

New York State
Regional Economic Development Councils
September 27, 2011

Partnerships—Higher Education:
“The 21st Century Relevant University”

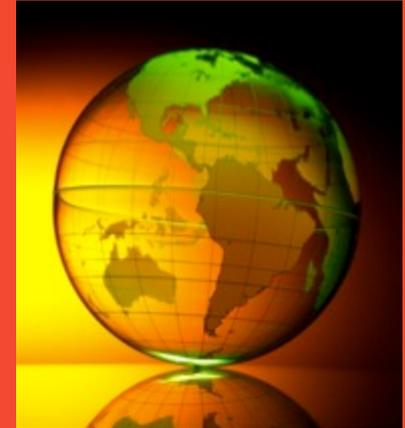


Strategies for the Global Knowledge Economy

- ➔ The Global Knowledge Economy Context

- ➔ Universities in Regional Innovation Strategies
 - Human Capital
 - Regional Innovation Systems
 - Quality of Place

- ➔ The 21st Century *Relevant University*



The Global Knowledge Economy Context: Some Comments and Definitions



In 8,000 Years of Human Economies and Societies: Only 3 HUGE Transformations



Pre-Agrarian

– Pre-history to 8,000 BC

- ➔ Hunting/Gathering
- ➔ Nomadic Cultures
- ➔ Emergence of Tools



Agrarian

– Since @ 8,000 BC

- ➔ Agricultural Cultivation
- ➔ Formation of Communities
- ➔ Laws for Land Ownership



Industrial

– Since @ 1800

- ➔ Machines/Production Process
- ➔ Literacy/Public Schools
- ➔ Business Organizations & Law



Knowledge

– Since last few decades

- ➔ Innovation & Technology
- ➔ Knowledge Work Force
- ➔ Globalization, Alliances, Regionalism, Networks

The Global Knowledge Economy: A Definition

- ➔ Captures and commercializes innovation
- ➔ Advances competitiveness of traditional industries
- ➔ Grows visible, globally-competitive clusters in new knowledge-intensive enterprises
- ➔ Creates and sustains a highly-skilled work force



The Global Knowledge Economy: 4 Mega-Industry Clusters

➤ Information and Telecommunications

- Hardware
- Software
- Telecommunications and Internet services

➤ Life Sciences

- Genomics-human, plant, animal
- Diagnostics, treatments, biomaterials, bioengineering
- Food supply

➤ Advanced & Sustainable Manufacturing

- New Materials, e.g. nano-materials
- New Processes, e.g., nano-manufacturing
- Customization; identification; compatibility

➤ Energy and Environment

- Alternative/clean energy
- Transportation and logistics
- Protection and remediation of water, air, earth—and SECURITY
- Sustainability

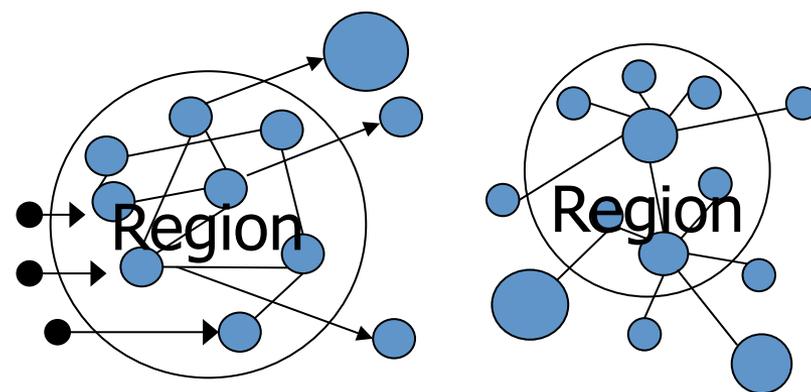
A Very Old Model—New Strategic Importance

- ➔ Groups of businesses that form a value or supply chain and that interact by...
 - Buying from and selling to one another
 - Using the same physical infrastructure
 - Relying on the same institutions
 - Both competing and collaborating
 - Sharing skilled workforce pools

- ➔ Clusters build on some form of competitive advantage, usually intertwined factors:
 - Critical infrastructure investments
 - Business climate
 - Presence of entrepreneurs
 - Emergence of a new technology
 - Niche expertise of a university

Old Cluster Examples:

Holland	Flower Bulbs
London	Finance
Antwerp	Diamonds
Paris	Couture
Hong Kong	Shipping/Trade
Hollywood	Cinema
Michigan	Automotive
New Jersey	Pharmaceuticals

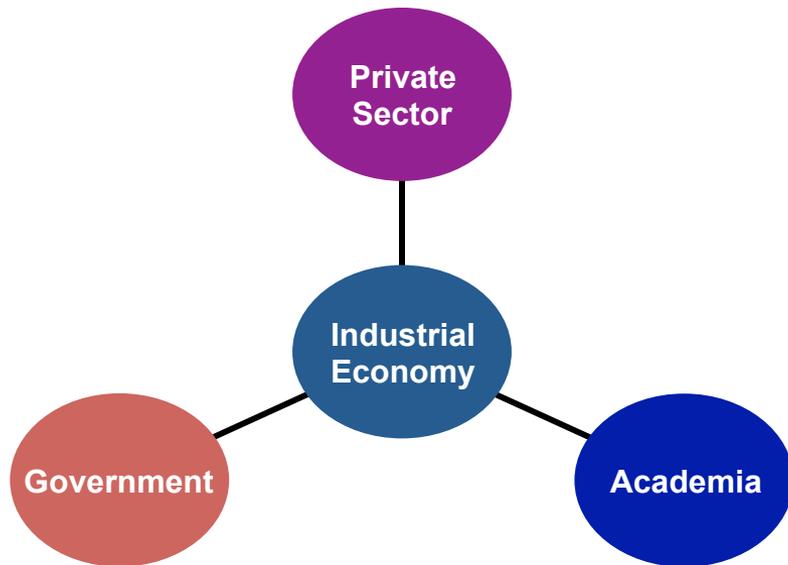


Source of Cluster Graphics: Jerry Paytas,
Carnegie Mellon University

From Sectoral to Functional Organization

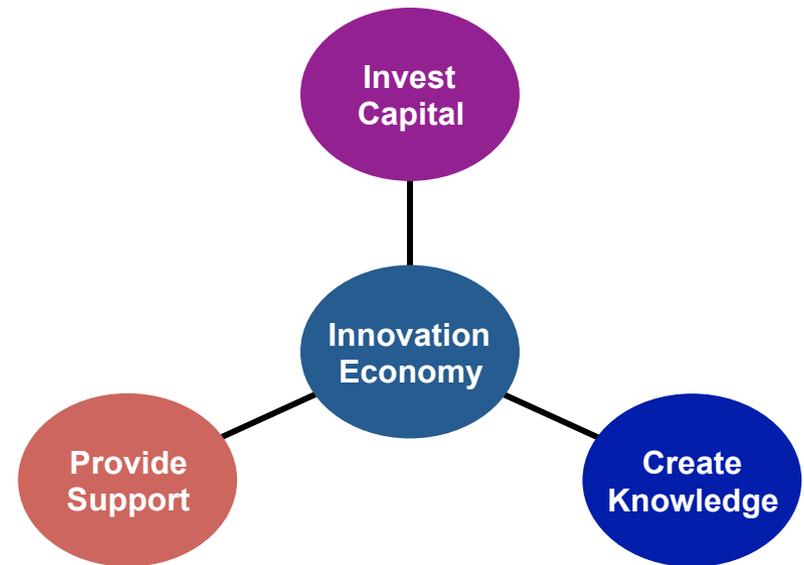
Partnerships are Not Optional

In the Industrial Economy
Functions were organized
within sectors



Wealth = Capital + Labor

In the Knowledge Economy
Functions are organized
across sectors



Wealth = Capital + Human Capital

Today, very little can be accomplished without viable partnerships.

