Annapolis Talk

Introduction

An Experiment

I've been asking for various groups to try to assess
the degree of change they believe the research university
must undergo during the 1990s in quantative terms,
…using a scale of 0 to 10
…with 0 meaning no change
…the status quo
…and 10 meaning radical change
…a total re-invention of the university
Most faculty tend to suggest relative modest change
…in the range of 3 to 4 on the 10-point scale
Most academic adminstrators, deans, EOs, and the like,
believe there will be more radical change
…of the order of 7 to 8 on the 10-point scale
While I was at the fall meeting of AAU presidents,
I asked many of these university presidents the same question.
…most responded with an answer of 20!
(Incidentally, that also is my own estimate
of the amount of change the American university
will experience in the decade ahead:
…20…on a 10-point scale!)

What are we...and how we get this way?

Images of the University
The Oxford don
U of M, Inc
"We don't know where we are...and where we are going...
so why are we in such a hurry to get there?"
Secrets of our success in years past...
It is true that Michigan is a prime example of
"a loosely-coupled, adaptive system,
with a growing complexity as its various components
respond to changes in the environment"
It is also true that Michigan is
"a learning organization".
…a holding company for 3,000 entrepreneurs

And that it has evolved over the years due to

…creativity and energy of its faculty (as entrepreneurs)

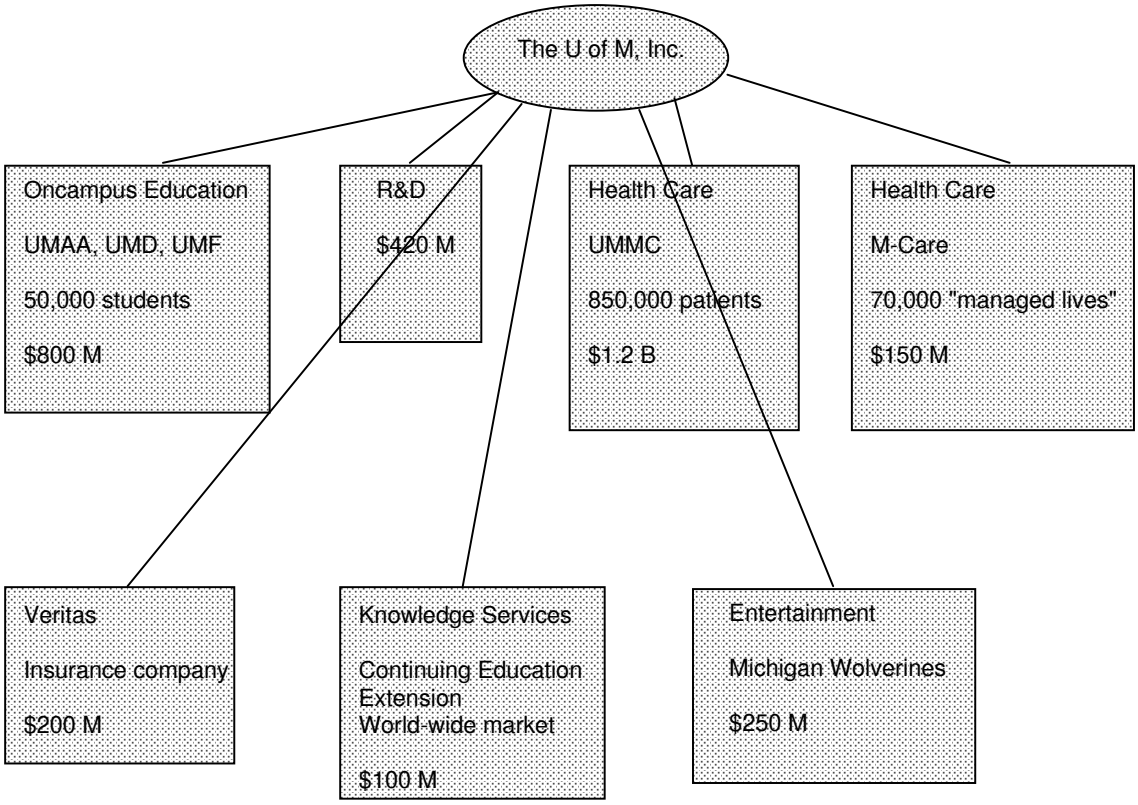
…the efforts of its many components to excell

…a "transactional" culture where everything is up for negotiation

But, look where this has led us! UofM, Inc!

(Note: Some of us know precisely where and what UM is today!)

Diagram: UofM, Inc.



The Challenges of Change

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.

