

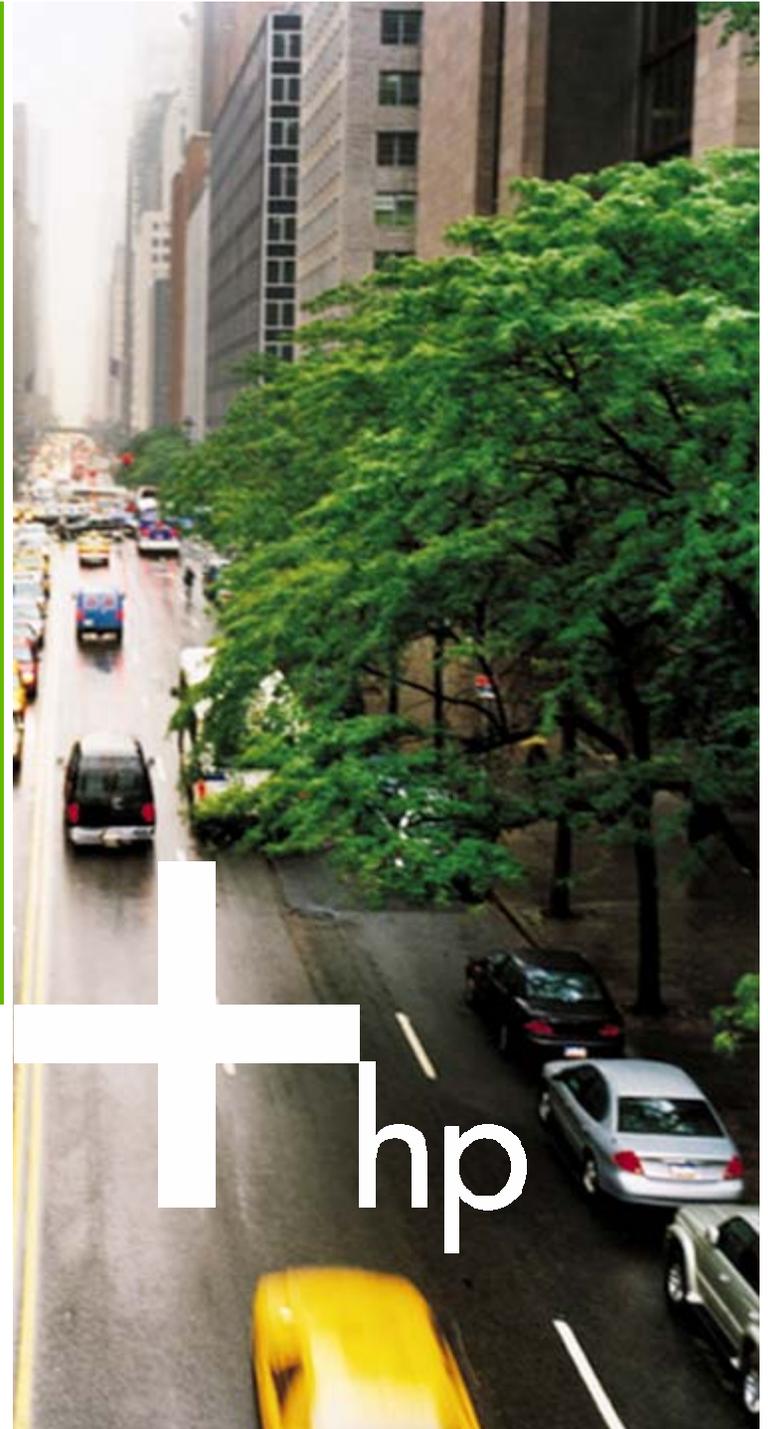


Globalization