The 20th Century University in the Industrial Economy

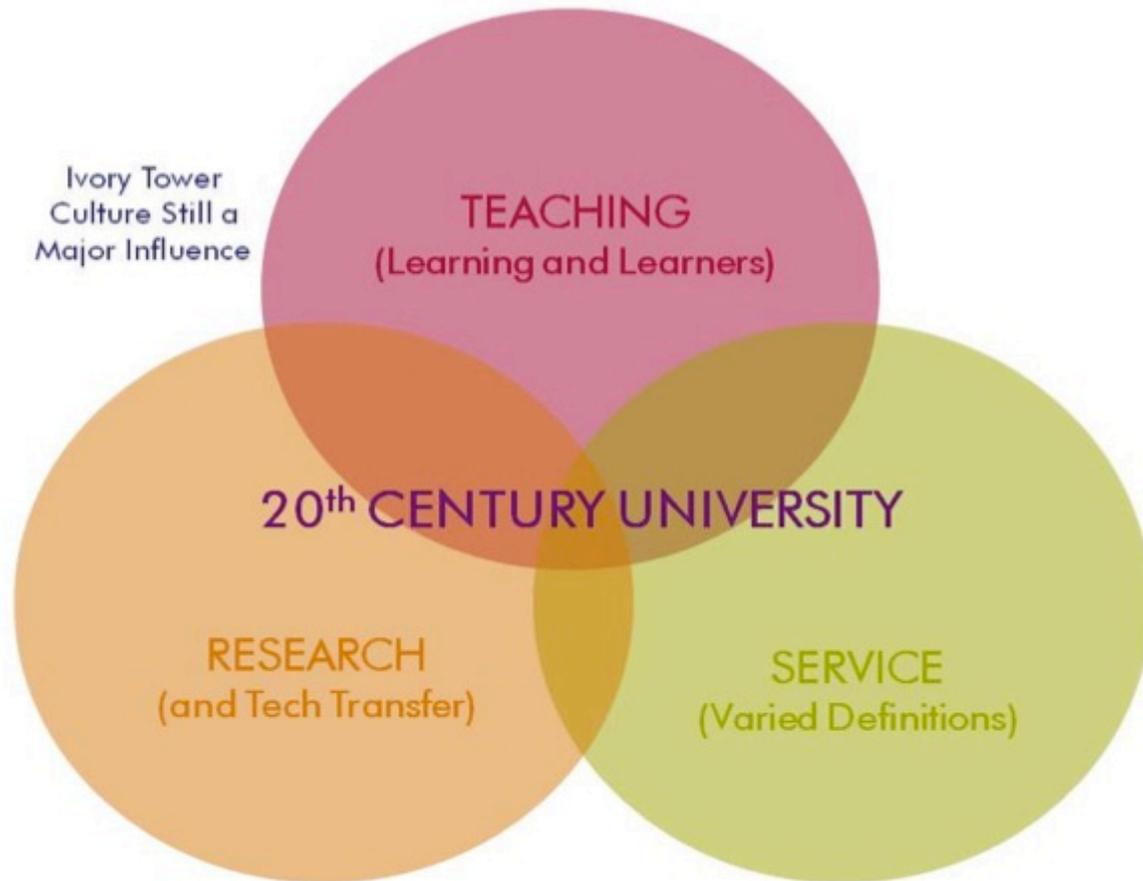
Teaching = 18 to 26 year olds

Tech commercialization = a recent mission expansion

Service = ill-defined and not measured or valued in the reward system

All the metrics are “internal.”

We value what we measure.



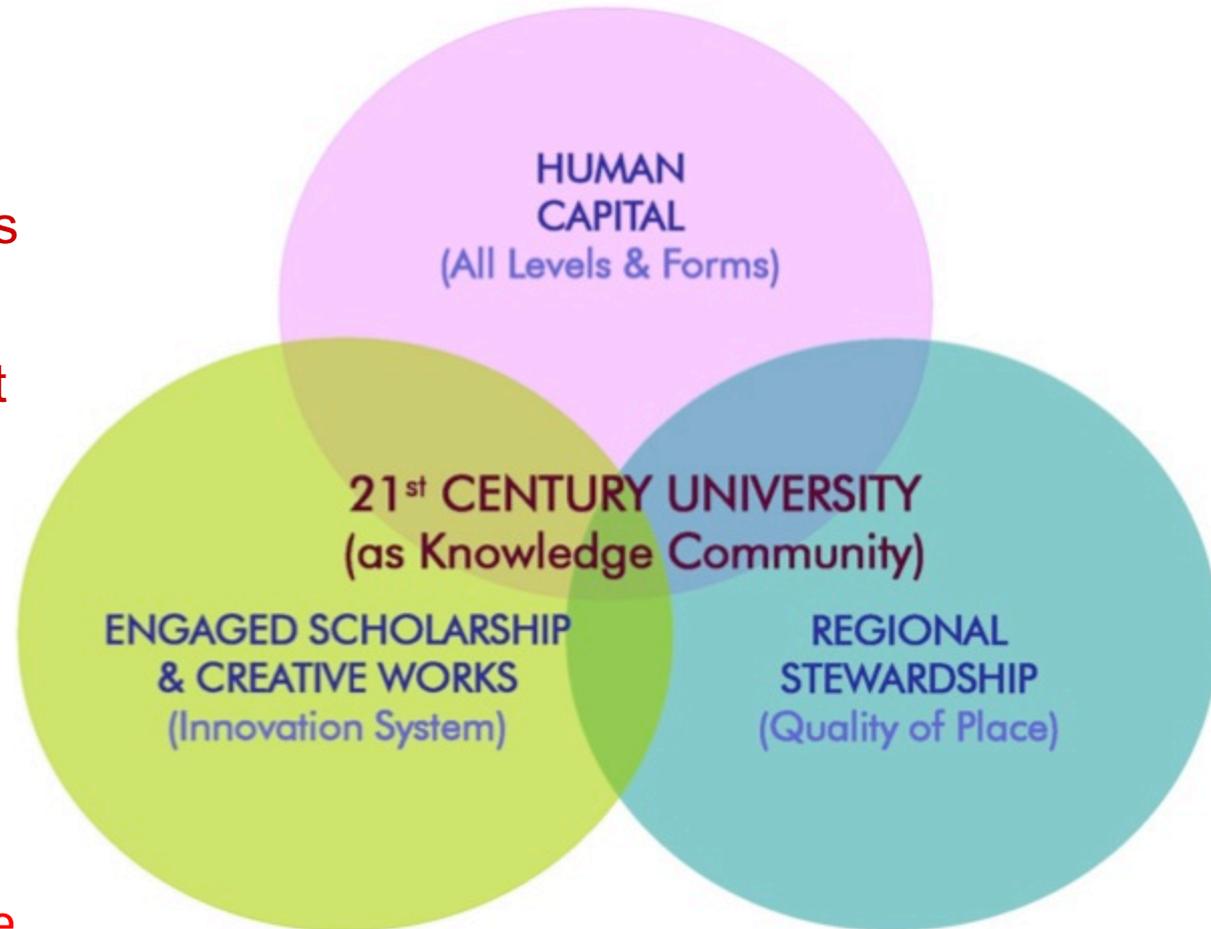
The 21st Century University in the Global Knowledge Economy

Human Capital = Take
responsibility for all of it

Leader and partner for
regional innovation systems

Define and reward
stewardship & engagement

Make the metrics external
(impact)



We value what we measure.



Universities in Regional Innovation Strategies: Human Capital

“Most widely dispersed form of wealth in human history”

(Review of Lester Thurow in BookNotes, American Journal of Economics and Sociology 1999)



➔ Human Capital =

- The knowledge residing in the heads of employees that is relevant to the purpose of the organization

➔ Customer Capital =

- The value of a company's ongoing relationships with the people or organizations to which it sells
 - e.g., market share, customer retention and defection rates, and profit per customer

➔ Structural Capital =

- The knowledge retained within the organization
 - Belongs to the company as a whole and can be reproduced and shared. Structural capital includes technologies, inventions, publications, and business processes
 - “Knowledge that doesn't go home at night”

Source: Stewart, Thomas. *Intellectual Capital*. 1998. Quoted at http://www.ultimatebusinessresource.com/images/intellectual_capital.pdf

