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Vision 2017:

The Third Century

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Executive Summary

As one of the most enduring of institutions of our civilization, universities have been quite extraordinary in their capacity to change and adapt to serve societies. Far from being immutable, the university has changed quite considerably over time and continues to do so today. There is a broad consensus, both among leaders of American higher education and on the part of our various external constituencies, that the 1990s will represent another period of significant change if our universities are to respond to the challenges, opportunities, and responsibilities before them.

In an earlier paper, *Vision 2000: The Leaders and Best,* we set out an agenda for the 1990s aimed at positioning the University of Michigan for a leadership role in higher education for the next century. This agenda is framed through a set of specific goals, the "26 Goal Plan", that provide measurable objectives for the institution. A related report, *The Michigan Metrics Project,* provides both a framework and a process for assessing progress toward each of the goals set by *Vision 2000*. It furthermore provides strong evidence that in recent years the University has made quite considerable progress toward this vision.

Yet, while the Vision 2000 strategy is both exciting and challenging, it is very much a **positioning** effort. It is designed to position the University of Michigan as the leader of higher education by the end of the decade, but very much within the existing paradigm of the American research university of the late 20th Century. Furthermore this strategy does not propose a specific direction beyond this point. Rather, this strategy and the vision should both be regarded as intermediate phases and not as a final goals. Put another way, the strategy for the 1990s has been designed to move Michigan into a true leadership position in American higher education. But the task of determining just **where** the University will lead in the 21st Century is still in an early stage of development.

This paper, **Vision 2017: The Third Century,** is quite different in both nature and scope from our earlier efforts. It attempts to articulate an array of possible visions of the University for the longer term. In particular, it considers the various changes characterizing our society and higher education, and then uses this context to examine a set of possible visions or paradigms for the "university of the 21st Century". It further suggests a particular vision for the University of Michigan which is built both on a foundation of our traditional values and a recognition of the challenges and opportunities that we will likely face in the decade ahead.

This essay is intended to identify key issues and themes for further discussion by the University community. It is a document intended to invite comments, criticism, and involvement. The proposed Vision 2017 should be regarded as a work in progress, an organic vision of the future of the University that will evolve substantially as broader elements of the University community become engaged in its development. The development and articulation of a Vision 2017 for the University's third century is a fitting exercise for an institution aspiring to become "the leader and best" . . . .

I. Introduction

Each fall, in preparation for my annual November address to the Senate Assembly on the state of the University, I have attempted to write an essay on a major issue facing our institution. This year marked the completion of my first five years as president. It also represented my family's silver anniversary in Ann Arbor, twenty-five years since we left the sunshine, earthquakes, and smog of Southern California for the "seasonal excitement" of Michigan. Hence it would have been natural to use the Fall-1993 exercise as an opportunity to look back over the past five years--or perhaps longer--and assess where we have tried to lead the University and where we ended up.

But I have never particularly enjoyed retrospectives. In fact, I suppose it is one of those character flaws of scientists that we are generally more comfortable thinking about the future rather than reflecting on the past. Since last year we celebrated the 175th year of the founding of the University of Michigan, it seemed more appropriate that to look forward twenty-five years to the University's next big birthday in the year 2017, as it enters its third century.

Actually, such long-range visioning is becoming more and more common in higher education as universities ranging from Harvard and Princeton to Minnesota and Ohio State to UCLA and Stanford launch major strategic planning exercises to determine their direction as we approach a new century. At meeting after meeting of leaders of higher education, the discussion of such planning activities dominates the agenda. And the focus of such exercises can be captured in a single word: *change.*

There is a broad consensus, both among leaders of American higher education and on the part of our various external constituencies, that the 1990s will represent a period of significant change if our universities are to respond to the challenges, opportunities, and responsibilities before them. Many institutions have already embarked on major transformation efforts similar to those characterizing the private sector. Indeed, many even use a corporate language as they refer to their efforts to "transform," "restructure," "re-engineer," or even "re-invent" their universities.

Hence this year's essay will focus both on possible visions of the University of Michigan for the century ahead and the changes these visions would demand on the part of our institution. Of course, change and transformation is no stranger to our University, since Michigan has frequently led the process of change in public higher education--as we blended scholarship with teaching a century ago to build the first of the great state universities, then rapidly expanded our professional schools to respond to societal needs, evolved into one of the nation's leading research universities following the war years, and have served as a stimulus for major social change in American society. It is my

belief that our heritage of leadership calls on us once again to transform ourselves once again to better serve a changing nation and a changing world.

Actually, this topic should not surprise you. In essentially every address I have given to the Senate Assembly--and the University more generally--I have stressed the two recurring themes: *leadership* and *change*.

For example, my inauguration address of five years ago suggested three themes that would drive change in our society: i) the increasing diversity of our population, ii) the internationalization of all aspects of our society, and iii) the degree to which knowledge itself was becoming the key strategic commodity determining prosperity, security, and social well-being. Let me quote a passage from that speech:

> "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 America of the twenty-first century?"
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> "Of course, there have been many in recent years who have suggested 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?"[1]
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> "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!"

So too, each of my "State of the University" Addresses over the past five years has focused on different aspects of change and the challenge and opportunity these presented to the University. An early address outlined many of the key challenges and constraints facing higher education. Another address raised a number of issues that should be considered in any effort to "re-invent" the university. One address focused on the changing external environment of

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[1]James J. Duderstadt, "The Challenge of Change", Presidential Inauguration Address, The University of Michigan, October 6, 1988

the university and steps we were taking to respond to these challenges. And my address last year considered the challenge of intellectual change to our teaching and scholarship and to our current disciplinary organization of the university. In each of these presentations, I attempted to make the case that the University of Michigan itself had a long heritage of providing leadership to higher education during periods of change.

2. A Time of Challenge and Change

Yet, despite this persistent focus on change, I must admit that even I was unprepared for the profound nature and rapid pace of the changes we have experienced in the early 1990s. Consider, for a moment, the changes which have occurred in our world over the past five years:

- The Cold War has ended, and communism has been rejected around the world, swept away by the winds of freedom and democracy.

- The Berlin Wall has fallen, Germany is now reunited, and Eastern Europe has broken away from the Soviet block to seek democracy.

- The Soviet Union has collapsed into chaos, torn apart by the forces of freedom, nationalism, and ethnic tensions.

- Over a decade of conservative Republican leadership in Washington has been swept aside by a liberal Democratic administration--with just the opposition political transition occurring in Lansing.

- Many of America's largest and most powerful companies including GM and IBM have been reeling from the rapid changes occurring in the world marketplace.

- Asia is emerging as an extraordinary economic power, with Japan and China now ranked as the second and third largest economies in the world.

- During the past five years, the top ten companies receiving U.S. patents were Hitachi, Toshiba, Cannon, Fuji, Philips, Siemens, Mitsubishi, IBM, GE, and Bayer.

- We are now manipulating the human gene directly to cure disease--and may soon be doing it to create new life forms and influence the evolution of the human species.

- Computing power--speed, memory, communication rates--has increased by a factor of 100 over the past five years, with world-wide networks connecting hundreds of millions of people, enabling them to communicate within one another with ease and sophistication.

- The computer and television are merging in a so-called "digital convergence," triggering a similar merger of the phone companies and the entertainment industry to create a new multimedia communications medium. Indeed, sales volume of computer games now exceeds that of the motion picture industry.

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

The three themes articulated in my inauguration continue to drive change both in our nation and our world: We continue to change dramatically as a people as we become ever more diverse and pluralistic. Our relationships with other nations and other peoples become every more important as the United States becomes a "world nation," a member of the global community. And we are changing rapidly in the nature of our activities as we evolve into a new post-industrial society. Indeed, the key strategic resource necessary for prosperity and social well-being has already become knowledge itself, that is, educated people and their ideas.

To provide some context for further discussion, let me review with you the profound nature of these themes of change in our world:

Demographic Change: The New Majority

America is changing rapidly. When we hear references to the demographic changes occurring in our nation, our first thought probably focuses on the aging of our population. It is indeed true that the baby boomers are now entering middle age, and their generation has been followed by a baby bust, in which the number of young adults will be declining by twenty percent over the remainder of this century. Indeed, today there are already more people over the age of sixty-five than teenagers in this country, and this situation will continue throughout our lives. Further, the growth rate in both our population and our work force is declining to the lowest level in our nation's history. America will simply not be a nation of youth again in our lifetimes.

Yet, there is a far more profound change occurring in the population of our nation. America is rapidly becoming one of the most pluralistic, multicultural nations on the face of the earth. Women, minorities, and immigrants now account for roughly 85 percent of the growth in the labor force. By the year 2000, they will represent 60 percent of all of our nation's workers.

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 women have already become not only the predominant gender in our nation and our institutions, but they are rapidly assuming their rightful role as leaders of our society.

In this future, the full participation of currently underrepresented minorities and women will be of increasing concern as we strive to realize our commitment to equity and social justice. But, in addition, this objective will be the key to the future strength and prosperity of America, since our nation cannot afford to waste the human talent represented by those currently underrepresented in our society--this human potential, cultural richness, and social leadership. If we do not create a nation that mobilizes the talents of all our citizens, we are destined for a diminished role in the global community, increased social turbulence, and, most tragically, we will have failed to have fulfilled the promise of democracy upon which this nation was founded.

But there are other important challenges associated with such demographic change. In particular, it is important to realize here that twenty-first century America will <u>not</u> be a melting pot in which all cultures are homogenized into a uniform blend--at least not during our lifetimes. Rather, it will be pluralistic, composed of peoples of vastly different backgrounds, cultures, and beliefs; people seeking to retain their cultural roots, to maintain their differences from others. Our challenge will be to find the common bonds and values that unite us, even as we learn to respect and value our differences.

The growing pluralism of our society is perhaps our greatest challenge as a nation. Yet it is also among our most important opportunities, since it gives us an extraordinary vitality and energy as a people.

<u>The Internationalization of America</u>

Whether through travel and communication, the arts and culture, the internationalization of commerce, capital, and labor, we are becoming increasingly dependent upon other nations and other peoples. The world, and our place in it, has changed.

The fact is that a truly domestic United States society has ceased to exist. It is no longer relevant to speak of the Michigan economy--or the competitiveness of American industry. Our economy, our companies are truly international--spanning the globe and intensely interdependent with other nations and other peoples. Indeed, in little more than five years, the United States trade deficit has took us from the world's largest creditor nation to its largest debtor nation. We are no longer self-sufficient or self-sustaining. We are not immune to the shocks of the world's society, as the extraordinary events of the past five years make all too clear.

But beyond commerce and national security, there is an even more important reason to pay attention to the trends of internationalization. The United States has become the destination of about one-half of the world's immigrants, probably about ten million during the 1980s alone. With falling fertility rates, immigration will soon become the primary determinant of the variability in our population. As we have been throughout our history, we continue to be nourished and revitalized by wave after wave of immigrants coming to our shores with unbounded energy, hope, and faith in the American dream. Today, in a very real sense, America is evolving into the first true "world nation" with not simply economic and political ties, but also ethnic ties to all parts of the globe.

From this perspective, it becomes clear that understanding cultures other than our own has become necessary, not only for personal enrichment and good citizenship, but for our very survival as a nation.

The Age of Knowledge

Looking back over history, one can identify certain abrupt changes and discontinuities in the nature, the very fabric of our civilization--the Renaissance, the Age of Discovery, the Industrial Revolution. There are many who contend that our society is once again undergoing such a dramatic shift in fundamental perspective and structure. Today we are evolving into a new post-industrial, knowledge-based society, just as a century ago our agrarian society evolved through the Industrial Revolution.

We are surrounded by evidence of this transition. Industrial production is steadily switching away from material and labor-intensive products and processes to knowledge-intensive processes. Our nation's future has probably never been less constrained by the cost of natural resources. Further, it is clear that increasing productivity has come to mean decreasing use of low-skilled labor. In the 1920s, one out of three workers was a blue-collar worker. Today that number is one in six and dropping fast, probably to about one in twenty within a decade or so.

It is clear that a transition is occurring in which intellectual capital--brain power--is replacing financial and physical capital as the key to our strength, prosperity, and 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; that is, educated people and their ideas.

The Post-Cold-War World

For almost half a century, the driving force behind many of the major investments in our national infrastructure has been the concern for national

security in the era of the Cold War. The evolution of the research university, the national laboratories, the interstate highway system, our telecommunications systems and airports, the space program, all were stimulated by concerns about the arms race and competing with the Communist Bloc. So too, much of the technology that we take for granted, from semiconductors to jet aircraft, from computers to composite materials, all were spin-offs of the defense industry.

Yet in the wake of the extraordinary events of the last five years--the disintegration of the Soviet Union and Eastern Europe, the reunification of Germany, and the major steps toward peace in the Middle East--the driving force of national security has disappeared, and along with it, much of the motivation for major public investment. Far from a "peace dividend" providing new resources in a post-Cold War world for investment in key areas such as education and research, instead the nation is drifting in search of new driving imperatives. While there are numerous societal concerns such as economic competitiveness, national health care, crime, and K-12 education, none of these has yet assumed an urgency sufficient to set new priorities for public investments.

Further, much of the existing intellectual infrastructure, developed to underpin national defense, is now at risk. The national laboratories are facing massive downsizing and necessarily searching for new missions. The burdens of the massive debts incurred in the buyout-merger mania of the late 1980s have forced corporate America to downsize research and development activities, including the shift of many of America's leading corporate research laboratories such as the Bell Laboratories and the IBM Research Laboratories from long-term research to short-term product development.

Equally serious are signs that the nation is no longer willing to invest in research performed by universities, at least at the same level and with a similar willingness to support curiosity-driven basic research. Congress has made it clear that they will insist that universities focus increasingly on applied research, more directly related to national priorities (although many industrial leaders have tried in vain to explain that without "basic" research, there is nothing to "apply"). The federal government has yet to develop an successor to the government-university research partnership which served so well during the Cold War years.

Hence, it is likely that many of society's most important institutions, including the research university, will be at some risk until a new social agenda is developed in post-Cold-War America.

Spaceship Earth

Perhaps even more serious is the increasing evidence that the growing population and invasive activities of humankind are now altering the fragile

balance of our planet. The concerns are both multiplying in number and intensifying in severity:

- the depletion of the stratospheric ozone layer
- the buildup of greenhouse gasses and global warming
- the destruction of forests, wetlands, and other natural habitats
- the extinction of millions of biological species and the loss of biodiversity
- encroaching desertification
- the pollution of our air, water, and land

Further, with the world population already at 5.3 billion, we are already consuming 40 percent of the world's photosynthetic energy production. Most estimates place a stable world population at 10 to 15 billion in the mid-twenty-first century. At this rate, we will eventually consume all of the planet's resources unless we do something. Because of this overload of the world's resources, even today over 1.2 billion of the world's population live below the subsistence level and 500 million live below the minimum caloric-intake level necessary for life; that is, they are starving to death.

And yet, in the face of such alarming global challenges, the United States' environmental effort is characterized by a highly self-indulgent, litigious nature, focusing on toxic waste dumps and ALAR and completely ignoring our nation's greedy consumption of the world's resources. According to most polls, the biggest problem Americans identify in their personal lives is dieting to overcome excess weight--oblivious to the tragic reality that over one-half billion people today are starving to death.

It could well be that coming to grips with the impact of our species on our planet, learning to live in a sustainable fashion on Spaceship Earth, will become the greatest challenge of all to our generation.

The Pace of Change

The America of the twentieth century that has characterized most of our lives was a nation characterized by a homogeneous, domestic, industrialized society. But that is an America of the past. Our students will inherit a far different nation, a highly pluralistic, knowledge-intensive, world-nation that will be America of the twenty-first century.

Of course, these themes of the future--the changing nature of the American population, our increasing interdependence with other nations and other peoples, the shift to a knowledge-intensive, post-industrial society, the end of the Cold War, and in impact of population growth on our planet--are actually not themes of the future, but rather themes of today. In a sense, I have simply

been reading the handwriting on the wall. But whether these are themes of the present or the future, it is clear that they are also themes of change, themes that will both reflect and stimulate even more fundamental structural changes in the nature of our society and our civilization.

Indeed, many believe that we are going through a period of change in our civilization just as profound as that which occurred in earlier times such as the Renaissance and the Industrial Revolution--except that while these earlier transformations took centuries to occur, the transformations characterizing our times will occur in a decade or less!

I used to portray the 1990s as the countdown toward a new millennium, as we found ourselves swept toward a new century by these incredible forces of change. But the events of the past several years suggest that the twenty-first century is already upon us, a decade early. We live in a time of breathtaking change, at a pace that continues to accelerate even as I speak.

But here we face a particular dilemma. Both the pace and nature of the changes occurring in our world today have become so rapid and so profound that our present social institutions--in government, education, the private sector--are having increasing difficulty in even sensing the changes (although they certainly feel the consequences), much less understanding them sufficiently to respond and adapt. It could well be that our present institutions, such as universities and government agencies, which have been the traditional structures for intellectual pursuits, may turn out to be as obsolete and irrelevant to our future as the American corporation in the 1950s. There is clearly a need to explore new social structures capable of sensing and understanding the change, as well as capable of engaging in the strategic processes necessary to adapt or control change.

