. It may take more than one generation to ease this situation.

By 1995 Michigan could point to significant progress in achieving diversity. By every measure, the Michigan Mandate was a remarkable success, moving the University far beyond our original goals of a more diverse campus. The representation of underrepresented students, faculty, and staff more than doubled over the decade of the effort. But, perhaps even more significantly, the success of underrepresented minorities at the University improved even more remarkably, with graduation rates rising to highest among public universities, promotion and tenure success of minority faculty members becoming

comparable to their majority colleagues, and a growing number of appointments of minorities to leadership positions in the University. The campus climate not only became far more accepting and supportive of diversity, but students and faculty began to come to Michigan because of its growing reputation for a diverse campus. And, perhaps most significantly, as the campus became more racially and ethnically diverse, the quality of the students, faculty, and academic programs of the University increased to their highest level in history. This latter fact seemed to reinforce our contention that the aspirations of diversity and excellence were not only compatible but, in fact, highly correlated.

In conclusion, while the Michigan Mandate has been a success, it should be made clear that no plan, no commitment, no goal, and no action could have brought us to this point, without the help and support of literally thousands of faculty, students, staff, alumni, and supporters. They are the ones who made change possible, and they continue to work for it today.

Michigan is always a work in progress.

The Michigan Agenda for Women

While we pursued the goals of the Michigan Mandate, we could not ignore another glaring inequity in campus life. If we meant to embrace diversity in its full meaning, we had to attend to the long-standing concerns of women faculty, students, and staff. We had not succeeded in including and empowering women as full and equal partners in all aspects of the life and leadership of the University despite many promises and continuing struggle.

Michigan takes pride in the fact that it was one of the first large universities in America to admit women. At the time, the rest of the nation looked on with a critical eye. Many were certain that the "experiment" would fail. The first women who arrived in 1870 were true pioneers, the objects of intense scrutiny and resentment. For many years, women had separate and unequal access to facilities and organizations. Yet, in the remaining years of the nineteenth century, the University of Michigan provided strong leadership for the nation. By 1898 the enrollment of women had increased to the point where they received 53 percent of Michigan's undergraduate degrees.

These impressive gains were lost during the early part of the twentieth century and even more with the returning veterans after World War II. The representation of women in the student body declined precipitously. It only began to climb again during the 1970s and 1980s and, for the first time in almost a century, once again exceeded that of men in 1996. During the past several decades, the University took a number of steps to recruit, promote, and support women staff and faculty, modifying University policies to reflect their needs. Yet true equality came slowly and great challenges remained.

The Challenges

In faculty hiring and retention, despite the increasing pools of women in many fields, the number of new hires of women had changed only slowly during the late twentieth century in most research universities. In some disciplines such as the physical sciences and engineering, the shortages were particularly acute. We also continued to suffer from the "glass ceiling" phenomenon, that is, because of hidden prejudice women were unable to break through to the ranks of senior faculty and administrators though no formal constraints prohibited their advancement. The proportion of women decreased steadily as one moved up the academic ladder. Additionally, there appeared to be an increasing tendency to hire women off the tenure track as postdoctoral scholars, lecturers, clinicians, or research scientists. The rigid division among various faculty tracks offered little or no opportunity for these women to move onto tenure tracks.

Retention of women faculty was also a serious concern. Studies suggested that women were less likely than men either to be reviewed for promotion or recommended for promotion at the critical step between assistant professors and associate professors. Women faculty, like men, came to the University to be scholars and teachers. Yet because of their inadequate representation in our institutions, our women faculty were clearly stretched far too thinly by committee responsibilities and mentoring roles. While this was true for women faculty at all ranks, it took the greatest toll on junior faculty.

The period of greatest vulnerability in promotion



Listening, learning, planning, and selling the Michigan Agenda for Women

and retention of women is in the early stage in their academic careers, when they are assistant professors attempting to achieve tenure. Women faculty experienced greater demands for committee service and mentoring of women students; inadequate recognition of and support for dependent care responsibilities; and limited support in the form of mentors, collaborators, and role models. The small number of women at senior levels was due in part to early attrition in the junior ranks. Women faculty at all ranks described their difficulties in juggling teaching, research, formal and informal advising, departmental and University-wide committee service, and family responsibilities. Many female faculty did not feel that these difficulties arose from overt or systematic discrimination, but rather from the interaction between a system that was becoming increasingly demanding and competitive and their personal lives, which were often more complex than

those of their male colleagues because of dependent care responsibilities.

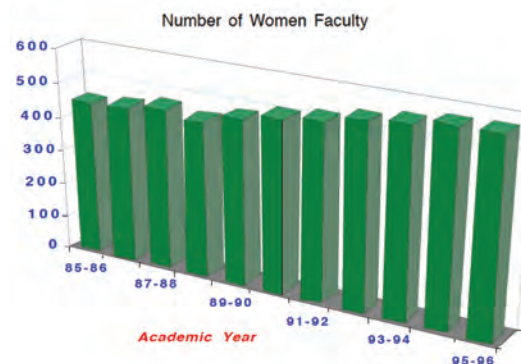
While the low participation of women in senior faculty ranks and among the University leadership was due in part to the pipeline effect of inadequate numbers of women at lower ranks, this absence of senior women was also due to the degree to which senior men faculty and administrators set the rules and perform the evaluations in a way—whether overt or unintended—that was biased against women. Old-boy networks, customs, and habits abounded. Women felt that in order to succeed, they had to play by the rules previously set up by the men in their fields. As one of our women faculty members put it, “My profession is male-oriented and very egalitarian. The men are willing to treat everyone the same as long as you act like a man.”

At the same time, we faced serious challenges in the

staff area. There was a concern that in higher education, we simply did not do an adequate job of placing women in the key staff positions to get them ready for senior assignments. Women were not provided with adequate stepping stones to senior management, and many believed they were all too frequently used as stepping stones for others. We also needed to rethink our philosophy of staff benefits. There was a need to move to more flexible benefits plans that could be tailored to the employee's particular situation (e.g., childcare in addition to dependent health care). Furthermore, we needed to aim at providing equal benefits for equal work that were independent of gender.

Many of our concerns derived from the extreme concentration of women in positions of lower status and power—as students, lower level staff, and junior faculty. The most effective lever for change might well be a rapid increase in the number of women holding positions of high status, visibility, and power. This would not only change the balance of power in decision-making, but it would also change the perception of who and what matters in the university. Finally we needed to bring university policies and practices into better alignment with the needs and concerns of women students in a number of areas including campus safety, student housing, student life, financial aid, and childcare.

Over the longer term it was essential that we draw more women into senior faculty and leadership roles if we were to be able to attract top women students. We also needed to do more to encourage and support women in fields of study where they had been discouraged from entering for decades. Our colleges and universities were far from where they should be—from where they must be—in becoming institutions that provided the full array of opportunities and support for women faculty, students, and staff. Despite the efforts of many committed women and men over the past several decades, progress had been slow and frustrating. Women deserved to be full members and equal partners in the life of our universities. While most women faculty, students, and staff succeeded admirably in a variety of roles within higher education, they nonetheless struggled against subtle pressures, discrimination, and a still-common feeling of invisibility. Removing barriers and encouraging women's participation in the full array of university



Number of women faculty

activities would transform the University, creating a community in which women and men shared equal freedom, partnership, and responsibility.

The Plan

It was clear in the 1990s that our university had simply not made sufficient progress in providing women with access to the full range of opportunities and activities in the institution. Not that we ignored these issues. Hundreds of dedicated members of the University community, women and men, had worked long and hard for women's equity. But our actions, while motivated by the best of intentions, had been ad hoc, lacking in coherence and precise goals and strategy, too independent of one another, and providing no assurance of progress or accountability for falling short. Here again we knew Michigan needed a bold strategic plan with firm goals for recruiting and advancing women at every level and in every arena. Programs could be tested against these goals, and our progress could be accurately measured and shared with the broader University community.

To this end, the University developed and executed a strategic effort known as the Michigan Agenda for Women. While the actions proposed were intended to address the concerns of women students, faculty, and staff, many of them benefited men as well. Just as the Michigan Agenda required a commitment from the entire University community, so too did its success benefit us all, regardless of gender.

In developing the Agenda we knew that different strategies were necessary for different parts of the



A quilt assembled from student T-shirts reflecting the University's diversity in 1998 presented by student government to the Duderstadts.

University. Academic units varied enormously in the degree to which women participated as faculty, staff, and students. What might work in one area could fail miserably in another. Some fields, such as the physical sciences, had few women represented among their students and faculty. For them, it was necessary to design and implement a strategy which spanned the entire pipeline, from K-12 outreach to undergraduate and graduate education, to faculty recruiting and development. For others such as the social sciences or law, there already was a strong pool of women students, and the challenge became one of attracting women from this pool into graduate and professional studies and eventually into academe. Still other units such as Education and many departments in humanities and sciences had strong participation of women among students and junior faculty, but suffered from low participation in the senior ranks.

There also was considerable variation among non-academic administrative areas of the University, with many having little or no tradition of women in key management positions. To accommodate this variation, each unit was asked to develop and submit a specific

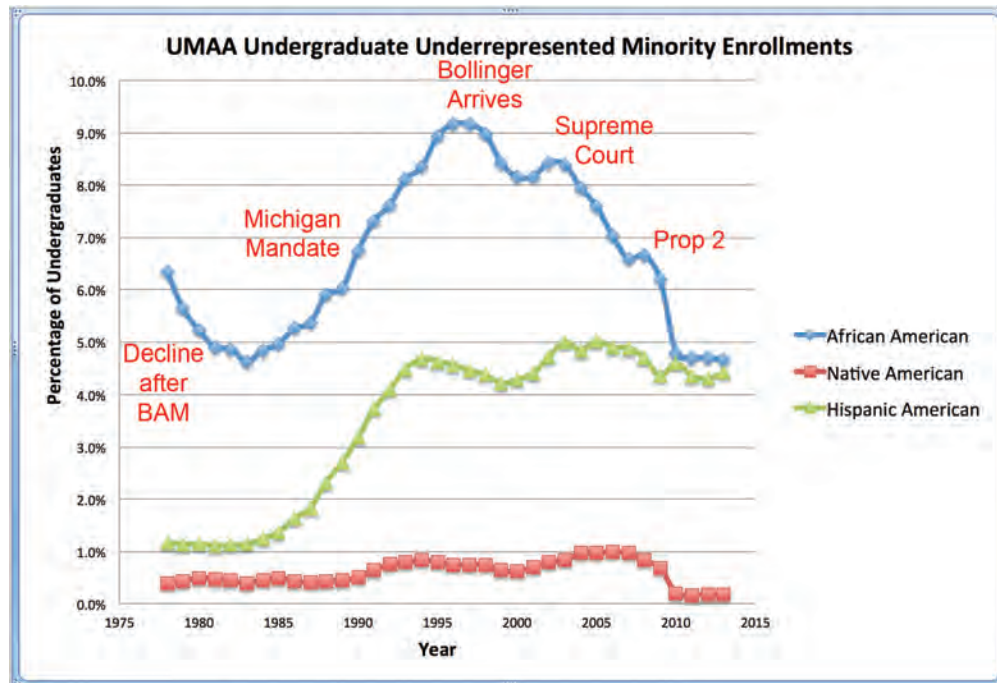
plan for addressing the inclusion of women. These plans were reviewed centrally, and the progress of each unit was then measured against their plan each year, as part of the normal interaction associated with budget discussions. The challenge here was to create a process that both permitted central initiative and preserved the potential for local development of unit-specific action plans. The Michigan Agenda for Women aimed at building a working and learning environment in which women could participate to their fullest. This plan represented a beginning, the sketch of a vision and a plan that would evolve over time as it was shaped through the interaction with broader elements of the University community.

Considerable progress has been made in the years since the Agenda for Women was proposed. More than half of the students in professional schools are now women. Women now serve in key administrative, executive, and management roles. These advances are the foundation for continued progress until full equity is achieved.

2000s

But, of course, this story does not end with the successful achievements of the Michigan Mandate in 1996 when a new president arrived. Beginning first with litigation in Texas (the Hopwood decision) and then successful referendum efforts in California and Washington, conservative groups such as the Center for Individual Rights began to attack policies such as the use of race in college admissions. Perhaps because of Michigan's success with the Michigan Mandate, the University soon became a target for those groups seeking to reverse affirmative action with two cases filed against the University in 1997, one challenging the admissions policies of undergraduates, and the second challenging those in our Law School.

Even as the Bollinger administration launched the expensive legal battle to defend the use of race in college admissions, it discontinued most of the effective policies and programs created by the Michigan Mandate, in part out of concern these might complicate the litigation battle, but also because such action was no longer a priority of the new administration. Indeed, even the mention of the Michigan Mandate became a



The decline and fall of UM's racial diversity with a new administration in the late 1990s.

forbidden phrase in its effort to erase the past.

Largely as a consequence, the enrollment of underrepresented minorities began almost immediately to drop at Michigan, eventually declining from 1997 to 2010 by over 50% for African American students overall and by as much as 80% in some of UM's professional schools. In 1996 half (5) of the Executive Officers were minority, but by the early 2000s, only one out of 11 executive officers and one out of 18 deans in the new administration were underrepresented minorities.

Although the 2003 Supreme Court decisions were split, supporting the use of race in the admissions policies of our Law School and opposing the formula-based approach used for undergraduate admissions, the most important ruling in both cases stated, in the words of the court: "Student body diversity is a compelling state interest that can justify the use of race in university admission. When race-based action is necessary to further a compelling governmental interest, such action does not violate the constitutional guarantee of equal protection so long as the narrow-tailoring requirement is also satisfied." Hence, the Supreme Court decisions on the Michigan cases reaffirmed those policies and practices long used by most selective colleges and universities throughout the United States. But more significantly, it reaffirmed both the importance of

diversity in higher education and established the principle that, appropriately designed, race could be used as a factor in programs aimed at achieving diverse campuses. Hence the battle was won, the principle was firmly established by the highest court of the land. We had won. Or so we thought...

While an important battle had been won with the Supreme Court ruling, we soon learned that the war for diversity in higher education was far from over. As university lawyers across the nation began to ponder over the court ruling, they persuaded their institutions to accept a very narrow interpretation of the Supreme Court decisions as the safest course. Actually, this pattern began to appear at the University of Michigan during the early stages of the litigation process. Although the Supreme Court decision supported the use of affirmative action (if "narrowly tailored"), many universities began to back away from programs aimed at recruitment, financial aid, and academic enrichment for minority undergraduate students, either eliminating entirely such programs or opening them up to non-minority students from low-income households. Threats of further litigation by conservative groups have intensified this retrenchment.

After the years of effort in building successful programs such as the Michigan Mandate and defending

the importance of diversity in higher education all the way to the Supreme Court, the tentative nature of the decision (“narrowly tailored race considerations”) probably caused more harm than good by unleashing the lawyers on our campuses to block successful efforts to broaden educational opportunity and advance the cause of social justice. Ironically, the uses of affirmative action (and programs that involved racial preference) actually were not high on the agenda of the Michigan Mandate. Rather our success involved commitment, engagement, and accountability for results.

Minority enrollments continued to decline at Michigan throughout the 2010s as the new priority became attracting large numbers of wealthy out-of-state students capable of paying high tuition and generating the revenue to compensate for the loss of state support. No effort was made to resume those programs that had been so successful in the 1990s under the Michigan Mandate. As the charts above indicate, Michigan’s decline in diversity ranked among the most precipitous among its peers during this period.

In 2006, Michigan voters approved a constitutional referendum similar to that of California’s Proposition 209 to ban the use of affirmative action in public institutions. Although most of the decline in minority enrollments had occurred by this time, this referendum prevented Michigan colleges and universities from using even the narrowly tailored prescriptions of the 2003 Supreme Court decision, and the decline in the enrollments of underrepresented minority students, erasing most of the gains with the Michigan Mandate strategy in the 1990s and returning this measure of diversity to the levels of the 1960s. More specifically (as shown in several charts depicting the enrollments of underrepresented minorities over the past 40 years, total African American enrollments have dropped from a peak of 9.3% in 1996 to 4.8% in 2015, and the enrollments in key professional schools such as Medicine, Law, and Business dropped from 10%-12% to less than 3%.

While the constitutional ban on the use of affirmative action resulting from a public referendum in 2006 certainly hindered the recruiting of minority students, the most precipitous drop in enrollments began long before the state ban on affirmative action. It clearly began when a new administration halted all

of the programs of the Michigan Mandate, and then following the 2003 Supreme Court decision, when it throttled back pressures on the deans and directors on achieving diversity. While diversity was certainly given lip service during the 2000s through a massive public relations effort, it most assuredly was not given priority for specific action or strong accountability. Instead the priority was given to a rapid expansion of students from affluent backgrounds capable of paying the high tuition necessary to generate revenues to compensate for the loss of state support. The University set aside its long-standing priority of “providing a uncommon education for the common man”, instead attracting the “uncommonly rich” students, which had major impact on its economic diversity.

Economic Diversity

Throughout the last decade, there has been an increasing concern that many public universities, particularly flagship research universities such as Michigan, were also losing the economic diversity that characterized their public purpose. A 2010 report by the Education Trust, *Opportunity Adrift*, stated: “Founded to provide ‘an uncommon education for the common man’, many flagship universities have drifted away from their historic mission”. (Haycock, 2010) Analyzing measures such as access for low-income and underrepresented minority students and the relative success of these groups in earning diplomas, they found that the University of Michigan and the University of Indiana received the lowest overall marks for both progress and current performance among all major public universities in these measures of public purpose. For example, Michigan’s percentage of Pell Grant students in its freshman class (the most common measure of access for low-income students) has fallen to 11%, well below most other public universities including Michigan State (23%) and the University of California (32%); it even lags behind several of the most expensive private universities including Harvard, MIT, and Stanford. (Campbell, 2015)

Yet, another important measure of the degree to which public universities fulfill their important mission of providing educational opportunities to a broad range of society is the degree to which they enroll first

Change in Minority Enrollments

Minority	1996	2015	Change
African Am	2,824	1,801	-36%
Hispanic	1,473	2,018	+37%
Native Am	227	92	-60%
Underrep	4,524	3,921	-14%

Change in Minority Percentages

Minority	1996	2015	Change
African Am	9.3%	4.8%	-48%
Hispanic	4.5%	5.4%	+20%
Native Am	0.7%	0.25%	-64%
Asian Am	11.6%	13.5%	+13%
Underrep	14.1%	10.1%	-32%
Fresh Afric	9.3%	5.1%	-45%

The drop in underrepresented minorities
over the past 20 years.

generation college students. It is disturbing that today less than 6% of the University's enrollment consists of such students, compared to 16% by its public university peers and 14% of the enrollments of highly selective private universities.

Of comparable concern is the significant drop in enrollments of underrepresented minority students, dropping from 17% of undergraduates in 1996 (including 9.4% African American) to 10% in 2015 (4.4% African American). Once Michigan's professional schools were leaders in minority enrollments (with Medicine, Business, and Law at 12% African American enrollments in the 1990s); today they have fallen badly to levels of 5% or less. While the very recent decline may be attributable in part to the impact of the State of Michigan's Proposition 2 passed in 2007 that restricted the use of affirmative action, racial diversity on campus has actually been declining for well over a decade, suggesting more fundamental concerns about the University's commitment to diversity.

What was happening? To be sure, the State of Michigan ranks at the bottom of the states in the amount of need-based financial aid it provides to college students, requiring the University to make these commitments from its own internal funds. But it is also due to the decision made in the late 1990s to compensate

for the loss of state support by dramatically increasing enrollments with a bias toward out-of-state students who generate new revenues with high tuition. Clearly students who can pay annual tuition-room & board at the out-of-state rates of \$60,000 come from highly affluent families. Indeed, the average family income of Michigan undergraduates now exceeds \$150,000 per year, more characteristic of the "top 1%" than the "common man".

Lessons Learned

It seems appropriate to end this chapter on the University's public purpose with several conclusions: First, we must always keep in mind that the University of Michigan is a public university, created as the first such institution in a young nation, evolving in size, breadth, and quality, but always committed to a truly public purpose of "providing an uncommon education for the common man".

Today there is an even more urgent reason why the University must once again elevate diversity to a higher priority as it looks toward the future: the rapidly changing demographics of America. The populations of most developed nations in North America, Europe, and Asia are aging rapidly. In our nation today there are already more people over the age of 65 than teenagers, and this situation will continue for decades to come. Over the next decade the percentage of the population over 60 will grow to over 30% to 40% in the United States, and this aging population will increasingly shift social priorities to the needs and desires of the elderly (e.g., retirement security, health care, safety from crime and terrorism, and tax relief) rather than investing in the future through education and innovation.

However, the United States stands apart from the aging populations of Europe and Asia for one very important reason: our openness to immigration. In fact, over the past decade, immigration from Latin America and Asia contributed 53% of the growth in the United States population, exceeding that provided by births (National Information Center, 2006). This is expected to drive continued growth in our population from 300 million today to over 450 million by 2050, augmenting our aging population and stimulating productivity with new and young workers. As it has been so many

times in its past, America is once again becoming a nation of immigrants, benefiting greatly from their energy, talents, and hope, even as such mobility changes the ethnic character of our nation. By the year 2030 current projections suggest that approximately 40% of Americans will be members of minority groups; by mid-century we will cease to have any single majority ethnic group. By any measure, we are evolving rapidly into a truly multicultural society with a remarkable cultural, racial, and ethnic diversity. This demographic revolution is taking place within the context of the continuing globalization of the world's economy and society that requires Americans to interact with people from every country of the world.

The increasing diversity of the American population with respect to culture, race, ethnicity, and nationality is both one of our greatest strengths and most serious challenges as a nation. A diverse population gives us great vitality. However, the challenge of increasing diversity is complicated by social and economic factors. Today, far from evolving toward one America, our society continues to be hindered by the segregation and non-assimilation of minority and immigrant cultures. If we do not create a nation that mobilizes the talents of all of our citizens, we are destined for a diminished role in the global community and increased social turbulence. Higher education plays an important role both in identifying and developing this talent. And the University of Michigan faces once again a major challenge in reclaiming its leadership in building a diverse campus.

Yet there is ample evidence today from states such as California and Texas that a restriction to race-neutral policies will drastically limit the ability of elite programs and institutions to reflect diversity in any meaningful way. In fact, many of the approaches used by the University of California in the wake of Proposition 209 have been considered by Michigan. The UC reached out to low-performing high schools, making it possible for students achieving at top levels in these schools would not be penalized in admission decisions for the weaknesses of their schools. They changed its standardized test requirements to put primary emphasis on achievements tests rather than aptitude tests. They sought to look more carefully at applicants to identify those who had overcome serious

obstacles in preparing themselves for higher education. They worked with K-12 schools and community colleges to strengthen the preparation for under represented minority students. They launched a major effort to let students, parents, and counselors know about the opportunities UC provided in financial aid, broadened applications, and preparation for attendance.

Yet, as former UC President Richard Atkinson and his colleagues concluded, "Today if we look at enrollment overall, racial and ethnic diversity at the University of California is in great trouble. A decade later, the legacy of Proposition 209 is clear. Despite enormous efforts, we have failed badly to achieve the goal of a student body that encompasses California's diverse population. The evidence suggests that—without attention to race and ethnicity—this goal will ultimately recede into impossibility." Today the University of Michigan provides further evidence from the collapse of its minority enrollments of the difficulty of achieving a diverse campus in the wake of Proposal 2.

However, when one turns to economic diversity, the University of California provides a sharp contrast to the University of Michigan. Today 42% of all UC undergraduates receive Pell Grants, compared to 15% at UM. 46% of UC's entering California residents come from families where neither parent graduated from college, compared to 5% for UM. Approximately 25% of undergraduates come from underrepresented minority populations (African American, Chicano/Latino, and Native American) compared to 10% at UM (although this later comparison is due in part to the very large growth in the Latino population of California). Key to the UC's success is achieving this remarkable economic diversity have been two key factors: i) the important of the state's Cal Grant program providing need-based financial aid that essentially doubles the support of Pell Grant eligible students, and ii) a strategic relationship between California's community colleges and the University of California, carefully articulated in the California master plan, that enables their associated degrees to serve as stepping stones from secondary school into baccalaureate programs at UC. In sharp contrast, the State of Michigan during the 2000s eliminated ALL state need-based financial aid. Furthermore, the autonomy granted Michigan's community colleges allows them to focus more on providing more lucrative adult education

programs in their communities rather than serving as “junior colleges” to prepare students for admission to university programs.

To be sure, rising tuition levels in Michigan’s public universities have also been a factor. However this has not been the fault of higher education in the state, since there is strong evidence that the actual cost of its educational programs has increased only at the inflation rate. Instead, the real blame for the increasing costs seen by parents must fall on the State of Michigan, which has dramatically cut its support of higher education. In fact, a chart comparing state appropriations with University tuition and fees demonstrates that almost all of the increase in the costs faced by students and parents has been driven by the erosion of the state subsidy through appropriations. Hence restoring the University’s economic diversity will require action along several fronts:

Of highest immediate priority is restoring a significant need-based financial aid program at the state level capable of augmenting the modest Pell Grants received by low income students to enable them to attend college. Next, there needs to be serious effort to better define the mission of the state’s community colleges in preparing students for further university education and developing appropriate articulation agreements to support this transition. Finally, it is absolutely essential to the future of the State of Michigan and the welfare of its people that it begin to restore adequate support for higher education. Michigan’s ranking in the bottom 10% in its ranking of state support for higher education is not only embarrassing but also indicative of why the state’s economic performance today and in the future will similarly lag the rest of the nation.

Hence restoring the University’s diversity will require not only a serious restructuring of Michigan’s financial strategies, but even more important, a renewed commitment to the fundamental public purpose that has guided the University for almost two centuries. While the University of Michigan’s concerted effort to generate support from other patrons, particularly through private giving and sponsored research, it simply must realize that these will never be sufficient to support a world-class university of this size, breadth, or impact. Without substantial public support, it is unrealistic to expect that public universities can fulfill

their public purpose.

Hence the highest priority should be to re-engage with the people of Michigan to convince them of the importance of investing in public higher education and unleashing the constraints that prevent higher education from serving all of the people of this state. This must become a primary responsibility of not only the leadership of the University, but its Regents, faculty, students, staff, alumni, and those Michigan citizens who depend so heavily on the services provided by one of the great universities of the world.

Returning again to President Atkinson’s analysis, he suggests “We need a strategy that recognizes the continuing corrosive force of racial inequality but does not stop there. We need a strategy grounded in the broad American tradition of opportunity because opportunity is a value that Americans understand and support. We need a strategy that makes it clear that our society has a stake in ensuring that every American has an opportunity to succeed—and every American, in turn, has a stake in our society. Race still matters. Yet we need to move toward another kind of affirmative action, one in which the emphasis is on opportunity and the goal is educational equity in the broadest possible sense. The ultimate test of a democracy is its willingness to do whatever it takes to create the aristocracy of talent that Thomas Jefferson saw as indispensable to a free society. It is a test we cannot afford to fail.”

The Road Ahead

Perhaps we need a bolder approach, similar to that when in 1862 President Lincoln signed the Morrill Act to create the land-grant colleges to serve both the working class and build an industrial nation. Or perhaps better yet, when President Roosevelt signed the G.I. Bill in 1944 or President Johnson signed the Higher Education Act in 1965. In this spirit, then, consider the following three recommendations:

Learn Grants for the Millennium Generation

Many disadvantaged students (and parents) really do not see higher education as an option open to them, but rather as a privilege for the more affluent. As a result, these students do not have the incentive

to perform well in K-12 (nor do their parents have the incentive to support them), hence falling behind early or dropping out of the college-bound ranks. To provide strong incentives, the idea would be to provide EVERY student with a “529 college savings account”, a “Learn-Grant”, when they begin kindergarten. Although this account would be owned by the students, its funds could only be used for postsecondary education upon the successful completion of a high school college-preparatory program. Each year students (and their parents) would receive a statement of the accumulation in their account, with a reminder that this is their money, but it can only be used for their college education (or other postsecondary education). An initial contribution of, say, \$10,000 (say, a \$5,000 federal grant with a state \$5,000 match) would accumulate over their K-12 education to an amount that when coupled with other financial aid would likely be sufficient for their college education at a public college or university.

Beyond serving as an important source of financial aid, the Learn Grants would in themselves be a critical incentive for succeeding in K-12 and preparing for a college education. The program might be funded from any of a number of sources, e.g., from a federal plus state match, much of the federal revenue coming from the auction of the digital spectrum. Learn Grants would be provided to all students when entering K-12 (in order to earn broad political support) and could be augmented with additional contributions from public, private, or parental sources during their pre-college years. As to cost, if we assume roughly 4.5 million children enter K-12 each year (the estimate for 2010), then at \$10,000 per student, this would cost \$40 billion annually (\$20 billion each to the states and the federal government). While such a sum is, in fact, immense, it is about the cost of one year of K-12 education (or college education, on the average). It also should be compared to other public expenditures (Medicaid/Medicare, corrections, defense, and even student financial aid). From this broader perspective, it really doesn't seem excessive when viewed as an investment in the future of the nation.

Building a Society of Learning through a National Commitment to Lifelong Learning

The nation would commit itself to the goal of providing universal access to lifelong learning opportunities to all its citizens, thereby enabling participation in the world's most advanced knowledge and learning society. While the ability to take advantage of educational opportunity always depends on the need, aptitude, aspirations, and motivation of the student, it should not depend on one's socioeconomic status. Access to lifelong learning opportunities should be a CIVIL RIGHT for all rather than a privilege for the few if the nation is to achieve prosperity, security, and social well being in the global, knowledge- and value-based economy of the 21st century. Perhaps no other recommendation, if implemented, would drive a greater transformation in higher education in America, changing very dramatically whom it serves, how it is financed, and how it is provided. It would clearly transform higher education into a resource capable of serving a 21st century nation in a global, knowledge economy.

A Final Appeal to “Us”...the “Me” Generation

When we joined the University of Michigan community in the late 1960s, our parents' generation was in the final stages of a massive effort to provide educational opportunities for all Americans. Returning veterans funded through the GI bill had doubled college enrollments, particularly at large public universities such as Michigan. The post-WWII research strategy developed by the federal government was transforming flagship institutions such as Michigan into research universities responsible for most of the nation's basic research. The Truman Commission had proposed that all Americans should have the opportunity of a college education, and California responded with its Master Plan, which would expand the opportunities for providing “an uncommon education for the common man” at great public universities such as the University of Michigan.

Our nation—and, indeed, the world—benefited greatly from these efforts both to provide the educational opportunity and new knowledge necessary

for economic prosperity, social well being, and national security. We saw spectacular achievements such as sending men to the Moon, decoding the human genome, and, of course, creating the Internet and the digital age. Although our generation of baby boomers benefited greatly from the commitments of the “Greatest Generation”, our priorities in the 1960s lay elsewhere—protesting the war in Vietnam, fighting for civil rights, saving the environment, and, of course challenging the establishment.

Yet, fast-forwarding to today, fifty years later, our generation has clearly failed to embrace the commitments made by our parents to educational opportunity. The quality of our primary and secondary schools lags many other nations as K-12 teaching has been transformed into a blue-collar profession. Over the past decade, state support of our public universities has dropped by roughly 35%, with the University of Michigan regarded as the poster child as its state appropriations dropped from 80% of our academic budget in 1960 to less than 8% in 2015. Perhaps most telling of all, are the extraordinary inequities characterizing educational opportunity today. As one of our colleagues has put it: “If you are poor and smart, today you have only a one-in-ten chance of obtaining a college degree. In contrast, if you are dumb and rich, your odds rise to nine-in-ten!” Something has gone terribly wrong!

Both the tragedy and irony of this situation flows from the realization that today our world has entered a period of rapid and profound economic, social, and political transformation driven by knowledge and innovation. It has become increasingly apparent that the strength, prosperity, and welfare of region or nation in a global knowledge economy will demand a highly educated citizenry enabled by development of a strong system of education at all levels. It will also require institutions with the ability to discover new knowledge, develop innovative applications of these discoveries, and transfer them into the marketplace through entrepreneurial activities.

Now more than ever, people see education as their hope for leading meaningful and fulfilling lives. Just as a high school diploma became the passport to participation in the industrial age, today, a century later, a college education has become the requirement

for economic security in the age of knowledge. Furthermore, with the ever-expanding knowledge base of many fields, along with the longer life span and working careers of our aging population, the need for intellectual retooling will become even more significant. Even those with advanced degrees will soon find that their continued employability requires lifelong learning.

Education in America has been particularly responsive to the changing needs of society during early periods of major transformation, e.g., the transition from a frontier to an agrarian society, then to an industrial society, through the Cold War tensions, and to today’s global, knowledge-driven economy. As our society changed, so too did the necessary skills and knowledge of our citizens: from growing to making, from making to serving, from serving to creating, and today from creating to innovating. With each social transformation, an increasingly sophisticated world required a higher level of cognitive ability, from manual skills to knowledge management, analysis to synthesis, reductionism to the integration of knowledge, invention to research, and today innovation, and entrepreneurship.

So what can our generation do, the “me” generation—who as students protested during the 1960s and 1970s, demanded less government and lower taxes in the 1980s and 1990s, and today are embracing the “Let’s eat dessert first since life is uncertain!” attitude even while denying the impact that their way of life poses to future generations—to address these challenges, much as our parents and our ancestors did for us? Perhaps it is time as we enter our “golden years” that we finally step forward to accept a greater degree of generational responsibility for the educational opportunities that we provide our descendants. Perhaps it is time that we use our influence, our wisdom, and for many, our considerable wealth, to make our own bold commitments for the educational resources that will be needed by future generations.

Today a rapidly changing world demands a new level of knowledge, skills, and abilities on the part of our citizens. Just as in earlier critical moments in our nation’s history when its prosperity and security was achieved through broadening and enhancing educational opportunity, it is time once again to seek

a bold expansion of educational opportunity. But this time we should set as the goal providing all American citizens with universal access to lifelong learning opportunities, thereby enabling participation in the world's most advanced knowledge and learning society.

Let us suggest that perhaps it should be our generation's legacy to ensure that our nation accepts a responsibility as a democratic society to provide all of its citizens with the educational, learning, and training opportunities they need and deserve, throughout their lives, thereby enabling both individuals and the nation itself to prosper in an ever more competitive global economy. While the ability to take advantage of educational opportunity will always depend on the need, aptitude, aspirations, and motivation of the student, it should not depend on one's socioeconomic status. Access to lifelong learning opportunities should be a right for all rather than a privilege for the few if the nation is to achieve prosperity, security, and social well being in the global, knowledge- and value-based economy of the 21st century.

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Chapter 11

Intercollegiate Athletics

Most concerns about college sports today derive from the fact that the culture and values of intercollegiate athletics have drifted far away from the educational principles and values of their host universities. Today's athletic departments embrace commercial values driven by the perception that the primary purpose of athletic competition is mass entertainment. There is ample evidence that the detachment of intercollegiate athletics from the rest of the university—its mission and values, its policies and practices—has led to the exploitation of students and has damaged institutional reputation to an unacceptable degree.

While the defense of truth, justice, and the Michigan way in intercollegiate athletics was a necessary role for the president, it was never a very pleasant or easy one. Over time, it took its toll. But it also provided a vivid education concerning what I gradually came to view as one of the most serious threats to the contemporary American university: the extraordinary commercialization and corruption of big-time college sports.

Over four decades as a faculty member, provost, and president of the University of Michigan and a member and chair of the Council of Presidents of the Big Ten Conference have brought me to several conclusions.

First, while most of intercollegiate athletics are both valuable and appropriate activities for our universities, big-time college football and basketball stand apart, since they have clearly become commercial entertainment businesses. Today they have little if any relevance to the academic mission of the university. Furthermore, they are based on a culture, a set of values that, while perhaps appropriate for show business, are viewed as highly corrupt by the academy and deemed corrosive to our academic mission.

Second, while I believe that one can make a case for

relevance of college sports to our educational mission to the extent that they provide a participatory activity for our students, I can find no compelling reason why American universities should conduct intercollegiate athletics programs at the current highly commercialized, professionalized level of big-time college football and basketball simply for the entertainment of the American public, the financial benefit of coaches, athletic directors, conference commissioners, and NCAA executives, and the profit of television networks, sponsors, and sports apparel manufacturers.

If you think about it for a moment, you will realize there are only three reasons why a university would want to conduct big-time college sports: i) because it benefits the student-athletes; ii) because it benefits the university (reputation, community, revenue; and iii) because it benefits the larger community. It is my belief that big-time college football and basketball, as currently conducted, fail to meet any of these criteria.

Third, and most significantly, it is my growing conviction that big-time college sports do far more damage to the university, to its students and faculty, its leadership, its reputation and credibility, that most realize—or at least are willing to admit. The evidence seems overwhelming:

Far too many of our athletics programs exploit young people, recruiting them with the promise of a college education—or a lucrative professional career—only to have the majority of Division 1-A football and basketball players achieve neither.

Scandals in intercollegiate athletics have damaged the reputations of many of our colleges and universities.

Big time college football and basketball have put inappropriate pressure on university governance, as boosters, politicians, and the media attempt to influence governing boards and university leadership.

The impact of intercollegiate athletics on university culture and values has been damaging, with inappropriate behavior of both athletes and coaches, all too frequently tolerated and excused.

So too, the commercial culture of the entertainment industry that characterizes college football and basketball is not only orthogonal to academic values, but it was corrosive and corruptive to the academic enterprise.

Some Myths and Realities of College Sports

Myth 1: Intercollegiate athletics are self-supporting.

Reality: No college programs in America today cover all their expenses (even those who claim to such USC, U Texas, Ohio State, Michigan, and even Notre Dame). Athletic directors use flakey accounting methods that do not include full costs of capital expenditures, hidden subsidies such as instate tuition for out-of-state athletes, indirect costs born by the institution, fund-raising that competes with academic units, etc. The NCAA estimates that in 2009 the total costs for intercollegiate athletics was \$10.5 billion, while the total revenue was \$5.6 billion (including ticket sales, television broadcasting, licensing, etc.). In reality the only people who make money –and big-time money, at that– from big time athletics are the coaches, athletic directors, NCAA brass, and the networks. But certainly not the “student athletes” and certainly not their host institutions.

In 2012 the media budget deficits for NCAA Division 1 programs averaged \$9 million per year. From 2005 to 2009 athletics departments increased spending on student athletes by 50%, to \$91,050 per athlete, while the increase for normal students was 20% to \$13,470 per student.

Myth 2: Intercollegiate athletics are important for fund raising.

Reality: Donors who give because of winning teams give to winning programs, not to academic activities. But it gets even worse, since the tax-benefited “premium” payments for skyboxes and preferred seating generally come out of gifts that would otherwise have gone to academic purposes. At Michigan, our largest donors could not care less about college sports! They view it

largely as a distraction from the primary mission of the University (except for Steve Ross, of course, who gave \$100 million to the Athletics Department in 2013 to help build a “Walk of Champions”, whatever that is).

Myth 3: All athletic facilities are self-financed.

Reality: Actually many require either institutional or public subsidy. But even those that are debt financed must pledge student tuition revenue for borrowing equity, not anticipated gate receipts or television revenue. They also depend on questionable tax practices such as being counted as 80% “charitable” deductions by the IRS despite the fact that they are quid pro quo required payments for benefits such as premium seating. If these inconsistent disappeared, the big stadium projects would collapse like a house of cards.

Myth 4: The power of the NCAA will protect the status quo.

Reality: Today the NCAA is in serious trouble and fighting for its survival. Its tax status is dependent upon rulings long ago that its primary purpose is educational. Yet grants-in-aid based on athletic performance could be ruled as “pay for play” and hence require employment rights for athletes (including unionization). The O’Bannon case could require payment to players for the use of their images for commercial purposes. Litigation associated with brain injuries or long-term health impact could cripple both the NCAA and universities. Finally, the compensation of coaches (\$5 M and up), athletic directors (\$1 M and up), and athletic staff (now several times that of faculty) is now so extreme that it raises the threat of federal action.

Myth 5: Intercollegiate athletics is important for school spirit.

Reality: Sure, student applications do go up after a major championship. But the students attracted to an institution are not necessarily those most concerned about academic achievement. Besides, how important is athletics to the school spirit of institutions like Harvard, Yale...and Caltech? And how important is athletics to Penn State these days?

Myth 6: But we do pay student athletes! We give



Marketing and the “wow” factor take over...while winning declines...

them valuable scholarships!

Reality 6: A quote from a recent book on college sports by Taylor Branch, the great historian about civil rights in America, puts this in an interesting context.

“Scholarship athletes are already paid,” declared the Knight Commission members, “in the most meaningful way possible: with a free education.” This evasion by prominent educators severed my last reluctant, emotional tie with imposed amateurism. I found it worse than self-serving. It echoes masters who once claimed that heavenly salvation would outweigh earthly injustice to slaves.

Myth 7: But we are preparing athletes for professional careers.

Reality: A recent Michigan survey indicates that most student athletes realize their odds of making the pros are very remote. Instead they view their college experience as an opportunity to enter careers very similar to other students in fields such as business, law, and medicine. But after a few weeks on campus, many of the most vigorously recruited student athletes realize they are woefully academically unprepared and saddled with 50-60 hour/week “jobs” and lives controlled by coaches. Hence they are forced to shift to “majoring in eligibility”, enrolling in cupcake majors (sports management, communications, general studies). The attrition rates are tragic, with 6-year graduate rates: less than 50% for football; 40% for basketball. Even those who graduate frequently have meaningless degrees (e.g., recreational sports, golf-course management).