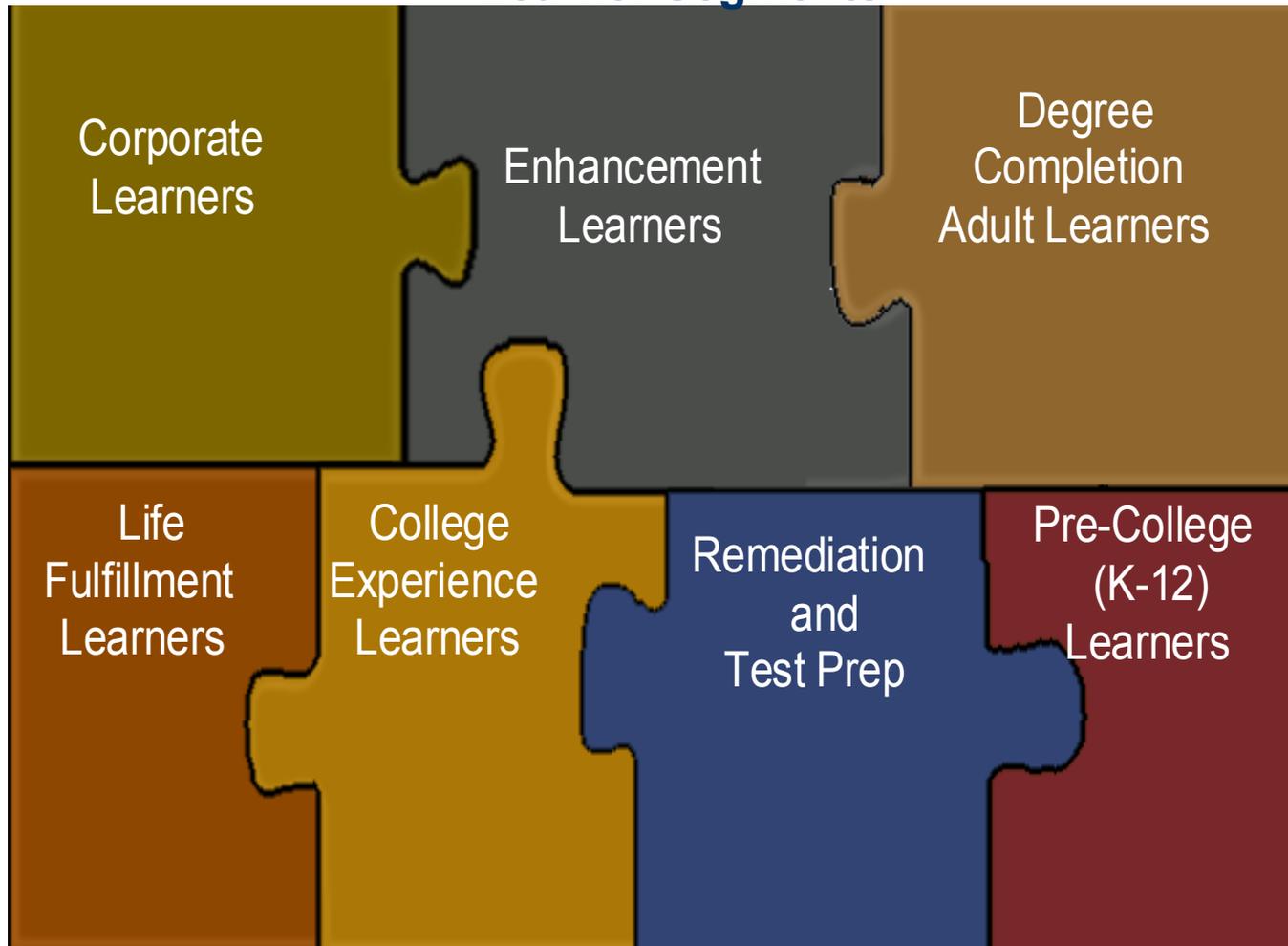
Population Matters: Ten US Megapolitans



Source: Lang and Dhavale, Metropolitan Institute at Virginia Tech University, 2005

To Sustain Human Capital in the Global Knowledge Economy: Maybe Everyone Will Always Be “in College”

7 Learner Segments



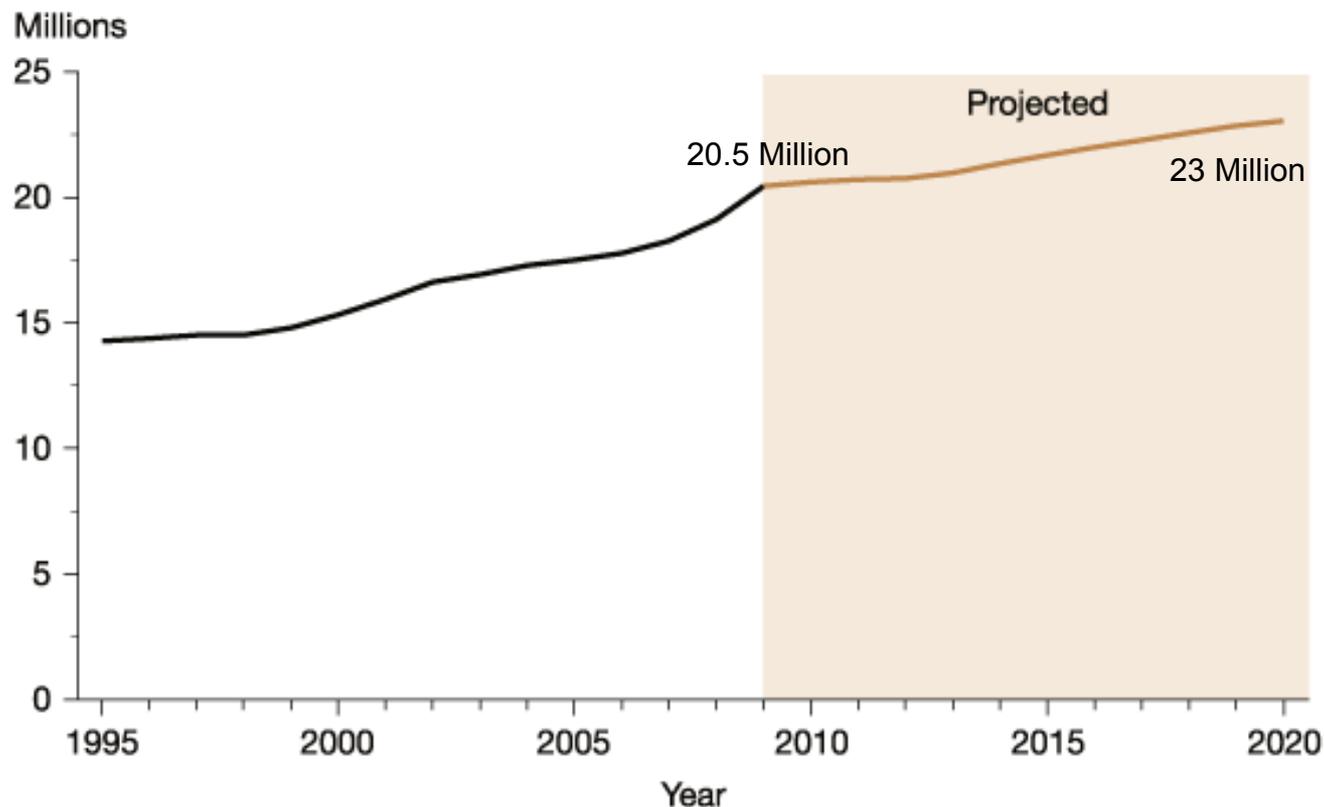
Source: Linda L. Baer, Minnesota State Colleges and Universities

What if NCES Projections are Wrong? What if Lumina and Others Get their Way?

Figure 16. Actual and projected numbers for total enrollment in all postsecondary degree-granting institutions: Fall 1995 through fall 2020



University of Phoenix
claimed that 38
million US adults are
seeking college
degrees.



http://nces.ed.gov/programs/projections/projections2020/figures/figure_16.asp?referrer=list

The Biggest Questions are Qualitative

- What does the credentialed graduate know and know how to do?
- What education experiences yield the most adaptable life-long learners?
- What are the uses and limitations of standardized testing?
- Can the liberal arts / general education requirements still save us?

Or, how do we produce very large numbers of people who:

- Have baseline knowledge about many things
- Have some specialized knowledge in some one thing
- Think critically and creatively
- Remain high-functioning throughout their lives
- Find it easy to return to education when needed



Technology and Pedagogy: Huge Increase in Learners and Now Rapidly-Evolving Changes



2,000 Years Ago



1,000 Years Ago



600 Years Ago



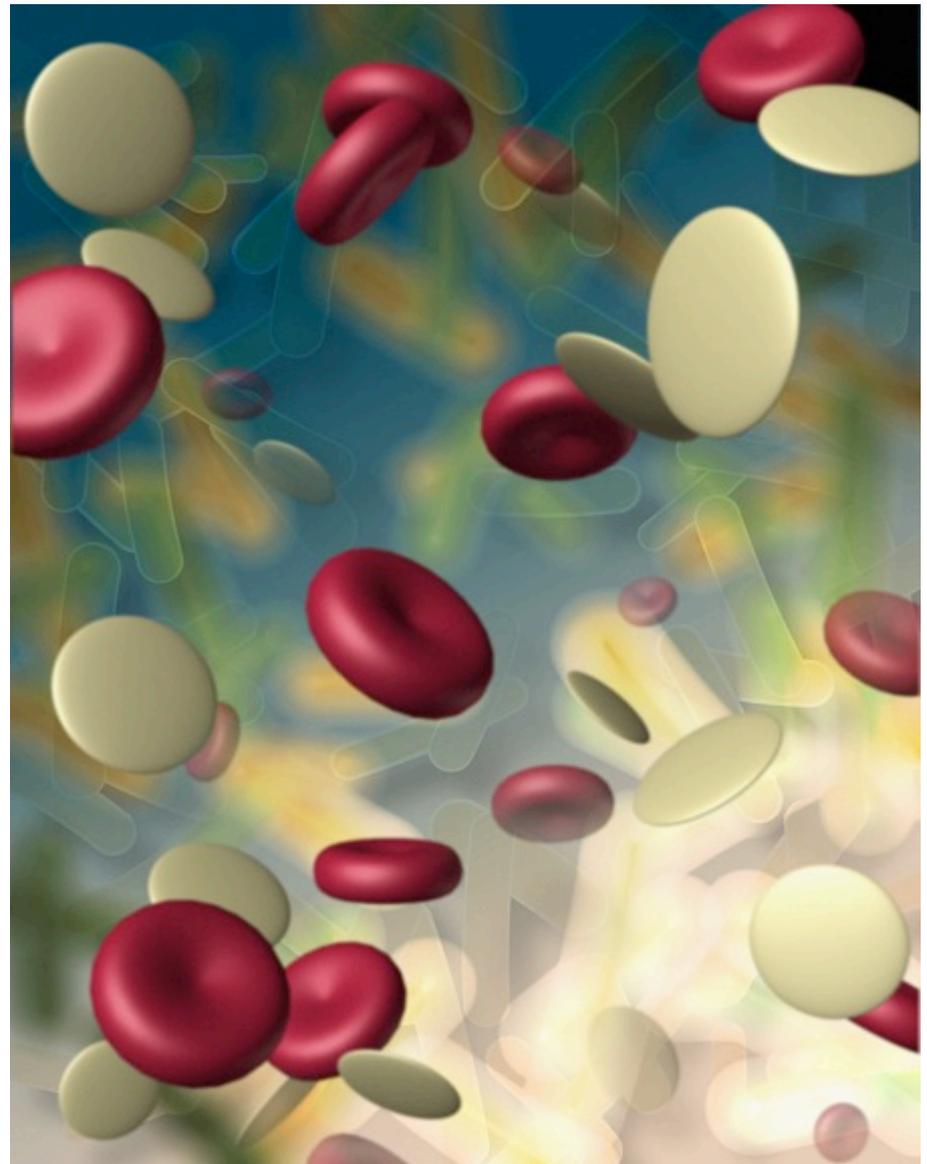
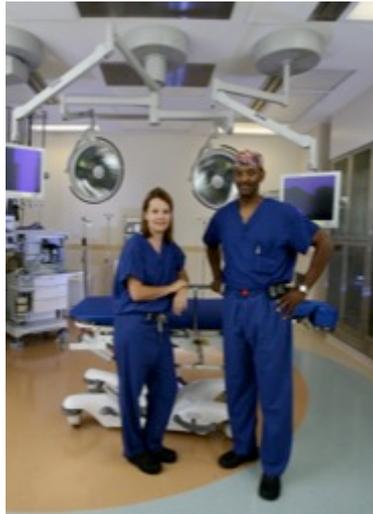
150 Years Ago



Yesterday

And then what...in 2020 or 2030?