3. Challenge and Change in Higher Education

Of course, higher education has been, and will continue to be, greatly affected by the changes in our society and our world. There are many symptoms of the changes occurring in higher education.

For example, the American research university is still very much on the mind of lots of folks: parents and students, governors and state legislators, the Congress and government bureaucrats, the media, and the public-at-large. To all too many we are seen as:

. . . being big, self-centered, and greedy
. . . having spoiled, badly behaved students
and even more spoiled faculty ("the new leisure class")
. . . gouging parents with high tuition and the government with
inappropriate charges for research
. . . being plagued by a long list of "isms"--racism, sexism, elitism,
and extremism
. . . suffering from a deterioration of our own intellectual values--
as evidenced by scientific fraud, political correctness, and
a lack of concern for undergraduate education

It might be easy enough to answer our critics with logic or a righteous dismissal of any who would question our purposes and privileges. And, of course, there is much that is refutable in the recent spate of books and articles from the right and the left that question our performance and even reject the very foundation of what we do. But it would be a mistake to simply dismiss the criticisms of higher education. They contain quite genuine concerns of the American public--albeit characterized by a great misunderstanding of what we are and what we do--and they unfortunately contain a good deal of truth about us. They also point out a serious mismatch between what the public wants from us and what we are currently providing.

To the extent that the criticism is constructive, we should try to hear it. To the extent that it is wrong, we should try to answer it with a compelling affirmation, a renewal of our vision and purposes, a confirmation of our unique community rights and responsibilities arrived at through extensive debate and discussion among ourselves and with many of our constituencies.

Another symptom of change can be found in the stresses felt by the faculty, particularly in research universities. During the course of the past year, I have been involved in an effort sponsored by the National Science Board to understand better the stresses on the academy as seen from the perspectives both of the faculty and university administrations. It is clear from a number of forums we have hosted on university campuses across the nation that there is a growing gulf between those characteristics faculty value--such as an emphasis on basic

research, a highly disciplinary focus, and strong, long-term support for individual investigators--and the terms dictated by federal and industrial sponsors, e.g., more applied investigations of a highly interdisciplinary nature involving large research teams. Put another way, the faculty believes they are deprived of the opportunity to do what they do best--thinking, dreaming, talking, teaching, and writing--by the pressures of the day which force them to hustle contract research, manage research projects, and deal with government and university bureaucrats, all of which takes them out of not only the classroom but the laboratory as well.

So too, there is an increasing recognition that there is a growing difference between today's generation of students and the faculty responsible for teaching them. Our students come from quite different backgrounds; they have different intellectual objectives; and they learn in quite different ways. This mismatch between teacher and student is also an important factor in the tensions surrounding teaching, particularly at the undergraduate level.

While the stress on the faculty today has many symptoms, it has fundamentally one major cause: the stress associated by the reaction to change--change occurring far more rapidly in universities that most of us are comfortable with. Indeed, one member of our study group remarked that university faculties appear to be the last groups remaining in our society who believe that "the status quo is still an option"!

A third symptom of change is provided by the extraordinary turnover in university presidents in recent years. During the past five years, the leadership of almost every major university in the nation has turned over...from Harvard, Yale, Columbia, Penn, Brown, and Cornell...to Stanford, Caltech, and MIT...from the Universities of California (and many of its campuses, including Berkeley), North Carolina, Virginia, Texas to most of the Big Ten. Indeed, in managing to survive as the University's president for five years, I have already exceeded the 3.5 year average tenure characterizing major public universities to become the third most senior president in the Big Ten and rank among the top 20 percent of "elders" among AAU presidents.

While some of these changes in university leadership are the result of natural processes such as retirement, many others reflect the serious challenges and stresses faced by universities that all too frequently result in pressures destabilizing their leadership. The swirling politics characterizing college campuses, from students to faculty to governing boards, coupled with the external pressures exerted by state and federal governments, alumni, the media, and the public-at-large, all make the university presidency a very hazardous profession these days. At a time when universities require strong, decisive, courageous, and visionary leadership, the eroding tenure and deteriorating attractiveness of the modern university presidency pose a significant threat to the future of our institutions.

But these phenomena--public concerns, stresses on the faculty, and the turnover in university leadership--are only symptoms of the profound challenges faced by the American university in the 1990s. It seems useful to identify and discuss further several of the most important of these challenges:

- The rising costs of academic excellence and the limits on resources
- The changing relationship with diverse constituencies
- The difficulty in comprehending the modern university
- The challenge of intellectual change
- The changing role of the university in our society

The Rising Costs of Excellence and the Limits on Resources

Higher education is suffering the impact of a deep and profound political-economic crisis. To be sure, the recent recession has taken a toll on universities. However current fiscal woes are not just temporary set-backs; they go much deeper. Universities are suffering the consequences of structural flaws of national and state economies--the growing imbalance between revenues and expenditures--that are undermining support for essential institutions as governments struggle to meet short-term demands at the expense of long-term needs.

The states are in serious trouble. For the first time in thirty years, state support for higher education is dropping. There are few areas of the country in which state support for public higher education will be able to keep pace with inflation during the 1990s, despite the fact that enrollment pressures are now building rapidly as our national demographics shift back onto the upswing part of the post-war baby boom/bust cycles.

Cuts in federally supported financial aid have shattered the dream of equal educational access for many students. Our universities have had to scramble to make up the difference in part through increasing tuition for those who can afford the costs of education. So, too, the federal government has embarked upon a massive effort to shift more of the costs of federally sponsored research to the universities through artificial caps on indirect cost reimbursement, even though university overhead rates are less than one-half to one-third those characterizing other federal contractors in the public and private sectors. Excessive cost-sharing requirements have also put serious stresses on universities, forcing them to reallocate resources away from education and service to attract federal research funding.

Beyond these factors, is the particular challenge faced by the best of America's universities. Harold Shapiro[2] has identified what he calls the "l

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[2]Harold T. Shapiro,

percent problem" facing those institutions that compete to be the very best in teaching and scholarship. The decade of the 1980s saw a trend in which the costs of achieving excellence in higher education rose roughly 1 percent per year more rapidly that the available resource base. (Some institutions such as Stanford found this mismatch to be 2 percent or higher.) Further, most studies project that this trend is likely to continue throughout the 1990s, driven in part by the expanding knowledge base and by the cost structures of quality research and teaching. While a given institution may be able to accommodate such an imbalance between costs and revenues over a short period, it is clear that over the long term, the "1 percent problem" will require a significant restructuring of the mission and activities of the university.

It seems increasingly clear that, even if we were to restore national resolve in investing in the future, our resource base will simply not expand as rapidly as the desires, the opportunities, or the needs of higher education. Further, in the face of other major societal needs such as health care, primary and secondary education, crime, and rebuilding our national infrastructure, society will ask harder questions about whether the social product of higher education is commensurate with the resources invested in it.

The absence of adequate resources to build and sustain the desired level of quality in most institutions could well lead to a shakeout process. The increasing competition for limited resources could pull many institutions down to a common level of mediocrity. However those few institutions which have the critical mass of excellence--and which have the determination and capacity to sustain it--may be able to draw the best from the available resources of students, faculty, and funding. They may accelerate away from the pack, leaving the remainder of higher education to compete for a declining pool of resources.

The Changing Relationships with Diverse Constituencies

The modern research university is accountable to many constituents: to its students, faculty, staff, and alumni; to the public and their elected leaders in government; to business and labor, industry and foundations; and to the full range of other private institutions in our society.

The diversity--indeed, incompatibility--of the values, needs, and expectations of the various constituencies served by higher education poses a major challenge. The future of our colleges and universities will be determined in most cases by their success in linking together the many concerns and values of these diverse groups, even as they respond in an effective fashion to their needs and concerns.

Higher education today faces greater pressures than ever to establish its relevance to the various constituencies in our society. Our colleges are drawn into new and more extensive relationships with each passing day. Yet, at the

same time they are expected to act as an independent and responsible critic of society. The tension between these roles and responsibilities poses one of the greatest challenges to higher education in America today.

An important example of the changing relationship with constituencies is provided by the deterioration in the partnership between the federal government and the research universities. The basic structure of America's academic research enterprise of the past half century was set out in the study chaired by Vannevar Bush, *Science, the Endless Frontier*,[3] almost fifty years ago. The central theme of the document was that the nation's health, economy, and military security required continual deployment of new scientific knowledge and that the federal government was obligated to ensure basic scientific progress and the production of trained personnel in the national interest. It insisted that federal patronage was essential for the advancement of knowledge. It stressed a corollary principle: that the government should preserve "freedom of inquiry" and should recognize that scientific progress results from the "free play of free intellects, working on subjects of their own choice, in the manner dictated by their curiosity for explanation of the unknown."

Since--at least in the past--the government recognized that it did not have the capacity to manage effectively either the research itself or the universities, the relationship was essentially a partnership in which the government provided relatively unrestricted grants to support a part of the research on campus with the hope that "wonderful things would happen." And they did, as evidenced by the quality and impact of academic research.

Unfortunately, in recent years the basic principles of this extraordinarily productive research partnership have begun to unravel, so much so that today this relationship is rapidly changing from a partnership to a procurement process. The government is increasingly shifting from being a partner with the university--a patron of basic research--to becoming a procurer of research, just like other goods and services. In a similar fashion, the university is shifting to the status of a contractor, regarded no differently from other government contractors in the private sector. In a sense, today a grant has become viewed as a contract, subject to all of the regulation, oversight, and accountability of other federal contracts. This view has unleashed on the research university an army of government staff, accountants, and lawyers all claiming as their mission that of making certain that the university meets every detail of its agreements with the government.

Surely the most ominous warning signs for academic research are the erosion, even breakdown, in the extraordinarily productive fifty-year partnership uniting government and universities. Scientists and universities are questioning

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[3]Vannevar Bush, Science--The Endless Frontier, United States Office of Scientific Research and Development (Washington, 1945)

whether they can depend on the stable and solid relationship they had come to trust and that has paid such enormous dividends in initiative, innovation, and creativity. It is ironic indeed that the partnership that has been in large measure responsible for our long undisputed national prosperity and security should be threatened at very moment when it has become absolutely critical for America's future.

The erosion of the government-university research partnership is just one example of the changing understanding and expectations of society toward higher education. The research university as we know it today is clearly the result of public policies which focused on the American university as critical to the nation's future in meeting needs such as national security, health care, and social mobility. As society develops a different set of needs, then too must universities evolve if they are to earn public support. Further, they must re-establish their relevance to this new social agenda, or run the risk of being marginalized and replaced by other social institutions. Clearly responsive and responsible change will be necessary.

The Difficulty in Comprehending the Modern University

There is another dilemma here, one perhaps best illustrated by the old parable of the blind men each feeling different parts of an elephant and arguing over just what the beast looks like. The modern research university is complex and multidimensional. People perceive it in vastly different ways, depending on their vantage point, their needs, and their expectations. Students and parents want high-quality, but low-cost, education. Business and industry seek high-quality products: graduates, research, and services. Patients of our hospitals seek high-quality and compassionate care. Federal, state, and local governments have complex and varied demands that both sustain and constrain us. And the public itself sometimes seems to have a love-hate relationship with higher education. They take pride in our quality, revel in our athletic accomplishments, but they also harbor deep suspicions about our costs, our integrity, and even our intellectual aspirations and commitments.

Beyond the classic triad of teaching, research, and service, society has assigned to the University over the past several decades an array of other roles:

- improving health care
- national security
- social mobility
- parenting
- big-time show biz (intercollegiate athletics)

Further, it is now asking to us to assume additional roles such as:

- revitalizing K-12 education

- improving race relations in America
- rebuilding our cities
- securing economic competitiveness

Unfortunately, most people--and most components of state and federal government--can picture the university "elephant" only in terms of the part they can feel, e.g., research procurement, student financial aid, and political correctness. Few seem to see, understand, or appreciate the entirety of the university. No one seems to understand or care that shifting state or federal priorities, policies, or support aimed at one objective or area will inevitably have an impact on other roles of the university. For example, it is clear that excessive cost-sharing requirements or inadequate reimbursement of research overhead costs will inevitably cause the shifting of funds from other functions of the university such as education or public service.

In many ways, the increasing complexity and diversity of the modern university reflect the character of American--indeed, world--society. To be sure, such intellectual and social diversity on our college campuses leads to fragmentation and the lack of a sense of unity of purpose on the part of students, faculty, and staff. Yet, the ideal of a "community of scholars," united by a sense of common values and purpose, has, in reality, never existed in American higher education. Rather, our universities have been energized and enlivened by the rich diversity of people and ideas that interact with one another, just as has American society more generally. While this diversity, this complexity, can pose great challenges, particularly when attempting to build consensus within the University about directions or needed changes, or when relating to a broad array of external constituencies, it also should be recognized as one of the great strengths of higher education in America.

Intellectual Challenges

There are many who contend that the most significant challenges before higher education today are intellectual in nature. The knowledge of the world is available almost literally "out of the air" with modern computer/communications networks and digital libraries. Beyond access to vast amounts of knowledge, we have also entered a period of great intellectual change and ferment. New ideas and concepts are exploding forth at ever-increasing rates. We have ceased to accept that there is any coherent or unique form of wisdom that serves as the basis for new knowledge. We have simply seen too many instances in which a new concept has blown apart our traditional views of the field.

Further, the way in which we acquire, understand, and apply new knowledge is changing. With the explosion in multi-media technology and the "MTV generation" of students, we may well be witnessing the passage of human

society from a writing and reading culture to one that is predominantly based on oral and visual communication.

Hence the capacity for intellectual change and renewal has become increasingly important to us as individuals and to our institutions. As the pace of discovery of new knowledge accelerates, it seems apparent that we are entering a period in which permanence and stability have become less valued than flexibility and creativity; in which the only certainty will be the presence of continual change; and in which the capacity to relish, stimulate, and manage change will be one of the most important abilities of all.

It may well be that the most significant challenges facing higher education today are not the tangible external issues such as resources or public perception, but rather the need to understand better and gain broader consensus about the central goals and beliefs that guide decisions made about the university. The intellectual renewal of the role, mission, values, and goals of the university may be the key challenge before us.

The Changing Role of the Research University

Throughout much of American history our universities were protected enclaves, respected well enough but mostly unnoticed and allowed to go about their business unchallenged and largely unfettered. What a contrast today when the university finds itself defined as a key economic, political, social, and cultural institution as the result of extraordinary transformations occurring throughout our nation and the world.

Beyond our traditional missions of teaching, research, and service, the university today is expected to play a broader role in providing the intellectual capacity necessary to build and sustain the strength and prosperity of our society. Through their research, they produce the new knowledge so necessary to the prosperity and well-being of society. They produce the teachers and scholars, the leaders, managers, and decision-makers necessary to apply this knowledge. And they provide the key to knowledge transfer, through their graduates, traditional scholarly mechanisms such as publications, through public service, and through spin-offs from their campus.

Hence, perhaps it is understandable that just as the university is becoming a key player in our society, it should also come under attack. When you get right down to it, perhaps we are victims of our own success. We have entered an era in which educated people and the ideas they produce have truly become the wealth of nations, and universities are clearly identified as the prime producers of that wealth. This central role means that more people today have a stake in higher education. More people want to harness it to their own ends. We have become both more visible and more vulnerable as institutions. We attract more constituents and support, but we also attract more opponents. In the process, the

American university has become in the minds of many just another arena for the exercise of political power, an arena for the conflict of special interests. We have become a prime target for media attention and exploitation. We are increasingly the focus of concern of both the powerful and the powerless.

Thus, we should not be surprised by our critics or by the assaults on the academy. Society has an increasingly vital stake in what we do and how we do it. Given the divisions in society-at-large, the tensions between tradition and change, liberty and justice, social pluralism and unity, nationalism and internationalism, it is no wonder that we find ourselves the battleground for many competing values and interests, both old and new. The more important question is whether we can survive this new attention with our missions, our freedoms, and our values intact.

The Challenge of Change

While it is always hazardous to speculate about the future, there is yet another theme I can predict with some certainty. That is the challenge of change itself. We face a future in which permanence and stability become less important than flexibility and creativity, in which the only certainty will be the presence of continual change. Here we face a particular challenge, since most of us have been trained to think in terms of change as a linear, causal, and rationale process. We have been taught that by looking at the past we can extrapolate to understand the future. Yet, perhaps because of my background as a physicist, I have become increasingly convinced that change in most complex systems, fields of knowledge, or complex institutions such as universities is: i) highly non-linear, ii) frequently discontinuous, and iii) usually stochastic or random in nature.

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.

An Observation

The profound nature of the challenges and changes facing higher education in the 1990s seems comparable in significance to two other periods of great change in the nature of the university in America: the period in the late nineteenth century when the comprehensive public university first appeared, and the years following WWII when the research university evolved to serve the needs of postwar America.[4]

A century ago, the industrial revolution was transforming our nation from an agrarian society into the industrial giant that would dominate the twentieth Century. The original colonial colleges, based on the elitist educational

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[4]Harold T. Shapiro,

principles of Oxbridge, were joined by the land-grant public universities, committed to broad educational access and service to society. In the decades following this period, higher education saw a massive growth in merit-based enrollments in degree programs at the undergraduate, graduate, and professional level as the comprehensive university evolved.

