The Relevance of U.S. Experience: Technology, Entrepreneurship, and Public Policy

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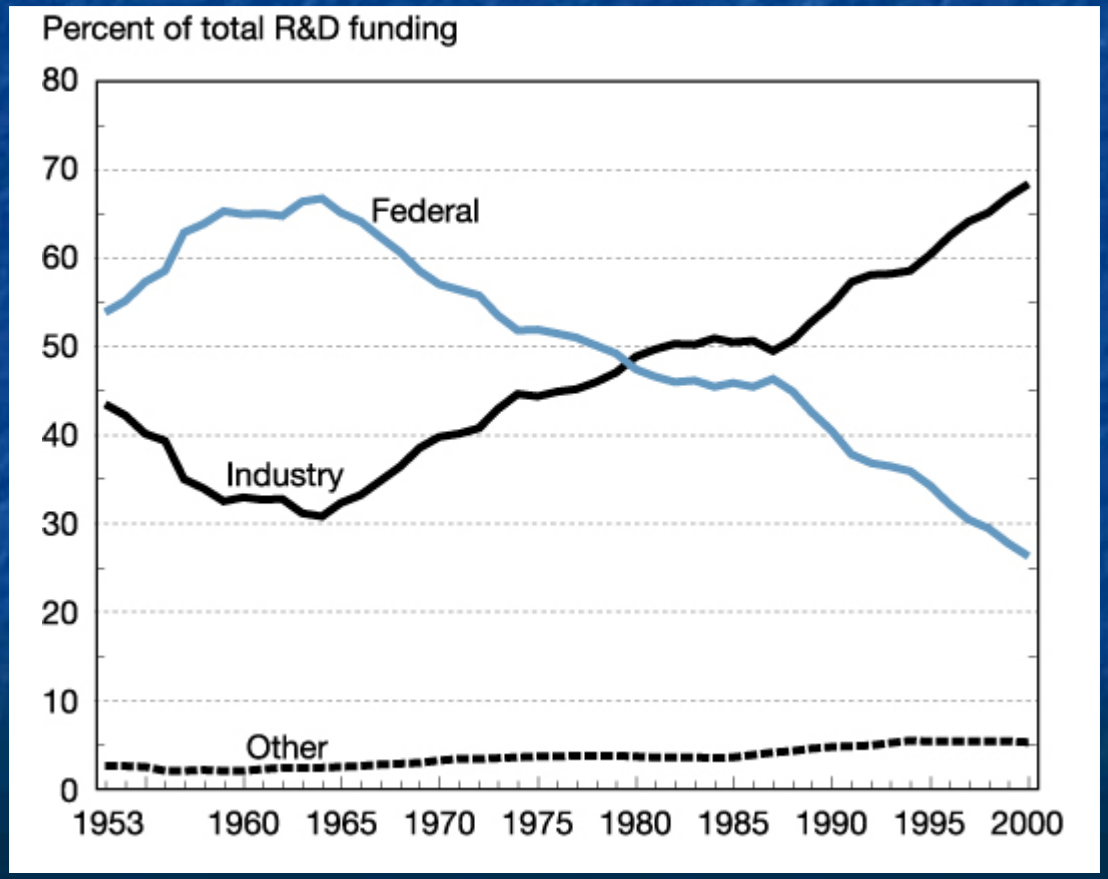
Technology, Entrepreneurship and Public Policy: A Sprawling Canvas

- *Forged Consensus: Science, Technology, and Economic Policy in the US, 1921-1953* (1998)
- "Making Technology Policy at the White House" (1998)
- "New Economy, Old Politics: The Evolving Role of the High-Tech Industry in U.S. Politics" (2000)
- "Antitrust and Technological Innovation: Ideas, Institutions, Decision, and Outcomes, 1890-2000" (2001)
- "Private Technological Capabilities as Products of National Innovation Systems: Four Ways of Looking at the State" (2002)
- *The Emergence of Entrepreneurship Policy: Governance, Start-Ups, and Growth in the Knowledge Economy* (2003)