Ever Greater Importance of *Effectiveness* in STEM: And New Models for Liberal Education?



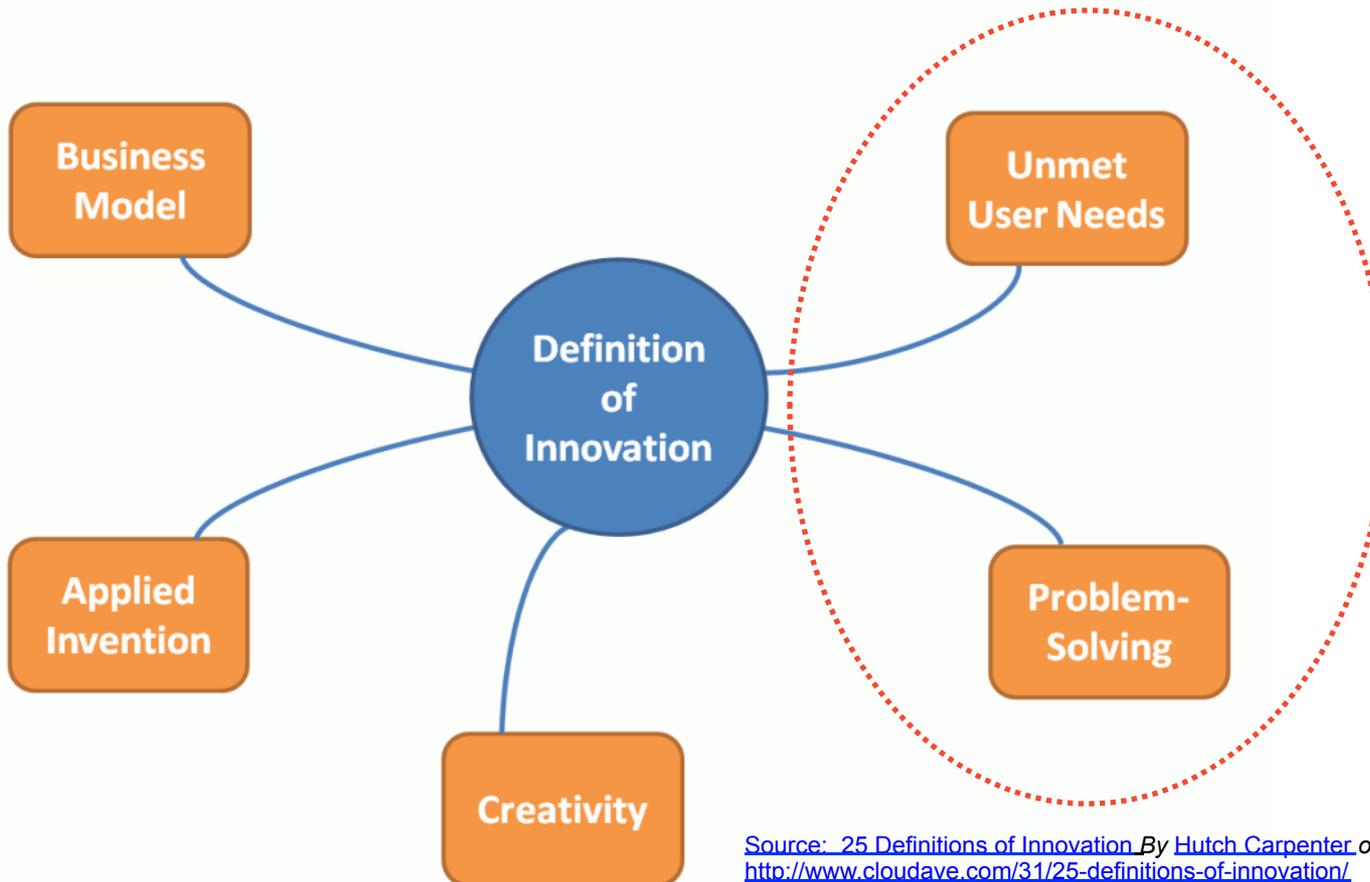


Universities in Regional Innovation Strategies: Innovation Eco-Systems



Mapping the Definitions of Innovation

It's NOT just about
technology!!!!



Source: [25 Definitions of Innovation](http://www.cloudave.com/31/25-definitions-of-innovation/) By Hutch Carpenter on August 18, 2010, Cloud Avenue
<http://www.cloudave.com/31/25-definitions-of-innovation/>

Regional Innovation Systems Metaphors for Higher Education's Roles

➡ Machine Metaphors:

- Suggestion that this is where the pace is set for the region's progress
- *Engine, powerhouse, driver, dynamo, booster, accelerator, or lever*

➡ Biological Metaphors:

- Suggests associations with something that sprouts, then blossoms or reinvigorates
- *Hothouse, seedbed, breeding ground, spawning place, catalyst, or fermenter*

➡ Network Metaphors:

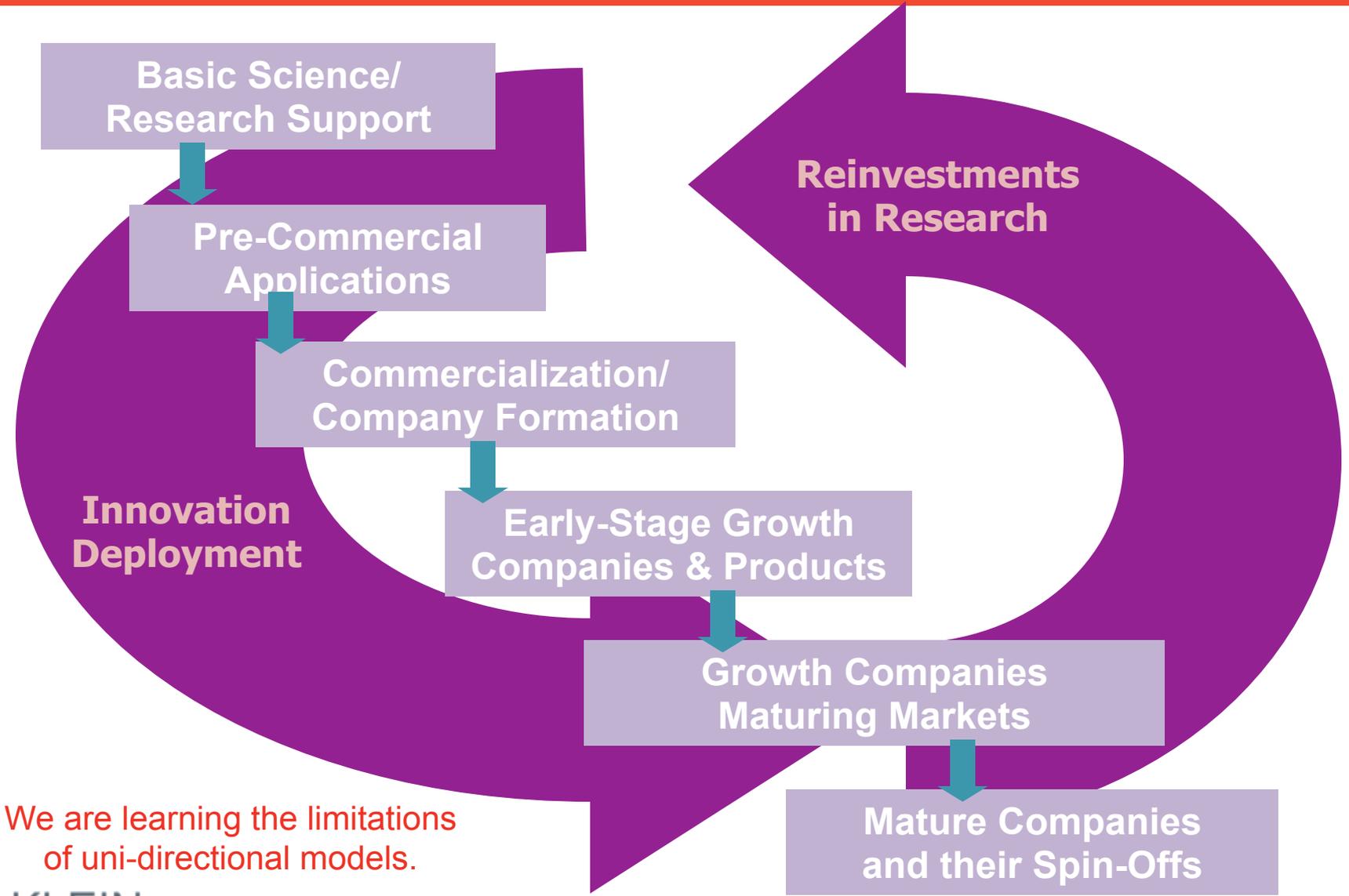
- Suggests access to and dissemination of information and knowledge
- *Node, hub, bridgehead, mediator, coupling unit, transfer point, transmission centre*