What to do? The Traditional Approach

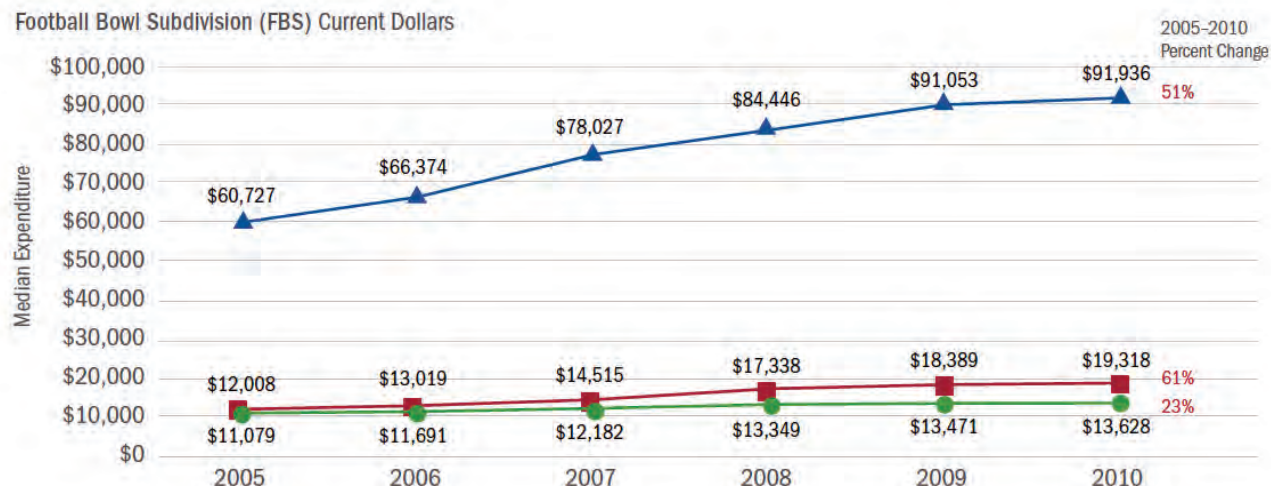
It doesn’t take a rocket scientist (although that happens to be my background) to see what has to be done to re-establish the primacy of educational over commercial values in college sports:

Freshman Ineligibility: All freshmen in all sports should be ineligible for varsity competition. The first year should be a time for students to adjust intellectually and emotionally to the hectic pace of college life.

Financial Aid: Eliminate the “athletic scholarship” or “grant-in-aid” and replace it with need-based financial aid. Note this would not only substantially reduce the costs of college sports, but it would also eliminate the legal risks of continuing what has become, in effect, a “pay for play” system.

Mainstream Coaches: Throttle back the salaries of coaches, athletic directors, and other athletic department staff to levels comparable to faculty and other university staff. Subject coaches to the same conflict of interest policies that govern other faculty and staff (e.g., eliminating shoe contracts, prohibiting the use of the university’s name and reputation for personal gain, etc.)

Mainstream the Administration of Intercollegiate Athletics: Intercollegiate athletics is a student extracurricular activity and, as such, should report to the vice president for student affairs. Academic matters such as student eligibility, counseling, and academic support should be the responsibility of the university’s



The disparity between expenditures per student on athletics (upper curve) and academics (lower curves) continues to diverge, particularly in the leading conferences and institutions.

chief academic officer (e.g., the provost). Financial matters should be under the control of the university's chief financial officer. Medical issues should be under the control of staff from the university medical center or student health service.

Financial Support: We should adopt the principle that if intercollegiate athletics are of value to students, they should be subsidized by the General and Education budget of the university. To this end, we might consider putting athletics department salary lines (coaches and staff) on the academic budget and under the control of the provost. We could then use a counter flow of athletic department revenue into the General and Education budget to minimize the net subsidy of college sports.

Faculty control: We need to restructure faculty athletics boards so that they are no longer under control of athletic directors but instead represent true faculty participation. It is important to keep "jock" faculty off these boards and to give priority to those faculty with significant experience in undergraduate education. It is also important for faculty boards to understand and accept their responsibilities for seeing that academic priorities dominate competitive and commercial goals, while student welfare and institutional integrity are priorities.

Rigorous Independent Audits and Compliance Functions: Here we need a system for independent auditing of not simply compliance with NCAA and conference rules, but as well financial matters, student

academic standing, progress toward degrees, and medical matters.

Limits on Schedules and Student Participation: We should confine all competitive schedules to a single academic term (e.g., football in fall, basketball, hockey in winter, etc.). Competitive schedules should be shortened to more reasonable levels (e.g., football back to 10 games, basketball to 20 games, etc.). We need to constrain competitive and travel schedules to be compatible with academic demands (e.g., no weekday competition). Student participation in mandatory, noncompetitive athletics activities during off-season should be severely limited (including eliminating spring football practice, summer conditioning requirements, etc.).

Throttle Back Commercialization: It is time to forget about the possibility of Division 1-A football playoffs and drastically reduce the number of post-season bowls. Perhaps we should return the NCAA Basketball Tournament to a two-week, conference champion only event. Furthermore, we need to stop this nonsense of negotiating every broadcasting contract as if dollars were the only objective and chase the sports press out of the locker rooms and lives of our students.

Of course, the first arguments launched against such reform proposals always have to do with money. College football and basketball are portrayed as the geese that lay the golden eggs for higher education. However I believe these arguments, long accepted but rarely

2014 NCAA FOOTBALL COACHES SALARIES							
RK	SCHOOL	CONF	HEAD COACH	SCHOOL PAY	OTHER PAY	TOTAL PAY ▼	MAX BONUS
1	Alabama	SEC	Nick Saban	\$6,950,203	\$209,984	\$7,160,187	\$700,000
2	Michigan State	Big Ten	Mark Dantonio	\$5,611,845	\$24,300	\$5,636,145	\$650,000
3	Oklahoma	Big 12	Bob Stoops	\$5,058,333	\$0	\$5,058,333	\$819,500
4	Texas A&M	SEC	Kevin Sumlin	\$5,000,000	\$6,000	\$5,006,000	\$750,000
5	Texas	Big 12	Charlie Strong	\$5,000,000	\$270	\$5,000,270	\$1,000,000
6	Ohio State	Big Ten	Urban Meyer	\$4,486,640	\$50,000	\$4,536,640	\$550,000
7	LSU	SEC	Les Miles	\$4,300,000	\$69,582	\$4,369,582	\$700,000
8	Penn State	Big Ten	James Franklin	\$4,300,000	--	\$4,300,000	\$1,000,000
9	Iowa	Big Ten	Kirk Ferentz	\$4,075,000	\$0	\$4,075,000	\$1,750,000
10	South Carolina	SEC	Steve Spurrier	\$4,000,000	\$16,900	\$4,016,900	\$1,700,000
11	Texas Christian	Big 12	Gary Patterson	\$4,008,150	--	\$4,008,150	--
12	Auburn	SEC	Gus Malzahn	\$3,850,000	\$4,500	\$3,854,500	\$1,400,000
13	Washington	PAC-12	Chris Petersen	\$3,681,720	\$0	\$3,681,720	\$1,175,000
14	Florida State	ACC	Jimbo Fisher	\$3,591,667	\$0	\$3,591,667	\$1,275,000
15	Oklahoma State	Big 12	Mike Gundy	\$3,500,000	--	\$3,500,000	\$550,000
16	Missouri	SEC	Gary Pinkel	\$3,400,000	\$0	\$3,400,000	\$1,825,000
17	Georgia	SEC	Mark Richt	\$3,200,000	\$114,000	\$3,314,000	\$1,000,000
18	Arizona	PAC-12	Rich Rodriguez	\$2,898,500	\$400,000	\$3,298,500	\$2,125,000
19	UCLA	PAC-12	Jim Mora	\$3,250,000	\$0	\$3,250,000	\$930,000
20	Arkansas	SEC	Bret Bielema	\$3,200,000	\$14,000	\$3,214,000	\$700,000

2014 compensation of leading football coaches

2013 NCAA ATHLETIC DIRECTORS SALARIES							
RK	SCHOOL	CONF	ATHLETIC DIRECTORS	SCHOOL PAY	OTHER PAY	TOTAL PAY ▼	MAX BONUS
1	Vanderbilt	SEC	David Williams	\$3,239,678	\$0	\$3,239,678	\$0
2	Louisville	Big East	Tom Jurich	\$1,401,915	\$10,000	\$1,411,915	\$344,000
3	Florida	SEC	Jeremy Foley	\$1,233,250	\$0	\$1,233,250	\$50,000
4	Wisconsin	Big Ten	Barry Alvarez	\$1,143,500	\$86,500	\$1,230,000	\$0
5	Nebraska	Big Ten	Shawn Eichorst	\$1,123,000	\$0	\$1,123,000	\$0
6	Texas	Big 12	DeLoss Dodds	\$1,107,391	\$1,650	\$1,109,041	\$125,000
7	Ohio State	Big Ten	Gene Smith	\$1,099,030	\$0	\$1,099,030	\$250,000
8	Notre Dame	Big East	Jack Swarbrick	\$1,026,942	\$0	\$1,026,942	\$0
9	Oklahoma	Big 12	Joe Castiglione	\$1,000,000	\$0	\$1,000,000	\$760,000
10	Duke	ACC	Kevin White	\$906,536	\$0	\$906,536	\$0
11	Arkansas	SEC	Jeff Long	\$900,000	\$3,900	\$903,900	\$650,000
12	Michigan	Big Ten	Dave Brandon	\$900,000	\$0	\$900,000	\$200,000
13	Iowa State	Big 12	Jamie Pollard	\$900,000	\$0	\$900,000	\$0
14	Tennessee	SEC	Dave Hart Jr.	\$817,250	\$0	\$817,250	\$0
15	Texas A&M	SEC	Eric Hyman	\$800,000	\$0	\$800,000	\$200,000
16	LSU	SEC	Joe Alleva	\$725,000	\$0	\$725,000	\$100,000
17	Clemson	ACC	Dan Radakovich	\$725,000	\$0	\$725,000	\$50,000
18	UCLA	PAC-12	Dan Guerrero	\$715,211	\$0	\$715,211	\$75,000
19	Michigan State	Big Ten	Mark Hollis	\$700,000	\$0	\$700,000	\$50,000
20	Texas Christian	Mt. West	Chris Del Conte	\$695,769	\$0	\$695,769	\$0

2014 compensation of leading athletic directors

challenged, are flawed. Essentially all intercollegiate athletic programs are subsidized, to some degree, by the academic programs of the university (when all costs are included, such as amortization of facilities and administrative overhead.) Furthermore, in the scheme of things, the budgets of these programs are quite modest relative to other institutional activities (e.g., at Michigan, the \$150 M/y budget of our athletic department is only about 2% of our total budget, and, more to the point, less than the amount of state support we have lost over the past three years!).

The current culture of college sports is driven by the belief that the team that spends the most wins the most. Not surprisingly, therefore, the more revenue athletic programs generate, the more they spend. Since most of the expenditures are in areas such as grants-in-aid, coaches and staff salaries, promotional activities, and facilities, many of the proposals in the previous section would dramatically reduce these costs. For example, replacing the current system of grants-in-aid by need-based financial aid would reduce these costs by at least a factor of two. Throttling back the extravagant level of celebrity coaches salaries (and applying conflict of interest to eliminate excessive external income and perks) would do likewise. Demanding university control of all auxiliary activities such as broadcasting and licensing so that revenue flows to the institution and not to the coaches would also help. And reducing the expenditures required to mount big-time commercial entertainment events would also reduce costs, thereby compensating for lost broadcasting revenue.

Treating Athletics Like the Rest of the University

More generally, the first step in reconnecting college sports to the academic enterprise is to stop treating our athletic departments, coaches, and student-athletes as special members of the university community, subject to different rules and procedures, policies and practices than the rest of university. The key to reform is to mainstream our athletics programs and their participants back into the university in three key areas: financial management, personnel policies, and educational practices.

Financial management: Athletics departments should be subject to the same financial controls, policies,



What? Me worry?...About big-time college sports?

and procedures as other university units. Their financial operations should report directly to the chief financial officer of the university and be subject to rigorous internal and external audit requirements and full public disclosure as an independent (rather than consolidated) financial unit. All external financial arrangements, including those with athletic organizations (e.g., conferences and the NCAA), commercial concerns (e.g., licensing, broadcasting, endorsements), and foundation/booster organizations should be under the strict control of the university's chief financial official and subject to rigorous external audits and public disclosure. (And clearly programs that push the bounds both of propriety and perhaps even legality such as the "seat tax" should be prohibited.) In that regard, I would even suggest that we take the Sarbanes-Oxley approach, designed to eliminate abuses in the financial operations of publicly-held corporations, by requiring the Athletic Director, President, and chair of the Governing Board to sign annual financial statements and hold them legally accountable should these later be found to be fraudulent.

There are many opportunities for significant cost reductions. For example, replacing the current system of grants-in-aid by need-based financial aid would reduce these costs by at least a factor of two. Throttling back the extravagant level of celebrity coaches salaries (and applying conflict of interest to eliminate excessive external income and perks) would do likewise. Demanding university control of all auxiliary activities such as broadcasting and licensing so that revenue

flows to the institution and not to the coaches would also help. And reducing the expenditures required to mount big-time commercial entertainment events would also reduce costs, thereby compensating for lost broadcasting revenue.

Personnel: All athletics department staff (including coaches) should be subject to the same conflict-of-interest policies that apply to other university staff and faculty. For example, coaches should no longer be allowed to exploit the reputation of the university for personal gain through endorsements or special arrangements with commercial vendors (e.g., sports apparel companies, broadcasting, automobile dealers). Employment agreements for coaches should conform to those characterizing other staff and should be subject to review by university financial and personnel units. All personnel searches, including those for coaches, should comply fully with the policies and practices characterizing other staff (e.g., equal opportunity)

Academics: Athletics programs should not be allowed to interfere with or undermine academic policies and principles. For example, the admission of student athletes, their academic standing, and their eligibility for athletic competition must be controlled by the faculty. There should be a ban on special academic support activities for student athletes that further isolate them from the rest of the student body and the university, such as academic support centers or special counseling services under the control of the athletics department. Universities must insist that competitive schedules are compatible with the academic calendar, even if this has significant revenue implications.

Who Should Take the Lead in Reform

Several years ago, I received an invitation from William Friday, former president of the University of North Carolina, to testify before the Knight Commission on Intercollegiate Athletics. My book on college sports had just appeared, and they were interested in my views on this complex subject. After stating my concerns, much as I have earlier in this chapter, I went on to suggest a possible approach to reform that began with the premier academic organization, the Association of American Universities (AAU). If these institutions were to adopt a series of reforms—a disarmament treaty,

if you will—for their members, much of the rest of the higher education enterprise would soon follow. It is my belief that such an effort by the AAU would propagate rather rapidly throughout other organizations such as the National Association of State Universities and Land Grant Colleges and even the American Council on Education.

I concluded my testimony by stressing the point that as higher education entered an era of great challenge and change, it was essential that we re-examine each and every one of our activities for their relevance and compatibility with our fundamental academic missions of teaching, learning, and serving society. From this perspective, it was my belief there was little justification for the American university to mount and sustain big-time football and basketball programs at their current commercial and professional level simply to satisfy the public desire for entertainment and pursue the commercial goals of the marketplace. The damage to our academic values and integrity was simply too great. If we were to retain intercollegiate athletics as an appropriate university activity, it was essential to decouple our programs from the entertainment industry and reconnect them with the educational mission of our institutions.

After I had finished my remarks, the co-chair of the commission, Father Theodore Hesburg, former president of Notre Dame, was first to respond. He thanked me (after offering a prayer: “May God have mercy on your soul!”) for not only reinforcing many of the Commission concerns, but, in effect, providing a first draft of the Commission’s report! Of course, others on the Commission challenged some of my more outspoken conclusions and recommendations. But in the end, my conclusions seemed to stand, as evidenced by the strong statement in the final report of the Commission:

“After digesting the extensive testimony offered over some six months, the Commission is forced to reiterate its earlier conclusion that at their worst, big-time college athletics appear to have lost their bearings. Athletics continue to threaten to overwhelm the universities in whose name they were established. Indeed, we must report that the threat has grown rather than diminished. Higher education must draw together

all of its strengths and assets to reassert the primary of the educational mission of the academy. The message that all parts of the higher education community must proclaim is emphatic: Together, we created today's disgraceful environment. Only by acting together can we clean it up."

A Call to Action: Reconnecting College Sports
and Higher Education

The Knight Commission on Intercollegiate Athletics
June, 2001

Yet, in retrospect, I now believe that while both my testimony and the Knight Commission report urgently portrayed the threat to American higher education posed by the ever-increasing commercialization and corruption of big-time college sports, neither proposed an effective method to deal with the problem. Put simply, in both cases we bet on the wrong horse. We proposed that the university presidents take the lead in the reform of college sports, whether through academic organizations such as the AAU and ACE (my proposal) or the NCAA (the Knight Commission). And nothing has happened.

Clearly working through athletic organizations such as the NCAA, the conferences, or the athletic departments is futile since these are led or influenced by those who have the most to gain from the further commercialization of college sports. It is my belief that we will never achieve true reform or control through these organizations, since the foxes are in firm control of the hen house. After all, the primary purpose of the NCAA is to maintain and promote the commercial value of college sports, not to protect the welfare of student-athletes or higher education.

In fact, a major reason why the various efforts to reform college sports over the past several decades have failed is that we continue to bet on the wrong horse. We continue propose that the university presidents take the lead in the reform of college sports, whether through academic organizations such as the AAU and ACE (my proposal) or the NCAA (the Knight Commission). And very little happens, and the mad rush toward more and more commercialism and corruption continues.

Perhaps this is not so surprising. After all, university presidents are usually trapped between a rock and a hard place: between a public demanding high quality entertainment from the commercial college sports

industry they are paying for, and governing boards who have the capacity (and all too frequently the inclination) to fire presidents who rock the university boat too strenuously. It should be clear that few contemporary university presidents have the capacity, the will, or the appetite to lead a true reform movement in college sports.

Well, what about the faculty? Of course, in the end, it is the governing faculty that is responsible for its academic integrity of a university. Faculty members have been given the ultimate protection, tenure, to enable them to confront the forces of darkness that would savage academic values. The serious nature of the threats posed to the university and its educational values by the commercialization and corruption of big-time college sports has been firmly established in recent years. It is now time to challenge the faculties of our universities, through their elected bodies such as faculty senates, to step up to their responsibility to defend the academic integrity of their institutions, by demanding substantive reform of intercollegiate athletics.

To their credit, several faculty groups have responded well to this challenge and stepped forward to propose a set of principles for the athletic programs conducted by their institutions. Beginning first in the Pac Ten Conference universities, then propagating to the Big Ten and Atlantic Coast Conferences, and most recently considered and adopted by the American Association of University Professors, such principles provide a firm foundation for true reform in college sports.

Yet as the influence of the faculty have been pushed out of intercollegiate athletics by eliminating oversight boards, as athletic departments have taken over control of academic counseling (and at some institutions, even admission and academic standing), and as even faculty participation as spectators has eroded due to premium pricing of tickets, little wonder that most faculty members treat the Athletics Department with benign neglect (at least until its missteps severely damage the integrity of their institution).

What about trustees? The next obvious step in this process is for the faculties to challenge the trustees of our universities, who in the end must be held accountable for the integrity of their institutions. To be sure, there will always be some trustees who are more beholding

to the football coach than to academic values. But most university trustees are dedicated volunteers with deep commitments to their institutions and to the educational mission of the university. Furthermore, while some governing boards may inhibit the efforts of university presidents willing to challenge the sports establishment, few governing boards can withstand a concerted effort by their faculty to hold them accountable for the integrity of their institution. In this spirit, several faculty groups have already begun this phase of the process by launching a dialogue with university trustees through the Association of Governing Boards.

Ironically, it could well be that the long American tradition of shared university governance, involving public oversight and trusteeship by governing boards of lay citizens, elected faculty governance, and experienced but generally short-term and usually amateur administrative leadership, will pose the ultimate challenge to big time college sports.

After all, even if university presidents are reluctant to challenge the status quo, the faculty has been provided with the both the responsibility and the status (e.g., tenure) to protect the academic values of the university and the integrity of its education programs. Furthermore, as trustees understand and accept their stewardship for welfare of their institutions, they will recognize that their clear financial, legal, and public accountability compels them to listen and respond to the challenge of academic integrity from their faculties.

What about a rising tide of public frustration? To be sure, many of those in charge of college athletics are unable (or unwilling) to understand the minefields that lie in the path of their plans. For example, the Big Ten leadership (conference commissioner and presidents) has largely destroyed the conference, adding new institutions using selection criteria such as television market rather than historical comparisons such as Midwest location or the similarity of academic and athletic programs. As fans begin to realize that long-standing rivalries (e.g., Michigan vs. Wisconsin) will largely disappear to satisfy the Big Ten Network, they could well abandon any loyalty to either teams or institutions. Of course, they could be replaced by new fans with interests more akin to professional sports such as automobile racing or boxing. After all, sports remain the "opiate of the masses".

Possible "Planet Killers" for College Sports

In summary, who will protect the interests of the student athletes?

Not the coaches or ADs or NCAA. They clearly have serious conflicts of interests.

What about faculty? They have been pushed to the side.

What about university leaders like presidents or trustees? They clearly have abdicated all responsibility!!!

What about the government? They got us into this trouble!!!

What about...lawyers? Perhaps that is the only protection left!!!

However there are still several possibilities on the horizon that could become "planet killers" for college sports as we know them today:

The federal government could finally step up to its responsibility to treat big-time athletics like other business enterprises, subjecting it to more reasonable treatment with respect to tax policy, employee treatment (meaning student-athletes), monopoly and cartel restrictions, and possibly even salary constraints.

The O'Bannon case has demonstrated that litigation may become a formidable force for changing college sports as we know it today. There are early signs that student-athletes may be given rights that protect them against exploitation by coaches and athletic departments, and others for personal gain.

But the most serious threat on the horizon is the increasing evidence of the damage that intensifying violent sports such as football, basketball, and hockey to professional levels do the health of young athletes. In recent years, there is growing medical evidence about the long-term impact of concussions and other trauma on longer-term illness such as dementia and Alzheimer's. These concerns are broadening out to explore the epidemiology of longer health impact including life expectancy (now found to be as low as 57 for NFL players). Although most attention has been focused on the health implications of competition at the high school and professional level, it is only a matter of time before college sports falls under the microscope. Beyond the concerns about the impact of violent sports on the health of student athletes, these studies are



The Michigan Marching Band has a good sense of where big-time college sports are headed!!!

likely to open up a Pandora's Box of litigation on issues such as institutional liability and requirements for the support of long-term health care that could financially cripple many institutions that insist on continuing to compete at the current level of intensity. In fact, the threat of litigation as class action suits could even eliminate violent sports such as football and hockey as we know them today at all but the professional levels.

A Magic Potion for Chasing Away the Commercialization of College Sports

Several years ago, a visit to give a major address to European university leaders at the University of Barcelona suggested another possible remedy. Across the street from the Barcelona campus was the incredible complex of FC Barcelona, one of Europe's most glamorous, successful, and profitable football clubs.

Check out their website:

<http://www.fcbarcelona.com/web/english/>

and you'll find that FC Barcelona has essentially everything that Michigan Athletics desires: the excitement of a winning program, the exceptional loyalty of 150,000 members of the "football club", quality treatment of athletes, and high integrity. FC Barcelona also has not only a "football" club but also basketball and hockey programs, along with several "amateur" Olympic sports as part of the club. Its massive facilities, including Estadio Camp Nou, the largest stadium in Europe is adjacent to the University of Barcelona campus, but there is no direct relationship between the university and the football club.

There is one more characteristic of note: FC Barcelona's revenue in 2014 was over 600 million Euros (\$700 million), far beyond that of Michigan, or any other college or professional sport in the United States. How, you might ask, can it achieve this? Because FC Barcelona is not a university or professional sports



Perhaps this is a model for the future of the Michigan Wolverines...

franchise but rather a corporation, with thousands of shareholders, and both a city (Barcelona) and region (Catalonia) of loyal fans.

So here is the proposal: How about conducting an IPO for the Michigan Wolverines? I'm sure that there would be hundreds of thousands of fans willing to participate in the initial stock offering. And the athletic directors are always looking for more revenue (and compensation, of course). The University could license to the new for-profit corporation, FC Michigan Wolverines, the trademark and lease them the stadium. With these funds, the University could return to truly amateur competition with REAL student participants and coaches as teachers, competing with other has-been big time programs that also sought escape from commercialism by taking their revenue-generating programs through a similar IPO process.

Seriously, this might be regarded as the way to finally separate "big time college sports" from the university, while maintaining a revenue flow to support "non-revenue" sports for students through licensing the UM "trademark" and renting its facilities. This might even be portrayed as "taking the Michigan Wolverines public" by enabling hundreds of thousands to become members of FC Michigan, even if they have never had a direct relationship with the University. (And of course it would also allow players, no longer necessarily students, to also benefit financially from the market for top talent...think Ronaldo or Beckham...)

Most important, it would allow the University to focus on its fundamental missions, teaching and

research, while giving the public what it wants and eliminating the hypocrisy that now characterizes big time (and highly commercialized) college sports.

Perhaps this sounds crazy? But perhaps it also provides a future in which the commercial character of college sports is spun off to satisfy a sports craving public, leaving our universities to return to true amateur athletics with the fundamental purpose of student participation.

A Final Observation

Today I stand among a growing number of university leaders who believe that today higher education has entered an era of great challenge and change. Powerful social, economic, and technological forces are likely to change the university in very profound ways in the decades ahead. As our institutions enter this period of transformation, it is essential that we re-examine each and every one of our activities for their relevance and compatibility with our fundamental academic missions of teaching, learning, and serving society.

If we were to retain intercollegiate athletics as appropriate university activities, it was essential we insist upon the primacy of academic over commercial values by decoupling our athletic programs from the entertainment industry and reconnecting them with the educational mission of our institutions.

From this perspective, it is my belief there is little justification for the American university to mount and sustain big-time football and basketball programs at

their current commercial and professional level simply to satisfy the public desire for entertainment and pursue the commercial goals of the marketplace. The damage to our academic values and integrity was simply too great.

The American university is simply too important to the future of this nation to be threatened by the ever increasing commercialization, professionalization, and corruption of college sports.

One of my colleagues suggested a quote from Thomas Paine's *Common Sense* (February 14, 1776) that applies to this issue:

"Perhaps the sentiments contained in these pages are not yet sufficiently fashionable to procure them general favour; a long habit of not thinking a thing wrong, gives it a superficial appearance of being right, and raises at first a formidable outcry in defense of custom. But the tumult soon subsides. Time makes more converts than reason."

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Chapter 12

Higher Education and Economic Development

Our world has entered a period of rapid and profound economic, social, and political transformation driven by knowledge and innovation. Educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, national security, and social well-being. It has become increasingly apparent that economic strength, prosperity, and social welfare in a global knowledge economy will demand a highly educated citizenry. It will also require institutions with the ability to discover new knowledge, develop innovative applications of these discoveries, and transfer them into the marketplace through entrepreneurial activities.

This world of an economy driven by education, knowledge, and innovation may be relatively new. But many areas of the United States are already behind. The purpose of these studies was to seek ways to close that gap and restore regions, states, and metropolitan areas to economic success in the brave new world of a hyper competitive knowledge-drive global economic. To provide our citizens with the knowledge and skills to compete on the global level, we must broaden access to world-class educational opportunities at all levels: K-12, higher education, workplace training, and lifelong learning. We must also build and sustain world-class universities capable of conducting cutting-edge research and innovation and producing outstanding scientists, engineers, physicians, teachers, and other knowledge professionals essential to creating the new jobs of the twenty-first century. We must build the advanced learning and innovation infrastructure necessary to sustain economic leadership in the century ahead.

Yet the traditional institutions responsible for education and innovation—schools, colleges,

universities, research institutes, business, and industry—are being challenged by the powerful forces characterizing the global economy: hypercompetitive global markets, demographic change, increasing ethnic and cultural diversity, and disruptive technologies, such as information technology. Hence new strategies and investments are necessary to build the learning and innovation enterprises necessary for prosperity in a global economy. From California to North Carolina, Helsinki to Bangalore, other states, regions, and nations are shifting their public policies and investments to support the new imperatives of a knowledge economy: knowledge creation (e.g., R&D, innovation, and entrepreneurial activities), human capital (e.g., lifelong learning and advanced education, particularly in science and engineering), and infrastructure (e.g., colleges and universities, research laboratories, and broadband networks).

There is a second important theme that characterizes the emerging knowledge economy: the increasing connectivity enabled by modern communications and transportation technologies is rapidly shifting the locus of economic and political power away from conventional geopolitical areas. As Thomas Friedman puts it, “The world is flat! Globalization has collapsed time and distance and raised the notion that someone anywhere on earth can do your job, more cheaply. Can we rise to the challenge on this leveled playing field?” (Friedman, 2005)

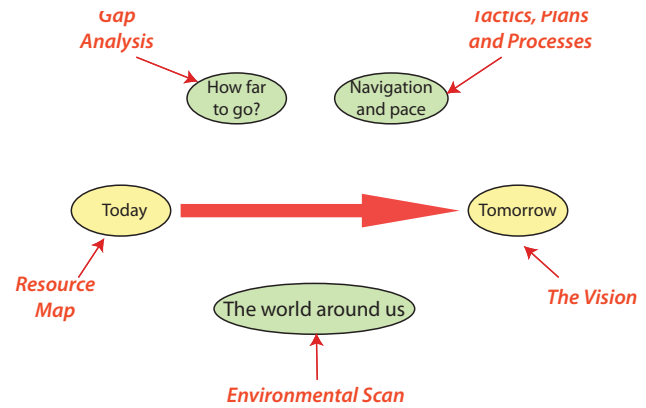
Strategic Roadmapping

So, what to do? That is the goal of this series of studies: to develop a plan for building a learning and knowledge infrastructure for a region—a state, a region such as the Great Lakes states, or a metropolitan area.

The plan needs to address the life-long educational needs of its citizens and the workforce skills necessary to compete and flourish in a global, knowledge-intensive economy. In addition, it needs to address how to build the sources of new knowledge, innovation, and entrepreneurial spirit necessary to create world-class companies and a world-class living environment.

Since advanced education and research provide the key human and knowledge resources critical to prosperity in the global economy, colleges and universities will play a central role in this effort. Yet, such studies differ from earlier education planning efforts, such as the “master plan” for higher education developed by California in the early 1960s. Today any such effort must consider the educational needs of the region from a broader perspective embracing pre-college, lifelong learning, and workplace-training activities—that is, education from “cradle to grave.” The role of higher education in generating knowledge, enabling innovation, and stimulating entrepreneurial activities must similarly be examined not only from the perspective of both private enterprise and public policy but also within a context that extends beyond the region to encompass national and global concerns.

There are many approaches to such a study. Most common are strategic planning exercises, which progress through the usual sequence of proposing a mission and vision, then assessing available assets and challenges through an environmental assessment, stating goals, proposing strategic actions and a process of tactical implementation, and finally performing assessment and evaluation. In this study we have adopted a common technique used in industry and the federal government: *strategic roadmapping* (Garcia, 1997). In roadmapping exercises, one uses expert panels to assess needs, then constructs a map of existing resources, performs an analysis to determine the gap between what currently exists and what is needed, and finally develops a plan or roadmap of possible routes from here to there, from now to the future. Although sometimes confused with jargon such as environmental scans, resource maps, and gap analysis, in reality the roadmapping process is quite simple. It begins by asking where we are today and where we wish to be tomorrow, then assesses how far we have to go, and concludes by developing a roadmap to get from here to



The strategic roadmap

there. The roadmap itself usually consists of a series of recommendations, sometimes divided into those that can be accomplished in the near term and those that will require a sustained effort.

To provide context, one usually begins with an environmental scan of the imperatives of the global knowledge economy, where robust telecommunications connectivity has empowered billions of new knowledge workers to compete for jobs and prosperity, regardless of location or nationality, provided they have developed the skills and infrastructure. Actually, we have already provided just such an exercise in the second chapter of this book that identifies most of the key issues one must face in achieving economic prosperity.

Next, one uses this scan to identify the knowledge assets and liabilities of a region and assess why it may be having difficulty in making the transition to a knowledge economy. With this analysis in mind, we suggest a vision to better position the region for economy prosperity and leadership in the 21st Century global economy, e.g., a workforce characterized by world-class skills, innovation, and entrepreneurial zeal; and a knowledge infrastructure capable of generating new knowledge and economic opportunities through a strategic utilization of the very technology that is reshaping our world. Put another way, we suggest those skills, educational opportunities, and research and innovation assets needed by the region.

Next, by comparing this vision with the current reality, we can determine how far the region must travel to reach a prosperous future. We can also identify the resource gap that exists between what we have now and what we will need for the future, between the

Strategic roadmapping is a needs-driven planning process to help identify, select and develop alternatives to satisfy the need. A roadmap can help make accurate predictions of future demands and determine innovative processes, products, and systems required to satisfy them.

- 1) Identifies critical system requirements
- 2) Sets performance targets
- 3) Alternatives and milestones for meeting targets.



The strategic roadmap process

obsolete institutions, policies and programs of today and the globally competitive resources the region must build for tomorrow.

We then develop a strategic roadmap, a set of goals and strategies designed to move the region toward this future. Since building a 21st century learning and innovation infrastructure for a region will clearly involve multiple players—institutions, states, and the nation more broadly—this roadmap is developed in a layered fashion, setting out the goals and strategies for each of the key players and patrons.

We then turn to a consideration of the tactics, plans, and processes necessary to achieve the objectives set by the roadmap studies. Here we adopt both the approach of pulling the various roadmaps (national, regional, state, and institutional) into a “master plan” (similar to that taken by the California Master Plan) and suggest a process of continued engagement, action, and refinement to build and sustain momentum (similar to the Bologna Process designed to integrate higher-education strategies for the European Union).

Finally, we take a longer-term perspective by considering bolder visions that exploit truly over-

the-horizon opportunities and visions. To this end, we conclude this roadmapping exercise with a series of bolder proposals that would act as game changers to challenge and change the entire learning and innovation infrastructure of the region. Included in this consideration are new types of institutions and practices that depart quite radically from the status quo to create a culture of learning and innovation in the heartland of America.

A Strategic Roadmap for the State of Michigan

Throughout the 20th century both America and Michigan have been leaders in the world economy. The democratic values and free-market practices of the United States, coupled with institutional structures such as stable capital markets, strong intellectual property protection, flexible labor laws, and open trade policies, positioned our nation well for both economic prosperity and security. With a highly diverse population, continually renewed and re-energized by wave after wave of immigrants, Michigan became the source of the technology and innovation that shaped the 20th-century global economy.

Michigan’s history as a frontier state gave it a priceless legacy of pioneering spirit, gritty courage, and self-reliance. Vast natural resources provided the opportunities for prosperous agriculture, lumbering, and mining industries. Our ancestors made our farms and our factories the best in the world. From the beginning Michigan believed in its people and invested heavily in their education and training, embracing the spirit of the Northwest Ordinance, which stated: “Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged.”

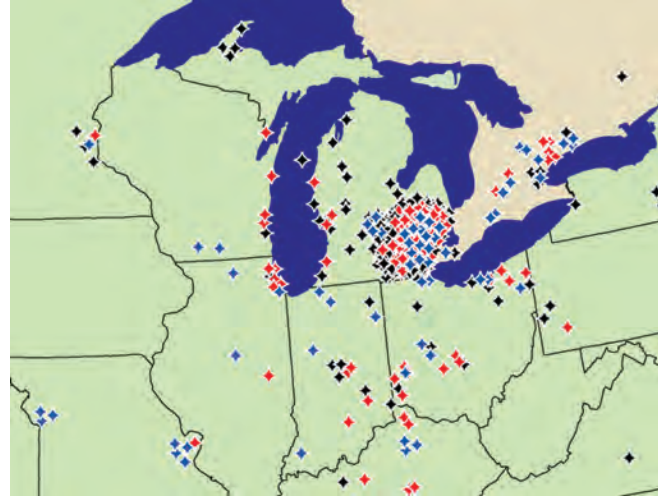
There was broad recognition that Michigan’s most valuable resources were its people. Hence investment in the knowledge, skills, and abilities of its people was seen as key to Michigan’s competitive edge in achieving global leadership in innovation, productivity, and trade. Michigan built a great education system of schools, colleges, and universities aimed at serving all of its citizens. It created and supported a social and civil infrastructure that was the envy of the nation.



The impact of the global economy on Michigan

Michigan companies invested heavily in R&D and technological innovation, working closely with the state's universities. The leaders of our state understood well the importance of investing heavily with both public tax dollars and private capital in those areas key to prosperity in an industrial economy. State leaders demonstrated a remarkable capacity to look to the future and a willingness to take the actions and make the investments that would yield prosperity and well-being for future generations. And the payoff was enormous, as Michigan led the world in productivity and prosperity. It rapidly became the engine driving the nation's economy. During the last century, it was Michigan that first put the world on wheels and then became the arsenal of democracy to defend freedom during two world wars.

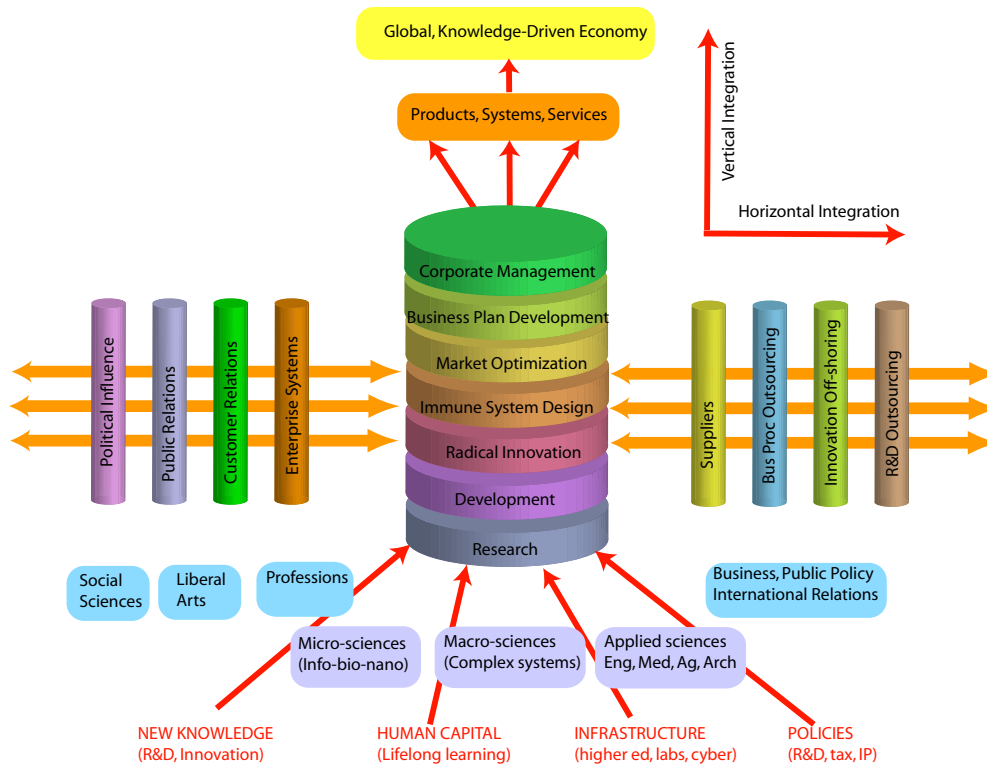
But that was yesterday. What about Michigan today? Ironically, as never before, the prosperity and social well-being of our state today is determined by the skills, knowledge, and talents of our people. In the global, knowledge-driven economy, educated human capital the key. Yet here, the vital signs characterizing Michigan today are disturbing indeed. The spirit of public and private investment for the future appears to have vanished in our state. In recent decades, failed public policies and inadequate investment have threatened the extraordinary educational resources built through the vision and sacrifices of past generations. Michigan business and industry have reduced very significantly their level of basic and applied research and now focus their efforts primarily on product



Michigan is still dependent on a factory economy.

development based on available technologies rather than exploring innovative breakthroughs. Ironically, at a time when the rest of the world has recognized that investing in education and knowledge creation is the key to not only prosperity but, indeed, to survival, too many of Michigan's citizens and leaders, in both the public and private sector, have come to view such investments as a low priority, expendable during hard times. The aging baby boomer population that now dominates public policy in our state demands instead generous retirement benefits, expensive health care, ever more prisons, and reduced tax burdens, rather than demanding that Michigan begin investing once again in education, innovation, and the future.

This neglect of adequate investment in human capital and knowledge infrastructure could not have happened at a worse time. As we enter a new century, Michigan's old industrial economy is dying, slowly but surely, putting at risk the welfare of millions of citizens in our state in the face of withering competition from an emerging global knowledge economy. For many years now we have seen our low-skill, high-pay factory jobs increasingly downsized, outsourced, and offshored, only to be replaced by low-skill, low-pay service jobs—or in too many cases, no jobs at all and instead the unemployment lines. Michigan's inability to adapt to a rapidly changing world is reflected by the fact that today our state ranks 50th in the nation in almost every economic indicator—employment, job creation, growth in personal income, economic momentum, and return of federal tax dollars.