A simple glance at the remarkable diversity of institutions

comprising higher education in America demonstrates

this evolution of the species.

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 World War II when the research university
evolved to serve the needs of postwar America.

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

Many point to negative factors, such as
i) the rapidly growing costs of quality education and research during
a period of limited resources,
ii) the erosion of public trust and confidence in higher education,
iii) or the deterioration in the partnership characterizing
the research university and the federal government.

But I believe our institutions will be affected even more profoundly
by the powerful changes driving transformations in our society, including
i) the increasing ethnic and cultural diversity of our people;
ii) the growing interdependence of nations;
iii) the degree to which knowledge itself has become
the key driving force in determining economic prosperity,
national security, and social well-being;
iv) and, of course, the digital age, which is now revolutionizing
"knowledge businesses" such as higher education.

The Challenge of Change

We are living in the most extraordinary of times.

Who would have predicted a few years ago
the collapse of communism,
the end of the Cold War,
the redefinition of the world economic order
the direct manipulation of the human gene to cure disease
theInternet phenomenon, linking 20 million people worldwide
digital convergence, in which phone and computer companies
merge with the entertainment industry

Yet all of these events have happened,
and the pace of change continues to accelerate.

Indeed, many believe that our civilization is going through a period of transformation just as profound as those that occurred in earlier times such as the Renaissance or the Industrial Revolution, except while these earlier transformations took centuries to occur, those characterizing our times will occur in a decade or less.

Some portray the 1990s as a countdown toward a new millennium, as we find ourselves swept toward the new century by these incredible forces of change.

But the events of the past several years suggest that the 21st century is already upon us, a decade early.

This last point is very important for today we are seeing a dramatic shift in the fundamental structure, nature, and perspective of our society.

We are evolving rapidly to a new post-industrial, knowledge-based society, just as a century ago our agrarian society evolved through the Industrial Revolution.

Key in this transformation is the emergence of knowledge as a strategic commodity, as important as natural resources or low-skilled labor were at earlier times.

This new critical commodity knows no boundaries.

It is generated and shared wherever educated, innovative, and creative people come together; and as we have learned, it spreads very quickly.

Indeed, the "age of knowledge" in which we now find ourselves is accompanied by a fundamental transformation in our economy that is reshaping virtually every product, every service, and every job throughout our country and indeed the world.

A Communications-Driven Society

In Michigan we have a unique vantage point from which to view a particularly important feature of these changes.

If there was one sector that most strongly determined the progress of the 20th 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, suggested that
the impact of information technology will be even more radical
than that of the harnessing of steam and electricity in the 19th
century.
He suggested it would be rather 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.
On the University's North Campus is a large glass building,
filled with computers, that in many ways represents just such
a future for our state.
This is the command center of NREN,
the National Research and Education Network,
a massive network operated by the University in collaboration
with IBM and MCI that links together the computers
on university campuses, industry, and government laboratories
throughout the world. In fact, today the network already links
together
over four million users worldwide and is doubling in size
and scope every six months.
Already NREN links together
…2.3 million computers

…23,500 networks
…1,100 colleges and universities (90%of nation’s students)
…1,000 high schools, several hundred libraries

With the associated Internet
…20 million people worldwide
…20 Terabytes of information

NREN is a component of the nation's High Performance Computing and Communications Program, and effort designed to dramatically expand and enhance the U.S. portion of the existing worldwide infrastructure of interconnected computer networks.

But NREN is also envisioned as the linkage between the nation's education infrastructure and its knowledge and information centers.

In this system, elementary schools, high schools, two and four-year colleges, and universities will be linked together with research centers and laboratories so that all may share access to resources such as libraries, data bases, and diverse scientific instruments such as supercomputers, telescopes, and particle accelerators. Furthermore, NREN would provide valuable experience necessary for the successful development of a broader, privately operated national information infrastructure.

Rapidly evolving technologies are dramatically changing the way we collect, manipulate, and transmit information.

This directly challenges the traditional paradigms of the university, where processes of knowledge creation, preservation, transmission, and application are still largely based on books, chalk boards, oral lectures, and static images.

In the last three decades, computers have evolved into powerful informationsystems with high-speed connectivity to other systems throughout theworld.

Public and private networks permit voice, imagine,and data to be made instantaneously available across the world to wide audiences at low costs.

The creation of virtual environments where human senses are exposed to artificially created sights, sounds, and feelings

liberate us from restrictions set by the physical forces of the world in which we live.

Close, emphathetic, multi-party relationships mediated by visual and aural digital communcations systems are becoming common, leading to the formation of closely bonded, widely dispersed communities of people interested in sharing new experiences and intellectual pursuits created within the human mind via sensory stimuli.