1890

The Situation	Things Happening	30-Year Time Frame
• fewer refrigerators than cars • less than 25% of homes had indoor plumbing • less than 10% graduated from high school • still an agrarian society • university as an intellectually coherent community of shared values	• Industrial Revolution was taking hold • colonial colleges were awakening • land-grant colleges were being mobilized • faculty leadership was stirring • foundations for research university were being laid	• massive growth in enrollments, degrees • evolution of open, merit-based colleges • teaching, research, service missions • UG, grad, prof level teaching • shift from transmission to search for knowledge • importance of government patronage

A similar period of rapid change in higher education occurred in the years following World War II. The educational needs of the returning veterans, the role of the universities in national defense, and the booming postwar economy led to an explosion in both the size and number of major universities. So too, the direct involvement of the federal government in the support of campus-based research led to the evolution of the research university as we know it today.

1945

The Situation	Things Happening	30-Year Time Frame
• universities emerging from depression and WWII • Ivys still elitist • few world-class public universities	• returning veterans • booming economy • role of university in national defense	• age profile of population and faculty • distribution of enrollment between publics and privates • importance of federal government financing • geographic distribution of students and institutions • spectrum of scientific and scholarly opportunities • public attitudes toward higher education

Note that during each of these periods, the American university was transformed in response to changing societal needs. New kinds of educational institutions appeared, e.g., the state university, the comprehensive research university, and the community college. Higher education demonstrated a remarkable ability to change and adapt to the needs of the society it was created to serve.

Today we face challenges and opportunities similar to those characterizing these two earlier periods of transformation. Many point to

negative factors, such as the rapidly growing costs of quality education and research during a period of limited resources, the erosion of public trust and confidence in higher education, or the deterioration in the partnership characterizing the research university and the federal government. It is my belief, however, that our institutions will be affected even more profoundly by the powerful changes driving transformations in our society, including the increasing ethnic and cultural diversity of our people; the growing interdependence of nations; the limits to our natural environment; and the degree to which knowledge itself has become the key driving force in determining economic prosperity, national security, and social well-being.

1990

The Situation	Things Happening	30-Year Time Frame
• US universities are best in the world...best financed, most respected • 1980s were a period of stability...stable enrollments modest growth in faculty, stable financial aid • expenditures per faculty (and student) have been rising • massive proliferation of research universities (with even more aspiring)	• chronic perceived shortage of resources • public concern • perceived unpredictability of resource flow • rigidity of disciplinary structure • difficulty in reaching agreement on evaluation standards • shift from UG to grad/prof education and research • short time frame between basic research and application • public concern about "what is going on in the nation's universities"	• cultural diversity? • globalization? • age of knowledge? • global change? • US < Europe, Asia? • cyberspace nets? • genetic engineering? • ethnic conflicts? • space colonization? • "progress" or "optimization"

4. Planning for the New Millennium

With this context in mind, during the mid-1980s the University of Michigan set out to develop a planning process capable of guiding it into the next century. More specifically, the University leadership, working closely with faculty groups and academic units, sought to develop and then articulate a compelling vision of the University, its role and mission, for the twenty-first century. This effort was augmented by the development and implementation of a flexible and adaptive planning process. Key was the recognition that in a rapidly changing environment, it was important to implement a planning process that is not only capable of **adapting** to changing conditions, but to some degree capable as well of **modifying** the environment in which the University would find itself in the decades ahead.

Strategic planning in higher education has had mixed success, particularly in institutions of the size, breadth, and complexity of the University of Michigan. Yet many in the University leadership believed that such a planning process was essential. All too often the University had tended to react to--or even resist--external pressures and opportunities rather than taking strong, decisive actions to determine and pursue its own goals. So too, it had all too frequently become preoccupied with process rather than objectives, with "how" rather than "what." There was a growing conviction that to seize the opportunities, to face the responsibilities, and to meet the challenges facing higher education, the University had to initiative a process capable of determining both a direction and a strategy capable of guiding it into the twenty-first century.

In this effort, several key assumptions were accepted at the outset. First, it was recognized that the University of Michigan was a very complex system, responding to the cumulative effects of its history as well as the dynamic boundary conditions characterizing its interactions with the changing world in which it functioned. Despite this complexity, it was considered essential for the University to take responsibility for its own future, rather than having this determined for it by simply reacting to external forces and pressures.

Second, there was a sense that the University of Michigan would face a period of unusual opportunity, responsibility, and challenge in the 1990s, a time during which it could--indeed must--seize control of its own destiny by charting a course to take it into the next century.

Finally, there was also a growing sense that the challenges before higher education in the late twentieth century would require a new paradigm of the university in America. The University of Michigan was believed to be in an excellent position to develop this model for the nation.

The University sought a planning process appropriate for an institution of vast scale, great diversity, and unusual complexity. Indeed, the University of

Michigan in Ann Arbor is one of the largest and most complex campuses in the world with over 36,000 students; 3,400 faculty; 14,000 staff; seventeen schools and colleges; hundreds of institutes, centers, and programs; and an operating budget of over $2 billion per year. Hence it was felt imperative to utilize a planning process capable of dealing with such complexity.

For this reason, the University adopted a variation of strategic planning known as "logical incrementalism."[5] As with most strategic processes, one begins with a clear vision statement for the institution. Within the context of this vision, one then sets out intentionally broad and rather vague goals--e.g., goals such as "excellence," "diversity," and "community." The strategic approach is then to engage broad elements of the institution in efforts to refine and articulate these goals while developing strategic plans and operational objectives aimed at achieving them. Key in the success of the logical incrementalism approach is the skill in separating out only those plans (actions and objectives) that move the institution toward the vision statement. Although logical incrementalism is a "small wins" strategy, relying on a series of small steps to move toward ambitious goals, it also is a highly opportunistic strategy in the sense that it prepares the organization to take far more aggressive actions if the circumstances arise.

During the early stages, the strategic process coincided with the organization and installation of a new University administration. More specifically, the transition from the Shapiro to the Duderstadt administration involved the turnover of not only the majority of the executive officers (Provost, VPCFO, VP-Research, VP-Student Affairs, Chancellor-UMD), but a great many deans, directors, associate vice presidents, and other senior officers. More specifically, during the first five years of the current administration, thirty-five of the forty leadership positions in the University turned over. As a result, there was an very unusual opportunity to rebuild an leadership team capable of and committed to moving the University in new strategic directions.

The strategic approach first taken by the administration involved four simultaneous activities:

- Setting the themes
- Building the leadership teams
- Building the networks
- Implementing the plans, actions, processes

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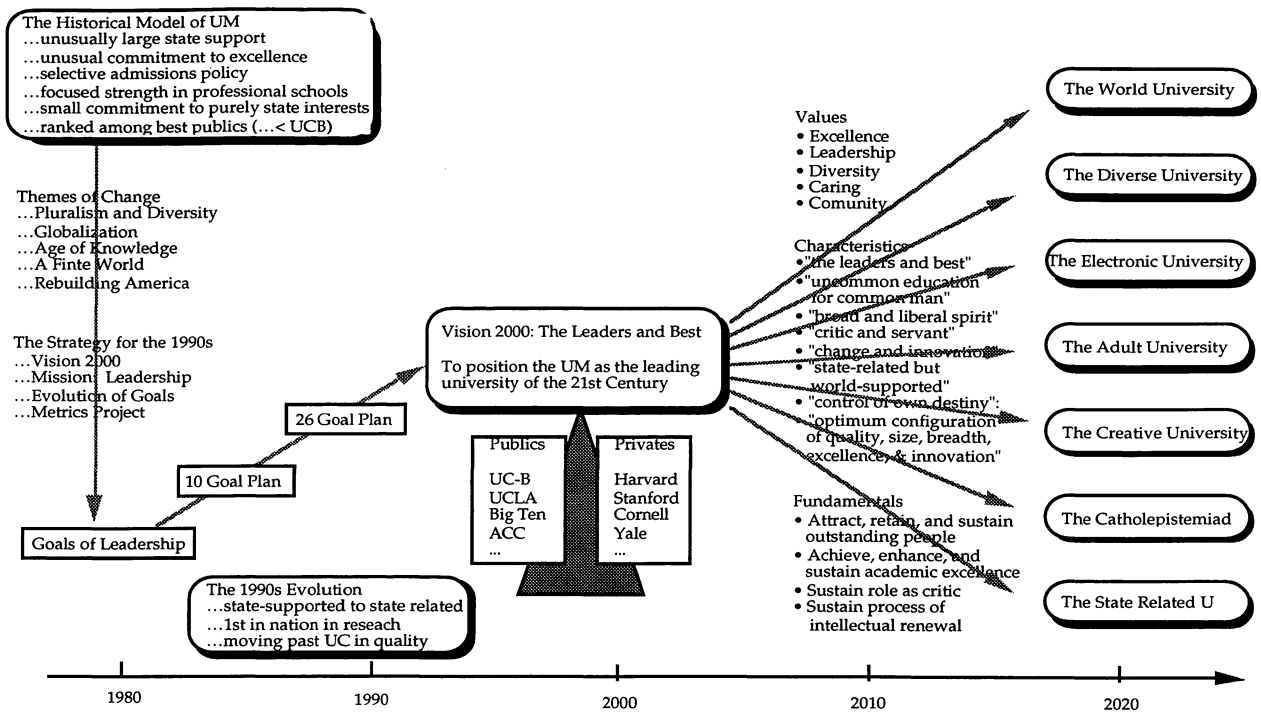
[5]James Brian Quinn



The key themes of change first identified and considered by the strategic planning process were set out in the Inauguration Address of 1988:

- The increasing pluralism and diversity of the American people
- The globalization of America and the shrinking global village
- The age of knowledge

These themes served as the rationale for the first major initiatives of the new administration: the Michigan Mandate, the Institute for International Studies, and the major leadership role played by the University in building and managing national computer networks (e.g., NSFnet, NREN, Internet). Further, the University took a number of important steps to achieve full participation of all groups in the life of the institution, including the Michigan Mandate (minorities), the Michigan Women's Agenda (women), and the recent change in the Regents' Bylaws to explicitly prohibit discrimination based on sexual orientation.

In subsequent years, three new themes were added to the original list:

- A finite world (global change)
- The post-Cold War world
- Rebuilding America (human and physical capital and infrastructure).

Again, strategic initiatives were developed and launched in these areas, including the Global Change Project funded through the Presidential Initiative Fund and the efforts to position the University better in an array of economic

development activities (e.g., the Flint Project, the IPPS State Economic Study, redesigning the University's technology transfer effort--the University Enterprise Zone project).

There were additional themes proposed that could better be classified as opportunities than challenges: exploration (of values, knowledge, the planet, the universe...) and creation (of knowledge, art, objects, intelligence, life forms...). These were the frontier themes traditionally addressed by research universities, although the rapid evolution of powerful tools such as information technology, molecular biology, and materials science triggered a rapid acceleration of University research in these areas. Examples here include the Molecular Medicine Institute in the School of Medicine, the Institute for the Humanities in LS&A, the Ultrafast Optics Laboratory in Physics and Engineering, and the adaptive complex systems activity, affiliated with the Santa Fe Institute.

Efforts were also made to identify and understand the particular challenges facing higher education during the 1990s:

- The challenge of change
- The commitment to excellence
- The importance of fundamental values
- Building a community of scholars
- Restoring public understanding, trust, and support
- Acquiring and managing the resources necessary for excellence

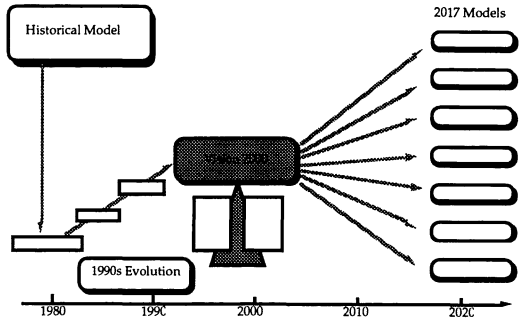
While these themes of challenge were faced by most institutions, an effort was made to take the University of Michigan one step further by defining unique strategic themes for our institution during the 1990s:

- Inventing the University of the twenty-first century
- Redefining the nature of the public university in America
- Financing the University in an era of limits
- The Michigan Mandate
- A world university
- An electronic university
- Global change
- A strategic marketing plan
- "Keeping our eye on the ball . . . "

The last theme, of course, referred to the fact that consistency and persistence were essential to the success of any strategic effort.

These themes were carefully woven into communications activities, both on and off campus. They served as the rationale and foundation for a wide array of specific objectives and strategic actions--all aimed at moving the University toward *Vision 2000: The Leaders and Best!*

5. Vision 2000: The Leaders and Best!



In any strategic activity, it is important to develop both a vision of the future of the institution and a definition of its mission. Although a great many groups were involved in various stages of the planning process, there was one common theme characterizing all discussions of vision and mission: the theme of ***leadership***.

More specifically, there was a general sense that leadership, more than any other characteristic of the University, would determine its impact on society, the state, the nation, and the world. While there was extensive discussion concerning the various definitions of the term "leadership," once again a consensus developed that institutional leadership should be interpreted as the University setting the pace or leading the way for higher education. In a sense, the University should strive to become the standard against which others would compare themselves.

This led to the following vision statement for the University:

> Vision 2000: "The leaders and best . . . "
>
> To position the University of Michigan to become the leading university of the twenty-first Century.

It was recognized that such a leadership vision would require a complex strategy, since all of the key characteristics of the University are involved: quality, capacity (size), breadth (comprehensiveness), excellence, and innovation. In fact, the achievement of the Vision 2000 would require an optimization of all of these factors.

In a similar sense, a great deal of effort was directed at developing an appropriate mission statement for the University. While there are many ways to articulate the mission of the University, we chose to do so using a language native to the business world, since this aligned most naturally with the particular strategic planning process we employed.

The Mission Statement:

Business Line:

Creating, preserving, transmitting, and applying knowledge

Products and Services:

Knowledge and knowledge-intensive services
Educated people with capacity and desire for leadership

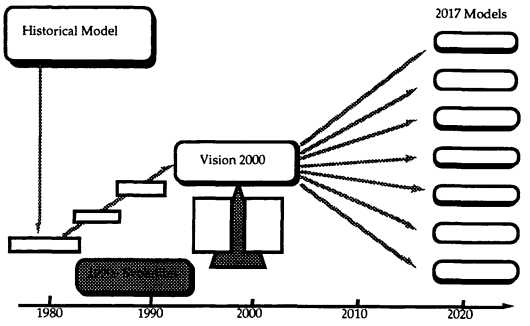
Customers:

Primary:	Society at large
Others:	Students, patients, sponsoring agencies . .
Shareholders:	State, feds, private sector, public

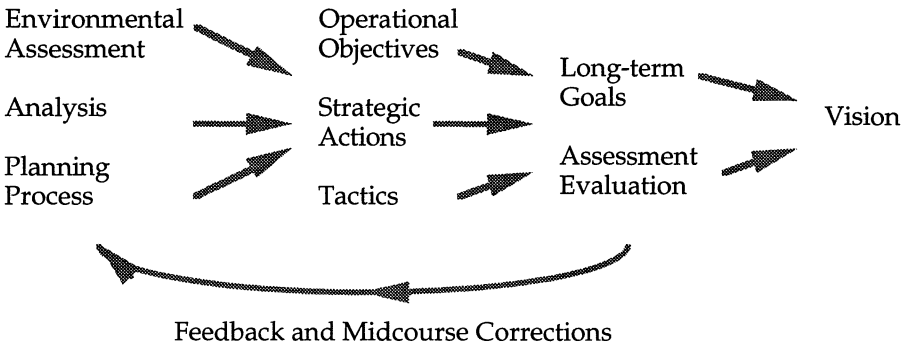
Market Niche: ***Leadership***

While some aspects of this mission statement would apply to any university--e.g., the triad mission of teaching, research, and service--other features are specific to the University of Michigan. For example, Michigan is one of the very few universities in the world that could claim society-at-large as its primary customer. And, indeed, over the course of its history, the University of Michigan's primary impact has been through its full array of activities rather than through a particular subcomponent of its mission such as teaching or research. So too, Michigan is one of the few universities that can claim leadership as a true component of its mission.

6. The Evolution of Goals



Any successful strategic planning process is highly iterative in nature. While the vision remains fixed, the goals, objectives, actions, and tactics evolve with progress and experience.



Further, during a period of rapid, unpredictable change, the specific plan chosen at a given instant is of far less importance than the planning process itself. Put another way, the University sought an "adaptive" planning process appropriate for a rapidly changing environment.

As a consequence, the goals developed by the planning process have evolved over time, from general to the specific. For example, the early goals developed in the mid-1980s reflected the following beliefs:

i) Placing the highest premium on focusing resources to achieve excellence.

ii) Recognition that excellence is people-driven . . . and that our goal should be to attract and retain the best people, provide them with the resources and opportunities to push to the limits of their abilities, and then get out of their way. That is, we should let our best people push the intellectual thrusts and determine the pace of the University.

iii) The importance of an entrepreneurial environment . . .
. . . which stresses excellence and achievement . . .
. . . which removes all constraints from talented people . . .

