

Successful Entrepreneurship for Microsystems

Rakesh Kumar, *Ph.D., Life Fellow IEEE*

March 31, 2015

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Teaching Assistant – **Sneha Venkatesh Yelimeli** (“Sneha VY”)

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Tutor – **Ashwin Raman**

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Course presented at UCSD CSE 190, Spring Quarter 2015

CSE 190 About the Instructor – Rakesh Kumar, *Ph.D., IEEE Life Fellow*

- President (2012-13) of the IEEE Solid-State Circuits Society with approximately 10,000 members
- TCX President and CEO (2001 - present)
- Ei2 President and CEO (2005 – 10)
- UCSD Entrepreneurism Center – Technology and Business Advisor (2012 – present)
- Workshops/courses on Semiconductor innovation, entrepreneurship and opportunities
 - Adjunct Professor, Yonsei University, Seoul, South Korea
- 41 years Semiconductor Industry Experience
 - TCX (14 years)
 - Cadence Design Systems (6 years)
 - Unisys (19 years)
 - Motorola (2 years)
- Author of “Fabless Semiconductor Implementation”, McGraw Hill, April 2008
 - A primer for entrepreneurs, as well as the experienced on the breadth of issues in the formation, and operation cycle of fabless semiconductor companies
- Author of numerous publications and presentations
- Distinguished Lecturer for the IEEE Solid-State Circuits, and Electron Devices Societies

CSE 190 About the TA – Sneha Venkatesh Yelimeli

- Graduate student, UCSD Computer Science and Engineering
- Background in web/mobile development and machine learning.
 - Part of the Calatrava core team (calatrava.github.com) – an open-source framework for cross platform mobile application development.
 - Worked with a start-up called BloomReach to build their online product recommendation system that will go live for 20 merchants like Staples etc.
 - Received Young Prodigy Award (sponsored by Amdocs Inc.) for the most Innovative Project in India
- TA for “Mobile Development and Entrepreneurship” SP14, W15
- TA for “Successful Entrepreneurship” FA14

CSE 190 About the Tutor – Ashwin Raman

- 4th year Undergraduate student (graduating Spring 2015), Computer Science & Business
- Background in databases/analytics and web development.
 - Worked on the Data Science team at Box, building a web application to analyze and visualize the results of user behavior (Hadoop, NodeJS, R).
 - Student researcher at the Qualcomm Institute, under Graphics Professor Jurgen Schulze
 - Interned at PARC Labs (Xerox), Cisco, and a 20-person startup called Wheelz (acquired)
- Tutor for CSE 8A/8AL and 8B (2012-2013)