➡ Time Metaphors:

- Suggests higher education takes the lead in a transformation process
- *Spearhead, vanguard, lighthouse, and signpost*

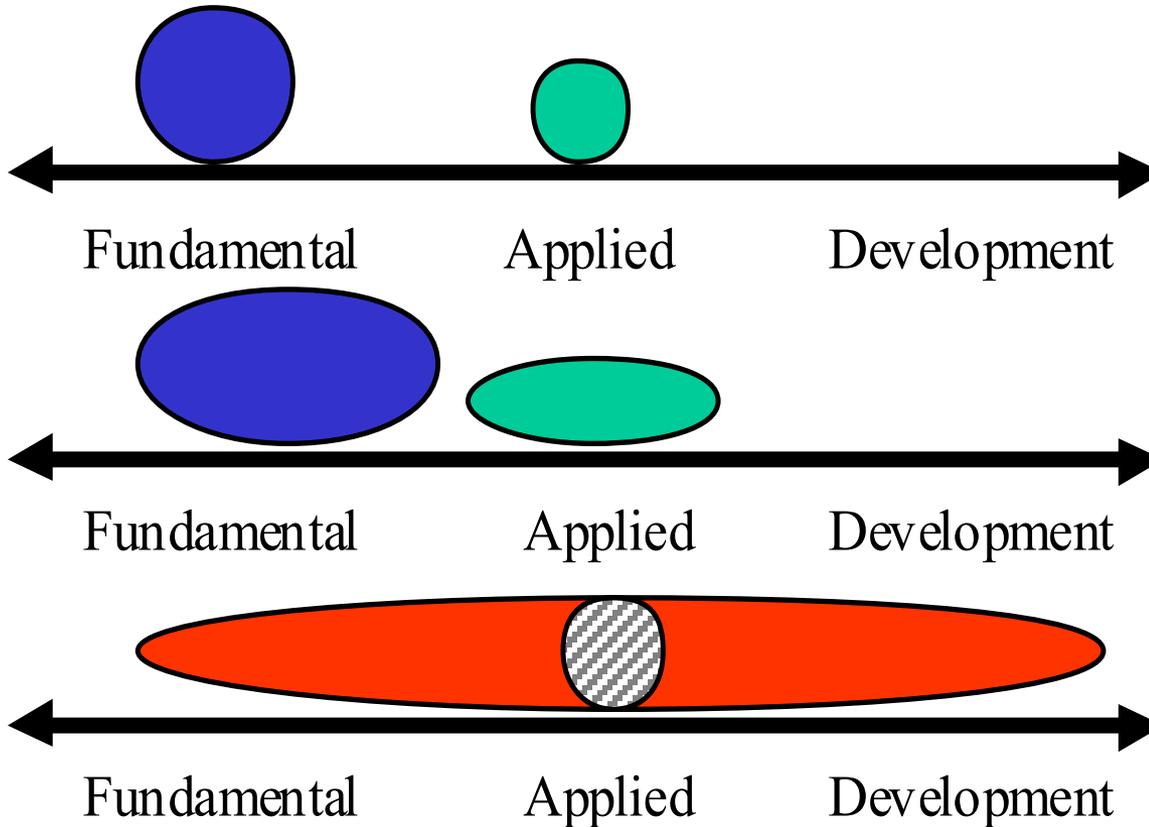
Peter Arbo, Peter and Benneworth, Paul. *Understanding the regional contribution of higher education institutions: A literature review, Introduction, pp. 6-7, OECD, 2006*

An Innovation Enterprise Life Cycle: Implant, Capture, Grow, Re-Seed



We are learning the limitations
of uni-directional models.

Research in an Innovation System: Starting from Both Ends



BUT:
Corporate R&D
investments are shifting
to Development.

We still need robust
Fundamental Research
funding and high
performance in our
universities.

Source: ROBERT D. ATKINSON AND LUKE
A. STEWART, MAY 2011

College of Textiles NC State

Or, the story of Dr. Fritz Russ, founder of Systems Research
Laboratories (SRL) in Ohio. Started MANY small companies.

Regional Innovation Systems: A View from Outside the University

Critical Elements

World-class Research Institutions

Experienced Entrepreneurial Talent

Access to Capital

Knowledgeable Service Providers

Entrepreneurial Culture
Supporting Innovation

Advanced R&D Facilities

Effective Tech Transfer

Educated Workforce

Quality of Life
Attractive to Creative Class

Engaged Public Sector



Fusion in a System



Center For Emerging TechnologiesSM

Regional Innovation Systems: It's Messy and Still Being Defined

THE SEEDS

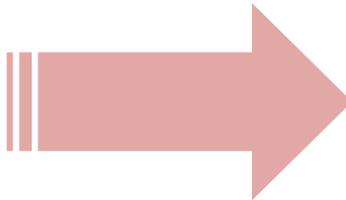
University Research
Strategic Niches / Focus



Collaborations
Ways to Enhance



Corporate & Federal R&D
Policy and Incentives



THE CULTIVATION

IP Policies—
New focus on deployment

Filling Risk Capital Gaps—
\$ for Proof of Concept, Pre-Seed, and Seed Investments

Business Development—
Entrepreneur support & business solutions

Knowledge Work Force—
New Education & Training Solutions

Creating a Regional Innovation Economy: 5 Success Factors

- ➔ Human capital
- ➔ Niches of competence
- ➔ Infrastructure for innovation
- ➔ Smart community “places” (civic/social capital)
- ➔ Regional leadership and strategy (with correct metrics)

Regional Innovation Systems The Skorton Report—NY State

- ➔ ***Research universities***
 - Boasting world-class expertise in a given area or areas
- ➔ ***R&D-dependent industry***
 - That seeks to leverage open-innovation principles
- ➔ ***Access to capital***
 - Characterized by both available investment capital and high levels of communication between venture capitalists and university researchers
- ➔ ***Business services***
 - For researchers and entrepreneurs looking to commercialize their research
- ➔ ***Critical mass***
 - Of researchers, entrepreneurs and investors with knowledge of strategic research areas (with “strategic” defined by industry and academic expertise and investment in those areas)
- ➔ ***Clearly defined government policies***
 - That establish broad-based technology priorities in areas of existing strength with growth potential and invest in those priorities
- ➔ ***Communication networks***
 - That facilitate collaboration between institutions of higher education, industry and the professional investment community
- ➔ ***Regular, public reporting of metrics***
 - Measuring nationwide, state-, university- and company-level performance on innovation capacity, activity and outcomes

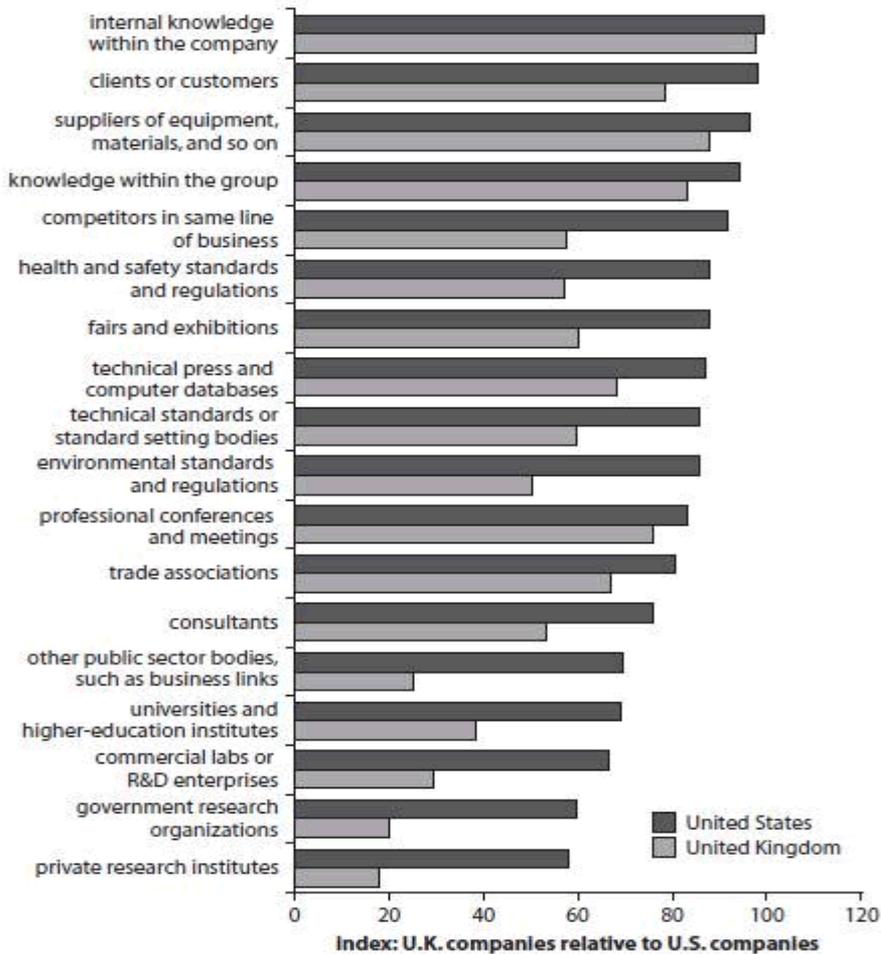
It's an Innovation System: Not Just Patents and Licensing Companies, Not Universities, Lead in Patents

- ➔ 14 universities, including one in China—Tsinghua University—were among the 300 organizations that earned the most US patents in 2010
- ➔ The University of California system, as usual, topped the list of universities; it won 349 patents in 2010 and was ranked 83rd over all.
- ➔ Tsinghua, with 104 patents, ranked 228th.
- ➔ The overall leader, IBM, got 5,866 patents.

