The Future of American Innovation: Sector Innovation, Small Companies and Collaboration

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Why I am here:

- Silicon Valley law practice, 17 years at Fenwick law firm and Apple.
- 2001-2007 UN agency, WIPO, Director
  - responsible for innovation strategy, technology licensing and patent drafting training, networks
  - Mission: "IP Assets" as an empowering tool.
- Since 2008, IP*SEVA, innovation strategy, technology contracts and IP education, concentrating on sustainable energy and environmental technology

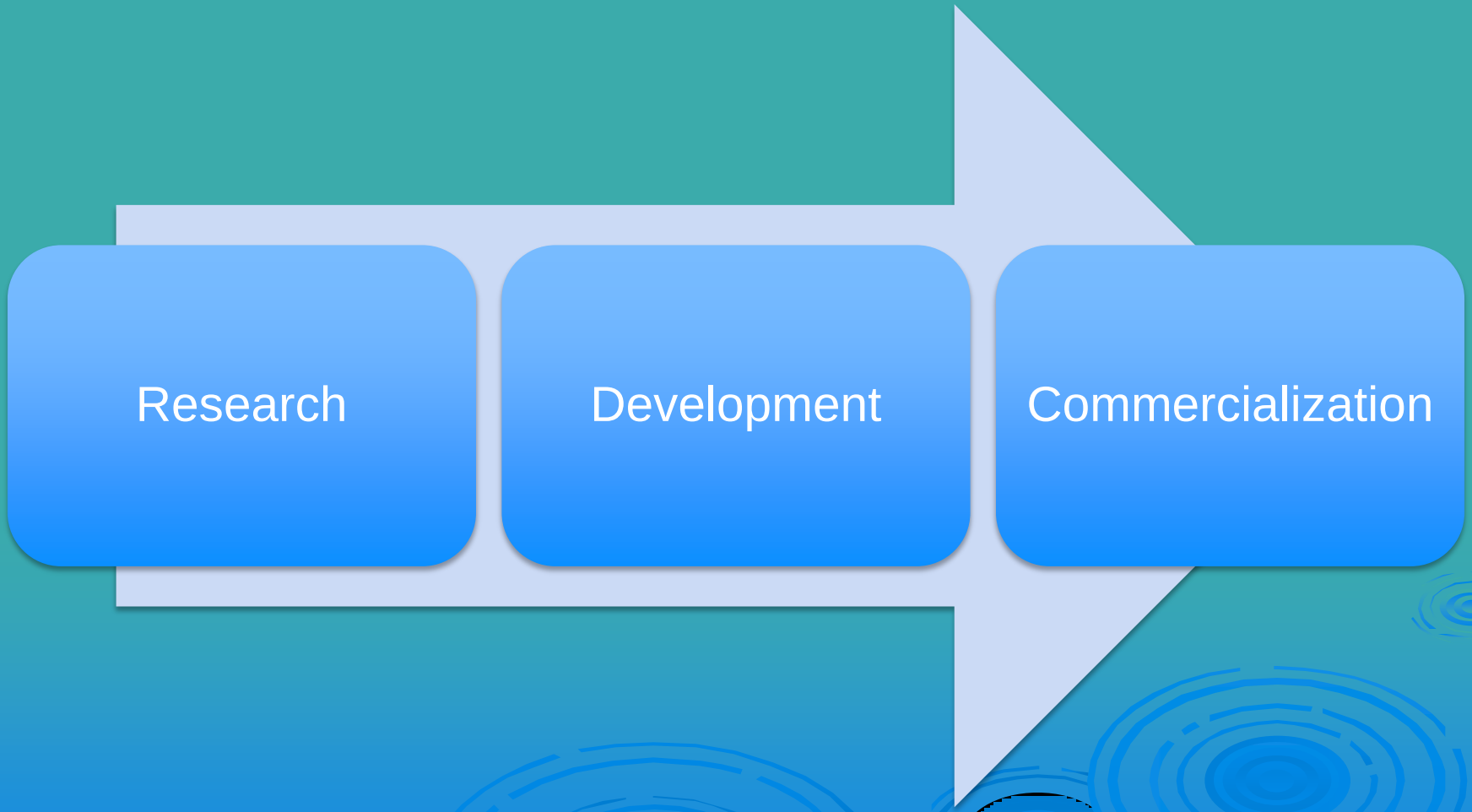
Innovation Strategy

An effective innovation system

1. Addresses sectors that meet a public or market need and provides public funding for early stage research;
2. Supports a vital role for “IP asset rich ventures” (small companies);
3. Promotes collaborative development of new technologies; and

Is periodically evaluated in a critical, practical and truthful way.

The R-D-C Continuum



Overview of this Presentation

- Is there sector innovation policy?
- Small companies drive innovation but can they survive?
- Is collaborative development of new technologies working?

