# Higher Education in the New Century: Themes, Challenges, and Opportunities

# A Social Transformation
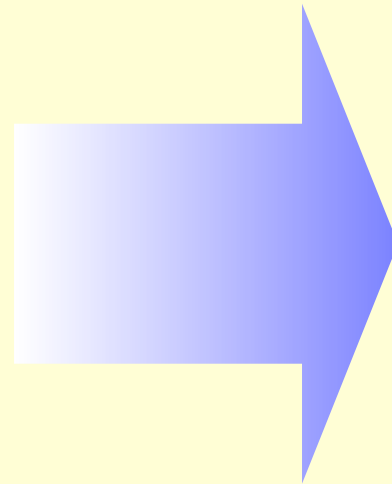
**The 20th Century**

Transportation

Cars, planes, trains

Energy, materials

Nation-states

Public Policy

**The 21st Century**

Communications

Computers, networks

Knowledge, bits

Nationalism

Markets

# The Age of Knowledge

**Educated people and ideas** →

**Prosperity**

**Security**

**Social well-being**

**Educated people are the most valuable resource for 21st societies and their institutions!!!**

# The Forces of Change

The Age of Knowledge

The Knowledge Explosion
Globalization
The High Performance Workplace
Diversity
Accelerating Technological Change
Nonlinear Knowledge Transfer

Changing Societal Needs
Financial Imperatives
Technology Drivers
Market Forces

# The Themes of Our Times

- The exponential growth of new knowledge.

- The globalization of commerce and culture.

- The lifelong educational needs of citizens in a knowledge-driven, global economy.

- The increasing diversity of our population and the growing needs of underserved communities.

- The impact of new technologies that evolve at exponential rates (e.g., info, bio, and nanotechnology).

- The compressed timescales and nonlinear nature of the transfer of knowledge from campus laboratories into the commercial marketplace.

# Forces of Change

**A Changing World**

The Knowledge Explosion

Globalization

High Performance Workplace

Diversity

Technological Change

Knowledge Transfer

**Forces on the University**

Economics

Societal Needs

Technology

Markets

**Evolution?**

**Revolution?**

**Extinction?**

# The Future of the University?

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

*– Peter Drucker*

"If you believe that an institution that has survived for a millennium cannot disappear in just a few decades, just ask yourself what has happened to the family farm."
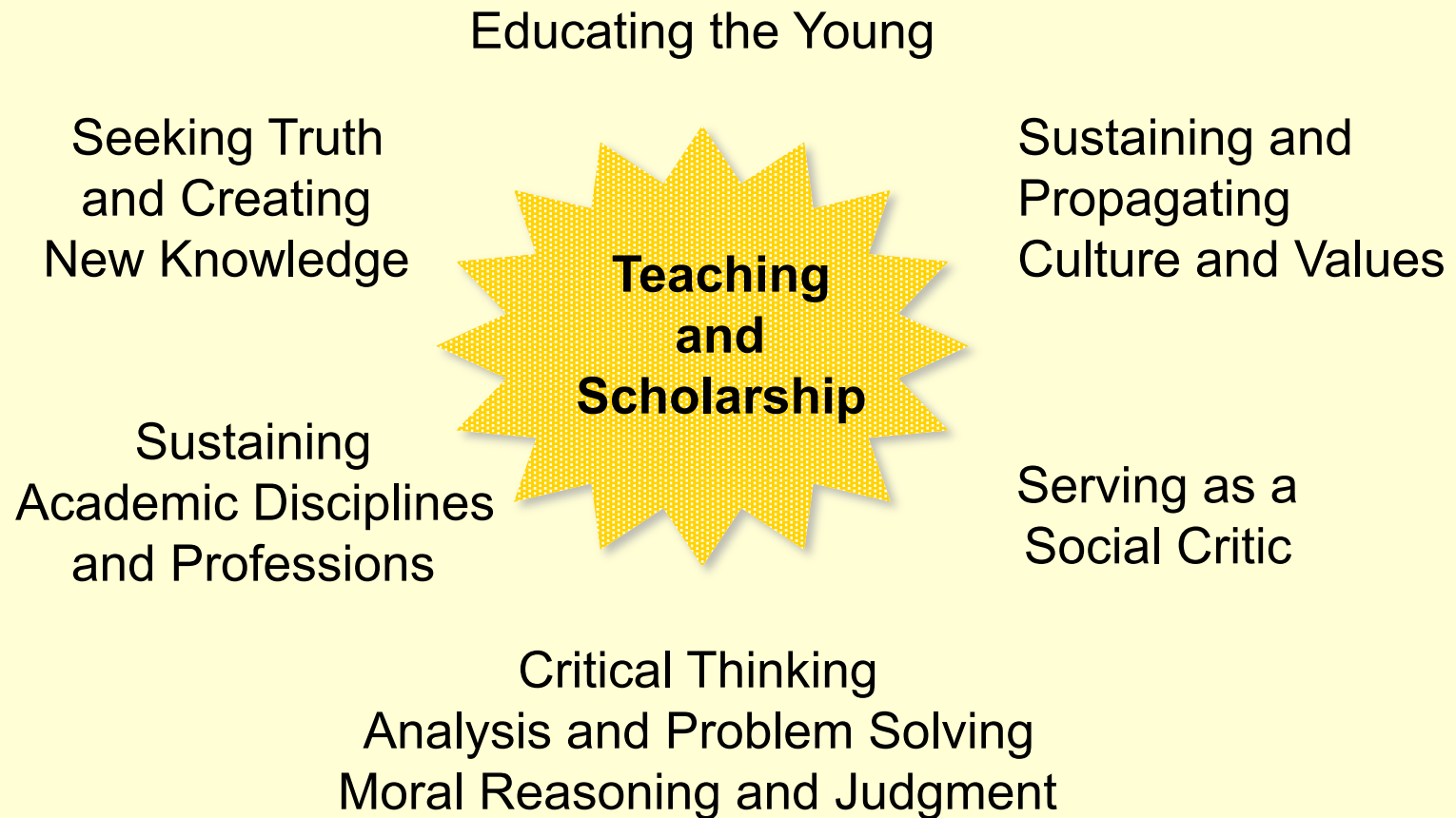
*– William Wulf*

"I wonder at times if we are not like the dinosaurs, looking up at the sky at the approaching comet and wondering whether it has an implication for our future."
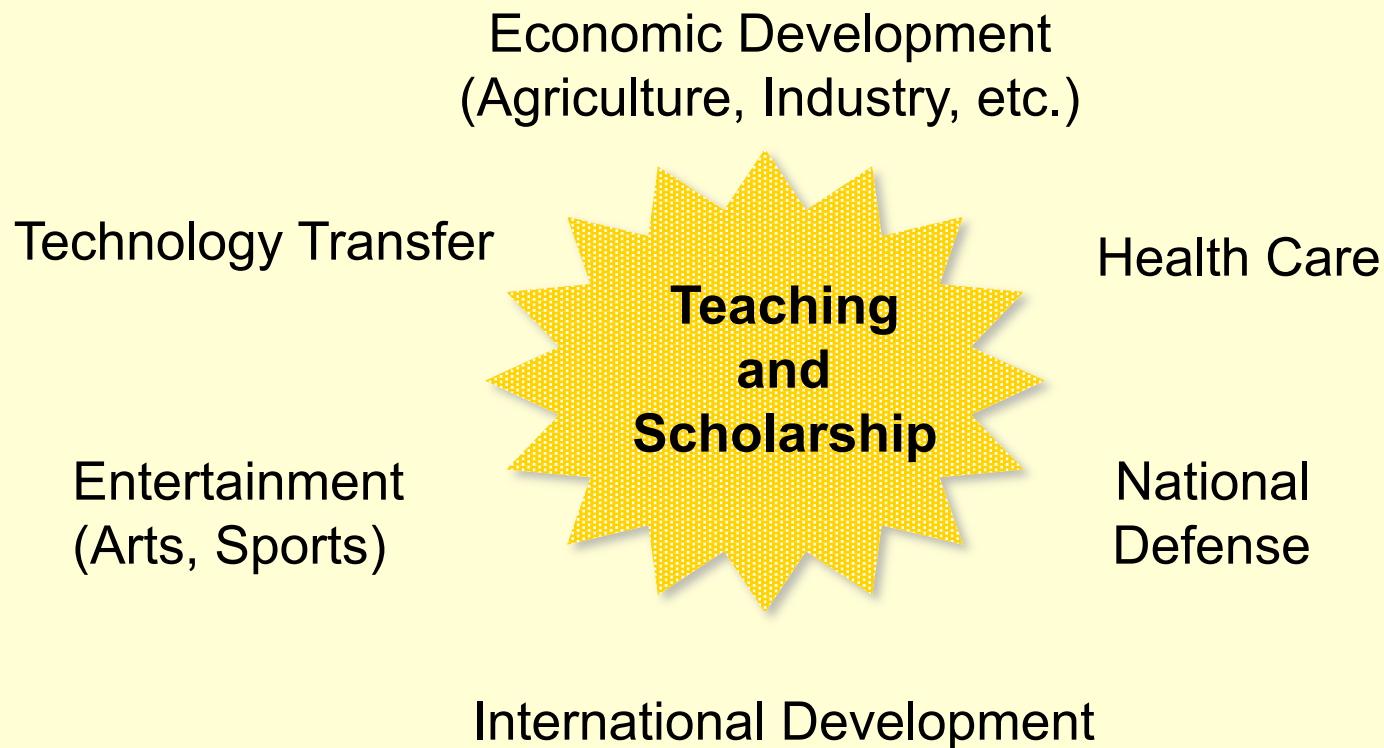
*– Frank Rhodes*

# Outline

- Characteristics of the 20th Century University
- The Forces Driving Change in Higher Education
- The University of the 21st Century
- Transforming Higher Education to Serve a New Century
- Some Lessons Learned
- Some Remaining (and Very Fundamental) Questions

# Traditional Roles of the University: The Core

Educating the Young

Seeking Truth
and Creating
New Knowledge

Sustaining and
Propagating
Culture and Values

**Teaching
and
Scholarship**

Sustaining
Academic Disciplines
and Professions

Serving as a
Social Critic

Critical Thinking
Analysis and Problem Solving
Moral Reasoning and Judgment

# The Traditional Roles of the University: The Periphery

Economic Development
(Agriculture, Industry, etc.)