. . . which lets our most creative people "go for it" . . .

These early goals were quite simple:

1. *To pick up the pace . . .*

   To pick up the pace of the University, to build a level of intensity and expectation to settle for nothing less than the best in the performance of our faculty, students, and programs.

2. *To focus resources to build spires of excellence . . .*

   To break away from the tendency to attempt to be all things to all people, and instead to focus our resources on building spires of excellence. In a world of limited resources, the quest for quality must dominate the breadth and capacity of our programs.

3. *To establish academic excellence as our highest priority . . .*

   To re-establish the core academic programs of the University as its highest priorities.

4. *To develop a "change-oriented" culture in the University . . .*

   To make the University better adaptive to change; to instill in faculty, students, and staff a relish and enthusiasm for change.

5. *To give highest priority to bold, new initiatives . . .*

   To focus wherever possible on exciting new initiatives. The best institutions are those which always seek to do something new, not just to maintain traditions.

The planning effort sharpened a bit in 1990, with an effort to develop a list of ten goals for the decade of the 1990s. Here, we sought goals as quantitative and measurable as possible so that we could assess progress, e.g., "increase private giving plus endowment income to a level equal to our state appropriation." Further, we sought to develop such goals with an aim to implementing a system of "management-by-objectives" in which people would be evaluated in terms of their success in moving toward the goals. The specific goals chosen were as follows:

1. To protect and enhance the University's autonomy.
2. To strengthen the University leadership.
3. To build private support to a level comparable to state appropriation.
4. To achieve the objectives of the Michigan Mandate.

5. To affirm and sustain the University's character as a hybrid public/private institution.
6. To restructure the University to better utilize available resources to achieve teaching and research of the highest possible quality.
7. To enhance the quality of UM as a comprehensive research university.
8. To attract, nurture, and achieve the extraordinary.
9. To position UM as a "world university."
10. To develop more compelling images of what we are or wish to become . . . and what we are not.

In 1993 we took the next step in the strategic process by refining from the planning process more specific goals, consistent with the leadership vision, but more amenable to measurement. Further, we began the task of developing more precise metrics capable of giving us an accurate assessment of our progress toward Vision 2000.

The goals we proposed can be separated into three categories: leadership goals, resource goals, and trail-breaking goals:

Leadership Goals

1. To enhance the quality of all academic programs.
2. To sustain UM blend of broad access and highest quality.
3. To build more spires of excellence.
4. To achieve more "firsts" for the University.
5. To become the leading research university in the nation.

6. To achieve the objectives of the Michigan Mandate.
7. To make UM the university of choice for women leaders.
8. To develop a new paradigm for undergraduate education.
9. To enhance the quality of the student living/learning environment.

Resource Goals

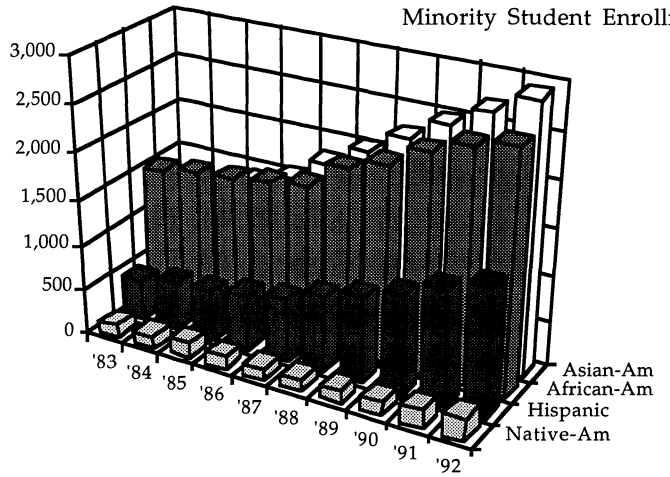
10. To build strong leadership teams for the University.
11. To acquire resources to compensate for the loss of state support.
12. To restructure the University to better utilize existing resources.
13. To strengthen external relationships (state, feds, public).
14. To enhance the quality of institutional advancement activities.
15. To increase private support to exceed the state appropriation by 2000.
16. To increase endowment to $2 B by 2000.
17. To dramatically improve the quality of UM facilities.

Trail-breaking Goals

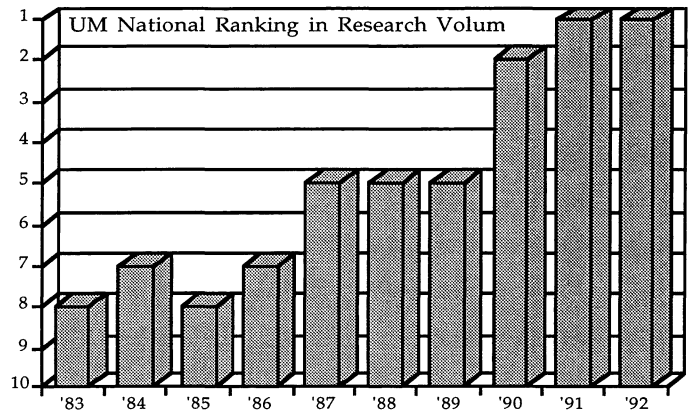
18. To restructure the University to better respond to intellectual change.
19. To explore new models for the University of the twenty-first century.
20. To position UM as a "world university."
21. To position UM as an "electronic university" of the twenty-first century.
22. To make UM a leader in knowledge transfer to society.
23. To make the Ann Arbor area the economic engine of the midwest.
24. To help implement a plan for "restructuring" the State of Michigan.
25. To have the leading intercollegiate athletics program in the nation.
26. To build more of a sense of pride in . . . respect for . . . excitement about . . . and loyalty to the University of Michigan!

A key aspect of any strategic effort involves an accurate assessment of progress toward meeting various goals. As we have refined our goals, we have also sought to identify "metrics," parameters subject to measurement and suitable for determining progress. Each of the goals listed above has been characterized by an array of such metrics, and we are in the process of gathering data characterizing these parameters over the past decade.

For example, we can easily measure our progress toward the objective of achieving strong representation of minority students:



So, too, we can measure the competitiveness of our faculty in attracting major research grants relative to other universities:



In a similar fashion, we developed metrics for each of the twenty-six goals involved in the Vision 2000 plan. The activity of identifying and gathering this assessment information is known as the Michigan Metrics Project. It is our intent to share this with the University community each year.

7. Vision 2017 . . . and Beyond

The vision and goals set forth in this strategic plan are the result of seven years of strategic planning activities involving many people and many groups within and outside the University. In each of these planning exercises, the participants eventually focused on the theme of **leadership**. Hence we have set a course toward a vision that positions the University of Michigan to be the leading university in America by the year 2000. Further, the Michigan Metrics Project provides strong evidence that the University has made significant progress toward this vision in recent years.

Yet, the Vision 2000 strategy is very much a **positioning** effort. It is designed to position the University of Michigan as the leader of higher education by the end of the decade. But this strategy does not propose a specific direction beyond this point. Rather, the current strategy and the vision should both be regarded as intermediate phases and not as a final goals. Put another way, the strategy for the 1990s has been designed to move Michigan into a true leadership position in American higher education. But the task of determining just **where** the University will lead in the twenty-first century is still in an early stage of development.

Of course, one might adopt a "Tao" philosophy and assume that the effort of positioning Michigan as a leader will establish objectives for the century ahead. A more pragmatic view would suggest that during the positioning effort of the 1990s, we will develop a better understanding of the challenges, responsibilities, and opportunities facing higher education and the University of Michigan in the next century.

Yet, the responsibility of leadership requires more than such a passive approach. If Michigan is to play a leadership role in defining the paradigm of the university in the twenty-first century, it must take steps now to better understand and articulate possible futures for higher education. That is, we should now shift at least a part of our strategic planning activity to the longer term, to the year 2020 and beyond.

While the *Vision 2000: The Leaders and Best*, is exciting, compelling, and clearly attainable for the 1990s, it is still only a short range vision. The development of a vision for the longer term--for the University of Michigan's third century--will pose an even greater challenge because the university itself is such a dynamic institution.

An example to illustrate the point. During the 175-year history of the University of Michigan, its mission has evolved to include teaching, research, and service across an extraordinarily broad array of disciplines and professions. Much of the discussion of the 1980s and 1990s has been focused on narrowing the mission of the university back to this classic triad of teaching, research, and

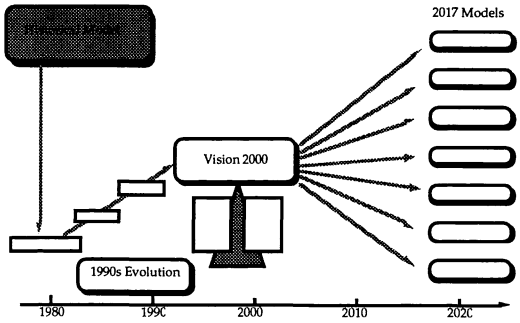
service. Yet, perhaps we should not attempt to narrow the current mission of the university, but rather let it evolve naturally to respond to the increasing needs of a knowledge-driven society.

As another example, when Angell arrived in Ann Arbor in 1878, he stated that he could not imagine a university of 5,000 students. Yet that is the size of the institution he ended up building. Hatcher faced a similar challenge with the return of the war veterans and the commitment of a nation to broadening the opportunities for a college education. Not only did the UM double in size during his tenure, but two regional campuses (UM-D and UM-F) were added.

In the 1990s we are approaching the end of the demographic decline of young people associated with the postwar baby boom and bust cycles. Although we have thought in terms of downsizing the University to better align our activities with our resources, perhaps we should think instead of selective growth strategies. After all, in a knowledge-driven society, the creation and transmission of knowledge is certainly a "growth industry." And certainly, because of its quality, size, and breadth of activities, the University of Michigan is as well positioned as any institution in the world to take advantage of this fact.

We are only beginning to sense the profound degree in which the comprehensive university is evolving rapidly once again during the 1990s, broadening considerably beyond its traditional teaching-research-service mission to an array of activities which can best be described as "knowledge-intensive." Yet even this evolutionary process may just be a transitional phase to institutional forms we cannot even imagine today. Perhaps we are thinking too narrowly, constrained by the mindset of a university of some distant past, which does not even resemble the university of today, much less that of the next century.

8. Traditional Visions of the University



There is strong evidence that, at least over the long term, the fundamental values and missions of the university are of great importance to society. Otherwise, how can one explain the fact that these institutions have survived more than a millennium and today are one of the few nearly universal human social institutions found in vastly different societies in every corner of the globe. Hence, perhaps if we understand better the source of our strength, we can identify the factors that should be preserved in any new paradigms of the university.

What explains the power of this durable and pervasive social institution? Lord Eric Ashby[6] points out that, whatever their flaws, "Universities are broadly accepted as the best means for social investment in human resources." Society believes in and supports the fundamental university missions of teaching and research. It entrusts to these institutions its children and its future. Our universities exist to be repositories, transmitters, and creators of human heritage. They serve as guardians and creators of that knowledge.

This mission is the glue that binds us together and accounts for our successful adaptation throughout the centuries, across so many disparate societies. Obviously, it is relatively easy to carry out our task in societies and times that are homogeneous and static, where there exists a high degree of consensus and gradual change. It is quite another thing to carry out our mission today in our own increasingly pluralistic society and interdependent world, a world characterized by the revolutionary transformations in knowledge itself and in the very nature of our role.

What has been the particular character of higher education in America? Certainly the education of our citizens has been its primary function--or, to quote Ralph Waldo Emerson's lofty ideal in his Harvard address to the Phi Beta Kappa Society in 1837:

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[6]Eric Ashby,

> "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 hospital halls, and by the concentrated fires, set the hearts of their youth aflame.[7]"

Or we might quote Michigan's own Henry Tappan:

> "Universities may, indeed, make learned men; but their best commendation is given when it can be said of them that furnishing the materials and appliances of learning, setting the examples in their professions and graduates, breathing the spirit of scholarship in all that pertains to them, they inspire men, by the self-creative force of study and thought, to make themselves both learned and wise, and thus ready to put their hand to ever great and good work, whether of science, religion, or the state."[8]

Indeed, America's system of higher education went beyond this and attempted to provide an education to our entire population by achieving the variety of institutions necessary to meet the differing needs and abilities of our society. The size and number of institutions grew rapidly to keep pace with our increasing population.

The second traditional role of our colleges and universities has been scholarship: the production, criticism, reevaluation, dissemination, systematization, and preservation of knowledge in all forms. While the academy would contend that knowledge is important in its own right and that no further justification is required for this role, it is also the case that such scholarship and research were essential to its related missions of instruction and service.

Yet another traditional mission has been to provide service to society. American higher education has long been concerned with providing their special expertise to the needs and problems of society. Indeed, a unique type of institution, the land-grant university, was created, in part, to respond to the needs of our agricultural base. Furthermore, the commitment of our universities to the development of professional schools in fields such as medicine, nursing, dentistry, law, and engineering are adequate testimony to the importance of this role.

Finally, higher education in American was expected to provide leadership for society more generally. There was a conviction that the university could serve both as a laboratory and a model where the major problems of our society could be addressed. In a sense, the university, its students and faculty, were asked to become an intellectual community in which the human mind was

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[7]Ralph Waldo Emerson,
[8]Henry Tappan,

brought boldly to bear on the largest and most enduring questions that confront us.

In planning exercises from years past, faculty at the University of Michigan have accepted this traditional triad mission statement:

i) to educate students in light of certain education goals
ii) to preserve and refine knowledge already acquired
iii) to help define and assist in the solution of the problems of society

However, if one were to take a more pragmatic view of the University of Michigan of the mid-to late twentieth century, one would identify the following characteristics:

- A public university with an unusual level of state support
- A public university with a serious commitment to scholarship
- Focused strength in the professions, particularly law, engineering, and medicine
- A public university with selective admissions policies and a strong "out of state" student component
- A relatively small commitment to purely state interests
- Programs generally ranked in quality "among the top public universities" . . . but rarely regarded as the top public university (i.e., lagging behind the University of California-Berkeley)

Yet, this model has already changed considerably: The University of Michigan no longer enjoys an unusual level of state support relative to other public universities. Indeed, we have fallen below the national average for state appropriations per student. Further, in contrast to the mid-twentieth century, today we find many other public universities with an equally serious commitment to scholarship.

To respond to these changes, during the 1970s and 1980s the University took a number of steps:

- To increase its dependence on tuition revenue (to compensate for the decline in state appropriations)
- To increase its reliance on "out of state" students both as a source of revenue and a source of student body quality
- To emphasize those programs with greater potential for alternative sources of funding (e.g., business administration, medicine, and engineering)
- As a first priority, to sustain its excellence in the professional schools where the University had a slightly larger comparative advantage
- To attempt to reduce the scope and breadth of our activities

Yet in this effort, we did not really attempt to reconceptualize that this new environment meant for the future of our University. We did not alter our fundamental model of the university in any significant way.

9. Some Simplistic Models

So, what are some alternatives to the historical model of the University of Michigan? For purposes of discussion, we might first consider the following highly simplistic--indeed, extreme--models:

1. *The University of the Common Man*

Goal
UM = "The University of the Common Man"
Priorities
Minimize student costs (tuition, room and board)
Broad admissions policies
Operational Objectives
Maximize student financial aid
Constrain tuition levels
Avoid highly selective admissions policies
Lower grading standards
Lower graduation requirements
Possible consequence
--> The University of Mediocrity???

2. *The University of "the State of Michigan"*

Goal
Maximize service to State of Michigan
Priorities
Maximize opportunities for Michigan citizens
Maximize service to State
Operational Objectives
Reduce nonresident enrollments
Constrain tuition levels
Stress service activities
Stress breadth and variety of programs
Start an Ag school . . .
Possible consequence
--> Michigan State II

3. *The Harvard of the West*

Priorities
Emphasize academic excellence as highest priority
Strive only for the best . . . in students, faculty, programs
Operational Objectives
Intensify Michigan's commitment to excellence
Stress quality over breadth and capacity

Stress priority of intellectual core
Operate Michigan as a national university

Possible Consequence

--> "MUCH smaller but better" . . .

4. *The Stanford of the East*

Goal

Develop an entrepreneurial, change-oriented, risk-taking, people-oriented culture

Priorities

Strong incentives and opportunities for individual achievement
Minimum constraints, regulations, hassles
High-risk intellectual activities

Operational Objectives

Harvard style of resource management (every tub on its own bottom)
Stanford-MIT style of external interaction Silicon Valley-Route 128 style
Modify organizational structures to stimulate change
Oppose efforts to constrain faculty and students

Possible Consequence

"The University of the Bottom Line" . . .

