

## The University of Michigan, circa 1995

The University of Michigan today is better, stronger, more diverse, and more exciting than at any time recent memory. National rankings of the University's academic programs are the highest since these evaluations began several decades ago. The recent rise of the University to national leadership in important characteristics such as the volume of its research activity, the financial success of its Medical Center, the success of its affirmative action programs, and its financial strength (as measured by Wall Street) are additional evidence of its remarkable progress. Indeed, one could argue that the University of Michigan today is not only the leading public university in America, but that it is challenged by only a handful of distinguished private universities in the quality, breadth, capacity, and impact of its many programs and activities.

This progress has been all the more remarkable in light of the sharp deterioration in state support which has occurred in recent years. More specifically, over the past decade state support has declined in real terms by 23 percent. This continues a three-decade trend which has seen state appropriations drop from 70 percent of the University's operating budget in the 1960s to 11 percent in FY94-95. Yet the University has managed to not only maintain but enhance its quality and capacity to serve through a three-tiered strategy:

- i) effective cost containment,
- ii) wise management of resources, and
- iii) aggressive development of alternative revenue sources.

More specifically, the administrative costs of the University now rank among the lowest of our public and private peers. The implementation of sophisticated, effective programs for managing the assets of the University has resulted in four-fold growth in its endowment to over \$1.3 billion. Further, the loss in state support has been compensated, to some degree, by growth in revenue from

tuition and fees, sponsored research grants, private gifts, income on endowment, and auxiliary activities such as hospitals, housing, and continuing education. Particularly important in this effort was the launch of the ongoing Campaign of Michigan, now at 90 percent of its \$1 billion goal.

There are many signs of the vitality and excitement of the University today. The Michigan Mandate has resulted in a far more diverse campus, increasing the number of students and faculty from underrepresented minorities by more than 70 percent over the past seven years. Indeed, representation of students of color will comprise over 25 percent of the University's enrollment this fall, with each underrepresented ethnic group now represented at all degree levels, in all academic programs, at the highest levels in the University's history. So too, there has been significant progress on a number of fronts for women students, faculty, and staff through the recently launched Michigan Agenda for Women, including a number of women senior faculty and administrative appointments, campus safety, and dependent care.

Despite the necessity of rising tuition in the wake of deteriorating state support, we have been able to maintain effective financial aid programs that have preserved access to the University by students from all economic backgrounds. This is demonstrated by the high admissions yields in lower income groups and rising student retention rates, now the highest among all public universities. Finally, after a slight flattening during the early 1990s due to the demographic decline in the number of high school graduates, the number of applications, yield rates, and student quality are on the rise again.

In recent years, we have made major progress toward rebuilding the physical infrastructure of the University, with almost \$1 billion of construction and renovation projects completed or underway, including completion of the North Campus, the Medical

Campus, most of the Central Campus, and the South Campus area. The University has also acquired important new sites for further expansion such as East Medical Campus.

This same excitement has been reflected in the auxiliary units of the University. The University of Michigan Medical Center is widely recognized as the leading academic health centers in the nation. Continuing education programs such as the School of Business Administration's Executive Management Education programs are generally ranked as world leaders. And Michigan Athletics continue to be regarded as a national leader in the success, integrity, and visibility of its programs.

This progress has not been serendipitous. Rather it has resulted from the efforts of a great many people following a carefully designed and executed strategy. To illustrate, it is instructive to consider the highest priorities of this effort over the past several years.

### The Challenge of Change

We can all take great pride in what the Michigan family--Regents, faculty, students, staff, alumni, and friends--has accomplished during these stressful times. Working together, we have indeed built the finest public university in America--perhaps the finest in the world. But we have built a university for the twentieth century, and that century is rapidly coming to an end. The university that we have built, the paradigms in which we have so excelled, may no longer be relevant to a rapidly changing world.

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

Many believe that we are going through a period of change in our civilization as profound as that which occurred during 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! The 1990s are viewed as the countdown toward a new millennium; we find ourselves swept toward a new century by these incredible forces of change. However, 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.

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*,<sup>1</sup> 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,

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<sup>1</sup>Jacques Attali, *Millennium*

since it will prepare the way for a revolutionary leap into a new age that will profoundly transform human culture.

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.

These rapidly evolving technologies are dramatically changing the way we collect, manipulate, and transmit information. Needless to say, the implications for our society and its institutions are profound.

### The Challenges Before Higher Education

We also face a particular dilemma. The pace and nature of the changes occurring in our world have become so rapid and profound that our social institutions--in government, education, and the private sector--are having difficulty even sensing the changes (although they certainly feel the consequences), much less understanding them sufficiently to respond and adapt. Our institutions, including universities and government agencies, which have been the traditional structures for intellectual pursuits, may soon be as obsolete and irrelevant to our future as the American corporation of the 1950s. We need to explore new structures that are

capable of sensing and understanding the change, and that can engage in the strategic processes necessary to adapt or control it.

As one of civilization's most enduring institutions, the university has been extraordinary in its capacity to change and adapt to serve society. The university has changed considerably over time and continues to evolve. A simple glance at the remarkable diversity of institutions comprising higher education in America demonstrates this evolution.

The challenges and changes facing higher education in the 1990s are comparable in significance to two other periods of great change for American higher education: the period in the late nineteenth century, when the comprehensive public university first appeared, and the years following World War II, when the research university evolved to serve the needs of postwar America. Many are concerned about the rapidly increasing costs of quality education and research during a period of limited resources, the erosion of public trust and confidence in higher education, and the deterioration in the partnership between the research university and the federal government. However, 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; and the degree to which knowledge itself has become the key driving force in determining economic prosperity, national security, and social well-being.

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, integrating, transmitting, and applying* knowledge. From this more abstract viewpoint, it is clear that while these fundamental roles of the university do 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 "digital" 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 twentieth-first century university will be asked to set aside their roles as teachers and instead 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. Indeed, is the concept of the disciplinary 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"? Who needs such specialists when intelligent software agents will soon be available to roam far and wide through robust networks containing the knowledge of the world, instantly and effortlessly extracting whatever a person wishes to know?

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 expects 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).

This abstract definition of the roles of the university have 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, integration, transmission, and application will continue to change in profound ways, as they have so often in the past. And hence, the challenge of change, of transformation, is, in part, a necessity simply to sustain our traditional roles in society.

There is an increasing sense among leaders of American higher education and on the part of our various constituencies that the 1990s will represent a period of significant change on the part of our universities if we are to respond to the challenges, opportunities, and responsibilities before us. A key element will be efforts to provide universities with the capacity to transform themselves into entirely new paradigms that are better able to serve a rapidly changing society and a profoundly changed world.

If American higher education is to respond to the challenges, opportunities, and responsibilities before us, universities must

develop the capacity to transform themselves into entirely new paradigms that can serve a rapidly changing society and a changed world.

We must unshackle the constraints that prevent our institutions from responding to the needs of a rapidly changing society, remove unnecessary processes and administrative structures, question existing premises and arrangements, and challenge, excite, and embolden members of our university communities to embark on this great adventure. Our challenge is to provide an environment in which such change is regarded not as threatening but rather as an exhilarating opportunity to engage in learning, in all its many forms, to better serve our world.