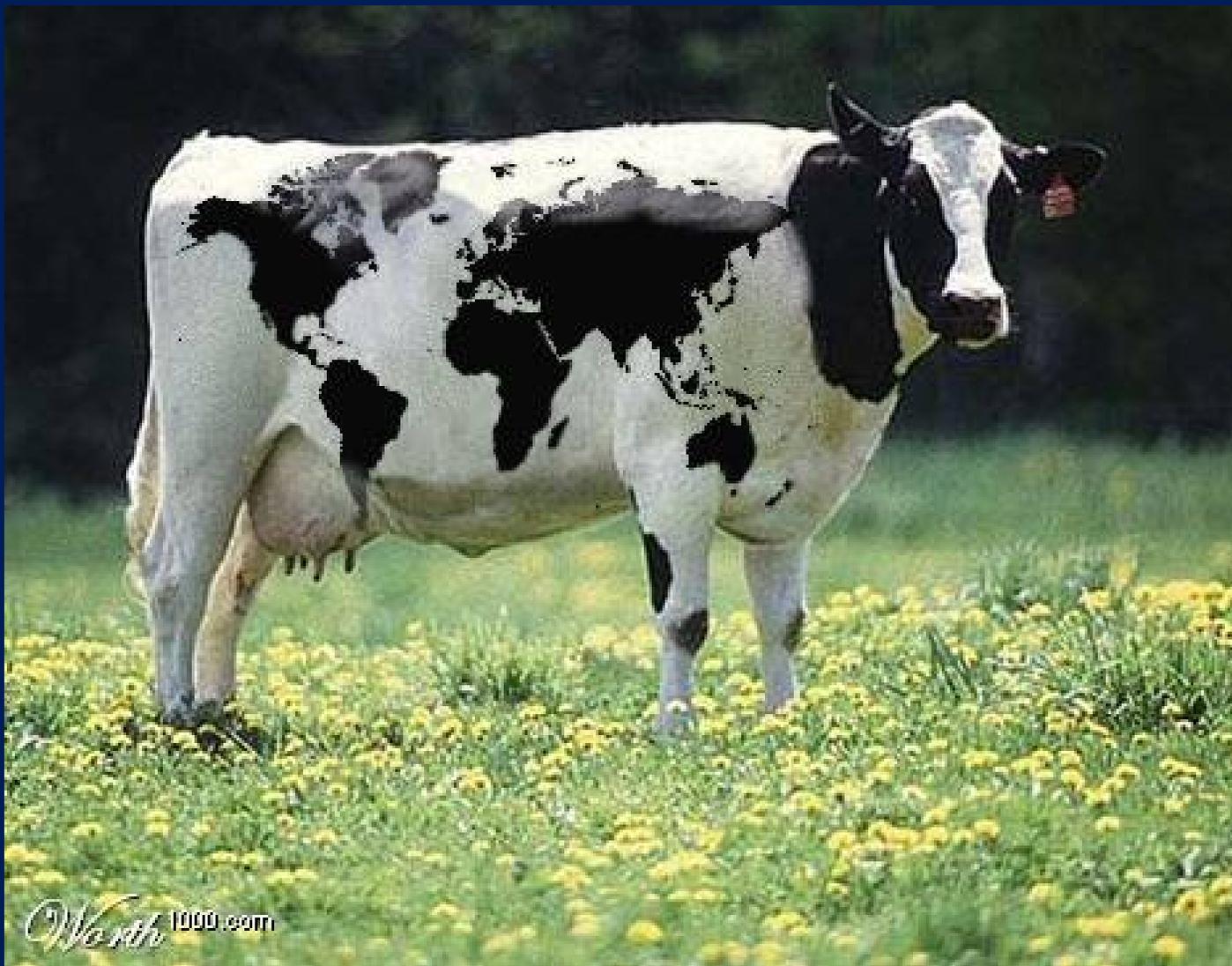
from engineering to
economic
development

