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### **Challenges and Opportunities**



- Challenging times for higher education
- Major socioeconomic changes that are transforming the way we live, work and communicate
- Strategies for success in the new so-called "information-economy" are drastically different from the past
- Society is scrutinizing ever more closely the behavior and performance of higher education institutions
- The Internet is creating new opportunities for unconventional teaching and training that challenge our most fundamental business case
- Only the "fittest" institutions will flourish (fittest = most able to adapt)
- Great challenges --- great opportunities



## **Better Integration with Society**



- Changing role of Universities in modern societies
- Impact on Quality of life: educate "better" citizens
   graduate "productive" citizens careers –
   economic development
- To accomplish these goals Universities must be "open" and more integrated with society
- Being integrated implies Universities are directly accountable to society at large (i.e. the public) and to its various governance organizations and layers
- Our students and their careers are our best ambassadors to society at large
  - Must produce students that are more agile in their career pursuit
  - Must be able to succeed in the global economy exchange programs
  - Cross-disciplinary education out-of-school cooperative experience a must
- Industry an important factor in this integration programmatically and financially



# Universities and Society: Examples



- Universities and K-12 education
- Research experiences for undergraduates
- Research experiences for high school students
- Educating high school teachers (math, science, technology, ...)
- Universities and life-long learning
- Universities as knowledge sources
- Universities as key contributors to solving problems of significant impact to society
- Universities and economic development innovation jobs
- Universities and quality of life and work
- Universities as contributors to art and culture
- Universities for international collaboration and peaceful coexistence

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## **Accountability to Society**



 Must prove Universities' "worthiness" and "value added" on a continuous basis and in understandable and quantifiable terms

#### **Examples:**

- Measurement of economic development impact and jobs creation
- Improvement of healthcare quality
- Lowering the cost of health care systems
- Improved transportation infrastructures
- Measuring contributions to sustainability and the environment
- Policy and new systems for energy efficiency

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# Independence, Self-Governance and Accountability



- To accomplish these objectives and missions
   Universities need independence and self -- governance,
   but at the same time must establish strong
   accountability, transparency and evaluations (for
   feedback and improvement)
  - At all scales of the organization
  - At periodic time intervals
- One can't manage what one can't measure
- Accountability
  - Introducing the analog of a Board of Trustees for each University is a good step
  - Rector to serve at the discretion of the Board of Trustees (or Regents) is a good step
  - Constructive coexistence of executive and faculty governance essential
  - At all levels: University-wide, College level, Department level



# Independence, Self-Governance and Accountability



- Evaluations Colleges, Departments, Faculty
- Accreditation
  - Universities, Colleges, Departments
- Significance of evaluation-based feedback and improvement
- Evaluation of teaching restructure
- Competitive allocation of resources internal and external (over a 3-5 year rolling horizon)
- The implementation of teaching is changing (hands-on, assessment and knowledge-retaining based)
- Universities need to "explain" their role (i.e. educate) to:
  - The public
  - Politicians



### **Funding Public Universities**



- Funding components:
  - Central Government
  - Local Government
  - Research contracts/grants
  - Education contracts/funds
  - Industry, Corporations, non-academic institutions
  - Private
  - Tuition
- Government part in the USA less than 20% in most Public Universities
- Decreasing also dramatically in several European countries



### **Funding Public Universities**



- Develop new and improved Business/operations model
- Including faculty salaries (75% public funds, 25% other)(move to 60% public, 40% other?)
- Tenure--track faculty --- Research faculty
   State funds Non-state funds
- Brings to the fore the significance of endowment funds (Universities' own capital)
  - Alumni association
  - Corporate philanthropy, private philanthropy, etc.
- Evaluations: Assessment exercises of Research, Education, Outreach (currently being done in Europe)
  - Monitor recommendations implementation
- Educate politicians and "prove ROI" Science and Technology Days for the Parliament



## Universities and Economic Development



- Infrastructure supporting Economic Development
- Infrastructure supporting innovation and entrepreneurship
- Implementing something like the European "Competence Centres" in Greece; across the country in business areas where Greece can be competitive
- Such centers can have social focus, quality of life focus, not just technology focus
  - Agriculture
  - Shipping
  - Health care local mini-clinics, assisted living, etc.
  - Apps for archeology, tourism, restaurants, etc.



## Universities and Economic Development



- Developing "Total Innovation Systems" (e.g. MTECH at UMD, Swedish Universities)
- Teaching and cultivating entrepreneurship
- "Guided Entrepreneurship" programs
- Government matching of industry funding in projects
- Venture Capital support
- Business plan competitions
- Incubators
- Supporting SMEs

Note: Students in Greece are trying on their own – but there is no supporting infrastructure



#### Some Ideas for Greece



- A small "task force" is needed to investigate Center idea and develop an implementation plan for Greece, including identification of the "best" areas to invest in
- Use such Centers to attract companies to Greece world-wide
- Use such Centers to create SMEs in specific areas
- Example: France (De Gaulle) established small "tiger teams" of carefully selected scientists/technologists (about ten members each) to investigate economic development opportunities/challenges for France and provide the Government with evaluated/ranked action options
- Example: France (Mitterand) INRIA launches spin-off program



#### Some Ideas for Greece



- Possible Center topical areas for Greece:
  - Health IT
  - Management and improvement of agricultural processes
  - Sustainable management of fisheries
  - Energy-photovoltaic systems
  - All electric cars
  - Fast trains
  - Efficient ethanol production from diverse plants via biotechnology
- Can Greece still play a major role in South East Europe and the Middle East?
- Integrated higher education layers; 2 year programs, 4-5 year programs, MS programs, PhD programs
- International R&D collaboration programs that include economic development impact (with US, Europe, China, ...)