Technology Transfer

Health Care

**Teaching
and
Scholarship**

Entertainment
(Arts, Sports)

National
Defense

International Development

# Case Study 1

# Higher Education
# in the United States

# The Evolution of U.S. Higher Education

1700s…Frontier America ⟶ Colonial Colleges

1800s…Industrial Society ⟶ Land-Grant Universities

1900s…Rise of Professions ⟶ Technical Colleges

1940s…WWII, the Cold War ⟶ Research Universities

1950s…Mass Education ⟶ University Systems

1990s…Market Forces ⟶ Cyber-U, Global U, For-profit U

# The United States Higher Education "System"

AAU-Class Research Universities (60)

Research Universities (115)          Doctoral Universities (111)

Comprehensive Universities (529)

Baccalaureate Colleges (637)

Two-Year Colleges (1,471)

**Total U.S. Colleges and Universities:  3,595**

# The Evolving U.S. Education System

For profit U
(650)

Cyber U
(1,000)

AAU Res U
Res U I, II
Doc U I, II
Comp U I, II
Lib Arts Colleges
Community Colleges
K-12

Open U

Niche U

Corporate U
(1,600)

New learning
lifeforms

**Knowledge Infrastructure**
(production, distribution, marketing, testing, credentialling)

# Some Other Characteristics of the U.S. System of Higher Education

- 65% of high school graduates attend college
  - (although only 50% of these will receive degrees)
- 15 million students enrolled in 3,595 colleges and universities
  - (520,000 international students)
- 80% of students enrolled in "public" universities
- $200 billion/year spent on U.S. higher education
  - $50 billion/y in federal student financial aid
  - $20 billion/y in federal research grants
  - $60 billion/y in state (regional) appropriations
  - $70 billion/y in tuition, gifts, business activities, etc.

# The Role of Government in the U.S.

- **The Federal Government:**
  - No ministry, no national system, no controls…no policy
  - $50 B/y of financial aid for students
  - $15 B/y of research grants to faculty
  - NOTE: The federal government provides funds to people (students, faculty, patients), not universities.

- **State Governments:**
  - $65 B/y to support operation of public universities
  - Great diversity in state governance, from rigidly controlled systems (New York, Ohio) to strategic master plans (California) to anarchy (Michigan)

# The Role of Markets

The U.S. higher education enterprise is highly competitive!

- For students (particularly the best)
- For faculty (particularly the best)
- For public funds (research grants, state appropriations)
- For private funds (gifts, commercial)
- For winning athletics programs
- For everything and everybody…

In a sense, Michigan competes not only with UC-Berkeley, Harvard, and MIT, but also with Oxford and Cambridge, not to mention IBM and Microsoft!

# The University of Michigan

# University of Michigan

- First truly public university in United States (1817)
- Constitutional autonomy
- One of U.S.'s largest universities
  * People: 50,000 students; 3,500 faculty, 25,000 staff
  * Budget: $3.4 billion/year; ($3.9 billion endowment)
  * Facilities: 3 million m$^2$ of facilities
  * Campuses in Europe, Hong Kong, Korea, Brazil, cyberspace
- One of U.S.'s leading research universities (> $600 million/year)
- Some other features:
  * First university hospital (1 million patients a year, $1.4 billion/year)
  * Key role in developing and managing the Internet (now Internet2)

# UM Schools and Colleges

- Architecture
- Art and Design
- Business Administration
- Dentistry
- Education
- Engineering
- Graduate programs
- Information
- Kinesiology
- Law

- Humanities
- Medicine
- Music
- Natural Resources
- Nursing
- Pharmacy
- Public Health
- Public Policy
- Sciences
- Social Work

UNIVERSITY of

ARTES · SCIENTIA · VERITAS

1817 ·

MICHIGAN
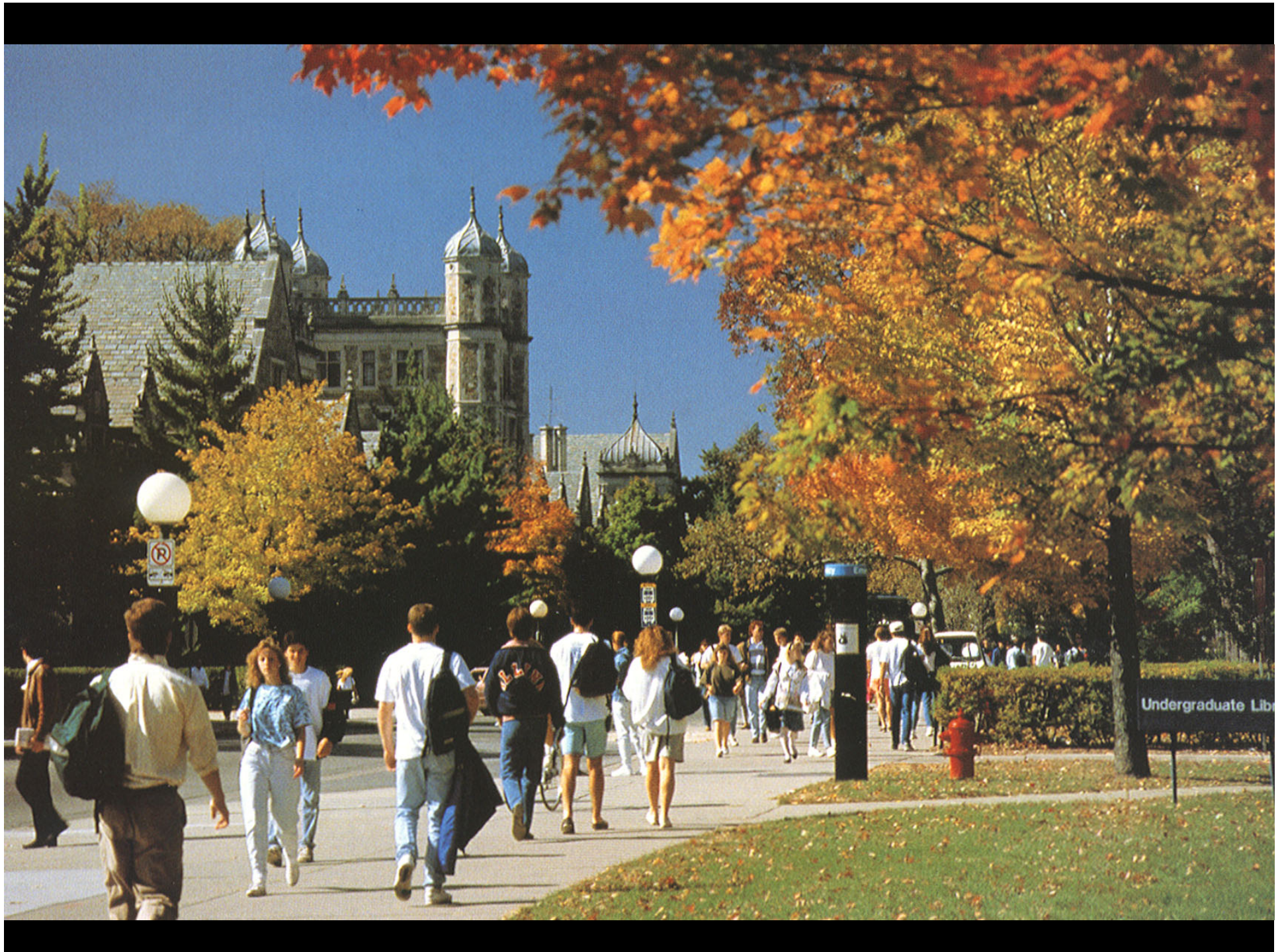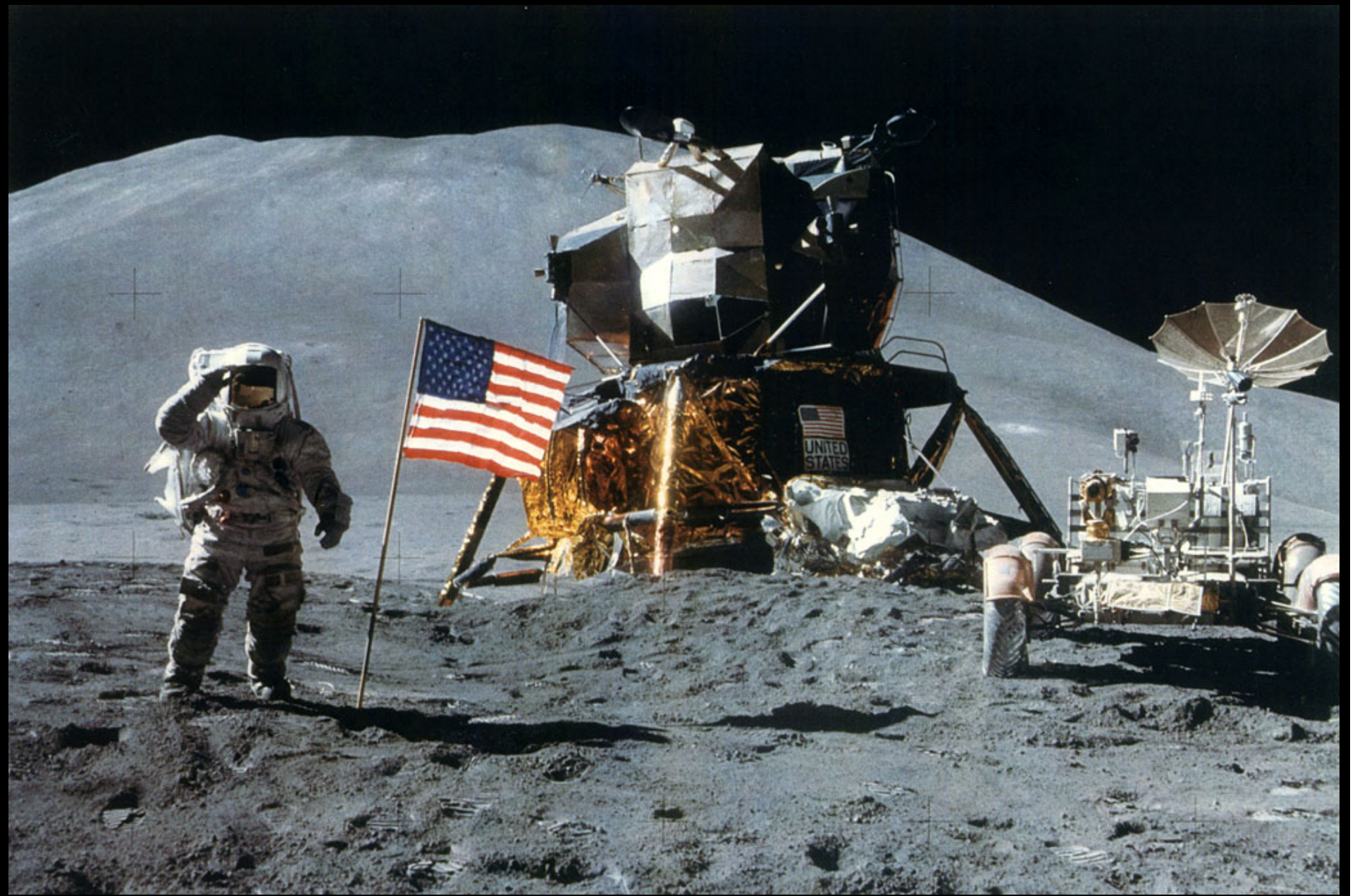
THIS FLAG CARRIED ABOARD APOLLO 15 DURING THE FIRST EXTENDED
SCIENTIFIC EXPLORATION OF THE MOON. JULY 26 — AUGUST 7, 1971

