

The Future of the University in an Era of Change

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This past Sunday one of my colleagues forwarded to our deans the following quote from an interview with Peter Drucker that appeared in this week's *Forbes* magazine:

Thirty years from now the big university campuses will be relics.
Universities won't survive. It's as large a change as when we first got the printed book.

Peter Drucker, *Forbes*, 3/10/97

Needless to say, this quote stimulated a great deal of E-mail traffic among our deans. Some responded by blasting Drucker. Others were simply moot. A few noted that a former president of the University of Michigan would probably agree with Drucker

Several years ago, I conducted an informal survey of attitudes toward change in higher education. I asked several groups to quantify the degree of change they believed the university would undergo during the 1990s, using a scale of 0 to 10—with 0 representing no change, the *status quo*, and 10 representing radical change, a total reinvention of the university.

Most faculty tended to suggest relatively modest change, in the range of 3 to 4 on the 10-point scale. Most academic administrators—deans, provosts, and the like—believed there would be more radical change, on the order of 7 to 8 on the 10-point scale.

During one of our annual Association of American Universities (AAU) meetings, I asked a number of presidents of major research universities this same question. Most of them responded that, on a scale of 0 to 10, the magnitude of the changes would be about 20! Incidentally, that is also my own estimate of the amount of change the American university will experience in the decade ahead: 20, on a 10-point scale.

Actually, this should be neither alarming or surprising. As one of civilization's most enduring institutions, the university has been quite extraordinary in its capacity to change and adapt to serve society. Far from being immutable, the university has changed quite considerably over time, and continues to do so today. Even in our nation, the remarkable diversity of institutions of higher education, ranging from small liberal arts colleges to gigantic university systems, from storefront proprietary colleges to global "cyberspace" universities, all demonstrating the evolution of the species.

Many established institutions are responding to the challenges and opportunities presented by a changing world. They are evolving to serve a new age. But, beyond evolutionary change, there are many who believe that both the dramatic nature and compressed time scales characterizing the changes of our times will drive not evolution but revolution. To be sure, many colleges and universities will remain much as they are today. But many others will transform themselves—or be transformed—into quite different types of institutions. And

some entirely new institutional forms will likely appear to challenge both our experience and concept of the university.

The major paradigm shifts that will likely characterize higher education in the years ahead will require a more strategic approach to institutional change than has characterized the evolution of the university in years past. This challenge of change to higher education provides a remarkable opportunity to schools of planning on our campuses. For these schools have long traditions and great expertise in a disciplined approach to planning and transformation in social institutions. They can and should play important roles as their host institutions grapple with the powerful forces of change characterizing our times.

Forces of Change

We are living in the most remarkable of times. Just consider, for a moment, some of the changes which have occurred in our world just within the past few years:

- The Cold War has ended, and Communism has been rejected around the world, swept away by the winds of freedom and democracy.
- The Soviet Union has collapsed into chaos, torn apart by the forces of freedom, nationalism, and ethnic tensions.
- Asia is emerging as an powerful economic force, with Japan and China now ranked as the second and third largest economies in the world.
- 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—witness the recent cloning of mammals
- Computing power—speed, memory, communication rates—has increased by a factor of 1000 over the past five years, with world-wide networks connecting hundreds of millions of people, enabling them to communicate with one another with ease and sophistication.
- The computer and television are merging in a so-called “digital convergence,” triggering a similar merger of the telecommunications companies and the entertainment industry to create a new multimedia communications medium. Indeed, sales volume of computer games now exceeds those of the motion picture industry.

Yet, the changes we have seen thus far are just the tip of the iceberg.

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.

The signs are all about us. Today, we are evolving rapidly to a post-industrial, knowledge-based society, just as a century ago our agrarian society evolved through the Industrial Revolution. 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. Our society is becoming ever more knowledge-intensive and ever more dependent upon educated people and their ideas.

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. In this country, there will soon be more people over the age of sixty-five than teenagers, and the situation is certain to continue for the remainder of our lives.

But there is a certain irony here. For while America and much of Europe are aging, the rest of the world is becoming ever younger. In fact, by the turn of the century, there will be over two billion teenagers—fifty times the number in the United States during the peak of the baby boom. All of these future teenagers are already born, and most live in Asia and Latin America. Add to this youth-dominated world the capacity for cheap, global communication, and you can just imagine the scenario. Within a decade, hundreds of millions—if not billions—of young people will be linked together by the ubiquitous information technology rapidly appearing throughout the world. A glance at early forms of the popular culture arising from such “wired communities” of young people—MTV or *Wired* magazine—provides ample evidence that their future is certainly *not* our present.