Dan Marcek
HP University Relations

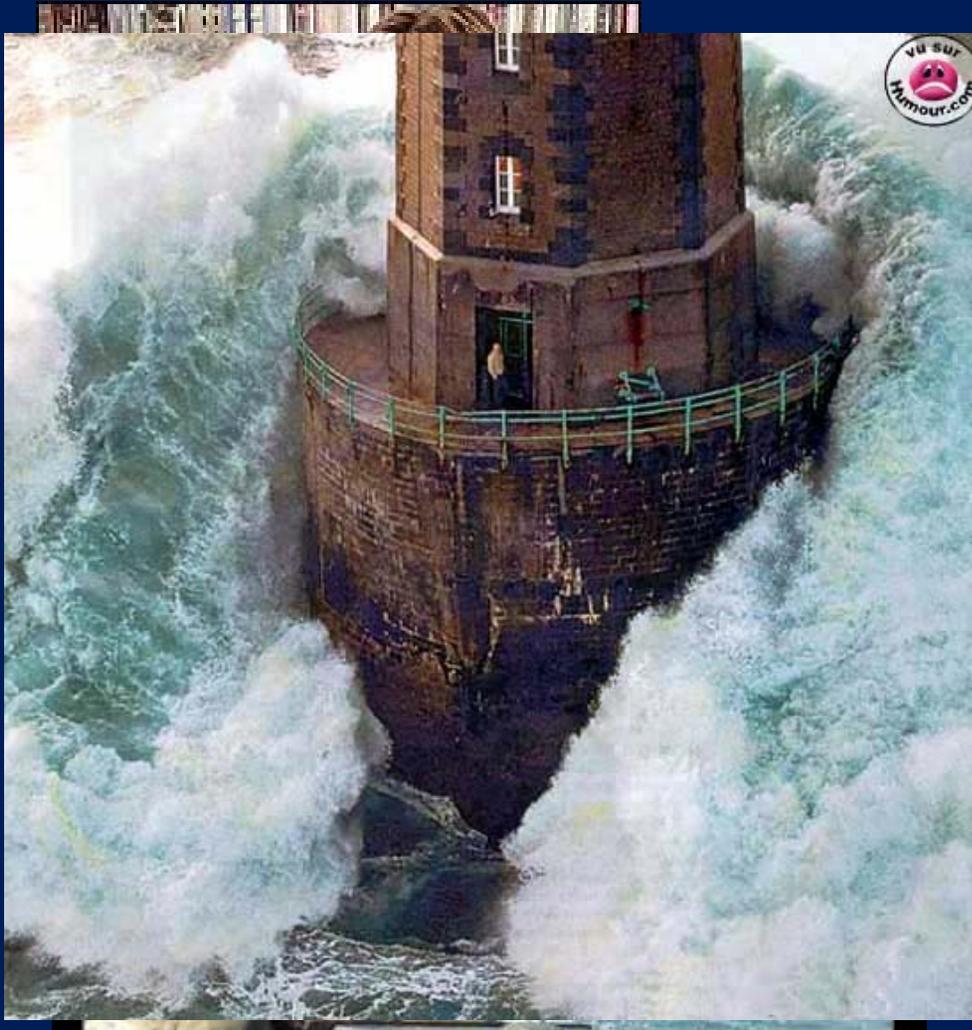
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Globalization: What's Really Happening Here?



Globalization: What's Really Happening Here?



Brien Aho / U.S. Navy via Reuters

- Evolving Economic Ecosystems
- Local Interpretation
- Changing Skillsets
- *This is not new*
- Accelerating Change
- Balance, Equilibrium
- Are We Ready?

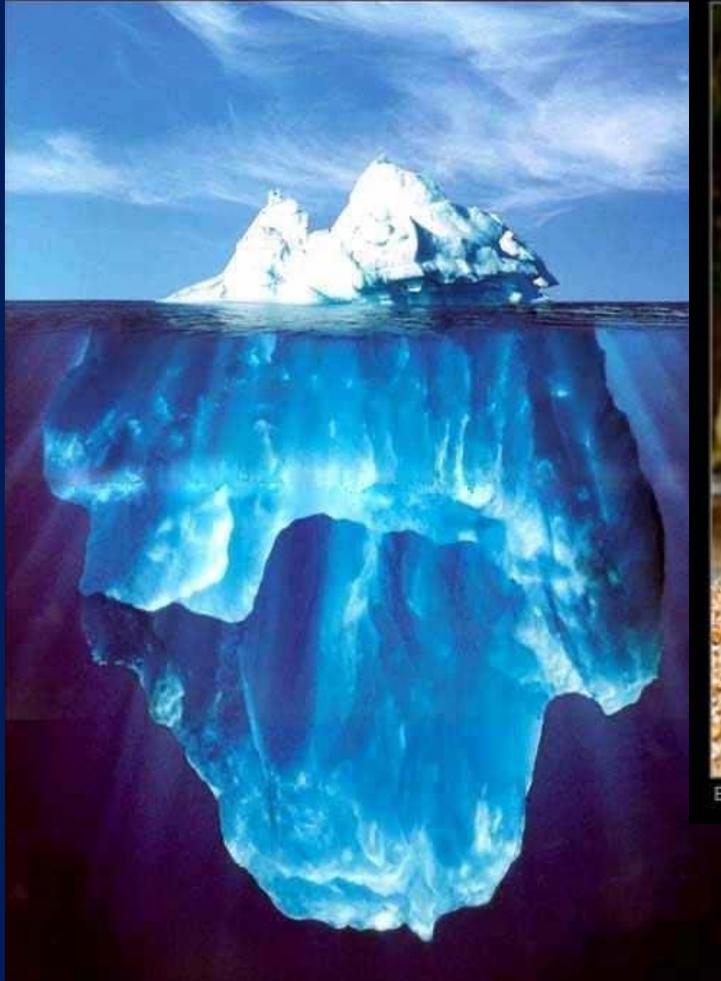
Globalization: What's the Role of Industry?



