entrepreneurship, science, and columbia

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outline:
1. innovation and entrepreneurship
2. resources available to you
3. lessons learned

entrepreneurship is the pursuit of opportunity beyond resources controlled.

https://hbr.org/2013/01/what-is-entrepreneurship
1. innovation and entrepreneurship:
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boundary conditions + constraints:

- resources
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   - Resources
   - Institutional (e.g., R+D)
1. innovation and entrepreneurship:
boundary conditions + constraints:
- resources
- institutional (e.g., R+D)
- awarded
1. Innovation and entrepreneurship: boundary conditions + constraints:

- Resources
- Institutional (e.g., R+D)
- Awarded
- Startups: dilutive / controlling
1. innovation and entrepreneurship:

boundary conditions + constraints:
- resources
- institutional (e.g., R+D)
- awarded
- startups: dilutive / controlling
- users/customers
1. innovation and entrepreneurship:

boundary conditions + constraints:
- resources
- institutional (e.g., R+D)
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- startups: dilutive / controlling
- users/customers
- time and money
1. innovation and entrepreneurship: boundary conditions + constraints:
- resources
- institutional (e.g., R+D)
- awarded
- startups: dilutive / controlling
- users/customers
- time and money
1. institutional innovation, e.g.,
...led to dilutive/controlling
..which led to

New capital committed to VC, in millions

![Chart showing new capital committed to VC over the years, with a significant increase in 2000.](chart.png)
2. resources available to you, doing:

1. patent/license (e.g., GOOG)
   - CTV
   - IRL (NYC lawyers, etc)
2. newco/startup (e.g., YHOO)
   - CTV
   - IRL (NYC investors)

Columbia University's Axel Patents: Technology Transfer and Implications for the Bayh-Dole Act

ALESSANDRA COLAIANNI, ROBERT COOK-DEEGAN

2. resources available to you, learning:

1. classes
2. books+blogs
3. CTV
4. entrepreneurship @ SEAS
5. entrepreneurship @ CU
6. people:

"The best way to send information is to wrap it up in a person." - RJ Oppenheimer
outline:
1. innovation and entrepreneurship
2. resources available to you
3. lessons learned: “lean theory”
theory:

1. peer review vs. counterpart review
2. explore before exploit
grand unified theory: special cases

- startups: “lean startups”
- design: “design thinking”
- software: “agile development”

you can tell something’s a good idea if every field makes up its own name for the same idea.
A classic problem in computer science is hill climbing. Imagine you are dropped at a random spot on a hilly terrain, where you can only see a few feet in each direction (assume it's foggy or something). The goal is to get to the highest hill.

Consider the simplest algorithm. At any given moment, take a step in the direction that takes you higher. The risk with this method is if you happen to start near the lower hill, you’ll end up at the top of that lower hill, not the top of the tallest hill.

A more sophisticated version of this algorithm adds some randomness into your walk. You start out with lots of randomness and reduce the amount of randomness over time. This gives you a better chance of meandering near the bigger hill before you start your focused, non-random climb.

Chris Dixon, 2009: “climbing the wrong hill”
“algorithms to live by”, 2016

Chapter 2: “explore/exploit”
lean: efficient improvement

doing things right

vs.

doing the right thing
lean: efficient improvement

doing things right

vs.

doing the right thing

“a startup is a temporary organization in search of a repeatable and scalable business model” – Steve Blank
role of the tech nugget:

1. customer interviews
2. pain-driven development
3. actual science
4. ops includes engagement ops
actual science
1. mockup*
2. develop method
3. validate method*
4. deploy*
5. ops*

actual science *with customer iteration
1. mockup*
2. develop method
3. validate method*
4. deploy*
5. ops*
simpler frameworks

1. “lean”
2. design thinking
3. “agile”
defining “lean”

“an innovation method for startup companies that claims that the most efficient innovation is the one for which there is an actual demand by the users”

Design Thinking vs. Lean Startup, 2016
defining "lean"

"an innovation method for startup companies that claims that the most efficient innovation is the one for which there is an actual demand by the users."

Design Thinking vs. Lean Startup, 2016
defining “design thinking”

http://dschool.stanford.edu/dgift/
defining “design thinking”

empathy... or data!!

http://dschool.stanford.edu/dgift/
in common:

1. discovery oriented approach
2. learning as unit of understanding
3. focus on customers needs,
   - not biz plan
   - not your tech

Design Thinking vs. Lean Startup, 2016
Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.
in 99 words

Produce working software every week, and demonstrate to stakeholders that you have done so.

Invite anyone who's interested to the demo. It should take about ten minutes. The product manager often conducts the session. Briefly describe the features scheduled, their value, and any unexpected changes. Build trust by being honest, not defensive, about changes.

At the end of each demo, ask your executive sponsor two questions: "Is our work to date satisfactory?" and "May we continue?"

Conduct demos at the same place and time each week. When schedule problems occur, a regular demo makes it easier to face reality.