Computer-based learning systems are also being explored, opening the way to new modes of instruction and learning.

New models of libraries are being explored to exploit the ability to access vast amounts of digital data in physically dispersed computer systems which can be remotely accessed by users over information networks.

New forms of knowledge accumulation are evolving: writtentext, dynamic images,voices, and instructions onhow to create new sensory environments can be packaged indynamic modes of communcation never before possible.

The applications of such new knowledge forms challenge the creativity and intent of authors, teachers, and students.

Needless to say, the implications for our universities of these extraordinary challenges...and opportunities ...are profound.

The Changing Nature of the University's Fundamental Missions

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 be 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.

The Need to "Reinvent" the University

We face a particular dilemma in developing more revolutionary models for the American university because of a challenges mentioned early in this talk.

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.

Indeed, there are some who suggest that our present knowledge-based institutions, such as universities, the media, and federal or industrial laboratories, 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 of the 1950s.

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.

We must take great care not simply to extrapolate the past, but to examine the full range of possibilities for the future.

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

A university with a strong public character, but supported primarily through resources it must generate itself (e.g., tuition, federal grants, private giving, auxiliary enterprises), not through general purpose appropriations.

the "world" university

As a new world culture forms, a number of universities will evolve into learning institutions serving the world, albeit within the context of a particular geographical area (e.g., North America).

the diverse university (or the "uni-di-versity")

A university drawing its intellectual strength and its character from the rich diversity of humankind, providing a model for our society of a pluralistic learning community in which people respect and tolerate diversity even as they live, work, and learn together as a community of scholars.

the cyberspace university

A university that spans the world (and possibly even beyond) as a robust information network linking together students, faculty, graduates, and knowledge resources.

the creative university

As the tools for creation become more robust (e.g., creating materials atom-by-atom, genetically engineering new life forms, or computer-generating artificial intelligence or virtual reality), the primary activities of the university will shift from a focus on analytical disciplines and professions to those stressing creative activities (i.e., "turning dreams into reality").

the divisionless university

The current disciplinary (and professional) organization of the University is viewed by many as increasingly irrelevant to their teaching, scholarship, and service activities. Perhaps the university of the future will be far more integrated and less specialized through the use of a web of virtual structures which provide both horizontal and vertical integration among the disciplines and professions.

the university college

It seems clear that we need to develop a new paradigm for undergraduate education within the complex environment provided by a comprehensive research university. This "university college" should draw on the intellectual resources of the entire university: its scholars, libraries, museums, laboratories, graduate and professional programs, and its remarkable diversity of people, ideas, and endeavors.

the university as capstone of a lifelong sequence of education

Since education will increasingly require a lifetime commitment, perhaps the University should reinvent itself to span the entire continuum of education, from cradle to grave. It could form strategic alliances with other components of the educational

system, and commit itself to a lifetime of interaction with its students/graduates, providing them throughout their lives with the education necessary to meet their changing goals and needs.

Even further questions...

Will a "university of the 21st century" be localized in space and time,

or will it be a "metastructure," involving people throughout their lives

wherever they may be on this planet--or beyond?

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?" Will intelligent

software agents roam far and wide through robust networks containing

the knowledge of the world and instantly and effortlessly extract

whatever a person wishes to know?

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?

In the spirit of these questions, perhaps we should pay far more attention

to evolving new structures more appropriate for the evolving

information technology. One example would be the collaboratory,

envisioned as an advanced, distributed infrastructure which would use

multimedia information technology to relax the constraints on distance,

time, and even reality.

One approach: The New University

Could we create within our institutions a "laboratory" or "new" university that would serve as a prototype or test bed for possible features of the University of the twenty-first century? 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 experimentation.

the university as a "knowledge server"

Perhaps the triad mission of the university--teaching, research, and service--is simply the twentieth century manifestation of the more fundamental roles of creating, preserving, transmitting, and applying knowledge. While this fundamental "knowledge server" definition of the university does not change over time, it seems clear that the particular realization of these roles is changing rapidly (e.g., digital convergence, collective learning, strategic research).

The Process of Change

So how does an institution as large, complex, and tradition-bound as the modern research university go about transforming itself.

Historically we have accomplished change using a variety of mechanisms:

i) "buying" change with additional resources;

ii) laboriously building the consensus necessary for grassroots support of change;

iii) changing key people; iv) finesse;

iv) finesse...or by stealth of night;

vi) The Nike Approach: "Just do it!," that is, top-down decisions followed by rapid execution (following the old adage that "it is better to seek forgiveness than to ask permission").