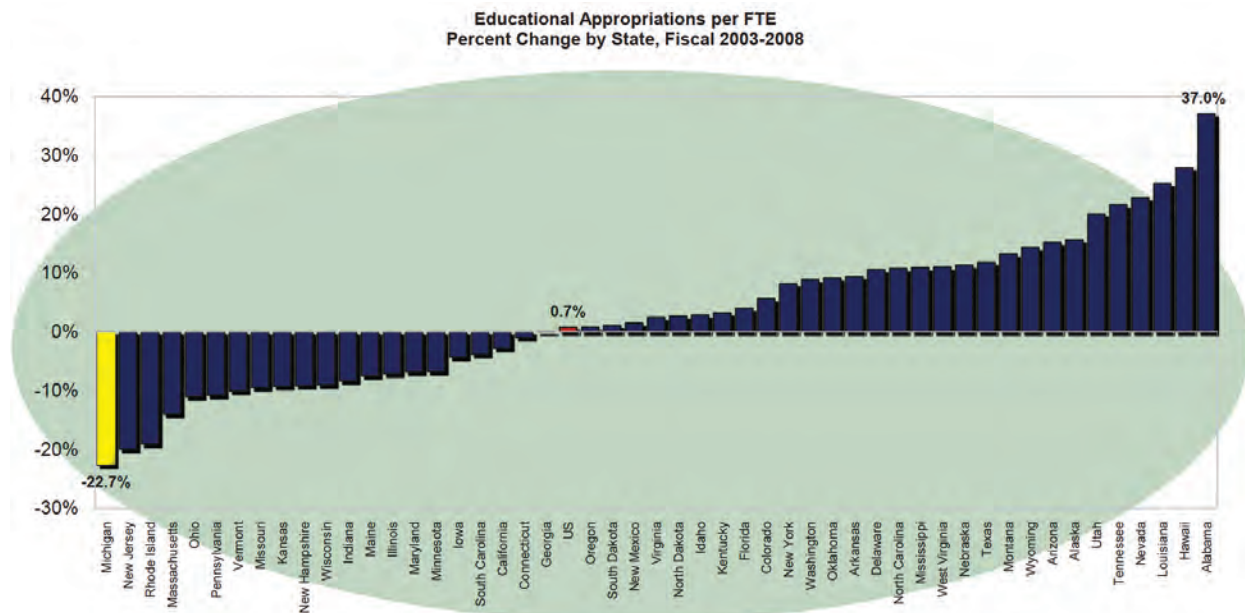
The knowledge economy of the 21st century

Preoccupied with obsolete and irrelevant political battles, addicted to entitlements, manipulated by lobbyists and special interest groups, and assuming what worked before will work again, Michigan today is sailing blindly into a profoundly different future. Today's policies embraced by state leaders are increasingly incompatible with the realities of the emerging global economy. Our current tax system is not only regressive and inequitable, but it is both structurally and strategically misaligned with the character of Michigan's increasingly knowledge-driven economy, unable to generate the revenues to sustain the necessary investments in our knowledge, social, and civic infrastructure. The legacy costs of obsolete and excessively burdensome retirement and health care benefits threaten to bankrupt both government and industry. Obsolete sentencing policies have burdened us with incarceration rates and prison costs that lead the nation. Our investment in key knowledge resources such as higher education has dropped to last in the nation. We have allowed external groups to persuade voters to cripple Michigan's efforts to secure equal opportunity and social inclusion for an increasingly diverse population. And special interest groups

continue to block legislative efforts to bring Michigan in line with other states and nations on critical public health measures such as smoking and environmental protection.

Thus far our state has been in denial, assuming our low-skill workforce would remain competitive and our factory-based manufacturing economy would eventually be prosperous once again. Yet that 20th-century economy will not return. Michigan is at great risk, since by the time we come to realize the permanence of this economic transformation, the outsourcing/off-shoring train may have left town, taking with it both our low-skill manufacturing jobs and many of our higher-paying service jobs.

Michigan is certainly not alone in facing this new economic reality. Yet as we look about, we see other states, not to mention other nations, investing heavily and restructuring their economies to create high-skill, high-pay jobs in knowledge-intensive areas such as new technologies, financial services, trade, and professional and technical services. From California to North Carolina, Bangalore to Shanghai, there is a growing recognition throughout the world that economic prosperity and social well-being in a



Michigan's Achilles heel: failure to invest in education

global knowledge-driven economy require public and private investment in knowledge resources. That is, regions must create and sustain a highly educated and innovative workforce, supported through policies and investments in cutting-edge technology, a knowledge infrastructure, and human capital development.

However, history has also shown that significant investment is necessary to produce the essential ingredients for innovation to flourish: new knowledge (research), human capital (education), infrastructure (facilities, laboratories, communications networks), and policies (tax, intellectual property). Other nations are beginning to reap the benefits of such investments aimed at stimulating and exploiting technological innovation, creating serious competitive challenges to American industry and business both in the conventional marketplace (e.g., Toyota) and through new paradigms such as the off-shoring of knowledge-intensive services (e.g., Bangalore, Shanghai). Yet again, at a time when our competitors are investing heavily in stimulating the technological innovation to secure future economic prosperity, Michigan is missing in action, significantly under-investing its economic and political resources in planting and nurturing the seeds of innovation.

Adequately supporting education and technological innovation is not just something we would like to do; it is something we simply have to do. What is really at

stake here is building Michigan's regional advantage, allowing it to compete for prosperity, for quality of life, in an increasingly competitive world. In a knowledge-intensive society, regional advantage is not achieved through gimmicks such as lotteries and casinos. It is achieved through creating a highly educated and skilled workforce. It requires an environment that stimulates creativity, innovation, and entrepreneurial behavior. Specifically, it requires investment in the ingredients of innovation—educated people and new knowledge. Put another way, it requires strategic vision, enlightened policies, and sustained investment to create a knowledge society that will be competitive in a global economy.

To this end, this study has applied the planning technique of strategic roadmapping to provide a framework for the issues that Michigan must face and to suggest the commitments that we must make, both as individuals, as institutions, and as a state, to achieve prosperity and social well-being in a global knowledge economy. The roadmapping process was originally developed in the electronics industry and is applied frequently to major federal agencies such as the Department of Defense and NASA. Although sometimes cloaked in jargon such as environmental scans, resource maps, and gap analysis, in reality the roadmapping process is quite simple. It begins by asking where we are today, then where we wish to

be tomorrow, followed by an assessment of how far we have to go, and finally concludes by developing a roadmap to get from here to there. The roadmap itself usually consists of a series of recommendations, sometimes divided into those that can be accomplished in the near term and those that will require longer-term and sustained effort.

By any measure, the assessment of Michigan today is very disturbing. Our state is having great difficulty in making the transition from a manufacturing to a knowledge economy. As we have noted earlier, Michigan has dropped to dead last—50th among the states—in most measures of economic momentum. Our leading city, Detroit, now ranks as among nation's poorest, not to mention becoming the largest U.S. city to declare bankruptcy. Furthermore, Michigan leads the nation in population loss, with the out-migration of young people in search of better jobs the fourth most severe among the states; our educational system is underachieving with one-quarter of Michigan adults without a high school diploma and only one-third of high school graduates college-ready. Fewer than one-quarter of Michigan citizens have college degrees. Although Michigan's system of higher education is generally regarded as one of the nation's finest, the erosion of state support over the past two decades and most seriously over the past seven years—with appropriation cuts to public universities now ranked as the most severe in the nation and ranging from 20% to 40%—has not only driven up tuition but put the quality and capacity of our public universities at great risk.

More generally, for many years Michigan has been shifting public funds and private capital away from investing in the future through education, research, and innovation to fund instead short term priorities such as prisons and excessive employee benefits while enacting tax cuts that have crippled state revenues. And all the while, as the state budget began to sag and eventually collapsed in the face of a weak economy, public leaders were instead preoccupied with fighting the old and increasingly irrelevant cultural and political wars (cities vs. suburbs vs. exurbs, labor vs. management, religious right vs. labor left). In recent years the state's motto has become "Eat dessert first; life is uncertain!" Yet what Michigan has really been consuming is the seed corn for its future.

A vision for Michigan tomorrow can best be addressed by asking and answering three key questions:

1. *What skills and knowledge are necessary for individuals to thrive in a 21st-century, global, knowledge-intensive society?* Clearly a college education has become mandatory, probably at the bachelor's level, and for many, at the graduate level. Beyond this goal, the state should commit itself to providing high-quality, cost-effective, and diverse educational opportunities to all of its citizens throughout their lives, since during an era of rapid economic change and market restructuring, the key to employment security has become continual, lifelong education.

2. *What competencies are necessary for a population (workforce) to provide regional advantage in such a competitive knowledge economy?* Here it is important to stress that we no longer are competing only with Ohio, Ontario, and California. More serious is the competition from the massive and increasingly well-educated workforces in emerging economies such as India, China, and the Eastern Bloc. Hence the challenge is no longer to simply focus on the best and brightest, the economic and social elite, as in earlier eras, but instead to recognize that it will be the education, knowledge, and skills of Michigan's entire population that determine our economic prosperity and social well-being in the global economy. We must invest in learning opportunities for all of our citizens throughout their lives. And we must recognize that equal opportunity and social inclusion are no longer simply moral obligations but moreover strategic imperatives if we are to compete in the global economy.

3. *What level of new knowledge generation (e.g., R&D, innovation, entrepreneurial zeal) is necessary to sustain a 21st-century knowledge economy, and how is this achieved?* Here it is increasingly clear that the key to global competitiveness in regions aspiring to a high standard of living is innovation. And the keys to innovation are new knowledge, human capital, infrastructure, and forward-looking public policies. Not only must a region match investments made by other states and nations in education, R&D, and infrastructure, but it must recognize the inevitability of new innovative,



The key question before Michigan: Are today's citizens and their leaders willing to invest in the education and knowledge resources necessary to secure a prosperous and secure future for tomorrow's generations?

technology-driven industries replacing old obsolete and dying industries as a natural process of "creative destruction" (a la Schumpeter) that characterizes a hypercompetitive global economy. Yet it must also provide a safety net for those citizens caught in such economic transformations through inclusive social programs.

So how far does Michigan have to travel to achieve a knowledge economy competitive at the global level? What is the gap between Michigan today and Michigan tomorrow?

This part of the roadmapping process does not require a rocket scientist. One need only acknowledge the hopelessness in the faces of the unemployed, or the backward glances of young people as they leave our state for better jobs, or the angst of students and parents facing yet another increase in college costs as state government once again cuts appropriations for higher education. Yet this effort must also challenge the inability of Michigan's leaders to address the imperatives of the global economy, while building an awareness among Michigan parents that nothing will matter more to their children's future than their education. To paraphrase Thomas Friedman, "The world is flat! Globalization has collapsed time and distance and raised the notion that someone anywhere on earth can do your job, more cheaply. Can Michigan

rise to the challenge on this leveled playing field?"

So, what do we need to do? What is the roadmap to Michigan's future? In a knowledge-intensive economy, regional advantage in a highly competitive global marketplace is achieved through creating a highly educated and skilled workforce. It requires an environment that stimulates creativity, innovation, and entrepreneurial behavior. Experience elsewhere has shown that strategic vision, enlightened public policies, and significant public and private investments in high-skilled human capital, research and innovation, and infrastructure are necessary to sustain a knowledge economy.

The Roadmap: The Near Term (...now!...)

In the near term our principal recommendations focus on Michigan's most valuable resources, its people, investing in their education, skills, and creativity, and developing the knowledge infrastructure to enable their innovation and entrepreneurial zeal. Our recommendations are also aimed at providing the state's economic sectors and institutions—including government, industry, and education—with capacity, incentives, and encouragement to become more agile and market-smart.

Human Capital

1. The State of Michigan will set as its goal that all students will graduate from its K-12 system with a high school degree that signifies they are college ready. To this end, all students will be required to pursue a high school curriculum capable of preparing them for participation in post-secondary education and facilitating a seamless transition between high school and college. State government and local communities will provide both the mandate and the resources to achieve these goals.

2. Beyond the necessary investments in K-12 education and the standards set for their quality and performance, raising the level of skills, knowledge, and achievement of the Michigan workforce will require a strong social infrastructure of families and local communities, particularly during times of economic



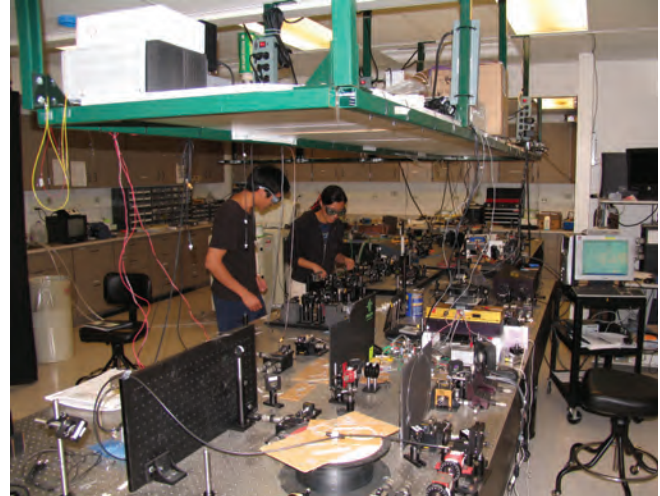
Investing in tomorrow's human capital

stress. To this end, state government and local government must take action both to re-establish the adequacy of Michigan's social services while engaging in a broad effort of civic education to convince the public of the importance of providing world-class educational opportunities to all of its citizens.

3. Michigan must create and articulate clearer pathways among educational levels and institutions while removing barriers to student mobility and promoting new learning paradigms (e.g., distance education, lifelong learning, workplace programs) to accommodate a far more diverse student cohort.

4. Higher education must become significantly more engaged with K-12 education, accepting the challenge of improving the quality of our primary and secondary schools as one of its primary responsibilities and highest priorities with the corresponding commitment of faculty, staff, and financial resources. Each Michigan college and university should be challenged to develop a strategic plan for such engagement, along with measurable performance goals.

5. Michigan must increase very substantially the participation of its citizens in higher education at all levels—community college, baccalaureate, and graduate and professional degree programs. This will require a substantial increase in the funding of higher education from both public and private sources as well as significant changes in public policy. This, in turn,



Investing in cutting-edge research

will require a major effort to build adequate public awareness of the importance of higher education to the future of the state and its citizens. It will also likely require a dedicated source of tax revenues to achieve and secure the necessary levels of investment during a period of gridlock in state government, perhaps through a citizen-initiated referendum.

6. To achieve and sustain the quality of and access to educational opportunities, Michigan needs to move into the top quartile of states in its higher education appropriations (on a per student basis) to its public universities. To achieve this objective, state government should set a target of increasing by 30% (beyond inflation) its appropriations to its public colleges and universities over the next five years.

7. The increasing dependence of the knowledge economy on science and technology, coupled with Michigan's relatively low ranking in percentage of graduates with science and engineering degrees, motivates a strong recommendation to state government to place a much higher priority on providing targeted funding for program and facilities support in these areas in state universities, similar to that provided in California, Texas, and many other states. In addition, more effort should be directed toward K-12 to encourage and adequately prepare students for science and engineering studies, including incentives such as forgivable college loan programs in these areas (with forgiveness contingent upon completion of degrees and

working for Michigan employers). State government should strongly encourage public universities to recruit science and engineering students from other states and nations, particularly at the graduate level, perhaps even providing incentives such as forgivable loans if they accept employment following graduation with Michigan companies.

8. Colleges and universities should place far greater emphasis on building alliances that will allow them to focus on unique core competencies while joining with other institutions in both the public and private sector to address the broad and diverse needs of society in the face of today's social, economic, and technological challenges. For example, research universities should work closely with regional universities and independent colleges to provide access to cutting-edge knowledge resources and programs.

New Knowledge (R&D, innovation)

9. The quality and capacity of Michigan's learning and knowledge infrastructure will be determined by the leadership of its public research universities in discovering new knowledge, developing innovative applications of those discoveries that can be transferred to society, and educating those capable of working at the frontiers of knowledge and the professions. State government should strongly support the role of these institutions as sources of advanced studies and research by dramatically increasing public support of research infrastructure, analogous to the highly successful Research Excellence Fund of the 1980s. Also key will be enhanced support of the efforts of regional colleges and universities to integrate this new knowledge into academic programs capable of providing lifelong learning opportunities of world-class quality while supporting their surrounding communities in the transition to knowledge economies.

10. In response to such reinvestment in the research capacity of Michigan's universities, they, in turn, must become more strategically engaged in both regional and statewide economic development activities. Intellectual property policies should be simplified and standardized; faculty and staff should be encouraged

to participate in the startup and spinoff of high-tech business; and universities should be willing to invest some of their own assets (e.g., endowment funds) in state- and region-based venture capital activities. Furthermore, universities and state government should work more closely together to go after major high tech opportunities in both the private and federal sectors (attracting new knowledge-based companies and federally funded R&D centers—FFRDCs).

11. Michigan must also invest additional public and private resources in private-sector initiatives designed to stimulate R&D, innovation, and entrepreneurial activities. Key elements would include reforming state tax policy to encourage new, high-tech business development, securing sufficient venture capital, state participation in cost-sharing for federal research projects, and a far more aggressive and effective effort by the Michigan Congressional delegation to attract major federal research funding to the state.

Infrastructure

12. Providing the educational opportunities and new knowledge necessary to compete in a global, knowledge-driven economy requires an advanced infrastructure: educational and research institutions, physical infrastructure such as laboratories and cyberinfrastructure such as broadband networks, and supportive policies in areas such as tax and intellectual property. Michigan must invest heavily to transform the current infrastructure designed for a 20th-century manufacturing economy into that required for a 21st-century knowledge economy. Of particular importance is a commitment by state government to provide adequate annual appropriations for university capital facilities comparable to those of other leading states. It is also important for both state and local government to play a more active role in stimulating the development of pervasive high speed broadband networks, since experience suggests that reliance upon private sector telcom and cable monopolies could well trap Michigan in a cyberinfrastructure backwater relative to other regions (and nations).

Policies

13. As powerful market forces increasingly dominate public policy, Michigan's higher-education strategy should become market-smart, investing more public resources directly in the marketplace through programs such as vouchers, need-based financial aid, and competitive research grants, while enabling public colleges and universities to compete in this market through encouraging greater flexibility and differentiation in pricing, programs, and quality aspirations.

14. Michigan should target its tax dollars more strategically to leverage both federal and private-sector investment in education and R&D. For example, a shift toward higher tuition/need-based financial aid policies in public universities not only leverages greater federal financial aid but also avoids unnecessary subsidy of high-income students. Furthermore greater state investment in university research capacity would leverage greater federal and industrial support of campus-based R&D.

15. Key to achieving the agility necessary to respond to market forces will be a new social contract negotiated between the state government and Michigan's public colleges and universities, which provides enhanced market agility in return for greater (and more visible) public accountability with respect to quantifiable deliverables such as graduation rates, student socioeconomic diversity, and intellectual property generated through research and transferred into the marketplace.

16. Michigan must recommit itself to the fundamental principles of equal opportunity and social inclusion through the actions of its leaders, the education of its citizens, and the modification of restrictive policies, if it is to enable an increasingly diverse population to compete for prosperity and security in an intensely competitive, diverse, and knowledge-driven global economy.

The Roadmap (longer term...but within a decade)

For the longer term, our vision for the future of higher education is shaped very much by the recognition that we have entered an age of knowledge in a global economy, in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, social well-being, and national security. Moreover, education, knowledge, innovation, and entrepreneurial skills have also become the primary determinants of one's personal standard of living and quality of life. We believe that democratic societies—including state and federal governments—must accept the responsibility to provide all of their citizens with the educational and training opportunities they need, throughout their lives, whenever, wherever, and however they need it, at high quality and at affordable prices.

To this end, the long-term roadmap proposes a vision of the future in which Michigan strives to build a knowledge infrastructure—a society of learning—capable of adapting and evolving to meet the imperatives of a global, knowledge-driven world. Such a vision is essential to create the new knowledge (research and innovation), a skilled workforce, and the infrastructure necessary for Michigan to compete in the global economy while providing citizens with the lifelong learning opportunities and skills they need to live prosperous and secure lives in our state. As steps toward this vision, we recommend the following actions:

1. Michigan needs to develop a more systemic and strategic perspective of its educational, research, and cultural institutions—both public and private, formal and informal—that views these knowledge resources as comprising a knowledge ecology that must be adequately supported and allowed to adapt and evolve rapidly to serve the needs of the state in a change driven world, free from micromanagement by state government or intrusion by partisan politics.

2. Michigan should strive to encourage and sustain a more diverse system of education, since institutions with diverse missions, core competencies, and funding mechanisms are necessary to serve the diverse

needs of its citizens, while creating a knowledge infrastructure more resilient to the challenges presented by unpredictable futures. Using a combination of technology and funding policies, efforts should be made to link elements of Michigan's learning, research, and knowledge resources into a market-responsive seamless web, centered on the needs and welfare of its citizens and the prosperity and quality of life in the state rather than the ambitions of institutional and political leaders.

3. Serious consideration should be given to reconfiguring Michigan's educational enterprise by exploring new paradigms based on the best practices of other regions and nations. For example, the current segmentation of learning by age (e.g., primary, secondary, collegiate, graduate-professional, workplace) is increasingly irrelevant in a competitive world that requires lifelong learning to keep pace with the exponential growth in new knowledge. More experimentation both in terms of academic programs and institutional types should be encouraged.

4. The quality and capacity of Michigan's learning and knowledge infrastructure will be determined by the leadership of its research universities in discovering new knowledge, developing innovative applications of these discoveries that can be transferred to society, and educating those capable of working at the frontiers of knowledge and the professions. Because of the importance of research and graduate education to the state's future, these universities should be encouraged to give priority to these activities, while undergraduate education remains the primary mission of Michigan's other colleges and universities.

5. Michigan's research universities should explore new models for the transfer of knowledge from the campus into the marketplace, including the utilization of endowment capital (perhaps with state match) to stimulate spinoff and startup activities and exploring entirely new approaches such as "open source – open content paradigms" in which the intellectual property created through research and instruction is placed in the public domain as a "knowledge commons," available without restriction to all, in return for strong

public support.

6. While it is natural to confine state policy to state boundaries, in reality such geopolitical boundaries are of no more relevance to public policy than they are to corporate strategies in an ever more integrated and interdependent global society. Hence Michigan's strategies must broaden to include regional, national, and global elements, including the possibility of encouraging the state's two internationally prominent research universities, the University of Michigan and Michigan State University, to join together to create a true world university, capable of assisting the state to access global economic and human capital markets.

7. Michigan should explore bold new models aimed at producing the human capital necessary to compete economically with other regions (states, nations) and provide its citizens with prosperity and security. Lifelong learning will not only become a compelling need of citizens (who are only one paycheck away from the unemployment line in a knowledge-driven economy), but also a major responsibility of the state and its educational resources. One such model might be to develop a 21st-century analog to the G.I. Bill of the post WWII era that would provide—indeed, guarantee—all Michigan citizens with access to abundant, high-quality, diverse learning opportunities throughout their lives, and adapts to their ever-changing needs.

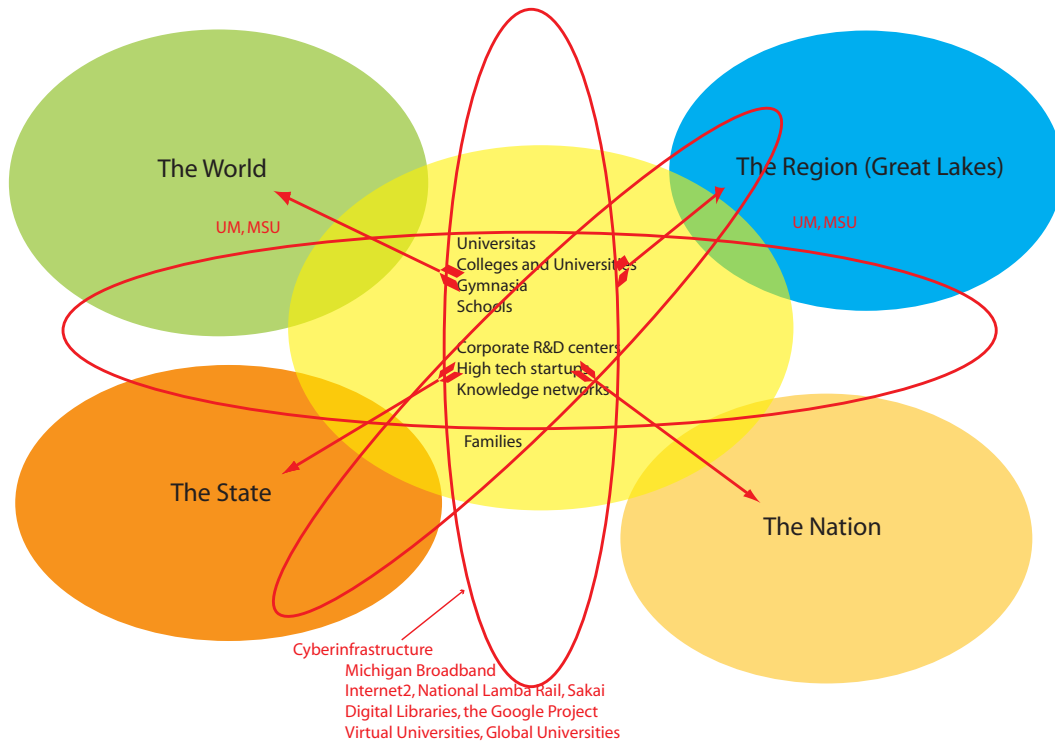
8. Michigan should work closely with other Great Lakes states facing similar challenges and opportunities to develop a regional agenda, both to facilitate cooperation and to influence national priorities.

9. Michigan should develop a leadership coalition—involving leaders from state government, industry, labor, education, and concerned citizens—with vision and courage sufficient to challenge and break the stranglehold of the past on Michigan's future!

Michigan is far more at risk than many other states because its manufacturing-dominated culture is addicted to an entitlement mentality that has long since disappeared in other regions and industrial sectors. Moreover, politicians and the media are both

Michigan Tomorrow

A Digital "Catholepistimead" or "Society of Learning"



Michigan tomorrow

irresponsible and myopic as they continue to fan the flames of the voter hostility to an adequate tax base capable of meeting both today's urgent social needs and longer-term investment imperatives such as education and innovation. As Bill Gates warned, cutting-edge companies no longer make decisions to locate and expand based on tax policies and incentives. Instead they base these decisions on a state's talent pool and culture for innovation—priorities apparently no longer valued by many of Michigan's leaders, at least when facing actions that challenge partisan politics.

To be sure, it is difficult to address issues such as developing a tax system for a 21st-century economy, building world-class schools and colleges, or making the necessary investments for future generations in the face of the determination of the body politic still clinging tenaciously to past beliefs and practices. Yet the realities of a flat world will no longer tolerate procrastination or benign neglect.

It is time for leaders of state government, business, labor, education, and foundations to acknowledge and explain to the public that without the sacrifices we

must make today to enable investments for tomorrow, Michigan is well on its way to becoming Mississippi, a backwater filled with the rusting hulls of an obsolete manufacturing economy while other states and nations make the investments to move into the knowledge economy. A civil society does require some degree of sacrifice on the part of all citizens, relative to their capacity and means. To be sure, this might infuriate some—particularly among the affluent who benefit most from this "cut my taxes now; I'll worry about my kids later" mentality, and who will eventually pack off and retire in Florida, taking their tax-cut windfalls with them. It might also lose some votes. But what is the purpose of leadership if all one does is leave behind a legacy of poverty and hopelessness?

Unlike most states, Michigan has no alliance of business, labor, higher education, and public leaders to push for the future of the state. Instead, narrowly focused special-interest groups have captured control of the political parties and public policy process (e.g., labor-left, religious-right, neo-cons). They are running the train off the track, blocking any effective efforts

Recommendations

The Near Term

Today's Challenge: Enabling Michigan's transition to a knowledge-driven economy capable of providing prosperity, security, and social well-being in a hypercompetitive global economy.

Key Vision:

To invest more adequately, strategically, and intelligently, with investments in people as the highest priority.

Investment Goals:

- ... human capital (lifelong learning)
- ... new knowledge (research, innovation, entrepreneurship)
- ... infrastructure (institutions, labs, cyber)
- ... policy (tax, investment, intellectual property)

The Elements:

1. All K-12 students will graduate college ready.
2. Priority will be given to the social infrastructure for learning.
3. Create clearer pathways among learning institutions.
4. Higher education will become more engaged with K-12 schools.
5. Increase participation of all citizens in higher education.
6. Move Michigan into top quartile in higher ed investments.
7. Targeted state investment in science and engineering.
8. Stress alliances among Michigan's colleges and universities.
9. Increase state investments in university research infrastructure.
10. Universities should become more engaged in tech transfer.
11. Incentives to stimulate private sector R&D and innovation.
12. Public investment in infrastructure such as broadband is critical.
13. Michigan should invest more in need-based financial aid.
14. State funds should be used to leverage private and federal funds.
15. Universities should be provided with agility to adapt to markets.
16. A recommitment to equity and social inclusion.

The Longer Term

Tomorrow's Challenge: To provide all of Michigan's citizens with the education and training they need, throughout their lives, whenever, wherever, and however they desire it, at high quality, and affordable cost.

Key Vision:

To develop a society of learning capable of responding to the imperatives of a 21st century, global, knowledge-driven society.

Goal:

A society of learning, capable of adapting and evolving rapidly to provide learning opportunities, knowledge, and innovation during a period of extraordinary change.

The Elements:

1. Michigan must develop a more systemic and strategic approach to its knowledge resources.
2. The state should encourage more diversity in institutions.
3. New paradigms for K-16 education should be explored.
4. UM and MSU should be encouraged to stress advanced education and research.
5. UM and MSU should be encouraged to develop capacity to access global markets.
6. Michigan's universities should explore bolder models of tech transfer, spinoffs, and startup activities.
7. Michigan should consider bolder models for producing human capital such as a 21st century version of the G.I. Bill that guarantees lifelong educational opportunities for all citizens.

of strategic action. Only the narrowest of political initiatives is able to get any traction (e.g., bans on gay marriages or affirmative action).

It is time that someone sounded the alarm: Michigan is falling apart! It is rapidly losing its ability to compete in the economy of the future. We have only a short time to make the moves that will allow us to stay competitive!

The Michigan Roadmap is intended in part for leaders in the public sector (the Governor, Legislature, and other public officials), the business community (CEOs, labor leaders), higher education leaders, and the nonprofit foundation sector. However, this report is also written for those interested, concerned citizens who have become frustrated with the deafening silence about Michigan's future that characterizes our public, private, and education sectors. The state's leaders, its government, industry, labor, and universities, have simply not been willing to acknowledge that the rest

of the world is changing. They have held fast to an economic model that is not much different from the one that grew up around the heyday of the automobile era—an era that passed long ago.

It should be acknowledged that much of the rhetoric used in this report is intentionally provocative—if not occasionally incendiary. But recall here that old saying that sometimes the only way to get a mule to move is to whack it over the head with a 2x4 first to get its attention. The Michigan Roadmap is intended as just such a 2x4 wake-up call to our state. For this effort to have value, we believe it essential to explore openly and honestly where our state is today, where it must head for tomorrow, and what actions will be necessary to get there. Michigan simply must stop backing into the future and, instead, turn its attention to making the commitments and investments today necessary to allow it to compete for prosperity and social well-being

tomorrow in a global, knowledge-driven economy.

Here a second caveat is important. Such roadmaps should be viewed as transient documents, since the Michigan landscape changes over time. As the world continues to change, and as thoughtful and creative people become more engaged in considering our state's challenges and opportunities, new paths to the future will become apparent. Hence it is important for readers to consider this particular effort as both organic and evolutionary. Feedback, criticism, and suggestions are strongly encouraged and these will reshape future versions of the Michigan Roadmap, just as the current Michigan Roadmap Redux was reshaped by the input of many of those who provided feedback on the earlier 2005 document.

What is really at stake today is building Michigan's regional advantage, allowing it to compete for prosperity and quality of life, in an increasingly competitive global economy. In a knowledge-intensive society, regional advantage is not achieved through traditional political devices such as tax cuts for the wealthy, regulatory relief of polluters, entitlements for those without need, or tax-subsidized gimmicks such as lotteries, casinos, or sports stadiums. A knowledge-based, competitive economy is achieved through creating a highly educated and skilled workforce. It requires public investment in the ingredients of innovation—educated people and new knowledge—and the infrastructure to support advanced learning, research, and innovation. It requires an environment that stimulates creativity, innovation, and entrepreneurial behavior. Put another way, it requires strong public purpose, wise public policy, and adequate investment to create a true society of learning. And these, in turn, require dedicated, visionary, and courageous leadership in government, business, education, and other areas of civic life.

To face the opportunities, challenges, and responsibilities of an increasingly uncertain future, Michigan needs to rekindle the spirit of adventure, creativity, innovation, and boundless hope in the future that has characterized its history. During its early years, its frontier spirit was sustained by a sense of optimism and excitement about the future and a relish for change. Today this same spirit needs to be rekindled to secure Michigan's future.



The Midwest and the Great Lakes states

A Strategic Roadmap for the Midwest

The Midwest Today

In his recent book, *Caught in the Middle*, Richard Longworth portrays the challenge of regional economic development in a compelling way: "As the Midwest moves toward the future, leaving the past behind, the social disruption is going to be enormous. Hard decisions must be made. State governments, unsupported, cannot make them. Someone else must lead. But lead where. Globalization changes everything in economics and in life. Nothing remains the same. No real future exists except the future that the Midwest creates for itself. New England and the South have already learned this. So have many regions inside the European Union. This future must be crafted regionally, by the Midwest acting as a single unit, not as a mélange of hostile states but as one region that shares not only a past but a future." (Longworth, 2008)

To be sure, it is difficult to address issues such as building world-class schools and colleges, developing a tax policy for a 21st century economy, or making the necessary investments for future generations when the body politic and its political leaders seem determined to cling tenaciously to past beliefs and practices. Yet the realities of a flat world will no longer tolerate procrastination or benign neglect. For this effort to have value, we believe it essential to explore openly and honestly where the Midwest is today, where it must head for tomorrow, and what actions will be necessary

to get there.

This report is aimed at several audiences. Certainly it is intended for leaders in the public sector (governors, legislatures, mayors, and other public officials), the business community (CEOs, labor leaders), higher-education leaders, and the nonprofit foundation sector. However, the report is also written for interested and concerned citizens who have become frustrated with the myopia that characterizes our public, private, and education sectors.

The Midwest region faces a crossroads, as a global knowledge economy demands a new level of knowledge, skills, and abilities on the part of our citizens. The goal is to transform what was once the farming and manufacturing center of the world economy into what could become its knowledge center. Put another way, while the Midwest region once provided the muscle for the manufacturing economy that powered the 20th century, now it must make the commitment and the investments necessary to become the brains of the 21st century knowledge economy.

While there are many components to transforming the American Midwest into a learning- and innovation-driven economy—tax policy, providing adequate social services, government restructuring, and, of course, political transformation—this report focuses particular attention on the role played by colleges and universities. In earlier critical moments in our nation's history, public initiatives gave high priority to expanding educational opportunities as a route to prosperity, security, and social well being. The states took action to ensure universal access to secondary education. The Land Grant Acts in the 19th century extended college education to the working class. The G. I. Bill provided the returning veterans of World War II with college educations while the Truman Commission proposed extending college opportunities to all Americans. The partnership developed between the federal government and faculty researchers on the campuses created the American research university as a source of much of the basic research and innovation that powered the global economy in the post WWII years.

A half-century ago, during a period of similar demographic and economic challenge and opportunity, the state of California responded with a master plan that not only broadened the opportunity for a college

education to all Californians but also created the finest university in the world, the University of California. As one of the architects of that plan, UC President Clark Kerr, emphasized: "The future of California no longer depends upon the gold in the hills, or the fertility of the valleys, or the climate in Southern California producing Hollywood as a place that can operate all year round and provide a favorable place for artists, for actors and actresses to live. We can no longer count on the physical resources of the state. From here on out, our future depends upon how well we develop our human resources, how well we develop our research and development efforts, how well we develop the skills of our labor force as currently in electronics and biotechnology. So let me conclude with these final words. As goes education, so goes California." (Kerr, 2001)

Today the challenges and opportunities confronting the American Midwest demand a similarly profound vision and commitment. To paraphrase President Kerr: The future of the Midwest region no longer depends on our factories and farms or a labor force possessing physical strength and determination, but limited skills and education. Nor will our region's remarkable natural resources, our forests and fertile fields, our rivers and inland seas, determine our future. From here on out, our future depends on how well we develop our human resources and how we create and apply new knowledge through innovation and entrepreneurial zeal. So let us conclude with final words: As goes higher education, so goes the Midwest!

Overburdened with legacy economic and political burdens, state governments are less and less influential in determining prosperity in the new economy. In today's economy, any region in the world can be a locus for knowledge work. In a wired, interdependent global economy that allows people to choose where to live and work and where to make goods and services, regions are now challenged to identify and nurture their unique economic advantages. Today's economic activities are no longer constrained by traditional geopolitical boundaries, such as states and nations. Instead, they span larger multistate or multinational regions with common economic, demographic, and cultural characteristics. Furthermore, the centers of economic and political activities within such regions

have become large metropolitan concentrations, capable of building and sustaining the learning and innovation infrastructure necessary to power the knowledge economy.

The states and cities of the American Midwest, with their common history, demographics, economy, and culture, comprise just such a region. The farms and factories built by pioneers and immigrants transformed the Midwest. The region's innovative and entrepreneurial spirit in key industries, such as agriculture, manufacturing, and transformation made the Midwest the geopolitical, cultural, and economic heartland of twentieth century America.

But, more precisely, just what is the Midwest? It might be defined as those states in the midsection of the nation: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, and Missouri. More broadly, one could add portions of other states that also rim the Great Lakes and line the Ohio watershed, notably western Pennsylvania and New York, West Virginia, and northern Kentucky, comprising the "Great Lakes-Midwest" region. Or we could add the Great Plains states of North and South Dakota, Nebraska, and Kansas. In fact, one might even cross national boundaries to add the Canadian Great Lakes provinces of Ontario and Quebec, creating an international region with remarkably common histories, geographies, economies, and cultures.

Although we will focus most of our attention on the more narrowly defined eight-state Midwest region, our analysis and discussion will at times adopt a broader definition of the "Greater Midwest" that broadens to include additional states from the Great Lakes and Great Plains regions.

Today the American Midwest, the region that once powered the global economy, created the middle class, fed the world, and defended democracy, is floundering in a twenty-first century global economy driven by knowledge and innovation. The region is having great difficulty in making the transition from an industrial agricultural and manufacturing economy to a knowledge economy. A recent Brookings Institution study summarizes the state of the region as follows:

Still heavily reliant on mature industries and products, its aging workforce lacks the education and skills needed to fill and create jobs in the new economy.

Its entrepreneurial spirit is lagging, hampering its ability to spur new firms and jobs in high-wage industries. Its metropolitan areas are economically stagnant, old and beat up, and plagued with severe racial divisions. Its landscape is dotted with emptying manufacturing towns, isolated farm, mining, and timber communities. It continues to bleed young, mobile, educated workers seeking opportunities elsewhere. Its legacy of employee benefits, job, and income security programs—many of which the region helped pioneer—has become an unsustainable burden, putting its firms at a severe competitive disadvantage in the global economy. And most important, the culture of innovation that made it an economic leader in the 20th century has long since vanished. (Austin, 2008)

The Midwest has many assets—the immense fresh water resources of the Great Lakes watershed, the region's limited vulnerability to natural disasters, such as earthquakes and hurricanes, its forests and fertile fields. Other characteristics have more questionable value. Its highways and factories, communications and urban infrastructure, and even its public priorities, evolved to serve a factory-based economy, not a knowledge economy, and today represent more of a liability than an asset.

Yet it is with the most important assets driving the global economy where the Midwest region has the greatest challenge. Our world today has entered an era in which educated people, the knowledge they produce, and the innovation and entrepreneurial skills they possess have become the keys to economic prosperity, public health, national security, and social well-being. Unfortunately, many of the workforce skills of the Midwest region are no longer at world-class levels, both because of aging and declining populations and because of the relatively low priority given to education by an agricultural and factory-based economy. Furthermore, the region has lost much of the zeal for risk-taking and innovation that led to its remarkable economic leadership in agriculture and industry in earlier times.

For years now the Midwest has seen its low-skill, high-pay factory jobs outsourced and replaced by low-skill, low-pay service jobs—or in too many cases, no jobs at all (Glazer, 2010). Other states, regions and nations, from Europe to Asia, invest heavily in high-

skill, high-wage jobs in areas, such as information services, financial services, trade, and professional and technical services. Yet in much of the Midwest—among its political leaders, its media and opinion makers, and its people—there is a deafening silence about the implications of a global, knowledge-driven global economy for the region's future. There is little evidence of effective policies, new investments, or visionary leadership capable of reversing the downward spiral of our industrial economies (Power, 2009).

Leaders in both the public and private sectors continue to cling tenaciously to past beliefs and practices, preoccupied with obsolete and largely irrelevant issues (e.g., the culture wars, entitlements, tax cuts or abatements for dying industries, and gimmicks, such as casinos and cool cities) rather than developing strategies, taking actions, and making the necessary investments to achieve economic prosperity and social well-being in the new global economic order. Assuming that what worked before will work again, the Midwest today is sailing blindly into a profoundly different future.

Perhaps nowhere is this inability to read the writing on the wall more apparent than in the Midwest region's approach to education. Our strategies and policies aimed at providing our citizens with the education and skills, the innovative and entrepreneurial spirit, so necessary today for personal well-being and economic prosperity, have been woefully inadequate, all too often political in character, and largely reflecting a state of denial about the imperatives of the emerging global economy.

It may seem surprising that a region, which a century and a half ago led the nation in its commitment to building great public education systems aimed at serving all of its citizens, would be failing today in its human resource development. Indeed the guiding principle of the Northwest Ordinance of 1787 that shaped the new Midwest states preparing to enter the Union stated firmly that: "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged" (Thorpe, 1909). During the early half of the nineteenth century, the religious revival movement known as the Great Awakening stimulated the efforts of religious

denominations to establish hundreds of small religious colleges across the Midwestern United States that today have become some of the nation's finest independent colleges. The Morrill Act of 1863 put federal lands at the disposal of states to build the land-grant universities that would extend educational opportunity to the working class in the nineteenth and twentieth centuries and today comprise the world's greatest concentration of comprehensive research universities. In the late nineteenth century, the public secondary schools first appeared in the Midwest both to provide the further education needed by an increasingly industrial society and to prepare students for further study at the university level, thereby defining and implementing the principle of universal educational opportunity for the nation.

The strength of the Midwest—its capacity to build and sustain such extraordinary institutions—arose from its ability to look to the future and its willingness to take the actions and make the investments that would yield prosperity and well-being for future generations. Yet, today this spirit of public investment for the future has disappeared. Decades of failed public policies and inadequate investment now threaten the extraordinary educational resources built through the vision and sacrifices of past generations.

Beyond educational opportunities, there is another key to economic prosperity in today's global economy: technological innovation. As the source of new products and services, innovation is directly responsible for the most dynamic areas of the U.S. economy and is estimated to have provided roughly 50 percent of America's economic growth since World War II (Augustine, 2005). It has become even more critical to our prosperity and security in today's hypercompetitive, global, knowledge-driven economy. But history shows that significant public investment is necessary to produce the essential ingredients for innovation to flourish: new knowledge (e.g., research), human capital (e.g., education), infrastructure (e.g., facilities, laboratories, communications, and networks), and policies (e.g., tax and intellectual property).