# Financing the University
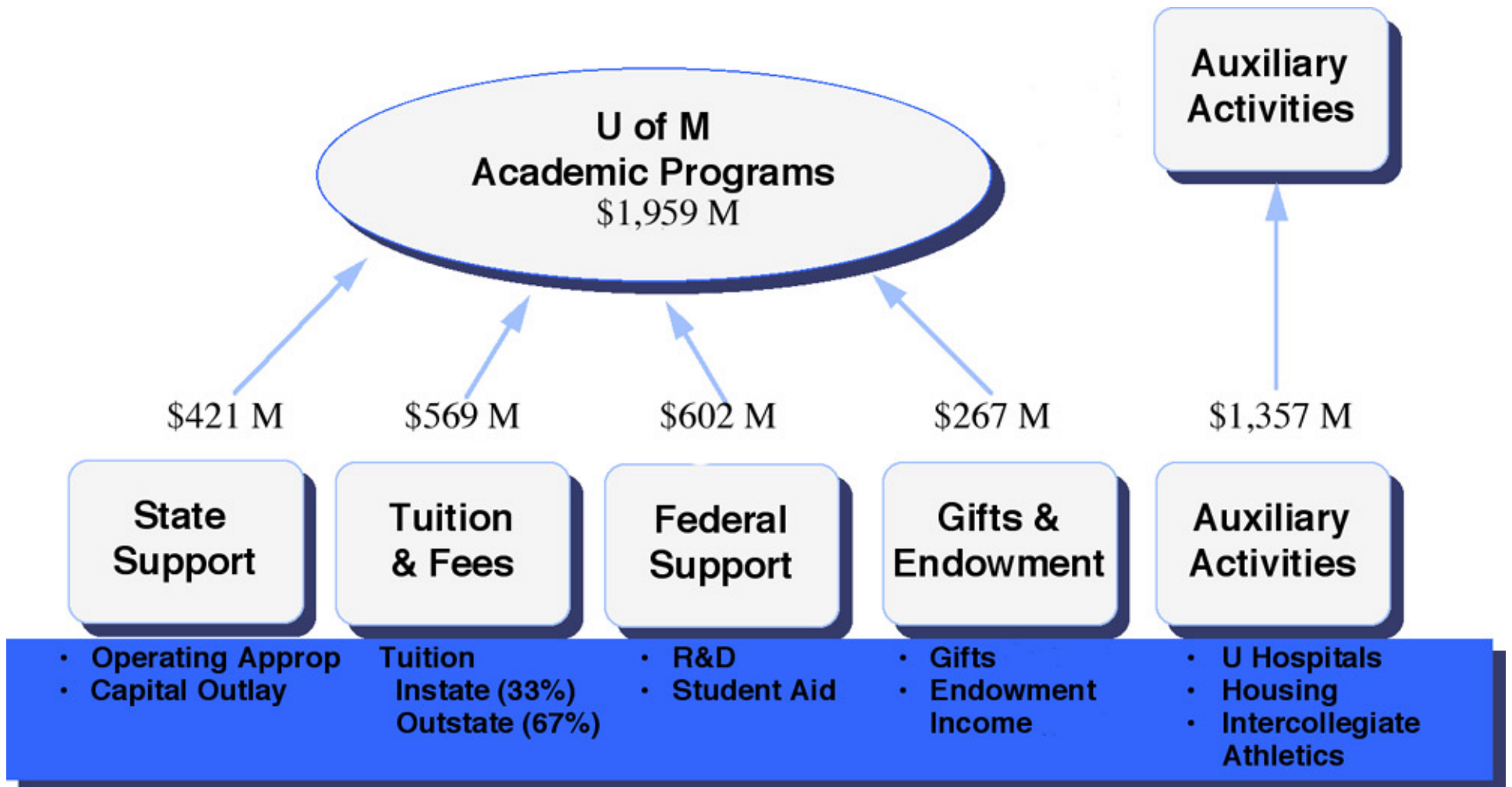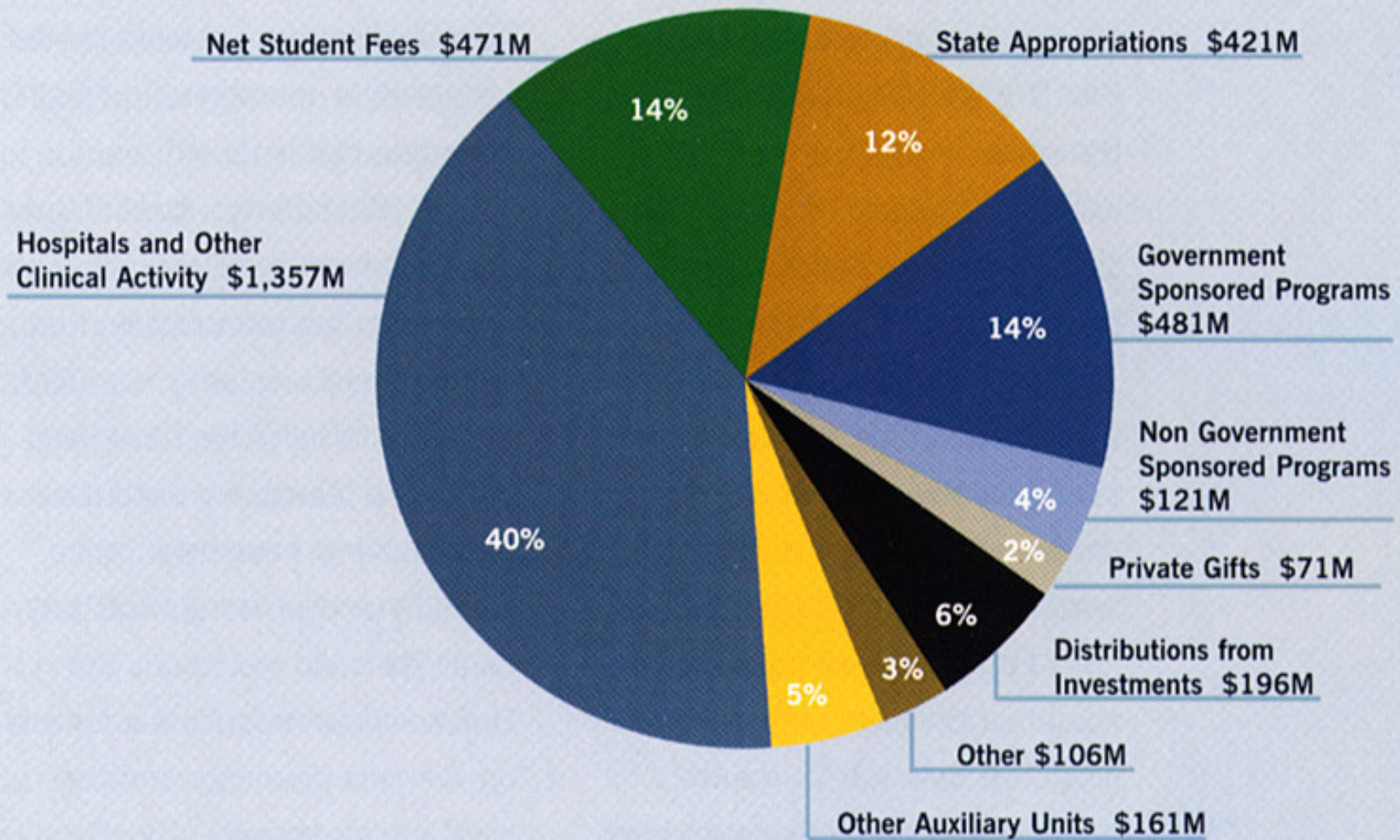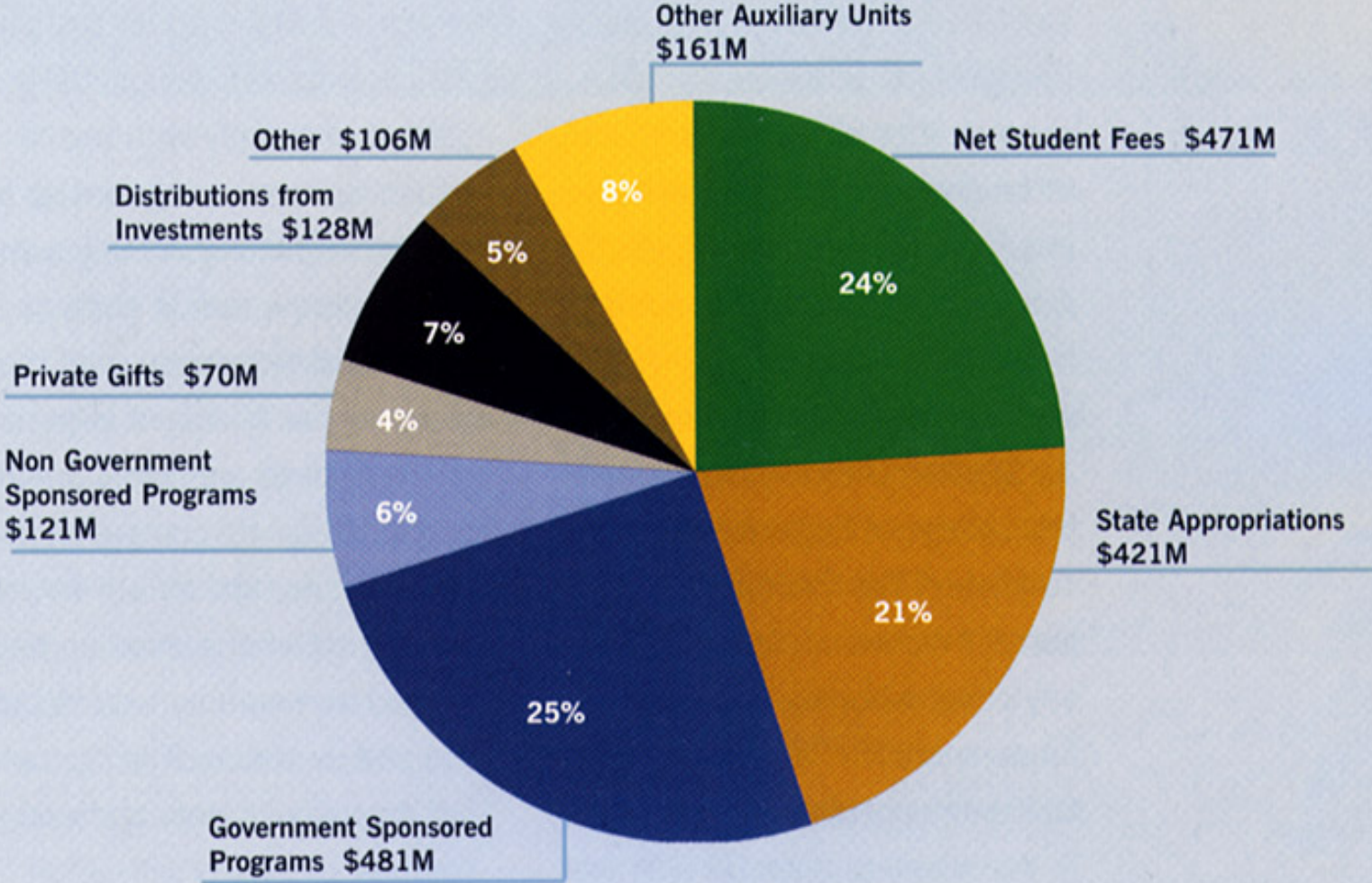


