Policy Entrepreneurship for Science, Technology and Innovation

Thomas Kalil
Deputy Director for Policy
White House Office of Science and Technology Policy & National Economic Council
December 14, 2012
Outline of Talk

• Intro to science and technology policy

• What is policy entrepreneurship?

• Examples of tools that a WH policy entrepreneur can use

• Examples of initiatives from my team
Science for policy vs. policy for science

• Science for policy. Use scientific and technical expertise to inform decision-making.
  – Does the US have the capability to verify a given international treaty?
  – How solid is the scientific case for a given environmental regulation?

• Policy for science and technology
  – How much should the U.S. Government invest in R&D?
  – Should the federal government invest in stem cell research?
  – Should the federal government change the way it manages spectrum for wireless communications?
Diversity of S&T policy

• Very broad range of topics and issues

• Intersects with many other areas of policy

  – Immigration (allow foreign students to stay in US)
  – Energy and climate policy (clean energy R&D)
  – Education (implications of online learning)
  – Biosecurity (dual use research of concern)
  – Tax policy (tax credits for private sector research)
  – FDA approval of drugs, devices, diagnostics
Idealized policy process

- Identify a problem
- Gather evidence
- Identify options, costs and benefits of different options
- Make a decision
- Implement the decision, monitor progress
Where do ideas come from?

• Guidance from President
• Advisory committees (President’s Council of Advisors of Science and Technology)
• National Academy of Sciences
• External events
• Think tanks
• Views of stakeholders
• Opinions of policy-makers
Policy entrepreneurs

• “Highly motivated individuals or small teams can do much to draw attention to policy problems, present innovative policy solutions, build coalitions of supporters, and secure legislative action.” [Mintrom and Norman, 2009.]

• Entrepreneurship as “the pursuit of opportunity without regard to resources currently controlled.” [Stevenson.]
Examples of Tools (1)

- Authoritative statements of national policy (Executive Orders, Presidential Policy Directives, agenda-setting documents, etc.)
- President’s Budget
- Work with Congress on legislation
- Presidential events and speeches (powerful artificial deadlines)
  - “And so today, I am pleased to announce that ...”
- Bully pulpit/ability to convene
  - “All hands on deck” – public-private partnerships
  - If you could call anyone, who would you call and what would you ask for?
Examples of Tools (2)

• Encourage or direct an agency to achieve a particular goal
• Inter-agency coordination
  – Decisions, dispute resolution
  – “Whole-of-government” approach – shared vision with distributed execution
• Personnel decisions across the government, creating new positions
• Create/task Presidential advisory committees
• International policy (e.g. treaties, bilateral or multilateral collaboration)
• Create new tools!
President Obama’s Innovation Strategy
Innovation for Sustainable Growth and Quality Jobs

Invest in the Building Blocks of American Innovation

• Restore American leadership in fundamental research
• Educate the next generation with 21st century knowledge and skills while creating a world-class workforce
• Build a leading physical infrastructure
• Develop an advanced information technology ecosystem

Catalyze Breakthroughs for National Priorities

• Unleash a clean energy revolution
• Support advanced vehicle technology
• Drive breakthroughs in health IT
• Address the “grand challenges” of the 21st century

Promote Competitive Markets that Spur Productive Entrepreneurship

• Promote American exports
• Support open capital markets that allocate resources to the most promising ideas
• Encourage high-growth and innovation-based entrepreneurship
• Improve public sector innovation and support community innovation

Source: www.whitehouse.gov
Materials Genome Initiative

Goal: Decrease the time-to-market by 50%

To help businesses discover, develop, and deploy new materials twice as fast, we’re launching what we call the Materials Genome Initiative. The invention of silicon circuits and lithium ion batteries made computers and iPods and iPads possible, but it took years to get those technologies from the drawing board to the market place. We can do it faster.