Again, the irony of the region's plight today is that the Midwest led the world in technological innovation throughout much of the 20th century (Longworth, 2008). The automobile industry concentrated in Michigan



Getting ready for the Millennials!

because of the skills of our craftsmen, engineers, technologists, and technicians and the management and financial skills of corporate leadership as the industry grew to global proportions. Modern agriculture and the commodity markets were defined in both the farming communities of the Midwest and great trading and manufacturing centers such as Chicago. While the workforce skills required by factory manufacturing required only minimal formal education, technological excellence and skillful management enabled Midwestern corporations to achieve global impact. Basic research was also key, funded both by industry in world-class laboratories such as the Bell Laboratories, the Ford Scientific Laboratory, and the General Motors Research Laboratory, by national laboratories in areas such as nuclear research and high energy physics (e.g., Argonne National Laboratory and Fermi National Laboratory), and by the emergence of one of the most formidable concentrations of outstanding research universities in the world.

Yet by the late twentieth century, the Midwestern economic picture had changed. Short-term planning cramped innovation. Restructuring led to the loss of hundreds of thousands of manufacturing jobs. The Midwest's Washington influence was used more to promote farm subsidies and to block federal regulation in areas, such as automobile emissions standards and fuel economy than to attract additional federal R&D dollars to the region. And state governments shifted public funding away from the support of higher education and research and instead to the priorities



Embracing the diversity a new generation

of aging populations, such as safety from crime (e.g., prison construction), social services (e.g., health care), and tax relief. As a consequence, at a time when other states and nations were investing heavily in stimulating the technological innovation to secure future economic prosperity, much of the Midwest was missing in action, significantly under-investing in the seeds of innovation.

The Strategic Roadmap

We begin with three important perspectives: acting regionally while thinking globally; demanding regional collaboration instead of pointless competition; and thinking far more strategically:

Regional to National to Global: While it is natural to confine policy to state boundaries, in reality such geopolitical boundaries are of no more relevance to public policy than they are to corporate strategies in an ever more integrated and interdependent global society. Hence the Midwest's strategies must broaden to include regional, national, and global elements. (Now!)

Competition to Collaboration: Midwestern states, governments, and institutions must shift from Balkanized competition to collaboration to achieve common interests, building relational rather than transactional partnerships most capable of responding to global imperatives. (Now!)



Restructuring higher education

System and Strategic Perspectives: The Midwest needs to develop a more systemic and strategic perspective of its educational, research, and cultural institutions—both public and private, formal and informal—that views these knowledge resources as comprising a knowledge ecology that must be adequately supported and allowed to adapt and evolve rapidly to serve the needs of the state in a change driven world, free from micromanagement by state government or intrusion by partisan politics. (Now!)

The roadmap for higher education in the Midwest consists of a number of recommendations, some obvious, some seemingly radical, but all aimed at reinvigorating Midwestern education and applying it to the recovery of the Midwestern economy. These recommendations are organized into four groups corresponding to key responsibilities at the national, regional, state, and institutional levels. We begin with the foundation for these recommendations:

Pre-College

All Students College- or Workplace-Ready: The Midwest region should set high goals that ALL students will graduate with a high school degree that signifies they are not only either college- or workplace-ready but furthermore prepared for a world that will require a lifelong commitment to learning. State governments and local communities should provide both the mandate and the resources to achieve these goals. (Now!)



The emergence of “world” universities

Restructuring K-12 to Achieve World-class Performance: To achieve a quantum leap in student learning, Midwest school systems will have to restructure themselves to achieve world-class performance, including setting high standards for student and teacher performance, lengthening the school year, investing in modern learning resources, implementing rigorous methods for assessing student learning, preparing and rewarding outstanding teachers, and managing and governing school systems in an accountable fashion. (Soon)

Social Infrastructure: Beyond the necessary investments in K-12 education and the standards set for their quality and performance, raising the level of skills, knowledge, and achievement of the Midwest’s workforce will require a strong social infrastructure of families and local communities, particularly during times of economic stress. To this end, state and local governments must take action both to re-establish the adequacy of the Midwest’s social services while engaging in a broad effort of civic education to convince the public of the importance of providing world-class educational opportunities to all of its citizens. (Soon)

Higher Education Engagement with K-12: Higher education must become significantly more engaged with K-12 education, accepting the challenge of improving the quality of our primary and secondary schools as one of its highest priorities with the corresponding



Enhanced college participation and degrees

commitment of faculty, staff, and financial resources. Each Midwest college and university should be challenged to develop a strategic plan for such engagement, along with measurable performance goals and should be encouraged to join in consortia to address the challenges of K-12 education. (Now!)

Linkages and Pathways: The Midwest must create clearer pathways among educational levels and institutions and removing barriers to student mobility and promoting new learning paradigms (e.g., distance education, lifelong learning, workplace programs) to accommodate a far more diverse student cohort. (Soon)

Higher Education

Demanding Zero-Defects Institutional Performance: All Midwest colleges and universities should be challenged to achieve a “zero-defects, total quality” performance goal in which all enrolled students are expected to graduate in the prescribed period. This will require not only adequate financial, instructional, and counseling support but as well strong incentives and disincentives at the individual and institutional level (e.g., basing public support on graduation rates rather than enrollments, demanding that faculty give highest priority to adequate staffing of required curricula, and setting tuition levels to encourage early graduation). (Soon)

Institutional Diversity: The Midwest should strive



Preparing for Generation Z

to encourage and sustain a more diverse system of higher education, since institutions with diverse missions, core competencies, and funding mechanisms are necessary to serve the diverse needs of its citizens, while creating a knowledge infrastructure more resilient to the challenges presented by unpredictable futures. Using a combination of technology and funding policies, efforts should be made to link elements of the Midwest’s learning, research, and knowledge resources into a market-responsive seamless web, centered on the needs and welfare of its citizens and the prosperity and quality of life in the region rather than the ambitions of institutional and political leaders. (Soon)

Community Colleges and Regional Universities: Key will be enhanced support of the efforts of community colleges and regional universities to integrate the new knowledge developed by research universities into academic programs capable of providing lifelong learning opportunities of world-class quality while supporting their surrounding communities in the transition to knowledge economies by developing additional professional programs more suited to the needs and interests of adult students. (Now!)

Independent Colleges: The region should encourage affiliations among independent colleges stressing high quality undergraduate education based on the liberal arts and research universities capable of providing the vast resources for state-of-the-art education in advanced subjects such as science and engineering. (Now!)

For-Profit and Proprietary Providers: To meet the expanding needs of a knowledge-driven economy requiring lifelong learning opportunities, the Midwest should recognize the strategic importance of for-profit and proprietary higher education providers who not only have the capacity to access capital markets, but have developed successful paradigms for educating adult learners. Yet it is also important that the for-profit sector be held accountable for student success and employability. (Now!)

World Universities: As a component of the Midwest's higher education strategies, serious consideration should be given to encouraging the region's internationally prominent research universities to explore the possibility of evolving into truly world universities, capable of accessing global economic and human capital markets. Key in this effort will be a far more strategic approach to immigration, viewing the region's research universities as portals to attract talent from around the world. (Soon)

Immigration: Immigration is vital to transforming the Midwest economy, as a source of both talent and energy and contributing to its innovation and entrepreneurship. The only immigration policy that will help the Midwest is one that opens the door as widely as possible. (Now!)

Expanding Educational Opportunities: The Midwest must recommit itself to the fundamental principles of equal opportunity and social inclusion through the actions of its leaders, the education of its citizens, and the modification of restrictive policies, if it is to enable an increasingly diverse population to compete for prosperity and security in a intensely competitive, diverse, and knowledge-driven global economy. (Now!)

Restructuring the Higher Education Enterprise: Serious consideration should be given to reconfiguring the Midwest's educational enterprise by exploring new paradigms based on the best practices of other regions and nations. For example, the current segmentation of learning by age (e.g., primary, secondary, collegiate, graduate-professional, workplace) is increasingly

irrelevant in a competitive world that requires lifelong learning to keep pace with the exponential growth in new knowledge. More experimentation both in terms of academic programs and institutional types should be encouraged. Academic institutions should be provided with greater agility—albeit accompanied by greater accountability—to adapt and evolve to address new challenges and opportunities. (Eventually)

Adopting Best Practices from Abroad: Beyond strengthening and focusing the existing education infrastructure of the region—its schools, colleges, and universities—it is clear that a changing world will demand these be augmented by new institutions addressing emerging needs. Here the experience and practice of other nations should be considered as possibilities for the Midwest, e.g., European models such as the Gymnasias and Sixth-form colleges used for advanced college preparation; the Fachhochschulen and polytechnic institutes stressing rigorous education in the applied sciences; and the open universities used to provide broad educational opportunities for adults.

New Funding Paradigms: Alternative mechanisms for funding higher education should be explored, such as adopting a “reverse social-security” approach in which students pay for their education from future earnings, institutions align the funding of their multiple missions with key patrons, and “learn grants” from public or private sources that provide strong incentives for early learning by providing all students entering K-12 with college investment accounts. (Soon)

Innovation

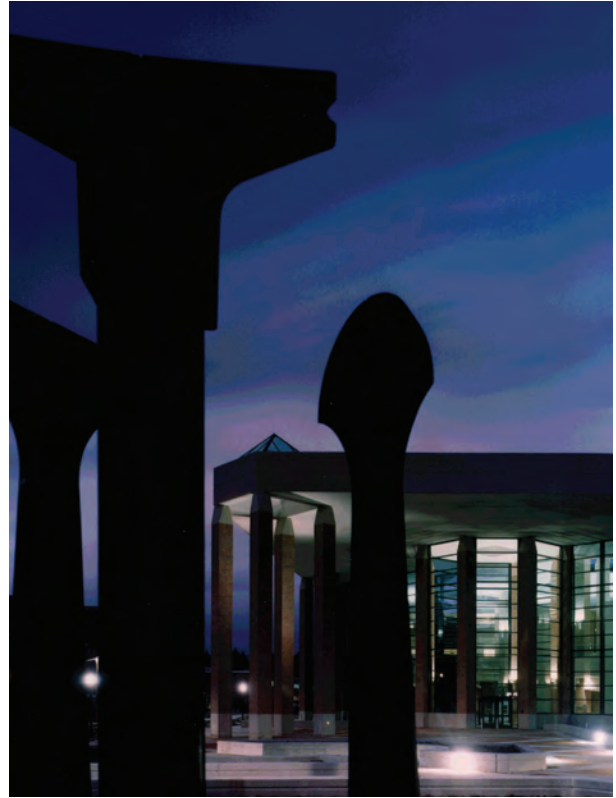
Increased Investment in Innovation: The Midwest must invest additional public and private resources in initiatives designed to stimulate R&D, innovation, and entrepreneurial activities. Key elements would include reforming state tax policy to encourage new, high-tech business development, securing sufficient venture capital, state participation in cost-sharing for federal research projects, and a far more aggressive and effective effort by the Midwest state's Congressional delegations to attract major federal research funding to the region. (Now!)

Importance of Science and Engineering Education: The increasing dependence of the knowledge economy on science and technology, coupled with the Midwest's relatively low ranking in percentage of graduates with science and engineering degrees, motivates a strong recommendation to place a much higher priority on providing targeted funding for program and facilities support in these areas in state universities. (Now!)

Innovation Infrastructure: Providing the educational opportunities and new knowledge necessary to compete in a global, knowledge-driven economy requires an advanced infrastructure: educational and research institutions, physical infrastructure such as laboratories and cyberinfrastructure such as broadband networks, and supportive policies in areas such as tax and intellectual property. The Midwest must invest heavily to transform the current infrastructure designed for a 20th-century industrial economy into that required for a 21st-century knowledge economy. (Soon)

Research Universities and Innovation: The quality and capacity of the Midwest's learning and innovation infrastructure will be determined by the leadership of its research universities in discovering new knowledge, developing innovative applications of these discoveries that can be transferred to society, and educating those capable of working at the frontiers of knowledge and the professions. Because of the importance of research and graduate education to the region's future, these universities should be encouraged to strike an appropriate balance between these activities, while undergraduate education remains the primary mission of the Midwest's other colleges and universities. (Now!)

Engagement in Economic Development: The research universities of the Midwest must become more strategically engaged in both regional and statewide economic development activities. Intellectual property policies should be simplified and standardized; faculty and staff should be encouraged to participate in the startup and spinoff of high-tech business; and universities should be willing to invest some of their own assets (e.g., endowment funds) in state- and region-based venture capital activities. Furthermore, universities and state governments should work



Preparing for future unknowns

more closely together to go after major high-tech opportunities in both the private and federal sectors (attracting new knowledge-based companies and federally funded R&D centers). (Soon)

A Roadmap for the Midwestern States

Enhanced College Participation: The Midwest states must commit to increasing very substantially the participation of its citizens in higher education at all levels—community college, baccalaureate, and graduate and professional degree programs. This will require a substantial increase in the funding of higher education from both public and private sources as well as significant changes in public policy. This, in turn, will require a major effort to build adequate public awareness of the importance of higher education to the future of the state and its citizens. (Now!)

Higher Education Funding in the Top Quartile: To achieve and sustain the quality of and access to educational opportunities, the Midwest states should each set an objective to move into the top quartile in



A challenge to the nation

their higher education appropriations (on a per student basis). (Soon)

Market-Smart Strategies: As powerful market forces increasingly dominate public policy, the Midwest's higher-education strategy should become market-smart, investing more public resources directly in the marketplace through programs such as vouchers, need-based financial aid, and competitive research grants, while enabling public colleges and universities to compete in this market through encouraging greater flexibility and differentiation in pricing, programs, and quality aspirations. (Soon)

Leveraging Federal and Private-Sector Investment: The Midwest should target its tax dollars more strategically to leverage both federal and private-sector investment in education and R&D. For example, a shift toward higher tuition/need-based financial aid policies in public universities not only leverages greater federal financial aid but also avoids unnecessary subsidy of high-income students. Furthermore greater state investment in university research capacity would leverage greater federal and industrial support of campus-based R&D. (Now!)

Changing State Higher Education Policies: Key to achieving the agility necessary to respond to market forces will be modernizing the policies that define the relationship between state governments and the Midwest's public colleges and universities to provide

them with enhanced market agility in return for greater (and more visible) public accountability with respect to quantifiable deliverables such as graduation rates, student socioeconomic diversity, and intellectual property generated through research and transferred into the marketplace. (Now!)

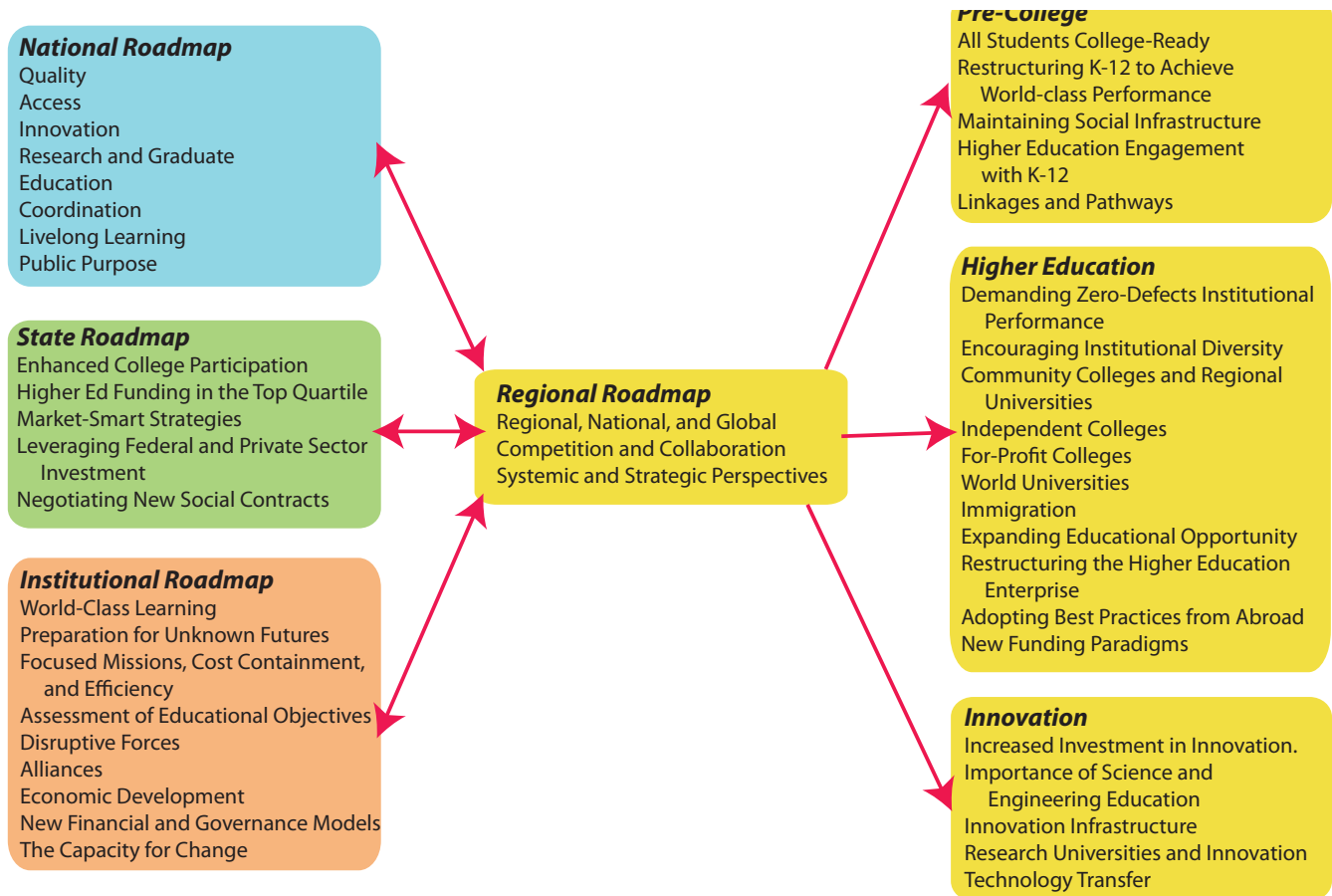
A Roadmap for Colleges and Universities

World-Class Learning: Colleges and universities should aspire to achieve world-class quality, nimbleness, innovation, efficiency, and the capability of providing our citizens with the higher order intellectual skills (critical thinking, moral reasoning, an appreciation of cultural and human values, commitment to lifelong learning, adaptive to change, tolerance of diversity) necessary for achieving national prosperity, security, and social well-being in a global, knowledge-driven society. (Now!)

Preparation for Unknown Futures: While colleges and universities should be responsive to the interests of students, their employers, and the nation, it is essential that they should also strive to prepare their graduates for the unknown challenges of careers and citizenship of tomorrow by providing the higher order intellectual skills necessary to cope with a future of continual yet unpredictable change (e.g., critical thinking ability, a commitment to lifelong learning, the ability to adapt to change, and the capacity to thrive in a world of increasing diversity). (Now!)

Focused Missions, Cost Containment, and Efficiency: Colleges and universities should develop the ability (through the necessary changes in governance, leadership, management, and culture) to control costs, focus resources on well-defined missions, and achieve new levels of efficiency while enhancing quality and capacity. (Now!)

Assessment of Educational Objectives: It is time to challenge the academy to redefine the purpose and nature of a college education in today's (and tomorrow's) world and develop methods to assess whether these objectives are being achieved. This will require the development of more sophisticated tools to



The layers of strategic roadmaps for the Midwest region

assess the achievement of the more abstract goals of a college education (e.g., critical thinking, communication skills, inductive/deductive reasoning, quantitative skills, cultural appreciation, systems thinking). (Now!)

Alliances: Colleges and universities should place far greater emphasis on building alliances that will allow them to focus on unique core competencies while joining with other institutions in both the public and private sector to address the broad and diverse needs of society in the face of today's social, economic, and technological challenges while addressing the broad and diverse needs of society. For example, research universities should work closely with regional universities and independent colleges to provide access to cutting-edge knowledge resources and programs. (Soon)

New Financial and Governance Models: Public colleges and universities need to develop new financial

and governance strategies better able to adapt to declining state support and 21st century imperatives. (Eventually)

A Higher Education Roadmap for the Nation

Quality: The United States must demand and be prepared to support a world-class higher education system, utilizing market forces shaped by incentives, public-private partnerships, and requirements for evidence-based assessment of educational effectiveness to drive all elements of postsecondary toward higher quality, efficiency, innovation, and nimbleness. (Now!)

Access: Access to higher education should receive the highest priority for public funding, whether through financial aid, state appropriations to colleges and universities, or tax policy (e.g., "tax expenditures"). Public funds should be targeted to those students with greatest need. (Now!)

Innovation: To support American innovation, the nation's colleges and universities must embrace innovation themselves, by developing new learning pedagogies, academic paradigms, and educational forms that are more responsive to national priorities. This will require a very substantial increase in the support of research and development associated with learning and education by the federal government and higher education institutions. (Soon)

Research and Graduate Education: The erosion of state and private sector support of higher education in recent years makes it apparent that it is time for the federal government should assume the lead responsibility for sustaining the capacity of America's research universities to conduct world-class research and graduate education. (Soon)

Coordination: Coordination among the various components of the nation's educational enterprise, including K-12, higher education, workplace training, and lifelong learning—should be strongly encouraged and supported at all levels—national, regional, state, and institutional. (Now!)

Public Purpose: Higher education must take decisive action to address current concerns about quality, efficiency, capacity, and accountability if it is to earn the necessary level of public trust and confidence to enable it to pursue its public purpose. (Now!)

Of course, a roadmap is just that, a set of possible directions to the future. Setting a direction is far from arriving at one's destination. Achieving the vision of a learning and innovation-driven economy will require a sustained commitment at all levels, e.g., government, business, labor, education, foundations, citizens, and media.

What is really at stake today is building the Midwest's regional advantage, allowing it to compete for prosperity and quality of life in an increasingly competitive global economy. But today regional advantage is not achieved through politically popular devices, such as tax cuts for the wealthy, public subsidy of dying industries, or attempts to raid business from



The KC Task Force Report

neighboring states. Instead it is achieved by creating a highly educated and skilled workforce. It requires public investment in the ingredients of innovation—educated people, new knowledge, and the infrastructure to support advanced learning and research. Put another way, it requires firm public purpose, visionary policies, and adequate investment to create a learning and innovation driven society.

Strategic Roadmapping at the Metropolitan Level: The Kansas City Project

There are times in the lives of great cities when they seem caught, almost suspended, between their past and their future. This is such a time for Kansas City. The city stands with one leg planted in an old economy of manufacturing, rail transportation and low-skill jobs, while the other leg is striding briskly into the knowledge economy of high-tech jobs, complex information systems and the dazzling intellectual revolution of the life sciences. Can Kansas City be a center of excellence in the relentless competition of the global knowledge

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economy? The city has many strengths. It also has some serious problems. Kansas City enjoys great museums, a broadband of exciting music, from classical and opera to jazz and the blues, a lively visual arts community and a thriving theatre scene. It is working hard to bring life back into its depleted urban core with the biggest downtown building boom in the city's history. High tech jobs are growing at twice the rate of old economy jobs, and the city is home to leading enterprises in telecommunications, information systems, engineering and finance. The learned professions — architecture, law, medicine, management, and the clergy — have a strong presence.

Kansas City has a noble tradition of philanthropy. The city's latest example of creative giving has the potential to be its greatest. The Stowers Institute for Medical Research is in its early days, but already has the largest endowment in the world supporting basic life sciences research. The Stowers Institute currently plans to concentrate its expanding presence in Kansas City, which would make the city home to the world's largest private medical research institute. The promise of Stowers for Kansas City, for the nation and for humanity is enormous. But for Stowers to reach its potential in Kansas City it must be augmented by world-class higher education research capacity in the life sciences and in cognate areas of knowledge such as computer science and electrical engineering, mathematics and statistics and nanoscience. When the huge promise of Stowers is added to Kansas City's other strengths, one can see that the city has some strong foundations on which to build.

Kansas City also faces some serious problems. The city has a long, dismal history of lack of opportunity for its African-American citizens, most of whom are stuck in the blighted urban core. The same lack of educational opportunity and isolation are spreading to Kansas City's Latino population. Together these groups are

one-third of the city, and they are growing faster than other groups. Kansas City will not be a great city for anyone if the city continues to fail its African-American and Latino populations. The only way to address this problem is by providing educational opportunity. This is Kansas City's — and America's — greatest challenge.

Kansas City's second great challenge is that it lacks an essential institutional requirement for competitive strength in the knowledge economy. Kansas City is almost alone among important American cities in not having in its midst a world-class research university that is deeply engaged in meeting all the city's opportunities and challenges. Research universities are the foundation of the global knowledge economy. Universities help cities and regions attract and create skilled human capital which is the most valuable resource today. The discoveries of the university help drive the innovation and entrepreneurship that is the key to economic growth. The fastest growing industries in the information sciences, in biotechnology and in nanotechnology tend to locate where strong basic research universities or private research institutions are found. With the turning of the millennium, Kansas City has taken stock of itself in a number of excellent studies. Virtually every one of these has identified the absence of research university capacity as the city's most serious competitive weakness. The task force agrees with this assessment, although we go farther.

Kansas City needs not only world-class quality higher education research capacity; it equally needs a deeply engaged urban university with energy and imagination to focus creatively on the City's opportunities and major problems, especially the expansion of educational opportunity to the city's African-American and Latino communities.

Kansas City cannot defer to Jefferson City or Topeka to plan the city's human capital strategy, although it can enlist the states as collaborators. The cities that prosper in the global knowledge economy will be the cities that are smart and strategic about human capital. This is Kansas City's challenge, and its greatest opportunity. The city is fortunate to have elements of the higher education capacity it needs in the University of Missouri- Kansas City (UMKC) and the University of Kansas Medical Center (KUMC). But these institutions require substantial enhancement if Kansas City is to

The task force believes that the most important responsibilities of an engaged urban university in Kansas City would include the following:

- 1) Providing the research capacity needed to drive the regional economy
- 2) Serving as a magnet for talented students and faculty
- 3) Expanding educational opportunity for underserved and disadvantaged groups, especially minority groups and the poor
- 4) Providing educational opportunity for adults and students who work and have families
- 5) Engaging deeply in K-12 public education to improve urban public schools
- 6) Enriching and providing the educational foundation for the arts
- 7) Providing educational capacity to all the city's important professional groups
- 8) Focusing on work force preparation
- 9) Applying expertise and hands-on solutions to the city's most pressing problems
- 10) Bringing energy and vitality to the urban core.

Key KC Task Force recommendations enjoy the benefits of a world-class research university that is deeply engaged in the city.

The only feasible way Kansas City can create the higher education capacity it needs is by an integrated, two-state strategy building on all available institutional foundations. This will require an unprecedented level of civic leadership. In building higher education, the city must convert the disadvantage of being divided between rival states to an advantage of being able to work with two state universities to build capacity.

Life Sciences First

We believe it is clear that research capacity in the life sciences is the broad area of knowledge that offers Kansas City the greatest opportunity. This is the area that holds the greatest promise for economic and humanitarian returns. It is the only broad area of knowledge in which Kansas City has the potential, with Stowers, of becoming one of the world's leading centers of discovery in the decade ahead. It is also the research area that is supported by the most generous external funding. The life sciences are the research area in which

the returns on investment are highest. If Kansas City becomes a leading life sciences center, it can become an important center for the biotechnology industry, one of the most dynamic sectors of the global knowledge economy.

The life sciences strategy we recommend has four main elements.

1. Build basic research capacity at KUMC, with the bone biology group centered at UMKC's excellent School of Dentistry a strategic partner. In essence, the strategy seeks to move KUMC's research funding from \$75 million today to \$300 million in ten years. This will give Stowers a strong basic science collaborator and move Kansas City in a decade to a position among the country's top twenty cities in basic life sciences research. There is no better investment Kansas City could make in its future.

2. Align the basic research at KUMC and Stowers with the translational and clinical research capacity of Kansas City's excellent hospitals. KUMC includes a strong teaching and clinical care hospital, the University of Kansas Hospital. However, most of the clinical capacity in the city is in the three hospitals on the Missouri side, St. Luke's, Children's Mercy and the Truman Medical Center. KUMC needs to collaborate closely with these hospitals.

3. Create a compelling life sciences strategy for UMKC. UMKC has not had the leadership in recent years to put together a life sciences strategy that makes sense for itself, for the city and for the state of Missouri. It has had in the past neither the funding nor the mandate to become a strong life sciences research university.

4. Create a Center for Translational Research that is a matrix organization to facilitate the translation of basic discoveries into useful drugs, devices and therapeutic interventions. Enlist the expertise of the Kauffman Foundation and the Bloch School at UMKC in creating an entrepreneurial pipeline for biotech innovation.

An Engaged Urban University

UMKC has embraced in words the strategy of being a “model urban university,” deeply engaged with the most important opportunities and challenges of the city that is its home. In some important areas, such as the performing arts and various clinical activities of its schools of dentistry, nursing and medicine, UMKC is an effective, engaged institution. The Bloch School and the Law School also reach out to the community in creative ways. But most elements of the community perceive UMKC to be disengaged. This is particularly true of the urban public education systems of the city. Effective engagement with urban public education is especially important for UMKC. The task force believes that one of the two highest strategic priorities for education at all levels in Kansas City is to dramatically expand educational opportunity for Kansas City’s underserved African-American and Latino communities. This requires every college and university in the city to become deeply engaged in improving the city’s public schools. UMKC should be the leader in this effort. It is far from that today.

The task force believes that there are three critical elements, now largely lacking at UMKC, which must be in place in order for UMKC to achieve its aspiration as a “model urban university.” The first of these is a broadening of UMKC’s governance to give the Kansas City community a fiduciary role in the university. The second element is leadership, both academic and civic. With governance that has roots in the community, and with effective leadership, UMKC can develop the third critical element: a compelling institutional strategy. We believe there are currently two areas of strength at UMKC where a focused philanthropic investment would pay significant dividends for Kansas City. The first area is the performing and visual arts. The second is the entrepreneurship program at the Bloch School. UMKC surely needs further philanthropic investment. But further philanthropic investment should await a demonstration of effective leadership and the creation of a sustainable institutional strategy.

A New Consortial University

We believe that Kansas City should consider the

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creation of a new institution, organized around specific programs, which would be a consortium of a number of universities, private research institutes such as Stowers and Midwest Research Institute (MRI) and charitable foundations. We believe such consortial institutions will increasingly be the model for translational and interdisciplinary research and teaching at the highest levels. The costs of instrumentation and the demands of wide-ranging interdisciplinary teams are becoming too great for even the richest universities to tackle alone. A consortial institution in Kansas City might focus on areas in which KUMC and UMKC need reinforcement or do not offer strong foundations on which to build. Examples of such areas would be bioinformatics, computer science, telecommunications, urban education and nanoscience. Such a consortium would itself require a further careful planning exercise.

Conclusion

We are enthusiastic about Kansas City’s potential to build a world-class urban research university enterprise that drives innovation and offers educational opportunity to the entire community. Because we believe this is the highest strategic priority for the metropolitan area, we are cautiously optimistic that the concerted philanthropic investment and the determined, long-term civic leadership that are required to achieve it will be forthcoming.

Five Years Later: Is Kansas City Getting It Right?

To address the many opportunities and challenges faced by the Greater Kansas City area, in 2005 a blue ribbon task force, created by several of the city's foundations and led by the Greater Kansas City Community Foundation, was charged with developing a strategy for capturing the city's great promise through a major investment in higher education. The resulting report, *Time to Get It Right: A Strategy for Higher Education in Kansas City*, proposed a bold vision for Kansas City's future based upon focused investments and actions in three critical areas: the life sciences, an engaged urban university, and a consortial approach to attracting the presence of world-class research universities to Kansas City. It was recognized at the outset that this decades-long agenda would require significant collaboration among people and organizations, substantial investment from public and private sources, and considerable restructuring of existing institutions and policies.

Now, four years into this ambitious decades-long agenda, it has become important to assess progress toward the original objectives of the *Time To Get It Right* report, to identify remaining challenges, and to consider possible mid-course corrections. This update provides such an assessment, based upon in-depth interviews of over sixty community leaders of Kansas City foundations, business, educational institutions, health systems, government, and civic organizations, and augmented by independent progress assessments provided by many of the organizations involved in the *Time To Get It Right* project.

At the outset it is important to observe that the challenging national and global environment that stimulated this effort has continued to intensify. The recent recession has provided even more evidence that regional advantage in a hypercompetitive global, knowledge-driven economy requires both a highly education and skilled workforce and an environment that stimulates creativity, innovation, and entrepreneurial behavior. It also requires an unusual degree of cooperation, collaboration, strategic focus, and commitment by a region's people and its institutions, including governments, business, labor,

and foundations.

This report concludes that Kansas City has made very significant early progress towards these goals as articulated by the TIME TO GET IT RIGHT report. In the life sciences the Stowers Institute has made remarkable progress in recruiting outstanding scientists, achieving impressive research results, and achieving a world-class reputation. The University of Kansas Medical Center has made similar progress, increasing the level of its sponsored research support by 29%, expanding its faculty and graduate student ranks, and developing important research and training affiliation agreements with other major medical centers in the Kansas City area. It remains well on track to apply for and achieve NCI Designated Cancer Center status in the next several years. The area's life sciences initiative has broadened considerably with the growth of activity in animal health and plant sciences, with the leadership of Kansas State University and the participation of the University of Missouri Columbia and Kansas City industry. The public sector has stepped forward with strong support through the Kansas Biosciences Authority and the Johnson County Education and Research Triangle sales tax, while foundations, corporations, and individual donors have made important commitments to key areas such as cancer research, drug discovery, and pediatric medicine. Supportive organizations such as the Kansas City Area Life Sciences Institute, Kansas Bioscience, the Kansas City Area Development Council, and the Greater Kansas City Chamber of Commerce are playing key roles. The new affiliations among area hospital systems (KUMC, Saint Lukes, Children's Mercy, Truman) in clinical research and training and research programs at the Stowers Institute, UMKC, and KU-Lawrence hold great promise for the next stage of expanding translational research and stimulating economic development in the life sciences. Kansas City's foundations and civic leadership groups continue to play essential roles in supporting and coordinating these rapidly evolving efforts in the life sciences.

There has also been important progress in the area of urban education. The new leadership team at UMKC is providing strong, effective, and accountable leadership, earning the support of faculty and community leaders. The establishment of the private UMKC Foundation for both fund-raising and endowment management

has been an important step toward the concept of rooted governance, enabling deeper engagement and influence by the Kansas City community. Key priorities such as the Institute for Urban Education, the Bloch School's Institute for Entrepreneurship, and new leadership in the performing arts, business, engineering, education, and pharmacy are important steps toward transforming the institution into a high quality urban university. Moreover the University of Kansas Edwards Campus in Overland Park continues to exhibit strong vitality and growth, benefiting from solid leadership and strong civic support. The quality, impact, and collaboration of the areas community colleges are essential, commendable, and deserving of greater public and private support. While K-12 education in the urban school districts remains a considerable challenge, there are signs of progress resulting from the numerous efforts targeted to this essential community priority.

While this progress is impressive, it is also clear that much work remains to be done. While the primary objectives of the original the TIME TO GET IT RIGHT remain both valid and compelling, the experience of the past several years suggest several mid-course corrections should be considered. While these suggestions are provided in detail in the report, there are several that require immediate attention by the community if progress is to be sustained:

Today (now!):

1. The joint effort by KUMC, area medical centers, and the Stowers Institute to achieve NCI Designated Cancer Center status must remain the highest near-term priority. Key in this effort is assembling the necessary private support, with a target now set at \$92 million. Yet the clock is ticking. While it is understandable that the Kansas City philanthropic community has numerous goals, including many of historic character, the potential impact of the cancer center campaign on the future of the city demands that it be the highest priority for immediate attention and commitment of the necessary support. This effort clearly also requires a more sophisticated and dedicated fund-raising structure with adequate staffing and strong accountability to the life sciences community.

2. While there are many elements of the *Time To Get It Right* effort in the three major areas of the life sciences, urban education, and needs for a comprehensive research university, it is important that the city's major leadership organizations—civic, business, foundation, research and educational—be at the table as participants in each of the major priorities where they are needed and capable of impact. At this critical juncture, the effort will not succeed if key leadership organizations take a “bye” from collaboration and participation, regardless of their particular longer-term agendas.

3. Finally, while the degree of collaboration and cooperation is commendable, it is still falls short of what will be needed to achieve the goals of the *Time To Get It Right*. There remain pockets of resistance toward true partnerships. It is now time to set aside historical divisions and competition to embrace a new spirit of trust and engagement. Those who are unable to achieve this commitment should step aside.

Tomorrow (within the year):

4. It is essential that faculty members and research investigators in Kansas City's key life sciences organizations, e.g., universities, the Stowers Institute, area medical centers, and life sciences businesses, be strongly encouraged to work together. Every effort should be made by organizations to remove those factors that hinder such intellectual collaboration.

5. As public funding declines in the wake of the current recession, it is important that private philanthropy step in to provide support for those programs and institutions key to the region's urban education needs. In particular, the activities of UMKC to transform itself into an urban-focused institution, the needs of the area's community colleges, and those activities aimed at improving K-12 education should be given high priority.

6. The chancellors and president of the University of Kansas, Kansas State University, and the University of Missouri system should begin meeting (along with their key officers) to develop a strategic plan to address Kansas City's urgent needs for those resources that

can only be provided by world-class comprehensive research universities.

7. A more concerted and effective strategy needs to be developed and implemented to convince the state governments of Missouri and Kansas about the importance of providing adequate support of public higher education as absolutely critical to the future of their states—particularly during the post-recession period.

The Day After Tomorrow:

It is clear that the *Time To Get It Right* agenda has galvanized the Kansas City community—its colleges and universities, leading civic institutions, the philanthropic community, business, and state and municipal governments—into a powerful force determined to secure a future of prosperity and leadership for the city. There has been very considerable progress on most of the report's recommendations. New levels of cooperation and commitment have been achieved across state lines, municipal boundaries, institutional missions, and cultural differences. Kansas City is clearly “getting it right”, although just as clearly, it still has some distance to travel.

Hence the most important recommendation is to stay the course, continuing to focus on the key objectives, while strengthening collaboration and commitments. The highest priorities should be given to those efforts and organizations that draw people and communities together rather than dividing forces and distracting attention.

The importance of sustaining the momentum, commitment, and progress toward the goals of the *Time To Get It Right* effort cannot be overstated. This is one of the few times that the Greater Kansas City community has mounted a major campaign that draws together people and institutions across state lines, counties, and municipalities in a challenging long-term strategy.

In 2005 the *Time To Get It Right* report recommended a series of near term (five-year) actions to begin to move Kansas City toward a bold vision of its future. It is now time to transition to a longer-term agenda (ten years and beyond), to sustain the early momentum, commitment, and focus to actually achieve this vision

of hope, prosperity, and leadership.

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Chapter 13

Global Issues

We live in a time of great change, an increasingly global society, driven by the exponential growth of new knowledge and knitted together by rapidly evolving information and communication technologies. It is a time of challenge and contradiction, as an ever-increasing human population threatens global sustainability; a global, knowledge-driven economy places a new premium on technological workforce skills through phenomena such as out-sourcing and off-shoring; governments place increasing confidence in market forces to reflect public priorities even as new paradigms such as open-source software and open-content knowledge and learning challenge conventional free-market philosophies; and shifting geopolitical tensions are driven by the great disparity in wealth and power about the globe, manifested in the current threat to homeland security by terrorism. Yet it is also a time of unusual opportunity and optimism as new technologies not only improve the human condition but also enable the creation and flourishing of new communities and social institutions more capable of addressing the needs of our society. Such issues provide the context for higher education in the 21st century.

Global Imperatives

Our world today is undergoing a very rapid and profound social transformation, driven by powerful information and communications technologies that have stimulated a radically new system for creating wealth that depends upon the creation and application of new knowledge and hence upon educated people and their ideas. As Thomas Friedman stresses in his provocative book, *The World is Flat*, information and telecommunications technologies have created

a platform “where intellectual work and intellectual capital can be delivered from anywhere—disaggregated, delivered, distributed, produced, and put back together again”, or in current business terms, this gives an entirely new freedom to the way we do work, especially work of an intellectual nature. (Friedman, 2005)

Our economies and companies have become international, spanning the globe and interdependent with other nations and other peoples. As the recent report of the National Intelligence Council’s 2020 Project has concluded, “The very magnitude and speed of change resulting from a globalizing world—apart from its precise character—will be a defining feature of the world out to 2020. Globalization—growing interconnectedness reflected in the expanded flows of information, technology, capital, goods, services, and people throughout the world will become an overarching mega-trend, a force so ubiquitous that it will substantially shape all other major trends in the world of 2020.” (National Intelligence Council, 2004) It is this reality of the hyper-competitive, global, knowledge-driven economy of the 21st century that is stimulating the powerful forces that will reshape the nature of our society and our knowledge institutions.

Nations are investing heavily and restructuring their economies to create high-skill, high-paying jobs in knowledge-intensive areas such as new technologies, financial services, trade, and professional and technical services. From Paris to San Diego, Bangalore to Shanghai, there is a growing recognition throughout the world that economic prosperity and social well being in a global knowledge-driven economy requires investment in knowledge resources. That is, regions must create and sustain a highly educated and innovative workforce and the capacity to generate and apply new knowledge, supported through policies and

investments in developing human capital, technological innovation, and entrepreneurial skill. (Council on Competitiveness, 2004)

Markets characterized by the instantaneous flows of knowledge, capital, and work and unleashed by lowering trade barriers are creating global enterprises based upon business paradigms such as out-sourcing and off-shoring, a shift from public to private equity investment, and declining identification with or loyalty to national or regional interests. Market pressures increasingly trump public policy and hence the influence of national governments. Yet the challenges facing our world such as poverty, health, conflict, and sustainability not only remain unmitigated but in many respects become even more serious through the impact of the human species—global climate change being foremost among them. The global knowledge economy requires thoughtful, interdependent and globally identified citizens. Institutional and pedagogical innovations are needed to confront these challenges and insure that the canonical activities of universities – research, teaching and engagement – remain rich, relevant and accessible.

