Revisiting the *Science: The Endless Frontier*

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KOSGEB/KEN WORKSHOP
SUPPORTING PARTNERSHIPS in INNOVATION & ENTREPRENEURSHIP
“I’ll be happy to give you innovative thinking. What are the guidelines?”
Today’s talk:

• **Natural questions:**
  – What can public policy do to help foster Science, Technology, and Innovation (ST&I)?
    • When partnerships in ST&I most likely to get it right?

• **Background and discussion:**
  – Will seek to answer these questions by looking ST&I dynamics
    • A glimpse of key drivers
    • A current partnership challenge: Renewable energy

• **Thoughts:**
  – Consider many elements of the innovation and entrepreneurship ecosystem in parallel
    • The case for Istanbul as entrepreneurship hub
Background: Vannevar Bush’s insight (1938-44)

“...For America to win the war that was to come, it had no choice but to make aggressive, focused investments in basic science.”

Bush's insight was his appreciation of the value of basic research in powering innovation by enduring partnerships between the federal government, research universities, and industry.
Background: Vannevar Bush’s insight—

Science: The Endless Frontier (1944-45)

• “What can be done to make known to the world as soon as possible the contributions which have been made during our war effort to scientific knowledge?

• What can be done now to organize a program for continuing in the future the work which has been done in medicine and related sciences particular reference to fight against diseases?

• What can the Government do now and in the future to aid research activities by public and private organizations?

• Can an effective program be proposed for discovering and developing scientific talent in American youth so that the continuing future of scientific research may be assured on a level comparable to what has been done during the war?”

President F. D. ROOSEVELT, November 17, 1944
Some challenges linked to ST&I

• Economic recovery & growth: ST&I as drivers
  – Deploying ST&I for poverty eradication, development

• Health care: better outcomes for all at lower cost
  – Combating preventable and pandemic diseases

• Energy and climate: cleaner, safer energy supply
  – Transforming the global energy system and practices to avoid unmanageable climate change
  – Managing the ecological integrity and productivity for land and water

• ST&I policies (interconnected and interrelated) are not just significantly relevant to success but central:
  – Solutions require partnerships across government, public, private, philanthropic stakeholders—and nations
Situation: Key drivers

- **Macro-data**
  - Gross Expenditure on R&D (GERD)
  - Patents
  - Financing entrepreneurship
  - Scientific talent
GERD, 2001-2010

Source: OECD
Patents per million people, 1999-2008

Source: OECD
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Source: OECD
Ratio of Venture Capital Investment to GDP, 2007

Country: Australia, Austria, Belgium, Canada, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Malaysia, New Zealand, Norway, Philippines, Poland, Portugal, Romania, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, The Netherlands, United Kingdom, United States, Vietnam

Source: Lerner, 2009
Scientific talent

Country of citizenship of doctorate holders who are new recipients of U.S. H-1B temporary work visas: FY 2006

- China 32%
- India 13%
- South Korea 7%
- Canada 5%
- Germany 3%
- UK 3%
- Japan 3%
- Russia 2%
- Taiwan 2%
- Turkey 2%
- France 2%
- Other countries 26%

Source: NSF S&T Indicators, 2010
Situation

• A Current I&E partnership challenge: Renewable energy
  – Industry growth trend
  – Financing and government support
Annual value of renewable energy capacity installed, 2005-30 by technology sector ($bn)

Source: Bloomberg, 2011

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Renewable energy and funding needs (b$/yr)

(*The chart represents a hypothetical innovation's funding needs – scale and gaps may vary by technology*)
US DoE Recovery Act Funds (m$)

Source: Robert et al. (2011)
Figure 1: US wind project installations, 1999-2005 (MW)

-92%  3886%  -76%  331%  -74%  332%

PTC expires June 1999, extended Dec 1999
PTC expires Dec 2001, extended Feb 2002
PTC expires Dec 2003, extended Oct 2004

Source: Bloomberg, 2011

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Thoughts

- Vannevar Bush’s Science: The Endless Frontier
  - Still is the best blueprint to start with for ST&I policy exercise!
    - New knowledge can be obtained through scientific research
    - Scientific human capital is crucial
    - Commercializing research (industry-university linkages) is key for success
    - S&T is a TEAM WORK!
- Consider many elements of the innovation and entrepreneurship (I&E) ecosystem in parallel
  - The case for Istanbul for entrepreneurship hub
Istanbul: Past and present, one of the world’s greats hubs

Source: Isenberg and Bozkaya, 2012
The case for Istanbul as entrepreneurship hub is clear

- Economy is robust and growing
- Geopolitical leadership is strengthening
- Istanbul’s infrastructure is rapidly improving
- Multinational presence strong (market access, legitimacy, venture M&A)
- Private equity chain forming (angel, seed, VC, PE, exit)
- Leaders see economic, social, and political value of entrepreneurship
- Government policy reforms and programs (eg tax credits, TTGV)
- Public-private sector dialog increasing (E-ship Council)
- Numerous specific entrepreneurship initiatives
- Universities becoming committed
- Entrepreneurship is “in the air”
Policy reforms and incentives being planned.

Access to regional markets and multinationals.

Venture capital funds and angel investment just starting.

Entrepreneurship education accelerating.

Strong support mechanisms forming. Infrastructure strengthening.

Social norms becoming pro-entrepreneurship. Some initial successes.

Lots of promising pieces

Source: Isenberg, 2012
But stakeholders are understandably confused

Source: Isenberg and Bozkaya
Domains of the Entrepreneurship Ecosystem

Leadership
- Unequivocal support
- Social legitimacy
- Open door for advocate
- Entrepreneurship strategy
- Urgency, crisis and challenge

Government
- Institutions e.g. Investment, support
- Financial support e.g. for R&D, jump start funds
- Regulatory framework Incentives e.g. Tax benefits
- Research institutes
- Venture-friendly legislation e.g. Bankruptcy, contract enforcement, property rights, and labor

Financial Capital
- Micro-loans
- Angel investors, friends and family
- Zero-stage venture capital
- Venture capital funds
- Private equity
- Public capital markets
- Debt

Success Stories
- Visible successes
- Wealth generation for founders
- International reputation

Societal norms
- Tolerance of risk, mistakes, failure
- Innovation, creativity, experimentation
- Social status of entrepreneur
- Wealth creation
- Ambition, drive, hunger

Early Customers
- Early adopters for proof-of-concept
- Expertise in productizing
- Reference customer
- First reviews
- Distribution channels

Networks
- Entrepreneur's networks
- Diaspora networks
- Multinational corporations

Labor
- Skilled and unskilled
- Serial entrepreneurs
- Later generation family

Educational Institutions
- General degrees (professional and academic)
- Specific entrepreneurship training

Infrastructure
- Telecommunications
- Transportation & logistics
- Energy
- Zones, incubation centers, clusters

Support professions
- Legal
- Accounting
- Investment bankers
- Technical experts, advisors

Non-Government Institutions
- Entrepreneurship promotion in non-profits
- Business plan contests
- Conferences
- Entrepreneur-friendly associations

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Tesekkürler!

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