For the type of institutional transformation necessary to move toward the major paradigm shifts that will likely characterize higher education in the years ahead, we will need a more strategic approach capable of staying the course until the desired changes have occurred.

Indeed, many institutions have already embarked on major 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 "re-invent" 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.

As a result, the process of institutional transformation is necessarily more complex.

Experience demonstrates that the process of transforming an organization is not only possible but also understandable and even predictable, to a degree.

The revolutionary process starts with an analysis of the external environment and the recognition that radical change is the organization's best response to the challenges it faces.

The early stages are sometimes turbulent, marked by conflict, denial, and resistance. But gradually, leaders and members of the organization begin to develop a shared vision of what their institution should become and to turn their attention to the transformation process.

In the final stages, grass-roots incentives and disincentives are put into place to create the market forces to drive institutional change; and methods are developed to measure the success of the transformation process. Ideally, this process never ends.

Through the experience of 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. Rather it is the degree of cultural change required.

We must transform a set of rigid habits of thought and arrangements that are currently incapable of responding to change
either rapidly or radically enough.

ii) It is important to achieve true faculty participation in the design and
implementation of the transformation process, in part since the transformation of the faculty culture is the biggest challenge of all. But here the faculty participation must involve its true intellectual
leadership rather than the political leadership more common to formal faculty governance.

iii) It has been found that the use of an external group 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. Rather it has taken a crisis to get folks to take the transformation effort seriously--and sometimes even this is not sufficient.

v) The president must play a critical role both as a leader and as an educator in designing, implementing, and selling the transformation process, particularly with the faculty.

The necessary transformations will go far beyond simply restructuring finances to face the brave new world of limited resources.

Rather, they will 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

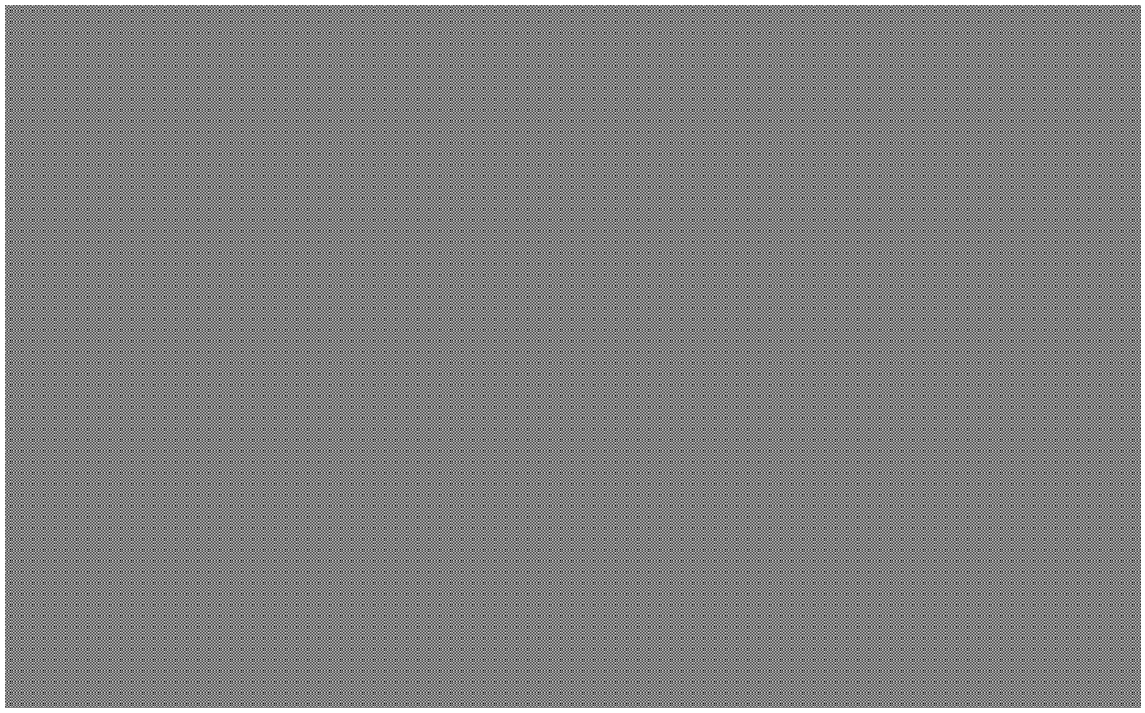
Concern

The Michigan entreprenurial culture,
at least with the present set of rules and constraints,
has led to an institution with the following problems:
…it has diluted its "core businesses" with lots of entreprenurial efforts
…it has become so complex that few even know what it is
…the difficulty in allowing out-moded and obsolete activities to disappear has put us very much at risk