Perhaps even more profound than the changing age demographics of our society is its increasing diversity by race, ethnicity, and nationality. More specifically, 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. By the year 2000, roughly 50 percent of school children will be Hispanic or Black. In the second half of the 21st century, Hispanics are likely to become the largest ethnic group in America. Those groups which 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 are rapidly assuming their rightful role as leaders of our society.

The growing pluralism of our society is 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. As both a reflection and leader of society-at-large, universities have a special challenge and responsibility to develop effective models of multicultural, pluralistic communities for our nation. We must strive to achieve new levels of understanding, tolerance, and mutual fulfillment for peoples of diverse racial and cultural backgrounds.

The Internationalization of America

Whether through travel and communication; the arts and culture; or 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. Our economy, our companies are truly international—spanning the globe and intensely interdependent with other nations and other peoples.

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. 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.

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

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 Challenge of Change

Earlier this year, I had the privilege of co-chairing with Governor Richard Celeste a national meeting hosted by the National Academy of Sciences and the National Science Board, concerned with the nature of the stresses on research and education in American higher education.

This effort was stimulated several years earlier by the observation of Roland Schmitt, then chair of the National Science Board, that despite the relatively generous federal funding of academic research during the 1980s, faculty morale on our campuses appeared to be at an all-time low. A series of informal workshops hosted by the NSB revealed the usual litany of concerns:

- Fears about the future funding of research
- The stresses of grantsmanship
- The loss of a sense of scholarly community with increasing specialization
- The imbalance between the rewards for research vs. teaching
- And a host of technical issues, such as indirect costs, facilities support, government reporting and accountability requirements, and so on

To explore this in more detail, we asked the NAS Government-University-Industry-Research Roundtable to sponsor dozens of town hall meetings for faculty and academic administrators on university campuses across the nation. Representatives of each of these universities then were invited to a meeting in Washington to discuss their findings with representatives of the federal government, including the White House science advisor, the heads of a number of key federal agencies, and the leaders of the national academies.

From these meetings, it has become clear that the stresses were driven by an array of more fundamental forces, all of which could be captured in a single word: *change*. Rapid and profound change is occurring in our world, our society, and consequently in our social institutions. And our universities are feeling the stresses of these forces of change.

There are many ways to group the challenges of change in higher education. For our purposes today, let me suggest the following framework:

A political-economic crisis: All universities are suffering the consequences of the structural flaws of national and state economies, the growing imbalance between revenues and expenditures, that are undermining support for essential social institutions as governments struggle to meet short-term demands at the expense of long-term investment. Beyond this, there is a growing sense that the traditional public principle—that education is a public good that benefits all of society and hence should be supported by society-at-large—is shifting to a view of education as a private good that should be paid for by those benefiting most directly—the students.

Cost shifting among stakeholders: Each of the many stakeholders of the contemporary university—students and parents, state and federal government, business and industry, the public-at-large—wants to minimize the resources it provides to and maximize the services it receives from our institutions. Today few seem to be able to see the university and its diverse missions as a whole. More specifically, each

constituency seems to want much more out than it is willing to put in, thereby leveraging other contributors.

A shift in national priorities—from guns to butter: 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. As concerns about national security have ebbed in the wake of the geopolitical restructuring of recent years, 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.

A change from partnership to procurement: In recent years the basic principles of the extraordinarily productive partnership between the federal government and America's universities in support of research and advanced training has begun to unravel, so much so that today this relationship is rapidly changing from a partnership to a procurement process. Scientists and universities are questioning whether they can depend on the stable and solid relationship they had come to trust and that has paid such enormous dividends in the scientific and technological strength of our nation.

A shift in attitudes toward teaching and research: In recent years, there has been a decided shift in public attitudes toward the purpose of a university, away from research and toward undergraduate education. A several decade-long public consensus that universities were expected to create as well as transmit knowledge, a consensus that supported strong investment in the scientific, technological, and scholarly preeminence of this nation, has begun to erode.

