Successful Entrepreneurship for Microsystems

Rakesh Kumar, Ph.D., Life Fellow IEEE
October 22, 2015
rakeshk@eng.ucsd.edu
Rakesh.tcx@gmail.com
858.945.3758

Teaching Assistants:
Dharmil Chandarana dharmil@ucsd.edu
Swetha Krishnakumar swk032@ucsd.edu

Course presented at UCSD CSE 190, Fall Quarter 2015
10 Rules for a Great Startup Idea

1. You are passionate about it
Are you so passionate about this problem that you can see yourself working on it in 10 years?

2. It’s simple
Start by solving one problem, with one product, for one customer.

3. One revenue stream
Focus on one revenue stream to start, and if you can’t identify a primary revenue stream, then it’s a bad business.

4. Few steps to revenue
The best ideas have a very small number of steps to revenue (steps from engagement to payment).

5. You know the customer
From the outset, you need to intimately know of one very specific archetype who desperately needs your product.

6. You know the market
How can you possibly have a meaningful vision about the future of a market if you are not a leading domain expert on that market?

7. Sufficiently large market
Any market with < 10 million people or multiple billions in annual revenue will be very hard to address.

8. Original secret sauce
Is what you are doing unique, or better, than everybody else? Do you know a secret that nobody else does?

9. You have tried to kill it
Find the things that make your idea bad, and then eliminate them through iteration.

10. You are sharing your idea
Nobody is going to steal your idea! Are you sharing it with as many people as possible?

Ref: Founder Institute  www.fi.com
Guy Kawasaki – Key Takeaways

- Make MEANING
  - Quality of Life
  - Right a wrong
  - Prevent the end of something good
- Make MANTRA (No Mission statements!)
- Get GOING
  - Think different
  - Polarize People
  - Find soul mates
- Business Model
- Wear a MAT (Milestones, Assumptions, Tasks)
- PITCHING
- Hire Infected People (Team Traction Technology)
- Mouse Traps – flatten the Learning Curve
- SALES
- Be a Maensch
- BOOTSTRAP
- Create something GREAT – Guy’s Golden Touch

https://www.youtube.com/watch?v=7mEQ0ono8mg
Guest Lecturer – Yapert Founder, Phil Kelly

- Entrepreneur Traits
  - Risk takers
  - Team Building
  - Wealth creation potential
  - Personal considerations/Job Security are a Low priority
  - Work Hard
- PIVOT Points – expect many direction changes
- Investors invest in PEOPLE First, then the idea
- Opportunities for new grads are ~10X greater than before, because the World is open to entrepreneurs, and the world markets have opened up
- Entrepreneurs do what other people won’t do!
- People are “Builders” or “Maintainers”
- How to pick your Team …best question ever!
  - Members must be Compatible
  - Add specialists when needed
  - Just because you know someone does not mean they’ll be the best team members
  - People you TRUST
Steve Blank (father of the “Lean StartUp”) at UCSD, April 15th

- The old way of Entrepreneurship
- The Lean Start-Up Methodology – key elements
  - Customer Discovery
    - “Get out of the building”
  - Customer Validation
    - “like it” vs. “buy”
  - MVP – Minimum Viable Product
  - Business Model Canvas
Steve Blank – key Takeaways

- Founders are very special people….Not every one can be a founder
  - Artists
  - Passionate, not in it for the $
  - MUST be able to go out and TALK to customers…don’t rely on a VP of sales!
- Your first idea will never be the one you end up commercializing…don’t get hung up on protecting it!
- Anyone can build a product…only smart people can build an MVP
  - Ex. – Robotic Machine vision Drone…weed detector and puller ($5M…$5K)
  - During Customer Development
    - Not only will they like it, but will they PAY for it…leads to serious conversations!!
Steve Blank – key Takeaways

➢ The old way of Entrepreneurship
➢ The Lean Start-Up Methodology – key elements
  ➢ Customer Discovery
  ➢ “Get out of the building”
  ➢ Customer Validation
  ➢ “like it” vs. “buy”
➢ MVP – Minimum Viable Product
Customer Discovery…1

- Walk in the Customer’s shoes
- Observe the Customer
- Regroup
- Summarize Lessons Learned

Ref: Giff Constable, “Talking to Humans"
Customer Discovery…2

- **Who** do you want to learn from?
  - Typical envisioned customer
  - Early Adopters
  - Critical potential partners for distribution, manufacturing, fulfillment
- **What** do you want to learn?
- **How** will you get to them?
- How can you ensure an effective session?
- How do you make sense of what you learn?

