



Turning Government Science Into Companies – *NSF I-Corps*



Students Solving Government Problems - *Hacking for X*

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National Science Foundation I-Corps

National Program to Commercialize
Government-Funded Research

National Science Foundation



- Federal agency for funding U.S. science and engineering
 - \$7 billion budget
- Funds: Basic non-biomedical research and education across all fields and at all levels of education
- Funds: Advanced instrumentation and facilities, Arctic and Antarctic research and operations, cooperative research partnerships between universities and industry, and U.S. participation in international scientific efforts

1982 - the SBIR program



- National Science Foundation (NSF) starts the SBIR program
 - Seed funding for *commercialization* of research
 - Available to researchers with a NSF science grant
 - Up to \$1.5 Million per company over 24 months
- No commercial incubators, accelerators or entrepreneurship curriculum exist

1982 – 2010 Most Fail



- NSF invests 2% of its budget in SBIR program
- 100's of companies each year funded
- No commercialization support other than money
- *Most companies funded via SBIR fail*

2010 – SBIR Lessons Learned



- NSF recognizes that SBIR company failures were because they lacked *product/market fit*
- Scientists were:
 - Developing products no one cared about
 - Didn't understand customers, channel, pricing, competition, sales, marketing, etc.
 - *They were innovators but not entrepreneurs*
- Meanwhile, the startup ecosystem, methodology and tools had evolved to provide a solution
 - Incubators, accelerators, Lean Startup, etc.

2011 – NSF SBIR – New Idea





- Build a training program to teach scientists who apply for an SBIR grant the basics of commercialization
 - Surround the science innovators with entrepreneurs
 - Teach them a formal method of commercialization
- Permanently change how researchers view commercialization
 - Embed those skills into research leaders so that they can train their grad students and post-docs what they've learned
- Adopt the best practices of startup methods

2011 – Lean Methodology Emerges

- Lean Methodology - 3 components
 1. Business Model – 9 components of commercialization
 - Customer, Value Proposition, Channel, Get/Keep/Grow, Revenue, Activities, Resources, Partners, Costs
 2. Customer Development – hypothesis testing of the business model and product outside the building – using the scientific method
 3. Agile Development – Incremental and Iterative product development

Basics of Commercialization

The Business Model Canvas

<p>Key Partners</p> <p>Which of these activities can your company outsource to others?</p>	<p>Key Activities</p> <p>What are the <i>unique</i> activities your company needs to deliver the value proposition?</p>	<p>Value Proposition</p> <p><i>For each customer</i> what is their value proposition?</p> <p>What problem pain/gain does this solve for them?</p>	<p>Customer Relationships</p> <p><i>How to you "Get, Keep and Grow"</i> customers?</p>	<p>Customers</p> <ul style="list-style-type: none"> • By title/function who are the individuals who are creating value for? • What are their pains/gain/jobs to be done? • What is their archetype
<p>Costs </p> <p>What are the costs to deliver the value proposition? Fixed costs? Variable costs?</p>		<p>Revenue Streams </p> <p><i>For each customer segment</i> what is the revenue model? What are the pricing tactics?</p>		
<p>Key Resources</p> <p>Which of these activities does your company needs to own?</p>		<p>Channel</p> <ul style="list-style-type: none"> • What's the distribution channel? • What are the channel economics 		

2010 – Stanford *Lean LaunchPad* Class

- Developed by Steve Blank. Taught in the Engineering School
- Uses the Lean Methodology to students how to build startups
- Team-based – teams of 4 – *innovators + entrepreneurs*
- Experiential – *talk to 10-15 customers a week*
- Iterative – *build a new minimum viable product weekly*
- Peer-driven –work in groups of 8-teams
- Social pressure –*present the results in front of other teams and professors weekly*