- Producers of Technology
- Consumers of Talent
- Partners in Creating New Knowledge

- *Ecosystem is Complex*
- Example: [Hewlett-Packard](#)

Globalization: What's Needed?

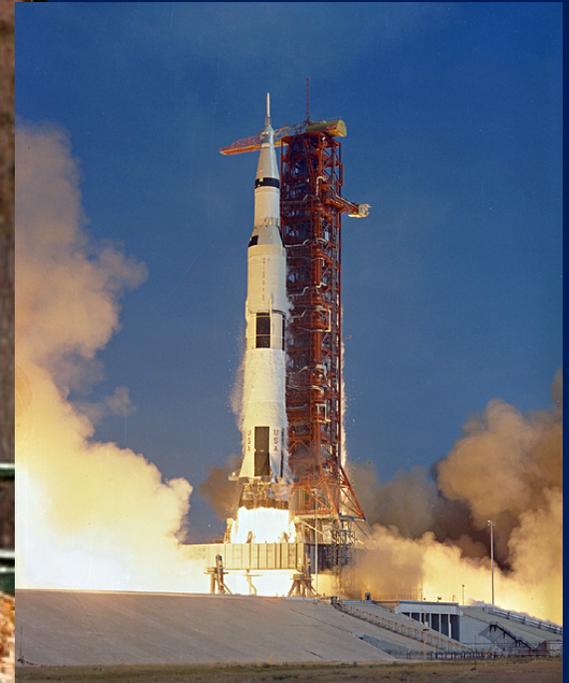


~ Honest Assessment ~



Eric Petersen / The Livingston Enterprise

~ The Right Attitudes ~



~ Inspiration ~

A photograph of a man in a light-colored shirt and dark trousers walking away from the camera down a long, brightly lit hallway in a server room. The hallway is lined with glass-walled server racks on both sides. The floor is made of light-colored square tiles. The ceiling is a grid of recessed lights. The man is carrying a dark bag or folder under his arm. The overall atmosphere is clean, modern, and professional.

Thank You

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What's Happening in...

China

- More Students in Colleges & Universities (20 million) than US, India, Russia, Japan
- Doubled Number of S & E PhDs From 1996-2001 to Greater Than 8,000
- Beijing Geely University, one of 1,300 Private Universities – 20,000 Students @ \$1,000/yr
- Tsinghua University – the MIT of China – Most Faculty Studied Abroad, English Popular
- Applications to US Down 60% in Last Two Years



World Bank – The Four Pillars of The Knowledge Economy

- *Education & Training*

An educated and skilled population is needed to create, share and use knowledge.

- *Information Infrastructure*

A dynamic information infrastructure-ranging from radio to the internet-is required to facilitate the effective communication, dissemination and processing of information.