Ref: Giff Constable, “Talking to Humans”

©2015 TCX Inc
Customer Discovery…3

- **What** do you want to learn?
  - Most important questions you have…typically the most risky assumptions
  - Why can’t the customer solve the problem today?
  - The measurable outcome the customer expects?
  - …

- Get STORIES, not speculation
- Ask open-ended questions
- Test for PRICE
  - How much do you currently spend to address this problem?
  - What budget have you allocated to this solution? Who controls it?
  - How much would you pay for the problem to go away?
- Get feedback on a prototype
- The magic wand question
  - If you had a magic wand, what problem would you solve?

**Observe the Customer!**

Ref: Giff Constable, “Talking to Humans”
Customer Discovery…4

- **How** will you get to them?
  - Google search
  - Hang out in the right places – coffee shops, bars,…
  - Referrals
  - Conferences and meet-ups
  - LinkedIn, social media,…
  - Ask for advice vs. selling
  - Use “gatekeepers” to your advantage, e.g., CEO’s Admin
    - …connect me to the right person….
  - Students and researchers
  - Online forms and landing pages
  - Webinars
  - ….

Ref: Giff Constable, “Talking to Humans”
Customer Discovery…5

- How can you ensure an effective session?
  - In person interviews
  - Talk to one person at a time
  - Add a note taker
  - Start with a warmup and keep it human
  - Disarm your own biases
  - Look for solution hacks
  - LISTEN, Don’t TALK
  - Drill down – don’t be afraid to ask questions
  - Parrot back (or misrepresent) to confirm
  - Do a dry run
  - Getting feedback on your product
    - Have them tell the story first
    - People don’t like to criticize and give negative feedback, so make sure their feedback is honest/candid

- How do you make sense of what you learn?
  - Systematically analyze the results

Ref: Giff Constable, “Talking to Humans”
Building the Lean Canvas Business Model – UVP

- Be Different, but make sure your difference matters
- Target Early Adopters
- Focus on finished story BENEFITS
  - Features are nice, but BENEFIT is key for the customer
  - Clear Headline
    - end result customer wants + specific period of time + consequence
    - Example, Domino’s:
      - “Hot fresh Pizza delivered to your door in 30 minutes, or it’s free”
- Pick your words carefully and OWN them
  - Ex, Performance – BMW, Prestige – Mercedes
- What, Who, Why?
- Study competition, and other good UVPs
- Create a high concept pitch

Ref: Ash Maurya, “Running Lean”
Marketing “101”

Mobile Device RF TAM

~15% CAGR

TAM
Total Available Market

SAM
Served Available Market

Target Market *

* “SOM”
Served Obtainable Market

“Early Adopters”, Initial Start-up Focus

Source: RFMD Analyst Day 41118


©2015 TCX Inc
Marketing / Sales Channels

…Getting the Customers

➢ “Free” – SEO, social media, blogs, Amazon,…
➢ “Pull” vs. “Push” messaging – “word of mouth” vs. sending emails, etc.
➢ Direct Sales
  ➢ good for initial contacts…sell your initial product yourself first!
  ➢ Direct sales people can be expensive…use judiciously when appropriate
➢ Strategic Partnerships …caution – good for visibility, but do you really get the attention from the Partner’s sales people?
➢ Referrals – must have a GOOD product to get them!

Ref: Ash Maurya, “Running Lean”
Who do you sell to?... **Target Early Adopters**

...from Geoffrey Moore, “Crossing the Chasm”, “Dealing with Darwin”
CISCO example of Category-Maturity Life Cycle
...from Geoffrey Moore, “Crossing the Chasm”, “Dealing with Darwin”
Target Early Adopters
...from Geoffrey Moore, “Crossing the Chasm”, “Dealing with Darwin”
Target Early Adopters
...from Geoffrey Moore, “Crossing the Chasm”, “Dealing with Darwin”

Differentiation thru Disruptive Innovation
➔ Huge competitive advantage
...but needs “Crossing of the Chasm”
Success elements – product positioning

