Approaching Sustainability and Industry: A Longest but not Last Mile

Michael Zentner, hubzero Platform Director

NSF SI2 PI Meeting
Alexandria, VA April 2018
1994-2000 - Startup 1
2001 - Startup 2
2001-2005 - Startup 3
2003 - Startup 4
2005-2007 - Consultant
2007-2009 - Startup 5
2009 - Startup 6

2013 - 2018: Startup 7
1994-2000 - Startup 1
2001 - Startup 2
2001-2005 - Startup 3
2003 - Startup 4
2005-2007 - Consultant
2007-2009 - Startup 5
2009 - Startup 6
2010 - present: Senior Research Scientist
2012 - present: Entrepreneur in Residence
2013 - 2018: Startup 7
2015 - present: HUBzero Director
Crossing the Finish Line of Sustainability!

No more proposals!

No more months of reporting!

Finally some breathing room!
But Wait, There’s More!

Sustainability is a full time job.
The fishbowl of grant funding
Dwindling grant funding
Dwindling grant funding
“The next gig”
How far away is it?
Does it look anything like the previous one?
How do I need to look to survive there?
How do I need to look to survive there?
How do I need to look to survive there?
What is the gap between environments? What species do we have to be to survive?
What is the gap between environments?
What species do we have to be to survive?

Team composition
Major activities
Funds allocation
Legal structure
Technology

...basically, everything
Path to who will pay the bills?

- SME
- Big E
- Industry
- Academia/Private Agencies
- "The Lab" (NSF-Agency)
- Grant Services
- Large Grant Provider
- Community Lever
- Renewal
- Next Best Opportunity
Size of the species gap

“The Lab” (NSF-Agency)

Industry

Academia/Private Agencies

SME

Big E

Grant Services
Large Grant Provider
Community Lever
Renewal
Next Best Opportunity
Size of the funding gap

"The Lab" (NSF-Agency)

Industry

SME

Big E

Grant Services

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Community Lever

Renewal

Next Best Opportunity

Academia/Private Agencies
Size of the environment

“The Lab” (NSF-Agency)

Industry

SME

Big E

Academia/ Private Agencies

Grant Services

Large Grant Provider

Community Lever

Renewal

Next Best Opportunity
An example: Scheduling & supply chain optimization

"The Lab" (NSF-Agency) -> Industry -> Big E
An example: Scheduling & supply chain optimization
Early customer feedback is essential


Academic Research (algorithms, data representations)
Industry Consortium (graphics, test cases, technology bundling)
Paying Customers (selling, consulting)
An example:
Scheduling & supply chain optimization

+$500,000

$300,000
An example: Scheduling & supply chain optimization

“The Lab” (NSF-Agency) → Industry → Stakeholder Champion

Big E
An example:
Structured + unstructured data analytics
An example: Structured + unstructured data analytics
An example:
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An example:
Structured + unstructured data analytics

- **2005**: Personal Research (algorithms, data structure)
- **2006**: Industry Consulting (use cases)
- **2007**: Venture A Round
  - Paying Customers (interface, sales)
- **2008**: Venture B Round
  - Paying Customers (interface, sales)
An example: Structured + unstructured data analytics
An example:
*Structured + unstructured data analytics*
An example:  
**Structured + unstructured data analytics**

- 25,000 new subscribers a month
- 25% of them paying $10/month
- =$62,500 in NEW revenue monthly

*How can we get more than 25% to pay?*
An example:
**Structured + unstructured data analytics**
An example:
Structured + unstructured data analytics
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An example:
Structured + unstructured data analytics
What these customers want

Solutions, NOT Capabilities

Industry

SME

Big E

"The Lab" (NSF-Agency)
What these customers want

“At my tech, you can do almost anything”
What these customers want

“With my tech, you can do almost anything”

“Look, my problem is X, just give me an answer”
What these customers want

Our capabilities

“With my tech, you can do almost anything”

Our “users” capabilities

“Look, my problem is X, just give me an answer”
What these customers want

Our capabilities

“With my tech, you can do almost anything”

Gap too large?

Gap worth filling?

Unlikely...

