United States Innovation Policy at a Crossroads

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THE NATIONAL ACADEMIES
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National Academy of Sciences
National Academy of Engineering
Institute of Medicine
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The United States is blessed with an extraordinarily successful (innovation) system, as evidenced by its world leadership over the past half century ...in developing and putting to use new technologies for commercial, civilian, and national security purposes. (U.S.) firms have mastered wave after wave of new technologies, from aerospace and electronics to pharmaceuticals and nanotechnology. These were built on strong foundations of new knowledge in the physical, mathematical, and biological sciences and engineering...(and) have benefited from the establishment of a highly supportive national innovation system (NIS).

-- Christopher T. Hill, George Mason University

WEF Global Competitiveness Index, 2007

Ranking 2007-2008

Rank	Country	Score
1.	United States	5.67
2.	Switzerland	5.62
3.	Denmark	5.55
4.	Sweden	5.54
5.	Germany	5.51
6.	Finland	5.49
7.	Singapore	5.45
8.	Japan	5.43
9.	United Kingdom	5.41
10.	Netherlands	5.40
34.	China	4.57
48.	India	4.33
58.	Russian Federation	4.19
72	Brazil	3.99

http://www.gcr.weforum.org/

ELEMENTS IN THE NIS

- Institutions (public, NGO, commercial) that perform R&D
- institutions that finance investments in technology-based start-ups and growing firms
- The intellectual property rights regime and its enforcement
- Tax policies
- Education and training of STEM workforce at all levels
- Technical standards for compatibility of innovations
- Regulatory standards and procurement specifications

U.S. innovation institutions and policies are in continual flux for reasons tangential to innovation concerns, however from time to time they are reviewed systematically, usually in response to foreign challenges:

- 1957 Russian Sputnik (Eisenhower)
- 1961 CITP (Kennedy)
- 1971 NTOP (Nixon)
- 1979-80 Innovation Domestic Policy Review (Carter)
- 1983 Commission on Industrial Competitiveness (Reagan)
- 2006-07 America COMPETES Act based on Academy and Council on Competitiveness reports (G.W. Bush)

COMMON RECOMMENDATIONS

- Increase public R&D
- Stimulate R&D collaboration directly and by relaxing antitrust enforcement
- More generous tax incentives for corporate R&D
- Direct support of small business R&D
- Strengthen IPRs
- Accelerate public --> private sector technology transfer
- Procurement/regulatory reform
- Expand training of scientist and engineers
- Improve STEM education

RESULTS

Short-lived and/or small scale:

- Direct federal spending programs (e.g., TIP, ATP, CRADAs, fellowship programs) except health research

Long-lived and robust:

- Antitrust relaxation
- Patent system strengthening
- University tech transfer
- SBIR a set-aside from agency research funds, not a direct appropriation
- Performance-based procurement/regulation

Uncertain:

- Tax expenditures (e.g., R&E Tax Credit)

America COMPETES Act, 2007

Authorizes (but does not provide funds for):

- funding of NIST, NSF, DoE research to double in 7 to 10 years
- funding of Manufacturing Extension Partnership (MEP) to double in 10 years
- Advanced Technology Program (ATP) replaced by Technology Innovation Program (TIP) focusing on small- and medium-sized companies and universities
- establish Advanced Research Projects Agency for Energy (ARPA-E) to address long-term and high-risk technological barriers in energy through collaborative R&D
- summer institutes for STEM teachers
- Bachelor's and Master's program for STEM teachers
- grant program for math teachers
- increase STEM college graduates
- expand science and engineering graduate research fellowships

REASONS FOR WEAK POLICY RESPONSE

- Constraints on federal domestic discretionary spending
- Ideological debate about picking "winners and losers“
- Exceedingly weak institutional base for sustained analysis and policy development (e.g., weakened OSTP, demise of Commerce Department’s Technology Administration, dispersed congressional committee jurisdiction)
- Policy driven by measurable contributors to innovation (e.g. R&D expenditures, number of scientist and engineers).

Despite recurring pattern, the latest round of U.S. Innovation Policy may be the last…

THE PROCESS OF INNOVATION IS CHANGING

FROM THE PERSPECTIVE OF THE FIRM:

- U.S. a high cost R&D location with less unique R&D capital, fewer unique human resources
- Reliance on outside sources of new knowledge
- Global sourcing of new knowledge
- Globalization of investment (including angel and venture capital)
- Firm concentration on collaboration, synthesis, design, creativity, imagination
- Innovation less reliant on natural sciences and engineering, more on social science, art, new business processes

FROM THE PERSPECTIVE OF THE ECONOMY:

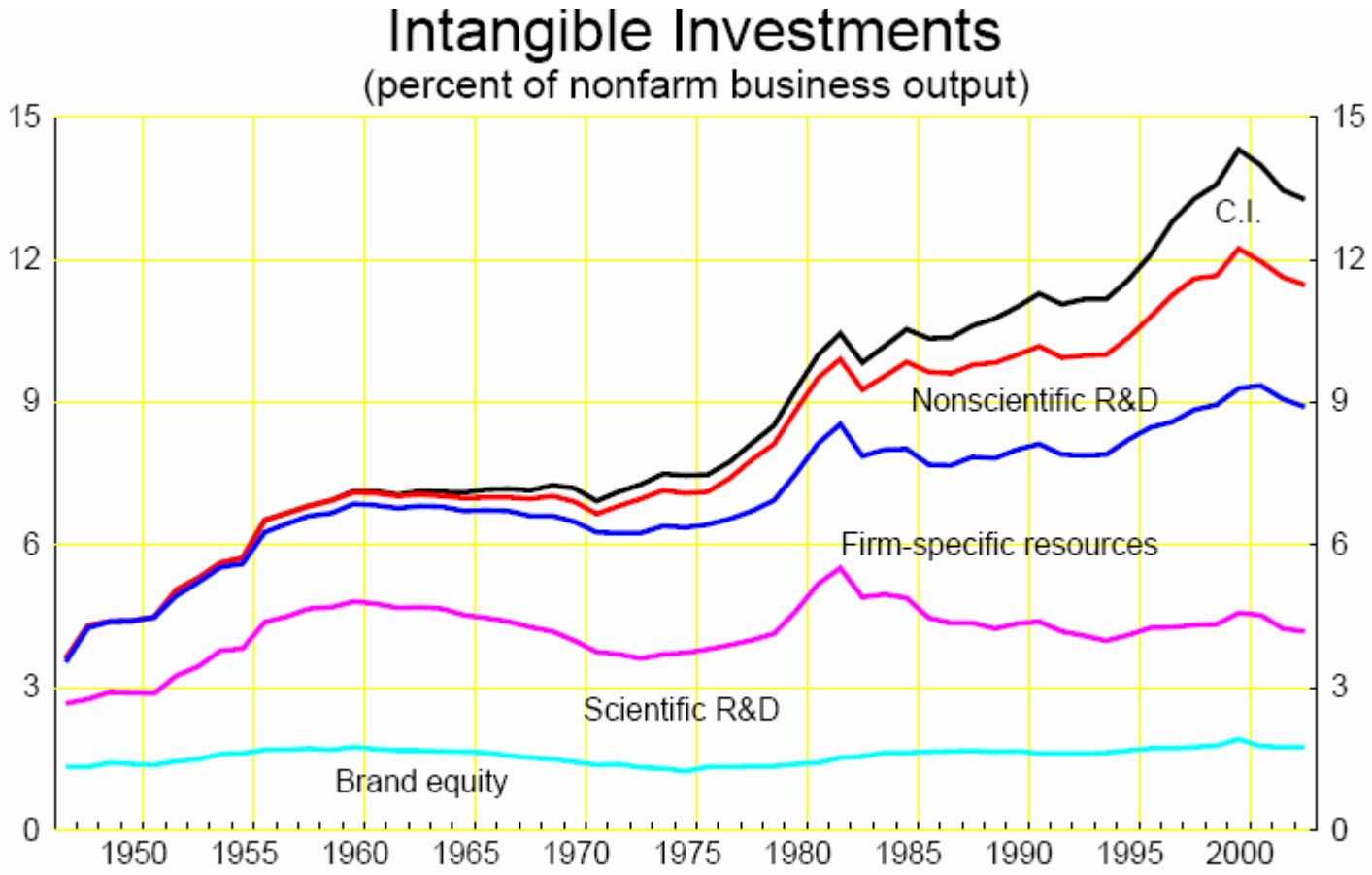
	1950-59	1960-69	1970-79	1980-89	1990-99	2000-03
Total Intangibles	19.4	41.9	103.4	349.3	749.8	1,226.20
1. Computerized information (mainly computer software)		0.8	4.5	23.3	85.3	182.5
2. Innovative property						
(a) Scientific R&D	7.7	16.9	34	104.6	157.7	230.5
(b) Nonscientific R&D	0.5	1.7	10.9	58.4	145.2	237.2
3. Economic competencies						
(a) Brand equity	5.3	9.5	18.2	54.4	105.7	160.8
(b) Firm-specific resources	5.9	13	35.7	108.7	255.9	425.1
Ratio of intangibles to NIPA tangibles	0.47	0.62	0.6	0.82	1.1	1.36

- Proper accounting of intangibles would boost U.S. productivity growth 20% for the period 1973 – 1995, more for the period 1995 – 2003

- By 2000 intangible investment exceed tangible investments, and the ratio is growing

- Scientific R&D represents less than 1/5 of intangibles

Source: Corrado, Hulten and Sichel, 2005



Source: Corrado, Hulten, and Sichel, 2005

IMPACT ON POLICY?

1) Underscores need for a new statistical underpinning of policy premised on generating intangibles as investments rather than expenditures and better measures of

- "non-scientific" R&D
- transactions in technology, domestic and international
- business process improvements
- training to improve human capital

These challenges are being addressed in Commerce Department's Bureau of Economic Analysis, Advisory Committee on Measurement of Innovation.

IMPACT ON POLICY, cont.

2) Shift may be divisive in some cases, e.g. patent reform:

	Software, computer services, finance sector	**Biopharma, old-style manufactures**
1.	Open-ended post-patent challenge process	Very limited
2.	Limit damages for infringement to invention's contribution to product	Opposed
3.	Limit injunctions when infringement found	Opposed

IT sector’s agenda would reverse 25 years of strengthening patents

POLICY IMPACT, cont.

3) Other possible new policy premises & directions:

- K – 12 Education reform: rebalancing of basic skills, creativity
- Reform of copyright and other IP regimes
- Perception of U.S. universities as global institutions
- Expansion of the R&E tax credit to encompass non-scientific research
- Reform of undergraduate and graduate S&E curricula, e.g. "service science"
- Development and use of new policy instruments, e.g., inducement prize competitions

IMPLICATIONS FOR BRAZIL AND OTHER RAPIDLY DEVELOPING ECONOMIES

- US diplomacy will shift slowly (e.g., emphasis on strong IPRs and vigorous enforcement)
- Domestic lessons limited

Thank you
Obrigado

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