Regional Challenges

Regions face numerous challenges in positioning themselves for prosperity in the global economy, among them changing demographics, limited resources, and cultural constraints. The populations of most developed nations in North America, Europe, and Asia are aging rapidly where over the next decade the percentage of the population over 60 will grow to over 30% to 40%. Half of the world's population today lives in countries where fertility rates are not sufficient to replace their current populations, e.g. the average fertility rate in EU has dropped to 1.45, below the 2.1 necessary for a stable population. Aging populations, out-migration, and shrinking workforces are having an important impact, particularly in Europe, Russia, and some Asian nations such as Japan, South Korea, and Singapore. The implications are particularly serious for schools, colleges, and universities that now experience not only aging faculty, but excess capacity that could lead to possible closure.

In sharp contrast, developing nations in Asia, Africa,

and Latin America are characterized by young and growing populations in which the average age is less than 20. Here the demand for education is staggering since in a knowledge economy, it is clear to all that this is the key to one's future security. Unless developed nations step forward and help address this crisis, billions of people in coming generations will be denied the education so necessary to compete in, and survive in, the knowledge economy. The resulting despair and hopelessness among the young will feed the terrorism that so threatens our world today.

Today we see a serious imbalance between educational need and educational capacity—in a sense, many of our universities are in the wrong place, where populations are aging and perhaps even declining rather than young and growing. This has already triggered some market response, with the entry of for-profit providers of higher education (e.g., Laureate, Apollo) into providing higher education services on a global basis through acquisitions of existing institutions or distance learning technologies. It also is driving the interest in new paradigms such as the Open Education Resources movement. (Atkins, 2007) Yet, even if market forces or international development efforts are successful in addressing the urgent educational needs of the developing world, there are also concerns about whether there will be enough jobs to respond to a growing population of college graduates in many of these regions.

Growing disparities in wealth and economic opportunity, frequently intensified by regional conflict, continue to drive population migration. The flow of workers across the global economy seeking prosperity and security presents further challenges to many nations. The burden of refugees and the complexity of absorbing immigrant cultures are particularly apparent in Europe and North America. In the United States, immigration from Latin America and Asia is now the dominant factor driving population growth (53%), with the U.S. population projected to rise from 300 million to over 450 million by 2050. (National Information Center, 2006) While such immigrants bring to America incredible energy, talents, and hope, and continue to diversify the ethnic character of our nation, this increasing diversity is complicated by social, political, and economic factors. The full participation of

immigrants and other underrepresented ethnic groups continues to be hindered by the segregation and non-assimilation of minority cultures and backlash against long-accepted programs designed to achieve social equity (e.g., affirmative action in college admissions). Furthermore, since most current immigrants are arriving from developing regions with weak educational capacity, new pressures have been placed on U.S. educational systems for the remedial education of large numbers of non-English speaking students.

On a broader scale, the education investments demanded by the global knowledge economy are straining the economies of both developed and developing regions. (OECD, 2005) Developing nations are overwhelmed by the higher education needs of an expanding young population at a time when even secondary education is only available to a small fraction of their populations. In the developed economies of Europe and Asia, the tax revenues that once supported university education only for a small elite are now being stretched thin to fund higher education for a significant fraction of the population (i.e., massification). Even the United States faces the limits imposed on further investment in education by retiring baby boomers who demand other social priorities such as health care, financial security, low crime, national security, and tax relief. (Zemsky, 2005; Newman, 2004)

These economic, social, and technological factors are stimulating powerful market forces that are likely to drive a massive restructuring of the higher education enterprise. Already we see many governments tending to view higher education as a private benefit (to students) of considerable value rather than a public good benefiting all of society, shifting the value proposition from that of government responsibility to support the educational needs of a society to that of university responsibility to address the economic needs of government—an interesting reversal of responsibilities and roles. Many nations are moving toward revenue-driven, market-responsive higher education systems more highly dependent on the private sector (e.g., student fees and philanthropy) because there is no way that their current tax systems can support the massification required by knowledge-driven economies in the face of other compelling social priorities (particularly the needs of the elderly).

The changing nature of the global economy is also exerting new and powerful pressures on regional educational needs and capacity. The liberalization of trade policies coupled with the ICT revolution has allowed the emergence of global corporations characterized by weakening ties to regional or national priorities. The trend for out-sourcing of business processes and off-shoring of jobs has accelerated as many corporations are now beginning to distribute not only routine production but fundamental aspects of core business activities (e.g., design, innovation, R&D) on a global basis, leaving behind relatively little core competence in their countries of origin. While this can create new regions of high innovation, these too can out-source/off-shore activities to still less expensive, although competent, labor markets, leaving behind enterprises characterized by little value added aside from financial management and brand name—no longer a solid foundation for a prosperous regional economy. From the United States to India to Viet Nam to Kenya... the out-sourcing/off-shoring practices of the global corporation continue to distribute value-adding activities ever further, wherever skilled and motivated labor is available at highest quality and lowest cost.

National Responsibilities

In summary then, the forces driving change in our world—changing demographics (aging populations, migration, increasing ethnic diversity), globalization (economic, geopolitical, cultural), and disruptive technologies (info-bio-nano technologies)—are likely to drive very major changes in post-secondary education as a global knowledge economy demands a new level of knowledge, skills, and abilities on the part of our citizens. The strength, prosperity, and leadership of a nation in a global knowledge economy will demand highly educated citizenry and hence a strong system of post-secondary education. It will also require research universities, capable of discovering new knowledge, developing innovative applications of these discoveries, transferring them into society through entrepreneurial activities, and educating those capable of working at the frontiers of knowledge and the professions.

Yet there are broader responsibilities beyond national interests—particularly for developed nations—in an ever

more interconnected and interdependent world. Global challenges such as crippling poverty, health pandemics, terrorism, and global climate change require both commitment and leaderships. Whether motivated by the economic design to create new markets or the more altruistic motives of human welfare, affluent nations have a responsibility to address global issues.

The ongoing debate concerning the future of higher education in the United States provides an illustration of the tension between the traditional roles of the university and the needs of the knowledge economy.

Emerging Opportunities

The information and communications technologies enabling the global knowledge economy—so-called cyberinfrastructure (the current term used to describe hardware, software, people, organizations, and policies) evolve exponentially, doubling in power for a given cost every year or so, amounting to a staggering increase in capacity of 100 to 1,000 fold every decade. It is becoming increasingly clear that we are approaching an inflection point in the potential of these technologies to radically transform knowledge work. To quote Arden Bement, Director of the U.S. National Science Foundation, “We are entering a second revolution in information technology, one that may well usher in a new technological age that will dwarf, in sheer transformational scope and power, anything we have yet experienced in the current information age.” (Bement, 2007)

Many leaders, both inside and outside the academy, believe that these forces of change will so transform our educational institutions—schools, colleges, universities, learning networks—over the next generation as to be unrecognizable within our current understandings and perspectives. (Duderstadt, 2005; Brown, 2006) Let me illustrate with several possibilities:

The Global University: The emergence of a global knowledge economy is driven not only by pervasive transportation, information, and communications technologies but also by a radically new system for creating wealth that depends upon the creation and application of new knowledge and hence upon advanced education, research, innovation, and

entrepreneurial activities. There is a strong sense that higher education is similarly in the early stages of globalization, through the efforts of an increasing number of established universities to compete in the global marketplace for students, faculty, and resources; through the rapid growth in international partnerships among universities; and through for-profit organizations (e.g., Apollo, Laureate) that seek to expand through acquisition into global enterprises. New types of universities may appear that increasingly define their purpose beyond regional or national priorities to address global needs such as health, environmental sustainability, and international development—what one might call “universities in the world and of the world”.

Lifelong Learning: Today the shelf life of education provided early in one’s life, whether K-12 or higher education, is shrinking rapidly in face of the explosion of knowledge in many fields. Furthermore, longer life expectancies and lengthening working careers create additional needs to refresh one’s knowledge and skills through. Hence, an increasing number of nations are setting the ambitious goal of providing their citizens with pervasive, lifelong learning opportunities. Of course, this will require not only a very considerable transformation and expansion of the existing post-secondary education enterprise but also entirely new paradigms for the conduct, organization, financing, leadership, and governance of higher education. Yet, if successful, it could also create true societies of learning, in which the sustained development of knowledge and human capital become the key paths to economic prosperity, national security, and social welfare.

The Meta University: Some of the most interesting activities in higher education today involve an extension of the philosophy of open source software development to open up opportunities for learning and scholarship to the world by putting previously restricted knowledge into the public domain and inviting others to join both in its use and development. MIT led the way with its OpenCourseWare (OCW) initiative, placing the digital assets supporting almost 1,800 courses in the public domain on the Internet for the world to use. Today over 150 universities have adopted the OCW paradigm

to distribute their own learning assets to the world. (Vest, 2006) Furthermore, a number of universities and corporations have joined together to develop open-source middleware to support the instructional and scholarly activities of higher education, already used by several hundred universities around the world. (Sakai Project, 2006; Moodle, 2006) Perhaps the most exciting—and controversial—effort is the Google print library project in which a number of leading universities have joined together with Google to digitize a substantial portion of their library holdings, making these available for full-text searches using Google's powerful Internet search engines. (Google, 2006) For example, Google scanned the entire 7.8 million volume library of the University of Michigan by 2010. Over the next several years, Michigan led an effort to combine the digital collections of over 80 institutions to create the HathiTrust, today with over 16 million volumes, 5 million of which are open access. While there are still many copyright issues that need to be worked through, it is our hope that we will be able to provide full access to a significant fraction of this material to scholars and students throughout the world.

Open source, open content, open learning, and other “open” technologies become the scaffolding on which to build truly global universities—what Vest terms the “meta” university. (Vest, 2006) As he observes, “the incredibly large scale of education world wide; the huge diversity of cultural, political, and economic contexts; and the distribution of public and private financial resources to devote to education are too great.” Instead Vest suggests that “through the array of open paradigms, we are seeing the early emergence of a Meta University – a transcendent, accessible, empowering, dynamic, communally-constructed framework of open materials and platforms on which much of higher education world wide can be constructed or enhanced.”

Universal Access to Knowledge and Learning: Imagine what might be possible if all of these pieces could be pulled together, i.e., Internet-based access to all recorded (and then digitized) human knowledge augmented by powerful search engines, open source software (SAKAI), learning resources (OCW), open learning philosophies (open universities), new collaboratively developed tools (Wikipedia II, Web

2.0); and ubiquitous information and communications technology (e.g., Negroponte's \$100 laptop computer or, more likely, advanced cell phone technology). In the near future it could be possible that anyone with even a modest Internet or cellular phone connection has access to all the recorded knowledge of our civilization along with ubiquitous learning opportunities. Imagine still further the linking together of billions of people with limitless access to knowledge and learning tools enabled by a rapidly evolving scaffolding of cyberinfrastructure increasing in power one-hundred to one thousand-fold every decade. In fact, we may be on the threshold of the emergence of a new form of civilization, as billions of world citizens interact together, unconstrained by today's monopolies on knowledge or learning opportunities. (Atkins, 2007; Kelly, 2006)

Perhaps this, then, is the most exciting vision for the truly global university, no longer constrained by space, time, monopoly, or archaic laws, but rather responsive to the needs of a global, knowledge society and unleashed by technology to empower and serve all of humankind.

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Further Studies

The Glion Colloquium has established itself as an influential resource in addressing both the challenges and responsibilities of the world's research universities. Every two years the Glion Colloquium provides a forum for research university leaders to join leaders from business and government to consider together the role that the world's leading universities should play in addressing the great challenges and opportunities of our times. These activities, consisting of papers prepared by participants prior to three days of intense discussions in Glion-above-Montreux, Switzerland, are captured in subsequent books given wide circulation throughout the world.

During the past 16 years, over 200 leaders of higher education, business, and government agencies have participated in the Glion Colloquium to consider topics such as the rapidly changing nature of research universities, university governance, the interaction between universities and society, collaboration between



The Glion Colloquium on the future of the research university

universities and business, the globalization of higher education, and how universities prepare to address the changes characterizing our times. The papers presented and associated discussions at each colloquium have subsequently been published in a series of books available through publishers or downloadable in full-text format on the Glion Colloquium website at <http://www.glion.org>.

Earlier conferences have considered the many global challenges requiring both the human and intellectual contributions of universities, e.g., global sustainability as the activities of humankind threaten the fragile balance of our planet; the widening gaps in prosperity, health, and quality of life characterizing developed, developing, and underdeveloped regions; the accelerating pace and impact of new technologies; and the stability of the global economy in the face of questionable business practices, government policies, and public priorities.

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Chapter 14

Information Technology and Higher Education

Higher education has entered a period of significant change as our universities attempt to respond to the challenges, opportunities, and responsibilities facing them in the new century. The forces driving change are many and varied: the globalization of commerce and culture, the advanced educational needs of citizens in a knowledge-driven global economy, the exponential growth of new knowledge and new disciplines, and the compressed timescales and nonlinear nature of the transfer of knowledge from campus laboratories into commercial products. We are in a transition period where intellectual capital is replacing financial and physical capital as the key to prosperity and social well being. In a very real sense, we are entering a new age, an age of knowledge, in which the key strategic resource necessary for prosperity has become knowledge itself, that is, educated people and their ideas.

Our rapid evolution into a knowledge-based, global society has been driven in part by the emergence of powerful new information technologies such as digital computers and communications networks. Modern digital technologies have vastly increased our capacity to know and to do things and to communicate and collaborate with others. They allow us to transmit information quickly and widely, linking distant places and diverse areas of endeavor in productive new ways. This technology allows us to form and sustain communities for work, play, and learning in ways unimaginable just a decade ago. It has broadened access to knowledge, learning, and scholarship to millions throughout the world. Information technology changes the relationship between people and knowledge. It is likely to reshape in profound ways knowledge-based institutions such as our colleges and universities.

Of course higher education has already experienced significant change driven by digital technology.

Our management and administrative processes are heavily dependent upon this technology. Research and scholarship are also highly dependent upon information technology, for example, the use of computers to simulate physical phenomena, networks to link investigators in virtual laboratories or “collaboratories,” and digital libraries to provide scholars with access to knowledge resources. There is an increasing sense that new technology will also have a profound impact on teaching, freeing the classroom from the constraints of space and time and enriching learning by providing our students with access to original source materials.

Yet, while information technology has the capacity to enhance and enrich teaching and scholarship, it also poses certain threats to our colleges and universities. We can now use powerful computers and networks to deliver educational services to anyone, anyplace, anytime, no longer confined to the campus or the academic schedule. Technology is creating an open learning environment in which the student has evolved into an active learner and consumer of educational services. Faculty loyalty is shifting from campus communities and universities to scholarly communities distributed in cyberspace. The increasing demand for advanced education and research from a knowledge-driven society, the appearance of new for-profit competitors, and technological innovations are stimulating the growth of powerful market forces that could dramatically reshape the higher education enterprise.

Preparing for the Revolution

Reflecting their broad interest in the health of America’s research enterprise, the National Academies launched a study in early 2000 on the implications of

PANEL ON THE IMPACT OF INFORMATION TECHNOLOGY ON THE FUTURE OF THE RESEARCH UNIVERSITY

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 PAUL M. HORN, Senior Vice President for Research, IBM
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information technology for the future of the nation's research university—a social institution of great importance to our economic strength, national security, and quality of life. The premise of this study was a simple one. Although the rapid evolution of digital technology will present numerous challenges and opportunities to the research university, there is a sense that many of the most significant issues are not well understood by academic administrators, faculty, and those who support or depend on the institution's activities.

The steering group for the effort was comprised of leaders from higher education, the chief technology officers of major IT companies, and leaders in national science policy. This group met on numerous occasions over a two-year period to consider these issues, including site visits to major technology laboratories such as Bell Labs and IBM Research Labs and drawing upon the expertise of the National Academy complex. At the end of this period, over one hundred leaders

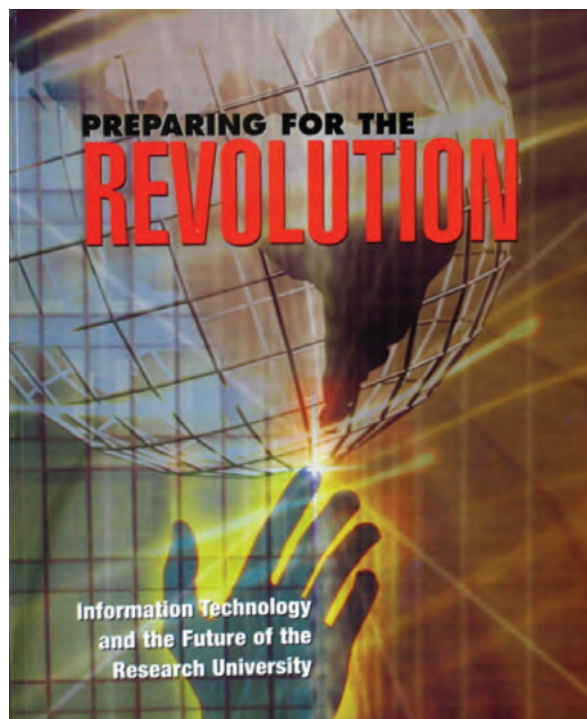


Roundtable discussions with university leaders

from higher education, the IT industry, and the federal government, and several private foundations convened for a two-day workshop at the National Academy of Sciences to focus this discussion. Beyond the insight brought by these participants, perhaps even more striking was their agreement on a number of key issues.

The first finding was that the extraordinary pace of information-technology evolution is likely to continue for the next several decades, possibly even accelerating. Hence, in thinking about changes to the university, one must think about the technology that will be available in 10 or 20 years, technology that will be thousands of times more powerful as well as thousands of times cheaper. The second finding was that the impact of IT on the university is likely to be profound, rapid, and disruptive, affecting all of its activities (teaching, research, service), its organization (academic structure, faculty culture, financing, and management), and the broader higher education enterprise as it evolves toward a global knowledge and learning industry. If change is gradual, there will be time to adapt gracefully, but that is not the history of disruptive technologies. As Clayton Christensen explains in *The Innovators Dilemma*, new technologies are at first inadequate to displace existing technology in existing applications, but they later explosively displace the application as they enable a new way of satisfying the underlying need.

While it may be difficult to imagine today's digital technology replacing human teachers, as the power of this technology continues to evolve 100- to 1000-fold each decade, the capacity to reproduce all aspects of



DOE Task Force Report

human interactions at a distance with arbitrarily high fidelity could well eliminate the classroom and perhaps even the campus as the location of learning. Access to the accumulated knowledge of our civilization through digital libraries and networks, not to mention massive repositories of scientific data from remote instruments such as astronomical observatories or high energy physics accelerators, is changing the nature of scholarship and collaboration in very fundamental ways.

The third finding stresses that although information technology will present many complex challenges and opportunities to universities, procrastination and inaction are the most dangerous courses to follow all during a time of rapid technological change. Attempting to cling to the status quo is a decision in itself, perhaps of momentous consequence.

The first phase of this study, its conclusions, and its recommendations were published in a report, *Preparing for the Revolution*, available both online and through hard copy from the National Academies Press.

The IT Forum

In 2003 the National Academies have extended this effort to involve directly a large number of research universities by creating a National Academy roundtable on information technology and research universities ("the IT-Forum") to track the technology, identify the key issues, and raise awareness of the challenges and opportunities. The IT Forum has also conducted a series of workshops for university presidents and chief academic officers in an effort to help them understand better the transformational nature of these technologies and the importance of developing strategic visions for the future of their institutions.

The IT Forum began its activities in spring of 2003 with a two-day workshop involving two dozen leaders of major research universities at the spring meeting of the Association of American Universities (AAU). To launch the discussion, Louis Gerstner, CEO of IBM, spoke at a dinner meeting the evening before the workshop to share with the presidents some of his own observations concerning leadership during a period of rapid change. The IBM experience demonstrated the dangers of resting on past successes. Instead, leaders need to view information technology as a powerful tool capable of driving a process of strategic change, but only with the full attention and engagement of executive leadership—meaning university presidents themselves.

Noting that university presidents listen most carefully to their own voices, the workshop was organized about several panels of the participating presidents. The first panel was asked to discuss what was currently in their in-out box, the here-and-now issues. These included the usual concerns such as how to meet the seemingly insatiable demand for computing resources (particularly bandwidth), how to pay for this technology, and how to handle privacy and security issues. It is probably no surprise that that most of the presidents believed that they had these issues well in hand—a perception quite different than we were to find with their provosts several months later.

Members of the IT Forum then attempted to move the discussion farther into the future and elevate it to a more strategic level by posing a number of provocative possibilities to the presidents. For example, how

IT Forum

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IT Forum Participants

would adapt their library planning to the very real possibility that within a decade, the entire Library of Congress (about 10 TB) could be contained in a consumer device about the size of a football (a size university presidents understand well)—or more to the point of students, an iPod? How would the rapid evolution of cyberinfrastructure—the hardware, software, organizations, people, and policy increasing undergirding scientific research—into functionally complete environments for scholarship and learning affect their faculty and students? What if their students utilized IT to take control of their learning environments? These rhetorical hand-grenades

- 11/7/2002: IT Forum Meeting, NAS, DC
- 2/25/2003: IT Forum Meeting, NAS, DC
- 4/15/2003: AAU Presidents' Workshop, DC
- 9/3/2003: Carnegie Mellon University, Pittsburgh
- 9/6/2003: AAU Provosts' Workshop, Irvine
- 11/1/2003: NSF Leadership Tutorial, DC
- 3/11/2004: Institute for Creative Technologies, LA
- 9/1/2004: Exec Wkshp, MIT-CMU-Cornell, MIT
- 10/20/04: Keynote, Educause, Denver
- 11/11/04: IT Forum Meeting, Ann Arbor
- 1/24/05: Exec Wkshp: UNC-NCSU-Duke-GT, MU
- 3/21/05: Exec Wkshp: UT, TAMU, UA, ASU, Rice
- 4/24/05: Exec Wkshp: USC, UCLA, UCSD, UCSB, UCI
- 6/1/05: IT Forum Meeting, NAS, DC

IT Forum Meetings

triggered a broader discussion of related concerns such as the technological generation gap among students and faculty, the disruptive force of the marketplace brought onto campus by IT, and the disaggregation and reaggregation of the traditional roles and functions of the university.

As the discussions moved on to consider increasingly unpredictable futures, there was a growing recognition of the challenge of providing leadership in the face of such uncertain futures. Finally one of the presidents suggested that he had no idea how presidents were to lead in such a chaotic environment, and that he and his colleagues needed help. Hence, the workshop had managed to bring the presidents through several critical stages: from denial to acceptance to bargaining to seeking help...

The IT Forum followed several months later with a very similar workshop for the provosts of AAU research universities. Again the session began by first asking a panel of provosts to lay out the issues as they saw them at the moment, then to move the discussion to a longer-term perspective, and finally to conclude with a discussions of next steps. The near-term concerns of the provosts were very similar to those of the presidents: network and bandwidth manage, the financing of technology, the protection of security and privacy, and data management and preservation.

Perhaps not surprising was a far greater degree of sophistication among the provosts in understanding and addressing these issues than shown by the presidents, perhaps since as chief academic officers,

they were on the front line. But here there was an even more significant difference: unlike the presidents, the provosts recognized (or at least admitted) that these were very difficult issues and that they certainly did not have the answers. The provosts also were willing to discuss issues that would require major cultural changes in their institutions. For example, they expressed growing concern about the degree to which universities were being disadvantaged by the effective monopolies created by IT providers. As one provost put it, universities acted like deer paralyzed in the oncoming headlights, continuing to re-invent the wheel and getting devoured by the marketplace. The provosts were essentially unanimous in their belief that it was time for the universities to set aside their competitive instincts and to build consortia to develop together the technologies to support their instructional, research, and administrative needs through open-source paradigms that would break the stranglehold of the current IT marketplace.

Many provosts suspected that while the faculty believed they knew how their students learned, in reality they had not a clue, particularly in technology-rich environments. This was a theme we were to encounter again and again in our later workshops. The provosts believed that their universities needed far more sophisticated help to understand the learning and cognitive processes characterizing contemporary students, although they also recognized the disruptive nature of these studies, which might eliminate over time the rationale for the lecture-classroom paradigm.

In-Depth Meetings

To explore in depth several of the issues raised in the workshops with presidents and provosts, the IT Forum arranged several more focused site visits:

IT-Forum Meeting on “Cognition, Communication, and Communities”

Carnegie-Mellon University (September 5-6, 2003)

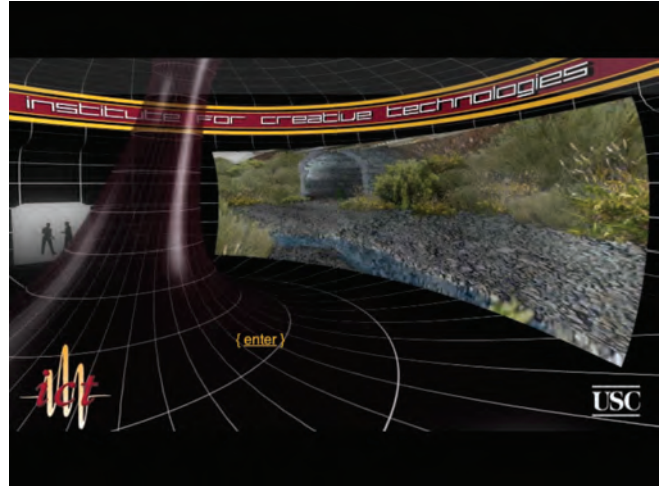
To learn more about how learning occurs in technology-intensive environments, the IT Forum held its fall 2003 meeting at Carnegie Mellon University, renown both as one of the nation’s most wired—and

now wireless—campuses and also for its strength in the cognitive sciences. As the CMU faculty put it, their students have embraced IT to become a transformative force, frequently forcing the faculty to react to their learning styles and activities. An example is the way students use this technology for communication. From instant messaging to e-mail to blogs, students are in continual communication with one another, forming learning communities that are always interacting, even in classes (as any faculty member who has been “Googled” can attest). A young professor of physics told us he had been forced to give up trying to teach difficult concepts in his classes. Instead he introduces a topic by pointing to several resources until a few students in the class figure out a way to teach themselves the concept. Then they teach their fellow students, and through peer-to-peer learning, the concepts propagate rapid through the class.

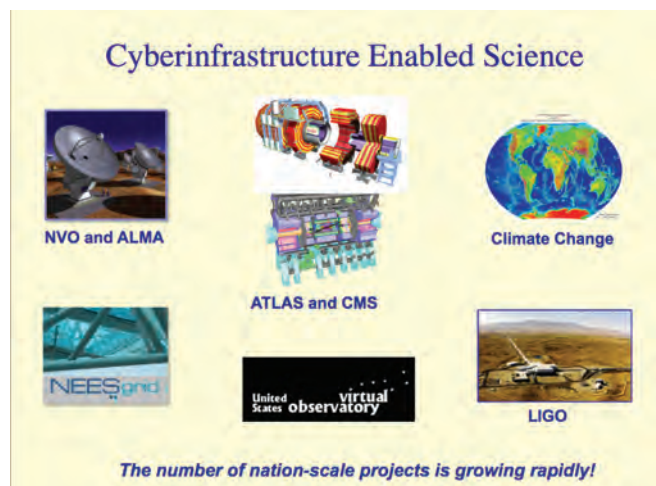
Today’s students are active learners, building their own knowledge structures and learning environments through interaction and collaboration. Their approach to learning is highly nonlinear rather than following the sequential structure of the typical university curriculum. They are adept at multitasking and context switching. And they are challenging the faculty to shift their instructional efforts from the development and presentation of content, which is more readily accessible through the web and open-content efforts such as the Open CourseWare initiative of MIT, and instead become more of a mentor and consultant to student learning.

Some CMU faculty members have concluded that perhaps the best approach in these technology-rich environments is to turn the students loose, letting them define their own learning environments. Peer-to-peer learning is rapidly replacing faculty teaching as the dominant educational process on this technology-rich campus. There is not yet a consensus among the faculty as to where they are headed, but there is strong agreement that the net generation is both challenging and changing the learning process in very fundamental ways.

On a deeper level, information technology is forcing us to rethink the nature of literacy: From literacy in the oral tradition...to the written word...to the images of film and then television...to the computer and



Meetings of the IT Forum



multimedia. Of course there are many other forms of literacy: art, poetry, mathematics, science itself, etc. But more significantly, the real transformation is from literacy as “read only, listening, and viewing” to composition in first rhetoric, then writing, and now in multimedia.

Increasingly, we realize that learning occurs not simply through study and contemplation but through the active discovery and application of knowledge. From John Dewey to Jean Piaget to Seymour Papert, we have ample evidence that most students learn best through inquiry-based or “constructionist” learning. As the ancient Chinese proverb suggests “I hear and I forget; I see and I remember; I do and I understand.” To which we might add, “I teach and I master!!!”

IT Forum Meeting on “Virtual Worlds” at
The Institute for Creative Technologies, Marina del
Rey (March 11, 2004)

To understand new paradigms of technology-assisted learning, the spring 2004 meeting of the IT-Forum was held at the Institute for Creative Technologies in Marina del Rey. Here, the University of Southern California is applying the entertainment and gaming technologies developed by Hollywood and others to create a “holodeck” to train military officers in high level cognitive activities such decision making and leadership. They have learned something that universities have yet to grasp: how technology can be used to create an emotional connection between knowledge and learning.

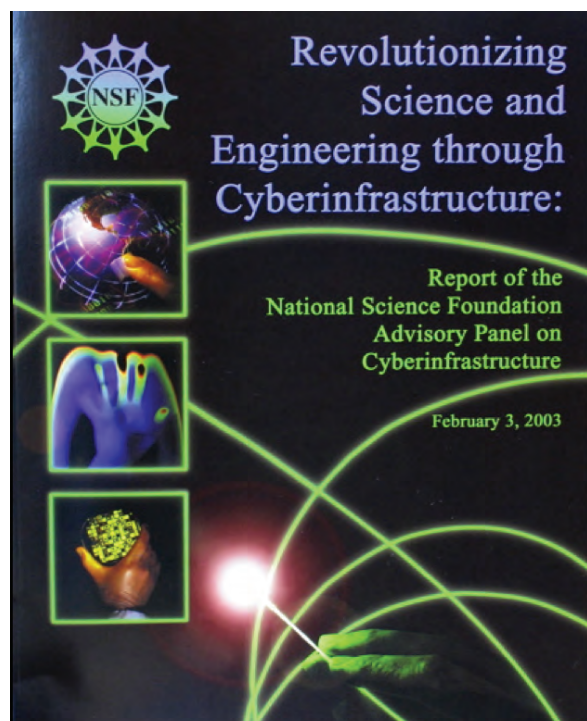


IT-Forum Meeting on “Cyberinfrastructure” at
University of Michigan, Ann Arbor (November
11-12, 2004)

In fall of 2004, the IT Forum met at the University of Michigan to consider the important study by the National Science Foundation Blue Ribbon Advisory Panel on Cyberinfrastructure.

Here “cyberinfrastructure” is the term used to describe hardware, software, people, organizations and policies related to information and communications technology. The panel concluded that we are approaching an inflection point in the potential of rapidly evolving information and communications technology to transform how the scientific and engineering enterprise does knowledge work, the nature of the problems it undertakes, and the broadening of those able to participate in research and the related educational activities. To quote the concluding paragraph of its report:

“A new age has dawned in scientific and engineering research, pushed by continuing progress in computing, information, and communication technology, and pulled by the expanding complexity, scope, and scale of today’s challenges. The capacity of this technology has crossed thresholds that now make possible a comprehensive ‘cyberinfrastructure’ on which to build new types of scientific and engineering knowledge environments and organizations and to pursue research in new ways and with increased efficacy.



Atkins Report on Cyberinfrastructure

Increasingly, new types of scientific organizations and support environments for science are essential, not optional, to the aspirations of research communities and to broadening participation in those communities. They can serve individuals, teams, and organizations in ways that revolutionize what they can do, how they do it, and who participates. This vision has profound broader implications for education, commerce, and social good."

Clearly, cyberinfrastructure is not only reshaping but actually creating new paradigms for science and engineering research, training, and application. Once the microprocessor was imbedded in instrumentation, Moore's Law took over scientific investigation. The availability of powerful new tools such as computer simulation, massive data repositories, massively ubiquitous sensor arrays, and high-bandwidth communication are allowing scientists and engineers to shift their intellectual activities from the routine analysis of data to the creativity and imagination to ask entirely new questions. Today, information technology has created, in effect, a new modality of scientific investigation through simulation of natural phenomenon and serving as the bridge between

experimental observation and theoretical interpretation. Globalization is a particularly important consequence of the new forms of scientific collaboration enabled by cyberinfrastructure, which is allowing scientific collaboration and investigation to become increasingly decoupled from traditional organizations (e.g., research universities and corporate R&D laboratories) as new communities for scholarly collaboration evolve.

While promising significant new opportunities for scientific and engineering research and education, the digital revolution will also pose considerable challenges and drive profound transformations in existing organizations such as universities, national and corporate research laboratories, and funding agencies. Here it is important to recognize that the implementation of such new technologies involve social and organizational issues as much as they do technology itself. Achieving the benefits of IT investments will require the co-evolution of technology, human behavior, and organizations.

Although the domain-specific scholarly communities, operating through the traditional bottom-up process of investigator-proposed projects, should play the lead role in responding to the opportunities and challenges of new IT-enabled research and education, there is a clear need to involve and stimulate as well those organizations that span disciplinary lines and integrate scholarship and learning. Perhaps the most important such organization is the research university, which despite the potential of new organizational structures, will continue to be the primary institution for educating, developing, and financing the American scientific and engineering enterprise. Furthermore, because the contemporary research university not only spans the full range of academic disciplines but as well as the multiple missions of education, scholarship, and service to society, it can—indeed, it must—serve as the primary source of the threads that stitch together the various domain-focused efforts.

There is a sense among many in the research university community that we will see a convergence and standardization of the cyberinfrastructure necessary for state-of-the-art research and learning over the next several years, built upon open source technologies, standards, and protocols, and that the research universities themselves will play a leadership

role in creating these technologies, much as they have in the past. For the IT-driven transformation of U.S. science and engineering to be successful, it must extend beyond the support of investigators and projects in domain-specific science and engineering research to include parallel efforts in stimulating institutional capacity.

National Science Foundation Tutorial

In fall of 2004, members of the IT Forum were invited to conduct a day-long “tutorial” for the leadership of the National Science Foundation concerning the potential impact of information technology on learning, broadly defined. Forum members began by stating their concern that the changing learning needs of our society and the disruptive nature of digital technology may extend well beyond the capacity of our existing learning infrastructure of schools, universities, training programs, and cultural institutions. Approaching the challenge by reforming existing institutions may not be sufficient. After all, “a butterfly is not simply a better caterpillar!” Instead perhaps it was time to explore entirely different types of learning organizations and ecologies.

Today the human resource needs of the nation, an increasingly competitive global, knowledge-driven economy, and the challenge and promise presented by exponentially evolving digital technology presents a new and compelling challenge to NSF to provide leadership and stimulate change in our nation’s learning enterprise.

University Executive Leadership Core Workshops

One of the major concerns voiced in the workshops with the Association of American Universities presidents and provosts was the difficulty in getting universities to recognize the strategic implications of rapidly evolving digital technologies as they reshape the most fundamental aspects of learning and scholarship. Some participants portrayed the challenge to be getting the executive leadership core of the institution—the president, provost, CFO, CIO, director of libraries, key deans—on the same page, communicating with one another rather than simply dumping a diverse array of

issues and demands on the CIO and saying, “Handle it!”

To this end they suggested that the IT Forum conduct a series of roundtable workshops around the country, bringing together the executive leadership of several institutions in a facilitated roundtable discussion to compare notes on what they saw as challenges and opportunities. The hope was that engaging in a candid and confidential discussion with peer institutions would force each of the participating teams to get their act together. They would learn from each other and perhaps develop the basis for further collaboration.

Over the course of the 2004-2005 academic year, the IT Forum organized four such workshops:

Cambridge (September 1-2, 2004): CEO-led teams from Carnegie-Mellon University, Cornell University, and Massachusetts Institute of Technology

Chapel Hill (January 24-25, 2005): CEO-led teams from North Carolina State University and the University of North Carolina at Chapel Hill, an Executive Vice Chancellor-led team from Duke University, and individual leaders from Georgia Institute of Technology and the University of Maryland

Austin (March 21-22, 2005): CEO-led teams from Texas A&M University, the University of Arizona, and the University of Texas at Austin, and individual leaders from Arizona State University and Rice University

Irvine (April 25-26, 2005): CEO-led teams from the University of California, San Diego, the University of California, Santa Barbara, and the University of Southern California, an Executive Vice Chancellor-led team from the University of California, Los Angeles, and an individual leader from the University of California, Irvine.

The purpose of these workshops were: i) to help university leadership identify the key challenges and opportunities presented by emerging information technology by comparing perspectives with several peer institutions; ii) to help the executive leadership of a university get on the same page in developing

institutional strategies; and iii) to explore how to build stronger coalitions of universities working together to address these challenges.

The workshops were organized in a roundtable format developed by Robert Zemsky, former chair of the Pew Higher Education Roundtable and now director of the Learning Alliance at the University of Pennsylvania, who also served as the moderator for these sessions. Such a roundtable process is particularly effective in encouraging broad and candid engagement of all participants. Each workshop was launched with a working dinner the evening before a day-long workshop, asking each of the presidents to begin the conversation by describing what excited and what scared them about rapidly evolving digital technology. Needless to say, the fears tended to outnumber the hope.

Not surprisingly, several presidents immediately brought up the challenge of managing unbridled expectations for the IT environment. Their faculties believed that “bandwidth should flow like water from a faucet”. These university leaders worried that they would be unable to afford the IT investments necessary to stay on the cutting edge of research while meeting ever-expanding student expectations and eventually fall behind, unable to compete for the best faculty and students. Several also expressed concern about the difficulty of making the right decisions on investments, e.g., knowing whether they were headed in the right direction or toward a wall (or a cliff). There was a sense of dread because of the uncertainty and the implications of a bad decision, in terms of cost, the quality of the environment or teaching and research, and even the ability of the institution to function. As one president put it, “I worry that one day I will come into work and find that absolutely nothing works.”

Such concerns usually led rapidly to a discussion of the increasing challenge in maintaining the security of the IT infrastructure. Some participants even suggested that a failure in this area could lead to the entire enterprise grinding to a halt, or that a severe attack launched through a university and impacting broader society might result in civil or even criminal liability. Although several of the CIOs agreed that this problem was solvable with sufficient standards and controls, frequently these were incompatible with the diversity–

indeed, anarchy–characterizing the many computing environments and student and faculty cultures in the university.

One of these evening dinner discussions was dominated by a conversation on the degree to which students were beginning to use technology both to seize control of their learning environments and to drive change within the institution, much as the IT Forum had found in the workshop at Carnegie-Mellon University. The student social life and learning activities were increasingly structured around always-on, always-in-contact communication (wireless, e-mail, instant messaging). In contrast to the student isolation that some predicted as a consequence of the propagation of technology into the university, there is a zeal for contact and community building among students, demanding not only an ever more sophisticated IT environment, but as well the convenience and responsiveness of university services and instructional activities that students were accustomed to in the commercial arena (Amazon, Google, e-Bay, Travelocity, etc.) Students were beginning to form communities capable of learning on their own and challenging the one faculty member-one course paradigm.

Yet at most institutions, these new IT-based social organizations were quite beyond the comprehension of the faculty, many of whom would just as soon ban wireless connectivity from the classroom and restrict students to using 110 bits-per-second modems to slow things down. While several participants questioned the effectiveness of this highly interactive, multi-tasking, and rapid context switching approach to learning, others suggested it might actually be the best preparation for leadership roles in the very complex, fast-moving social situations of 21st century society. Yet this not only raised the challenge of keeping up with the kids as they became less and less tolerant of traditional approaches to higher education, but it also raised the question of the role that the faculty would play, e.g., leading, lagging, or just staying out of the way.

Such discussions usually converged on recognition that the rapid evolution of digital technology was not only creating a very complex environment for leadership, but that it was characterized by chaos, in which the predictability of decisions and actions became

very difficult if not impossible. Efforts to exert the top-down controls demanded by network security and integrity sometimes seemed like trying to close the barn door after the horse had not only already escaped, but the barn itself had fallen down. Several of these evening conversations even suggested that the traditional organization, structure, management, and leadership of the university might be inadequate to deal with such a rapidly evolving and changing technology. At this point, we usually called it an evening, and adjourned to the next day for more in-depth discussions of particular issues of interest to the participants.

Managing Change

The primary issue arising in discussions of managing the IT environment involved the balance between the centralized control and standardization necessary to achieve adequate connectivity and security, and the inevitable chaos that characterizes the university IT environment because of highly diverse needs and funding sources—particularly in the research arena. There needs to be a balance between infinite customizability and institution-wide standards that protect the organization. There is a need to tolerate freedom—indeed, anarchy—in some domains such as research, while demanding tight control and accountability in others such as telecommunications and financial operations. Of course, this is similar to the struggle between the centralization (security, interoperability) and the decentralization (creativity, unique needs) in all organizations—universities, governments, and corporations.

There was also considerable discussion of just where universities should focus their resources and attention. Some universities felt that the best approach was to outsource the stable infrastructure, including mission-critical services such as finance and telecommunications, and focus attention instead on advanced development efforts, particularly those involving consortia such as Open Knowledge Initiative and Sakai. It is important to select what you can manage, and what you can let go, to pick those areas where you can see strategic opportunities for influence. Outsourcing commodity products and services can allow institutions to free up resources for investing in the future.

Although some institutions were still striving for centralized control, most had recognized that heterogeneity was a fact of life that needed to be both tolerated and supported. It was important to move beyond the contrasts between academic and administrative IT and instead recognize the great diversity of needs among different missions such as instruction, research, and administration as well as among early adopters, mainstream users, and have-nots. The faculty seeks both a reliable platform (a utility) as well as the capacity to support specific needs; researchers would frequently just as soon the administration kept hands off, since their grants are paying for their IT support. The students seek the same robust connectivity and service-orientation that they have experienced in the commodity world, and they will increasingly bring the marketplace onto the campus. In some ways, executive leadership is less a decision issue than a customer relationship management issue.

