Higher Education:
Options for India and India Inc.

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Yale University
Keynote Address, Sakal Educon 2014
Paris, France, September 12-14, 2014
Preamble

• Since her independence, India has overcome many crises: its survival, integration, famines, political institutions, balance of payments

• This democracy and its leadership has risen to prove all the pessimists wrong by rising to its challenges, and confounding its critics

• Today, I am going to play the role of a critic, but only because, once recognized, India—you in this room—can resolve the crisis of higher education

• Korea, Taiwan, and China have done it; India can too

• I share the 10,000 mile distance perspective, with intent to help identify and address the problem, not criticize the system
An Overview

• Wealth of nations: physical or human
• Where does Indian higher education stand? What is its direction?
• Qualities of world-class universities
• Roadmap for transformation
  – Teaching
  – Research
  – Human resources
  – Physical and legal/regulatory infrastructure
  – Financing and management: Public vs. private
• Structure and benchmarking: Yale, a US private research university (and other types of universities)
• Consequences for India (parents, students, teachers, politicians, civil servants, labor unions)
• And for India Inc.
Wealth of Nations

Heckman Equation

- **Invest** in early education and development for disadvantaged families +
- **Develop** cognitive and social skills of children aged 0-5 years +
- **Sustain** early development with effective education through adulthood =
- **Gain** capable, productive, and valuable workforce that generates wealth for many generations

James J. Heckman
2000 Economics Nobel Laureate
Rates of Return to Human Capital Investment at Different Ages: Return to an Extra Dollar at Various Ages

- Programs targeted towards the earliest years
- Preschool programs
- Schooling
- Job training

Age:
- 0–3
- 4–5
- School
- Post-School

Rate of return to investment in human capital
How Does Education Add to Nation’s Wealth and Prosperity?

• Convincing evidence from careful research studies:
  – Early childhood programs (pre-school) reduce K-12 costs and result in higher earnings
  – A high and increasing rate of return to earning a bachelors or post-graduate degree
  – A substantial return for an associates degree or technical program certificate
  – Higher earnings $\Rightarrow$ higher tax revenues and lower social assistance costs (unemployment insurance, etc.)

• Social returns
  – Less crime, smoking, drunken driving, unemployment
  – Better health, more voting, more volunteering
  – Higher productivity feeds enduring appetite of labor markets for educated workers
FIGURE I:1
MEAN ANNUAL EARNINGS BY AGE AND EDUCATIONAL ATTAINMENT IN THE UNITED STATES
Full-time, Year-Round Workers, 2002-03

Sommers (2006) from NORED

Figure 1:3
RATIO OF MEAN ANNUAL EARNINGS OF UNIVERSITY GRADUATES TO HIGH SCHOOL GRADUATES
Full-time, Year-Round Workers in the United States

Earnings Ratio

Year


Men Women
Where Does Indian Higher Education Stand?

- **Rapid growth** of institutions, and enrollments
- But of uncertain **quality**, compared to the West as well as China
- **Thin top layer** of talent entering a few dozen (mostly but not all) state subsidized institutions
- Their selective admissions from a large pool provide valuable **screening** for employers
- Inflated reputation of **overall** quality of Indian education
- Emphasis on **credentialing**, instead of creating human capital of society
This is Nothing New or Radical

• “Our university system is, in many parts, in a state of disrepair.... In almost half the districts in the country, higher education enrollments are abysmally low, almost two-third of our universities and 90 percent of our colleges are rated as below average on quality parameters.... I am concerned that in many states university appointments, including that of vice-chancellors, have been politicised and have become subject to caste and communal considerations, there are complaints of favouritism and corruption. ...”