<table>
<thead>
<tr>
<th>EXISTING</th>
<th>NEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard, market, customer base</td>
<td>Standard, market, customer base</td>
</tr>
<tr>
<td>➢ Super-Integration</td>
<td>➢ Emerging standard</td>
</tr>
<tr>
<td>➢ Problem solutions</td>
<td>➢ New features/capabilities</td>
</tr>
<tr>
<td>➢ Evolutionary enhancements</td>
<td>➢ New interfaces</td>
</tr>
<tr>
<td>➢ e.g. Cost reduction</td>
<td>➢ “Revolutionary” enhancements</td>
</tr>
</tbody>
</table>

Will Impact Schedule, Technology Selection, Design Methodology, ....
Conceptual timeline

Existing markets:

- Chip Development
- Market Accept
- Ramp
- Hi Volume

~5 quarters

For existing markets, getting the product to market and increasing market share is important!

New markets:

- Chip Development
- 1st Customer
- Slow Ramp
- Hi Volume
- Alliance / New Standard Accept

Key: early engagement with customer to evaluate and validate the new chip.

- J. Fiebiger (Board Directors Actel, Mentor, QLogic):
  
  “The fabless company must identify the first potential customer early. It is important to have customer’s input in shaping the product requirements… Investors and suppliers will get a favorable story when they perform due diligence with the customer about the viability of the product and potential volume.”
Product Positioning

“Movie” Candy

- A product of Switzer Clark
- Small ad budget
- Created a differentiating feature
  - Normal candy does not last long
  - Kids love it!
  - Lasts as long as the movie!

Candy

Ref: Al Ries, Jack Trout, “Positioning”
The “Productization / Commercialization” Lifecycle

Basic Research

Applied Research

Project “down-selection”

Lab Demo
Funding
Market
Customer
Biz Plan
...

Model Prototype

“System”/Produce-able Prototype

Production

Technology Release Levels, Ref. nasa.gov

1 Basic Principle  2 Concept  4  5  7  9

Methodologies
The “Productization / Commercialization” Lifecycle
...Idea to High Volume Production

Technology Release Levels, Ref. nasa.gov

1 2 4 5 7 9
The “Productization / Commercialization” Lifecycle
...Idea to High Volume Production

Technology Release Levels, Ref. nasa.gov

1 2 4 5 7 9

UNDERSTAND PROBLEM ▶ DEFINE SOLUTION ▶ VALIDATE QUALITATIVELY ▶ VERIFY QUANTITATIVELY

Problem/Solution Fit ▶ Product/Market Fit

CANVAS CUSTOMER INTERVIEWS 1st Demo/Sample

Customer Discovery Customer Validation

Biz Plan

IDEA Lab Demo Funding Market Customer Biz Plan ...

Model Prototype “System”/Produce-able Prototype

Production

FFF Angel VC IPO, M&A
Lifecycle of a Fabless IC development – the 4 phases

- Global Planning
- IC Design
- IC Prototyping
- IC Production

Series A

Series B

30 – 50% of TT$
Lifecycle of a Fabless IC development – activity highlights

“System” Architecture / Design / Simulation / Verification

FPGA Implementation
Reference Design
Customer Evaluation “Proof of Concept”

Global Planning

IC Design
Chip Design
Physical Design
RTL NL NL GDSII

IC Prototyping

IC Production
IC Qualification
Prod. Ramp
Debug
Hi volume

Analog IP Design

Series A

Series B

30 – 50% of TT$
Typical ASIC Development Cycle
System vs. IC Development Cycle

a. At the System company:

- Concept
- HW/SW Dev
- Demo
- Qual
- Trial Mkt
- Build
- Hi Volume

b. At the Fabless IC company:

- ASIC DESIGN
- Proto
- Prod Ramp
- Hi Volume

©2015 TCX Inc
List the 3 most important learnings from Steve Blank regarding Lean Startups

- Customer ______
- Customer ______
- “Get ____________”
HW 6 – Lean Canvas

...Due Thursday, 29\textsuperscript{th}

- Describe a Customer Discovery plan for your team project. (ONE submission per team)

- Bonus
  - Describe one of your experiences with an Early Technology Adoption Cycle – a new app, a new product,…