Politics: Most of America's colleges and universities have more than once suffered the consequences of ill-thought-out efforts by politicians to influence everything—what subjects can be taught, who is fit to teach, and who should be allowed to study or teach. The special interest politics of our times, with a decidedly slash-and-burn character, are increasingly focusing on higher education. In the past, our universities were buffered from politics both by their governing boards and the media. Today, however, these groups now serve to focus and magnify political attacks on our campuses, rather than shielding us from them.

Deteriorating ability to lead: A recent study by the Association of Governing Boards has concluded that one of our greatest challenges is the weakness of the contemporary university presidency. They found that the authority of university presidents had been undercut by all of their partners—trustees, faculty, and political leaders—and, at times, by the president's own lack of assertiveness and willingness to take risks for change.

Such challenges suggest that the status quo is no longer an option. But, of course, change is no stranger to the university. American higher education has always been characterized by a strong bond with society, a social contract. As society has changed, so too have our institutions changed to continue to serve.

The American university has responded quite effectively to the perceived needs—or opportunities—of American society. A century ago our universities developed professional schools and rapidly transformed themselves to stress applied fields, such as engineering, agriculture, and medicine, favored by the federal land-grant acts. In the post-World War II years, they responded again, expanding to absorb the returning veterans and later the postwar baby boom. They then developed an extraordinary capability in basic research and advanced training in response to the evolving government-university research partnership.

But today we face a somewhat different situation. 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, and 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.

There are even more fundamental forces of change at work here: change in our *roles*, in our *relationships* with society, in the *nature* of our institutions, and in the higher education *enterprise* more broadly. Let me consider each of these in turn.

The Changing Roles of the University

It is common to refer to the primary missions of the university in terms of the honored trinity of teaching, research, and service. But these roles can also be regarded as simply the 20th 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. 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 21st 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 with its collection of written works preserving the knowledge of civilization. Yet today such knowledge exists in many forms—as text, graphics, sound, algorithms, and 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.

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

Changes in the University's Relationship with Society

The modern university interacts with a diverse array of external constituencies—alumni and parents, local communities, state and federal government, business and industry, the media and the public-at-large. All depend on the university in one way or another, just as we depend upon them. The management of the complex relationships between the university and its many constituencies is one of the most important challenges facing higher education.

America's universities touch the lives of a great many people in a great many different ways. Our society has assigned to the research university an increasing number of roles—broadening its research mission and increasing participation of scholars as experts deeply engaged in public affairs and the world of commerce and industry. As a consequence, the contemporary university becomes ever more complex and multi-dimensional. Beyond the classical triad of teaching, research, and service, society has assigned to us an array of other roles: health care, economic development, entertainment (intercollegiate athletics), enabling social mobility and change, sustaining national security, even as we attempt to explore the far reaches of space or the depths of the ocean or the fundamental nature of matter or life itself. Also, today's society is asking us to assume additional roles such as revitalizing K-12 education, securing economic competitiveness, providing models for multicultural society, rebuilding our cities, and preparing the way for internationalization.

Yet, as important as universities are today in our everyday lives, it seems clear that in the future they will play an even more critical role as they become the key players in providing the knowledge resources—knowledge itself and the educated citizens capable of applying it wisely—necessary for our prosperity, security, and social well-being. As Erich Bloch, former Director of the National Science Foundation, stated in Congressional testimony, “The solution of virtually all the problems with which government is concerned: health, education, environment, energy, urban development, international relationships, space, economic competitiveness, and defense and national security, all depend on

creating new knowledge—and, hence, upon the health of America’s research universities.”

If ever there were ivied walls around universities, protecting us against the intrusions of politics or the economy, these walls have long since tumbled down. The environment beyond our campuses is very different today than it was even a decade ago. Today we are neither isolated nor protected. We are very much engaged and exposed in the world. If you doubt it, you have only to read the headlines. Hardly a day passes without some news story on higher education; state budget cuts; college closings; or some legislative committee out to regulate, legislate, or fact-find in areas that were once privileged academic territory.

It is paradoxical that the extraordinarily broad public attention and criticism of the academy comes at a time when the American university is more deeply engaged in society, when it has become a more critical actor affecting our economy, our culture, and our well-being than ever before. But, then again, perhaps it is not so paradoxical that just as the university is becoming a key player in our society, it should come under much closer scrutiny and be subjected to greater accountability.

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 more visible and more vulnerable as institutions. We attract more constituents and support, but we also attract more opponents.