Auxiliary Activities

U of M
Academic Programs
$1,959 M

$421 M        $569 M        $602 M        $267 M        $1,357 M

| State Support | Tuition & Fees | Federal Support | Gifts & Endowment | Auxiliary Activities |
|---|---|---|---|---|
| • Operating Approp<br>• Capital Outlay | Tuition<br>Instate (33%)<br>Outstate (67%) | • R&D<br>• Student Aid | • Gifts<br>• Endowment Income | • U Hospitals<br>• Housing<br>• Intercollegiate Athletics |

# OPERATING ACTIVITIES
## Total Revenues: $3,385 million



Net Student Fees $471M — 14%

State Appropriations $421M — 12%

Hospitals and Other Clinical Activity $1,357M — 40%

Government Sponsored Programs $481M — 14%

Non Government Sponsored Programs $121M — 4%

Private Gifts $71M — 2%

Distributions from Investments $196M — 6%

Other $106M — 3%

Other Auxiliary Units $161M — 5%

OPERATING ACTIVITIES EXCLUDING HOSPITALS AND OTHER SIMILAR ACTIVITIES
Total Revenues: $1,959 million

Other Auxiliary Units $161M

Net Student Fees $471M — 24%

Other $106M — 5%

Distributions from Investments $128M — 7%

Private Gifts $70M — 4%

Non Government Sponsored Programs $121M — 6%

Government Sponsored Programs $481M — 25%

State Appropriations $421M — 21%

8%

# Another way to look at UM
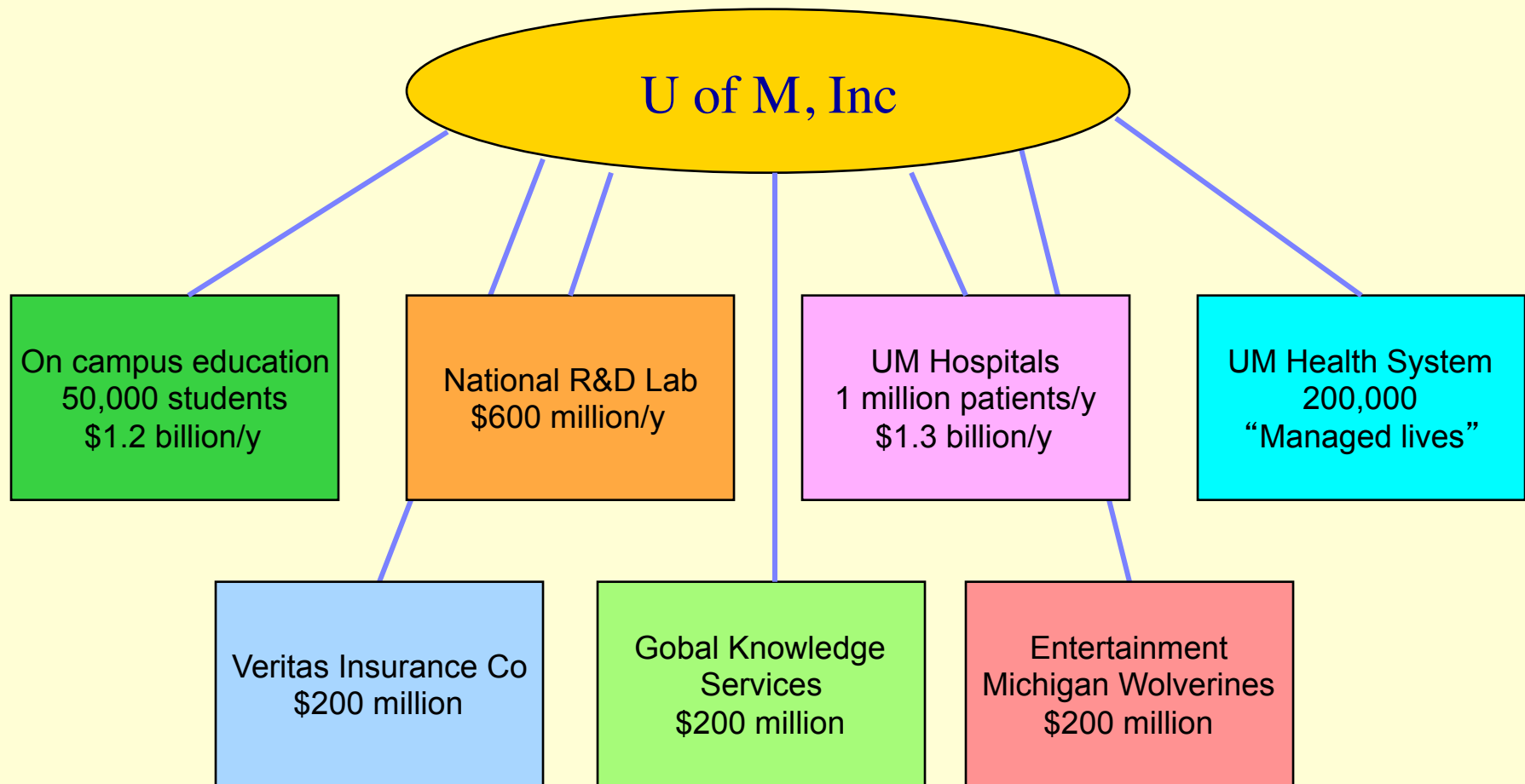
# The Forces of Change

# Forces of Change

**A Changing World**

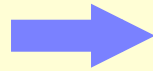The Knowledge Explosion

Globalization

High Performance Workplace
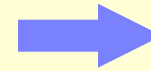
Diversity

Technological Change

Knowledge Transfer

**Forces on the University**

Societal Needs

Economics

Technology

Markets

**Brave New World?**

**Society of Learning?**

# Forces on the University

- Changing Societal Needs
- Financial Imperatives
- Technology
- Market forces

# Changing Societal Needs

- Increasing population of "traditional" students

- The "plug and play" generation

- Education needs of adults in the high-performance workplace (lifelong learning)

- Passive student to active learner to demanding consumer

- "Just-in-case" to "just-in-time" to "just-for-you" learning

- Diversity (gender, race, nationality, socioeconomic,…)

- Global needs for higher education

**Concern: There are many signs that the current paradigms are no longer adequate for meeting growing and changing societal needs.**

# Global Needs

Half of the world's population is under 20 years old.

Today, there are over 30 million people who are fully qualified to enter a university, but there is no place available. This number will grow to over 100 million during the next decade.

To meet the staggering global demand for advanced education, a major university would need to be created every week.

"In most of the world, higher education is mired in a crisis of access, cost, and flexibility. The dominant forms of higher education in developed nations–campus based, high cost, limited use of technology–seem ill-suited to addressing global education needs of the billions of young people who will require it in the decades ahead."