• Manmohan Singh, Prime Minister of India (2007)
The Problem of Quality

- World Bank-FICCI Survey: 64 percent employers not satisfied with engineering graduates at some level
- Infosys finds 2 percent of 1.3 million job applicants acceptable
- Not enough talent goes into teaching and scholarship
- Many colleges run as rule-bound bureaucracies or businesses
- Difficulty of running universities by civil service processes because learning, scholarship, and teaching do not lend themselves to profit-seeking businesses cannot produce public goods for society bureaucratic control and performance measurement
- India’s reputation built on a few lakh graduates of elite colleges where admissions screening plays an important role
- But India’s economy calls for educating the annual cohort of 260 lakh children
- How do we teach the remaining 250 lakh students per year below the top layer? India needs many more real teachers, real colleges and resources
- Though comparative data are hard to get, personal observations of top universities in both countries suggest big Chinese lead
Levels of Knowledge

• India exudes a great deal of confidence in its technological capabilities today
• Confidence is a big plus, but not misplaced confidence
• Distinction among various levels of knowledge is critical
• Six levels of knowledge about a car:
  – The owner
  – The driver
  – The mechanic
  – The manufacturer (production engineer)
  – The Designer (engineer)
  – The inventor of car
• A person riding in his car may appear knowledgeable (= rich?)
• But owning a car requires little knowledge, driving requires only a little more
• What is the link between level of knowledge and social status in various societies? In India?
• At which level of knowledge do India’s IT or other industries operate? Talk about “Knowledge Commission”
Challenges for India

• Attracting more talent to teaching and scholarship
• Separation and fragmentation of education and research
• Financing: Who should pay?
• Investor-run colleges and universities
• Attitudes of the business community and public
• Rent-seeking and universities as employment agencies
• Each of these issues can be tackled effectively
1. Attracting More Talent to Universities: What do India’s Einsteins do?

- Insufficient top quality talent attracted to teaching and scholarship
- Cannot be addressed by U.S. or British universities; India is too big
- Farmer saves his best grains to seed the next crop
- PhD programs are the seed farms for national intellect—to instruct, expose, explore, innovate and inspire the youth
- Money matters, but is not the only factor
  - “The Pharmacy Council of India has noted with concern that several Universities/institutions are offering PG programmes in Pharmacy (M.Pharm) without having necessary infrastructure and qualified faculty. The pass outs from such universities/institutions are appointed as teaching faculty in pharmacy institutions to teach D.Pharm/B.Pharm/ M.Pharm/Pharm.D. students.”
  - 500+ engineering schools in Anna University; who teaches them?
- A wise society sends its best brains to think, create, and teach the next generation
Total PhD Degrees Granted in China, India and US

Year


PhD Degrees Granted

0 10000 20000 30000 40000 50000 60000

USTotal China Total India Total

9/22/2014 Higher Education China and India (c) Shyam Sunder 15
Science-Engg. PhD Degrees Granted in China, India, and U. S.
## Delhi, Kanpur and Bombay IIT Students’ main reasons for not wanting to do PhD in India

<table>
<thead>
<tr>
<th>Reason</th>
<th>IITD</th>
<th>IITK</th>
<th>IITB</th>
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</thead>
<tbody>
<tr>
<td>PhD takes too much time</td>
<td>47.0</td>
<td>10.7</td>
<td>24.2</td>
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<td>Doing a good PhD in India is not possible as research work in India is poor</td>
<td>38.0</td>
<td>5.3</td>
<td>14.1</td>
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<tr>
<td>Indian PhD has low market value</td>
<td>35.0</td>
<td>24.0</td>
<td>12.1</td>
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<tr>
<td>Faculty who taught me doesn't inspire me to take up higher studies</td>
<td>26.0</td>
<td>24.0</td>
<td>10.1</td>
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<tr>
<td>Do not want to spend another few years as a student</td>
<td>25.0</td>
<td>2.7</td>
<td>0.0</td>
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<tr>
<td>Have just not thought about PhD and career options with it</td>
<td>21.0</td>
<td>54.7</td>
<td>36.4</td>
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<td>I do not want to be an academician (and that is what PhDs do)</td>
<td>20.0</td>
<td>22.7</td>
<td>33.3</td>
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<tr>
<td>Faculty and their research is not known</td>
<td>18.0</td>
<td>6.7</td>
<td>5.1</td>
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<td>Job options after PhD are few</td>
<td>18.0</td>
<td>41.3</td>
<td>37.4</td>
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<tr>
<td>Attraction of settling abroad</td>
<td>16.0</td>
<td>6.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Range of research areas available in India are limited as compared to foreign universities</td>
<td>14.0</td>
<td>38.7</td>
<td>31.3</td>
</tr>
<tr>
<td>I expect to get a good job, so why should I do a PhD</td>
<td>14.0</td>
<td>30.7</td>
<td>34.3</td>
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<tr>
<td>There are too many courses which one has to do before starting research work</td>
<td>4.0</td>
<td>10.7</td>
<td>17.2</td>
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<tr>
<td>Would not be able to get admission in IITs/IISc or other top places</td>
<td>3.0</td>
<td>12.0</td>
<td>19.2</td>
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<tr>
<td>PhD is too difficult</td>
<td>1.0</td>
<td>9.3</td>
<td>22.2</td>
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</table>
## Delhi, Kanpur and Bombay IIT Students’ Changes that will make the consider doing PhD in India