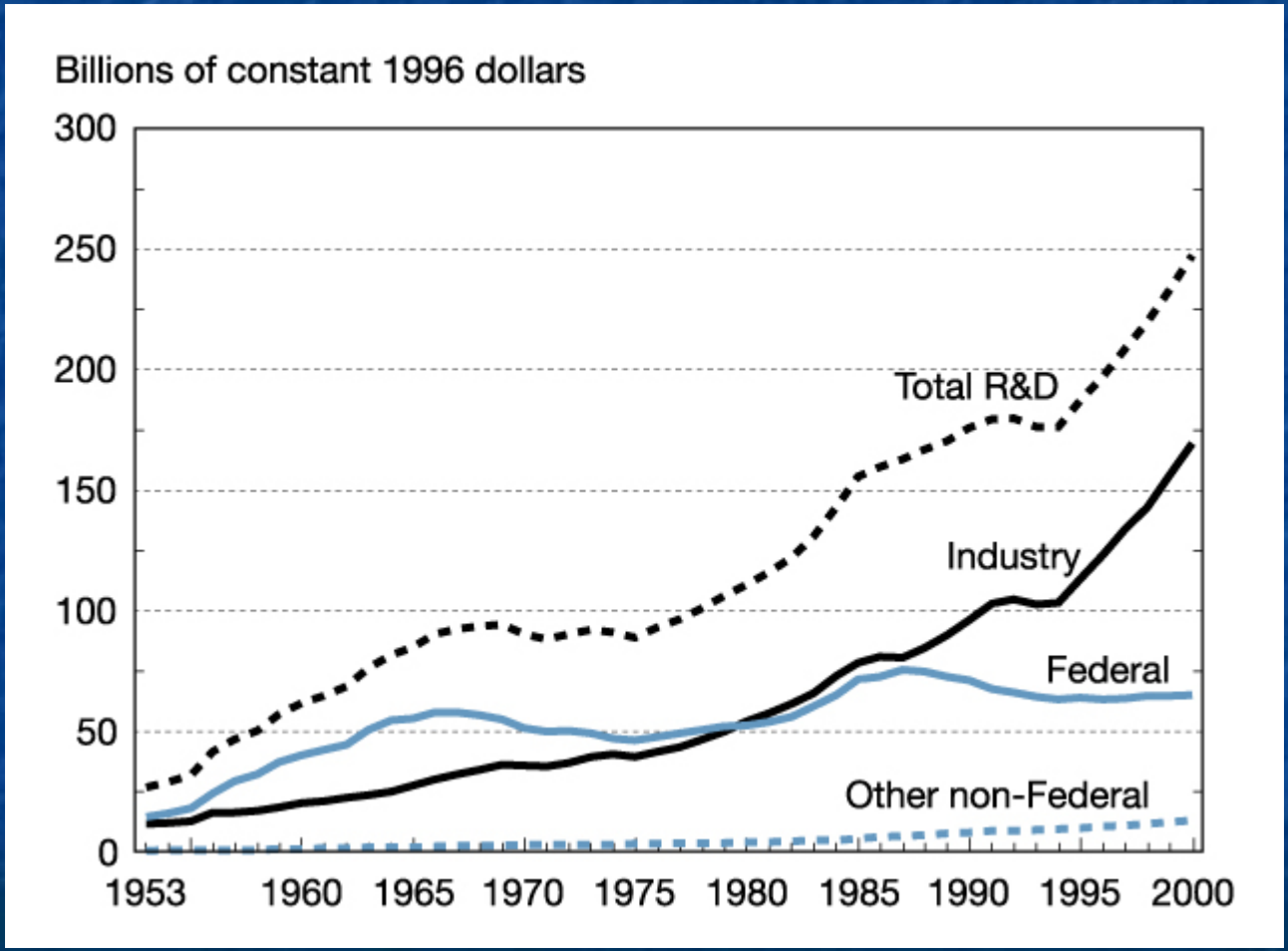
Outline of Presentation

- Premise: Both Sectors Matter
- Conceptualizing STI Policy
- Entrepreneurship Policy as an Element of STI Policy:
  - Definitions
  - History
  - Challenges
  - Cases