Changes in the Nature of the University

The complex and heterogeneous nature of American society has given rise to a system of higher education of extraordinary diversity. From small colleges to big universities, from religious to secular institutions, from single-sex to coeducational colleges, from vocational schools to liberal arts colleges, from land-grant to urban to national research universities, there is a rich diversity both in the nature and the mission of America's roughly 3,600 accredited colleges of higher education. These factors not only lead to great diversity in the character of institutions appropriate for a highly diverse society—they also lead to a remarkable diversity in how institutions respond to a changing society.

Today, we see signs that this evolution of the species is continuing. “Open universities” based upon distance-learning paradigms have been common throughout the world for decades. The rapid evolution of information technology is making possible a new class of institution, the “virtual university,” an institution without walls—and perhaps even without faculty—capable of providing education anytime, anyplace, at modest cost. As higher education breaks away from the constraints of space and time—and as the needs for

advanced education in a knowledge-driven civilization become more intense—there are already signs that a new class of global universities is forming.

In this discussion I would not be so bold as to suggest a particular form for the university of the 21st Century. Indeed, the great and ever-increasing diversity characterizing higher education in America makes it clear that there will be many forms, many types of institutions serving our society. But let me suggest a number of themes that will likely characterize the higher education enterprise in the years ahead:

- *Lifelong Learning*, requiring both a willingness to continue to learn on the part of our citizens and a commitment to provide opportunities for this lifelong learning by our institutions
- *A Seamless Web*, in which all levels of education not only become interrelated, but blend together
- *Asynchronous* (anytime, anyplace) *Learning*, breaking the constraints of time and space to make learning opportunities more compatible with lifestyles and needs
- *Affordable*, within the resources of all citizens, whether through low cost or societal subsidy
- *Interactive and Collaborative*, appropriate for the digital age, the “plug and play” generation
- *Diversity*, sufficient to serve an increasingly diverse population with diverse needs and goals

Changes in the Higher Education Enterprise

In the past, most colleges and universities served local or regional populations. While there was competition among institutions for students, faculty, and resources—at least in the United States—the extent to which institutions controlled the awarding of degrees, credentialing, led to a tightly controlled competitive market.

Today, universities are facing new competitive forces. As the need for advanced education becomes more intense, some institutions are moving far beyond their traditional geographical areas to compete for students and resources. There are hundreds of colleges and universities that increasingly view themselves as competing in a national or even international marketplace. Even within regions such as local communities, colleges and universities that used to enjoy a geographical monopoly now find that other institutions are establishing beachheads through extension services, distance learning, or even branch campuses. Furthermore, with advances in communications, transportation, and global commerce, several universities in the United States and abroad are increasingly viewing themselves as international institutions, competing in a global marketplace.

In a very real sense, higher education is evolving from a loosely federated system of colleges and universities serving traditional students from local communities

to a *knowledge industry*. Since nations throughout the world recognize the importance of advanced education, this industry is global in extent. With the emergence of new competitive forces and the weakening influence of traditional regulations, it is evolving like other “deregulated” industries, e.g., communications or energy. It is strongly driven by changing technology. And as our society becomes ever more dependent upon new knowledge and educated people, upon “knowledge workers,” the higher education business must be viewed clearly one of the most active “growth industries” of our times.

While many in the academy would undoubtedly view with derision or alarm the depiction of the higher education enterprise as an “industry,” operating in a highly competitive, increasingly deregulated, global marketplace, this is nevertheless an important perspective that will require a new paradigm for how we think about post-secondary education. Furthermore, it is clear that no one, no government, is in control of the knowledge industry. Instead it responds to forces of the marketplace. Universities will have to learn to balance the competitive pressures for the millennium-old model against the new market forces compelling change.

Today comprehensive universities, at least as full-service organizations, are at considerable risk. These institutions have become highly vertically integrated. They provide courses at the undergraduate, graduate, and professional level; support residential colleges; professional schools; lifelong learning; athletics; libraries; museums; athletics; entertainment; and on, and on, and on. Yet today we are already beginning to see the growth of differentiated competitors for many of these activities. Universities are under increasing pressure to spin off or sell off or close down parts of their traditional operations in the face of this new competition.