<table>
<thead>
<tr>
<th>Option</th>
<th>IITD</th>
<th>IITK</th>
<th>IITB</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the job opportunities after PhD increase and provide a compensation of more than `100,000 per month</td>
<td>56.0</td>
<td>32.0</td>
<td>40.4</td>
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<tr>
<td>Part-time program option of doing PhD while in job</td>
<td>36.0</td>
<td>2.7</td>
<td>7.1</td>
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<tr>
<td>If the PhD program involves collaboration with R&amp;D groups in companies in India including internship stints for PhD scholars</td>
<td>36.0</td>
<td>17.3</td>
<td>22.2</td>
</tr>
<tr>
<td>If the PhD degree is a joint degree between an Indian Institution and a foreign university (with at least one year being spent in the foreign university)</td>
<td>36.0</td>
<td>44.0</td>
<td>32.3</td>
</tr>
<tr>
<td>If the stipend of PhD scholars is increased to about `20K per month</td>
<td>28.0</td>
<td>34.7</td>
<td>33.3</td>
</tr>
<tr>
<td>If the PhD program involves spending (on scholarship) at least one-year in a research group in an overseas University</td>
<td>28.0</td>
<td>44.0</td>
<td>37.4</td>
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<tr>
<td>If the duration of PhD is reduced so it can be completed in four years</td>
<td>28.0</td>
<td>21.3</td>
<td>14.1</td>
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<tr>
<td>More information on programmes and opportunities</td>
<td>25.0</td>
<td>42.7</td>
<td>49.5</td>
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<tr>
<td>If the course work in PhD is reduced and the focus is mostly on research</td>
<td>19.0</td>
<td>20.0</td>
<td>23.2</td>
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<tr>
<td>Removal of compulsory GATE exam for admission</td>
<td>8.0</td>
<td>38.7</td>
<td>40.4</td>
</tr>
</tbody>
</table>
Gross Enrollment Ratio (Relevant Age)

World Region

North America
Asia/Oceania
Europe
Arab
Latin/Car.
India
World
Total

1995
2000
Teachers per Million Population

World Region

North America
Asia/Oceania
Europe
Arab
Latin/Car.
India
World
Total

1995
2000

Teachers per Million Population

Percentage

0 500 1000 1500 2000 2500 3000 3500 4000

World Region

9/22/2014
Higher Education China and India (c) Shyam Sunder
<table>
<thead>
<tr>
<th>Country</th>
<th>Population (millions)</th>
<th>Top 20</th>
<th>Top 50</th>
<th>Top 100</th>
<th>Top 200</th>
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<td>China</td>
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<td>Hong Kong</td>
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<td>Japan</td>
<td>127</td>
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<td>3</td>
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<td>Other Asia</td>
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<tr>
<td>Asia subtotal</td>
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<td>9</td>
<td>16</td>
<td>32</td>
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<td>Australia</td>
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<td>U.K.</td>
<td>61</td>
<td>5</td>
<td>8</td>
<td>18</td>
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<td>U.S.</td>
<td>310</td>
<td>13</td>
<td>18</td>
<td>32</td>
<td>54</td>
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<tr>
<td><strong>Total in this table</strong></td>
<td><strong>4,338</strong></td>
<td><strong>20</strong></td>
<td><strong>44</strong></td>
<td><strong>79</strong></td>
<td><strong>138</strong></td>
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## Top 200 Universities of the World