Top 300 Organizations Granted U.S. Patents in 2010, International Patent Owners Association, *May 25, 2011*

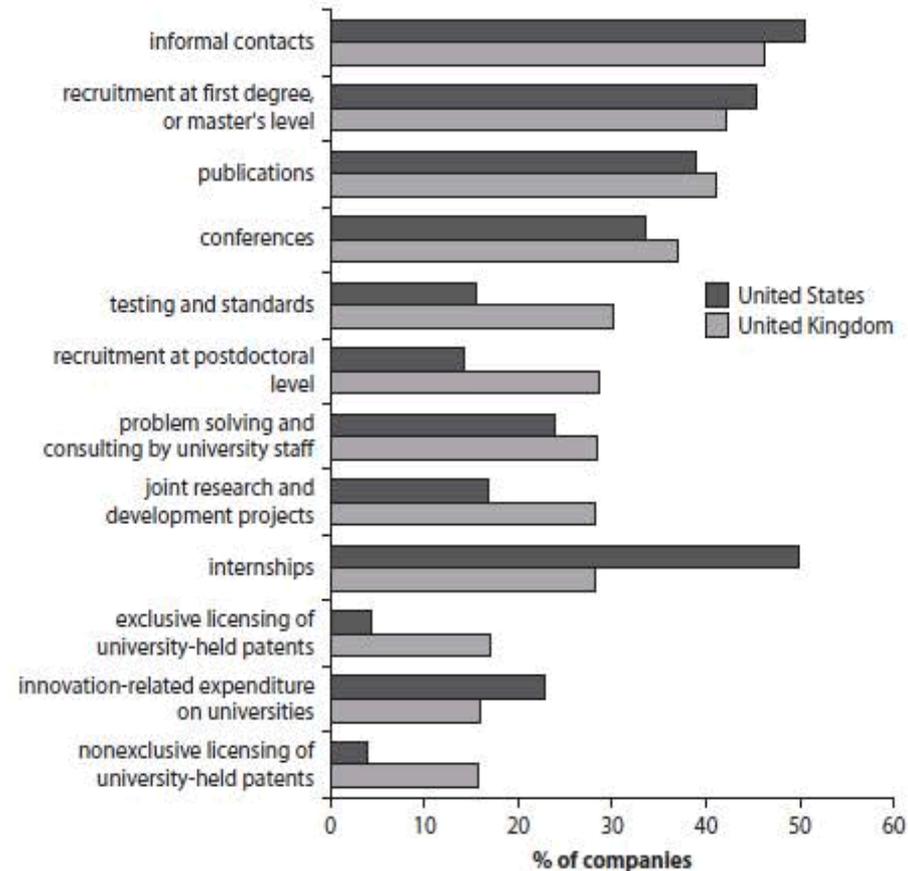
http://www.ipo.org/AM/Template.cfm?Section=Top_300_Patent_Owners&ContentID=29856&template=/CM/ContentDisplay.cfm

Do we Overstate the Case for Intellectual Property Protection?



Source: Cosh, Hughes, and Lester 2006.

Figure 4.1. University-Industry Interaction Contributing to Innovation



Source: Cosh, Hughes, and Lester 2006.

John Steen, University of Queensland Business School, *Do Universities Matter for Innovation?* June 12, 2011 at <http://www.innovationexcellence.com/blog/2011/06/12/do-universities-matter-for-innovation/>

University Roles and Interactions in an Innovation System

- ➔ Educating people
 - Training skilled undergraduates, graduates & post-docs
- ➔ Providing public space
 - Forming/accessing networks and stimulating social interaction
 - Influencing the direction of search processes among users and suppliers of technology and fundamental researchers
 - Meetings and conferences
 - Hosting standard-setting forums
 - Entrepreneurship centers
 - Alumni networks
 - Personnel exchanges (internships, faculty exchanges, etc.)
 - Joint academic-industry visiting committees
 - Curriculum development committees
- ➔ Increasing the stock of ‘codified’ useful knowledge
 - Publications
 - Patents
 - Prototypes
- ➔ Problem-solving
 - Contract research
 - Cooperative research with industry
 - Technology licensing
 - Faculty consulting
 - Providing access to specialised instrumentation and equipment
 - Incubation services

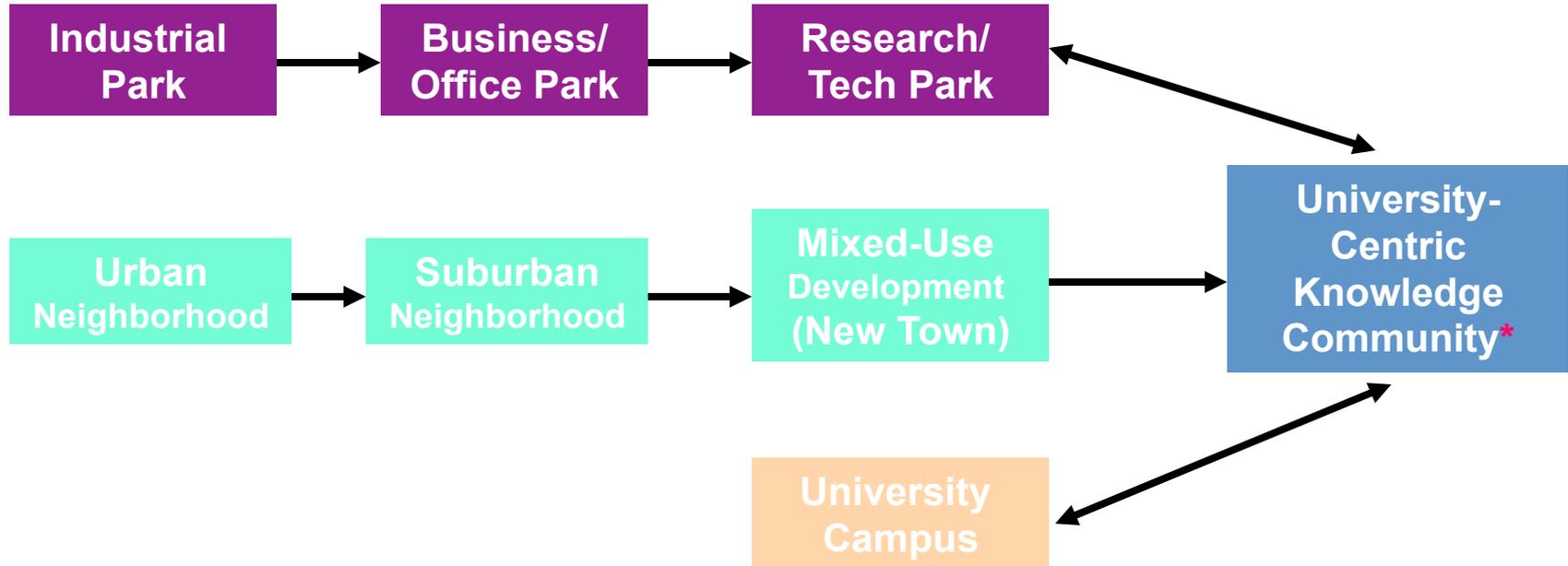
Andy Cosh, Alan Hughes, and Richard K. Lester, UK plc: Just How Innovative Are We? Findings from the Cambridge-MIT Institute International Innovation Benchmarking Project, Industrial performance Center, Massachusetts Institute of Technology, Working Paper Series, December 2006, page 8. <http://web.mit.edu/ipc/publications/pdf/06-009.pdf>



Universities in Regional Innovation Strategies: Regional Stewardship / Quality of Place



“Place”—Narrower Definition From Research Parks to Mixed-Use Knowledge Communities



Live, work, and play in a university-centered (urbanist) community setting.