Insufficient additional value

Our “users’” capabilities

“Look, my problem is X, just give me an answer”
An example: Medical device informatics

"The Lab" (NSF-Agency)

Industry

SME
An example:
Medical device informatics

“The Lab” (NSF-Agency)
Industry
SME
Other Seed Funds
INFUSION PUMP ALERTS

Drug Limit Library Database

Setting

Alert
PROBLEM
PROBLEM
PROBLEM
PATIENT SAFETY
BREAKING TRADITION

Practitioners

Researchers
A 2-SIDED DATA MARKET

Practitioners

Researchers

Ann Christine Catlin, Purdue
A 2-SIDED DATA MARKET

Practitioners

Researchers
A 2-SIDED DATA MARKET

Practitioners

Researchers

Labs
Competing hospitals all identify themselves to each other for direct comparison to improve medical safety!
Vast amounts of data available for healthcare safety researchers
An example:
Medical device informatics

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- **Non-Paying Customers (technology building)**
- **Industry Consortium (growing community)**
- **Academic Research (interventions)**
- **Paying Customers?? (selling, consulting)**
Vendors, nurses, pharmacists

"Why do we get to use this for free?"
Early customer feedback is essential

- **Academic Research** (algorithms, data representations)
- **Industry Consortium** (graphics, test cases)
- **SBIR (3xI, 2xII)** (technology bundling)
- **Paying Customers** (selling, consulting)
Early customer feedback is essential
Early customer feedback is essential
BUT WAIT…
THERE'S A PROGRAM FOR THAT!
I-Corps solicitation

Expectations from the I-Corps Teams Grant:

Successful completion of the I-Corps Teams grant is expected to contribute to one or more of the following:

- New for-profit, start-up business
- Licensing
- SBIR/STTR proposal
- A business model suitable for review by third-party investors
- Students prepared to be entrepreneurially competitive
- Enhancing the entrepreneurial mindset among NSF-funded researchers

NSF will seek to collect outcomes from the awardees along the lines listed above during post-award period.
I-Corps solicitation

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Start a for profit business

Train to start some other for profit business

- Students prepared to be entrepreneurially competitive
- Enhancing the entrepreneurial mindset among NSF-funded researchers
What about us?

"The Lab" (NSF-Agency)

Academia/Private Agencies

Grant Services

Large Grant Provider

Community Lever

Renewal

Next Best Opportunity

Industry

SME

Big E
No Talking To Yourselves!
THE focus of I-Corps...

<some person>

will do

<some thing>

because

<that person will realize this value>
THE focus of I-Corps…

Definitely NOT “buy my product”

<some thing>

Maybe not “use my technology”
nanoHUB goes to I-Corps

Week 1: 24
Week 2: 52
Week 3: 94
Week 4: 117
Week 5: 141
Week 6: 155
nanoHUB goes to I-Corps

Dow

GM

United Airlines

Ford

NIST

GE Digital

Caterpillar

Trelleborg Sealing Solutions

Evonik
nanoHUB goes to I-Corps

These guys have lots of problems but they’re not easily solved…more like grand challenges:

Provenance/Reproducibility
Validation
Making Academic Research Practical
“Those class 3 medical device guys do simulation all the time, check with them. People will die if they are wrong.”
nanoHUB goes to I-Corps

Week 1: 24
Week 2: 52
Week 3: 94
Week 4: 117
Week 5: 141
Week 6: 155
nanoHUB goes to I-Corps

“We don’t simulate anything, we just generate specs and assemble parts. Talk to our suppliers.”
nanoHUB goes to I-Corps

24
Week 1

52
Week 2

94
Week 3

117
Week 4

141
Week 5

155
Week 6
nanoHUB goes to I-Corpor

“Sure, we simulate some, but we don’t really get measured on whether anyone lives or dies, we just meet the specs.”
nanoHUB goes to I-Corps

Week 1: 24
Week 2: 52
Week 3: 94
Week 4: 117
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Week 6: 155
nanoHUB goes to I-Corps

“Simulation is indispensable for making competitive bids in sales.”
nanoHUB goes to I-Corps
nanoHUB goes to I-Corps

“Medical devices is only 10% of what we do. We injection mold all kinds of parts.”
nanoHUB goes to I-Corps
nanoHUB goes to I-Corps

CEO’s care about engineering.

CEO’s care about sales.
...thoughts on I-Corps...

The time commitment is not as advertised

It is too rushed to come to a valid business model

The instruction is unnecessarily brutal (or even rude?)

No real cohort is formed
SINNERS
In the Hands of an
Angry GOD.
A SERMON

Preached at Enfield, July 8th 1741.
At a Time of great Awakenings; and attended with remarkable Impressions on many of the Hearers.

By Jonathan Edwards, A.M.
Pastor of the Church of Christ in Northampton.