Sir John Daniels

# Financial Imperatives

- Increasing societal demand for university services (education, research, service)

- Increasing costs of educational activities

- Declining priority for public support

- Public resistance to increasing prices (tuition, fees)

- Inability to re-engineering cost structures

**Concern:  The current paradigms for conducting, distributing, and financing higher education may not be able to adapt to the demands and realities of our times**

# Technology

Since universities are knowledge-driven organizations, it is logical that they would be greatly affected by the rapid advances in information and communications technologies

We have already seen this in administration and research.

But the most profound impact could be on education, as technology removes the constraints of space, time, reality (and perhaps monopoly … )

**Concern: The current paradigm of the university may not be capable of responding to the opportunities or the challenges of the digital age.**

# Market Forces

Changing societal needs, economic realities, and rapidly evolving technology are creating powerful market forces in the higher education enterprise. The traditional monopolies of the university, sustained in the past by geography and certification, are breaking apart.

We may be seeing the early signs of a **restructuring** of the higher education enterprise into a global knowledge and learning industry.

**Concern: The current faculty-centered, monopoly-sustained university paradigm is ill suited to the intensely competitive, technology-driven, global marketplace.**
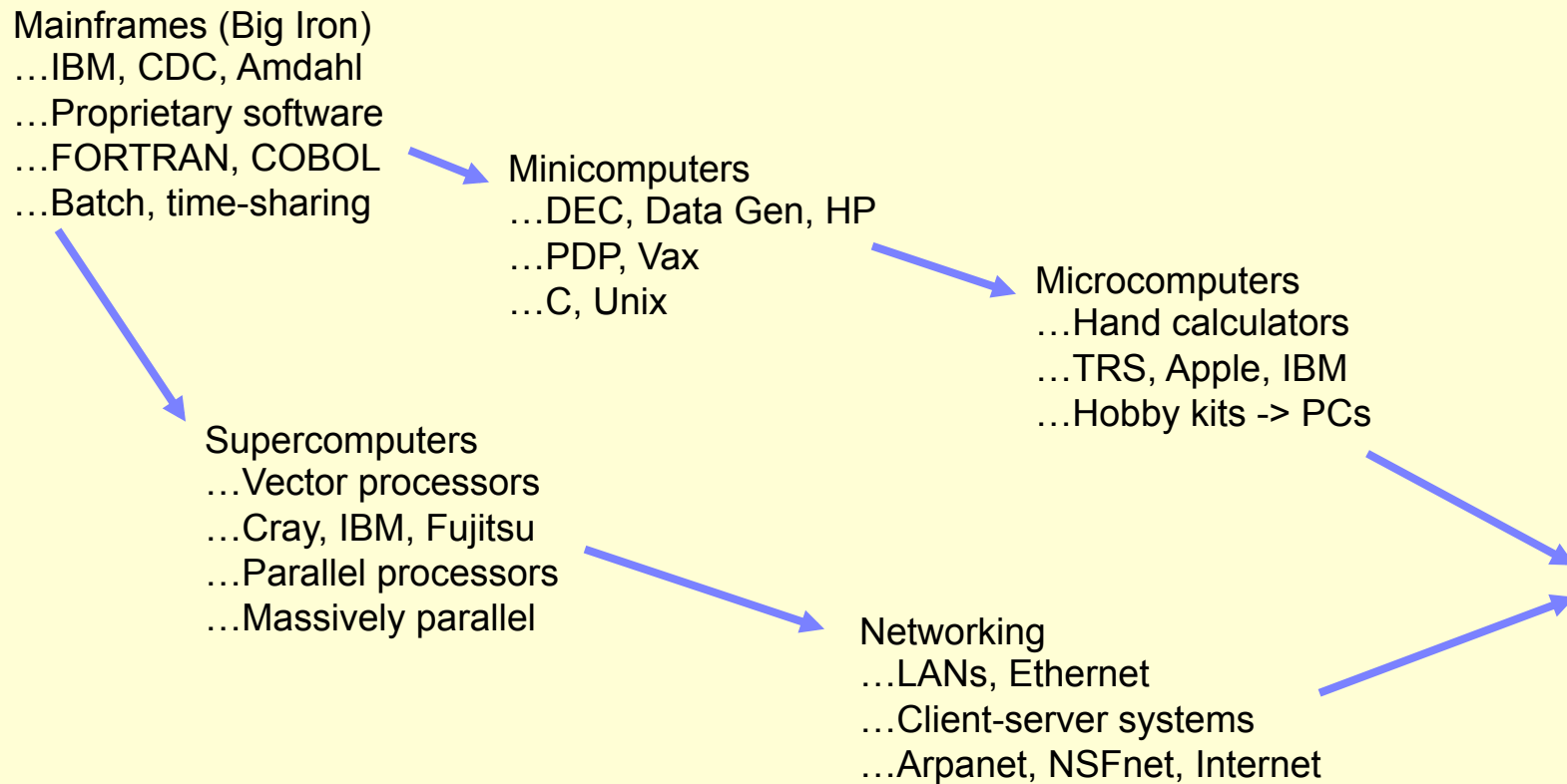
# Information Technology and the

# Future of the University
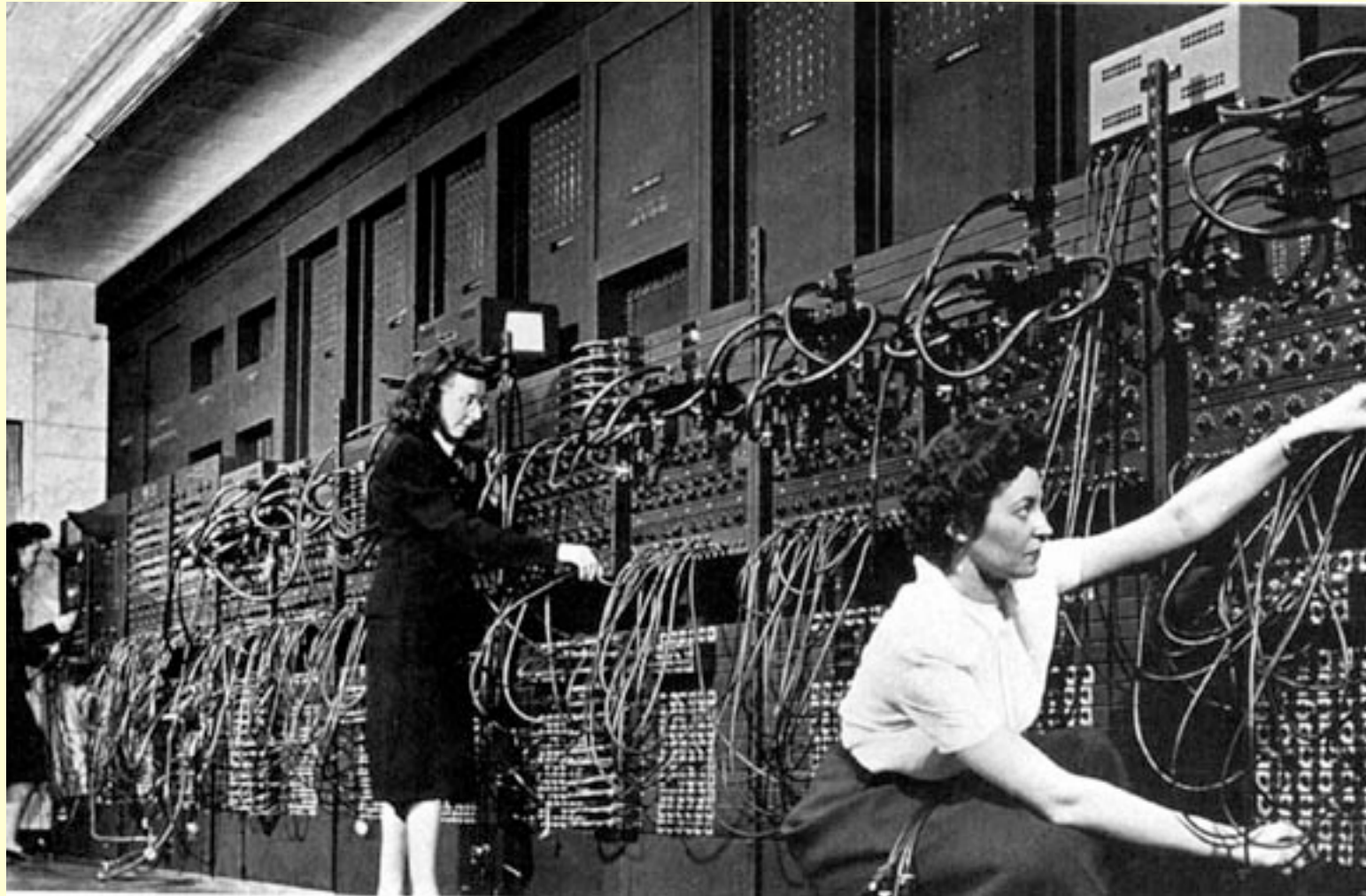
# The Key Themes of the Digital Age

- The exponential pace of the evolution of digital technology.
- The ubiquitous/pervasive character of the Internet.
- The relaxation (or obliteration) of the conventional constraints of space, time, and monopoly.
- The pervasive character of information (universal access to information, education, and research).
- The changing ways we handle digital data, information, and knowledge.
- The growing important of intellectual capital relative to physical or financial capital in the "new economy".

# A Detour:
## The Evolution of Computers

Mainframes (Big Iron)
…IBM, CDC, Amdahl
…Proprietary software
…FORTRAN, COBOL
…Batch, time-sharing

Minicomputers
…DEC, Data Gen, HP
…PDP, Vax
…C, Unix

Microcomputers
…Hand calculators
…TRS, Apple, IBM
…Hobby kits -> PCs

Supercomputers
…Vector processors
…Cray, IBM, Fujitsu
…Parallel processors
…Massively parallel

Networking
…LANs, Ethernet
…Client-server systems
…Arpanet, NSFnet, Internet

Batch ⟶ Time-sharing ⟶ Personal ⟶ Collaborative

# From Eniac

# To ASCI White

# The Evolution of Computing

# All Thinks, Great and Small



A logarithmic scatter plot comparing computational power (MIPS, vertical axis) against memory (Megabytes, horizontal axis) for various biological organisms and computing devices.

