

Independence and Interdependencies

↕

Accountability (on what and to whom?)

John S. Baras

**Institute for Systems Research and
Department of Electrical and Computer Engineering
Department of Computer Science
Fischell Department of Bioengineering
Applied Mathematics, Statistics and Scientific Computation Program
University of Maryland College Park**

**First Greek American Academic Meeting
January 15-16,2011
Georgetown University
Washington DC**

- **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**

- **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 co-existence
-
-
-

- **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**
-
-
-

- 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

- **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 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**

- 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

- **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.**

- 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

- 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

- **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, ...)**

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**



- 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 21st 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

Table 1. Preliminary comparisons based on interview data. Blue denotes agreement with the statement while dark blue denotes disagreement (and/or the opposite is true); light blue reflects an intermediate/unknown state/no change – for many of the statements the colours are not absolute, but relational in nature (e.g. in comparison to Switzerland, Sweden has been and is less stable in its research structures).

	Sweden	Switzerland	Netherlands	Finland	Taiwan	South Korea
Formal inter-ministerial/inter-departmental coordinating bodies	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Science and innovation council/platform headed by President/Prime Minister	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
National roadmaps for research performed regularly	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Special/additional funding for elite universities	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Ministry of Enterprise active in research policy debate and research policy-making	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Private sector representation in top policy bodies	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Frequent use of consultants for governmental foresights	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Frequent use of international advisory/review panels for government programmes (other than university audits)	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Current balance in favour of prioritised funding to universities	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
"Efficiency more important than fairness"	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Agency for International Business and/or technology transfer (facilitating access to international markets)	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Presence of major institute facilitating innovation-to-market development (e.g. TNO, VTT, ITRI)	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Infrastructure roadmaps are officially coordinated with neighbouring/associated countries	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Major recent mergers of universities	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Long-lasting stability of research & policy structures	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Current balance in favour of block funding to universities	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Ministry of Education opposed to prioritising research	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Strong civil service or direct democratic influence on research policy	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
High level of regional autonomy in research policy	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue
Tendency to further increase prioritisation of university funding	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue

Legend:
 = agree
 = disagree
 = intermediate

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?

RESEARCH AND INNOVATION DEVELOPMENT WILL
MAKE SWEDEN EUROPE'S MOST ATTRACTIVE NATION
CONCLUSIONS FROM IVA'S AND VINNOVA'S RESEARCH & INNOVATION FORESIGHT



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.

- **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**