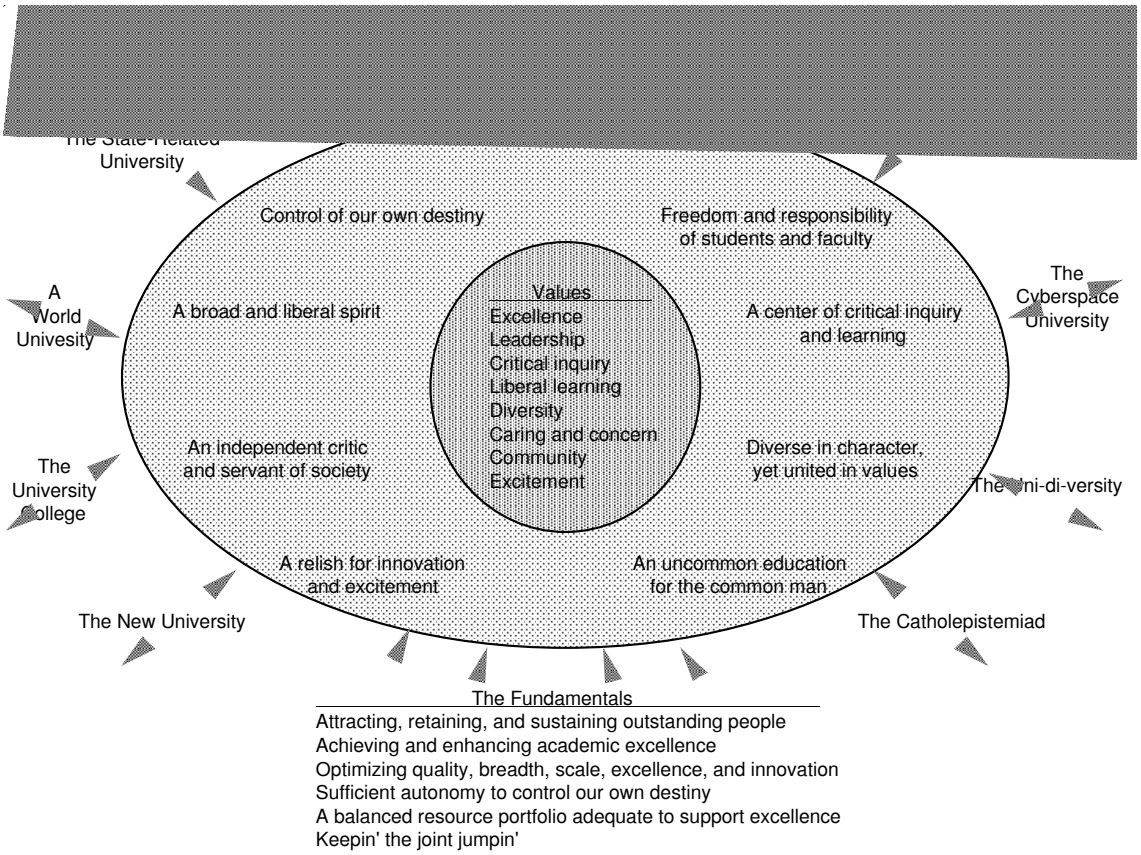
In a sense, we have become sufficiently encumbered with
processes, policies, procedures, practices of the past
that our very best people, our most exceptional and creative people no longer determine the direction of the University.
…funding limitations
…resource allocation (incremental budgeting which preserves the past)
…personel policies
…disciplinary dominance
…consensus gridlock

JJD approach is, in reality, natural evolution
…with constraints to preserve fundamental values and mission
…but freeing most creative people to drive the institution

Natural Evolution



That is, to attract, retain, and nurture extraordinary people
and let them drive the University.
This is why Vision 2017 is well-defined in the center,
and blurry on the edges...
suggesting that the new paradigms will be created
by our very best people...
Vision 2017



The basic approach is to

i) Attract and retain exceptional people of true creativity

ii) To remove constraints on creativity and adaptability,
to create a fault-tolerant system

iii) But to constrain evolution to protect our fundamental missions, character, and values.

Concluding Remarks

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.

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, 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 engage in the primary activity of a university, learning, in all its many forms, to better serve our world.

The capacity for intellectual change and renewal has become increasingly important to us as individuals and to our institutions.

In summary, our objective for the next several years is to provide our universities with the capacity to transform themselves into institutions more capable of serving our states, our nation, and the world.