Several of the workshops featured discussions about the most important IT-related decisions made in the past few years, what issues were involved, who was involved in discussion and decision-making, and what the results were. To our ears, these decisions mainly fell into two categories. The first consisted of seeming “no-brainers,” where it was necessary to get presidential approval and mobilize resources to join initiatives that were already moving forward, and where participation was clearly in the institution’s long-term interest. The second category consisted of somewhat more difficult decisions where an entrenched interest within the institution had to be taken on in order to conserve resources or achieve other goals for the campus as a whole. There were initiatives that would qualify as visionary, but these were few and far between.

Several participating universities have undergone recent changes in organization or have launched standing councils or committees to address IT issues. Personnel changes have sparked some of these changes. Direct CEO-level involvement in these discussions is uncommon. One long-term trend is the increase in the number and proportion of CIOs who come from industry or other non-academic backgrounds, and the corresponding decrease in the number and proportion of CIOs who emerge from the faculty. Interestingly, participation in decision-making processes did not

necessarily map on to the composition of the teams that attended the workshop. Several teams featured department heads and others from academic units, while others consisted entirely of central administrators. Overall, the message we got from all four workshops was that leading research universities believe they are doing a good job managing the IT “here and now”; that they are in control regarding the most important issues; and that a cataclysmic meltdown is not a real possibility.

The Learning Environment

Although the influence of the net generation of students was raised in early discussions, there was surprisingly little discussion of the use of IT in the instructional environment. To be sure, most participants recognized the way that technologies such as instant messaging, wireless access, and search engines such as Google were changing both the social interactions and intellectual development of students. Yet there was little discussion of how to harness these new capabilities in the learning environment.

The faculty, by and large, is not as tech savvy as students, and is not aware of the tech-infused culture in which students live and learn. In contrast to the research mission, where the faculty is pushing the boundaries and administrators are forced to respond, in these institutions at least, few faculty members seem involved in cutting-edge use of technology in the instructional domain.

However, this is an arena in which for-profit competition is appearing, where overseas competition might be expected to appear, and where U.S. universities may be in danger of being “Napsterized.” The fact that students use one mode of interaction in dealing with faculty because they have to and use another mode when dealing with each other might partially reflect a longstanding intergenerational dynamic. It might also imply that traditional educational institutions are not reaching them, and they are “ripe for the picking” by some new educational institution or instructional mode.

Some participants were confident about the prospects for the optimal uses of technology emerging naturally, while others believed that institutional leaders need to be more proactive in guiding and facilitating. We are left

with the questions of how leadership can recognize and leverage strategic opportunities, and how universities can collaborate and learn from one another.

The Library as the Poster Child of the IT Revolution

To make these discussions less abstract, the impact of information technology on university planning for libraries was introduced in several workshops. In a sense the library has become the poster child for the impact of IT on higher education. Beyond the use of digital technology for organizing, cataloguing, and distributing library holdings, the increasing availability of digitally-created materials and the massive digitization of existing holdings (e.g. the Google project to digitize and put online in searchable format the entire holdings of major research libraries) is driving massive change in the library strategies of universities. While most of the universities in our workshops were continuing to build libraries, many were no longer planning them as repositories (since books were increasingly placed in off-campus retrievable high-density storage facilities) but rather as a knowledge commons where users accessed digital knowledge on remote servers. When pressed, it turned out that the most common characteristic of these new libraries was a coffee shop. They were being designed as a community center where students came to study and learn together, but where books were largely absent. The library was becoming a people place, providing the tools to support learning and scholarship and the environment for social interaction.

What is the university library in the digital age? Is it built around stacks or Starbucks? Is it a repository of knowledge or a “student union” for learning? In fact, perhaps this discussion was not really about libraries at all, but rather the types of physical spaces universities require for learning communities. Just as today every library has a Starbucks, perhaps with massive digitization and distribution of library holdings, soon every Starbucks will have a library—indeed, access to the holdings of the world’s libraries through wireless connectivity.

In a sense, the library may be the most important observation post for studying how students really

learn. If the core competency of the university is the capacity to build collaborative spaces, both real and intellectual, then the changing nature of the library may be a paradigm for the changing nature of the university itself.

Yet the participants in our workshops also raised the very serious issue concerning the preservation of digital knowledge, now increasing at a rate an order of magnitude larger than written materials. Without a more concerted effort for the standardization of curation, archiving, and preservation of digital materials, we may be creating a hole in our intellectual history. Traditionally this has been a major role of the research university through its libraries. There was a general agreement that research universities need to collaborate more on their responsibilities for the stewardship of knowledge in the digital age.

Competition vs. Cooperation vs. Collaboration

Another workshop theme was the degree to which information technology was changing the balance between university competition and collaboration. To be sure, the competitive spirit was alive and well in those workshops involving IT leaders (e.g., MIT, Carnegie Mellon, and Cornell) as well as those with both public and private universities (e.g., the University of California and USC). Yet, just as in the earlier workshops held with presidents and provosts, there was recognition that few, if any, institutions had the capacity to go it alone in technology development and implementation, particularly in the face of monopoly pressures from the commercial section.

This growing need to build alliances was particularly apparent in the middleware and networking area. A new set of open educational resources (open-source tools, open content, and open standards) is being created by consortia such as Open Knowledge Initiative, Sakai, and the Open CourseWare project and being made available to educators everywhere. Networking initiatives led by higher education, grid computing, and other elements of cyberinfrastructure are gaining momentum through alliances such as Internet2 and the National Lambda Rail.

Just as in the IT industry itself, there are emerging trends where universities are cooperating in areas such as cyberinfrastructure and instructional computing

that allow them to compete more effectively for faculty, students, and resources. The CIOs in our workshops suggested that the growing consensus on nature IT infrastructure of research universities over the next several years—based on open-source standards and outsourcing stable infrastructure—would demand such cooperative efforts.

Leadership

How does one lead an institution through when key technologies are undergoing such order of magnitude changes? To some participants, the key was empowering the next generation of the faculty. “Our young faculty members generate the best ideas, but traditional academic structures may prevent those ideas from coming to the fore. Therefore, visionary university leadership requires the creation of ad hoc structures that empower young faculty to generate ideas, and focusing presidential attention and resources on the best ones. As long as we can attract the best young faculty, we will be able to stay on the leading edge and innovate.”

While this sounded like an appropriate strategy, and the participating schools could clearly point to a number of important initiatives that have emerged in this way, we were not so convinced. Is there really is such a strong flow of innovative ideas in the IT sphere, even from the top young faculty? And if there is such a strong flow, how do leaders then decide which “horses to back” from among the many worthy candidates?

Other participants conveyed a much more skeptical discussion of leadership and governance, at least as it relates to IT. The leadership ideal expressed by one participant was “make a transformative decision, execute, and repeat.” However, several participants expressed the view that the changing environment has made it difficult if not impossible for individual leaders to reach this ideal with any consistency. For example, it is more difficult than it used to be to generate a significant impact with a relatively small bet. With the current threshold at \$10-\$20 million, risk aversion may lead to technology investments being made in dysfunctional ways.

Also, in contrast with the faith that some participants expressed in the ideas of individual faculty as a transformative force, others were more inclined to see

the faculty as a group or vested interest standing in the path of needed innovation. In this formulation, even new ad hoc structures could not overcome the dead weight of traditional structures that are not working.

Some even suggested that neither university leaders nor even individual institutions could lead through such an era of rapid and profound change. Rather alliances must be created to provide the leadership, or the monopoly-dominated marketplace itself will lead, perhaps in directions antithetical to the nature of the research university. It could well be that it is the leadership structure of the university itself that has become obsolete, and this is the area in most need of change. Here, one participant reminded us, a true revolution replaces all of the leadership of a society.

General Strategies

Here we found a very significant contrast between two approaches to IT management and development: the optimists, who viewed the chaos of the rapidly evolving IT environment as not only inevitable but tolerable—just let it happen, we can adapt, *hakuna matata*—and the pessimists, who believed that the university needed to control and guide the IT revolution. The former group usually consisted of those institutions that had been leaders in IT development and implementation. They were confident while the revolution would continue, their institutions would remain in a leadership role. (One colleague mentioned the old proverb that one needs not outrun a tiger, but only outrun your companion...)

There was, however, general agreement about the unpredictable and occasionally disruptive nature of this technology. Some felt that the biggest threat was the frustration over constant technological change. Others suggest that folks just “get over it”, since continuous change is the key characteristic of a knowledge-driven society. The chaos of IT evolution could be an asset if it stimulated more experiment. Since the marketplace might be a more effective and efficient way to allocate resources and determine priorities, some suggested that universities should strive for an ecology of experimentation and alliances.

An Assessment of the Executive Leadership Core Workshops

In looking back over the year of workshops with the executive leadership cores of 18 leading research universities, the IT Forum has several interesting observations. First, it seems clear that while most university presidents are aware of the challenges posed by rapidly evolving digital technology (their world is indeed “flat”), they do not include it high on their lists of priorities for personal attention. Presidents are looking at IT only as a threat, not an opportunity, and they do not believe this is where the wheels are likely to come off the train, as they are in other more critical areas such as state support, private fund-raising, faculty recruiting, demographic changes in the student population, or federal higher education policy where they prefer to focus attention. Besides, if IT is really an area characterized by chaos, there is little that can be controlled anyway.

This *hakuna matata* attitude is the second issue. To be sure, most of the universities involved in our workshop had long histories of adapting readily to change and sustaining leadership in areas such as technology. The richest universities may well be able to ignore these technology trends, pull up the lifeboats, and feel secure with business as usual. Yet the complacency that accompanies past success can be dangerous, as Lou Gertsner pointed out to the AAU presidents from IBM’s history.

The third observation is just how difficult it was to steer these discussions in a more strategic direction, attempting to look over the horizon at the challenges and opportunities that could arise as this technology continued its inevitable progression, a 100 or 1,000 fold over the next decade. While participants would nod their heads, they soon regressed into a “we’re positioned well for whatever comes, so let’s get back to taking about the details of today’s issues”. The discussions kept coming back to concern “this is what bothers us now” rather than “where we might be ten years from now”.

There was remarkably little conversation about the major changes occurring in scholarship and learning, driven in part by technology. Although there was recognition about the new IT-based communities that

were evolving for faculty (e.g., cyberinfrastructure-based, global research communities) and students (e.g., social learning communities based on instant messaging), there was little discussion about how the university could take advantage of this in their educational and research missions.

There was also little evidence that these leaders understood just how rapidly this technology is driving major structural changes in other sectors such as business and government. Today an industry's CIO's life is challenged to reduce IT costs for given productivity by factors of 10 every few years. While university leaders were aware of the productivity gains enabled by a strategic use of technology in industry, they found it difficult to imagine the structural changes in the university capable of delivering such improvement.

To some degree, this unwillingness to think more deeply about the strategic implications of a technology evolving at a Moore's Law pace is evidence again of the complacency characterizing leading research universities. Their perch atop the higher education food chain and their relative wealth leads them to continue doing things the same old way. The real challenge is to pry the leadership away from near-term decisions to focus instead on long-term strategies, on "what" you do rather than "how" you do it.

The Future of Discovery, Learning, and Innovation

In October of 2012, the National Science Foundation sponsored a workshop at the University of Michigan to assess the impact of rapidly evolving information and communications technology (i.e., cyberinfrastructure) on the activities of discovery, learning, and innovation. This workshop convened an unusually diverse group of thought leaders from multiple disciplines and venues to consider the changing nature of learning and discovery in broad terms, spanning learning at all levels and discovery for all forms including research, development, innovation, invention, design, and creativity. The objectives of the workshop included: i) suggesting key research questions, likely game-changers, and possible paradigm shifts, ii) framing an interdisciplinary research agenda for the next decade, and iii) identifying possible

research programs, experiments, and organizational structures that would best meet the needs of the nation in this rapidly changing environment. In simpler terms, the goals of the workshop were to set an agenda for the exploration how to transform the what, the how, and who participates in discovery and learning; to personalize and broaden participation in discovery and learning; and to accelerate discovery and the transfer from discovery to innovative use.

More specifically, the topics considered by the workshop considered the impact of powerful technologies such as always-on, ubiquitous connectivity (anywhere, anytime, everyone); social networking, crowd sourcing, collaborative learning and discovery, functionally complete cyberinfrastructures, emerging learning paradigms such as massively open online courses (MOOCs), cognitive tutors, gaming, immersive experiences; big data, data-intensive discovery, learning analytics, intelligent software agents; and possible surprises such as cognitive implants. Of particular concern were the impact of emerging technologies on both learning institutions and learning paradigms? Similarly consideration was given to the way in technology was transforming research paradigms (e.g., data centers (clouds), big data (analytics), crowd sourcing, and open knowledge resources) In particular, the roundtable of participants was challenged to suggest a framework for the conduct of research concerning the impact of possible emerging technologies on the conduct of scientific research, technological innovation, and STEM education. Of particular interest was the identification of possible advances in technology that could radically transform the existing paradigms for these activities.

Organization of the Workshop

The workshop was organized as a series of moderated roundtable discussions captured by both experienced rapporteurs and video in a special studio that allowed multiple HD cameras and directional sound systems capable of recording the dialog among various participants for later distribution over the Internet. The workshop was organized into four specific sessions:



The Duderstadt Center at the University of Michigan



Changing Needs for Discovery and Learning: Here the focus was on the rapidly changing needs of society for workforce learning and skills, new knowledge, research, innovation, and creativity in a world increasingly integrated and transformed by digital technology. The differing priorities for learning and discovery were examined at the level of individuals, organizations, nations, and the world. The impact of demographic change (from baby boomers to Millennials to Gen Z), workplace needs (adaptive, ubiquitous, and lifelong learning opportunities), and learning structures (explicit, tacit, and intuitive knowledge) were considered. Different forms of discovery were also considered, e.g., transformational to translational to entrepreneurial R&D, as well as differing needs at the organization level (business, industry, government, OECD, emerging economics, and the developing world). The key question facing the group was: “Scientific and technology-enabled workspaces will soon be enormously different. How can we prepare our citizens—researchers, workers, and leaders—for this future?”

The Future Evolution of Digital Technology: Here the topics included the emergence of always-on, ubiquitous connectivity (anywhere, anytime, everyone); social networking, and collaborative learning and discovery, collaboratories; four-quadrant paradigms (i.e., same place/same time; same place/different times; different places at the same time; and different places at different times) and functionally complete cyberinfrastructures;

emerging learning paradigms such as intelligent tutors, gaming, immersive experiences; big data, data-intensive discovery, visual analytics, intelligent software agents; and possible surprises such as cognitive implants. The key question: “We will have amazing tools. How can we use them in the service of learning and discovery?”

Possibilities, Game-Changers, and Paradigm Shifts: This session addressed questions such as: How might these emerging technologies transform learning institutions (schools, colleges, workplace training, lifelong learning, open learning) and paradigms (from learning to know, to learning to do, to learning to become)? How are research paradigms likely to change (Pasteur’s Quadrant, citizen scientists, crowd sourcing, open knowledge)? Could these drive major social transformations such the Renaissance and Enlightenment that appeared during earlier eras of major changes in discovery and learning. The key question: “The environments for discovery and learning face transformative change. What must learning institutions do to enable this change?”

Paths to the Future of Discovery and Learning: The final session focused on specific findings and recommendations for consideration of federal agencies, educational institutions, industry, foundations, and other organizations and communities concerned with scientific discovery, innovation, and learning. In particular, the roundtable was challenged to suggest a framework for the conduct of research concerning

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the impact of possible emerging technologies on the conduct of scientific research, technological innovation, and STEM education. Here the panel included expertise in learning sciences and cognitive science, selected in particular to help uncover how the new possibilities can build on the past half-century of research on how people learn. For example, how does our understanding of human memory and information processing inform the design of new interfaces to extend human capability? How do we design learning and discovery environments that emphasize “21st Century Skills” while ensuring that learners at all levels achieve necessary mastery of core topics? Of particular importance here was the identification of possible advances in technology that could radically transform the existing paradigms for discovery and learning activities (e.g., “Watson in your pocket”). Here the roundtable was asked to suggest new research programs, experiments, and organizational structures that could augment or replace existing discovery, innovation, and learning paradigms. In addition, consideration was given to the social and organizational challenges in exploiting the power of these technologies.

Session One: The Changing Need for Discovery and Learning

Demographic Challenges

The first set of discussions concerned the radically different demographics characterizing developed and developing economies. For example, the populations of most developed nations in North America, Europe, and Asia are aging rapidly where over the next decade the percentage of the population over 60 will grow to over 30% to 40%. Half of the world’s population today lives in countries where fertility rates are no longer sufficient to replace their current populations. In sharp contrast, developing nations in Asia, Africa, and Latin America are characterized by young and growing populations in which the average age is less than 20. The number of students enrolled in higher education by 2030 is forecast to rise from 100 million in 2000 to 400 million in 2030 – an increase of 314%. Here the demand for education is staggering since in a knowledge economy, it is clear to all that this is the key to one’s future security. Unless developed

nations step forward and help address this crisis, billions of people in coming generations will be denied the education so necessary to compete in, and survive in, the knowledge economy.

Today we see a serious imbalance between educational need and educational capacity—in a sense, many of our universities are in the wrong place, where populations are aging and perhaps even declining rather than young and growing. This has already triggered some market response, with the entry of for-profit providers of higher education (e.g., Laureate, Apollo) into providing higher education services on a global basis through acquisitions of existing institutions or distance learning technologies. But more significantly, meeting this demand will require new forms of technology-enabled learning such as Massively Open Online Courses (MOOCs) and the Open Learning Initiative. Yet, even if market forces and technology-enabled learning paradigms are successful in addressing the urgent educational needs of the developing world, there are also concerns about whether there will be enough jobs to respond to a growing population of college graduates in many of these regions.

The Educational Needs of 21st-Century Citizens

It is estimated over 80 percent of the new jobs created by our knowledge-driven economy require education at the college level, and for many careers, a baccalaureate degree will not be enough to enable graduates to keep pace with the knowledge and skill-level required for their careers. The knowledge base in many fields is growing exponentially. In some fields such as engineering and medicine the knowledge taught to students becomes obsolete even before they graduate! Hence a college education will serve only as a stepping-stone to a process of lifelong education. The ability to continue to learn and to adapt to—indeed, to manage—change and uncertainty are among the most valuable skills of all to be acquired in college.

Both young, digital-media savvy students and adult learners will likely demand a major shift in educational methods, away from passive classroom courses packaged into well-defined degree programs, and toward interactive, collaborative learning experiences,



Discussions of the NSF Workshop on the Impact of IT on Discovery, Learning, and Innovation

provided when and where the student needs the knowledge and skills. There will be a shift from “just in case” learning, in which formal education is provided through specific degree programs early in one’s life in the hope that the skills learned will be useful later, to “just in time” lifelong learning, in which both informal and formal learning will be expected to occur throughout one’s life, when it is relevant and needed to “just for you” learning, highly customized to the needs and styles of the learner. This suggests that most of one’s learning will occur after the more formal K-16 experience, either in the workplace or other learning environments. The increased blurring of the various stages of learning throughout one’s lifetime—K-12, undergraduate, graduate, professional, job training, career shifting, lifelong enrichment—will require a far

greater coordination and perhaps even a merger of various elements of our knowledge infrastructure.

The Changing Nature of Learning

Yet while learning and teaching in higher education is changing, both those driving change and those who need to change (professors/instructors) do not always know how. Learning is happening outside formal structures like the classroom, through hands-on engagement, internships and apprenticeships. It has become life-long and life-wide. The physical spaces where learning happens on campus can be more or less facilitative of learning, and universities have the power to create such spaces, if they recognize the need and value the craft aspects of learning. Part of the

challenge here is to understand better how the learning experiments around the edges of learning institutions is challenging and changing traditional forms of pedagogy.

Should educational institutions challenge these characteristics of today's youth, such as multiprocessing homework, texting, gaming and music or capability for rapid context switching, increasingly both created by and necessary to master emerging technologies? Or should we allow our students to adapt naturally to the power of communication using mobile devices and social networks that enable learning through online interactions, particularly among peers, rather than the more structured classroom curriculum characterizing today's institutions. Perhaps we have not thought sufficiently about connecting the dots of all the learning options that students have these days!

Lifelong Learning

In a global economy increasing driving by rapidly evolving knowledge and technology, a nation's workforce will require ever more sophisticated and sustained education and training to sustain its competitiveness. Today's graduates will change careers many times during their lives, requiring additional education at each stage. Furthermore, with the ever-expanding knowledge base of many fields, along with the longer life span and working careers of our aging population, the need for intellectual retooling will become even more significant. Even those without college degrees will soon find that their continued employability requires advanced education. Hence opportunities for lifelong education will become a necessity for a knowledge-driven world.

Unfortunately, with the exception of a few of the professional schools such as medicine, business, and law, there is ample evidence that most faculty members have not been very interested in developing the paradigms necessary for adult education, e.g., the short courses and training programs that will help with new skills. Trying to find a way for the university to incorporate more of the educational apparatus to equip people for lifelong issue is a very big issue, and we have not dealt with it well. Fortunately recently emerging technology-based learning paradigms such

as MOOCs and open learning seem particularly well suited to providing lifelong learning opportunities for adult students, since their strong emphasis on both synchronous and asynchronous online education and social networks to build huge learning communities address particularly well the constraints faced by working adults.

It was noted that the flipside of lifelong learning is that students do not have to wait until later in life to learn about the workplace. In fact, most want to get out of universities faster, since these are expensive, and there are plenty of other learning opportunities beyond the campus. Students are already well into their lives when they arrive on campus, and they are taking control of their educational experiences. They are using technology to access learning opportunities beyond the formal curriculum, using digital knowledge resources such as Google, Wikipedia, and digital libraries and building learning communities with other students. We have to understand that the university is no longer the warden for student learning, if it ever was. Instead we have to take advantage of the "life-wide" nature of student learning, just as we have to prepare them for lifelong learning activities.

The Changing Nature of Research and Scholarship

The evolution of powerful cyberinfrastructure is driving significant change in the paradigms for discovery and research. With the exploding capacity of sensor technology and data centers, data mining (analytics) as been added to the traditional scientific processes of observation, hypothesis, and experiment, becoming more data correlation driven than hypothesis driven. Both fundamental research and product development are increasingly dependent on simulation from first principles requiring massive supercomputers rather than experimental measurement and testing. If one subscribes to the view that there is a paradigm shift from hypothesis driven to data driven discovery and simulation, then it is clear that the entire conduct and culture of scientific and engineering discovery and innovation is changing as a result of access to data, technology and social networks. We are going to need new models for sharing data, software, and computational resources.

Yet another concern is the degree to which many companies are embracing philosophies of outsourcing the risks of research, encouraging scientists and engineers to leave the “mother ship” of the company to do a start up such as developing a cloud-based software platform, thereby assuming all the risk, but eventually hoping to be reacquired by the old company through *de novo* financing. Another pragmatic approach is to offshore corporate research to less expensive research centers in countries like India or China.

As a result, little of today’s corporate R&D was basic in nature but rather consisted of extrapolation of existing knowledge through applied research and development. In fact it was suggested that much of the technology of American industry was largely based on scientific research conducted in the 1950s and 1960s in the Cold War era. There was significant concern expressed about the disappearance of major industrial research laboratories such as Bell Laboratories or the Ford Scientific Laboratory, capable of significant translational research connecting basic research with applied research and development to create new products and processes to be transferred into the marketplace to service society. This suggests that we need a new relationship among universities (where basic research and advanced education occurs), national laboratories (where very large-scale R&D projects are launched, and industry (where both unique facilities and data sets exist).

Access to the Tools and Data Necessary for Cutting-Edge Research

Today there are major questions with respect to who has access to and control of scientific data. Much data exists in the private sector and is unavailable to researchers in higher education—a break from the past, even in the Cold War years where there much research was constrained by security classification. We are beginning to see a phenomenon of research going where data is and hence migrating to corporate settings. This is creating a deluge of strange results. Experiments and findings are hard to reproduce because scientists cannot get at underlying data. Conclusions that become folklore rather than rigorously reproduced experiments spread quickly through networks.

There were also concerns expressed by representatives from industry that graduate students were not being adequately trained to meet their needs, in part because of the increasing sophistication of technology required for the analysis and development of industrial processes that was simply unavailable on the campuses. Conversely, students coming out of higher education have values that industry does not always share. The open and collaborative nature of recent graduates butts up against intellectual property and privacy rules as well as existing corporate culture.

It was acknowledged that the responsibility for adequate training in such areas required more intimate partnerships between universities and industry. Yet industry participants also acknowledged their practice of luring talented undergraduates in the areas of software development to leave their studies prior to their degrees. Several industry participants admitted they were eating their own seed corn in pursuit of near term profits.

Craftsmanship

Several participants noted a structural hole that had appeared in today’s learning institutions that could impact innovation. In earlier times, when universities were brilliant at doing ideation, and industry was brilliant at de-risking everything and grinding away, there were places like Bell Labs, Xerox PARC, SRI, etc. that had as many craftspeople as scientists. They could build anything, and they built it well. Those people never got recognition. But in labs themselves, shoulder to shoulder, they had as much reputation as any of the PhD’s within the organization. This group built the stuff that enabled a serious conversation with engineering and manufacturing companies about product development.

Yet today we have a situation where there are few institutional mechanisms to do the applied research to take ideas into prototypes because of the rapid payback required by venture capital. Furthermore applied research activities based on craft as much as science, and universities are not that good at keeping people good at craft around for time required for these developments. Other players such as the national laboratories still emphasize craft in their major activities,

but their cultures and infrastructure are directed at major project work rather than product-oriented R&D needed by industry.

Several European nations such as Germany and Switzerland are much better at creating and valuing craftsmanship. They understand the importance of craft and have developed both the educational structures (e.g., Fachhochschulen for learning in the applied sciences and the Fraunhofer Institutes for applied technology research) and the reward system to encourage and sustain it. Fortunately today in the United States there are early signs such as the “maker” movement that suggest that young people are becoming very interested once again in making things. A culture of wanting to build stuff is beginning to appear again, but higher education is not geared up for this yet.

Industry Views of the University

One of the great challenges facing the American research university is the lack of understanding of their broad mission as the nation’s key asset for the conduct of basic research (providing over 50% of the national effort), producing the next generation of scientists and scholars, and knowledge professionals (engineering, medicine, law, etc.), providing state-of-the-art health (university medical centers), and attracting global talent (both students and faculty). Hence it was surprising—indeed, alarming—that several of the participants from high-tech industry stressed that the primary purpose of these institutions should be to provide the low-cost mass education and training specific to meeting the immediate needs of industry. In fact, some participants even discounted the value of campus-based research, arguing that in today’s economy, it is more efficient to outsource R&D to small spinoff companies or cheaper offshore providers. Another surprise from the discussions was the belief that university research and education were becoming less and less relevant to the information technology industry. There seemed to be a confidence that IT companies, particularly those in software development, could get all the R&D help they need by either outsourcing it to small spinoff companies, offshore it to low cost economies, or simply pluck an outstanding student or faculty member out of a university.

This view seems to have colored the current relationship between universities and the computer industry, which today lags many other industries such as pharmaceuticals in the support of campus-based research. This is ironic, since the basic research conducted on the campuses laid the fundamental foundation for computing, e.g., mathematical logic, solid state physics, systems analysis, while the technology needs of faculty members and the innovation from students drove much of the innovation in the industry (e.g., Univac, CDC, DEC, Microsoft, Apple, Google, Facebook, etc.). Furthermore, many of the paradigms characterizing today’s technology actually began on the campuses (e.g., digital computing, time sharing, the Internet, search algorithms, data mining, cognitive tutors). Hence the absence of more robust relationships between today’s industry and higher education could well become its Achilles heel because of the growing need for basic research in areas such as artificial intelligence, DNA storage, and quantum computing necessary to advance the technology.

Session Two: The Future Evolution of Digital Technology

The End of Moore’s Law?

Although most characteristics of cyberinfrastructure, e.g., processing power, data storage, network bandwidth continue to increase at an exponential pace described by Moore’s law, various components of the technology do eventually encounter limits and saturation that require major technology shifts. For example, VLSI processors and memories are approaching the limits of miniaturization and hence processing speed. In the near term devices are exploiting multiprocessor architectures, with dozens of processors on a single chip (and millions of processors in supercomputers). But other constraints such as power requirements will soon require new technologies such as DNA storage and quantum computing.

Similar evolution continues to occur in how information is processed. For example, companies such as Google are built around data centers, analyzing and extracting information and knowledge from large data centers (or clouds). Here scale truly matters, with

increases of factors of ten in storage and processing speed regularly required and achieved to meet market requirements. Similarly, data concepts have shifted to larger, more abstract structures such as entities, concepts, and knowledge, that require enormous increases in data storage and processing speed. They also require more sophisticated software for data processing to enable rapid searches for abstract concepts through petabytes of data.

The Human Interface

One of the most rapidly changing characteristics of this technology involves the human interface. Although we look back at the transition from text to image to video to 3D immersive displays, there are other characteristics such as mobility, size, and context that also change rapidly. For example, the development of software agents that rely on natural interactions such as speech and context awareness are already transforming both mobile phones (e.g., Apple's Siri) and interfaces with the physical world (e.g., imbedding computing into eyeglasses to assist in context analysis).

Similarly, there is great interest in the evolution of the Internet into a network of objects such as ubiquitous sensors, the rise of contextual data, and the ability to do predictive models of individual behavior. The need for accessibility raises the issue of digital inclusion in the broadest sense. How does one design technology to assist physically challenged individuals, aging populations, those with limited literacy skills, indeed, providing a global population of 10 billion with robust digital access.

The Evolution of the IT Industry

The history of the computing and communications industry has followed Schumpeter's process of creative destruction. Each major technology turn has been accompanied by the emergence of new companies that frequently destroy the old. While new companies such as Facebook, Google, and Amazon have exploited new paradigms such as social network, big data, clouds, and data mining to rapidly rise to global prominence, they may also be following the evolutionary pattern of earlier market leaders such as Control Data Corporation,

Digital Equipment Corporation, and the Bell System.

One interesting scenario is long-term status of the United States IT ecosystem. As an example of how this is evolving consider mobile devices. Remember here that most of mobile phone users on the planet are not from Europe and not from North America but rather from Asia and increasingly Latin America. That will forever more be true. That ratio only continues to expand. For most of these people the mobile phone is their definition of computing. It is not just their primary computer device but usually their only technology. Yet a second example is the continuing outsourcing of the U.S. silicon ecosystem, the whole mix of captive silicon foundries versus open foundries and open intellectual property. This has major implication for not only national competitiveness but also national security. Currently this migration of hardware development is counter balanced by innovation in the software space. But even here we have already begun to lose our status as a major player.

The Next Big Paradigm Shift

So, what are the early warning systems for major paradigm shifts? What does one look for? Do you look at the research labs on college campuses? Or do you look at Harvard dormitories for what students are doing before they drop out? Do you try to spot the next Bill Gates, Mark Zuckerberg, or Larry Page? Do you have any tracking systems?

Industry participants responded with "No, we don't look at the campuses until things break out of them. We try to spot activities characterized by hyper exponential growth, things that are growing every year by a factor of two or more. If we spot interesting students or faculty in universities, we try to extricate them as soon as possible. The success model is what escapes not what stays inside."

Again from industry's viewpoint, the elephant in the room is knowledge creation, not knowledge dissemination. Of course, this is the unique role of the research university, albeit in addition to its other missions of knowledge dissemination (e.g., teaching, service). The stovepipe structure in academia (and NSF itself) is stifling. We have commoditized knowledge generation. We need to be more focused on knowledge creation,

integration, synthesis, and dissemination. This involves working to broaden access through libraries, search tools, and push models in education. This is the big opportunity that research universities have to embrace. It is about DIKW: data, information, knowledge, and wisdom. One needs to use cyberinfrastructure together with creation tools, and universities are not stepping up to that.

Resilience

We need to think more about robustness and resilience of cyberinfrastructure and our knowledge systems. In rapidly changing environment, the capability of responding and being flexible and making smart choices without planning and thinking in advance become extremely important. The academy does not seem to be preparing students for understanding what “big data” really means. What happens when you start changing orders of magnitude, or when noise becomes signal as you amplify it? In the next few years we will be experiencing exa-data. Yet we have very few data scientists. The universities are not churning them out the people who actually know how to do the analysis. There is a sense that we now have fundamentally new tools that will give payoff, if you really do understand data analytics, the mathematical models, but more so if we also understand math, physics, chemistry, and other sciences and know how to bring them together? After all, the correlations identified through data mining do not necessarily lead to causal explanations.

The mental model of cloud-based knowledge and learning is intrinsically difficult. The fundamental challenge is that industry is actively building new stuff all the time. While this is a benefit for doing something innovative, it is not necessarily a good thing if you have a thousand companies innovating in an incompatible manner. Deleting in this case is non-deleting in that case. It is an ecology problem. We live not in the single system we are building but rather in an ecosystem with multiple providers of multiple things. As participant asked: “Do digital natives have any better mental models of new knowledge paradigms such as clouds? I don’t think they have deep computational models or insights. I don’t know. I really don’t.”

Session Three: Possibilities, Game-Changers, and Paradigm Shifts

The workshop participants were encouraged that in their discussion of possibilities, game-changers, and paradigm shifts in discovery, learning, and innovation, they try to strike a balance between identifying possibilities vs. arguing whether they will occur or not. They were invited to suggest important missing topics that need to get on table. Techies tend to talk about change-change-change. But there is also a need to talk about things that will not change. If there are things that are invariant, protected, and nurtured, we should identify them.

Cyberinfrastructure now allows tools, data, experiments, and other assets to support online knowledge communities, making these functionally complete in any of the four quadrants, that is, with all the resources necessary to handle knowledge flow. Using the scaffolding of cyberinfrastructure, one can dramatically reduce constraints of distance and time. This creates a major disruption in how knowledge work is done, expanding significantly the degrees of freedom.

New Paradigms for Learning and Teaching

So what are the opportunities presented by cyberinfrastructure for learning and teaching, for example Massively Open Online Courses (MOOCs) or cognitive tutor systems or Carnegie Mellon’s Open Learning Initiative. Are these something new? Or is this really just old wine in new bottles? After all, millions of students have been using online learning for decades (estimated today to involve over one-third of current students). There are lots of highly developed models, including the UK Open University and the Mellon Foundation’s asynchronous learning paradigms.

Of course today’s MOOCs do have some new wrinkles, aside from the massive markets they are able to build through the Internet and their current practice of free access. Their semi-synchronous structure, in which courses and exams are given at a specific time while progress is kept on track, allows them to leverage both grading and advising from more advanced students through social networks. (Here one might

think of MOOCs as a clever combination of UK's Open University and Wikipedia!) Furthermore MOOCs, like the far-more sophisticated Open learning Initiative, are able to use data mining (analytics) to gather a large amount of information about student learning experiences. When combined with cognitive science, this provides a strong source of feedback for course improvement.

More broadly, there are many other emerging and rapidly evolving learning technologies:

- E-books, digital libraries, and intelligence clouds of data
- Online synchronous and asynchronous lectures (over all four quadrants)
- Analytics on student performance and new approaches to learning research
- Use of artificial intelligence to create cognitive tutor systems (sans faculty)
- Massively multiplayer gaming (e.g., World of Warcraft or MineCraft)
- Immersive technologies (e.g., Second Life, Enders Game)

So what do we know about these new paradigms? Certainly there is a great deal of hype (e.g. that they will unleash a tsunami upon higher education). But where is the beef? Where are the careful measurements of learning that rigorously compare new paradigms such as MOOCs with classroom, studio, or tutorial-based learning? What are the advantages of technology-based learning? Cost and efficiency? Access to gigantic markets (with significant revenue potential)? Standardization...or customization? Capacity to gather data on learning and improve pedagogy? Quality of the learning experience?

Of course, it eventually leads back to a consideration of the most valuable form of learning and how it occurs? Through formal curricula? Through engaging teachers? Through learning communities? Particularly at the graduate level, centuries of experience suggest that the medieval concept of a Universitas Magistrorum et Scholarium, a gathering of scholars and masters, may not only be the most valuable form of learning, but also the most difficult to automate in a technology-intensive environment.

Knowledge communities fracture in strange and interesting ways. MOOCs are just one example of many new kinds learning technologies appearing that represent efforts to try to take over part of what the university nominally does but doing it better. These are not just flipping the classroom but flipping the entire model of the university. Of course, many of these efforts are driven by the exploding global needs for higher education mentioned earlier. For example, to meet the needs of its population, India would have to build 1,500 new universities just to handle its current number of secondary school graduates. There is no way that is going to happen. Hence there are gigantic markets that raise issues of scale.

Worries were expressed about the hype given MOOCs by the media. Certainly this paradigm is characterized by a powerful delivery mechanism. But it is just one model. It is much more important to focus on improving learning by integrating emerging technology with research about how people learn. We need to keep an open mind. Exploring these opportunities will be good for the learning business. There is no question that there will be transformative aspects of this. But there are also other models to explore and much richer collaboration opportunities to share. Through knowledge creation, we need to embrace new paradigms as a community.

The arc of conversation about technology-enabled learning was interesting. It started with MOOCs and how that paradigm could deliver education more cheaply to gigantic markets of users. Then it moved to speculation about whether these could not only lower the cost of education but perhaps shift learning to a new learning paradigm that would create a tsunami sweeping over universities. Yet it was also observed that 500 years it was thought that the printing press would destroy the medieval university. We would no longer need teachers since students could just read the books. As Clark Kerr's famous quote suggests, the university today remains one of the most enduring social institutions.

We must remember that there are actually students living on a university campus, completely immersed in an exciting intellectual and social physical environment and sophisticated communities where most of the learning occurs far from the classrooms and instead

through groups of students and teachers, interacting in diverse environments including laboratories, studios, and clinical settings. On a university campus we hope to have people—not just students but faculty and staff—engaged in learning activities all of their waking hours, and in the case of faculty at least, throughout their lives. MOOCs are interesting, but they are far from the vibrant, immersive environment of a college education, at least as we understand it today. And, as yet, there is little rigorous evidence of their learning effectiveness. Most of the efforts in learning science have not looked small experiments in traditional institutions. Learning science as a field is not ready yet for looking more broadly at more flexible learning communities.

A great thing about universities is that there are so many interesting things going on. Companies such as Google and Microsoft are always so focused. Universities have a breadth of opportunities because by design, they are optimal at driving curiosity and creating serendipity. This is a very important theme to think about. Where is the real value added for university environment.

The Challenge of Inequity in Learning Opportunities

Here one must keep in mind the following fact characterizing American higher education today: If you are smart and poor (bottom quartile), you have only a 10% chance of earning a college degree. If you are dumb and rich (top quartile), you have a 90% chance. The rapidly changing nature of our world challenges our adherence to the traditional disciplines. This is part of what happens and affects low-income kids. We are teaching kids curriculum in K-12 schools that do not prepare them for the world they are coming from and going to. They are double burdened: both how they have been prepared and where they are going.

One of the findings from large ethnographic studies of the way kids are learning on line speaks to social nature of learning through peer-to-peer interaction. This is incredibly important. In a social world, peer to peer learning, apprenticeship can look a lot of different ways. The way kids find their interest starts off with kids hanging out with each other. What are you doing? What does that look like? That looks interesting. I want

to tinker with that. Play with that. I want to mess around with that. I want to go deeper – asking each other how to do it. This is an incredibly efficient form of learning. People finding out how to do things and learning that from each other is efficient as long as we scaffold and construct those spaces. Yet have also learned that in the fear-driven communities, sometimes we do not allow kids to hang out together. We only provide geeking out, collaborative space around STEM education for people to go into specific programs. And universities cannot leverage this. For our youth, we do that in kindergarten, but we lose it for middle school and high school kids. We lose the opportunity to play and innovate. If you separate content from context and you get these didactic approaches that leave out particularly low-income kids. When we start talking about “we need fundamentals, we need core.” That’s what has been happening to our education system for last decades. We have not been addressing the broader set of learning issues related to how kids behave. Perhaps we need math and physics moms like soccer moms, parents showing kids that it is important? The social incentive to be a geek is not high.

Is the Paradigm for Basic Research Really Changing?

Are research and scholarship paradigms shifting? How? We all hear the buzzwords: clouds, analytics, convergence, etc. Is the way in which research is changing? What about global competition? Is the world of high-energy physics sustainable where you send people off to only one place CERN to do the work, resulting in a list of authors longer than substance of the papers? Are we moving to a wiki world where crowd sourcing of amateurs becomes important? How important is the role of research and scholarship within universities? Do we need tweaking of tax laws so the translational research of Bell Labs begins to reappear as part of the knowledge ecosystem?

Crowd-sourcing, open software, Wikipedia, and social networking enable certain forms of research to fractionalize. But there are deeper fiscal properties. What about the instrumentation (including distributed sensor technology) necessary to generate data? Have we done all the physical things we need so we need not invest in massive experimental facilities like the Large

Hadron Collider or missions to the outer planets? Of course, most scientists would contend that industry is really not talking about basic research anymore. Rather they are basing their activities primarily on the applications of things known. Yet if you ask more broadly what society needs from universities, it clearly needs basic research. No one else is doing generating the new knowledge that applied research flows from. Without that you don't get building blocks for innovative applications.

A Caution about Change in Universities

We should remember that while many think of the university in medieval terms, that universities change only one grave at a time, in reality universities change very quickly and in profound ways. It is true that the university today looks very much like it has for decades—indeed, centuries in the case of many ancient European universities. They are still organized into academic and professional disciplines; they still base their educational programs on the traditional undergraduate, graduate, and professional discipline curricula; our universities are still governed, managed, and led as they have been for ages.

But if one looks more closely at the core activities of students and faculty, the changes over the past decade have been profound indeed. The scholarly activities of the faculty have become heavily dependent upon digital technology—rather cyberinfrastructure—whether in the sciences, humanities, arts, or professions. Although faculties still seek face-to-face discussions with colleagues, these have become the booster shot for far more frequent interactions over the Internet. Most faculty members rarely visit the library anymore, preferring to access digital resources through powerful and efficient search engines. Some have even ceased publishing in favor of the increasingly ubiquitous digital preprint or blog route. Student life and learning are also changing rapidly, as students bring onto campus with them the skills of the net generation for applying this rapidly evolving technology to their own interests, forming social groups through social networking technology (Facebook, Twitter), role playing (gaming), accessing web-based services, and inquiry-based learning, despite the insistence of their

professors that they jump through the hoops of the traditional classroom paradigm.