The most significant impact of a deregulated higher education “industry” will be to break apart this monolith, much as other industries have been broken apart through deregulation. As universities are forced to evolve from “faculty-centered” to “learner-centered,” they may well find it necessary to unbundle their many functions, ranging from admissions and counseling to instruction to certification.

Higher education is one of the few activities which has yet to evolve from the handicraft, one-of-a-kind mode of a cottage industry to the mass production enterprise of the industrial age. In a very real sense, the industrial age has largely passed the university by. Faculty continue to organize and teach their courses much as they have for decades—if not centuries. Each faculty member designs from scratch the courses they teach, whether they be for a dozen or several hundred students. They may use standard textbooks from time to time—although most do not—but their organization, their lectures, their assignments, and their exams are developed for the particular course at the time it is taught. So too our social institutions for learning—schools, colleges, and universities—continue to favor programs and practices based more on past traditions than upon contemporary needs.

Universities—more correctly, faculty—are skilled at creating the content for educational programs. Indeed, we might identify this as their core competency. But they have not traditionally been particularly adept at “packaging” this content for mass audiences. To be sure, many faculty have written best-selling textbooks, but these have been produced and distributed by textbook publishers. In the future of multimedia and Net-distributed educational services, perhaps the university will have to outsource both production and distribution from those most experienced in reaching mass audiences—the entertainment industry.

The perception of the higher education enterprise as a deregulated industry has several other implications. There are over 3,600 colleges and universities in the United States, characterized by a great diversity in size, mission, constituencies, and funding sources. Not only are we likely to see the appearance of new educational entities in the years ahead, but as in other deregulated industries, there could well be a period of fundamental restructuring of the enterprise itself. Some colleges and universities might disappear. Others could merge. Some might actually acquire other institutions.

A case in point: The Big Ten universities (actually there are twelve, including the University of Chicago and Penn State University) have already merged many of their activities, such as their libraries and their federal relations activities. They are exploring ways to allow students at one institution to take courses—or even degree programs—from another institution in the alliance in a transparent and convenient way. Could one imagine the Big Ten universities becoming a university system “of the heartland of America”?

One might also imagine affiliations between comprehensive research universities and liberal arts colleges. This might allow the students enrolling at large research universities to enjoy the intense, highly personal experience of a liberal arts education at a small college while allowing the faculty members at these colleges to participate in the type of research activities only occurring on a large research campus.

Indeed, one might even imagine “hostile takeovers,” in which a Darwinian process emerges such that some institutions devour their competitors. All such events have occurred in deregulated industries in the past, and all are possible in the future we envision for higher education.

Perhaps the most profound question of all concerns the survival of the university—at least as we know it—in the face of the changes, the emergence of new competitors, during our times. While few would agree with Drucker’s prediction, there are many who believe that the new forms of the university may evolve which could be unrecognizable to 20th Century higher education. To illustrate, let me suggest one possible evolutionary path: *the ubiquitous university*.

The Ubiquitous University

In today's world, knowledge has become not only the coin of the realm, determining the wealth of nations, but also the key to one's personal standard of living, the quality of one's life. We might well make the case that today it has become the responsibility of democratic societies to provide their citizens with the education and training they need throughout their lives, whenever, wherever, and however they desire it, at high quality and at a cost they can afford.

Of course, this has been one of the great themes of higher education in America. Each evolutionary wave of higher education has aimed at educating a broader segment of society—the public universities, the land-grant universities, the normal and technical colleges, the community colleges.

For the past half a century, national security was America's most compelling priority, driving major public investments in social institutions such as the research university. Today, however, in the wake of the Cold War and on the brink of the age of knowledge, one could well make the argument that education will replace national defense as the priority of the 21st Century. Perhaps this will become the new social contract that will determine the character of our educational institutions, just as the government-university research partnership did in the latter half of the 20th Century. We might even conjecture that a social contract, based on developing the abilities and talents of our people to their fullest extent could well transform our schools, colleges, and universities into new forms that would rival the research university in importance.

Once again we need a new paradigm for delivering education to even broader segments of our society. Fortunately, today's technology is rapidly breaking the constraints of space and time. It has become clear that most people, in most areas, can learn and learn well using asynchronous learning, that is, "anytime, anyplace, anyone" education. Modern information technology has largely cut us free from the constraints of space and time, and has freed our educational system from these constraints as well. The barriers are no longer cost or technology but rather perception and habit.

