



Panel Discussion: University/Industry Collaboration on Data-Centric Methods & Applications

Panelists:

Prof. Vladimir Cherkassky, Univ. of Minn.

Prof. George Cybenko, Dartmouth College

Dr. Arthur Kordon, Dow Chemical Company

Dr. Rudolf Kulhavy, Honeywell Laboratories

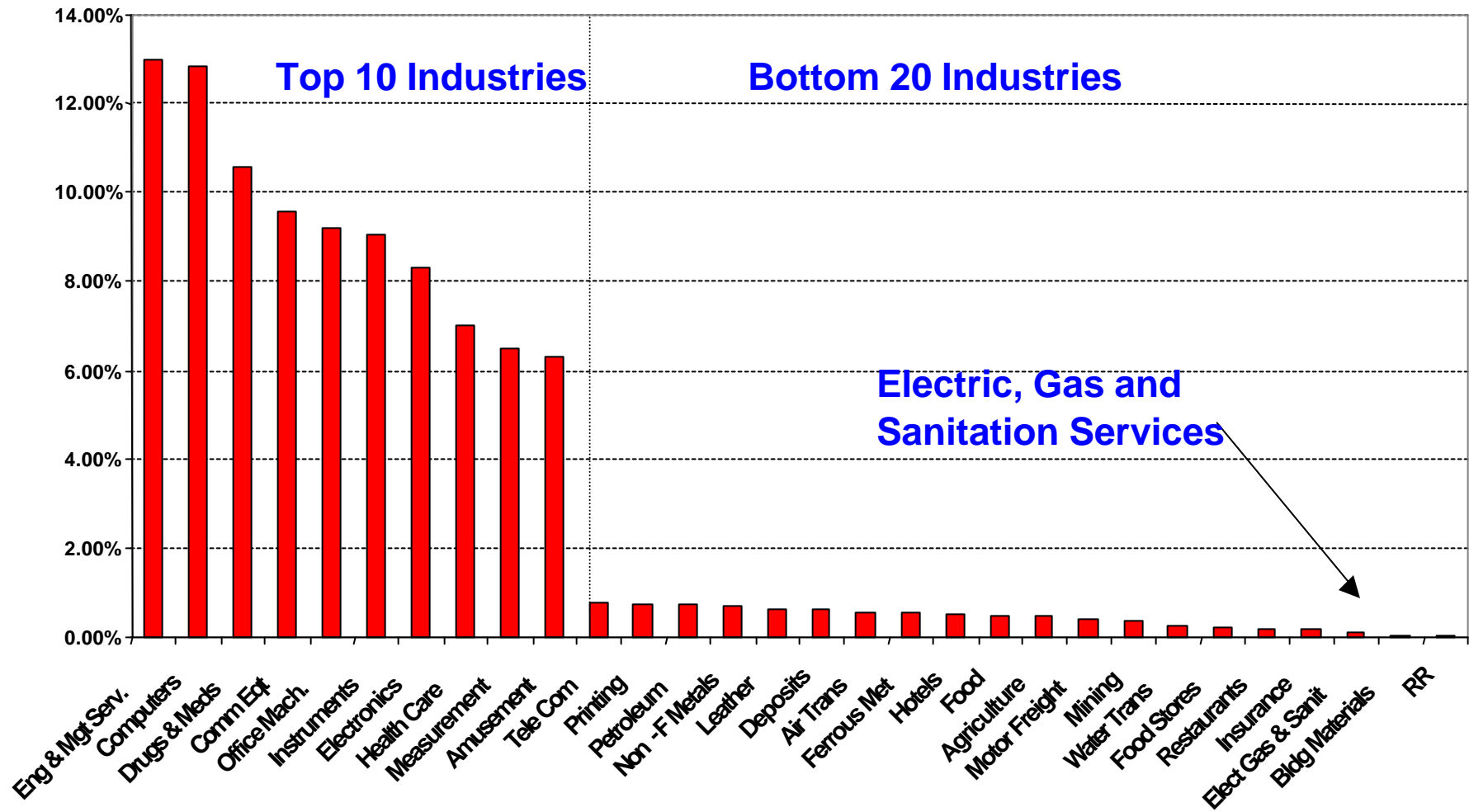
Moderator: Dr. Massoud Amin, EPRI

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EPRI

Context: R&D Expenditures*



R&D expenditures as % of net sales

“The empires of the future are the empires of the mind” - Winston Churchill

- The wealth of nations is not limited by land or minerals, it comes predominantly from “the acquired abilities of people, their education, experience, skills and health.”

– *Investing in people: The Economics of Population Quality, (1981)* Theodore Schultz, Economist and Nobel Laureate

- Nations are very slow to heed this wisdom & what is needed is not done.
- U.S. scientist and engineers working in R&D make up about 75/10,000 people employed, about 80/10,000 in Japan, 50/10,000 in UK, 30 in Italy...
- U.S. spending in R&D accounts for 2.5% of the GDP, yet the results rippling outward from the investments in technology - and its related educational base...

“accounts for perhaps 50% of the past growth of the American economy”
don't mean to overstate the roles of science and technology. But nations

“Planning for a secure future as the knowledge base ebbs away”

- Challenges: Limited funding, e.g. States do not feel responsible to solve industrial human capital needs
 - Will market-based priorities support university programs and strategic R&D?
 - Patient money!
 - Who owns what?
 - Public good vs. private good
- Loss of knowledge resulting from reduction in work forces, and new business focus:
 - “we have been downsized, right-sized and capsized!”
 - “employees walking out of the door and taking their knowledge with them”
 - “consultants are also getting older”
- E.g. average age of power engineers has increased significantly
 - “... we all tend to be gray haired ... If you don't see that as a problem, you're part of the problem...”
- Training the next generation of engineers and availability of rewarding careers

Wish List

- Incentives for R&D, Knowledge Management and “reversing the trend”
- Technology/Market forecast of the road ahead and cost/benefit assessment of partnerships
- University research more closely tied to the industry
- Strengthen links to all stakeholders including academe, industry & the Government
- Build strategic partnerships, and create active Univ./Indus/Gov. programs and new initiatives
- Technical and organizational infrastructure
- Senior management and stake-holder support



But, what do our “customers” really want?

And what are the societal needs?

Observations

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Theodore Schultz, Economist and Nobel Laureate, *Investing in people: The Economics of Population Quality*, (1981)

The future is bright:

- Changing profiles– structural changes in industries
- Understanding the changing industry challenges and needs
- Infusion of new technologies
 - Grand challenges and sanitized data
 - Adaptive models: Credibility and “Value”
 - What gets measured gets managed
→What gets priced gets managed
- Highly interdisciplinary
- Asset management of young engineers

Potential sources of funding:

- State & Fed. Government (incl. NSF & DoD’s specific programs for Gov./Ind./Univ.)
- Industry and its’ R&D organizations
- Private foundations
- NGOs and Int’l Organizations
- Incubators/startups

Discussion Questions

- What would you like the data-driven systems/networks to look like or perform in 2020?
- What are the difficult challenges to overcome to achieve your vision?
- What enabling technologies are needed to address these challenges?
- What should industry and univ. be doing now to develop the enabling technologies and enhanced human capital?
- What level of funding/support is the industry responsible for, and what does government need to address?



What is working? What's not working? What needs to be done?