-President Obama, Carnegie Mellon University, June 2011

Initiatives

• Develop a Materials Innovation Infrastructure
• Achieve National goals in energy, security, and human welfare with advanced materials
• Equipping the next generation materials workforce

Themes

• Incentivizing open paradigms of sharing & access of tools
• Facilitating the development of innovation ecosystems & access to all stakeholders
• Driving innovative techniques across computation, informatics & experimentation
• Catalyzing shift in culture across the entire materials continuum & scaling the movement
The realization of co-robots acting in direct support of individuals and groups... manufacturing, exploration, discovery, agriculture, security, .....
BIG DATA

• “The future of computing is not just big iron. It’s big data.”

• March 29th – agencies announce $200 million in additional investments in R&D related to Big Data (volume, variety, velocity and veracity)
  • NSF and NIH joint solicitation
  • DARPA XDATA program
  • Accelerate “data to knowledge to action.”
Brain Activity Map
“The possibilities of where this research might lead are endless. Imagine a new treatment that kills cancer cells but leaves healthy ones untouched; regenerative medicine that ends the agonizing wait for an organ transplant… intelligent prosthetics that can enable a wounded veteran to play the piano again.”

- President Obama, 2010
US Ignite Partnership

Goal: Create a national testbed for next-gen apps and networks

“Building a nationwide broadband network will strengthen our economy and put more Americans back to work. By connecting every corner of our country to the digital age, we can help our businesses become more competitive, our students become more informed and our citizens become more engaged.”

- President Obama, June 2012

Initiative

• Stitching together communities that have already deployed 100Mbps+ to allow next-gen applications to be demonstrated.
• Leveraging existing high-speed research networks.
• Sharing best practices in infrastructure deployment, service creation and delivery, application development, and R&D.
• Goal: deliver over 60 next-gen apps to a national network of 200 communities

Current Partners

• 9 agencies, including NSF as lead
• 15 companies
• 25 communities
• 60 campuses
“Educate to Innovate” Launched in 2009

Public-Private Campaign to Spur STEM; Over $700M in direct/in-kind raised

Some Key Partnerships

• “100Kin10”
• Change the Equation
• Annual White House Science Fair
• NMSI AP Initiative
• Digital Promise
• Maker Education Initiative
• “Equal futures” partnership

“Through these efforts, we going to expand the scope and scale of science and math education all across America.”

–President Barack Obama, November 3rd, 2009
• Responding to President’s call in State of the Union to prepare 100,000 excellent STEM teachers over next 10 years.

• Led by Carnegie Corp., over 115 organizations have come together to answer the call.

• Includes 15 major funders that have raised a $24M fund through a common funding registry. Due to major interest, they are now exploring a second fund.

• In addition to funding, over 100 other individual commitments, including by UChicago to build research track on the investments.
• Growing movement to give more opportunities to children to be able to make things – not just consume.

• Over 60+ “Maker Faires” planned this year. San Mateo Faire gets over 100,000 visitors.

• With support from Cognizant, Pixar, Make and Intel, Maker Education Initiative launched earlier this month, with goal of building a movement to thousands more children a making experience.
High Skill Immigration

Non-legislative approaches
• Developing a handbook that clarifies existing pathways for noncitizen STEM experts to work at DoD labs where no qualified U.S. citizen is available for a mission-critical position.

• Within U.S. Citizenship and Immigration Services (USCIS), an Entrepreneurs in Residence (EIR) team of outside experts and agency staff is focused on optimizing the range of existing visa categories used by entrepreneurs to provide pathways that are clear, consistent and aligned with business realities.

“let’s at least agree to stop expelling responsible young people who want to staff our labs, start new businesses, defend this country. Send me a law that gives them the chance to earn their citizenship. I will sign it right away.”

- President Barack Obama, Tuesday, January 24, 2012
Startup America: Fueling high-growth entrepreneurship

**Administrative action**
“[What] we want to do is to make sure that **every single agency**, even as they’re tending to their energy initiatives or providing homeland security or transportation or defense, that we’re also thinking about how are we’re advancing the cause of **giving small businesses and entrepreneurs opportunities** to start creating the next Google or the next Apple or the next innovative company that’s going to create jobs and improve our economy.”