Perhaps lifetime education will soon become a reality, making learning available for anyone who wants to learn, at the time and place of their choice, without great personal effort or cost.

But this may not be enough. Instead of asynchronous learning, perhaps we should instead consider a future of "ubiquitous learning"—learning for everyone, every place, all the time. Indeed, in a world driven by an ever-expanding knowledge base, continuous learning, like continuous improvement, has become a necessity of life.

Rather than "an age of knowledge," could we instead aspire to a "culture of learning," in which people were continually surrounded by, immersed in, and absorbed in learning experiences. Information technology has now provided us with a means to create learning environments throughout one's life. These environments are able not only to transcend the constraints of space and time,

but they, like us, are capable as well of learning and evolving to serve our changing educational needs.

Transforming the University

How does an institution, as large, complex, and tradition-bound as the modern university, transform itself to fulfill its mission, achieve its vision, and move toward its strategic intent? Historically, we have accomplished change using a variety of mechanisms:

- buying change with additional resources
- building the consensus necessary for grassroots support of change
- changing key people
- through finesse, stealth of night
- a “Just do it!” approach, that is, top-down decisions followed by rapid execution (following the old adage that “it is better to seek forgiveness than to ask permission”)

The major paradigm shifts that will likely characterize higher education in the years ahead will require a more strategic approach to transformation, capable of staying the course until the desired changes have occurred. Many institutions already have embarked on transformation agendas similar to those characterizing the private sector. Some even use similar language as they refer to their efforts to “transform,” “restructure,” or even “reinvent” their institutions. But, of course, herein lies one of the great challenges to universities, since our various missions and our diverse array of constituencies, give us a complexity far beyond that encountered in business or government. For universities, the process of institutional transformation is necessarily more complex.

At Michigan, we have grappled with such transformation efforts for a number of years. During the early 1980s, it was necessary to restructure the financing of the University. Then, as we approached the 1990s, a series of transformations were launched in key units, such as the university medical center. Finally, in the mid-1990s, a more dramatic transformation process was launched to position the institution to face the challenges and opportunities of a rapidly changing world. Through these efforts and from the experience of other organizations in both the private and public sector, several features of transformation processes should be recognized at the outset:

- i) First, it is critical to define the real challenges of the transformation process properly. The challenge is usually not financial or organizational; it is the degree of cultural change required. We must transform a set of rigid habits of thought and arrangements that are incapable of responding to change rapidly or radically enough.
- ii) True faculty participation in the design and implementation of the transformation process is necessary, since the transformation of the faculty culture is the biggest challenge of all.

- iii) The involvement of external groups is not only very helpful, but probably, necessary, to provide credibility to the process and assist in putting controversial issues on the table (*e.g.*, tenure reform).
- iv) Unfortunately, no universities—and few organizations in the private sector—have been able to achieve major change through the motivation of opportunity and excitement alone. It has taken a crisis to get folks to take the transformation effort seriously; sometimes even this is not sufficient.
- v) The president must play a critical role as leader and educator in designing, implementing, and selling the transformation process, particularly to the faculty.

To summarize, the most important and difficult part of any transformation process involves changing the culture of the institution. At Michigan, we sought both to affirm and intensify the institution's dual commitment to academic excellence and leadership. Beyond this, we also sought to create more of a sense of excitement and adventure among students, faculty, and staff while aligning the University to better serve a rapidly changing society.

Universities need to consider a broad array of transformation areas that go far beyond simply restructuring finances, to face the brave new world of limited resources. The transformation process must encompass every aspect of our institutions, including:

- the mission of the university
- financial restructuring
- organization and governance
- general characteristics of the university
- intellectual transformation
- relations with external constituencies
- cultural change.

A key element involves efforts to provide our institutions with the capacity to explore new paradigms that are better able to serve a changing society and a changed world. We must remove the constraints that prevent our universities from responding to the needs of a rapidly changing society and remove unnecessary processes and administrative structures. We must question existing premises and arrangements and challenge, excite, and embolden the members of our university communities to embark on this great adventure. Our challenge is to work together 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.

Launching the Transformation Process

Perhaps our first challenge is simply to understand the nature of the contemporary university and the forces driving its evolution. In many ways, the university today has become the most complex institution in modern society—far more complex, for example, than corporations or governments.