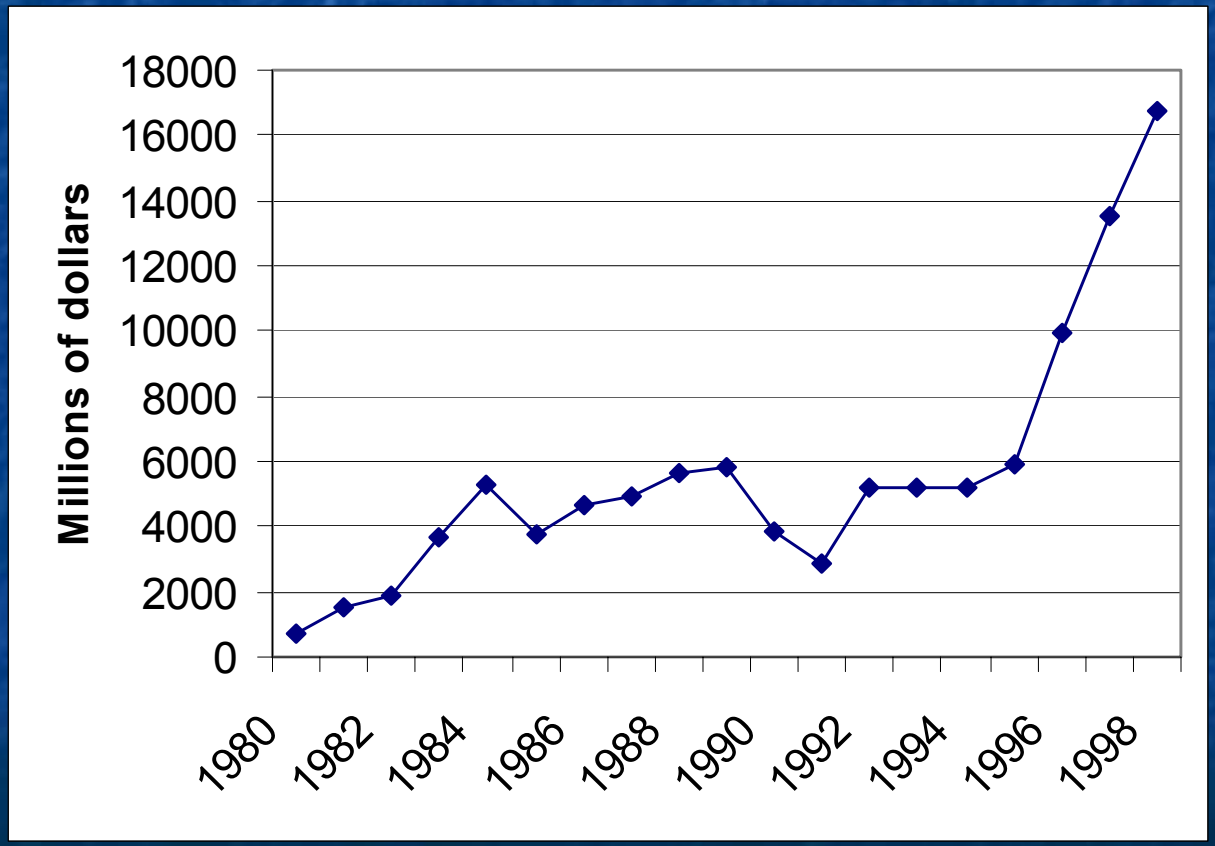
Shares of U.S. R&D expenditures, by source of funds: 1953-2000