---President Obama, Jan. 31, 2012

**Legislative agenda**

**JOBS Act highlights:**
- Crowdfunding (<$1M)
- Mini public offerings (<$50M)
- IPO on-ramp (<$700M)

**Private-sector mobilization**
- Delivering services valued at >$1.5B to 100,000 startups over 3 years
- Over 30 entrepreneur-led Startup Regions
- Startup-Corporate Connection “dating site” for startups to partner with Fortune 500
Harnessing Innovation for Global Development

We’re expanding scientific collaboration with other countries and investing in game-changing science and technology to help spark historic leaps in development.

- President Obama, September 2010

Open Source Development: Empowering problem-solvers from around the world to tackle development challenges
• Higher Education Solutions Network
• Development Innovation Ventures
• Saving Lives at Birth Grand Challenge
• LAUNCH (USAID, NASA, Nike, State)

Making Greatest Use of Science Investments
• USAID PEER Program: Partnerships for Enhanced Engagement in Research
• NIH: Non-profit Model License, Medicines Patent Pool, and WIPO Re:Search

Leveraging Technology for Efficacy & Scale
• Mobile Money: Better than Cash Alliance
• Aid Transparency: Geo-Spatial Center and Foreign Assistance Dashboard
“[T]otal funds from large prizes have more than tripled over the last decade to surpass $375 million.”

- And the winner is...
  McKinsey 2009

1919 Orteig Prize
Charles Lindbergh: Non-Stop Flight NY-Paris

Incentive Prizes – Record of Spurring Innovation
Benefits of Prizes

1. Shine a spotlight on a problem or opportunity
2. Pay only for results
3. Target an ambitious goal without predicting which team or approach is most likely to succeed
4. Reach beyond usual suspects to tap top talent
5. Stimulate private sector investment many times greater than the prize purse
6. Bring out-of-discipline perspectives to bear
7. Inspire risk-taking by offering a level playing field
8. Establish clear target metrics and validation protocols
America COMPETES Reauthorization Act

“Each head of an agency, or the heads of multiple agencies in cooperation, may carry out a program to award prizes [up to $50 million] competitively to stimulate innovation that has the potential to advance the mission of the respective agency”

-Congress
December 21, 2010
On Challenge.gov, the public and government can solve problems together.

SIGN UP AND PARTICIPATE or Learn More

Featured Challenges

Startup America Policy Challenge
by The White House
Help knock down barriers to innovation and entrepreneurship in health care IT, clean energy, and learning technologies.

3 months left to submit LEARN MORE

Browse Challenges

CATEGORIES
- Defense (19)
- Economy (12)
- Education (32)
- Energy & Environment (31)
- Health (53)
Grand Challenges
Sequencing the Human Genome

Cost per Genome

Moore’s Law

National Human Genome Research Institute
genome.gov/sequencingcosts
Private Sector Grand Challenges

• Google – self-driving car (outgrowth of DARPA Challenge)

• IBM – AI that beats Gary Kasparov at chess, Ken Jennings at Jeopardy – Watson may create huge commercial markets

• Qualcomm – Tricorder X Prize

• Elon Musk/SpaceX – humanity should become a multi-planetary species. “I want to die on Mars.”

• Pronutria – 10x or more increase in productivity for nutrition (output/acre)
Attributes of Grand Challenges

1. Significant impact in areas of national and global priority
2. Ambitious yet achievable
3. Compelling, motivating, capture the public imagination
4. “Goldilocks” level of specificity and focus
5. Able to harness innovation and advances in science and technology
“By defining our goal more clearly, by making it seem more manageable and less remote, we can help all peoples to see it, to draw hope from it, and to move irresistibly towards it.”

- President John F. Kennedy

June 10, 1963,
Commencement Address,
American University
Next Steps on Grand Challenges

• A growing number of individuals and organizations are involved in the identification and pursuit of a Grand Challenges (government, private sector, research universities, philanthropists, non-profits, etc.)

• Grand Challenges become more prominent in America’s popular culture and conversations about the future