<table>
<thead>
<tr>
<th>2009 Rank</th>
<th>2008 Rank</th>
<th>Name</th>
<th>Country</th>
<th>Peer review Score (40%)</th>
<th>Recruiters Review (10%)</th>
<th>Int’l Faculty Score (5%)</th>
<th>Int’l Student Score (5%)</th>
<th>Faculty Student Score (20%)</th>
<th>Citations Faculty Score (20%)</th>
<th>Overall Score</th>
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<td>1</td>
<td>1</td>
<td>Harvard University</td>
<td>US</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>100</td>
<td>85</td>
<td>78</td>
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<tr>
<td>2</td>
<td>3</td>
<td>Cambridge University</td>
<td>UK</td>
<td>100</td>
<td>100</td>
<td>400</td>
<td>89</td>
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<td>67</td>
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<td>100</td>
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<td>National University of Singapore</td>
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## Number of High-Ranked Universities

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<th>Rank</th>
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<td>3**</td>
</tr>
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</table>
An Inconvenient Truth

- **An inconvenient truth**: India lags in quality education and innovation, is falling further behind—a largely unrecognized crisis (not like flood or fire)
  - Like CO poisoning, not noticed until it is too late
- Research and scholarship lies at the narrow top of the educational pyramid (like a seed farm at the top of the pyramid of agriculture)
  - 260 lakh children born/year
  - 100 lakh in high school/year
  - 40 lakh in college/per year
- Only 16,000 PhDs/per year (only 6,500 in STEM)
- No steel without blast furnaces, no educated without talented teachers (not the bechaara teachers)
Developing Scholarly Talent

• In year 2006-2007 [the annual report of AICTE], faculty development programs affected 1,350 individuals
• Granted Rs. 50,000 each to 10 out of 25 research proposals received (Compare with Chinese program)
• Consuming the fruits of trees planted long ago
• Evidence that this decline has been continuing for years
• Unless India invests heavily in research and doctoral education today the quality of its higher education will continue to decline, with serious consequences for its economy
• The technology boom may lose steam as Indian firms move their operations to other countries where they can find well-educated employees in large numbers
• How many college and university teachers teach classes to which they could gain admission as a student?
• **Top talent for teaching as Item 1 for the government and Educon**
2. Structure of Innovation/Research

- Structural obstacles to promote research and innovation
- After independence, set up specialized research organizations initially attracted talented scientists and engineers to research
- Were well financed by government, had little contact with education, industry or the market (business was a dirty word)
- With a few exceptions, isolated from the fresh air and inconvenient discipline of the market and contact with the young minds, most laboratories gradually fell into bureaucratic routine, promoting largely by seniority, spending the budget, producing little research or innovation (India hardly appears in the world research map)
- The civil services that run these organizations, e.g., Council for Scientific and Industrial Research, control much of government budget for promoting innovation
Policy of Separating Research from Education

• Second, most of the government budget for innovation captured by these organizations, leaving little for universities
• Third, isolation of research from the education of the young
• Universities reduced to classrooms printing diplomas
• Starved of talent in faculty, funding for innovation, and research culture. In such environment, even talented students had no exposure to research, no opportunities for even accidental discovery of their affinity for innovation.
• The few PhD programs that existed could not attract young talent
• Most members of faculty could not do or supervise research
• The quality of people entering the PhD program lowered the social regard for academia; this vicious cycle of mutual reinforcement continues
Separation of Research from Teaching

• System of independent bunkers for research and teaching, had devastating consequences
• Neither research (no youth) nor education (no money and talent)
• Functioning by civil service rules, little mobility, competition, or industry contact
• Low quality of students in PhD programs
• Narrowly defined disciplinary charters of research labs as well as educational institutions
• Signboards of “National Institute of XYZ” in and around Delhi (e.g., National Defence University at 3B rupees, 200 acres, why not on a university campus?)
• Consequences of free-standing special purpose universities
• Legislative and financial controls: 15 councils each with its own act of Parliament; every ministry is an education ministry
Excessive Specialization

• A fourth consequence: narrow charters of research institutes did not allow focus on the exciting interfaces of disciplines where innovation occurs as
• Each institute, defined by its own agenda or discipline, bound by its own charter, did not facilitate or encourage casual interaction with ideas from outside that may occur in broader university settings
  – Will an institute to conduct research on candles discover electricity
  – Will an institute to conduct research on horse carts invent a car
• Imposition of narrow super-specialization has damaged India’s education system. Importance to diploma, not to the creativity of a young mind
• Importance to administrative authority, not to originality of thinking and power of ideas
  – Human Indian scientists known for their science, not authority
India Needs Domestic Capacity for Scholarship and Innovation