5. *The University of America*

Priorities

BOTH quality and breadth
Strong national representation among students and faculty
Responsive to national (rather than state) priorities

Operational Objectives

Stress institutional autonomy
Continue shift toward nonresident enrollment
Aggressive national marketing effort

Possible Consequence

"the Dallas Cowboy model: America's university"

6. *A National Leader (a variation on two themes)*

Goal

National leadership in higher education (both public and private)

Priorities

Emphasis academic excellence as highest priority
Strive only for the best--in students, faculty, staff, programs

Tactics

Intensify Michigan's commitment to excellence

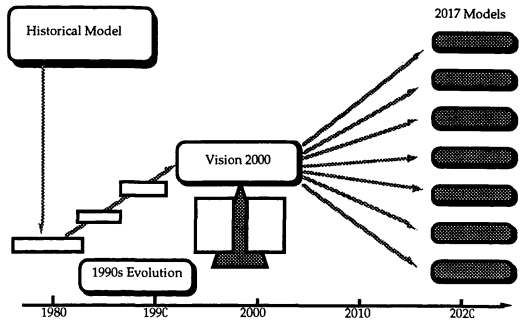
. . . "pick up the pace"
Stress quality over breadth and capacity
. . . "spires of excellence"
Stress priority of intellectual core
. . . e.g., LS&A . . . OR key professional schools
Operate Michigan as a national university

Possible consequences

Michigan overtakes Harvard, Stanford, UC-Berkeley

These models, while amusing, actually represent extreme cases of existing paradigms of the twentieth century. They do not provide much guidance about where the University of Michigan should head in the century ahead.

10. Some Radically Different Paradigms



We face a particular dilemma in developing more revolutionary models for the American university because of a challenge mentioned early in this essay. The pace and nature of the changes occurring in our world today have become so rapid and so profound that social institutions such as university have great difficult in sensing and understanding the true nature of the changes buffeting them about, much less in responding and adapting adequately. Hence any process aimed at articulating and analyzing new models for the university must do so with the recognition that these models must themselves adapt to an environment of continual change.

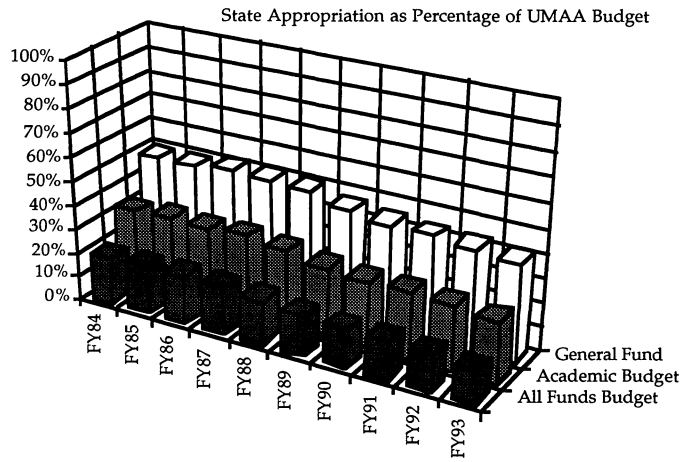
With this caveat in mind, let us consider several of the more provocative themes suggested by colleagues across the University to illustrate the broad range of possibilities for the university of the twenty-first century. These include

- the state-related, but world-supported, university
- the "world" university
- the diverse university (or the "uni-di-versity")
- the cyberspace university
- the creative university
- the divisionless university
- the adult university
- the university college
- the university as capstone of a lifelong sequence of education
- the "laboratory" university ("the university within the university")
- the university as a "knowledge server"

Of course, it is unlikely that the University of Michigan will assume the form of any one of these models. But each paradigm has aspects that will almost certainly be a part of our character in the century ahead.

Theme 1: The State-Related, World-Supported University
(or a privately-supported university with a strong public character...)

Over the past two decades, the share of the University of Michigan's support provided by state appropriations has declined to the point today where it comprises only 37 percent of our General Fund, 22 percent of our academic budgets (non-auxiliary funds), and 11.6 percent of our total resource base:



Further, it seems clear that if the present rate of deterioration continues, by the end of the decade, state support will amount to less than 7 percent of our total resources. In a sense, long ago we ceased to be a state-supported university. Indeed, today, we are, by most measures, not even a strongly state-assisted university, since other shareholders--students and parents through tuition, the federal government through research grants, alumni, friends, and benefactors through gifts, and patients through health care fees--each provide more support to the University than does the State of Michigan. Yet, despite the low level of state support, the University remains committed to serving the citizens of Michigan. Further, it is clearly governed by the state through its publicly-elected Board of Regents.

Hence, the University of Michigan has become today a *state-related* university, supported by a broad array of constituencies at the national--indeed, international--level, albeit with a strong mission focused on state needs. More precisely, in many ways it has become a privately-supported public university, in the sense that it must earn the majority of its support in the competitive marketplace (i.e., via tuition, research grants, gifts) much as a private university, yet it still retains a public commitment to serve the people of the State of Michigan.

While the University of Michigan was the first public university to see its state appropriations drop to such a low fraction of its operating budget, it is now being joined by other major public universities facing a similar "state-related"

future--most notably the University of California, most Big Ten universities, and the Universities of Virginia and North Carolina. Today many might conclude that America's great experiment of building world class universities supported by public taxes has come to an end. Put another way, it could well be that the concept of a world-class, comprehensive university supported primarily by state appropriations may not be viable over the longer term. It may not be possible to justify the level of public support necessary to sustain the quality of these institutions in the face of other public priorities such as health care, K-12 education, and public infrastructure needs--particularly during a time of slowing rising or stagnant economic activity.

Perhaps we should consider more carefully the implications of being a "state-related, world-supported" university. For example, it is clear that if our viability depends on building and sustaining sufficient resources to maintain our remarkable combination of quality, breadth, and size, we must serve more than the state alone. It is also clear that our capacity to position the University to attract these resources will require actions that may come into conflict from time to time with state priorities. Hence, the autonomy of the University will be one of its most critical assets.

So, how might we embark on this path to serve far broader public constituencies without alienating the people of our state--or risking our present (albeit low) level of state support? One approach would be to simply observe that the present level of state appropriations is only sufficient (barely) to cover the tuition "discount" provided for Michigan residents. Hence we could simply offer to educate only those students the state wished to pay for, at a tuition level determined by the degree of state subsidy.

To be more specific, let us consider the implications of true cost-based pricing for the University of Michigan, taking in account the partial state subsidy of these costs through our operating appropriation. At the present time, the baseline tuition for non-Michigan-resident students is set at the median of private universities, e.g., $16,000 for undergraduates. The state currently provides $260 million in appropriation for the general operations of the UM-Ann Arbor campus. If we subtract financial aid ($60 million) and research support ($40 million) from this appropriation, we find that the amount remaining to subsidize the educational costs for our 24,000 Michigan resident students, $160 million, would provide a tuition discount of $7,000 per student, on the average. Hence, if we were to use true cost-based pricing, we would need to increase instate tuition levels to $16,000 - $7,000 = $9,000, or roughly 55% of the nonresident levels--or reduce resident enrollments to 16,000 students. Clearly, while such increased pricing or lower enrollments is probably consistent with the diminishing state subsidy of the University, either course would pose serious political risks.

A more diplomatic approach would be to attempt to persuade the public--and particularly the media--that the University of Michigan is vital to the state in a far more multidimensional way that simply education alone--through health care, economic development, pride (intercollegiate athletics), professionals (doctors, lawyers, engineers, teachers), etc. Further, we might shift the public perception of the University from that of a consumer of state resources to that as a generator of state resources.

We might argue that for a small contribution--less than 12 percent of our operating costs--the people of the state of Michigan get access to the vast resources and benefit from the profound impact of one of the world's great universities.

Some Questions:

1. How does one preserve the "public character" of a "privately-financed" institution?

2. How does a "state-related" university adequately represent the interests of its majority shareholders (parents, patients, federal agencies, donors)?

3. Can one sustain an institution of the size and breadth of the University of Michigan on self-generated ("private") revenues alone?

Theme 2: The World University

The University of Michigan has evolved over time, from a state university to a national university. Yet throughout its history it has always had a strongly international character. Perhaps now is the time to evolve once again, this time into a "world" university. To illustrate how dramatic such a paradigm shift might be, consider two possible futures suggested by University faculty members:

> "A new world culture will be formed over the next century, and a basic step in forwarding whatever we mean by that term will be the establishment of three or four world universities (Europe, Asia, Africa, Latin America) to be the focal point for certain sorts of study of international order--political, cultural, economic, technological. Since the genius of higher education in America is the comprehensive public university, the University of Michigan is well positioned in character--as well as geographical location--to play this role for North America."
>
> Ralph Williams, English

"Suppose that the University of Michigan in the year 2020 has an enrollment of 100,000 students--but only 20,000 are located in Ann Arbor. The remaining 80,000 are scattered about the globe, interacting with the University through robust information technology networks (holographic images, ubiquitous computing, knowbots, and such . . .)"

Doug Van Houweling, Political Science

Such statements motivate a number of provocative questions:

1. What would be the characteristics of a world university? What would be its primary missions?

2. Teaching: Who would it teach? More international students? (Note that only 6.5 percent of our students today are international . . . and most of these are in our graduate programs.) What would such a university teach? Would our objective be to make our students more "worldly," to challenge their "Americentric" view of the world, to help them understand cultural differences and be able to handle them? How could we make better use of the extraordinary resource represented by our international students?

3. Scholarship: How would a world university organize its teaching and scholarship? Through conventional area centers? Major new schools of international studies? By infusing international content into its programs? How about "ausland/inland" issues--e.g., African studies vs. African-American studies?

4. Service: Would a world university be more committed to public service on an international scale? What about international development (through organizations such as the Midwestern Universities Consortium for International Activities)?

5. International Extension: What about overseas campuses? Overseas opportunities for faculty? Overseas extension programs for international

students? What types of relationships would we build with other universities throughout the world?

Theme 3: The Diverse University

Yet another model of the University of the twenty-first century is suggested by the Michigan Mandate, the University of Michigan's deep commitment to become a leader in building the type of diverse learning community so critical to the future of our nation and the world.

The University of Michigan has long been among the most faithful realizations of the Jeffersonian concept of a public university, responsible and responsive to the needs of the people who founded it and supported it, even as it sought to achieve quality equal to that of the most distinguished private institutions. Throughout its long history, perhaps the most distinguishing characteristic of the University has been its commitment, as stated by President Angell, to "provide an uncommon education for the common man." This aspiration to provide an education of the highest quality to all with the ability to succeed and the will to achieve stood in sharp contrast to the role of the nation's earliest eastern colleges, which traditionally served those of the elite and specific religious groups. The University of Michigan, instead, was responsible to and shaped by the communities that founded it, with the mission of serving all the people.

The early focus of the University was on expanding the availability of a university education to all economic classes and religious groups. Throughout the nineteenth century, the University of Michigan continued to expand access to groups who had been denied educational opportunity elsewhere. The first African Americans were admitted to the University in 1868 and the first women in 1869, and enrollments of women, students of color, and religious minorities grew rapidly in later years. The University has also played a major role in expanding the opportunity for higher education to students from abroad.

Yet, despite the degree to which the University broadened its commitment to provide an "uncommon education for the common man" to encompass gender, race, religious belief, and nationality, it has faced serious challenges. Many of these groups suffered from social, cultural, and economic discrimination. Simply opening doors--providing access--was not enough to enable them to take advantage of the educational opportunities of the University.

To address this challenge . . . this responsibility . . . this mandate, five years ago the University of Michigan began to transform itself in such a way as to bring all racial and ethnic groups fully into the life of the University. This process of transformation was guided by a strategic plan known as **The Michigan Mandate**. The fundamental vision was that the University of Michigan would become a leader known for the racial and ethnic diversity of its

faculty, students, and staff--a leader in creating a multicultural community capable of serving as a model for higher education and a model for society-at-large. We were convinced that our capacity to serve our state, our nation, and the world would depend on our capacity to reflect the strengths, perspectives, talents, and experiences of **all** peoples in everything that we do.

The Michigan Mandate broke new ground, drawing on the best available research and experience for promoting significant social change. It has provided the framework for a dynamic and inclusive reassessment of the University's future, based on the University's best academic traditions and values. It called upon the entire community to join in a commitment to change. Unique solutions, experiments, and creative approaches were encouraged, and resources were committed to them.

As we have suggested in the Michigan Mandate, the University has a mandate, a responsibility, not just to reflect the growing diversity of America--and, indeed, the world--in our students, faculty, and staff, but to go beyond this to build a pluralistic, multicultural model for our nation. This model seeks to build a community that values and respects and, indeed, draws its intellectual strength from the rich diversity of peoples of different races, cultures, nationalities, religions, and beliefs.

In this sense, the Michigan Mandate model seeks to join together objectives that initially may seem incompatible: community and pluralism, and excellence and diversity. In a sense, the goal would be to strengthen every part of our University community and our missions of teaching, research, and service by increasing, acknowledging, learning from, and celebrating our rich human diversity. Here we must make a very deep community to the achievement of an environment that seeks, nourishes, and sustains racial, cultural, and national diversity. We must learn how to resist the great pressures of prejudice, separatism, bigotry, and fear than push us apart. Societies around the world are being ripped apart by ethnic, racial, and religious strife that threatens world peace, causes untold suffering, and stands in the way of progress in addressing the most pressing problems facing humankind.

Hence, critical to this model is a recognition that we are first and foremost a "UNI" versity, not a "DI" versity. Our challenge is to weave together the dual objectives of diversity and unity in a way that strengthens our fundamental goal of academic excellence and serves our academic mission and our society.

There are many questions associated with this model, however:

1. What society do we strive to represent? Michigan? The United States? The World? The Present? The Future?

2. What kind of diversity do we seek? Racial? Ethnic? Gender? Socioeconomic? Geographical? Intellectual? Political? (Or do we just set our academic standards and then allow a "blind" selection process to determine our composition?)

3. How do we draw strength from diversity?

4. How do we teach our students to relate to, tolerate, enhance, and benefit from diversity?

5. How do we resist the forces of separatism driven by pluralism and build a "uni" versity--stressing the "unum" over the "pluribus"?

Theme 4: The Cyberspace University

Four important themes are converging in the final decade of the twentieth century: i) the importance of the university in an age in which knowledge itself has become a key factor in determining security, prosperity, and quality of life; ii) the global nature of our society; iii) the ease with which information technology--computers, telecommunications, multimedia--enables the rapid exchange of information; and iv) networking, the degree to which informal cooperation and collaboration among individuals and institutions is replacing more formal social structures such as governments and states.

In Michigan we have a unique vantage point from which to view the a particularly important feature of these changes. If there was one sector that most strongly determined the progress of the twentieth century, it was *transportation* and its related industries--cars, planes, trains, oil, space. Transportation determined prosperity, national security, even our culture--with the growth of the suburbs, international commerce, and so on. During this period Michigan's automobile industry had no equal, and the state rapidly became one of the most prosperous and powerful industrial regions on earth.

Today things are very different. We have entered a new era in which the engine of progress is not transportation but rather *communication*, enabled by the profound advances we are now seeing in computers, networks, satellites, fiber optics, and related technologies. We now face a world in which hundreds of millions of computers easily can plug into a global information infrastructure. Jacques Attali in his profound essay, *Millennium*,[9] suggested that the impact of information technology will be even more radical than that of the harnessing of steam and electricity in the nineteenth century. Rather it will be more akin to the discovery of fire by early ancestors, since it will prepare the way for a revolutionary leap into a new age that will profoundly transform human culture.

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[9]Jacques Attali, Millennium

It is clear that information technology on which our knowledge-intensive society is increasingly dependent continues to evolve very rapidly. In the next several years we will see yet another 1,000-fold increase in the power of computers and networks. In the same time frame, massively parallel computation servers will offer tera-operations per second, while the price performance ratio of workstations will continue to improve. Within several years, widely available international networks capable of point-to-point multi-media (including video) will be available. Wide-area networks in the gigabit-per-second range will be in routine use, although still well short of the 25,000 gigabit potential of third generation fiber optic technology. Wireless communication will support remote computing and communication.

Perhaps the university of the twenty-first century becomes an invisible, world-wide network, a "cyberspace," linking students, faculty, and society. Today's campuses might become "knowledge servers" linked into a vast information network, providing their services (teaching, research, public service) to whomever might request and need them.

Consider an interesting statement by one of the founders of the computer industry:

> "Perhaps we are missing the point in realizing the true impact on information technology on knowledge-based organizations like universities--much as folks missed the point during the early days of motion pictures. Perhaps we should think of the university in quite different ways, e.g., as "a remote expert" providing knowledge services to all peoples and all parts of the world."
>
> David Nelson, Apollo Computers

Since the business of the academic research enterprise is knowledge, perhaps the impact of the extraordinary advances in information technology could have--likely will have--profound implications. Technologies such as computers, networks, HDTV, ubiquitous computing, and knowbots may well invalidate most of the current assumptions in thinking about the future nature of the research enterprise. Consider, for example, the following questions:

1. Will the "university of twentieth century" be localized in space and time, or will it be a "meta-structure" involving people throughout their lives, wherever they may be on this planet--or beyond?

2. Is the concept of the specialist really necessary--or even relevant--in a future in which the most interesting and significant problems will require "big think" rather than "small think," where intelligent software agents can roam far and wide through robust networks containing the knowledge of the world and instantly and effortlessly extract whatever a person wishes to know?