Vertical axis (MIPS): Billion, Million, 1000, 1, 1/1000

Horizontal axis (Megabytes): 1/Million, 1/1000, 1, 1000, Million, Billion, Trillion

Items plotted: Whale, Elephant, Human, Monkey, Optical Fiber, Deep Blue Chess Machine, Mouse, Japan Earth Simulator, Lizard, 1996 Home Computer, Spider, Video Channel, 1995 Robot Van, VCR, Nematode, 1985 Home Computer, Audio Channel, Human Genetics, Bacterial Genetics, Manual Calculation, Viral DNA, Book, Compact Disk, Library of Congress
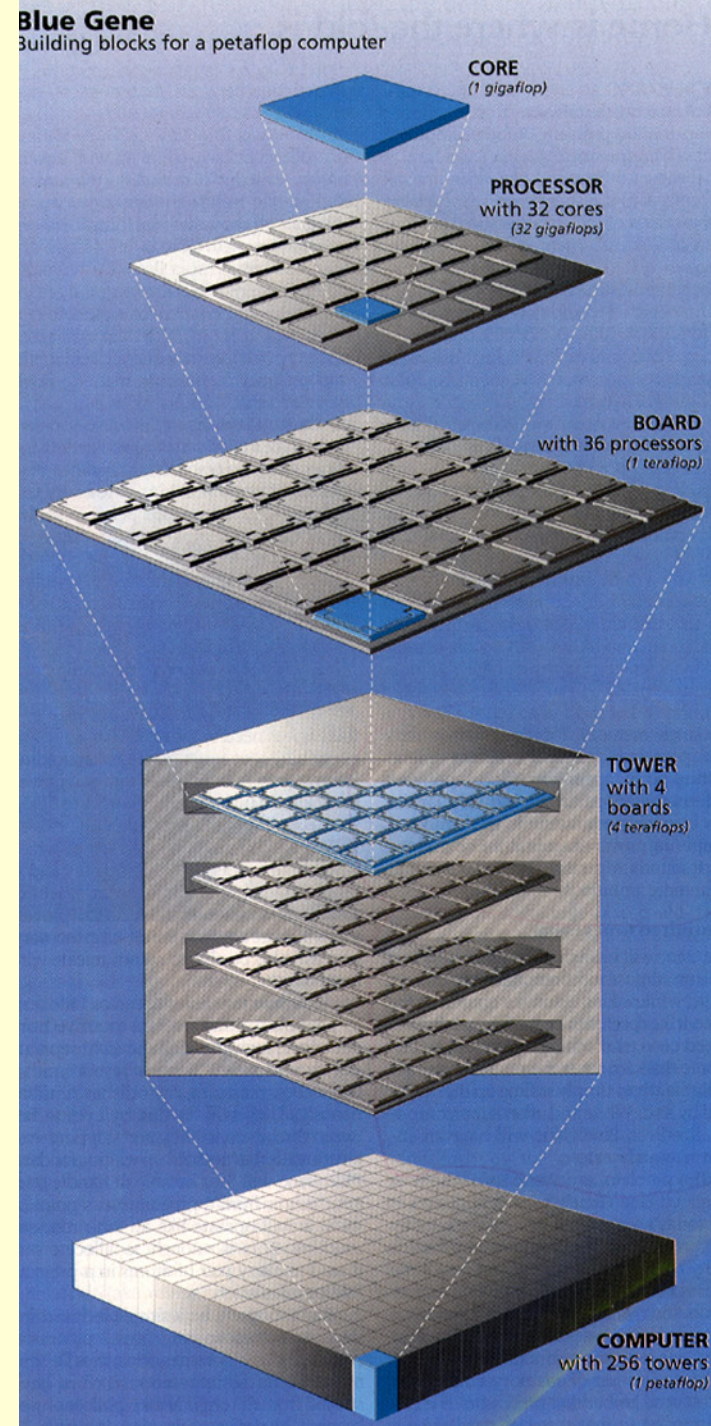
IBM Weather Simulator:

100 TeraFlops


IBM Blue Gene:

1,000 TeraFlops

= 1 PetaFlop

# Some Extrapolation of the PC

|          | 2000      | 2010      | 2020      |
|----------|-----------|-----------|-----------|
| Speed    | $10^9$    | $10^{12}$ | $10^{15}$ |
| RAM      | $10^8$    | $10^{11}$ | $10^{14}$ |
| Disk     | $10^9$    | $10^{12}$ | $10^{15}$ |
| LAN      | $10^8$    | $10^{12}$ | $10^{15}$ |
| Wireless | $10^6$    | $10^9$    | $10^{12}$ |

# Some Examples

- **Speed**
  - ✳ MHz to GHz to THz to Peta Hz
- **Memory**
  - ✳ MB (RAM) to GB (CD,DVD) to TB (holographic)
- **Bandwidth**
  - ✳ Kb/s (modem) to Mb/s (Ethernet) to Gb/s
  - ✳ Internet2 (Project Abilene):  10 Gb/s
- **Networks**
  - ✳ Copper to fiber to wireless to photonics
  - ✳ "Fiber to the forehead…"

# Computer-Mediated Human Interaction

- **1-D (words)**
  - Text, e-mail, chatrooms, telephony
- **2-D (images)**
  - Graphics, video, WWW, multimedia
- **3-D (environments)**
  - Virtual reality, distributed virtual environments
  - Immersive simulations, avatars
  - Virtual communities and organizations
- **And beyond...**
  - Telepresence
  - Neural implants

# Evolution of the Net

- Already beyond human comprehension

- Incorporates ideas and mediates interactions among millions of people

- 200 million today; more than 1 billion in 2005

- Internet2, Project Abilene

# Some Other Possibilities
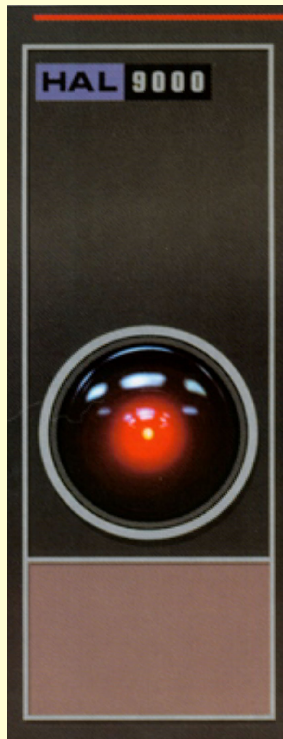
- **Ubiquitous computing?**
  - ✶ Computers disappear (just as electricity)
  - ✶ Calm technology, bodynets
- **Agents and avatars?**
  - ✶ Fusing together physical space and cyberspace
  - ✶ Plugging the nervous system into the Net
- **Emergent behavior?**
  - ✶ … Self organization
  - ✶ … Learning capacity
  - ✶ … Consciousness (HAL 9000)
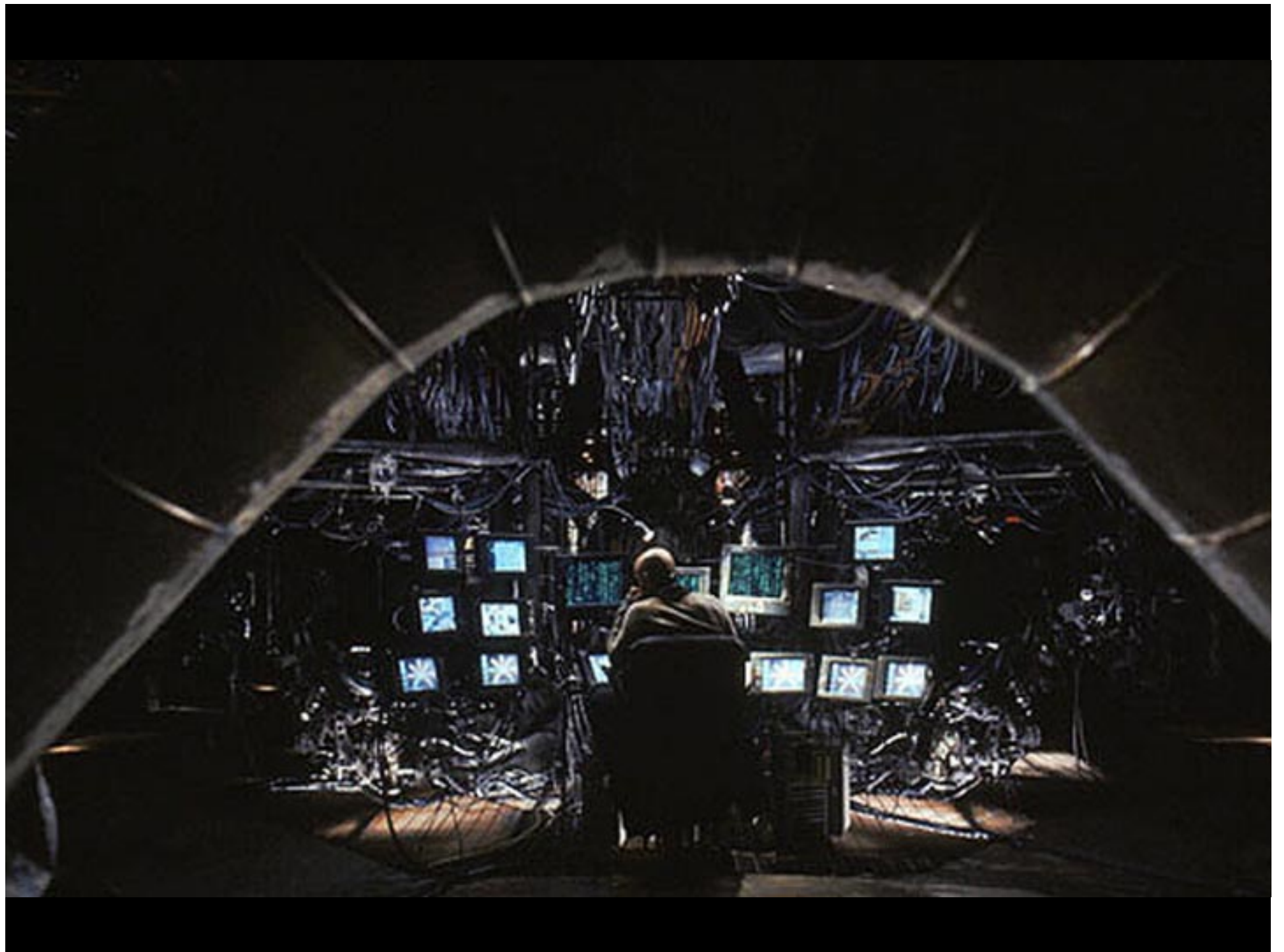
# IT and the University

**Missions**:  teaching, research, service?

**Alternative**:  Creating, preserving, integrating, transferring, and applying knowledge.

**The University**:  A "knowledge server", providing knowledge services in whatever form is needed by society.

**Note**:  The fundamental knowledge roles of the university have not changed over time, but their realizations certainly have.