- **To lead** India should rethink the future of innovation and original research in the Indian economy
- For India to become a “brain bank,” to use a popular phrase, it will have to become a source for first class scholarship where new theories, theorems, products, and ideas are generated for itself and the rest of the world. In other words, India must create, today, the seed farms for scholarship
- From all indications, the quality as well as quantity of high-talent young people being attracted to scholarly careers is too small today to support such dreams for the future
- Even US universities which used to attract a large number of PhD candidates from India, the number has dropped as the economic reforms made better employment opportunities available to them
- India as well as China is so large that neither can depend on foreign universities to train enough PhD for it
Administrative Perspectives

- Physical vs. human resources
- Every ministry is in education
- Regulatory waste
- Political, civil service and commercial control
- Indian constitution and the political power of teachers
- Enforcement of societies act
- Resource use and productivity
- Public good aspects of higher education
- Internal governance and evaluation of faculty
- Personnel policies
Physical vs. Human Resources

• Planning and governance dominated by physical resources—property and goods—as wealth of society
• Creative ability of people to think and do receives less attention
• Higher education plans consist of: acres, square meters of building space, employment, budgets, degree programs and diplomas granted
• The critical feature of education—the talent necessary to think, innovate, inspire, and teach—is more difficult to judge, is not emphasized, and remains in short supply
• Prescription of the Pharmacy Council of India:
  – The nature and period of study of practical training to be undertaken before admission to an examination;
  – the equipment and facilities to be provided for students undergoing approved courses of study;
  – the subject of examination and the standards therein to be attained; and
  – any other conditions of admission to examinations.”
• What is missing here?
Every Ministry is Education Ministry

• Fifteen councils, controlled by various ministries under various acts of Parliament
• Ministry of Health and Family Welfare controls Pharmacy Council of India
• Everybody protects their turf
• Collective opposition of all ministries and councils to Yash Pal Committee recommendation for integration of education
• Need strong political leadership to change
Regulatory Waste

• Mind-numbing detail in regulations to avoid discretion

• E.g., Dental Council of India: 5 acres, 30-year lease, 600-1,000 sq. ft./student, 50% living space, Rs.200,000 per student plus bank guarantee but no mention of faculty

• Avoiding fly-by-night operators, but permitting veritable Taj Mahals ignoring their opportunity cost and limits on enrollments
Political, Civil Service and Commercial Control

• We do not need to go into them here.
• Outsized control of ex officio presence of civil servants on policies
Constitutional Power of Teachers

• Low level of expectations (and performance) from teachers
• Between civil service rules and intensive unionism of teachers, how do you specify obligations for inspired teaching and brilliant scholarship?
• Excessive “democracy” on campus
• Article 171(3c) of Indian Constitution
Enforcement of Societies Act

• Traditional charitable and managerial participation of civil society in higher education being overtaken by commercial interests
• Focus: Return on invested capital
• Failure of the government to enforce the Societies Act
• Well-intentioned land grants for education sometimes become private source of wealth
Resource Use and Productivity

- High unfulfilled demand for higher education, low enrollment ratio, and scarcity of resources for higher education coexist with anomalous pattern of resource allocation by government
- Sprawling academic campuses in middle of cities with well-separated low-rise buildings on high value land on which 10 or 20 times as many students could be given quality education if faculty were available
- Provision of campus housing makes VCs and Directors mayors as well as land lords, high capital cost, lowers capacity
- Initial planning:
  - provisions for land, buildings, staff quarters, and academic and support staffs
  - Support staff positions are quickly filled into permanent tenure
  - Scarcity of candidates for the academic staff keeps positions vacant, forces compromises on hiring quality
  - Unfulfilled demand for higher-education brings plenty of student applications
  - Administration scurries to find instructors to fill the class time
  - No matter what the initial plans and intentions, the shortage of high-quality academic personnel makes it all but impossible to attend to the research and innovation goals of the project
Public Good Aspects of Higher Education

• Public good elements of various levels of education
• PhD education is an extreme case
• Cannot survive without major subsidies
• What does privatization of education do to seed farms?
Internal Governance and Evaluation of Faculty