Some Active Technology Sectors in the U.S. Today

- Molecular biology
  - Gene editing (CRISPR)
  - Protein engineering (e.g. computational design)
  - Pharmaceutical applications

Some Active Technology Sectors in the U.S. Today (2)

- Energy storage
  - Batteries for EV's
  - Distributed energy
- Liquid fuels
  - Critical problem of aviation fuel
  - Biofuels (2d generation cellulose)
  - Artificial photosynthesis
- Water and toxic remediation

Some Active Technology Sectors in the U.S. Today

- Materials, synthetic polymers, crystals
  - Aviation (civilian and military)
  - Transportation
  - Buildings and lighting
  - Medical devices
  - Electronics
  - Batteries
  - Textiles

Some Active Technology Sectors in the U.S. Today

- Robotics, automation and A.I.
  - Manufacturing
  - Drones and aviation
  - Transportation (driverless cars)
  - Hazardous and contaminated areas
  - Health (e.g. DNA “Nanobots”)
  - “Quality” of life appliances (e.g. humanoid servants) (?)
  - Data management in era of big data

Challenges for American Innovation

#1: Declining and inconsistent research funding in critical technology sectors

- Flat or declining federal government funding for R&D in universities, national labs, Advanced Research Projects Agency for Energy (ARPA-e)
- Push for military funding and other sectors that may not reflect critical needs and markets over medium to long term.

Challenges for American Innovation

#2: Premature pressure on research to move quickly to development and commercialization stages +

Pressure on universities to conduct applied research, conduct sponsored research from private donors, and provide job opportunities for their students.

Challenges for American Innovation

#3: Researchers low knowledge of how to use the IP system

- What can be protected in their field (subject matter)
- When to file
- Consequence of lack of protection in foreign markets
- How to use the non-user-friendly IP system
- What you do with patents—just a check off item for VCs?
- What is an IP strategy?
- How technology contracts work? What are the different types of technology contracts?

#4: Cost for small ventures to use the IP system

- Patent drafting to filing roughly= $US15K to $20K. Followed by office actions over 2-3 years
- International filing via Patent Cooperation Treaty (PCT) and direct filing in other countries adds about $4000 for PCT fees, plus huge atty fees, plus expense of each national phase translation, filing, local attorneys.
- PCT applications lapse if not completed or withdrawn and become public domain information.
- Few links to IP professionals; no IP networks.
- University TTOs do not usually cover these costs

PLUS the AIA's first to file and post grant challenge provisions.

#5: Low bargaining power of the highly innovative!

Weak contract negotiation with potential partners

- Funding shortfalls from government grants, VCs and other sources
- In green tech sectors, relative higher cost of green tech development
- Lack of patent power

Consequence: small tech ventures become service providers, not IP owners.

#6: Collaboration

Consortia

- Pre-competitive R&D Consortia
  - Important but difficult to form and operate
  - Rules are complex and require simplification
- Standards consortia
  - Risks violation of antitrust/competition law
  - Needed for interoperability of technologies but not for price fixing, output and patent abuse.
- “Roadmaps”

  (e.g. SEMATECH and the ITRS International technology roadmap for semiconductors)

#6: Collaboration (2)

- Technology development collaboration contracts are complex
- Equity joint ventures are difficult to manage
- Cultural and legal differences can hamper international transactions.
- Lack of norms for understanding when collaboration is needed and how to do milestones.
- Many companies still resist open innovation
- Collaboration requires relatively equal partners

#7-Access to Information

- As more money is invested in the collection of information, there is a push to own the information itself.
- Also a push to own content (images, music, even contracts)
- Big data means big control
- This is NOT consistent with the philosophy of IP—creativity, invention. So there is a push to bend traditional legal concepts.

Evaluation Metrics for Innovation

- Big picture: GERD/GDP
  - What is the return on R&D investment?
- Filing of domestic patent applications
- Licensing data (how to get) to show how patents get used.
- Grant as a % of applications
- Direct foreign and PCT applications and grants to address international market
- % of PCT apps that lapse
- Cost data on PCT and direct filing
- IP in practice: Contract models and results

Recent Developments

Trump and Innovation

- Destruction of the Environmental Protection Agency (EPA)?
- Privatization of Education, Betsy deVos
- Department of Energy and National Labs run by Texas Governor Rick Perry
- Information controls-Gag Rule
- Abolish Office of Science and Technology? and replace with “Science Advisor”

Science Advisor Candidates

- William Happer
  - “I don’t agree with all the hysteria about climate change” –
- David Gelernter
  - Anti-intellectualism
  - Advocates putting all knowledge in a data base
  - Critique of public education

Public Response

Conclusion

- Innovation systems are complex but important!
- Innovation at the national and company levels must be evaluated—is it working?
- Knowledge is power!
  - Who owns IP? Who controls it?
- Free access to information is necessary to science and innovation.
- In troubled times, can collaboration save us?

Arigatou gozaimasu!

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