The nature of the contemporary university and the forces that drive its evolution are complex and frequently misunderstood. The public still thinks of us in very traditional ways, with images of students sitting in a large classroom listening to a faculty member lecture on subjects, such as literature or history. The faculty thinks of Oxbridge—themselves as dons, and their students as serious scholars. The federal government sees just another R&D contractor or health provider—a supplicant for the public purse. And armchair America sees the university on Saturday afternoon only as yet another quasi-professional athletic franchise. Yet, the reality is far different—and far more complex.

In many ways, the university today has become one of the most complex institutions in modern society—far more complex, for example, than most corporations or governments. We are comprised of many activities, some non-profit, some publicly regulated, and some operating in intensely competitive marketplaces. We teach students, we conduct research for various clients, we provide health care, we engage in economic development, we stimulate social change, and we provide mass entertainment (athletics).

The modern university has become a highly adaptable knowledge conglomerate because of the interests and efforts of our faculty. We have provided our faculty with the freedom, the encouragement, and the incentives to move toward their personal goals in highly flexible ways. The university administration manages the modern university as a federation. It sets some general ground rules and regulations, acts as an arbiter, raises money for the enterprise, and tries—with limited success—to keep activities roughly coordinated.

In systems terminology, the modern university is a loosely coupled, adaptive system with a growing complexity as its various components respond to changes in its environment. We have developed a transactional culture, in which everything is up for negotiation. In a very real sense, the university of today is a holding company of faculty entrepreneurs, who drive the evolution of the university to fulfill their individual goals.

But, while the entrepreneurial university has been remarkably adaptive and resilient throughout the 20th Century, it also faces serious challenges. Many contend that we have diluted our core business of learning, particularly undergraduate education, with a host of entrepreneurial activities. We have become so complex that few, whether on or beyond our campuses, understand what we have become. We have great difficulty in allowing obsolete activities to disappear. Today, we face serious constraints on resources that no longer allow us to be all things to all people. We also have become sufficiently encumbered with processes, policies, procedures, and past practices that our best and most creative people no longer determine the direction of our institution.

To respond to future challenges and opportunities, the modern university must engage in a more strategic process of change. While the natural evolution of a *learning organization* may still be the best model of change, it must be augmented by constraints to preserve our fundamental values and mission. We must find ways to allow our best people to drive the future of our institutions.

Our challenge is to tap this great source of creativity and energy associated with entrepreneurial activity, but in a way that preserves our fundamental mission and values. We need to encourage our tradition of natural evolution, but do so with greater strategic intent. Instead of continuing to evolve as an unconstrained transactional entrepreneurial culture, we need to guide this process in such a way as to preserve our core missions, characteristics, and values.

It is from this perspective that we need to understand the most important goals of any broad effort at institutional transformation. It is not so much to achieve a specific set of goals, but rather to build the capacity, the energy, the excitement, and the commitment to move toward bold visions of the university's future.

In summary, the first—and most important—objective of any such effort is to simply build the capacity for strategic change, change necessary to enable our universities to respond to a changing society and a changing world.

A Final Caveat

Let me conclude with one of my favorite quotes:

There is no more delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful of success, than to step up as a leader in the introduction of change. For he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm support in those who might be better off under the new.

Niccolo Machiavelli

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 changing society and a profoundly changed world.

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

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 significant that our present social structures—in government, education, and the private sector—are having increasing difficulty in even sensing the changes, although they certainly feel their consequences. They are simply incapable of understanding the profound changes characterizing our world, much less responding and adapting in an effective way.

This time of great change, of shifting paradigms, provides the context in which we must consider the changing nature of the academic research enterprise itself. We must take great care not simply to extrapolate the past and instead examine the full range of possibilities of the future.

Clearly those institutions that bury their heads in the sand, that rigidly defend the status quo—or even worse, some idyllic vision of a past that never existed—are at great risk. So too, those institutions that are micromanaged either from within or by governing boards or by government stand little chance of flourishing during this era of change.

While many academics are reluctant to accept either the necessity or the validity of formal planning activities, woe be to the institutions that turn aside from strategic efforts to determine their futures. The ability of universities to adapt successfully to the revolutionary challenges they face will depend a great deal on an institution's collective ability to learn and to continuously improve its core competencies. It is critical that higher education give thoughtful attention to the design of institutional processes for planning, management, and governance. Only a concerted effort to understand the challenges of the present and the possibilities for the future can enable institutions to thrive during a time of such change.