“Place”—Broader Definition It Used to Be About “Sites:” Now, It’s About “Places”



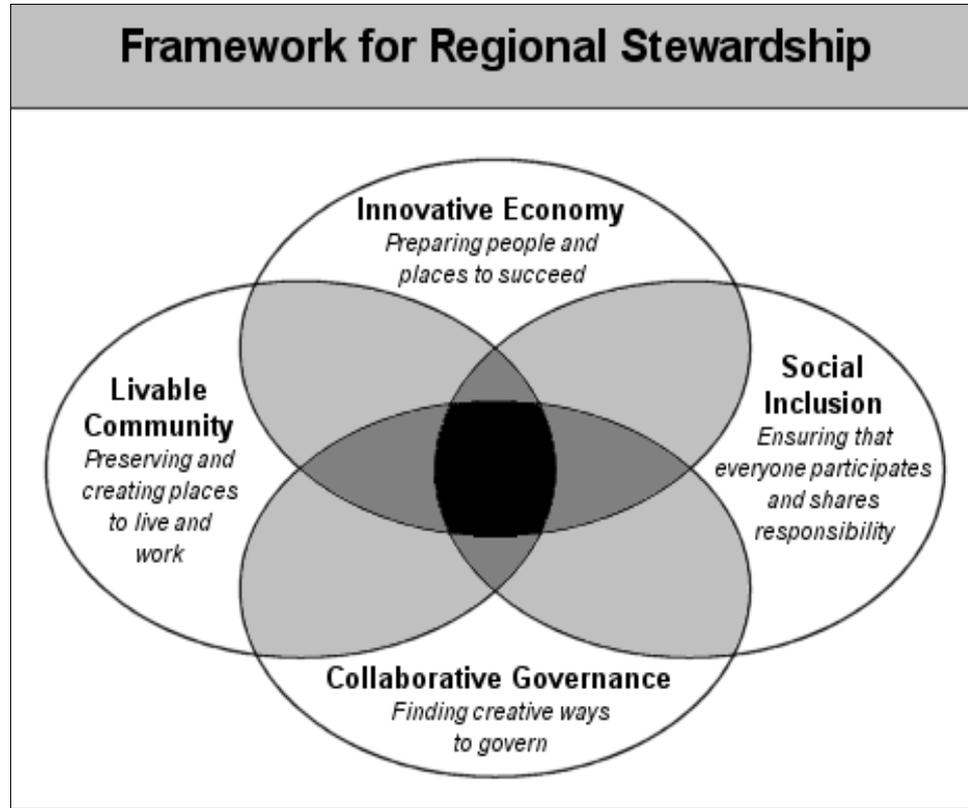
Cost-Effective
Industrial Sites



Cool Places



“Place”—Broader Definition Local/Regional Development, Engagement, and Stewardship



Source: Alliance for Regional Stewardship, in *Tools and Insights for Universities Called to Regional Stewardship*, 2006, Alliance for Regional Stewardship, AASCU and NCHEMS

- ➔ Dismal statistics
 - 68% of eighth-graders can't read at grade level.
 - About 1/3 of our students drop out of high school (50% in some areas)
 - Another 1/3 are not college-ready when they graduate.
- ➔ Of 30 developed nations, US is:
 - 24th in Math
 - 17th in Science
 - 10th in Literacy
- ➔ Social cost
 - Achievement gap costs the US \$525 billion each year.

NBC News "Education Nation,"
<http://www.educationnation.com>

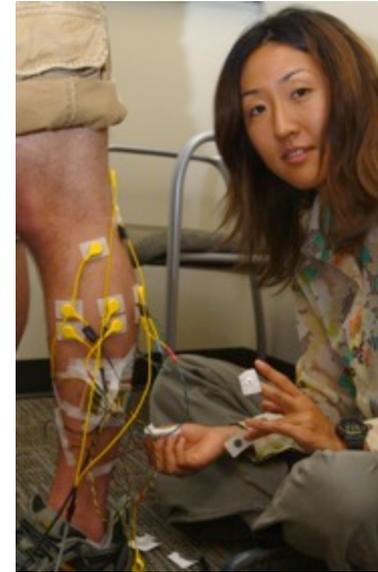


This is NOT just about what
the colleges of education do.

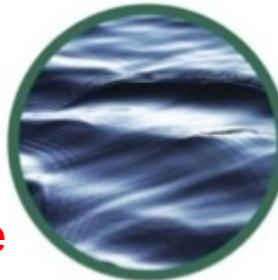
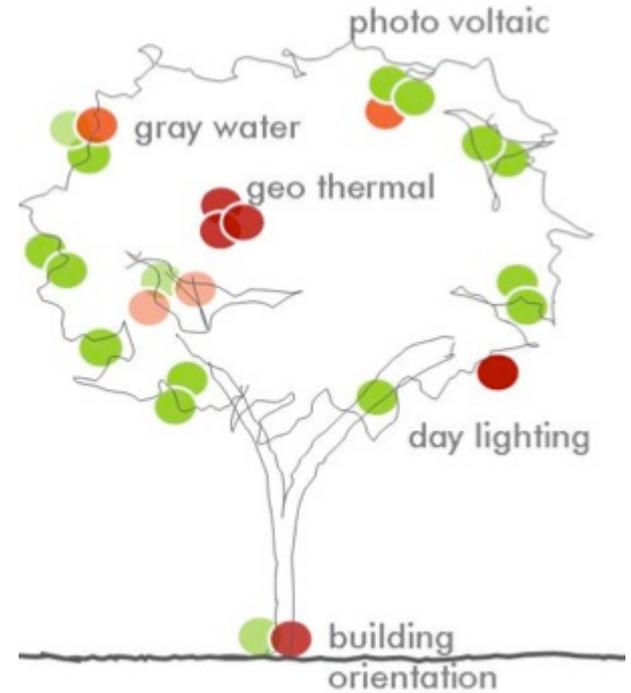
Stewardship of Place: Health and Wellness

- ➔ Many institutions have nursing, allied health, and human/social services programs
- ➔ Many institutions can address business, economic, and policy aspects of health care—and promote improvements in their regions
- ➔ All institutions can promote health/wellness education in their communities

This is NOT just about what the Health Sciences Centers do.



Stewardship of Place: Sustainability



Water



Energy



Waste



Transportation

This is NOT just about what the
Engineering colleges do.



LAND USE

Stewardship of Place: Community Development

- ➔ Residential communities
- ➔ Local business formation and support
- ➔ Promoting investment
- ➔ Urban/community planning and redevelopment
- ➔ Active help to economic development agencies
- ➔ Public Pre-K to 12 education
- ➔ Youth and family services
- ➔ Range and quality of amenities
- ➔ Local governance

This includes stewardship activities of every part of the institution.



The 21st Century Relevant University Institutional Evolution and Successful Partnerships



The Relevant University:

MAKING COMMUNITY AND ECONOMIC ENGAGEMENT MATTER



Regional Economic Development, Engagement, and Stewardship

➔ Human Capital

- Serious, competent, learning outcomes—UG / Grad
- Major impact on pre-K to 12
- Making adults welcome and a priority as learners

➔ Innovation System

- Entrepreneurship education/experience
- Impart skills that include problem identification, problem-solving, creativity
- Business services, brokering resources of others

➔ Health Care and Wellness

- Health care and human services professionals
- Health and wellness education and promotion

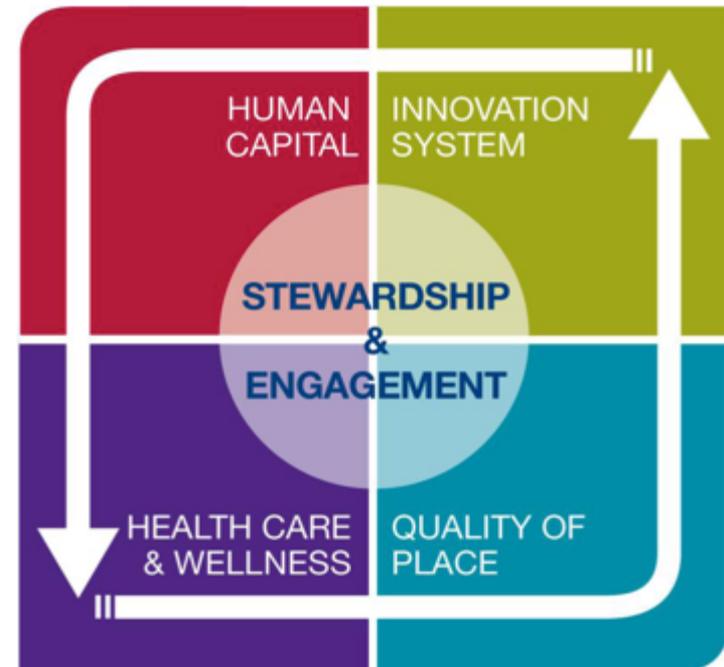
➔ Quality of Place

- Community development
- Fine and performing arts, recreation amenities
- Instill values re: “service,” civic responsibility, and good governance



The Relevant University:

MAKING COMMUNITY AND ECONOMIC ENGAGEMENT MATTER



The University of Toledo Model

Remember: The University is a 1,000 Year Old Institution

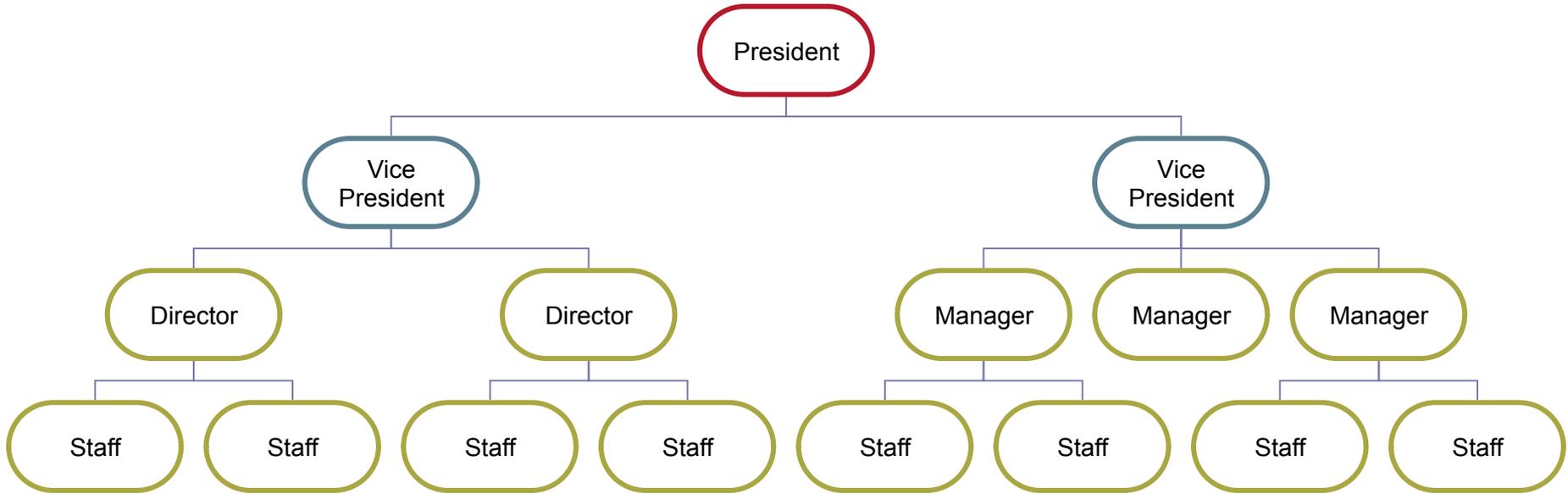
- Professionalization of Society
 - Law
 - Medicine
 - Sciences
- The Paris Model
- The Ivory Tower
 - Persecution vs. free inquiry
 - Faculty interests and culture
- A Few Major Innovations in Nearly 1,000 years
 - New disciplines
 - Land-grant college and extension
 - Community college



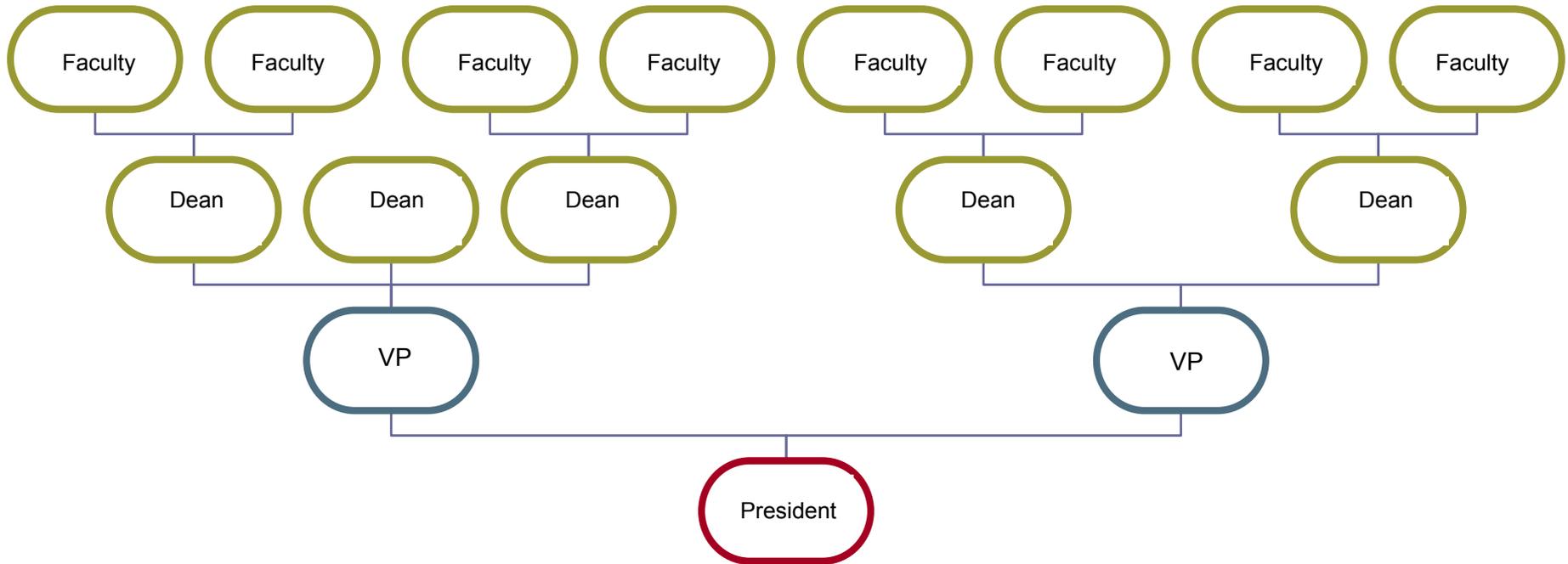
In the late 19th Century, it was a struggle to get Harvard College's faculty to accept modern languages as "suitable" for a Harvard education.

Only Greek and Latin were languages for university study.

Typical Hierarchical Organization Cultures: Corporate, Government, Military, Church



A Special Culture: University Organization



“Laws are sand, customs are rock. Laws can be evaded and punishment escaped, but an openly transgressed custom brings sure punishment.”

Mark Twain

Becoming Truly Effective at Partnerships Will Require *Broadening of Faculty Culture*

In 1985, none of this was commonly understood.

Today, we have the attention of the presidents/
chancellors.

The Real “Frontier” = Faculty Rewards, Incentives,
Culture Factors

➔ Less emphasis on:

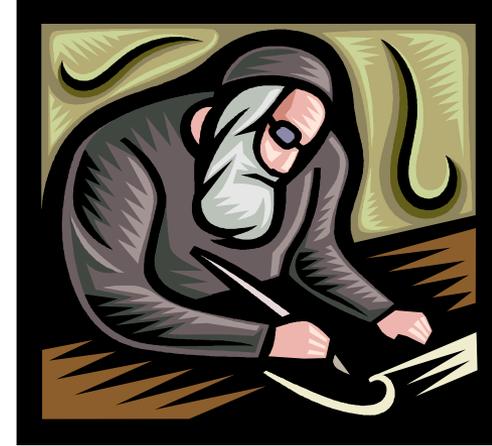
- Individual scholarship
- Control of tenure by departments

➔ More emphasis on:

- Contributions to group scholarship and interdisciplinary accomplishments
- External applications of knowledge solutions and services

➔ More flexibility in:

- Job descriptions or faculty cohorts
- Criteria for personal success
- Blending academic and business careers



Academic-Industry Partnerships: Overcoming the Cultural Divide

Academic Freedom

+

Public Good

Proprietary Interests

+

Private Gain



Conflicts of Interest
+ Conflicts of Commitment
+ Conflicts of Culture



Overcoming the cultural divide—
University leadership must say: We'll deal with it.

If you want to throw out the bath water, but not the baby,
then you need to know which is which.

The 21st Century Relevant University: Requires Shift in Perspective, Priorities, Culture, and Metrics

➤ Priorities

- Preserves best elements of academic traditions
- Serves millions more learners
- Redefines qualitative education outcomes
- Defines “engagement”

➤ Perspective

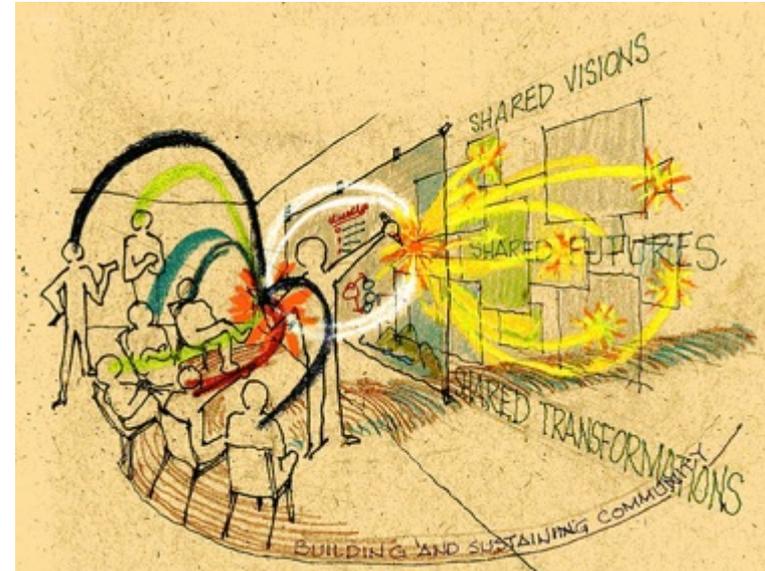
- Shifts planning perspective from “inside-in” to “outside-in”
- Takes real world into account in program design
- Becomes more permeable to constituents (well beyond “outreach”)

➤ Culture

- Responds to changing needs in something less than eons—greater agility
- Becomes more “big problem-focused”
- Goes out to find problems that need solutions
- Learns to reward faculty for engaged scholarship and service

➤ Metrics

- Evaluates outcomes it generates for others with entirely new metrics



New York State
Regional Economic Development Councils
September 27, 2011

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Strategies for the Global Knowledge Economy