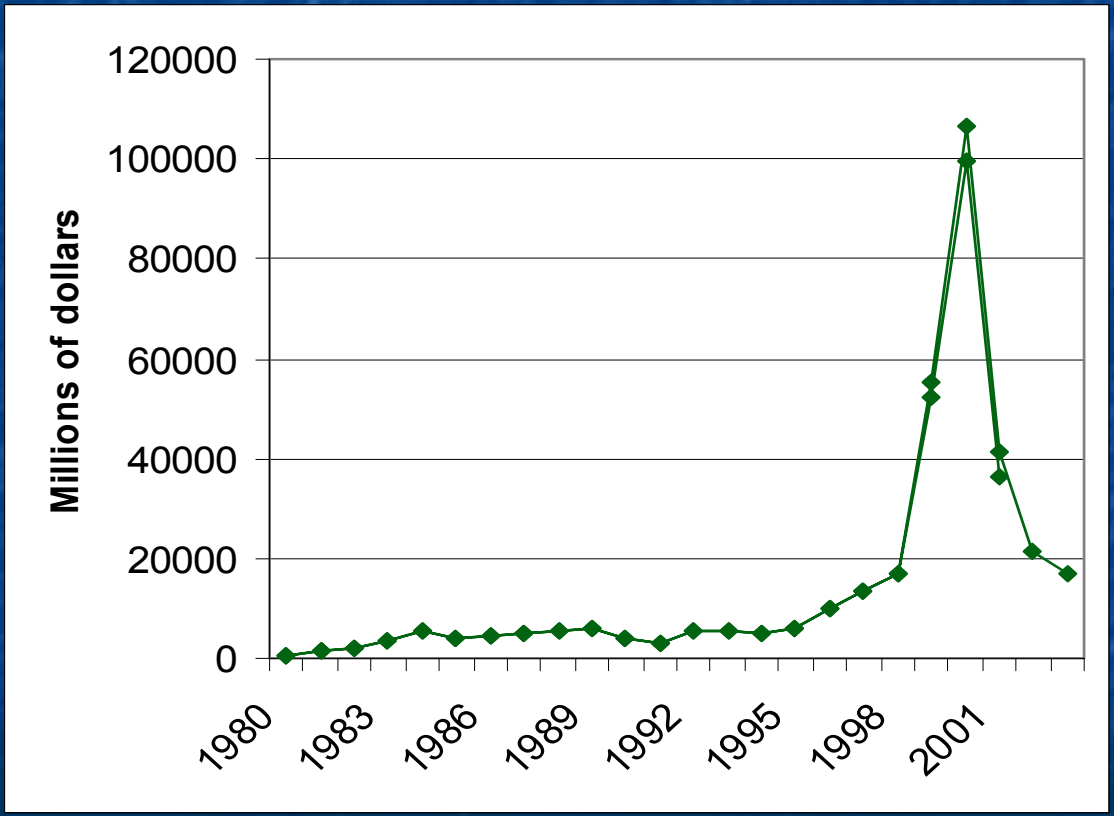
U.S. R&D funding, by source



Venture Capital Investments in the U.S., 1980-1998



Venture Capital Investments in the U.S., 1980-2003*



Four Ways of Looking at the State

- Taxing and spending
  - R&D spending, tax and investment incentives, etc.
- Market participant:
  - Procurement, state-owned enterprise, insurance, etc.
- Rule-maker and enforcer:
  - Property rights, regulation, trade barriers, etc.
- Creator/bearer/sustainer of normative order:
  - Symbolism, identity, recognition, etc.

A Comprehensive Conception of STI Policy

- The "worm's eye" view
- Multiple levels:
  - Local and regional (incubators, networking, partnerships…)
  - State (higher ed., seed capital, cluster development…)
  - Federal (competition, regulation, IP…)
  - Global (trade, security….)
- Multiple policy areas
- Multiple time scales:
  - Short-term conditions (macroeconomic…)
  - Intermediate conditions: years, not months or decades
  - Background conditions (property rights regime..)

Entrepreneurship, Governance, and Public Policy

- Entrepreneurship: starting and continuing to expand a business
  - E.P. and small business policy are different!
    - "opportunity" vs. "necessity" entrepreneurship (*GEM*)
  - E.P. does not have to be oriented toward high-technology, although it often is.
- Governance: conscious, collective action by government and its partners
  - E.P. often aims to catalyze better governance.

Why Try To Focus STI Policy on Entrepreneurship?

- Entrepreneurship matters:
  - Moral fiber?
  - Growth
    - Empirical correlation?
    - Innovation:
      - More radical
      - Impetus to more established rivals
    - Economic revitalization under capital mobility
- How much does policy matter?
  - Endogenous variation?
    - "Culture"?
    - Industrial composition?
  - Governance beyond "rule of law":
    - Biotechnology industry
    - Austin TX
    - South Korea?
    - Singapore?