In one sense it is amazing that the university has been able to adapt to these extraordinary transformations of its most fundamental activities, learning and scholarship, with its organization and structure largely intact. Here one might be inclined to observe that technological change tends to evolve much more rapidly than social change, suggesting that a social institution such as the university that has lasted a millennium is unlikely to change on the timescales of tech turns, although social institutions such as corporations have learned the hard way that failure to keep pace can lead to extinction. Yet, while social institutions may respond more slowly to technological change, when they do so, it is frequently with quite abrupt and unpredictable consequences, e.g., “punctuated evolution”.

It could also be that the revolution in higher education is well underway, at least with the early adopters, and simply not sensed or recognized yet by the body of the institutions within which the changes are occurring. Universities are extraordinarily adaptable organizations, tolerating enormous redundancy and diversity. It could be that the information technology revolution is more of a tsunami that universities can float through rather than a rogue wave that will swamp them.

Admittedly it is also the case that futurists have a habit of overestimating the impact of new technologies in the near term and underestimating them over the longer term. There is a natural tendency to implicitly assume that the present will continue, just at an accelerated pace, and fail to anticipate the disruptive technologies and killer apps that turn predictions topsy-turvy. Yet we also know that far enough into the future, the exponential character of the evolution of Moore's Law technologies such as info-, bio-, and nano-technology makes almost any scenario possible.

Clearly we have entered a period of significant change in higher education as our universities attempt to respond to the challenges, opportunities, and responsibilities before them. This time of great change, of shifting paradigms, provides the context in which we must consider the changing nature of the university.

Impact: Whence and Whither the Revolution

The report characterizing the first phase of this study of the impact of information technology on the university was entitled *Preparing for the Revolution*. But what revolution? The university today looks very much like it has for decades, still organized into academic and professional disciplines; still basing its educational programs on the traditional undergraduate, graduate, and professional discipline curricula; still financed, managed, and led as it has been for many years.

Yet if one looks more closely at the core activities of students and faculty, the changes over the past decade have been profound indeed. The scholarly activities of the faculty have become heavily dependent upon digital technology—rather cyberinfrastructure—whether in the sciences, humanities, arts, or professions. Although faculties still seek face-to-face discussions with colleagues, these have become the booster shot for far more frequent interactions over Internet. Most faculty members rarely visit the library anymore, preferring to access far more powerful, accessible, and efficient digital resources. Many have ceased publishing in favor of the increasingly ubiquitous preprint route. Even grantsmanship has been digitized with the automation of proposal submission and review and grant management and reporting by funding agencies. And, as we have noted earlier, both student life and learning is also changing rapidly, as students bring onto campus with them the skills of the net generation for applying this rapidly evolving technology to their own interests, forming social groups, role playing (gaming), accessing services, and learning—despite the insistence of their professors that they jump through the hoops of the traditional classroom paradigm.

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while social institutions may respond more slowly to technological change, when they do so, it is frequently with quite abrupt and unpredictable consequences, e.g., “punctuated equilibrium”. It could also be that the revolution in higher education is well underway, at least with the early adopters, and simply not sensed or recognized yet by the body of the institutions within which the changes are occurring.

Universities are extraordinarily adaptable organizations, tolerating enormous redundancy and diversity. It could be that information technology revolution is more a tsunami that universities can float through rather a tidal wave that will swamp them. One of our participants suggested that perhaps what we should view the transformation of the university as an evolutionary rather than a revolutionary process. Evolutionary change usually occurs first at the edge of an organization (an ecology) rather than in the center where it is likely to be extinguished. In this sense the cyberinfrastructure now transforming scholarship or the communications technology enabling new forms of student learning have not yet propagated into the core of the university. Of course, from this perspective, recent efforts such as the Google project take on far more significance, since the morphing of the university library from stacks to Starbucks strikes at the intellectual soul of the university.

It is certainly the case that futurists have a habit of overestimating the impact of new technologies in the near term and underestimating them over the longer term. There is a natural tendency to implicitly assume that the present will continue, just at an accelerated pace, and fail to anticipate the disruptive technologies and kill apps that turn predictions topsy-turvy. Yet we also know that far enough into the future, the exponential character of the evolution of Moore’s Law technologies such as info-, bio-, and nano- technology makes almost any scenario possible.

While perhaps not enabling the level of strategic discussions that we had hoped, the IT Forum certainly reinforced the good-news, bad-news character of digital technology. The good news is that it works, and eventually it is just as disruptive as predicted. The bad news is the same: this stuff works, and it is just as disruptive as predicted.

In this spirit, then, perhaps we should end with

a discussion that occurred with the AAU provost's workshop in 2004. While university presidents are reluctant to let speculation about the survival of the university on the table, not so with provosts, who were quite comfortable talking about very fundamental issues such as the values, roles, mission, and even the survival of the university, at least as we know it today. During this discussion it was pointed out during the 19th century, in a single generation following the Civil War, essentially everything that could change about higher education in America did in fact change: small colleges, based on the English boarding school model of educating only the elite, were joined by the public universities, with the mission of educating the working class. Federal initiatives such as the Land Grant Acts added research and service to the mission of the universities. The academy became empowered with new perquisites such as academic freedom, tenure, and faculty governance. Universities increased 10-fold and then 100-fold in enrollments. The university at the turn of century bore little resemblance to the colonial colleges of a generation earlier.

The consensus of our discussions with the provost suggested that we are well along in a similar period of dramatic change in higher education. In fact, some of our colleagues were even willing to put on the table the most disturbing question of all: Will the university, at least as we know it today, even exist a generation from now? Disturbing, perhaps. But certainly a question deserving of very careful consideration, at least by those responsible for leading and governing our institutions, suggesting that perhaps such studies should shift from "the impact of technology on the future of the research university" to "the impact of technology on scholarship and learning, wherever they may be conducted"!

Certainly the monastic character of the ivory tower is certainly lost forever. Although there are many important features of the campus environment that suggest that most universities will continue to exist as a place, at least for the near term, as digital technology makes it increasingly possible to emulate human interaction in all the sense with arbitrarily high fidelity, perhaps we should not bind teaching and scholarship too tightly to buildings and grounds. Certainly, both learning and scholarship will continue to depend heavily upon the existence of communities,

since they are, after all, high social enterprises. Yet as these communities are increasingly global in extent, detached from the constraints of space and time, we should not assume that the scholarly communities of our times would necessarily dictate the future of our universities. Even in the near term, we should again recall Christensen's innovators's dilemma, as these disruptive technologies, which initially appear rather primitive, are stimulating the appearance of entirely new paradigms for learning and research that could not only sweep aside the traditional campus-based, classroom-focused approaches to higher education but seriously challenge the conventional academic disciplines and curricula. For the longer term who can predict the impact of exponentiating technologies on social institutions such as universities, corporations, or governments, as they continue to multiply in power a thousand-, a million-, and a billion-fold?

To be sure, there will be continuing need and value for the broader social purpose of the university as a place where both the young and the experienced can acquire not only knowledge and skills, but the values and discipline of an educated mind, so essential to a democracy; an institution that defends and propagates our cultural and intellectual heritage, even while challenging our norms and beliefs; the source of the leaders of our governments, commerce, and professions; and where new knowledge is created through research and scholarship and applied through social engagement to serve society. But, just as it has in earlier times, the university will have to transform itself once again to serve a radically changing world if it is to sustain these important values and roles.

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Chapter 15

The Future of the University

*A Preamble:**Whence and whether the university of the future*

The triad mission of the university as we know it today—teaching, research, and service—was shaped by the needs of an America of the past. Since our nation today is changing at an ever-accelerating pace, is it not appropriate to question whether our present concept of the research university, developed largely to serve a homogeneous, domestic, industrial society, must not also evolve rapidly if we are to serve the highly pluralistic, knowledge-intensive world-nation that will be the America of the 21st Century?

Of course, there have been many in recent years suggesting that the traditional paradigm of the public university must evolve to respond to the challenges that will confront our society in the years ahead. But will a gradual evolution of our traditional paradigm be sufficient? Or, will the changes ahead force a more dramatic, indeed revolutionary, shift in the paradigm of the contemporary research university?

Just as with other institutions in our society, those universities that will thrive will be those that are capable not only of responding to this future of change, but that have the capacity to relish, stimulate, and manage change. In this perspective it may well be that the continual renewal of the role, mission, values, and goals of our institutions will become the greatest challenge of all!

The American university has changed quite considerably over the past two centuries, and it continues to evolve today. Colonial colleges have become private research universities; religious colleges formed during the early 19th century gradually became independent colleges; junior colleges have evolved into community colleges and then into regional universities.

Today public research universities also continue to evolve to adapt to changes in students (from state to national to global), support (from state to national, public to private), missions (from regional to national to global), and perception (education from a public good to a private benefit). Public universities are already rapidly expanding their public purpose far beyond the borders of their states, since the more mobile the society, the more global the economy, the broader the “publics” served by the university must become.

Of course, this ever-changing nature of the university itself is part of the challenge, since it not only gives rise to an extraordinary diversity of institutions, but also a great diversity in perspectives. What is a university? Is it a “college”, in the sense of the heritage of the colonial colleges (and, before that, the English boarding schools)? Is it the 20th century image of university life—football, fraternities, Joe-college, campus protests? Is it Clark Kerr’s multiversity, accumulating ever more missions in response to expanding social needs—health care, economic development, technology transfer? Or is the true university something more intellectual: a community of masters and scholars (*universitas magistrorum et scholarium*), a school of universal learning (Newman) embracing every branch of knowledge and all possible means for making new investigations and thus advancing knowledge (Tappan)?

What is the core of its university activities? Student development (or, in the words of Lord Rugby, “transforming savages into gentlemen”). Or creating, curating, archiving, transmitting, and applying knowledge? Or serving society, responding to its contemporary needs—health care, economic development, national defense, homeland security, entertainment (e.g., athletics).

What are its core values? Critical, rigorous thinking

(e.g., “the life of the mind”)? Academic freedom? Individual achievement (noting that the contemporary organization of the university is really designed to enable individuals to strive to achieve their full potential (as students, faculty, athletes).

With much the character of the proverbial elephant being felt by the blind men, it is not surprising that discussions involving the future of the university can be difficult. It is particularly difficult to ignite such discussions among university leaders, who generally fall back upon the famous Clark Kerr quote: “About 85 institutions in the Western World established by 1520 still exist in recognizable forms, with similar functions and with unbroken histories, including the Catholic Church, the Parliaments of the Isle of Man, of Iceland, and of Great Britain, several Swiss cantons, and...70 universities.”...Hakuna Matata

It is true that the university today looks very much like it has for decades—indeed, centuries in the case of many ancient European universities. They are still organized into academic and professional disciplines; they still base their educational programs on the traditional undergraduate, graduate, and professional discipline curricula; our universities are still governed, managed, and led as they have been for ages. But if one looks more closely at the core activities of students and faculty, the changes over the past decade have been profound indeed. The scholarly activities of the faculty have become heavily dependent upon digital technology—rather cyberinfrastructure—whether in the sciences, humanities, arts, or professions. Although faculties still seek face-to-face discussions with colleagues, these have become the booster shot for far more frequent interactions over the Internet. Most faculty members rarely visit the library anymore, preferring to access digital resources through powerful and efficient search engines. Some have even ceased publishing in favor of the increasingly ubiquitous digital preprint or blog route. Student life and learning are also changing rapidly, as students bring onto campus with them the skills of the net generation for applying this rapidly evolving technology to their own interests, forming social groups through social networking technology (Facebook, Twitter), role playing (gaming), accessing web-based services, and inquiry-based learning, despite the insistence of their

professors that they jump through the hoops of the traditional classroom paradigm.

In one sense it is amazing that the university has been able to adapt to these extraordinary transformations of its most fundamental activities, learning and scholarship, with its organization and structure largely intact. Here one might be inclined to observe that technological change tends to evolve much more rapidly than social change, suggesting that a social institution such as the university that has lasted a millennium is unlikely to change on the timescales of tech turns, although social institutions such as corporations have learned the hard way that failure to keep pace can lead to extinction. Yet, while social institutions may respond more slowly to technological change, when they do so, it is frequently with quite abrupt and unpredictable consequences, e.g., “punctuated evolution”.

It could also be that the revolution in higher education is well underway, at least with the early adopters, and simply not sensed or recognized yet by the body of the institutions within which the changes are occurring. Universities are extraordinarily adaptable organizations, tolerating enormous redundancy and diversity. It could be that the information technology revolution is more of a tsunami that universities can float through rather than a rogue wave that will swamp them.

An alternative viewpoint of the transformation of the university might be as an evolutionary rather than a revolutionary process. Evolutionary change usually occurs first at the edge of an organization (an ecology) rather than in the center where it is likely to be extinguished. In this sense the forces that are now transforming scholarship and enabling new forms of learning communities have not yet propagated into the core of the university. Of course, from this perspective, recent efforts such as the Google Book project take on far more significance, since the morphing of the university library from stacks to Starbucks strikes at the intellectual soul of the university.

Admittedly it is also the case that futurists have a habit of overestimating the impact of new technologies in the near term and underestimating them over the longer term. There is a natural tendency to implicitly assume that the present will continue, just at an accelerated pace, and fail to anticipate the disruptive

technologies and killer apps that turn predictions topsy-turvy. Yet we also know that far enough into the future, the exponential character of the evolution of Moore's Law technologies such as info-, bio-, and nano-technology makes almost any scenario possible.

Clearly we have entered a period of significant change in higher education as our universities attempt to respond to the challenges, opportunities, and responsibilities before them. This time of great change, of shifting paradigms, provides the context in which we must consider the changing nature of the university.

Much of this change will be driven by market forces—by a limited resource base, changing societal needs, new technologies, and new competitors. But we also must remember that higher education has a public purpose and a public obligation. Those of us in higher education must always keep before us two questions: "Whom do we serve?" and "How can we serve better?" And society must work to shape and form the markets that will in turn reshape our institutions with appropriate civic purpose.

From this perspective, it is important to understand that the most critical challenge facing most institutions will be to develop the capacity for change. As we noted earlier, universities must seek to remove the constraints that prevent them from responding to the needs of a rapidly changing society. They should strive to challenge, excite, and embolden all members of their academic communities to embark on what should be a great adventure for higher education.

As Frank Rhodes so eloquently stated it in his closing words of reassurance in the 1999 Glion Declaration:

"For a thousand years the university has benefited our civilization as a learning community where both the young and the experienced could acquire not only knowledge and skills, but the values and discipline of the educated mind. It has defended and propagated our cultural and intellectual heritage, while challenging our norms and beliefs. It has produced the leaders of our governments, commerce, and professions. It has both created and applied new knowledge to serve our society. And it has done so while preserving those values and principles so essential to academic learning: the freedom of inquiry, an openness to new ideas, a commitment to rigorous study, and a love of learning.

There seems little doubt that these roles will continue to

be needed by our civilization. There is little doubt as well that the university, in some form, will be needed to provide them. The university of the twenty-first century may be as different from today's institutions as the research university is from the colonial college. But its form and its continued evolution will be a consequence of transformations necessary to provide its ancient values and contributions to a changing world. "

Certainly the need for research universities will be of increasing importance in our knowledge-driven future. Certainly, too, it has become increasingly clear that our current paradigms for the university, its teaching and scholarship, its service to society, its financing, all must change rapidly and perhaps radically. Hence the real question is not whether higher education will be transformed, but rather how and by whom. If the university is capable of transforming itself to respond to the needs of a culture of learning, then what is currently perceived as the challenge of change may, in fact, become the opportunity for a renaissance, an age of enlightenment, in higher education in the years ahead.

The remarkable resilience of universities, their capacity to adapt and change in the past, has occurred in part because it embraces and encourages an intensely entrepreneurial cultures. We have provided our faculty the freedom, the encouragement, and the incentives to move toward their personal goals in highly flexible ways, and they have done so through good times and bad. Our challenge is to tap this grassroots energy and creativity in the effort to transform our institutions to better serve a changing world.

Yet we must do so within the context of an exciting and compelling vision for the future of our institutions. Rather than allowing the university to continue to evolve as an unconstrained, transactional, entrepreneurial culture, we need to guide this process in such a way as to preserve our core missions, characteristics, and values. We must work hard to develop university communities where uncertainty is an exhilarating opportunity for learning and discovery.

Challenges for the Near Term

Whenever any group of university presidents gets together, the discussions always begin with the usual topics: money (never enough), politics (always

too much), students (what are they up to now?), and for all too many university presidents these days, intercollegiate athletics (what is the next scandal?). However, after a bit of nudging, it is sometimes possible to push the conversation up to the 100,000 foot level to gain a better perspective of the key challenges and opportunities facing higher education today: the impact of the current global economic crisis on their institutions, the rising costs of education and research, the rapidly changing demographics of students as minorities become majorities, the reshaping of learning and research by rapidly evolving technologies, the emergence of powerful market forces, and the inadequate public understanding of the importance of the American university (Cole, 2009; Duderstadt, 2000).

Of course, while important today, these may not be the dominant issues facing higher education over the longer term. But these near term challenges must be addressed soon if our institutions are to meet the growing and changing needs of the nation. So let us begin with a few comments on the issues of today.

Today our world has entered a period of rapid and profound economic, social, and political transformation based upon a emerging new system for creating wealth that depends upon the creation and application of new knowledge and hence upon educated people and their ideas. It has become increasingly apparent that the strength, prosperity, and welfare of a nation in a global knowledge economy will demand a highly educated citizenry enabled by development of a strong system of tertiary education. It will also require institutions with the ability to discover new knowledge, develop innovative applications of these discoveries, and transfer them into the marketplace through entrepreneurial activities. (Friedman, 2005)

Yet the traditional institutions responsible for advanced education and research—colleges, universities, research institutes—are being challenged by the powerful forces characterizing the global economy: hypercompetitive markets, demographic change, increasing ethnic and cultural diversity, and disruptive technologies such as information, biological, and nanotechnologies. More specifically, markets characterized by the instantaneous flows of knowledge, capital, and work and unleashed by lowering trade barriers are creating global enterprises based upon

business paradigms such as out-sourcing economic activity and off-shoring jobs, a shift from public to private equity investment, and declining identification with or loyalty to national or regional interests.

The populations of most developed nations in North America, Europe, and Asia are aging rapidly while developing nations in Asia, Africa, and Latin America are characterized by young and growing populations. Today we see a serious imbalance between educational need and educational capacity. In a sense, many of our universities are in the wrong place, where populations are aging and perhaps even declining rather than young and growing, driving major population migration and all too frequently the clash of cultures and ethnicity.

New technologies are evolving at an exponential pace, obliterating both historical constraints such as distance and political boundaries and enabling new paradigms for learning such as open educational resources, virtual organizations, and peer-to-peer learning networks that threaten traditional approaches to learning, innovation, and economic growth.

On a broader scale, the education investments demanded by the global knowledge economy are straining the economies of both developed and developing regions. Developing nations are overwhelmed by the higher education needs of expanding young populations at a time when even secondary education is only available to a small fraction of their populations. In the developed economies of Europe, America, and Asia, the tax revenues that once supported university education only for a small elite are now being stretched thin as they are extended to fund higher education for a significant fraction of the population (i.e., massification). Yet their aging populations demand highest priority for public funding be given to health care, security, and tax relief, forcing higher education systems to become more highly dependent on the private sector (e.g., student fees, philanthropy, or intellectual property).

With this global context in mind, let us consider several of the important challenges facing higher education:

Challenge 1: Caught Between Massification, League Tables, and Tax Relief

In many respects the challenges facing higher education throughout the world are similar:

- The need to dramatically broaden participation in higher education to build a competitive workforce (massification);
- The desire to enhance the quality of both education and scholarship to compete in a knowledge-driven economy (as measured by league tables); and
- The pressures to reduce the relative burden on tax payers who face other public spending priorities such as health, retirement, and national security.

The incompatibility of these objectives create strong and conflicting demands on universities for greater accountability in areas such as cost containment, productivity, and learning outcomes. Many national and regional governments continue to view public support of higher education and research not as an investment but rather as an expenditure competing with other current needs (e.g., health care, retirement pensions). Furthermore, many of today's universities are being encouraged to reduce the burden on limited tax revenues by diversifying their funding sources through mechanisms such as raising student fees, building relationships with industry, encouraging philanthropy, and expanding the market for educational services through adult education or international students (or including the possibility of establishing international campuses).

Challenge 2: Mission Differentiation and Profiling

It is increasingly apparent that the great diversity of higher education needs, both on the part of diverse constituencies (young students, professionals, adult learners) and society more broadly (teaching, research, economic development, cultural richness) demands a diverse higher education ecosystem of institutional types. Key is the importance of mission differentiation, since the availability of limited resources will allow a small fraction of institutions to become globally

competitive as comprehensive research institutions. David Ward, former president of the American Council of Education and the University of Wisconsin, estimates that supporting a public world-class research university with annual budgets typically in the range of \$1 billion or more requires the tax base of a population of five million or greater. (Ward, 2010)

A differentiated system of higher education helps to accomplish both the goals of massification of educational opportunity and the conduct of research of world-class quality, but it assigns different roles in such efforts for various institutions. Enabled both by continental scale and its decentralized nature, the United States has achieved such a highly diverse system, enabling it to focus significant public and private resources to create a small set (less than 100) of world-class research universities, while distributing the broader roles of mass education and public service among a highly diverse collection of public and private institutions (roughly 3,600 in number), albeit with an inevitable tendency toward "mission creep".

But such diversity in institutional profiles is a major challenge for most nations where differentiation among the missions and character of universities faces formidable challenges of both tradition and political pressures. Stratification is a particular challenge in Europe, where broad distribution of resources leads to the illusion that the continent has one thousand quality research universities, with the result being that only a handful are truly world-class. Yet shifting from an egalitarian to a more elitist system that focuses resources to build and sustain only a small number of world-class research universities, likely excluding some EU nations entirely, will encounter political resistance.

Challenge 3: A Myopic Preoccupation with the Flat World

Many governments are now realigning higher education policies to address the challenges presented by the knowledge and innovation economy (as Tom Friedman would call it, the "flat world") by focusing priorities almost entirely on degree production (massification) and building research reputation (league tables) to the exclusion of the broader roles of the university. For example, there is a growing

utilitarianism associated with the role of higher education in addressing the need for human capital that could overwhelm the university's traditional social and cultural impact on society and civilization and its transformative potential through the creation, retention, and dissemination of knowledge. It is ironic that this shifts the value proposition from that of government responsibility for supporting the educational needs of a society to university responsibility for addressing the economic needs of government—an interesting reversal of traditional responsibilities and roles.

As a consequence, a serious gap can appear between national and regional higher education policies. For example, in America there is a mismatch between the priorities of the federal government for world-class excellence in graduate education and research and those of the states that are primarily focused on baccalaureate degree production. Fortunately in the United States such focused efforts by federal or state governments to demand that higher education address particular near term priorities (e.g., economic competitiveness, national defense, public health, the needs of underserved minority communities, etc.) are less influential. While the cacophony of demands from the highly diverse stakeholders attempting to influence American higher education (students, politicians, media, business, patients, sports fans...) can be a headache for university leaders and governing boards, it does have a moderating effect on dominance by any particular constituency or agenda because of the diversity of funding sources. Part of the challenge is balancing the needs of various stakeholders in higher education, predominantly the state, students, and business—and keeping all three satisfied without distorting the fundamental purpose of the university. Fortunately, the intensely competitive American higher education marketplace in which faculty, students, and resources move easily from one institution to another, has a self-correcting effect. If some institutions lose their way and become too focused on an agenda far removed from their core academic competence, they will quickly lose faculty, students, and eventually reputation.

This phenomenon may be a more serious issue in Europe because of the strong influence of government (support and regulation) on higher education. The cultural constraints on a freely operating market for

faculty and student talent in Europe, coupled with the much stronger role that governments play in both financing and governing higher education, put European universities at somewhat greater risk in the face of such present day imperatives as the innovation economy.

Challenge 4: Collapsing Financial Paradigms

There are growing concerns that the current model for financing higher education in most nations, almost entirely dependent upon public tax support, is simply incapable of sustaining massification while achieving world-class quality. For example, currently the investment in higher education in European countries ranges from 0.9% to 1.8% of GDP, of which only approximately 10% comes from private sources (e.g., student fees). European university leaders express many concerns about the financial vulnerability of their institutions, still primarily dependent on tax support without appreciable student fees or gift income, and insufficiently entrepreneurial compared to the massive research universities in America.

Since tax revenues are already stretched thin sustaining the strong social programs of many developed nations, it seems it is likely that many will be challenged to provide the advanced educational opportunities required by a knowledge-driven economy without appreciable changes in tax policies (to encourage private philanthropy) and student/family expectations (to accept significantly higher student fees). It has also become increasingly clear that with public tax support of higher education constrained by the burdens of generous social services and weak economic growth, further massification will only erode the support of research universities. While increasing student fees and modifying tax policies to encourage philanthropic support of higher education will be challenging, there may be no alternative to enhancing private support if Europe's universities are to remain competitive.

Yet there are similar fears that the more balanced financial model that has sustained American higher education for the past several decades is also beginning to fray. Traditionally, the support of American higher education has involved a partnership among states,

the federal government, and private citizens (the marketplace). In the past the states have shouldered the lion's share of the costs of public higher education through subsidies, which keep tuition low for students; the federal government has taken on the role of providing need-based aid and loan subsidies. However today the tuition and fees charged for private universities are now beyond the capacity of most families (e.g., \$40,000/year for tuition and \$60,000/year including housing). The tuition levels at public universities are also rising rapidly. For example, at both the Universities of California and U Michigan state residents pay \$15,000 a year while out-of-state students pay private tuition levels at \$45,000 a year.

A Brookings Institution study has concluded: "the traditional model of higher education finance in the U.S. with large state subsidies to public higher education and modest means-tested grants and loans from the federal government is becoming increasingly untenable." (Kane and Orzag, 2003).

Challenge 5: Public Policy vs. Markets

This combination of powerful economic, demographic, and technological forces could well drive a massive restructuring of the higher education enterprise on a global scale similar to that experienced by other economic sectors such as health care, transportation, communications, and energy. Nations are moving toward revenue-driven, market-responsive higher education systems because their current tax systems are increasingly unable to support the degree of universal access to post-secondary education required by knowledge-driven economies in the face of other compelling social priorities—particularly the needs of aging populations. Furthermore, there is growing willingness on the part of political leaders to use market forces as a means of restructuring higher education in an effort to increase both efficiency and quality. Put another way, market forces are rapidly overwhelming public policy and public investment in determining the future course of higher education.

Whether a deliberate or involuntary response to the tightening fiscal constraints and changing priorities for public funds, the long standing recognition that higher education is a public good, benefiting all of society,

is eroding. Higher education is increasingly viewed in many nations as a private benefit that should be paid for by those who benefit most directly, namely the students. Without the constraints of public policy, earned and empowered by public investments, market forces could so dominate and reshape the higher education enterprise that many of the most important values and traditions of the university could fall by the wayside, including its public purpose. (Newman, 2004) (Zemsky, 2005)

Challenge 6: Agility, Autonomy, and Accountability

Many of the most powerful forces driving change in higher education come from the marketplace, driven by new societal needs, the limited availability of resources, rapidly evolving technology, and the emergence of new competitors such as for-profit ventures. Clearly in such a rapidly changing environment, agility and adaptability become important attributes of successful institutions.

Yet the governance and leadership of most universities throughout the world are far more inclined to protect the past than prepare for the future. Furthermore, all of higher education faces a certain dilemma related to the fact that it is far easier for a university to take on new missions and activities in response to societal demand than to shed missions as they become inappropriate, distracting, or too costly. This is a particularly difficult matter for public universities because of intense public and political pressures that require these institutions to continue to accumulate missions, each with an associated risk, without a corresponding capacity to refine and focus activities to avoid risk.

In developed economies there is increasing government and stakeholder pressure for capable governance, leadership, and accountability of higher education, particularly in view of the expansion of participation and the increasing importance of education to prospering in the global knowledge economy. Paradoxically, in some states (and nations) even as relative government support has declined, the effort to regulate universities and hold them accountable has increased. Although some of this is rationalized by the sub-optimal activities of a relatively

small number of institutions, it is perhaps also evidence of governments attempting to retain control over the sector through regulation even as their financial control waned. (SHEEO, 2005)

While it is certainly true that cost-containment and accountability are important issues, it is also the case that in many nations, universities can rightly counter-argue that the main problem for them is that they are overregulated and underfunded. In the United States most public university governing boards view their role as one of oversight to ensure public or political accountability rather than stewardship to protect and enhance the university so that it is capable of serving both present and future generations. Similarly faculties and students tend to resist change. (AGB, 2006)

In the United States there has been a recent chorus of demands for increased transparency, accountability and commitment to public purpose (meaning cost containment) in the operation of our institutions. Of particular concern was the need for more evidence-based assessment of educational outcomes, particularly in the accreditation process. There have been numerous attempts to use the accreditation process as more active mechanism for quality improvement rather than simply to determine whether institutions meet the minimum qualifications for accrediting academic programs. In contrast, the European approach of quality assurance actually seems better aligned to driving quality enhancement, although it is my understanding that even in Europe is a movement toward greater use of accreditation. From the U.S. experience with the bureaucracy that inevitably infects such accreditation efforts in the United States, our recommendation to nation's exploring this practice can be captured in a single word: BEWARE!

Challenge 7: Research Strategies and Opportunities

While the long-standing partnership among research universities, business, and government in the United States continues to maintain global leadership in measures such as the percentage of GDP invested in R&D, the number and productivity of researchers, the volume of high-tech production and exports, and the global rankings of its research universities, there are several worrisome trends that have developed

over the past decade. These include the decline in federal funding for basic research and the imbalance in the national research portfolio, with roughly two-thirds of university research now in the biomedical sciences; the erosion of basic research in both corporate R&D laboratories and federal agencies; the increasing complexity of intellectual property policies; and the adequacy of the nation's supply of scientists and engineers in the wake of the changing immigration policies in the aftermath of the terrorist attacks of 2001.

The concerns raised by leaders of industry, higher education, and the scientific community, culminating in the National Academies' *Rising Above the Gathering Storm* study (Augustine, 2005), stimulated the federal government to launch two major efforts aimed at sustaining U.S. capacity for innovation and entrepreneurial activities: the Bush administration's American Competitiveness Initiative and Congress's America COMPETES Act (the latter being including an awkward acronym for "Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science".) If fully implemented, over the next decade these efforts would involve doubling federal investment in basic research in physical science and engineering; major investments in science and engineering education; tax policies designed to stimulate private sector in R&D; streamlining intellectual property policies; immigration policies that attract the best and brightest scientific minds from around the world; and building a business environment that stimulates and encourages entrepreneurship through free and flexible labor, capital, and product markets that rapidly diffuse new productive technologies. Unfortunately, in a 2007 year-end budget skirmish between President Bush and Congress, the funding for the America COMPETES effort was eliminated, and federal R&D continued to decline across all agencies funding university research.

A second major effort was launched in 2012 with the release of a major study by the U.S. National Academies of Science, Engineering, and Medicine concerning the future of the American research universities. Again bold recommendations were proposed to stabilize research funding, strive for greater cooperation between universities and industry, and demonstrate greater cost effectiveness. However, once again progress was limited by the reluctance of an increasingly conservative

Congress to increase these public investments in the nation's future.

European nations have adopted the Lisbon Agenda (2000) "to become the most competitive and dynamic knowledge-based economy with more and better jobs and social cohesion by mobilizing the brainpower of Europe". Such initiatives are both pan-European like the European Higher Education Area (e.g., the Bologna process) or at the level of the European Commission (e.g., the Lisbon agenda) with initiatives such as the European Research Area (better integration of National and European research policies and the project of the European Research Council). The Lisbon agenda tends to use as a benchmark the United States investments in higher education and research (currently at levels of 2.6% and 3.0 % of GDP, respectively) while the Bologna process and ERC tend to emulate characteristics of the American research universities (e.g., standardizing university degrees upon the bachelors, masters, and PhD while basing the envisaged European Research Council research programs on competitive, peer-reviewed grants much like the U.S. National Science Foundation. While this establishes major investments in higher education and research as priorities, with the goal of bringing Europe up to the level of the United States by 2010, there are serious concerns that such an ambitious objective may be inconsistent with the low economic growth of national economies. It furthermore will likely require major structural changes in how European universities are organized, governed, and financed.

Paradigm Shifts

The Common Denominators

As knowledge and educated people become key to prosperity, security, and social well-being, the university, in all its myriad and rapidly changing forms, has become one of the most important social institutions of our times. Yet many questions remain unanswered. Who will be the learners served by these institutions? Who will teach them? Who will administer and govern these institutions? Who will pay for them? What will be the character of our universities? How will they function? When will they appear? The list goes on.

It is difficult to suggest a particular form for the university of the 21st Century. The ever-increasing diversity of American higher education makes it clear that many types of institutions will serve our society. Nonetheless, a number of themes will almost certainly characterize at least some part of the higher education enterprise:

- Universities will shift from faculty-centered to *learner-centered* institutions, joining other social institutions in the public and private sectors in the recognition that we must become more focused on those we serve.
- They will be more *affordable*, within the resources of most citizens, whether through low cost or societal subsidy.
- They will provide *lifelong learning*, requiring both a willingness to continue to learn on the part of our citizens and a commitment to provide opportunities for this lifelong learning by our institutions.
- All levels of education will be a part of a *seamless web*, as they become both interrelated and blended together.
- Universities will embrace *asynchronous learning*, breaking the constraints of time and space to make learning opportunities more compatible with lifestyles and needs, anyplace, anytime.
- We will continue to develop and practice *interactive and collaborative learning*, appropriate for the digital age, the "plug and play" generation.
- Universities will commit to *diversity* sufficient to serve an increasingly diverse population with diverse needs and goals.
- Universities will need to build learning environments that are both *adaptive and intelligent*, molding to the learning styles and needs of the students they serve.

There is one further modifier that may characterize the university of the future: *ubiquitous*. Today, knowledge has become the coin of the realm. It determines the wealth of nations. It has also become the key to one's personal standard of living, the quality of one's life. We might well make the case that today it has become the responsibility of democratic societies to

provide their citizens with the education and training they need throughout their lives, whenever, wherever, and however they desire it, at high quality, and at a cost they can afford.

Of course, this has been one of the great themes of higher education in America. Each evolutionary wave of higher education has aimed at educating a broader segment of society—the public universities, the land-grant universities, the normal and technical colleges, and the community colleges. But today we must do even more to serve an even broader segment of our society.

Early Experiments

The Michigan Virtual Automotive College

One of the more provocative approaches to higher education in the information age is the so-called virtual university. In cybertalk, “virtual” is an adjective that means existing in function but not in form. A virtual university exists only in cyberspace, without a campus or perhaps even a faculty. Sophisticated networks and software environments are used to break the learning loose from the constraints of space and time and make it available to anyone, anyplace, at any time.

To respond to the changing educational needs of a major industry in our state, the automobile industry, as well as to explore the possibility of new types of learning institutions based upon rapidly emerging digital technology, in 1996, the State of Michigan launched the Michigan Virtual Automotive College. This is a collaborative effort among the University of Michigan, Michigan State University, the State of Michigan, the state’s other colleges and universities, and the automobile industry. It was formed as a private, not-for-profit, 501(c) 3 corporation aimed at developing and delivering technology-enhanced courses and training programs for the automobile industry.

MVAC was designed as a system integrator, a broker, between colleges and universities, training providers, and the automotive industry. It works to integrate customer needs, available academic/training programs, and development of new materials. It is designed as a “green field” experiment where colleges and universities can come together to test capabilities

to deliver their training and educational programs at a distance and asynchronously. It is also expected to serve eventually as a platform for the State of Michigan to build an education export industry.

MVAC is a college without walls. Courses and programs can be offered from literally any site in the state to any other technologically connected site within the state, the United States, or the world. Although learning technologies are rapidly evolving, MVAC currently brokers courses which utilize a wide array of technology platforms including satellite, interactive television, Internet, CD-ROM, videotape, and combinations of the above. MVAC will seek to develop common technology standards between and among providers and customers for the ongoing delivery of courses. MVAC offers courses and training programs, ranging from the advanced post-graduate education in engineering, computer technology, and business administration to entry level instruction in communications, mathematics, and computers.

MVAC was an early success, demonstrating the viability of such a new kind of educational institution. During the early years of the new century it has evolved in the the Michigan Virtual University, working closely with the public colleges and universities in the state, to provide anytime, anyplace education.

The Michigan-Oberlin-Kalamazoo Collaborative

A second major experiment of the 1990s was to build a collaborative network of research universities and liberal arts colleges, beginning with the University of Michigan, Oberlin College, and Kalamazoo College. The anticipated benefits of this effort for research universities were: 1) to use faculty-mentored teaching residencies at liberal arts colleges to better prepare PhD graduates for the diverse array of faculty roles characteristic of higher education in America; 2) to provide graduate programs at research universities with access to the outstanding undergraduate students produced by these colleges; and 3) to establish intellectual relationships between the faculties of the two institutions. The benefits to liberal arts colleges would be 1) the provision of research opportunities at leading universities, including research faculty, facilities, and libraries; 2) to enable the liberal arts colleges to evaluate some of our strongest Ph.D.

students through the teaching residency program; and 3) work with the research university faculty to weave cutting-edge research into the undergraduate programs of the colleges.

Of particular interest was an exploration of ways that the research universities might build alliances with liberal arts colleges that enhance its preparation of future college professors. There has been increasing concern that the highly specialized, research dominated focus of today's Ph.D. programs is not well aligned to producing the type of faculty members needed by the broader higher education enterprise. Furthermore, there is increasing concern about the difficulty that many Ph.D. graduates have in finding positions in higher education. In 1997 42,427 doctorates were awarded in United States, an increase of nearly a third from a decade earlier. Many of these graduates will be frustrated and defeated in their search for faculty positions. Some of this is due to a mismatch between the Ph.D. production and the academic marketplace. Institutional needs for graduate research and teaching assistants tend to drive the size of our graduate programs rather than the needs of the higher education enterprise. Yet it is also true that most graduates have relatively limited experience in teaching, awareness of the qualities of colleges and universities beyond the research university where they received their doctoral training, and knowledge of the broader role of faculty in an academic community. The difficult job market for new PhDs is, to some extent, the result of not getting the right preparation for the jobs that exist.

Few believe that there is a need to replace the research training that is the heart of doctoral study in America. Rather, there is a need to broaden the concept of academic professionalism by including preparation for teaching and for service. Several groups have called for augmenting the graduate training process with internships or residencies that emphasize the faculty roles of teaching and service in the broader higher education enterprise. The Modern Language Association recommended that "doctoral programs familiarize students with the complex systems of postsecondary education in this country and offer not just courses but also mentored internships, residencies, and exchanges among institutions. The National Academy of Sciences has similarly called for

the development of internship programs in teaching-intensive colleges and universities as one way to prepare doctoral students for broader faculty roles.

It was also clear, however, that there were many other potential benefits associated with such alliances. For example, faculty members and students at liberal arts colleges increasingly seek access to the research opportunities characterizing research universities. The undergraduate curriculum characterizing teaching-intensive institutions can become obsolete in the face of the rapid evolution of knowledge in fields such as the life sciences and physical sciences. The vast library and laboratory resources of a major research university are difficult to match with the limited resources of most liberal arts colleges. Yet, with emerging information and telecommunications technology, it is now possible to link together scholars and students in such a way as to facilitate intellectual interactions and share resources such as libraries and experimental apparatus. Examples here include digital libraries and collaboratories.

So too, liberal arts colleges produce many of the undergraduate students who continue on to graduate school at major research universities. There is considerable interest among graduate faculties in both influencing the undergraduate education these students receive and in recruiting them into graduate programs.

More broadly, there have been suggestions that a key theme of higher education in the years ahead would be alliances and networks that leverage and enhance the capabilities of colleges and universities to serve society. If properly structured, such alliances would allow institutions of various types to focus on their strengths, while relying on their partners in the alliance to help respond to broader societal needs.

The longer term goal of the collaborative was to explore the possibility of a new system structure of colleges and universities, for example linking the C.I.C. research universities (the so-called "Big Ten") with the network of high quality liberal arts colleges in the Midwest.

Learn Grant Universities

Perhaps we need new types of institutions that better address the importance of new knowledge and learning

opportunities for a 21st century world. Of course our nation has done this before. The land-grant acts of the 19th and 20th centuries created new institutions focused on developing the vast natural resources of our nation to build a modern agricultural and industrial economy. Today, however, we have come to realize that our most important resources for the future will be our people, their knowledge, and their skills and innovation. At the dawn of the age of knowledge, it is clear that learning and innovation are replacing earlier assets such as natural resources, geographical location, or cheap labor as the key to economic prosperity and national security. Perhaps a new social contract based on developing and maintaining the abilities and talents of our people to their fullest extent could well transform our schools, colleges, and universities into new forms that would rival the earlier land-grant university in importance. In a sense, the 21st Century analog to the land-grant university might be a *learn-grant university*.

Such a university would be designed to develop our most important resource, our human resources, as its top priority, along with the infrastructure necessary to sustain a knowledge-driven society. The field stations and cooperative extension programs—perhaps now as much in cyberspace as in a physical location—could be directed to regional learning and innovation needs. While traditional academic disciplines and professional fields would continue to have major educational and service roles and responsibilities, new interdisciplinary fields such as sustainable technologies and innovation systems might be developed to provide the skills, knowledge, and innovation for a region very much in the land-grant tradition.

Other national priorities such as health care systems, environmental sustainability, globalization, and entrepreneurship might be part of an expanded mission for universities. Institutions and academic researchers would then commit to research and professional service associated with such national priorities. To attract the leadership and the long-term public support needed for a valid national public service mission, faculties would be called upon to set new priorities, collaborate across campus boundaries, and build upon their diverse capabilities. This is just one example of many. But the point seems clear. Such a social contract, linking together federal and state investment and interests

with higher education and business to serve national and regional needs, could become the elements of a 21st century analog to the land-grant university.