3. Will lifestyles in the academy (and elsewhere) become increasingly nomadic, with people living and traveling where they wish, taking their work and their social relationships with them?

4. Will knowledge become less of a resource in the university of the twenty-first century and more of a medium?

Theme 5: The Creative University

The professions that have dominated the late twentieth century--and to some degree, the late twentieth century 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 increasing clear that the driving intellectual activity of the twenty-first century will be the act of creation itself.

> "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." Jacques Attali, *Millennium* [10]

Perhaps the determining characteristic of the University of the twenty-first century will be shift in intellectual focus from the preservation or transmission of knowledge to the process of creation itself. Here, the University of Michigan is already very well positioned. On our campus we already are fortunate to have several schools which focus on the act of creation--in music and dance and the performing arts; art and design; architecture; and in engineering, which, of course, is the profession concerned with "creating what has not been." But the tools of creation are expanding rapidly in both scope and power. Today we have the capacity to literally create objects atom-by-atom. We are developing the capacity to create new life-forms through the tools of molecular biology and genetic engineering. And we are now creating new intellectual "life forms" through artificial intelligence and virtual reality.

Hence, perhaps the University should structure itself in a more strategic fashion to nurture and teach the art and skill of creation. Perhaps we should form strategic alliances with other groups, organizations, or institutions in our society whose activities are characterized by great creativity (e.g., UM plus the Disney Company? . . .)

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[10]ibid., Attali

Again, some questions arise:

1. Will the "creative" disciplines and professions acquire more significance (e.g., art, music, architecture, engineering)?

2. How does one nurture and teach the art and skill of creation?

3. What is the role of creativity within other scholarly and professional disciplines? How might we enhance this?

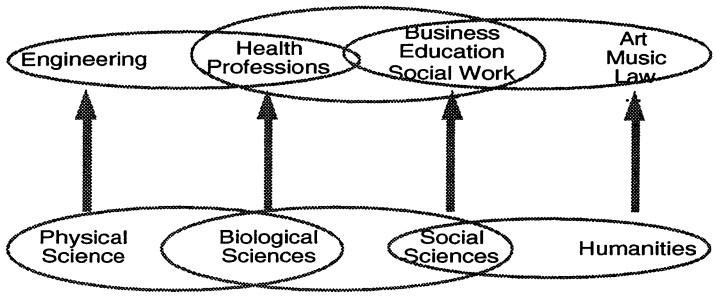
Theme 6: The Divisionless University

An earlier address to the Senate Assembly entitled "Redrawing the Boundaries" focused on the subject of intellectual change. At that time I noted that many of our faculty had expressed their growing frustration with the current intellectual organization of the University. They felt that our traditional structure of narrow disciplinary and professional academic programs was increasingly irrelevant to their teaching, scholarly, and service activities.

Of course our present organization into schools, colleges, and departments has much to recommend it. They set the norms for quality and provide a standard that relates to other academic institutions and to society-at-large. Further, much of the real power in a university flows through these academic units, including the power to appoint and tenure faculty, allocate resources, and offer academic degrees.

Yet there are many signs that the university of the future will be far less specialized and far more integrated through a web of structures, some real and some virtual, which provide both horizontal and vertical integration among the disciplines. For example, in my role as chair of the National Science Board, I have witnessed the blurring of the distinction between basic and applied research, between science and engineering, and between the various scientific disciplines. So too, we are seeing a far more intimate relationship between basic academic disciplines and the progress. For example, much of the most important basic biological research is now conducted by clinical departments in medicine--an example being molecular medicine. The professional schools of business, law, public health, and social work are deeply engaged in original and basic scholarship and teaching in the social sciences. And the performing arts are continually energized and nourished by the humanities--and vice versa!

We should seriously examine alternative ways to organize a university that are less constraining to the teaching and research of our faculty. For example, perhaps scholarly disciplines should be more closely integrated with professional schools through academic organization or campus location.



We might consider a fourth level of faculty appointment, beyond that of the professor, in which distinguished senior faculty of unusual intellectual span are appointed as professors-at-large with the ability to teach or conduct research wherever they wish in the University. We might construct various "integrative" facilities which bring together the teaching and scholarship of a broad range of academic programs, e.g., the Gateway Campus project on the Central Campus and the Integrated Technology Instructional Center (or "Media Union") on the North Campus.

Some questions:

1. Perhaps we should resist the trend toward highly specialized undergraduate degrees in favor of a "bachelor of liberal learning" that would prepare students to enter a wide array of post-graduate studies and careers.

2. Has the Ph.D. itself become an obsolete degree to the extent that all too often it is used to produce highly specialized clones of the present graduate faculty? perhaps it is time for a new graduate degree characterized by far greater breadth.

3. Should the basic disciplines be more intimately coupled to the professions. After all, many of the most exciting basic research is stimulated through interaction with the "real world."

4. How do we develop, evaluate, and reward faculty who are generalists rather than specialists?

Theme 7: The Adult University

To achieve excellence in advanced education and scholarship, research universities are required to make extensive investments in attracting world-class scholars, maintaining extensive libraries, and constructing state-of-the-art laboratory facilities. Some of these institutions may well decide that it is simply no longer cost-effective to use their campuses for general education programs for recent high school graduates, and instead admit only advanced, academically and emotionally mature students directly into disciplinary concentrations or

professional schools, much as their counterparts do in the United Kingdom and Europe.

In this model, the task of providing students with a broad, general education--and the opportunity to grow up--would fall to: i) small liberal arts colleges, which stress teaching and student intellectual development, while providing the small communities most supportive of student maturation, ii) community colleges or regional four-year colleges, which can draw upon both the family and neighborhood structures as support for the student's maturation, and, in some cases; iii) advanced high schools and preparatory schools capable of producing academically and emotionally mature students

The benefits of such a focused mission would be significant: First, it would allow the research 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 get them out of the business of general education and parenting, roles for which they are not very well suited in any event. It would also allow them to shed their activities in remedial education, a rather inappropriate use of the costly resources of the research university.

Such a focusing of efforts would probably reduce public criticism considerably. Most students--and parents--appear quite happy both with the quality of upper-class academic majors and with professional education. Furthermore they are also 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 at 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 much as they would a high school experience.

Focusing the research universities only on advanced education and training for academically mature students would greatly enhance the intellectual atmosphere of the campus, thereby improving the quality of both teaching and scholarship considerably. Students entering the research universities would be far more mature and able to benefit from the resources of these institutions. Unfortunately, the vast majority of freshmen and sophomores are simply not ready to benefit from the unique resources of the research campuses.

Such a proposal raises a number of questions:

1. Would this paradigm lose the opportunity for distinguished scholars to "inspire" young students during the formative years of their lives?

2. Would these institutions lose outstanding students who would choose to attend colleges or universities where they could receive all of their undergraduate education--both general and disciplinary concentration?

3. Would such a focus, in light of the clear weakness of K-12 and community college public education, relegate large numbers of students to a second-rate general education?

4. Could universities afford to focus only on advanced education and professional training, when the popular belief suggests that the lower costs of general education (as taught to large lecture sections utilizing graduate teaching assistants) yields a tuition revenue surplus that subsidizes the more expensive advanced instruction?

Theme 8: The University College

There is a contrasting paradigm. In recent years there have been calls for research universities to make a new commitment to quality undergraduate education, particularly at the lower division level. Here, we must acknowledge the difficulties that large research universities have had with general education and supporting the intellectual and emotional development of younger students. It seems increasingly clear that we need to develop a new paradigm of the "university college," the undergraduate programs surrounded by the graduate and professional programs of the comprehensive university. Among the particular challenges that this paradigm must address are the following:

1. We need to resist the increasing specialization that characterizes existing undergraduate majors and strive instead for the ideals of a broad, liberal education. The world of change our students will enter requires a far broader type of undergraduate education that we now provide, one that integrates knowledge and enables them to continue learning throughout their lives.

2. We should recognize that today's student is quite different from earlier generations. Not only do they come from vastly more diverse backgrounds with different academic goals and expectations, but they learn in quite different ways. More specifically, their knowledge-rich, media-dominated world has led them to develop more complex learning patterns. For example, the "plug and play" generation tends to favor nonlinear, inductive learning processes rather than the linear, sequential approach favored by most faculty.

3. We need to provide undergraduates with an experience that draws on the vast intellectual resources of the entire university: its scholars, libraries, museums, laboratories, its graduate and professional programs, its remarkable diversity of people, ideas, and endeavors.

4. We should expose our students to the excitement of great minds struggling to extend the bounds of knowledge. Of course we recognize that the scholars we place in the classroom may not always be the best teachers of knowledge in the traditional sense. But research universities benefit from the presence of a cadre of excellent, stimulating teachers, and we are convinced that only by drawing into the classrooms faculty with strong commitments to scholarship can we stimulate our students to develop the skill at inquiry across the broad range of scholarly disciplines that is so essential to life in an age of rapidly expanding knowledge.

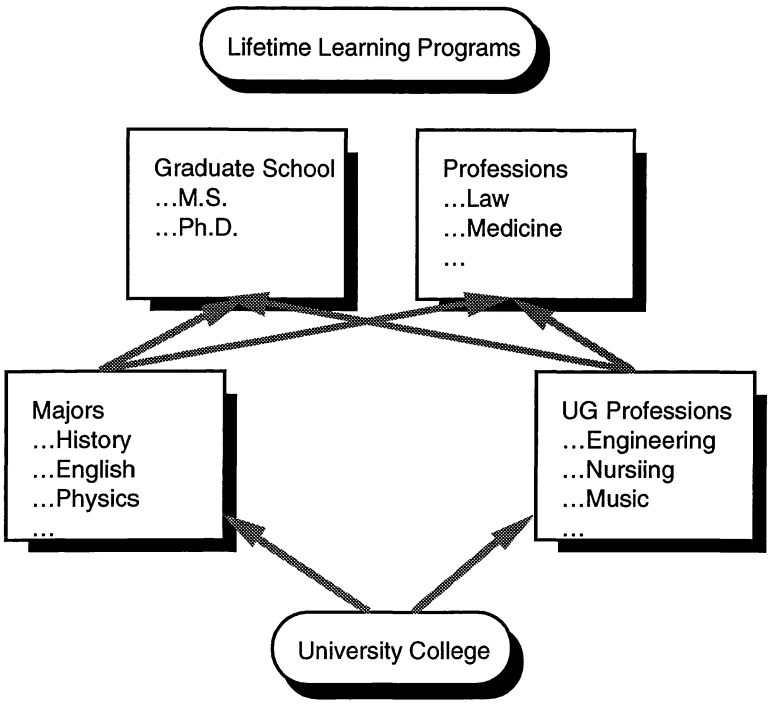
5. We should develop in our students both the ability and will to strive for knowledge. We believe that a critical component of an undergraduate education in a research university is the development of the will to seek and the skill to find.

6. We should expose our students to the diversity, the complexity, the pluralism of peoples, cultures, races, and ideas that can only be found in the intellectual melting pot of the modern research university.

7. And we must also accept our mission to educate the leaders of American society. Indeed, if past experience is any guide, most of the leaders of this nation will continue to be produced by our great research universities.

One possible paradigm would be to extend and adapt Robert Hutchin's ideal of a "university college" in the following way:

1. Lower-division undergraduate education would be the responsibility of a separate college of the University, focused on providing general education of the highest quality to all first- and second-year students enrolling in the University. This university college would provide these students with a gateway both to more specialized upper-division education in the majors and the professions as well as introducing them to the great intellectual resources of a major research university.



2. The University College would have its own dean and administration, on a par with the deans of other schools and colleges and reporting directly to the Provost. However, unlike other schools, it would have only a very limited number of faculty, but rather would draw most of its faculty from other academic units of the University--although there might be a few "master teacher" faculty members with tenure directly in the university college.

3. All first- and second-year (lower division) students would be admitted initially to the University College rather than to a liberal arts college or professional schools. They would then transfer into specific majors (concentrations) or into professional schools in their junior year. Some professional schools might choose to offer some outstanding students simultaneous admission to their advanced programs when admitted to the university college in order to attract the very best students.

4. The University College would be concentrated on a new campus, a complex of classrooms, laboratories, museums, and other academic facilities that would be clearly identified by students, faculty, and alumni as the University's focal point for undergraduate education. The College would also be adjacent to residence halls for first-year students in an effort to provide a more integrated academic and residential life that better responds to their needs.

5. All faculty of the University, including those in professional schools, would be required to teach periodically in the University College.

6. All undergraduates would be required to complete a major research or creative project under faculty supervision during their first two years. Further, all undergraduates would also be required to complete a capstone project or experience during their senior year that would pull together their undergraduate education.

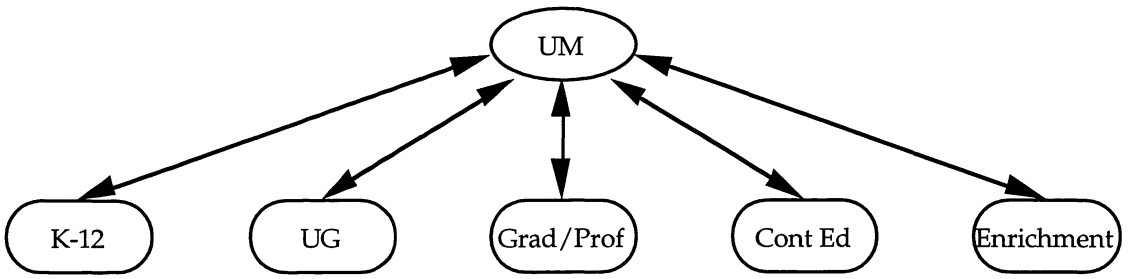
7. The faculty role would shift from traditional teaching to the activity of designing processes, experiences, and environments suitable for student learning. The student would shift from passive to active learning and intellectual engagement, engaged increasingly in collective rather than solitary learning experiences.

Theme 9: The Catholepistemiad of Michigania

In a world in which education becomes a lifetime commitment--in which we must prepare our students for multiple-career lives--perhaps we need to rethink the university in terms of an education continuum, in which we interact through a lifetime with our students. In fact, Howard Peckham noted in his popular history of the University of Michigan, that

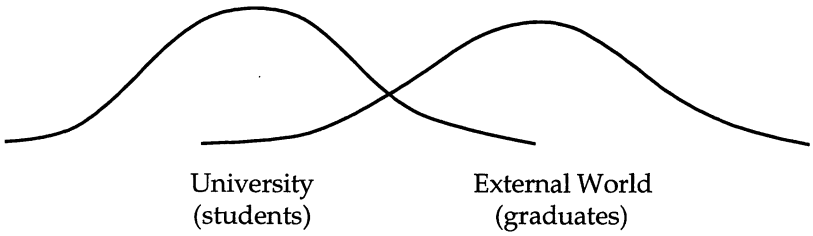
> "The original concept of the University was not as an isolated tower of learning, but rather the capstone of a statewide educational system which it would supervise. The president and didactors, or professors, were given power 'to establish colleges, academies, schools, libraries, museums, athenaeums, botanical gardens, laboratories . . . and to appoint instructors and insructrices in, among, and throughout the various counties, cities, towns, townships, and other geographical divisions of Michigan.' In a sense, Woodward followed the French idea of achieving a single and high set of standards for all schools by centering control in the university."[11]

Perhaps, then, we need to consider an evolutionary path through which the University becomes a "full service" educational institution, with an involvement across the entire spectrum of educational needs:



[11]Howard Peckham,

In this model, the university would commit itself to a lifetime of interaction with our students--once a Michigan student/graduate, always a Michigan student/graduate--providing them throughout their lives with the education necessary to responding to changing goals and needs. Further we would design our programs to bring together students with alumni who have established themselves in a particular career, thereby blurring the distinction between student and graduate, between the University and the external world.



Note here that information technology might be the key to providing such lifetime linkages with our students. This might allow our students to "take the University with them" when they graduate. It would also allow us to benefit from them as well.

Some questions:

1. How would this lifetime education be delivered?

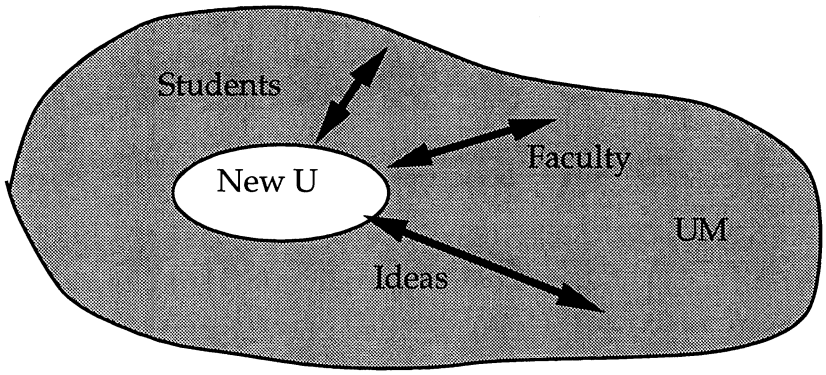
2. How would the University related to other components of the educational continuum?