A Very Brief History of U.S. Entrepreneurship Policy

- Federal level:
  - international competitiveness
  - capital gains tax reduction
  - deregulation
- State, regional, and local levels:
  - “smokestack-chasing” perceived to be ineffective
  - Silicon Valley example
  - “new wave” of economic development policy:
    - public venture capital
    - academic technology transfer
    - Cluster development

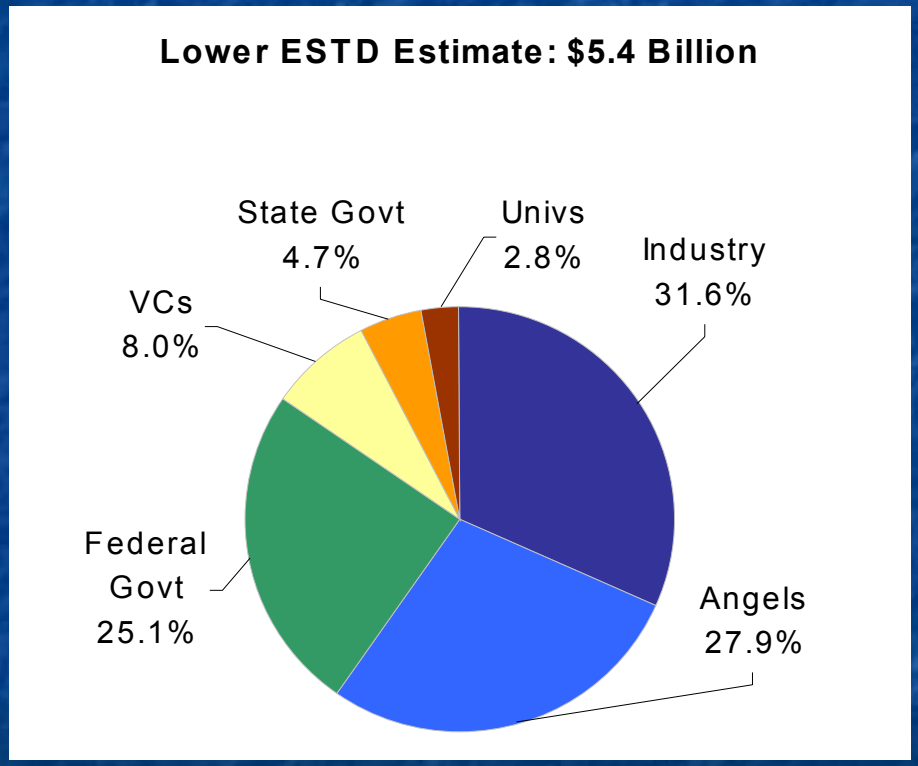
What Should E.P. Do?

- Vary according to specific conditions
- Enhance the "context" for entrepreneurship:
  - Make the "ingredients" for entrepreneurship more readily available
  - Facilitate access to services
  - Break down barriers to entry:
    - Cultural
    - Informational
    - Political

Ingredients for High-Tech Entrepreneurship

- People (human capital)
  - education
  - experience
  - temperament
- Money (financial capital):
  - angels
  - venture capital
- Ideas (intellectual capital):
  - science and technology push
  - customer pull
- Relationships (social capital):
  - entrepreneurial teams
  - inter-organizational networks

Auerswald-Branscomb estimates of funding for U.S. early stage technology development