# Research

- Simulating reality

- Collaboratories: the virtual laboratory

- Changing nature of research

  - Disciplinary to interdisciplinary

  - Individual to team

  - "Small think" to "big think"

- Analysis to creativity

  - Tools: materials, lifeforms, intelligences

# Libraries

- Books to bytes (atoms to bits)

- Acquiring knowledge to navigating knowledge

- What is a book?

  * A portal to the knowledge of the world.

# Teaching to Learning

- Pedagogy
  - ✴ From lecture hall to environment for interactive, collaborative learning
  - ✴ From teacher to designer and coach
- Classroom
  - ✴ From handicraft to commodity
  - ✴ From solitary students to learning communities
  - ✴ From campuses to virtual, distributed environments
- Open learning
  - ✴ From teacher-centered to learner-centered
- Passive Student to Active Learner to Demanding Consumer
  - ✴ Unleashing the power of the marketplace
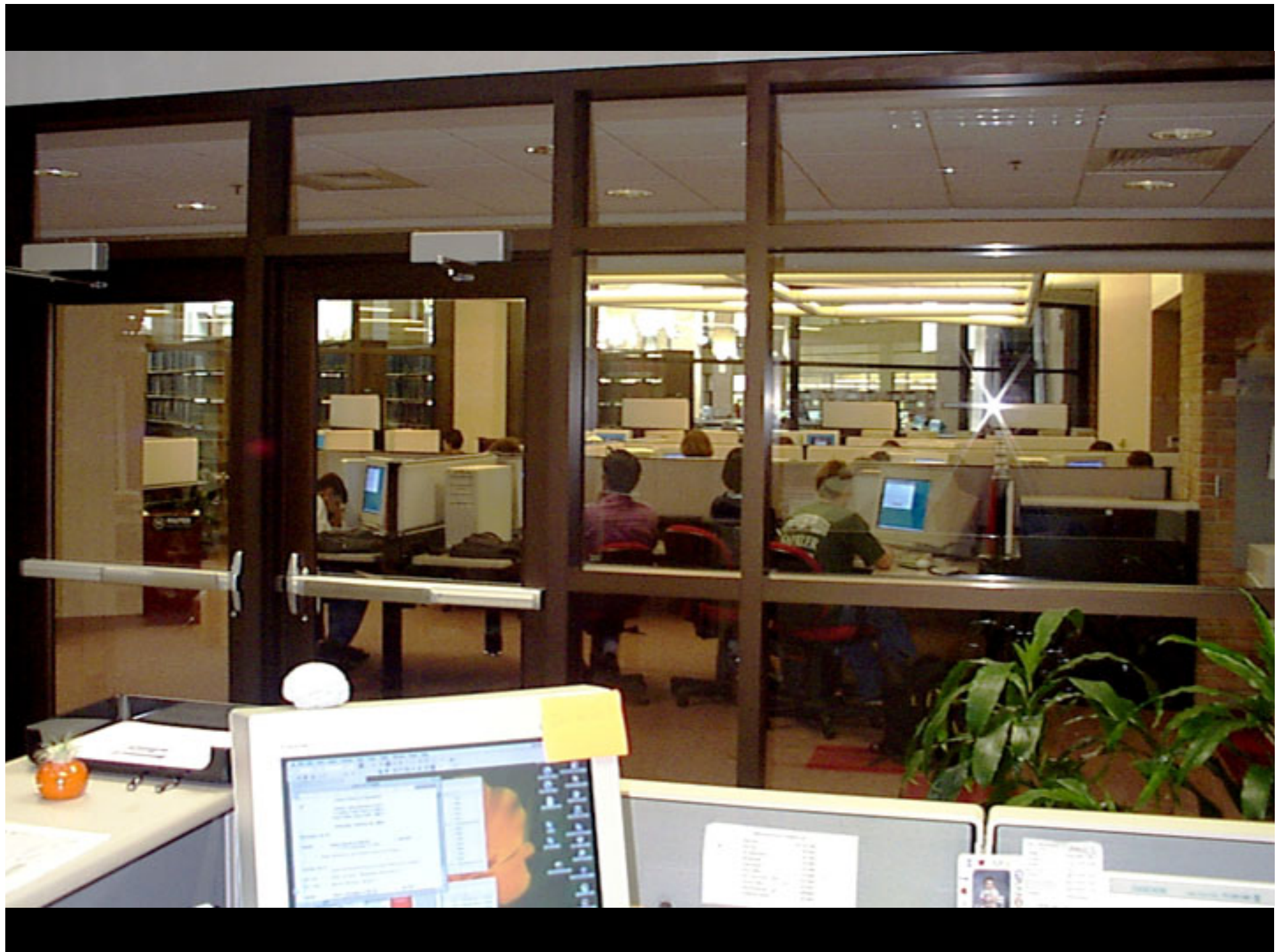
# The Plug and Play Generation

- Raised in a media-rich environment
  - ∗ Sesame Street, MTV,Playstation, Nintendo
  - ∗ Home computers, Internet, virtual reality
- Learn through participation and experimentation
- Learn through collaboration and interaction
- Multiprocessing, multimedia literacy, bricolage

# The Impact of Information Technology

## on the Future of

## the Research University

# Information Technology and
# the Future of the Research University

**Premise**:

Rapidly evolving information technology poses great challenges and opportunities to higher education in general and the research university in particular.

Yet many of the key issues do not yet seem to recognized or understood by either the leaders or stakeholders of the university.

# ITFRU Task Force

- James Duderstadt (Chair), President Emeritus, Univesity of Michigan
- Daniel Atkins, Professor of Information and Computer Science, University of Michigan
- John Seely Brown, Chief Scientist, Xerox PARC
- Marye Anne Fox, Chancellor, North Carolina State University
- Ralph Gomory, President, Alfred P. Sloan Foundation
- Nils Hasselmo, President, Association of American Universities
- Paul Horn, Senior Vice President for Research, IBM
- Shirley Ann Jackson, President, Rensselaer Polytechnic Institute
- Frank Rhodes, President Emeritus, Cornell University

- Marshall Smith, Professor of Education, Stanford; Program Officer, Hewlett Foundation
- Lee Sproull, Professor of Business Administration, NYU
- Doug Van Houweling, President and CEO, UCAIC/Internet2
- Robert Weisbuch, President, Woodrow Wilson National Fellowship Foundation
- William Wulf, President, National Academy of Engineering
- Joe B. Wyatt, Chancellor Emeritus, Vanderbilt University
- Raymond E. Fornes (Study staff), Professor of Physics, North Carolina State University

# Objectives

- To identify those information technologies likely to evolve in the near term (a decade or less).

- To examine the possible implications of these technologies for the research university: its activities; its organization, management, and financing and the impact on the broader higher education enterprise.

- To determine what role, if any, there is for the federal government and other stakeholders in the development of policies, programs, and investments to protect the valuable role and contributions of the research university during this period of change.

# Early Conclusions

- The extraordinary evolutionary pace of information technology is likely to continue for the next several decades.

- The impact of information technology on the university will likely be profound, rapid, and discontinuous–affecting all of its activities (teaching, research, service), organization (academic structure, faculty culture, financing and management), and the broader higher education enterprise.

# Conclusions (continued)

- Yet, for at least the near term, the university will continue to exist in essentially its present form, although meeting the challenge of emerging competitors in the marketplace will demand significant changes in how we teach, how we conduct scholarship, and how our institutions are financed.

- Although we feel confident that information technology will continue its rapid evolution for the foreseeable future, it is far more difficult to predict the impact of this technology on human behavior and upon social institutions such as the university.

# Conclusions (continued)

- In summary, for the near term (meaning a decade or less), we anticipate that information technology will drive comprehensible if rapid, profound, and discontinuous change in the university. It is a disruptive technology.

- For the longer term (two decades and beyond), the future is less clear. The implications of a million-fold or billion-fold increase in the power of information technology are difficult to even imagine, much less predict for our world and even more so for our institutions.

# Another Perspective …

The impact of information technology will be even more radical than the harnessing of steam and electricity in the 19th century. Rather it will be more akin to the discovery of fire by early ancestors, since it will prepare the way for a revolutionary leap into a new age that will profoundly transform human culture.

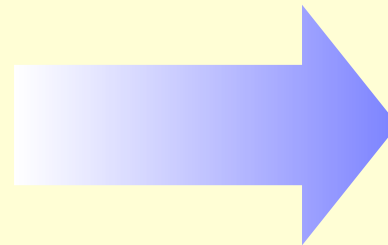–Jacques Attali, *Millennium*

# The Restructuring of the Higher Education ~~Enterprise~~ Industry

# Market Forces

Changing Social Needs

Financial Imperatives

Evolving Technology

**Powerful Market Forces**

# The Role of Markets

- For students (particularly the best)

- For faculty (particularly the best)

- For public funds (research grants, operating appropriations)

- For private funds (gifts, commercial revenue)

- For everything and everybody

# A Restructured Industry?

There are signs that higher education may be in the early stages of a major restructuring like other economic sectors such as energy, banking, and transportation that underwent restructuring following deregulation.