- *Economic Incentive & Institutional Regime*

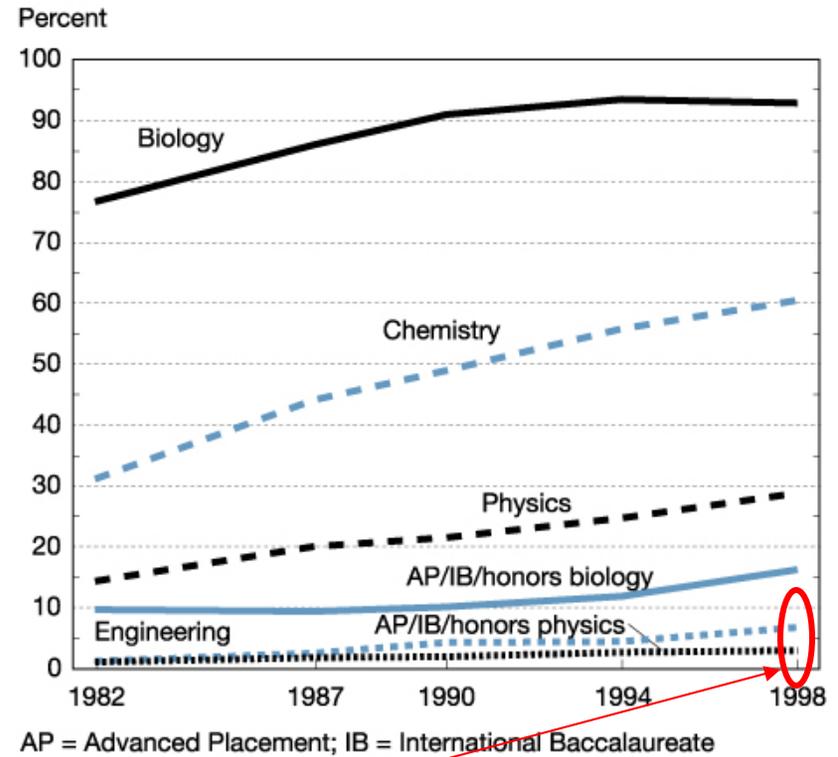
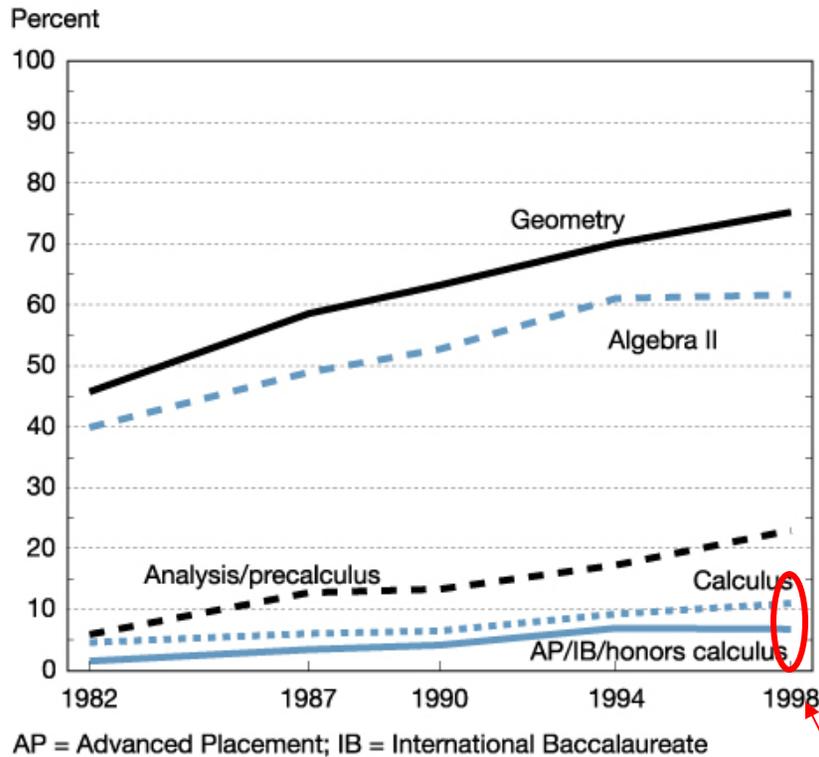
A regulatory and economic environment that enables the free flow of knowledge, supports investment in Information and Communications Technology (ICT), and encourages entrepreneurship is central to the knowledge economy.

- *Innovation Systems*

A network of research centers, universities, think tanks, private enterprises and community groups is necessary to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create new knowledge.