2011 – NSF I-Corps

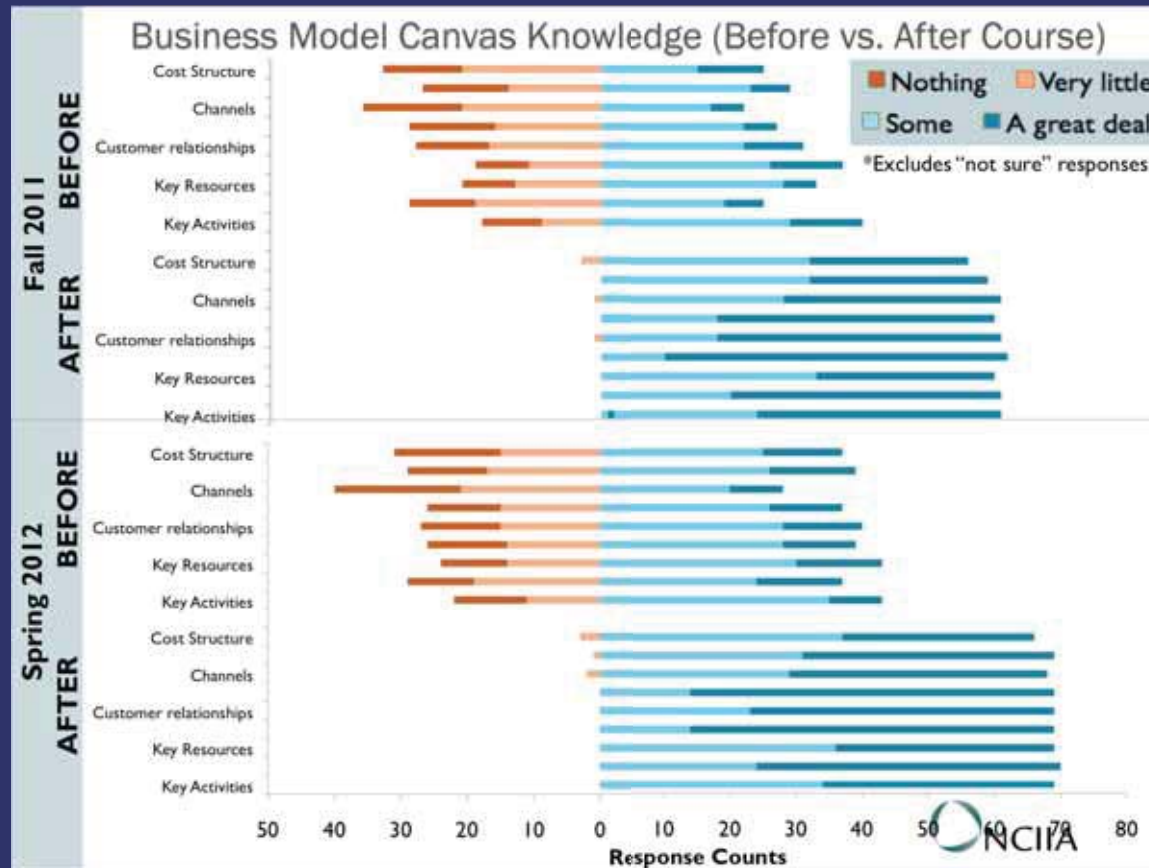


- NSF Adopts the Stanford *Lean LaunchPad* Class – renames it I-Corps
- Team-based – teams of 3: Principal Investigator + Entrepreneurial Lead (post-doc or grad student) + industry mentor
- Experiential – scientists talk to 10-15 customers a week, 100+ in seven weeks
- Iterative – build a new minimum viable product weekly
- Peer-driven – work in groups of 8-teams
- Social pressure – present the results in front of other teams and professors weekly

2011 – NSF I-Corps



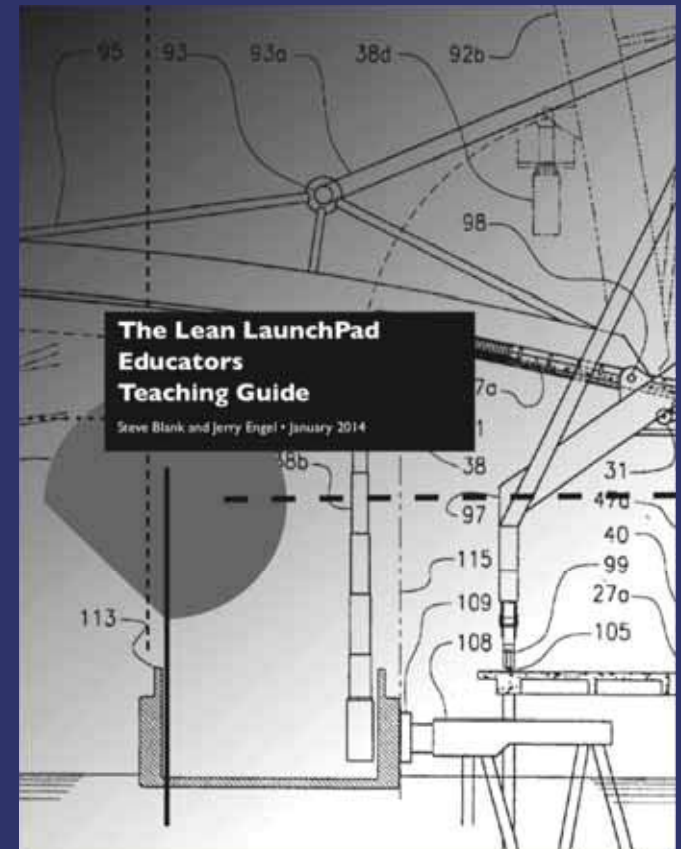
- NSF and Steve Blank at Stanford *prototype* NSF I-Corps class
- Learning results are excellent



Logistics – NSF I-Corps



- Wrote 200 page educator guide to train-the-trainers
 - <https://www.slideshare.net/sblank/educators-guide-jan-2014>
- Developed 2 ½ day educator course to train new instructors
 - <https://venturewell.org/lean-launchpad/>
- Developed on-line video course for students to use in place of lectures
 - <https://classroom.udacity.com/courses/ep245>

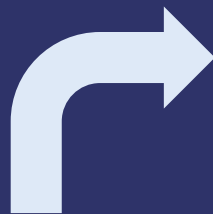


2019 – NSF I-Corps



- *Requirement* for the NSF SBIR program
- Trained over 1,500 principal investigator-led teams from over 230 U.S. universities
- Taught and supported in 98 U.S. universities
- More than 600 startups formed by teams
- More than \$250MM in private funds raised

I-Corps Growth



~400,000 on-line students
Udacity.com



I-Corps @ NSF
For SBIR/STTR
2011

1,500+ teams
Taught by 88
Universities



National Institutes
of Health
I-Corps @ NIH
For Life Sciences
2014



I-Corps @ NSA
2015



Hacking for
Defense/
Diplomacy
2016

STANFORD
UNIVERSITY

Lean LaunchPad
For Students
2010

NSF I-Corps: Results



- NSF adopted the best practices of startup methods
- Built a training program to teach scientists the basics of commercialization
- Permanently changed how researchers view commercialization
- Principal Investigators now pass-on and train their grad students and post-docs what they've learned