The restructuring of the higher education enterprise is being driven by changing social needs, financial pressures, rapidly evolving technology, and most significantly, emerging market forces. These are also driving a convergence of education with other knowledge-intensive industries such as information technology, telecommunications, information services, and entertainment into what might be regarded as:

**A Global Knowledge and Learning Industry**

# A Quote from a Venture Capital Prospectus

"As a result, we believe education represents the most fertile new market for investors in many years. It has a combination of large size (approximately the same size as health care), disgruntled users, lower utilization of technology, and the highest strategic importance of any activity in which this country engages . . . . Finally, existing managements are sleepy after years of monopoly."

# Contributions of the Research University

Research Universities → Teaching → Learning → People

Research → Discovery → Ideas

Service → Engagement → Tools
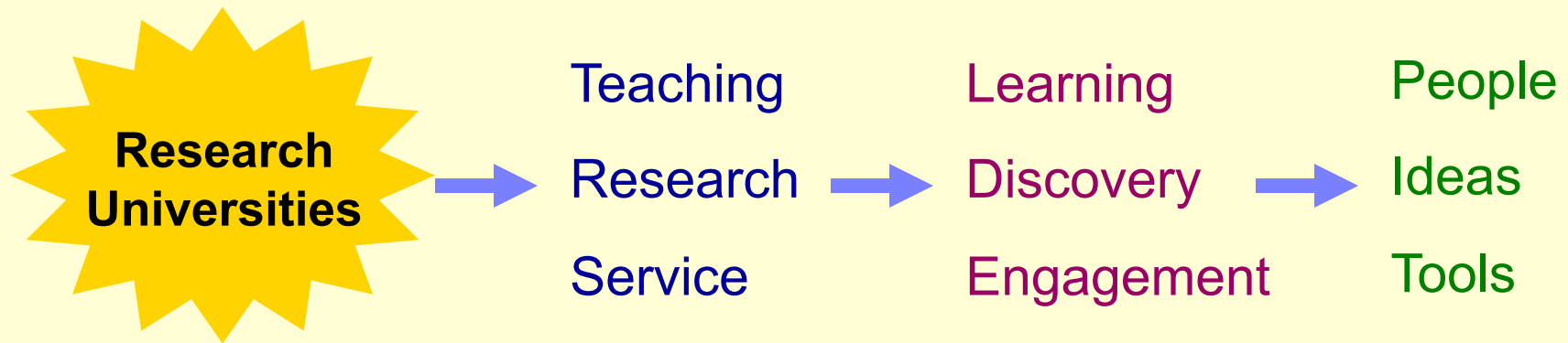
# Scenario 1

The Brave, New World

of

Commercial Higher Education

# The Knowledge Industry

Hardware ⟶ Boxes, PCs, PDAs ⟶ IBM, HP, Sun, Lucent, Nokia, Ericcson

Networks ⟶ Backbones, LANs, Wireless ⟶ AT&T, MCI, Telcoms

Software ⟶ OS, Middleware, Applications ⟶ Microsoft, IBM, Sun

Solutions ⟶ Systems, Integrators ⟶ Accenture, EDS, IBM, Unisys

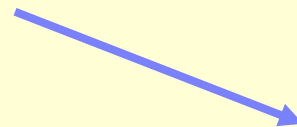Content ⟶ Data, Knowledge, Entertainment, Learning? ⟶ Time-Warner, Disney, "dot.coms", **AAU?**

# The Core Competencies of the University
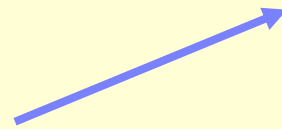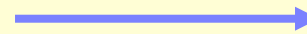
# A Possible Future
# for the U.S. Higher Education Enterprise

- $300 billion ($3 trillion globally)
- 30 million students
- 200,000 faculty "facilitators"
- 50,000 faculty "content providers"
- 1,000 faculty "celebrity stars"

Supported by a commercial industry handling the production and packaging of learning ware, the distribution and delivery of educational services to learners, and the assessment and certification of learning outcomes.

(compared to 800,000 current faculty serving a $180 billion enterprise with 15 million students …)

# Possibilities

- Unbundling
- A commodity marketplace
- Mergers, acquisitions, hostile takeovers
- New learning lifeforms
- An intellectual wasteland???

# Scenario 2

# A Society of Learning

# A Society of Learning

Since knowledge has become not only the wealth of nations but the key to one's personal prosperity and quality of life, 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 an affordable cost.

# Key Characteristics of Education in a Society of Learning

- Learner-centered
- Affordable
- Lifelong learning
- A seamless web
- Interactive and collaborative
- Asynchronous and ubiquitous
- Diverse
- Intelligent and adaptive

# A Key Policy Question

How do we balance the roles of market forces and public purpose in determining the future of higher education. Can we control market forces through public policy and public investment so that the most valuable traditions and values of the university are preserved?

Or will the competitive and commercial pressures of the marketplace sweep over our institutions, leaving behind a higher education enterprise characterized by mediocrity?

**Which of the two scenarios will be our future?**

# Transforming the University

# Challenges to Change

- The complexity of the contemporary university
- The unrelenting pace of change
- Resistance to change (from within and without)
- Mission creep
- Antiquated governance of universities

# Some Lessons Learned

- Always begin with mission and values
- The importance of diversity
- The difficulty of achieving balance
- Government and governance
- Institutional autonomy and subsidiarity
- Financing higher education
- Alliances
- Experimentation
- Turning threats into opportunities

# Begin with the basics: mission and values

- What are our most important roles? Educating the young? Preserving and transmitting culture? Basic research and scholarship? Sustaining the academic disciplines and professions? A responsible critic of society?

- What are our most important values? Academic freedom? An openness to new ideas? Rigorous study? Faculty governance? Faculty tenure?

# The Importance of Diversity

- Diverse institutions to serve diverse societal needs
- Importance of stratified systems, tiered to both achieve excellence and serve mass education needs (e.g., the California master plan)
- Focus on missions that reflect not only tradition and unique roles but also core competencies where institutions can attempt to be world-class
- Avoid the "Harvardization" syndrome

# Achieving balance

- Among missions (teaching, research, service)
- Among disciplines (liberal education, academic disciplines, professions)
- Undergraduate vs. graduate vs. professional education (e.g., education vs. training)
- Sciences vs. humanities
- Life sciences vs. everything else (U.S. dilemma)

# Governments and Governance

- Public policy that views the university as
  - A "public good" or an individual benefit?
  - A public investment or an expenditure?
  - A government agency or a social institution?
- Increasing government demands for accountability and performance
- Shared governance (rigor mortis or anarchy?)

# Some Governance Principles

- Institutional autonomy
  - Academic freedom
  - Responsible social critic
  - Ability to control destiny during time of change
- Subsidiarity
  - Authority and responsibility pushed to lowest possible level
  - Academic leadership provided with authority commensurate with responsibility

# Financing the University

- Who pays? Governments? Students? Research sponsors? Private donors? Marketplace?
- Tax policy that stimulates private donations (charitable contributions)
- Ownership of intellectual property (Bayh-Dole Act)
- The entrepreneurial university
- The "privately-supported but publicly-committed" university

# Alliances

- As universities become more specialized and differentiated, alliances become more important
- Among different types of institutions (research universities, polytechnics, liberal arts colleges)
- International alliances (e.g., Erasmus-Socrates, Bologna Declaration)
- Symbiotic relationships (industry, government)

# Experimentation

- Change is accelerating. The future is becoming less certain.

- One possible approach to uncertainty is explore possible futures through experimentation and discovery.

- To encourage a higher-risk culture in which occasional failure is tolerated

- To encourage grass-root engagement of faculty and students (to ban the word "No" from the vocabulary of administrators and bureaucrats)

# An Example: the University of Michigan

During the 1990s we explored an array of new paradigms

- A privately-supported, public university (restructuring financing by increasing tuition, federal R&D support, private gifts, endowments, reserves,and moving to more efficient management styles)

- A diverse university with respect to race, gender, nationality, socioeconomic background, etc.

- A world university with programs in Asia, Europe, Latin America, and Africa

- A cyberspace university, with leadership through the Internet (and now Internet2)

# Another Example: "An Open Source University"

- Linux software movement
- MIT Open Courseware Project
- Michigan CHEF Project

An idea: Suppose a small group of the world's leading comprehensive universities were to place in the public domain (for all to use) the digital resources supporting their entire curriculum (all academic disciplines and professional programs), along with open-source versions of the software tools and platforms necessary to use these resources…

# Turning Threats into Opportunities

- Approach issues and decisions concerning university transformation not as threats but rather as opportunities.

- Once we accept that change is inevitable, we can use it as a strategic opportunity to control our destiny, while preserving the most important of our values and our traditions.

# A Warning

"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*

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3. How do we balance the roles of public purpose versus market forces in determining the future of our universities? (Can public investment counter competitive and commercial market pressures?)

4. What should be the role of the research university within a changing higher education enterprise? Should we lead change? Or should we protect key values and traditions (e.g., academic freedom, social critic)?

# And, perhaps the most important question of all…

Are we facing a period of evolution, revolution, or possible extinction of the university as we know it today?

# One of civilization's most enduring institutions

For a thousand years the university has benefited our civilization as a learning community where both the young and experienced could acquire not only knowledge and skills, but as well the values and discipline of the educated mind.

It has defended and propagated our cultural and intellectual heritage, while challenging our norms and beliefs.

It has produced the leaders of our governments, commerce, and professions.

It has both created and applied new knowledge to serve our society.

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

# The Continuity of Change

Clearly higher education will flourish in the decades ahead. In a knowledge intensive society, the need for advanced education and knowledge will become ever more pressing, both for individuals and societies more broadly.

Yet it is also likely that the university as we know it today–rather the current constellation of diverse institutions comprising the higher education enterprise–will change in profound ways to serve a changing world.

Just as it has done, so many times in the past.