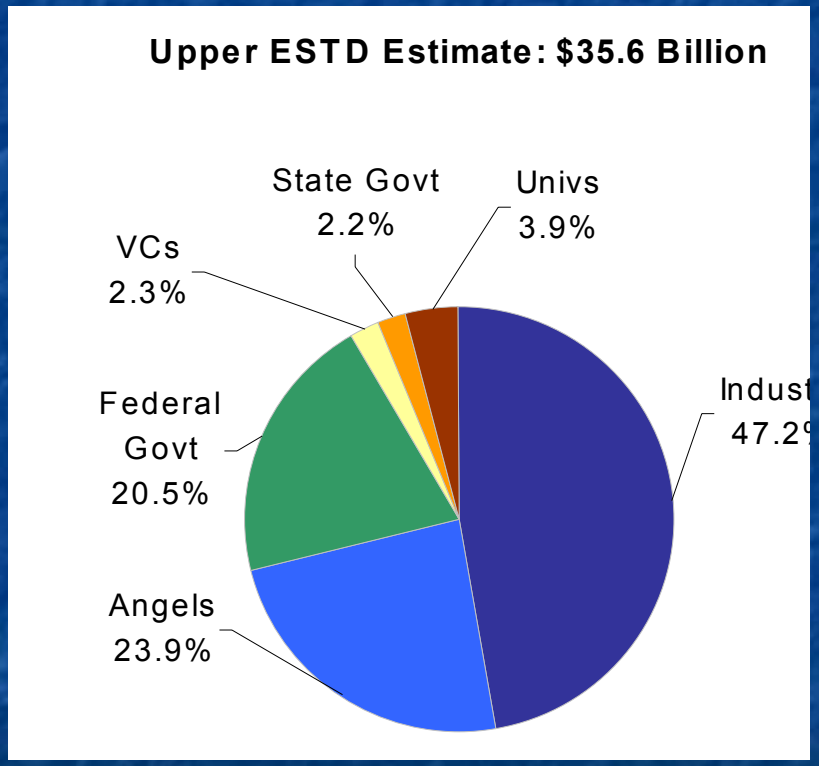


Figure 4.2. Estimated distribution of ESTD funding, based on narrow (lower estimate) and broader (upper estimate) definitional criteria.

Policy Design Challenges

- Is there an socially optimal level of entrepreneurship?
- Should (can) it be "generic," or should (must) it target particular sectors, institutions, or groups?
- How can sufficient information about opportunities and barriers be acquired?
- What kinds of partners should be recruited into the process of governance?
- How can we know if it's working?

Policy Process Challenges

- Can a sufficiently powerful constituency be built for it?
- Can it avoid being captured by its beneficiaries as circumstances change?
- Can the components of an effective policy be coordinated (avoiding "program-itis")?
- Can it be delivered in a timely fashion?

"Generic" E.P.: A New Recipe? (Richard Florida)

- Major empirical assertions:
  - Human capital is the key ingredient
  - Diversity is as important as clustering
    - more combinations of technology and talent
    - a signal to talented people
  - Artistic creativity is complementary to high-technology entrepreneurship
- Policy prescription: create a "habitat" for talent

High Tech and the Gay Index
(Florida, Table 3.4)

Table 3.4: High-Tech and the Gay Index

High-Tech Rank	Region	Gay Index Rank (1990)	Gay Index Rank (2000)
1	San Francisco	1	1
2	Boston	18	22
3	Seattle	5	8
4	Los Angeles	3	4
5	Washington DC	7	11 (tie)
6	Dallas	12	9
7	Atlanta	8	7
8	Phoenix	23	15
9	Chicago	17	24 (tie)
10	Portland	22	20
40	Buffalo	49	49
41	Oklahoma City	40	40
42	Las Vegas	28	5
43	Grand Rapids	32	38
44	Providence	31	32
45	New Orleans	25	11 (tie)
46	Louisville	47	36
47	Jacksonville	38	24 (tie)
48	Memphis	43	41
49	Detroit	42	45

Case: E.P. in Biotechnology (Andrew Toole)

- Four dimensions:
  - research funding
  - intellectual property law
  - drug regulation
  - ethical climate
- IP seems to be the biggest bottleneck
- Strong links between info tech and biotech entrepreneurship

Case: E.P. in Telecommunications (Eli Noam)

- Entrepreneurial boom prompted by deregulation
- Incumbents respond:
  - economies of scale
  - ability to discriminate subtly
- Shake-out
- Regulators must take aggressive measures if further new entry is to occur.

Case: E.P. in E-commerce (Viktor Mayer-Schönberger)

- Intellectual property and contract law are essential.
- Policy must find a balance that is neither too loose nor too rigid.
- Some policy, even if flawed, is better than none at all.

Conclusions

- Lots of work to be done.
- The challenges will be different, but E.P. subject may well be more important in developing countries than in the U.S.
- It's less like gardening than like ecosystem management.