## Need for National Policy/Strategies -- All Stakeholders



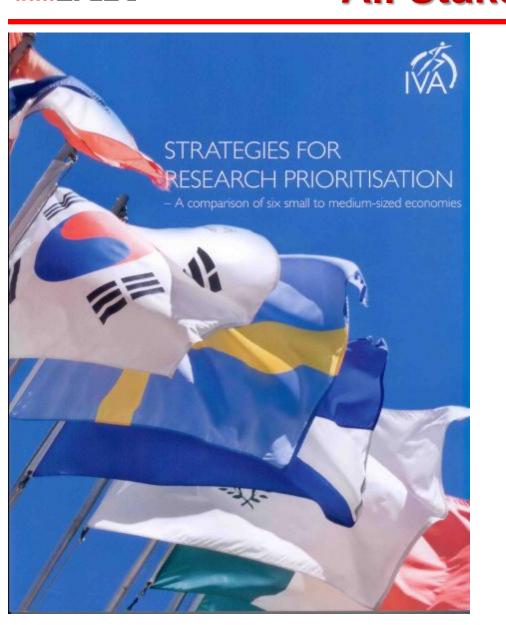
#### **Examples from the USA:**

- Engineering Research Centers (NSF)
- Science and Technology Centers (NSF)
- University Affiliated Research Centers (DoD)
- Nanotechnology Centers
- Manufacturing and Materials Centers
- Oncology Centers (NIH)
- Systems Biology Centers (NIH)
- Energy Centers (including energy efficient buildings, automotive, smart grid) (DOE)
- Cybersecurity Centers
- Health IT Centers (HITECH SHARP)
- SBIR, STTR, programs



## Need for National Policy/Strategies -- All Stakeholders



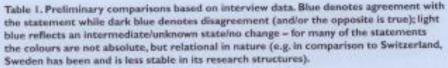


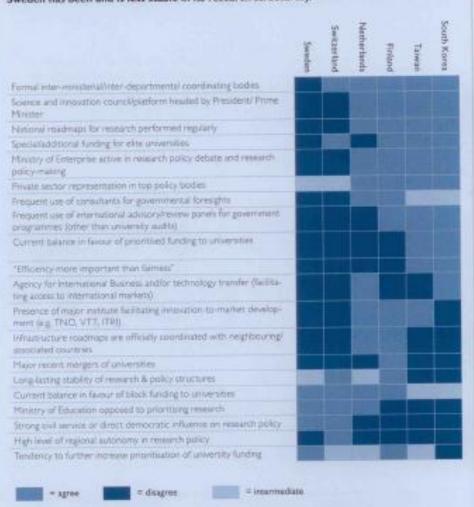
- Project and extensive study by the Royal Swedish Academy of Engineering Sciences (IVA) -- 2009
- The question posed: What should Sweden do to preserve its quality of life in the 21<sup>st</sup> century?
- The answer: Educate its people so that they can get the best jobs world-wide
- Compared R&D strategies and economic development in Sweden, Switzerland, the Netherlands, Finland, Taiwan, South Korea



## Need for National Policy – Six small countries







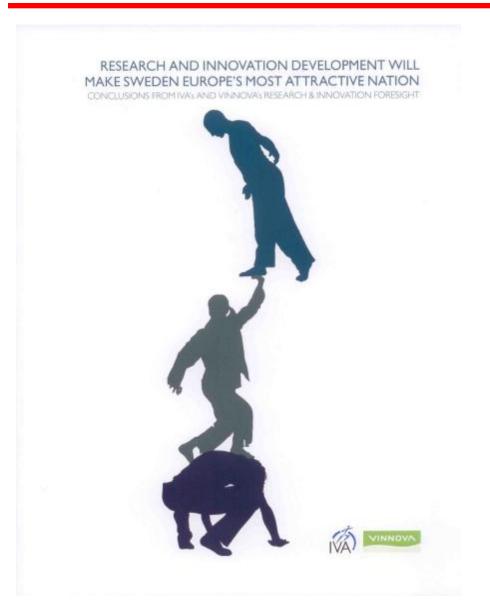
#### Difficult/sensitive issues

- Funding for Universities: Prioritized or block? Mixed?
- Role of Government research institutes?
- Need for a major institute/agency to facilitate innovation and commercialization?
- Regional vs. national competence centres?



## Strategies and Programs in Sweden





## **Most important findings/considerations:**

A general principle for all research: Research results must benefit society.

The insights that lead to this principle:

- Global competition necessitates relevance, excellence and critical mass.
- The need for new knowledge should determine the focus of research.
- Government funding of civil R&D should be stable, long term and amount to at least one per cent of GNP.
- Close collaboration between researchers, business and industry and society's other players will result in an effective innovative system.
- International cooperation and greater
   EU integration will increase the impact of investment in research.



### Findings -- Recommendations



- Universities must be independent and self-governed and exposed to competition
- Strategic research fields, excellent research environments and eminent researchers and research leaders must be prioritized
- The conditions that the Government can influence for all players in research, development and in the innovation system must be as beneficial as possible
- The financial structure for the State financed RDI system should be long-term, stable and sufficient to promote international competitiveness
- New models foundation university
- Universities need their own capital
- Prioritize areas important to the economy