3. How would this "seamless web" approach relate to our current focus on well-defined degree programs?

Theme 10: The Laboratory University

Here the idea would be to explore the possibility of creating within the University a "laboratory" or "new" university that would serve as a prototype or testbed for possible features of a twenty-first century university. The "New U" would be an academic unit, consisting of students, faculty, and programs, with a mission of providing the intellectual and programmatic framework for continual experiment. This could be a highly interdisciplinary unit with programs organized around such overarching themes as global change, social infrastructures, and economic transformation. It would span undergraduate, graduate, professional, and continuing education, bringing together students, faculty, and alumni to pool knowledge, work in teams, and address real problems. It would be a crucible for evolving new disciplines through interdisciplinary collaboration. Its programs would promote the transfer of knowledge to society through collaboration, internships, and exchanges of students, faculty, staff, and professionals. The "New U" would also be a place to

develop new structural models for the university, to experiment with lifelong education, new concepts of service, faculty tenure, leadership development, and community building.



Ideas:

i) This could be a prototype of what we believe the University of the twenty-first Century might be, a laboratory or "proving ground" for various possibilities.

ii) It could also be a more permanent part of the University that we intentionally try to keep twenty to thirty years ahead of the rest of the University--essentially our "corporate R&D" activity.

iii) The "New U" project might also provide an excellent device to better articulate the needs and opportunities of the University for major efforts such as fund-raising campaigns. It would be a key strategic planning device in our efforts to take the next step in refining our vision of the University of the twenty-first Century.

Questions:

1. Would the New U require a major physical presence? Dorms, offices, classrooms, and such? Or perhaps we could build it around other new facilities such as ITIC.

2. Perhaps we should build the New U around research as the most effective way to learn . . . at all levels, including the early undergraduate years.

3. Or perhaps we should build the New U around service, designing academic programs about major cross-disciplinary themes which address major societal problems (e.g., global change, the plight of our cities).

4. Clearly the New U will have a strong information technology infrastructure. In fact, we might offer students a "technology sandbox" that they can apply to major intellectual or societal changes.

5. We might also construct the New U so that it would allow students to "dial" the type of learning environment they want, e.g., from intimate experiences like the Residential College to the full-blown mega-university.

Theme 11: The Knowledge Server

One frequently hears the primary missions of the university referred to in terms of teaching, research, and service. But these roles can also be regarded as simply the twentieth century manifestations of the more fundamental roles of creating, preserving, transmitting, and applying knowledge. If we were to adopt the more contemporary language of computer networks, the university might be regarded as a knowledge server, providing knowledge services (i.e., creating, preserving, transmitting, or applying knowledge) in whatever form needed by contemporary society.

From this more abstract viewpoint, it is clear that while the fundamental *knowledge server* role of the university does not change over time, the particular realization of these roles do change--and change quite dramatically, in fact. Consider, for example, the role of "teaching"--that is, transmitting knowledge. While we generally think of this role in terms of a professor teaching a class of students, who, in turn, respond by reading assigned texts, writing papers, solving problems or performing experiments, and taking examinations, we should also recognize that classroom instruction is a relatively recent form of pedagogy. Throughout the last millennium, the more common form of learning was through apprenticeship. Both the neophyte scholar and craftsman learned by working as apprentices to a master. While this type of one-on-one learning still occurs today, in skilled professions such as medicine, and in advanced education programs such as the Ph.D. dissertation, it is simply too labor-intensive for the mass educational needs of modern society.

The classroom itself may soon be replaced by more appropriate and efficient learning experiences. Indeed, such a paradigm shift may be forced upon the faculty by the students themselves. Today's students are members of the "multimedia" generation. They have spent their early lives surrounded by robust, visual, electronic media--Sesame Street, MTV, home computers, video games, cyberspace networks, and virtual reality. They approach learning as a "plug-and-play" experience, unaccustomed and unwilling to learn sequentially--to read the manual--and rather inclined to plunge in and learn through participation and experimentation.. While this type of learning is far different from the sequential, pyramid approach of the traditional university curriculum, it may be far more effective for this generation, particularly when provided through a media-rich environment.

Hence, it could well be that faculty members of the "knowledge-server" university will be asked to set aside their roles as teachers and instead be asked to become "designers" of learning experiences, processes, and environments. Further, tomorrow's faculty may have to discard the present style of solitary learning experiences, in which students tend to learn primarily on their own through reading, writing, and problem solving. Instead they may be asked to develop collective learning experiences in which students work together and learn together with the faculty member becoming more of a consultant or a coach than a teacher.

One can easily identify other similarly profound changes occurring in the other roles of the university. The process of creating new knowledge--of research and scholarship--is also evolving rapidly away from the solitary scholar to teams of scholars, perhaps spread over a number of disciplines. So, too, there is increasing pressure to draw research topics more directly from worldly experience rather than predominantly from the curiosity of scholars. Even the nature of knowledge creation is shifting somewhat away from the analysis of what has been to the creation of what has never been--drawing more on the experience of the artist than upon analytical skills of the scientist.

The preservation of knowledge is one of the most rapidly changing functions of the university. The computer--or more precisely, the "digital convergence" of various media from print to graphics to sound to sensory experiences through virtual reality--has already moved beyond the printing press in its impact on knowledge. Throughout the centuries the intellectual focal point of the university has been its library, its collection of written works preserving the knowledge of civilization. Yet today, such knowledge exists in many forms--as text, graphics, sound, algorithms, virtual reality simulations--and it exists almost literally in the ether, distributed in digital representations over worldwide networks, accessible by anyone, and certainly not the prerogative of the privileged few in academe.

Finally, it is also clear that societal needs will continue to dictate great changes in the applications of knowledge it excepts from universities. Over the past several decades, universities have been asked to play the lead in applying knowledge across a wide array of activities, from providing health care, to protecting the environment, from rebuilding our cities to entertaining the public at large (although it is sometimes hard to understand how intercollegiate athletics represents knowledge application).

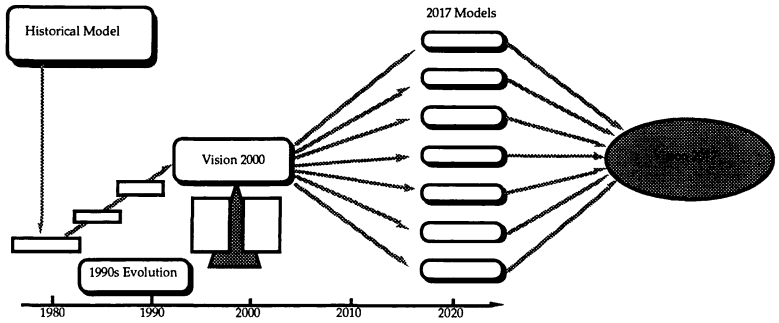
The knowledge server theme for the university is not merely a possible paradigm for the future. Rather it is a paradigm which has existed throughout the long history of the university and will certainly continue to exist as long as these remarkable social institutions survive. But the particular realization of the fundamental roles of knowledge creation, preservation, transmission, and

application will continue to change in profound ways, as they have so often in the past.

Other Possible Paradigms

These paradigms have only scratched the surface of the possibilities for future visions of the university. There are many other possible futures. For example, there are currently over 3,400 institutions of higher education in America, with many thousand more around the world. As the resource limitations and competitive pressures intensify, one might anticipate the same dynamics of mergers, acquisitions, and alliances that have characterized other industries. Further, it is likely that alliances between universities and other "knowledge-based" organizations such as national or industrial laboratories, research institutes, and museums may occur.

11. The Michigan Model



Who will determine the new paradigm for the research university in America? Who will provide the leadership? Why not the University of Michigan? After all, in a very real sense, it was our University that developed the paradigm of the public university capable of responding to the needs of a rapidly changing America of the nineteenth century, a paradigm that still dominates higher education today. In a sense, we have been throughout our history the flagship of public higher education in America. Today finds Michigan once again in an excellent position to assume a role of leadership in higher education, to develop a new model of what the research university must become to serve twenty-first-century America.

The University of Michigan has a long heritage of leadership in higher education. Although Michigan was not the first of the state universities, it was the first to free itself of sectarian control and become a true public institution, governed by the people of the state. So too, the act establishing Michigan in 1837 was regarded as the most advanced and effective plan for a state university, a model for all the state institutions of higher learning which were established subsequently. From its founding, Michigan was identified with the most progressive forces in American higher education. It was among the first to blend the classic curriculum with the German approach that stressed faculty involvement in research and dedication to the preparation of future scholars. It was the first university in the west to pioneer in professional education, establishing the Medical School in 1850, the Law School in 1859, and engineering courses in 1854. The University was among the first to introduce instruction in zoology and botany, modern languages, modern history, American literature, pharmacy, dentistry, speech, journalism, teacher education, forestry, bacteriology, naval architecture, aeronautical engineering, computer engineering, nuclear engineering, and molecular medicine.

Beyond tradition, however, there are other characteristics of our University today that position us well for the role of leadership. We continue to have a reputation as the flagship of public higher education. We are the prototype of the large, comprehensive, public research university, with a serious commitment to scholarship. We are distinguished by unusual breadth, a rich

diversity of academic disciplines, professional schools, social and cultural activities, and intellectual pluralism. We have benefited from an unusual degree of participation by our faculty and students in University decisions. Indeed, throughout its history, Michigan has long been known for a spirit of democracy and tolerance among its students and faculty. Over a century ago *Harper's Weekly* noted that "the most striking feature of the University of Michigan is the broad and liberal spirit in which it does its work."

We are characterized by a faculty of great intellectual strength and unusual breadth. Our student body has a quality unsurpassed by any public institution in American. And, of course, there is that marvelous army of Maize and Blue alumni, over 400,000 strong, one of every thousand Americans, who nourish a deep commitment to this institution.

While it is true that state support has not been strong in recent years, we nevertheless benefit from an unusually broad and balanced base of support from both public and private sectors. And, of course, we must never underestimate the importance of the fact that the University was created by the state constitution itself, which establishes our Board of Regents as a coordinate branch of state government, with authority over the University exceeding that of the legislature, governor, and judiciary. In a sense, we are almost unique among public universities in having the ability to control our own destiny.

It is this rich set of characteristics that could position the University to once again assume the leadership role it played in the nineteenth century by developing a new model for higher education appropriate for the needs of our state and our nation in the twenty-first century.

So how might we approach task of developing a distinct model for the University of Michigan of the twenty-first century? One approach would be to examine the various themes and objectives that have been suggested in years past. For example, our fund-raising campaigns have touted Michigan's "heritage of leadership." In the earlier 1980s, we adopted the down-sizing slogan of becoming "smaller but better." We have long striven to be "the best public university in America"--although many argue we should elevate our sights to becoming "the best university in America" . . . period!

Yet, perhaps it is more appropriate to build a new model of the University based on descriptors which convey both our most cherished values and our hopes for the future. For example, we might embrace the following shared values:

- Excellence
- Leadership
- Critical and rational inquiry
- Liberal learning

- Diversity
- Caring and concern
- Community
- Excitement

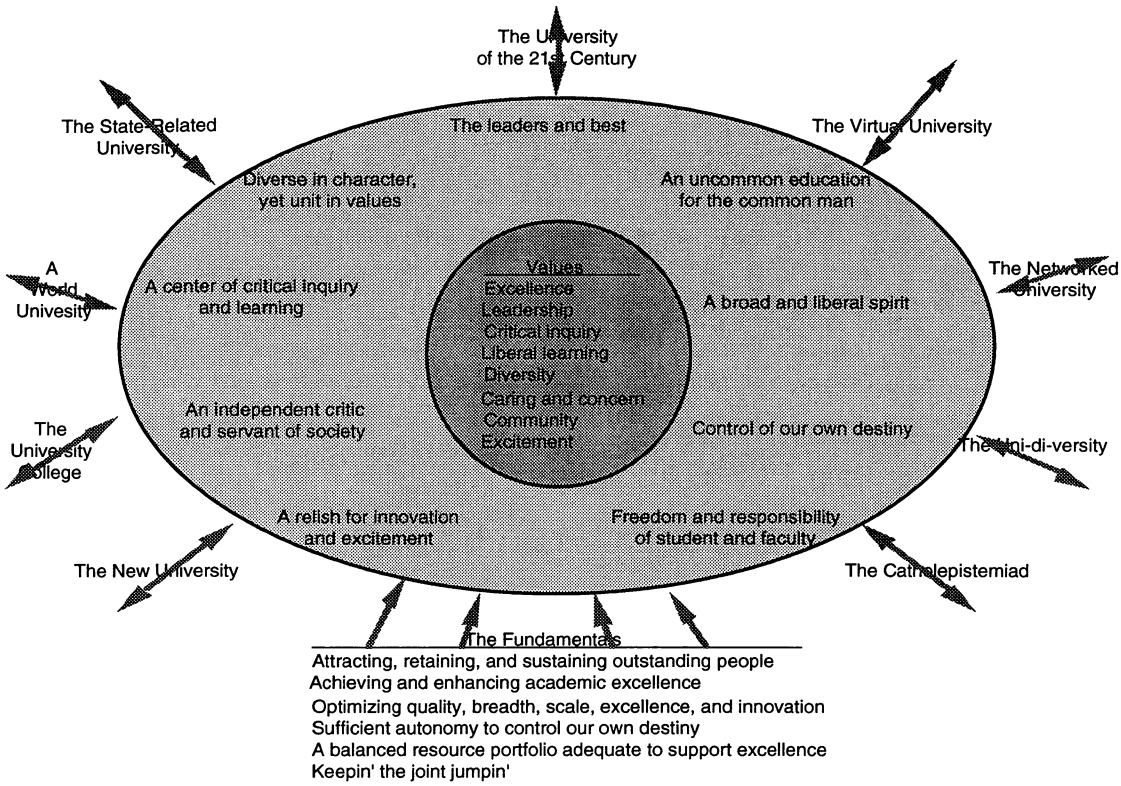
Beyond this, we might also choose from among the many past descriptors of the characteristics of the University, those which seem most important to preserve for the future:

- "The leaders and best . . . "
- "An uncommon education for the common man (person) . . . "
- "A broad and liberal spirit . . . "
- "Diverse, yet united in a commitment to academic excellence and public service . . . "
- "A center of critical inquiry and learning . . . "
- "An independent critic and servant of society . . . "
- "A relish for innovation and excitement . . . "
- "Freedom with responsibility for students and faculty . . . "
- "Control of our own destiny comparable to private universities..."

Undergirding these values and characteristics are descriptors that characterize "the fundamentals," those actions and goals we must continue to give high priority to achieve our vision:

- Attracting, retaining, and sustaining the most outstanding people (students, faculty, staff)
- Achieving, enhancing, and sustaining academic excellence in teaching and scholarship
- Optimizing the balance among quality, breadth, scale, excellence, and innovation
- Sufficient autonomy to control our own destiny
- A diversified resource portfolio, providing a stable flow of resources necessary for leadership and excellence regardless of the ebb and blow in particular areas (state, federal, private giving,...)
- Keepin' the joint jumpin"!

We can put together these descriptors to develop the core of a possible design of the University of Michigan for the century ahead:



Notice that we have arranged around this core of values and characteristics a number of the specific paradigms discussed in the previous section. As we noted earlier, while none of these would be appropriate alone to describe the University as it enters its third century, all are likely components of our institution, as seen by various constituents. For example, we are already well down the road to becoming a **state-related universit**y with state support declining to roughly 10 percent of our resource base. It is highly unlikely that it will ever recover to its previous levels in light of the limited capacity and will of our state.

So too, we are already well along in our efforts to transform Michigan into a **diverse university**, a university committed to building and sustaining a diverse learning community. Through major strategic efforts such as the Michigan Mandate and the Michigan Women's Agenda, we are becoming an institution more reflective of the rich diversity of our society. Further, we are learning how to weave together the dual objectives of diversity and unity in a way that strengthens our fundamental goal of academic excellence to better serve our state, our nation, and the world.

While some research universities may well decide to focus on advanced education and scholarship and leave general education to others, the University of Michigan should not only retain but greatly intensify its commitment to undergraduate education. The **university college** concept, whether as a formal self-standing entity or a virtual structure, seems the most appropriate paradigm for the general education of lower-division students in a vast research university

with an unusually broad array of disciplinary and professional majors. So too, several conditions point in the direction of a University College: the increasing need to broaden undergraduate education, to make it the responsibility of the entire University, and to dramatically change our pedagogical approaches so that we respond both to the changing learning styles of our students and to the rapidly expanding knowledge base. Our plan to construct a new Gateway Campus for undergraduate education will be key to this effort. This complex of new facilities, to be funded both through the Campaign for Michigan and through student fees (or state appropriation), will not only contain the key learning spaces for undergraduate education, but it will be linked as well to our key museums (Art, Kelsey, Anthropology, Natural History) and performing arts centers (Power, Hill, Mendelssohn), thereby providing our undergraduates with a gateway to the knowledge of mankind.

Somewhat more controversial is the concept of the University of Michigan as a **world university**. Yet what could be more natural? Both our heritage as the flagship of public higher education and our location in the heartland of the nation provide us with an unusual claim on being the most "American" of universities. And over the past century, we have led the way both in opening up doors of opportunity to students from abroad and in developing outstanding programs in international studies. Further, we have strong relationships with most of the leading universities around the world. But there is another important reason for seriously considering shifting our focus to the world level: our leadership role in the development and implementation of the technology with the potential to make worldwide access possible.