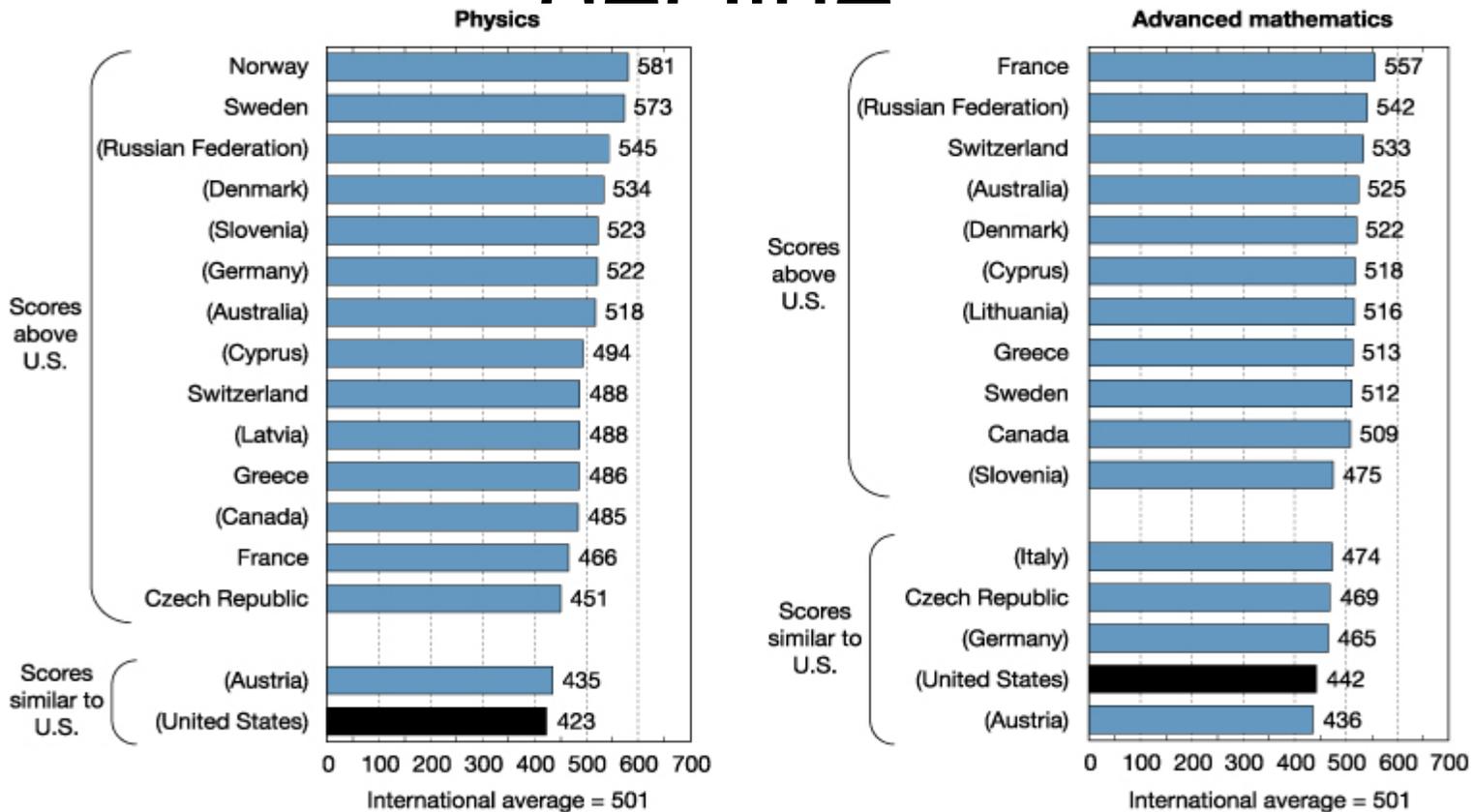
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Less than 15% of US students have the math and science prerequisites to realistically pursue technology/engineering related careers



US Engineering, Technology, and Science Pool

Global Competitiveness of US in Math and Science is on a decline



NOTE: Countries not meeting international guidelines are shown in parentheses.

SOURCE: Third International Mathematics and Science Study.

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The Changing Roles of Engineers



- **Globalization** of industry and engineering practice
- The **shift of engineering employment** from large companies to small and medium-sized companies, and the growing emphasis on **entrepreneurialism**
- The growing **share of engineering employment in non-traditional**, less-technical engineering work (e.g., management, finance, marketing, policy)
- The shift to a **knowledge-based “services” economy**
- Increasing opportunity for **using technology in the education and work of the engineer**

Successful Attributes for the Engineer of 2020



ADAPTIVE LEADERS

- Possess strong **analytical skills**
- Exhibit practical ingenuity; possess creativity
- Good **communication skills** with multiple stakeholders
- Business and management skills; **leadership** abilities
- High **ethical standards** and a strong sense of professionalism
- Dynamic/agile/resilient/**flexible**
- Lifelong learners
- Ability to frame problems, putting them in a **socio-technical** and operational context

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Jobs moving to India

US jobs are fleeing overseas...