Amos ix. 2, 3: Though they dig into Hell, thence shall my Hand take them; though they climb up to Heaven, thence will I bring them down. And though they hide themselves in the Top of Carmel, I will search and take them out thence; and though they be hid from my Sight in the Bottom of the Sea, thence I will command the Serpents, and he shall bite them.

BOSTON: Printed and Sold by S. Kneeland and T. Green, in Queen-Street over against the Prison. 1741.
...thoughts on I-Corps...

The time commitment is not as advertised

It is too rushed to come to a valid business model

The instruction is unnecessarily brutal (or even rude?)

No real cohort is formed

The time spent equates with reality of business

Less urgency means lack of focus on results

This is exactly what some people need in order to learn
...thoughts on I-Corps...

The time commitment is not as advertised

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This is exactly what some people need in order to learn

Perhaps 3rd best use of professional time in past 7 years
Definitely a metamorphosis

“The Lab” (NSF-Agency) → Industry → SME
How this looks in terms of grant activities
How this looks in terms of grant activities

- Activities Focused on Science
- Available Budget
- Activities Focused on Sustainability
How this looks in terms of grant activities
How this looks in terms of grant activities

- Activities Focused on Science
- Available Budget
- Activities Focused on Sustainability
- Anticipated Annual Review Rating
How this looks in terms of grant activities

- **Activities Focused on Science**
- **Available Budget**
- **Activities Focused on Sustainability**
- **Anticipated Annual Review Rating**

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How this looks in terms of grant activities

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Activities Focused on Science
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How this looks in terms of grant activities
What would help?

Guidance to PI’s

Guidance to Review Teams
One more case...

"The Lab" (NSF-Agency) → nanoHUB → Academia/Private → Large Grant Provider
One more case...

"The Lab" (NSF-Agency)
Bring your science to the web

No Hassle Hosting
- Cost effective
- Continuous upgrades
- Continuous security monitoring
- Continuous patching
- Dedicated community manager representative

Sponsored Research Projects
- Have HUBzero be part of your team
- New capability development
- Intellectual contribution
- Broader impact

Foundation Membership
- Dedicated consulting for running your own hub
- Preferential handling of tickets/issues
- Customized development
- Input for future capabilities

Open Source
- No cost
- Modify the code yourselves
- Host on your machine
No Hassle Hosting

Cost effective
Continuous upgrades
Continuous security monitoring
Continuous patching
Dedicated community manager representative

No hassles for less than 1/3 FTE
Bring your scientific projects to the web

Sponsored Research Projects

- Have HUBzero be part of your team
- New capability development
- Intellectual contribution
- Broader impact

IP creation

No Hassle Hosting

- Cost effective
- Continuous upgrades
- Continuous security monitoring
- Continuous patching
- Dedicated community manager representative

Open Source

- No cost
- Modify, re-use, code yourselves
- Host on your machine

Customized development
Input for future capabilities
Foundation Membership

Dedicated consulting for running your own hub

Preferential handling of tickets/issues

Customized development

Input for future capabilities

On the spot help

No Hassle Hosting

Cost effective
Continuous upgrades
Continuous security monitoring
Continuous patching
Dedicated community manager representative

Open Source

No cost
Modify the code yourselves
Host on your machine

Intellectual contribution
Broader impact

Customized development
Input for future capabilities
Open Source

No cost

Modify the code yourselves

Host on your machine

No Hassle Hosting

Cost effective
Continuous upgrades
Continuous security monitoring
Continuous patching
Dedicated community manager representative

Sponsorship

Project

Have HUBzero
New capability development
Intellectual contribution
Broader impact

Membership

Customized development
Input for future capabilities

Open Source

No cost

Modify the code yourselves
Host on your machine
Bring your science to the web

No Hassle Hosting
- Cost effective
- Continuous access
- Continuous security monitoring
- Continuous patching
- Dedicated community manager representative

Sponsored Research Projects
- Maximizes the pace of your year
- New capability development
- Intellectual contribution
- Broader impact

Foundation Membership
- Dedicated consulting for running your
- Club
- Differential handling of tickets/issues
- Customized development
- Input for future capabilities

Open Source
- No cost
- Modify as a co-developer
- Host on your machine

Community Management Services
SI2: Software Infrastructure for Sustained Innovation

Who is concerned about sustainability?
OneSciencePlace
A new address for sustainability
from the HUBzero Foundation
A community of science gateways living in one big community, solving sustainability together.

Grant +7 years minimum for starter hubs.
Sustainability just got easier

Your address to sustain your HUBzero hosted science community

http://OneSciencePlace.org