World Grant Universities

Many of our leading universities have evolved over time from regional or state universities to, in effect, national universities. Because of their service role in areas such as agriculture and economic development, some universities (particularly land-grant institutions) have gone even beyond this to develop a decidedly international character. Furthermore, the American research university dominates much of the world's scholarship and research, currently enrolling over 765,000 international students and attracting faculty from throughout the world. In view of this global character, some suggest that we may soon see the emergence of truly global universities that not only compete in the global market place for students, faculty, and resources but are increasingly willing to define their public purpose in terms of global needs and priorities such as environmental sustainability, public health, wealth disparities, poverty, and conflict. Such "universities in the world and of the world" might form through consortia of existing institutions (e.g., the U.K.'s Open University), new paradigms, or perhaps even existing institutions that evolve beyond the public agenda or influence of their region or nation-state to assume a truly global character. (Weber, 2008)

Lou Anna Simon, president of Michigan State University, one of the nation's earliest land-grant universities, coins the term "world grant university" to describe an extension of the principles inherent in the land-grant tradition adapted to address the global challenges of the twenty-first century and beyond. Such institutions would not be "granted" access to the world in the sense that states were granted tracts of land by the Morrill Act as a resource to support the establishment of land-grant institutions in the United States. Rather, the "world grant" ideal recognizes that fundamental issues unfolding in one's own backyard link directly to challenges occurring throughout the nation and the world. It not only recognizes this seamless connection but also actively grants to the world a deeply ingrained commitment to access and utilization of the knowledge

required to address these challenges. (Simon, 2010)

The evolution of a world culture over the next century could lead to the establishment of several world universities (Europe, Asia, Africa, and Latin America) as the focal point for certain sorts of study of international order—political, cultural, economic, and technological. Since the genius of higher education in America is the research university, perhaps these are the institutions destined to play this role for North America.

As *The Economist* notes, “The most significant development in higher education is the emergence of a super-league of global universities. The great universities of the 20th century were shaped by nationalism; the great universities of today are being shaped by globalization. The emerging global university is set to be one of the transformative institutions of the current era. All it needs is to be allowed to flourish.”

Hybrid Public/Private/State/ National/Global Universities

At a time when the strength, prosperity, and welfare of a nation demand a highly educated citizenry and institutions with the ability to discover new knowledge, develop innovative applications of discoveries, and transfer them into the marketplace through entrepreneurial activities, such vital national needs are no longer top state priorities. The model of state-based support of graduate training and research made sense when university expertise was closely tied to local natural resource bases like agriculture and manufacturing. But today’s university expertise has implications far beyond state boundaries. Highly trained and skilled labor has become more mobile and innovation more globally distributed. Many of the benefits from graduate training—like the benefits of research—are public goods that provide only limited returns to the states in which they are located. The bulk of the benefits are realized beyond state boundaries.

Hence, it should be no surprise that many states have concluded that they cannot, will not, and probably should not invest to sustain world-class quality in graduate and professional education—particularly at the expense of other priorities such as broadening access to baccalaureate education. Today, not only is state support woefully inadequate to achieve state goals,

but state goals no longer accumulate to meet national needs. The declining priority that states have given to public higher education makes sense for them but is a disaster for the nation. The growing mismatch between state priorities and national needs suggests that it is time once again to realign responsibilities between the state and the nation for higher education and provide adequate resources to sustain American leadership.

We write “once again” because this is not a brand new issue. The success of university research in winning World War II—with innovations such as radar and electronics—and Vannevar Bush’s seminal report, “Science, the Endless Frontier: A Report to the President on a Program for Postwar Scientific Research” (1945), convinced national leaders that university research is too important for national security, public health, and economic prosperity to allow it to be entirely dependent upon the vicissitudes of state appropriations and philanthropy. Hence, the federal government assumed the primary responsibility for the support of research, now at a level of \$30 billion each year—an effort that has been estimated to have stimulated roughly half of the nation’s economic growth during the latter half of the 20th century, while sustaining the nation’s security and public health. (Augustine, 2005)

Once more, it is time for the federal government to step in and provide the support necessary to keep our crucial graduate programs among the best in the world. Educating scientists and engineers, physicians and teachers, business leaders and entrepreneurs is vital to developing the human capital that is now key to national prosperity and security in the global, knowledge-driven economy. It cannot be left dependent on shifting state priorities and declining state support.

So how might this work? A new structure would distribute the primary responsibilities for the support of the nation’s flagship public research universities among the states, the federal government, and private donors. The states, consistent with their current priorities for enhancing workforce quality, would focus their limited resources on providing access to quality education at the associate and baccalaureate levels, augmented by student tuition and private philanthropy. The federal government would become, in addition to a leader in supporting university research, the primary patron of advanced education at the graduate and professional

level. Private patrons, including foundations and individual donors, would continue to play a major role in support of the humanities, the arts, the preservation of knowledge and culture, and the university's role in serving as an informed critic of society—all roles of great importance to the nation. Those functions would also continue to receive state support, because they are essential to high-quality baccalaureate education. (Courant, 2010)

How much additional federal investment will this new approach require? We suggest a magnitude roughly comparable to those of other major federal programs for the support of higher education such as university research (\$32 billion per year), the Pell Grant program (\$36 billion per year), tax-based aid (\$34 billion), or the foregone federal tax revenues associated with the beneficial tax treatment of charitable giving and endowment earnings (\$26 billion per year).

Those additional resources would best be allocated to universities based on a combination of merit and impact. For example, competitive graduate traineeship programs might be used in some disciplines, while grants for other fields might be based on graduation rates or the size of graduate faculties or student enrollments. Other grants could be designed to stimulate and support newly emerging disciplines in areas of national priority, like nanotechnology or global sustainability. In all cases, the key objective would be the direct support of graduate programs through sustained block grants to universities—rather than grants to individual faculty members or students. What matters now is that, more than ever before, America needs to develop a strategy for building and sustaining a system of research universities that is the best in the world.

The Broadening Mission of Public Universities

An important theme throughout the history of American higher education has been the evolution of the public university. The nation's vision and commitment to create public universities competitive in quality with the best universities in the world were a reflection of the democratic spirit of a young America. With an expanding population, a prosperous economy, and imperatives such as national security and industrial competitiveness, the public was willing to

make massive investments in higher education. While elite private universities were important in setting the standards and character of higher education in America, it was the public university that provided the capacity and diversity to meet our nation's vast needs for post-secondary education and research.

Today, however, in the face of limited resources and the pressing social priorities of aging populations, this expansion of public support of higher education has slowed. While the needs of our society for advanced education and research will only intensify as we continue to evolve into a knowledge-driven global society, it is not evident that these needs will be met by further expansion of our existing system of state universities. The terms of the social contract that led to these institutions are changing rapidly. The principle of general tax support for public higher education as a public good and the partnership between the states, the federal government, and the universities for the conduct of basic research and education, established in 1862 by the Morrill Act and reaffirmed a century later by post-WWII research policies, are both at risk.

These forces are already driving major change in the nature of the nation's public research universities. One obvious consequence of declining state support has been the degree to which many leading public universities may increasingly resemble private universities in the way they are financed, managed, and governed, even as they strive to retain their public character. Public universities forced to undergo this privatization transition—or, in more politically acceptable language, “self-sufficiency”—in financing must appeal to a broader array of constituencies at the national—indeed, international—level, while continuing to exhibit a strong mission focused on state needs. In the same way as private universities, they must earn the majority of their support in the competitive marketplace, that is, via tuition, research grants, and private giving, and this will require actions that come into conflict from time to time with state priorities. Hence, the autonomy of the public university will become one of its most critical assets, perhaps even more critical than state support for many institutions.

Indeed, today many states are encouraging their public universities to reduce the burden of higher education on limited state tax revenues by

diversifying their funding sources, e.g., by becoming more dependent upon tuition—particularly that paid by out-of-state students—by intensifying efforts to attract gifts and research contracts, and by generating income from intellectual property transferred from campus laboratories into the market-place. Some states are even encouraging experimentation in creating a more differentiated higher education structure that better aligns the balance between autonomy and accountability with the unique missions of research universities. Examples include Virginia's effort to provide more autonomy in return for accountability for achieving negotiated metrics, Colorado's voucher system, performance funding in South Carolina, and cohort tuition in Illinois (Breneman, 2005).

Yet, such efforts to "privatize" the support of public universities through higher tuition or increasing out-of-state enrollments can also encounter strong public and political opposition, even though there is ample evidence that, to date, tuition increases at most public institutions have not been sufficient to compensate for the loss in state appropriations. (Desrochers, 2011) Furthermore, since state support is key to the important public university mission of providing educational opportunities to students regardless of economic means, shifting to high tuition funding, even accompanied by increased financial aid, usually leads to a sharp decline in the socioeconomic diversity of students. (Haycock, 2008, 2010)

The privatizing strategy is flawed for more fundamental reasons. The public character of state research universities runs far deeper than financing and governance and involves characteristics such as their large size, disciplinary breadth, and deep engagement with society through public service. These universities were created as, and today remain, public institutions with a strong public purpose and character. Hence the issue is not whether the public research university can evolve from a "public" to a "private" institution, or even a "privately funded but publicly committed" university. Rather, the issue is a dramatic broadening of the "publics" that these institutions serve, are supported by, and become accountable to, as state support declines to minimal levels.

In view of this natural broadening of the institutional mission, coupled with the increasing inability (or

unwillingness) of states to support their public research universities at world-class levels, it is even possible to conclude that the world-class "state" research university may have become an obsolete concept. Instead, many of America's leading public research universities may evolve rapidly into "regional," "national," or even "global" universities with a public purpose to serve far broader constituencies than simply the citizens of a particular state who no longer are able or willing to provide sufficient support to sustain their programs at world-class levels. In fact, one might well argue that states today would be better off if they encouraged their flagship public research universities to evolve into institutions with far broader missions (and support), capable of accessing global economic and human capital markets to attract the talent and wealth of the world to their regions.

How might institutions embark on this path to serve far broader public constituencies without alienating the people of their states—or risking their present (albeit low) level of state support? One constructive approach would be to attempt to persuade the public—and particularly the media—that public research universities are vital to states in a far more multidimensional way than simply education alone—through health care, economic development, the production of professionals (doctors, lawyers, engineers, and teachers), talent magnets attracting talent from around the world, and for some a source of pride (particularly in college sports). The challenge is to shift the public perception of public research universities from that of a consumer to that of a producer of state resources. One might argue that for a relatively modest contribution toward their educational costs, the people of their states receive access to the vast resources, and benefit from the profound impact, of some of the world's great universities. It seems clear that we need a new dialogue concerning the future of public higher education in America, one that balances both its democratic purpose with economic and social imperatives.

Today, we face the challenges of a hypercompetitive global, knowledge-driven society in which other nations have recognized the positive impact that building world-class public universities can have. America already has them. They are one of our nation's greatest assets. Preserving their quality and capacity will require

not only sustained investments but also significant paradigm shifts in university structure, management, and governance. It also will likely demand that public research universities broaden their public purpose and stakeholders far beyond state boundaries. Preserving the quality and capacity of the extraordinary resource represented by our public research universities must remain a national priority, even if the support required to sustain these institutions at world-class levels is no longer viewed as a priority by our states.

The “No-Frills” University

In recent years there has been growing discussion about the possibility of accelerated three-year baccalaureate programs in U.S. higher education. In part this has been stimulated by the broad adoption by European universities of the three-year degree programs associated with the Bologna Process. But it has also been proposed as a way to reduce the cost of a college education, or as Senator Lamar Alexander puts it, viewed as “the higher ed equivalent of a fuel-efficient car”.

In fact, one might go even further and imagine introducing into American higher education streamlined universities more similar to those in Europe. Most European universities enroll adult students directly in three-year disciplinary majors after longer and more intense secondary educations. In contrast, American colleges and universities have inherited from their British antecedents the mission of the socialization of young students. Not only does this require a very substantial investment in supporting infrastructure such as residence halls, community facilities, and entertainment and athletic venues, but it can also distract the university from its more fundamental knowledge-based mission. Nevertheless it has become the expectation of American parents that “college is the place where we send our children to grow up”. Furthermore, U.S. colleges and universities are expected to compensate for the significant weaknesses currently characterizing primary and secondary education in the United States, even if that requires providing remedial programs for many under-prepared students.

In sharp contrast, European universities focus their activities on teaching and scholarship for adult

students. Entering students enroll in focused three-year discipline-based baccalaureate programs without the preliminary general education experience and socialization programs characterizing American universities. Students are expected to arrange for their own living and social activities, while the university focuses on its “knowledge and learning” mission, thereby avoiding many of the costs associated with socializing young students.

There have been numerous suggestions that the United States explore the “no-frills” approach of European universities by focusing the activities of some of their universities entirely upon disciplinary teaching and scholarship for upper-division students, thereby greatly reducing costs and tuition. This would allow the universities to focus their extensive—and expensive—resources where they are most effective: on intellectually mature students who are ready to seek advanced education and training in a specific discipline or profession. It would relieve them of the responsibility of general education and parenting, roles for which many large universities are not very well suited in any event. It might also allow them to shed their activities in remedial education, a rather inappropriate use of the costly resources of the research university. Focusing universities only on advanced education and training for academically mature students could actually enhance the intellectual atmosphere of the campus, thereby improving the quality of both teaching and scholarship considerably. Adult learners would be far more mature and able to benefit from the resources of these institutions.

Ironically, such a focusing of efforts might even reduce public criticism of higher education. Most students—and parents—appear quite happy with the quality of both upper-class academic majors and of professional education. Furthermore, they seem quite willing to pay the necessary tuition levels, both because they accept the higher costs of advanced education and training, and because they see more clearly the benefits of the degree to their careers, “the light at the end of the tunnel.” In contrast, most of the concern and frustration expressed by students and parents with respect to quality and cost are focused on the early years of a college education, on the general education phase, since they perceive this style of pedagogy very

similar to that of secondary education.

Yet the current quality and character of secondary education in the United States probably will not allow this for most students. Secondary education in Europe and much of the rest of the world is characterized by a more extended and intensive pre-college education, e.g., the German gymnasium, the British Sixth-Form, and the Canadian “college”, which provide much of the general education preparation that currently comprises the first two-years of American college education. Hence a major shift to three-year baccalaureate programs or no-frills adult universities would likely require a major restructuring of secondary education in the United States more along the lines of Europe and Canada.

Open and “Open Source” Universities

For many years, the educational needs of many nations have been addressed by open universities, institutions relying on both televised or Internet-based courses and local facilitators to enable students to study and earn degrees at home. Perhaps most notable has been the British Open University, but this is only one of many such institutions that now enroll over three million students worldwide.

These institutions are based upon the principle of open learning, in which technology and distance education models are used to break down barriers and provide opportunities for learning to a very broad segment of society. In these models, students become more active participants in learning activities, taking charge of their own academic program as much as possible. Most of these open universities are now embracing information technology, particularly the Internet, to provide educational opportunities to millions of students unable to attend or afford traditional residential campuses (e.g., the University of the People, which aims to provide tuition-free education to developing economies).

The motivation behind open universities involves cost, access, and flexibility. The open university paradigm is based not on the extension of the classroom but rather the one-to-one learning relationship between the tutor and the student. It relies on very high-quality learning materials, such as learning software and digital materials distributed over the Internet,

augmented by facilitators at regional learning centers and by independent examiners. Using this paradigm, for example, the British Open University has been able to provide high-quality learning opportunities (currently ranked among the upper 15 percent of British universities) at only a fraction of a cost of residential education (\$7,000 compared to \$20,000 per student year in North America).

To date most open universities rely heavily on self-learning in the home environment, although they do make use of interactive study materials and decentralized learning facilities where students can seek academic assistance when they need it. However, with the rapid evolution of virtual distributed environments and learning communities, these institutions will soon be able to offer a mix of educational experiences.

Clearly, the open university will become an increasingly important player in higher education at the global level. The interesting question is whether these institutions might also gain a foothold in the United States. During the 1990s the British Open University attempted to establish a beachhead in the United States, but the financial model did not work. More recently emerging institutions such as the Western Governors’ University and the University of Phoenix are now exploiting many of the concepts pioneered by the open university movement around the world, although recently the for-profit higher education sector has been experiencing declining enrollments.

Beyond the open university paradigm of admitting all applicants but setting firm requirements for graduation, some universities are embracing other aspects of the open philosophy in their educational activities. The explosion of online educational materials being made available through the OpenCourseWare and iTunes U paradigms, coupled with access to massive digital libraries such as the HathiTrust, is transforming the knowledge infrastructure of universities—and bringing the marketplace into the classroom, since many of these online courses compete very effectively with the instruction provided by oncampus faculty. A number of universities including the University of Michigan are playing leading roles in providing access to knowledge and learning tools through such open learning resources (e.g. MIT’s OpenCourseware, Rice’s Connexion Project, and Carnegie Mellon’s Open Learning Initiative.) Some

institutions are even preparing to explore the possible emergence of “open source” universities, committed to providing extraordinary access to knowledge and learning tools through open learning resources. In fact, some universities might decide to remove entirely the restrictions imposed by intellectual property ownership by asking all of their students and faculty members to sign a Creative Commons license for any intellectual property they develop at the University (at first copyright but eventually possibly even exploring other intellectual properties such as patents). Perhaps this would even redefine the nature of a “public” university, much in the spirit of the “public” library!

MOOCs, Learning Analytics, and Other “New” Learning Paradigms

The current strong interest (and hype) concerning massively open online courses (MOOCs) provides an example of how the merging of ubiquitous connectivity, social networking, and sophisticated pedagogy can create new forms of learning that access massive markets. Developed originally by computer scientists, the MOOC paradigm has rapidly been extended in numerous disciplines to massive markets by many universities working through integrators such as Udacity, Coursera, and EdX. While there are still many questions both about the rigor of the MOOC pedagogy and its capacity to generate revenues for the host institutions, it nevertheless provides an example of how robust connectivity leveraged through social networks can create massive learning communities at a global level.

Of course, today’s MOOCs do have some new elements, aside from the massive markets they are able to build through the Internet and their current practice of free access. (Waldrop, 2013) They augment online broadcast of canned lectures and automated grading of homework with social networks to provide teaching support through message boards and discussion groups of the students themselves. Their semi-synchronous structure, in which courses and exams are given at a specific time while progress is kept on track. Here one might think of MOOCs as a clever combination of UK’s Open University (online education) and Wikipedia (crowd sourcing of knowledge)! Furthermore, MOOCs,

like the far-more sophisticated Open Learning Initiative, are able to use data mining (analytics) to gather a large amount of information about student learning experiences. When combined with cognitive science, this provides a strong source of feedback for course improvement.

Some believe that today higher education is on the precipice of an era of extraordinary change as such disruptive technologies challenge the traditional paradigms of learning and discovery. (Friedman, 2011) They suggest that new technologies could swamp the university with a tsunami of cheap online courses from name-brand institutions, or adaptive learning using massive data gathered from thousands of students and subjected to sophisticated analytics, or even cognitive tutors that rapidly customize the learning environment for each student so they learn most deeply and efficiently.

But are these really something new or rather simply old wine in new bottles? After all, millions of students have been using online learning for decades (estimated today to involve over one-third of current students in the United States). There are many highly developed models for online learning, including the UK Open University, the Western Governor’s University in the United States, and the Apollo group’s global system of for-profit universities. Adaptive learning has been used in Carnegie Mellon’s cognitive tutor software for years in secondary schools and more recently in the Open Learning Initiative. Many of the buzzwords used to market these new technologies also have long established antecedents: Experiential learning? Think “laboratories” and “internships” and “practicums”... and even “summer jobs”! Flipped classrooms? Think “tutorials” and “seminars” and “studios”. Massive markets of learners? Many American universities were providing free credit instruction to hundreds of thousands of learners as early as the 1950s through live television broadcasts!

Certainly the MOOC paradigm is characterized by a powerful delivery mechanism. But it is just one model. There are also other models to explore and rich collaboration opportunities to share such as the data analytics and adaptive learning used in Carnegie Mellon’s Open Learning Initiative or the artificial intelligence-based cognitive tutor technology,

developed again by Carnegie Mellon, and used in K-12 and lower division college education for the past decade, open knowledge initiatives such as Google Books, the HathiTrust, and open scholarly data and publication archives; massively player gaming (e.g., Minecraft and the World of Warcraft) and immersive media (e.g., Second Life, and Enders Game). Automated assessment and evaluation could turn the whole education business upside down because we will have access to massive data sets that potentially will give us some insight in not how we deliver content but rather how people learn.

It is likely that MOOCs are a disruptive technology, and that analytics on learning data holds considerable promise. But it is also very important to separate the fundamental character of a college education from the specific resources used to achieve that, e.g., courses and curricula, textbooks and course notes, faculty and laboratory staff, and, of course, the complex learning communities that exist only on university campuses. After all, MOOCs are marketed as courses, not as a college education. We must remember the current university paradigm of students living on a university campus, completely immersed in an exciting intellectual and social physical environment and sophisticated learning communities, provides a very powerful form of learning and discovery. MOOCs are interesting, but they are far from the vibrant, immersive environment of a college education, at least as we understand it today.

Of course, there are highly disruptive scenarios. Suppose Stanford, Harvard, or MIT, the purveyors of for-profit ventures such as Coursera, Udacity, and EdX, were to begin to sell “Harvard-lite” credits or badges to students who successfully completed their MOOCs. Then many colleges would be compelled to accept these credentials for degree-credit, thus undermining their oncampus offerings. It would be ironic indeed if the same rich universities that are most guilty of driving up college costs by using their vast wealth to compete for the best faculty and students would now throw in yet another hand grenade consisting of brandname-driven cheap online education that could make them even wealthier while undermining the quality of education offered by traditional campus-based institutions.

What do we know about the effectiveness of these technology-based approaches? Where are the careful

measurements of learning necessary to establish the value of such forms of pedagogy? Thus far, promoters have relied mostly on comparisons of performances by both conventional and online students on standard tests. The only serious measurements have been those that Ithaka has conducted on the learning by cognitive tutor software in a highly restricted environment. (Bowen, 2012)

Of course, it eventually comes back to the questions of “What is the most valuable form of learning that occurs in a university...and how does it occur?” Through formal curricula? Through engaging teachers? Through creating learning communities? After all, the graduate paradigm of *Universitas Magistrorum et Scholarium* involving the interaction of masters and scholars will be very hard to reproduce online...and least in a canned video format!!!

As William Bowen, former president of Princeton and the Mellon Foundation and a founder of Ithaka suggests, it is time to “Walk, Don’t Run” toward the use of cyberlearning. We need lots of experimentation, including rigorous measurement of education—before we allow the technology tsunami to sweep over us! (Bowen, 2013)

A Return to Universitas Magistrorum et Scholarium—in Cyberspace

It is ironic that the cyberspace paradigm of learning communities may actually return higher learning to the medieval tradition of the master surrounded by scholars in an intense learning relationship. The term “university” actually originated during the Middle Ages with the appearance of “unions” of students or faculty members who joined together to form communities of teachers or students. The Latin origin, *universitas*, meant “the totality” or “the whole” and was used by medieval jurists as a general term to designate communities or corporations such as guilds, trades, and brotherhoods. Eventually the term university was restricted to these unions of masters and scholars and given the more formal Latin title: *Universitas Magistrorum et Scholarium*.

From time to time, educators have attempted to define the university in more intellectual terms. John Henry Newman stressed instead an alternative interpretation of the word: “The university is a place

of teaching universal knowledge.” In fact, the earliest European universities were designated as *stadium generale* by church or state to indicate their role to provide learning of a broad, universal nature to all of the known world (enabled, of course, by the use of Latin as the universal language of the academy).

We tend to prefer a simpler synthesis of these definitions of the university:

A university is a community of masters and scholars, a school of universal learning (Newman) embracing every branch of knowledge and all possible means for making new investigations and thus advancing knowledge (Tappan).

In a sense, this recognizes that the true advantages of universities are in the educational processes, in the array of social interactions, counseling, tutorial, and hands-on mentoring activities that require human interaction. In this sense, information technology will not so much transform the purpose of higher education—at least in the early phases—as enrich the educational opportunities available to learners. In a sense, technology is enabling the most fundamental character of the medieval university to emerge once again, but this time in cyberspace!

There is an important implication here. Information technology may allow—perhaps even require—new paradigms for learning organizations that go beyond traditional structures such as research universities, federal research laboratories, research projects, centers, and institutes. If this is the case, we should place a far higher priority on moving to link together our students and educators both among themselves and with the rest of the world. The necessary cyberinfrastructure would be a modest investment compared with the massive investments we have made in the institutions of the past—university campuses, transportation, and urban infrastructure. It is not too early to consider an overarching agenda to develop deeper understanding of the interplay between advanced information technology and social systems. We may soon have the knowledge to synthesize both in an integrated way as a total system.

Learning Ecologies

John Seely Brown suggests that we might think of the contemporary university as an interconnected set of three core competencies: *learning communities, knowledge resources, and the certification of knowledge skills*. (Brown, 2000) Social computing will empower and extend learning communities beyond the constraints of space and time. Open knowledge and education resources will clearly expand enormously the knowledge resources available to our institutions. And immersive environments will enable the mastery of not simply conventional academic knowledge but tacit knowledge. A fundamental epistemological shift in learning is occurring from individual to collective learning; from a focus on development of skills to instead dispositions, imagination, and creativity; and enabling the acquisition of both explicit and tacit knowledge.

In a rapidly changing world, innovation no longer depends only upon the explicit dimension characterizing conventional content-focused pedagogy focused on “learning to know”. Rather, one needs to enable an integration of tacit knowledge with explicit knowledge. Emerging ICT technologies that enable social networking to form learning communities and immersive virtual environments for simulation and play facilitate the “deep tinkering” that provides the tacit knowledge necessary to “learn to do”, “learn to create”, and “learn to be”, tools already embraced by the young if not yet the academy. In a sense, learning has become a “culture”, in the sense of the Petri dish that is in a state of constant evolution.

Once we have realized that the core competency of the university is not simply transferring knowledge, but developing it within intricate and robust networks and communities, we realize that the simple distance-learning paradigm of the virtual university is inadequate. The key is to develop computer-mediated communications and communities that are released from the constraints of space and time.

Distance learning based on computer-network-mediated paradigms allows universities to push their campus boundaries outward to serve learners anywhere, anytime. Those institutions willing and capable of building such learning networks will see

their learning communities expand by an order of magnitude. In this sense, the traditional paradigm of “time-out-for-education” can be more easily replaced by the “just in time” learning paradigms, more appropriate for a knowledge-driven society in which work and learning fuse together.

Renaissance: an Old Theme for a New Generation

Our world is changing rapidly, driven by the role played by educated people, new knowledge, creativity, innovation, and entrepreneurial zeal. The professions that have dominated the late 20th Century—and to some degree, the contemporary university—have been those which manipulate and rearrange knowledge and wealth rather than create it, professions such as law, business, accounting, and politics. Yet, it is becoming increasingly clear that the driving intellectual activity of the 21st Century will be the act of creation itself, as suggested by Jacques Attali in his provocative forecasts for the 21st Century at the turn of the Millennium: “The winners of this new era will be creators, and it is to them that power and wealth will flow. The need to shape, to invent, and to create will blur the border between production and consumption. Creation will not be a form of consumption anymore, but will become work itself, work that will be rewarded handsomely. The creator who turns dreams into reality will be considered as workers who deserve prestige and society’s gratitude and remuneration.” (Attali, 1991)

The tools of creation are expanding rapidly in both scope and power. Today, we can create objects literally atom by atom. We are developing the capacity to create new life-forms through the tools of molecular biology and genetic engineering. We are now creating new intellectual life-forms through artificial intelligence and virtual reality. Already we are seeing the spontaneous emergence of new forms of creative activities, e.g., the “maker” fairs providing opportunities to showcase forms of artistic, recreational, and commercial activity; the use of “additive manufacturing” or 3-D printing to build new products and processes atomic layer by atomic layer; and the growing use of the “app” culture to empower an immense marketplace of small software development companies. In fact, some suggest that our civilization may experience a renaissance-like

awakening of creative activities in the 21st century similar to that occurring in 16th century Europe.

A determining characteristic of the university of the 21st Century may be a shift in intellectual focus, from the preservation or transmission of knowledge, to the process of creativity itself. If so, then vision for the university of the early 21st century should stress characteristics such as creativity, innovation, ingenuity and invention, and entrepreneurial zeal. But here lies a great challenge. While universities are experienced in teaching the skills of analysis, we have far less understanding of the intellectual activities associated with creativity. In fact, the current disciplinary culture of our campuses sometimes discriminates against those who are truly creative and do not fit well into our stereotypes of students and faculty.

The university may need to reorganize itself quite differently, stressing forms of pedagogy and extracurricular experiences to nurture and teach the art and skill of creativity and innovation. This would probably imply a shift away from highly specialized disciplines and degree programs to programs placing more emphasis on integrating knowledge. There is clearly a need to better integrate the educational missions of the university with the research and service activities of the faculty by ripping instruction out of the classroom—or at least the lecture hall—and placing it instead in the discovery and tinkering environment of studios or workshops or even “hacker havens”.

Actually, as John Seely Brown suggests, today’s students are already using technology to function much like artists – disciplined, focused, pushing boundaries, challenging assumptions and creating meaning (Brown, 2009). They are willing to engage with multiple viewpoints before synthesizing their own. They are engaged, first and foremost, in fostering what might be called the creative class, desiring not only to create for themselves but also seeking others to build on their creations. The platforms they use are mostly digital, e.g., social networking, cloud-based data repositories, open source and open content technologies, and remixing the work of others through rich media capable of expressing complex ideas.

As Brown warns, in a rapidly changing world, innovation no longer depends only upon the explicit dimension characterizing conventional content-focused

pedagogy focused on “learning to know”. Rather, one needs to enable an integration of tacit knowledge with explicit knowledge to facilitate “learning to do”, “learning to create”, and “learning to be” tools already embraced by the young, if not yet, by the academy. Particularly key in this effort is the earlier goal of diversity. As Tom Friedman noted in a recent New York Times column, “The sheer creative energy that comes when you mix all our diverse people and cultures together. We live in an age when the most valuable asset any economy can have is the ability to be creative—to spark and imagine new ideas, be they Broadway tunes, great books, iPads, or new cancer drugs. And where does creativity come from?” As Newsweek described it, “To be creative requires divergent thinking (generating many unique ideas) and then convergent thinking (combining those ideas into the best result).” And where does divergent thinking come from? It comes from being exposed to divergent ideas and cultures and people and intellectual disciplines (Friedman, 2010).

Enlightenment: An Old Theme for a New Era

Today, a rapidly changing world demands a new level of knowledge, skills, and abilities on the part of our citizens. Just as in earlier critical moments in history when our prosperity and security was achieved through broadening and enhancing educational opportunity, it is time once again to seek a bold expansion of educational opportunity. But this time we should set as the goal providing all citizens with universal access to lifelong learning opportunities, thereby enabling participation in a world both illuminated and driven by knowledge and learning.

The challenge facing us today is to recognize and accept our responsibilities to provide all of our citizens with the educational, learning, and training opportunities they need and deserve, throughout their lives, thereby enabling both individuals and the nations to prosper in an ever more competitive global economy. While the ability to take advantage of educational opportunity will always depend on the need, aptitude, aspirations, and motivation of the student, it should not depend on one’s socioeconomic status. Access to lifelong learning opportunities should be a right for all rather than a privilege for the few if a society is to

achieve prosperity, security, and social well being in the global, knowledge- and value-based economy of the 21st century (Miller, 2006).

So, how might we achieve such a goal in the face of the array of financial, social, and political constraints faced by contemporary universities? Any vision proposing a future of the university must consider the extraordinary changes and uncertainties of a future driven by exponentially evolving information and communications technology. The extraordinary connectivity provided by the Internet already links together the majority of the world’s population. To this, one can add the emerging capacity to capture and distribute the accumulated knowledge of our civilization in digital form and provide opportunities for learning through new paradigms such as MOOCs and cognitive tutors. This suggests the possible emergence of a new global society no longer constrained by space, time, monopoly, or archaic laws and instead even more dependent upon the generation of new knowledge and the education of world citizens.

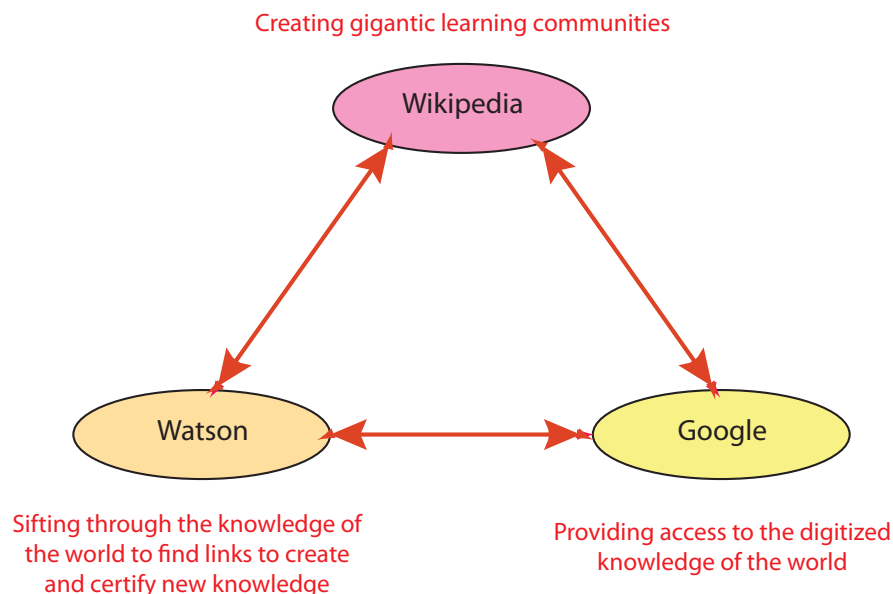
Today, the rapid evolution of information and communications technologies and the new paradigms they support, such as crowd sourcing, digital archives, and data mining, suggest a new learning ecosystem symbolized by the diagram of three elements: Wikipedia, Google, and Watson. Imagine a triangle, with Wikipedia on the top vertex, Google on the lower right, and Watson on the lower left. So, what is this puzzle?

Interestingly enough, each of these elements addresses a key core competency of the university:

- Wikipedia represents the capability to create enormous learning communities with a collective ability to digest and analyze information, self-correcting and evolving very rapidly through crowd sourcing as an emergent phenomenon.

- Google represents a future in which all knowledge is available in the cloud, digitized, accessible, searchable—everything ever printed, measured, sensed, or created—big data to the extreme.

- Watson (the IBM computer that used artificial intelligence to beat the champions of the game-show



A puzzle: Is this a possible future for the university?

Jeopardy, and more recently used to perform medical diagnosis) represents the capacity to use data mining and artificial intelligence to analyze information, trillions of transactions per second, identifying correlations, curating information, authenticating knowledge, certifying learning, and providing ubiquitous access.

So, what does this diagram represent? A new epistemology for the 21st century? Or perhaps it is a new form of a university capable of being extrapolated to serve the learning needs of all of humanity. Or perhaps it provides a contemporary path to a second great historical theme: the Enlightenment of the 18th and 19th centuries that swept aside the divine authority of kings and clerics by educating and empowering the public, stimulating revolution, and creating the liberal democracies that now characterize most developed nations. Clearly our world needs once again the “illumination” provided by distributing “the light of learning and knowledge” to counter the ignorance (e.g., today’s “denier” culture) and address the challenges of our times, informed by the rigor of scholarly inquiry rather than data-mined correlations.

More generally, the goals of the Enlightenment of 18th Century Europe were to provide for a rational distribution of freedom, universal access to knowledge, and the formation of learning communities. Rational and critical thought was regarded as central to freedom

and democracy. Knowledge and learning were regarded as public goods, to be made available through communities such as salons, seminars, and academies. These dreams of the universal and the collective, *Liberte, Egalite, and Fraternite* for the French Revolution—or perhaps better articulated by Jefferson’s opening words from our own Declaration of Independence: “We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.” remain as important today as they were three centuries ago.

Today, the educational institution most capable of launching a new “age of Enlightenment” is the “university”, with its dual missions of creating “unions” of scholars and learners and providing “universal” access to knowledge. In a sense, the word “university” itself conveys the elements of this vision: both the sense of a “union” or community of learners (i.e., *universitas magistrorum et scholarium*) and the “universality” or totality of knowledge and learning as the key to social well-being in an age of knowledge. Furthermore, since these have been regarded as public goods, one might even suggest that the public universities have a particular responsibility in providing these.

But while the Enlightenment of the 18th century was concerned with “celebrating the luminosity of knowledge shining through the written word”, today,

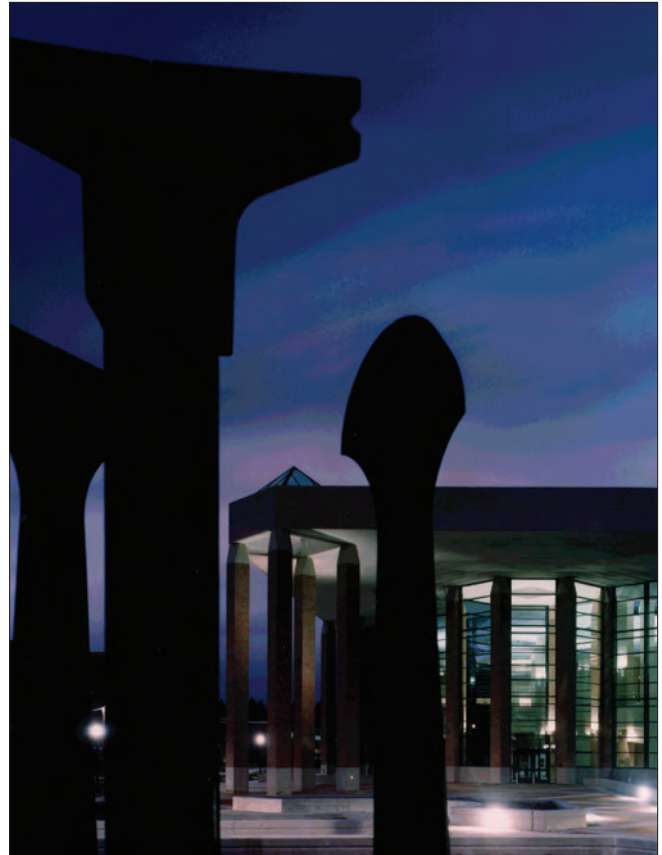
knowledge comes in many forms—words, images, immersive environments, “sim-stim”. And learning communities are no longer constrained by space and time but rather propagated instantaneously by rapidly evolving technologies (e.g., cyberinfrastructure) and practices (e.g., open source, open knowledge). The ancient vision of the Library of Alexandria to collect all of the books of the world in one place is rapidly becoming true—except the “place” has now become a cloud in cyberspace (e.g., the HathiTrust and Google Books). Learning communities are evolving into knowledge generating communities—wikis, crowd sourcing, hive cultures that span the globe.

William Germano suggests yet another argument for such a theme as the possible next stage in speculating about the evolution of the “book”, from the invention of writing to the codex to the printed volume to the digital revolution. As he explains:

“Right now we are walking through two great dreams that are shaping the future of scholarship, even the very idea of scholarship and the role “the book” should play within it. Great Dream No. 1 is universal access to knowledge. This dream means many things to many people, but for knowledge workers it means that scholarly books and journals can, and therefore should, be made available to all users. New technologies make that possible for the first time in human history, and as the argument goes, the existence of such possibilities obligates us to use them. Great Dream No. 2 is the ideal of knowledge building as a self-correcting, collective exercise. Twenty years ago, nobody had Wikipedia, but when it arrived, it took over the hearts and laptops for undergraduates and then of everyone else in the education business. Professional academic life would be poorer, or at least much slower, without it. The central premise of Wikipedia isn’t speed but infinite self-correction, perpetually fine-tuning what we know. In our second dream, we expand our aggregated knowledge quantitatively and qualitatively.” (Germano, 2010)

The University as an Emergent Civilization

So what might we anticipate over the longer term as possible future forms of the university? The monastic



The emergence of new learning ecologies

character of the ivory tower is certainly lost forever. Although there are many important features of the campus environment that suggest that most universities will continue to exist as a place, at least for the near term, as digital technology makes it increasingly possible to emulate human interaction in all the senses with arbitrarily high fidelity, perhaps we should not bind teaching and scholarship too tightly to buildings and grounds. Certainly, both learning and scholarship will continue to depend heavily upon the existence of communities, since they are, after all, high social enterprises. Yet as these communities are increasingly global in extent, detached from the constraints of space and time, we should not assume that the scholarly communities of our times would necessarily dictate the future of our universities. For the longer term, who can predict the impact of exponentiating technologies on social institutions such as universities, corporations, or governments, as they continue to multiply in power a thousand-, a million-, and a billion-fold?

But there is a possibility even beyond these.

Imagine what might be possible if all of these elements are merged, i.e., Internet-based access to all recorded (and then digitized) human knowledge augmented by powerful search engines and AI-based software agents; open source software, open learning resources, and open learning institutions (open universities); new collaboratively developed tools (Wikipedia II, Web 2.0); and ubiquitous information and communications technology (e.g., inexpensive network appliances such as iPhones, iPads, or netbooks). In the near future it could be possible that anyone with even a modest Internet or cellular phone connection will have access to the recorded knowledge of our civilization along with ubiquitous learning opportunities and access to network-based communities throughout the world (perhaps even through immersive environments such as Second Life).

Imagine still further the linking together of billions of people with limitless access to knowledge and learning tools enabled by a rapidly evolving scaffolding of cyberinfrastructure, which increases in power one-hundred to one thousand-fold every decade. This hive-like culture will not only challenge existing social institutions—corporations, universities, nation states, that have depended upon the constraints of space, time, laws, and monopoly. But it will enable the spontaneous emergence of new social structures as yet unimagined—just think of the early denizens of the Internet such as Google, Facebook, Wikipedia, ...and, unfortunately, Al Qaeda. In fact, we may be on the threshold of the emergence of a new form of civilization, as billions of world citizens interact together, unconstrained by today's monopolies on knowledge or learning opportunities.

Perhaps this, then, is the most exciting vision for the future of knowledge and learning organizations such as the university, no longer constrained by space, time, monopoly, or archaic laws, but rather responsive to the needs of a global, knowledge society and unleashed by technology to empower and serve all of humankind. And all of this is likely to happen during the lives of today's students. These possibilities must inform and shape the manner in which we view, support, and lead higher education. Now is not the time to back into the future.

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