United States

GDP per capita **\$35,060**

Unemployment rate **5.8%**

Labor force **141.8 million**

Population below the poverty line **13%**

Typical salary for a programmer **\$70,000**

India

GDP per capita **\$480**

Unemployment rate **8.8%**

Labor force **406 million**

Population below the poverty line **25%**

Typical salary for a programmer **\$8,000**

Top 5 US Employers in India

General Electric
17,800 employees

Hewlett-Packard
11,000 employees

IBM 6,000
employees

American Express
4,000 employees

Dell 3,800
employees



Engineering Graduates

Region/Location	Number of Engineering Graduates
China	300,000
India	200,000
Japan	104,478
Russia	82,409
United States	59,536
South Korea	56,508
Taiwan	26,587
Mexico	24,184
Germany	23,196
Brazil	18,072
Romania	6,632

Source: NRC Science and Engineering Indicators - 2004

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Engineering for the Americas



Lima Declaration Action Plan states:
“Build local engineering capacity to create knowledge that ensures the solution of local needs and opens the chance to compete for global opportunities.”

Engineering for the Americas endorsed

Engineering for the Americas Partners



- The Organization of American States (OAS)
- The U.S. Trade and Development Agency (USTDA)
- The World Federation of Engineering Organizations (WFEO)
- High Tech Enterprises
- The Western Hemisphere Initiative (WHI)
 - accreditation agencies in USA, Canada, Mexico & Peru
- Experts and volunteers from universities across the Americas



Capacity building and economic development



“Give a person a fish: you have fed them for today.

Teach a person to fish: you have fed them for a lifetime.”

Teach them how to process and package fish for export, and you have stimulated economic development.

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*Russel C. Jones, Ph.D., P.E.
President, WFEO Committee on Capacity Building*

HP Values

- passion for customers
- trust and respect
- achievement and contribution
- teamwork
- speed and agility
- meaningful innovation
- uncompromising integrity
- citizenship



HP benefited from one of the earliest examples of knowledge transfer and a strategic-relationship process with the investment by Stanford Professor Frederick Terman in the work of his former students, Dave Packard and Bill Hewlett.

Intellectual Property and Government Partnerships



- Our Position: *Cooperation in university-industrial relationships, strong partnership between government and industry, and a robust intellectual-property framework, are critical to HP's success as a creator and provider of high-technology products.*

- Alliance for Science and Technology Research in America (ASTRA)
- Bay Area Science and Innovation Consortium (BASIC)
- Corporate Foundation Alliance (CFA)
- Glion Colloquium (GC)
- Government of Puerto Rico
- Government-University-Industry Research Roundtable (GUIRR)
- National Council of University Research Administrators (NCURA)
- Texas Engineering and Technical Consortium (TETC)

Engineering Accreditation and Engineering Education



- Our Position: *As a global employer, HP is keenly aware of the need for equivalence and portability in technical degrees granted around the world. The company actively promotes progress toward this end.*
- Accreditation Board for Engineering and Technology (ABET)
- Ibero-American Science, Technology and Engineering Consortium (ISTEC)
- International Conference on Engineering Education (ICEE)
- International Network for Engineering Education and Research (iNEER)
- Information Technology Based Higher Education and Training (ITHET)
- Pan-American Union of Engineering Societies (UPADI)
- American Society of Engineering Education (ASEE)
- [Engineering for the Americas](#)



Engineering/Science Pipeline

- Our Position: *HP wants to increase the number of women and underrepresented minorities in technical careers. The company supports an approach that reaches to the earlier educational years, and advocates transformation of the university learning experience to improve retention rates.*
- Advancing Minorities' Interest in Engineering (AMIE)
- Alliance for Teaching, Learning, and Society (ATLAS)
- (BEST)
- Computer Research Association (CRA)
- Institute for Women and Technology (IWT)
- National Academy of Engineering (NAE)
- MentorNet (MN)
- Society of Women Engineers (SWE)
- Women in Engineering Programs & Advocates Network (WEPAN)



Learning Science and Technology

•Our Position: *HP believes watershed changes in teaching and learning are possible by combining technology with related course-content adjustment, and the company supports organizations pursuing this goal.*

- Learning Federation (LF)
- Frontiers in Education (FIE)
- American Society for Engineering Education (ASEE)

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