- Difficulty of objectively measuring accomplishment
- Universities depend on shared values among students, faculty, staff, administration, parents, government, donors, and the society
- Values too delicate to stand up to hard-ball confrontation and tactics by which various constituencies may seek their own rights with little shared understanding and obligation for their responsibilities
- Absent shared expectations and values, no university can deliver quality education, no matter how talented the administration is
- Degradation of education is the first victim of conflict.
- Almost immediate tenure to faculty
- Since subjective judgment may be abused, bright line rules made in Asia, damaging research cultures and intellectual discourse
- Sunder, Building Research Culture, (http://faculty.som.yale.edu/shyamsunder/Research/Accounting%20and%20Control/Published%20Articles/156.Building_Research_Culture/Building_Research_Culture.pdf)
Personnel Policies

- Importance to degrees and administrative authority, and seniority
- Creativity, originality of young minds ignored
- Scholars without administrative authority rarely in public domain
- P. Anandan: “India doesn't make heroes of its researchers.”
- Catch 22 of Indian scholarship: scholars become civil servants to have control over their work, which leaves them little time for scholarly work.
- Civil servants can rarely independently judge scholarship and art, it is reasonable for them to rely on the judgment of eminent people in the field
- This involvement in administrative matters also consumes time that would otherwise be spent on creative or scientific work
- India, like China, uses age and seniority as qualifications for decision-making, putting meritorious young scholars and their heterodox ideas at a disadvantage.
What Should India Do?

• **Solutions** will have to be found urgently, and from within India
  – No solutions suggested from outside would be acceptable
  – Nor are they likely to work

• If the problem is considered important, it must be addressed from within by carefully deliberation among top policy makers and experts, recognizing the serious conflicts of interest that exist at all levels (profit-making institutions owned by businessmen and legislators)

• Perhaps we should take some time to develop and discuss ideas for reform: Educon is a great forum to develop such solutions
Reform Proposals

- Yash Pal Committee Report
- Centers of excellence
- Knowledge as commodity or process
- Education or screening
- Identifying and attracting talent
- Audit and accountability
- Building expectations of good governance (autonomy and responsibility)
- Financing
- Organic growth
- Evolving competitive self-regulatory structures, management
- Retirement age
- Faculty support
- International faculty and students
- Redefinition of most PhD programs
- Cross university cooperation for efficient use of resources
Consequences

• For India Inc.: educated, skilled, responsible work force ➔ productivity, innovation and growth
• For parents: brighter future for your children
• For students: hard work now ➔ prosperity (China and Korea transformed in one generation)
• For politicians: be the builders of a new India
• For India: self-confident member of the world community
An Overview

- **Innovation** is the primary engine of economic growth.
- **Adoption** of innovation in the past has helped India reap its fruits and grow: agriculture, software.
- **Global competition** will not allow India to sustain this strategy for long.
- **An inconvenient truth**: India lags in innovation, is falling further behind—a largely unrecognized crisis.
- **To lead** India needs to seriously rethink the future of innovation in Indian universities and the economy.
- **Building seed farms of innovation** needs political and academic leadership, commitment, restructuring the institutions of innovation, financial investment, and social respect for scholarship.
- **Key elements**: not buildings, budgets and bureaucracy but imagination, creativity and ideas from brilliant brains.
- **False hope** of profit-driven colleges—which will not spend on talent or innovation—subsidy from government or charity necessary for quality.
- **Engage with this problem** and India can address it as well as others.
- **Better Solutions** from within, urgently (Educon, new government).
To Conclude: India

• Has many advantages to solve the problem
  – Has manpower (mouths as well as hands)
  – Education highly valued by all by culture
  – Mass media and technology infrastructure

• Need: talent, money, management, foresight, determination, and coordinated action by the political and business elite

• To overcome the crisis and develop and deliver quality education (not confuse diplomas for education)

• The patient is in ICU, need action on war footing

• 18th to 21st century world GDP. China is there already; whether India will depends on this group and govt; Let us not miss this chance

• Honored to be a part of your dialog. I look forward to the next three days to work on developing actual solutions
Thank You!

Shyam Sunder, “Higher Education Reforms in India”
Oxford Handbook of Indian Economy (2011)
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