Michigan is already well down the road toward becoming a **cyberspace university** through its management of NSFnet, the United States component of the Internet and the backbone of the National Research and Education Network. The University of Michigan's Ann Arbor campus has probably the most robust computing environment of any university in the world, and this environment--our students, faculty, and staff--are already linked to the world through our computer networks. Like many others, I believe that computer-communications technology will have a profound impact on the nature of teaching, scholarship, and service; and I believe Michigan is already in the vanguard of those knowledge-based institutions rapidly evolving to take advantage of this extraordinary resource.

This technology will likely make possible yet another vision of the University, the **Catholespistemiad**, in which we assume more direct responsibility for lifetime education. While I do not believe that the University should get into the business of managing K-12 systems, I do believe that we have both a public responsibility and a vested interest to be far more involved with primary and secondary education. We can certainly focus the vast resources of the University in a way that will better enable our public schools to meet their many challenges, particularly in the State of Michigan. But beyond that, I believe

we must build a new relationship with our students and our graduates that will amount to a commitment to provide them with education through their lives. Using an array of devices ranging from short courses to distributed educational sites to computer networks, we should develop programs capable of delivering educational services to our graduates whenever they need it. In a sense, our alumni should always remain part of our organization chart, just as they are always part of the Michigan family.

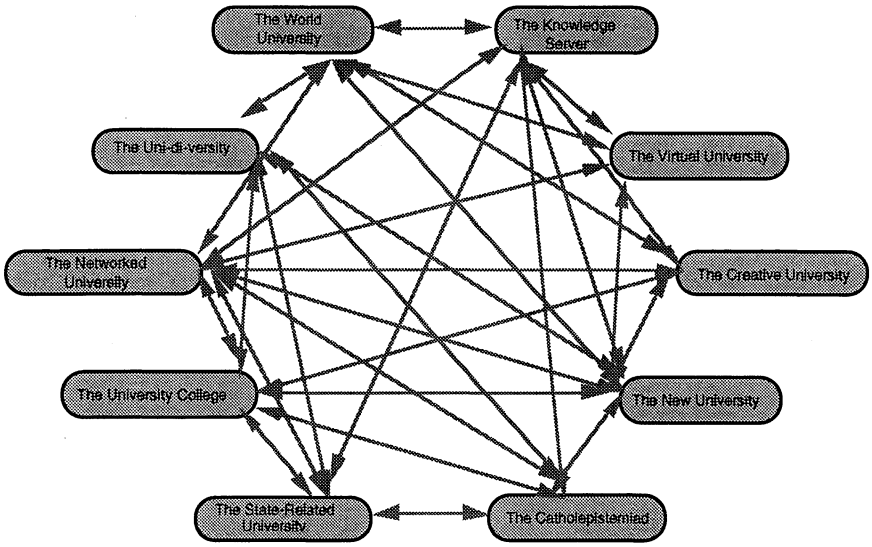
One of the most difficult tasks will be to move toward the paradigm of a **divisionless university**, an institution in which students and faculty are not constrained by disciplinary boundaries. Yet this change in the intellectual character of the University is one of most important goals before us, since it is increasingly clear that knowledge, education, and scholarship simply cannot be organized or constrained by disciplinary lines. Of course, the University has long been known for strong interdisciplinary programs including the Institute for Social Research, the Howard Hughes Medical Research Institute, the Institute for Humanities, the Rackham School of Graduate Studies itself, and literally hundreds of other institutes, centers, programs, seminars, and other informal groups. But far more must be done if we are to break the deification of the disciplines and allow our students and faculty the necessary freedom to keep pace with intellectual change. We must resist over-specialization in our degree programs, at the undergraduate, professional, and graduate levels. We should allow our best faculty to become professors-at-large in the University, with the freedom to teach and conduct scholarship wherever they wish. We should allow interdisciplinary groups to form easily--but also insist that when they have outlived their usefulness, they may be easily abandoned. And we should develop a pool of resources, "venture capital" if you will, that we can use to stimulate new interdisciplinary efforts.

The University is also well-positioned to develop the vision of the **creative university**. Interestingly enough, the four schools whose intellectual nature place most stress on creativity--Music, Art, Architecture, and Engineering--are located together on the University's North Campus. Over the past several years the deans and faculties of these schools have been engaged in an exciting dialogue to better integrate their teaching and research efforts, to learn from one another how to better understand and teach the process of creation. One of the most important resources for this effort will be a new North Campus facility, now under construction, that will bring together these schools in a "Media Union," that will contain libraries, classrooms, computer clusters, design spaces, and performance studios. The faculties of these schools even suggest that we should rename the North Campus as the "Renaissance Campus" to reflect this new focus on the process of creativity!

It is important to consider the more abstract concept of the university suggested by the **knowledge server** paradigm. The different manifestations of the basic functions of creating, preserving, transmitting, and applying

knowledge through the social institution of the university over the centuries is ample evidence that such evolution can be expected to continue.

Clearly, these visions of the University, these paradigm shifts, raise many questions which can only be answered through experience. Further, there will be numerous linkages among them:



Paradigm Linkages

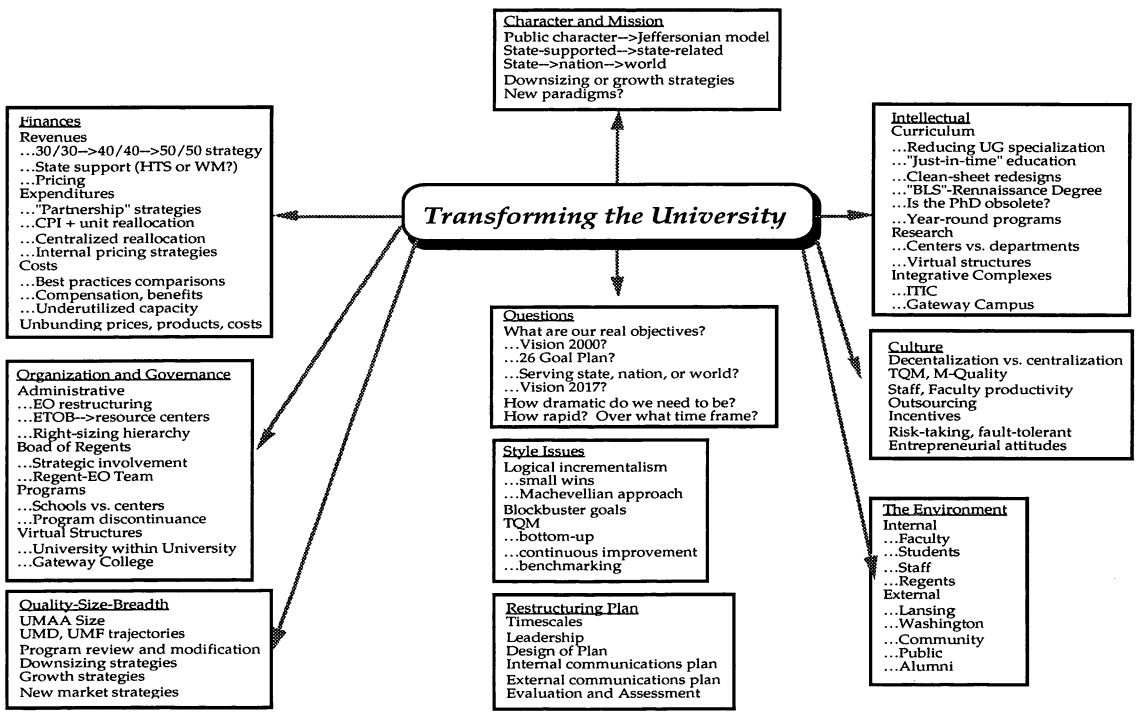
For that reason, among the various visions I have proposed, the "university within a university" or the **new university** is among the most important, since it can provide a laboratory for developing the other visions. In our earlier discussion of the "new university," we have noted how it might be organized along highly nondisciplinary lines, perhaps even integrating together various degree programs. It might also be used to test various schemes to better link alumni to the University or to develop international experiences for our students. In such an academic unit, we would hope to build a risk-tolerant culture in which students and faculty are strongly encouraged to "go for it," in which failure is accepted as part of the learning process associated with ambitious goals rather than poor performance. And, the new university should be characterized by a level of excitement and adventure that will propagate to the University at large.

12. Transforming the University

Each of these visions of the University of Michigan, circa 2017, will require great change. But, just as it has so many times in the past, it is clear that the University must continue to change and evolve if it is to achieve and sustain a position of leadership in the century ahead. Hence, it is appropriate to make a few remarks about the process of institutional change as it applies to our university.

Of course, such institutional change has become commonplace in the private sector, where companies frequently must "restructure" themselves to respond to rapidly changing markets. While such "restructuring," "repositioning," or "re-engineering" is sometimes associated with downsizing--or "rightsizing"--in reality, it involves an intense process to rethink the values, mission, and goals of an organization and then to take steps to align these with the needs and desires of those it serves.

But, of course, herein lies one of the great challenges to universities, since our various missions, our diverse array of constituencies, give us a complexity far beyond that encountered in business or government. As a result, the process of institutional transformation is necessarily more complex as suggested by the diagram below:



Of course, many elements of this transformation process are well underway. Indeed, the positioning strategy of Vision 2000, the "26 goal" plan,

spans many of the tasks necessary to transform the University, and we are well down the road in achieving many of these goals.

But the most important and difficult part of any transformation process involves the culture of the institution. And it is here that we must focus much of our attention in the years ahead. We seek both to affirm and intensify Michigan's commitment to academic excellence and leadership. We seek to build more of a sense of community, of pride in and commitment to the University. And, of course, we also seek to create more of a sense of excitement and adventure among students, faculty, and staff.

The capacity for intellectual change and renewal has become increasingly important to us as individuals and to our institutions. Our challenge, as an institution, and as a faculty, is to work together to provide an environment in which such change is regarded not as threatening but rather as an exhilarating opportunity to conduct teaching and scholarship of even higher quality and impact on our society.

13. Concerns and Questions

Despite the fact that we have made considerable progress toward the Vision 2000 positioning goal, there are still many concerns and questions about the process and the planning environment:

State Support: A Doomsday Scenario?

We have assumed a continued but gradual decline in real state support through the 1990s. However, the State of Michigan's capacity to support higher education could deteriorate far more rapidly that we have assumed. For example, the recent elimination of the property tax for the support of K-12 public education could cause a crisis in Michigan's tax system with catastrophic consequences for those areas supported in part by state tax dollars such as higher education. So too, a more rapid decline of the automobile industry in Michigan or further cost shifting from the federal government in areas such as Medicaid could accelerate the decline in state support.

Faculty Support . . . or Resistance?

The increasing specialization of faculty and their disciplinary fragmentation makes it difficult to build grassroots support for major institutional change. We have seen recent evidence of the sensitivity of faculty governance to special interest issues (e.g., the ability of a few faculty with narrow agendas to manipulate faculty governance). We have also seen strong faculty resistance to changes at the local level.

We should recall that strong faculty resistance blocked a number of important actions proposed in the "smaller but better" strategy of the early 1980s. Will similar faculty resistance constrain the University's efforts to move ahead toward Vision 2000? How can we design an internal communications strategy and a process of engagement to help faculty view change as empowering rather than threatening?

External Public Perceptions

External public perceptions at the state level and their consequent political implications could seriously constrain our strategic efforts. For example, there seems little understanding at the grassroots level of the importance of the University of Michigan and its impact on the state. Further, there is growing hostility toward the independence of the University, fueled in part by public concerns about the costs of education and the rise of populist (anti-intellectual) attitudes. And, of course, there is remarkably little public awareness of either the true costs and value of a quality college education or of the serious erosion in state support of this activity.

So too, public perceptions at the national level could have major implications. Both the national media and Congress have continued their attacks on higher education in recent months, and it is unlikely that there will be a positive change in attitudes in the near future.

The Dangers of Falling Into a Reactive Mode

The keys to our strategy for the 1990s can be captured in the words **consistency, persistence**, and **focus**. It is essential that we keep our eyes focused on the key goals and actions. Yet, the University is an extraordinarily complex institution; and much of the time, energy, and effort of its leadership is frequently directed to handling an array of "hot spots" that flare up from time to time. Included in these are student activism; political controversy at the local, state, or national level; intercollegiate athletics; community relations; and many other issues that require immediate, effective attention and action. Unfortunately, many of these issues tend to be quite unpredictable. They bubble up out of the extraordinary complexity and size of the University and as a result of its diverse range of interactions with a wide range of constituencies.

Are there any steps we could take to get a better handle on such matters, to achieve greater control of the agenda? The standard approaches involve greater centralized knowledge of activities throughout the institution, more central authority, and a greater insistence on accountability at the unit level. Yet such efforts run counter to the University culture. Greater centralized knowledge and control require more bureaucracy. Insistence on greater accountability may inhibit risk-taking and innovation and could make it difficult to attract our most creative people into key leadership positions.

Management Issues

The ever-broadening mission of the University, along with its increasingly complex and interwoven array of constituencies, suggests that we need to rethink how we manage the institution. In the past we have taken great pride in lean management, relying heavily on academic--and inexperienced--leadership.

But, in reality, the University of Michigan today is a $2.3 billion enterprise--a Fortune 500 company--yet, in fact, far more complex than any private corporation. Furthermore, for the past decade the University has grown at over a 10 percent per year compound rate, and it will almost certainly pass the $4 billion level by the year 2000, regardless of the level of state support. Indeed, since the "knowledge business" is a growth industry, the University may grow even more rapidly in the years ahead.

Hence we really need to think more carefully and expansively about the management of the University. For example, do we need to intensify our efforts to ensure greater accountability across the University with additional audit

operations, tracking, management information systems? Do we need to recruit a more experienced management team to handle the complexities of the UM, Inc.? Do we need to provide more formal training for all faculty moving into key management positions (department chairs, directors, deans), e.g., through the Executive Education program in the School of Business Administration?

The "C" Concerns

The concerns commonly mentioned on most college campuses these days include:

. . . morale, malaise, separatism, intellectual fragmentation
. . . behavior (substance abuse, crime, racism, vandalism)
. . . special interest agendas
. . . "What's in it for me? or "What have you done for me lately?"
. . . students vs. faculty vs. staff vs. administration vs. Regents

Part of the problem is that the modern "multiversity," highly fragmented by academic discipline and increasingly devoid of faculty loyalty, has moved away from the important "C" words--words such as community, communication, comity, collegiality, collaboration, cooperation, coherence, and concern. These are the "glue" values that bind together complex institutions, and these are the characteristics that we sometimes fail to appreciate or to stress.

Beyond that, one also finds a remarkable lack of

. . . pride in . . .
. . . respect for . . .
. . . excitement about . . .
. . . and loyalty to . . .
the University of Michigan

on the part of students, faculty, and staff--although it is certainly present among our alumni and friends. Somehow we have to re-establish such a commitment to the institution.

14. Concluding Remarks

The pace of change today is so great, and our vision of the future is so hazy, that some suggest we should settle for the positioning strategy represented by Vision 2000 and not attempt to venture further. With this more restricted strategy, the University would take the steps during the 1990s necessary to preserve its options, to create flexibility, to develop the capacity to adapt to and control change, and to open up opportunities. In a sense, by climbing to the top of the peak of higher education, the University would then position itself to see farther into the future, to better understand the alternatives before higher education, and better position itself to pursue them. The Vision 2000 strategy would then be clearly identified as an effort to position the University of Michigan for a changing world (. . . universe . . .) in a way that would assume a far more organic, evolutionary view of our goals and the institution itself.

But such a laissez-faire approach to the future is not the Michigan style. Rather, the University has tended to flourish when it has been enlivened--indeed, emboldened--by an exciting, compelling, and challenging vision of the future. Hence, while acknowledging the difficulties and the risks inherent in very long-range planning exercises, we nevertheless believe it important to engage the University and its various constituencies in a dialog about the future of higher education and the University of Michigan as it approaches its third century.

This essay is intended to launch this effort by identifying the key issues and proposing some themes for further discussion by the University community. It is a document intended to invite comments, criticism, and involvement. Further, the proposed Vision 2017 should be regarded as a work in progress, an organic vision of the future of the University that will evolve substantially as broader elements of the University community become engaged in its development. The development and articulation of a *Vision 2017* is a fitting exercise for an institution aspiring to become "the leader and best" . . . .

Acknowledgment: This paper attempts to capture both the substance and the spirit of University strategic planning efforts which have been underway for the past several years. These activities have involved hundreds of faculty members across the University, from senior scholars to junior faculty, from deans and chairs to executive officers, working in an array of formal and ad hoc groups. Since this planning process is organic and evolutionary in nature--in the spirit of logical incrementalism--it will continue to broaden and hence change more and more members of the University become involved in it. While I accept full responsibility for this particular status report on the effort, I also acknowledge that most of the ideas and creativity contained in report can be attributed to others. It is therefore appropriate to express my gratitude for their involvement and their wisdom.