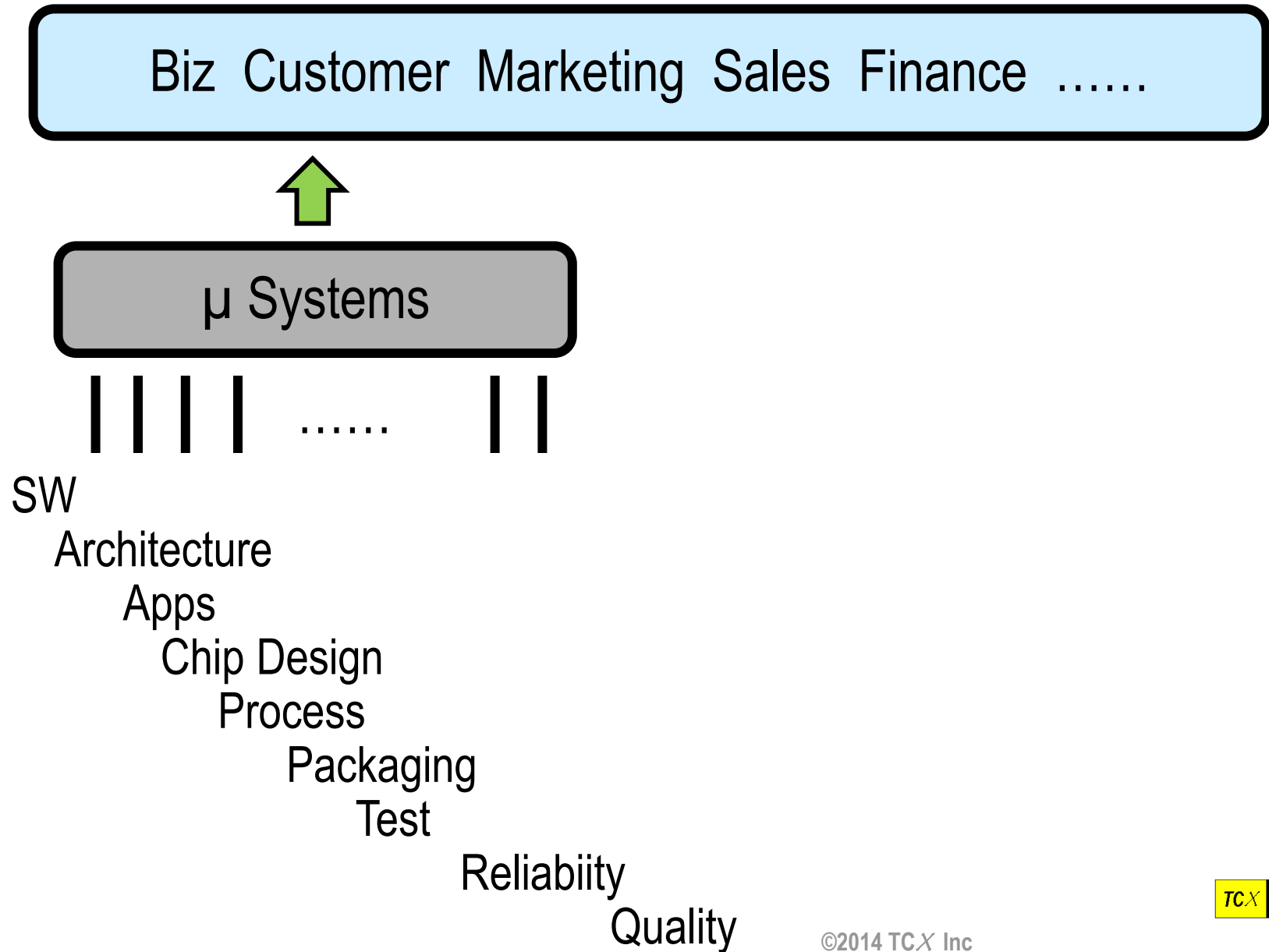
CSE 190 Objectives

- Encourage **Innovation**...the opportunities are HUGE!
- Encourage **Entrepreneurship**
- Familiarize students with the “**How-To’s**” for setting up, and implementing a **Start-up company** related to the many facets of **Microsystems**
 - Many of these themes will be applicable to “*Intrapreneurship*” - setting up and implementation of Projects *within* large Corporations

We will not design any new
Mobile Apps, Algorithms, Architectures, Integrated Circuits, etc.

BROADEN your Horizons

CSE 190 Broadening your Horizons



CSE 190 Piazza Signup Survey

A. Have Ideas, Serious	5	19%
B. Have Ideas, Some thoughts	6	23%
C. Have Ideas, Don't know how	5	19%
D. No Ideas, But some day	9	35%
E. No Ideas, Never	1	4%

Data from Spring 2014 class

CSE 190 Syllabus

Note – details are likely to be modified/adjusted

<p>Intro, Logistics Entre Intro Reasons for Failure Entre Checklist</p>	<p>Videos - Ohanian, Stanford Entrepreneur Traits Individual Presentations</p>
<p>Market Drivers MicroSystems History</p>	<p>Presentation Example Case Studies - Sneha</p>
<p>Team Presentation 1</p>	<p>µSys Product Lifecycle, TRL Levels What's needed for "must-have" Vetting New Ideas Biz Plan elements Running Lean Intro, Biz Model Canvas</p>
<p>µSys Opportunities</p>	<p>Running Lean</p>
<p>Guest Lecturer - Greg Hoover Mobile Apps SU experiences & Guidelines</p>	<p>Presentation Example Case Studies - Sneha</p>
<p>Team Presentation 2</p>	<p>Financials</p>
<p>Guest Lecturer - Phil Kelly, Yapert Entre Traits (Risks), Pivot Points Investors invest in PEOPLE First Builders & Maintainers, Trust</p>	<p>Case Studies TALKING to Customers</p>
<p>Legal/IP/Administrative/Case Studies</p>	<p>Value Chain</p>
<p>Legal/IP/Administrative/Case Studies</p>	<p>Presentation Dry Runs</p>
<p>Presentation Dry Runs</p>	<p>Team Presentation 3 (FINAL)</p>

CSE 190 - Reference Texts

- Ash Maurya, “**Running Lean**”, O’Reilly Media
- Giff Constable, “**Talking to Humans**”
- Bill Aulet, “**Disciplined Entrepreneurship**”

- Sean Wise & Brad Feld, “**Startup Opportunities – Know when to quit your day job**”
- Lucas Carlson, “**Finding Success in Failure**”

- Steve Blank & Bob Dorf, “**The Startup Owner’s Manual**”
- Eric Ries, “**The Lean Startup**”, Crown Business
- Harvard Business Review articles online

- Rakesh Kumar, “**Fabless Semiconductor Implementation**”, McGraw Hill

CSE 190 Logistics

➤ We will use **Piazza.com**

➤ **Office Hours:**

➤ Kumar – Tuesdays and Thursdays 5pm – 6:15pm, EBU3B 4204

➤ Sneha YV – Fridays 10am – 11am, EBU3B B250A

➤ **Discussion Session:**

➤ Sneha YV – Fridays 4pm – 4:50pm, Peterson 104

➤ **Class Hours:**

➤ T Th 6:30 – 7:50pm, Peterson 104

➤ Th (or F) June 4 (5), 5:00 – 9:00pm, EBU3B 1202

➤ **Finals week:**

➤ None

CSE 190 Grading

- We will be using **GradeSource.com**
- Class Participation 20%
- Home Work / Reports 50%
- Presentations
 - TEAM 20%
 - Individual 10%
- Bonus points
 - Homework “extras”
 - Demonstrated interest in following thru with a Start-up
 - Moxie Center
 - Von Liebig Center

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The Age of Entrepreneurship

- High growth Startup companies are a major source of job growth in the US
- Many Innovators
- Many new Opportunities for Entrepreneurship
 - CloudComputing, Mobile Apps, Internet of Things,...
- “Easy” to start a new company!

After Ash Maurya, “Running Lean”

Small Business Statistics (USA)

- 28 M Small Businesses (< 500 employees)
 - 22 M with < 5 employees, < \$50K Revenue
- > 50% of working population works for small Businesses
- > 65% of New Jobs created since 1995 by Small Businesses
- > 0.5M New businesses started every month...
.....but more close down every month!

→ Poor Success Rate

Opportunity:
Create **Smart Start-up** Infrastructure to Improve **Success Rate**

Ref.: www.Forbes.com Jason Nazar 2013

Recent Acquisitions

Amazon

- **Twitch** Aug 2014 Gaming \$1 B

Facebook:

- **Instagram** April 2012 (2011, sA \$7M) Photo Sharing \$ 1B
- **Face.com** June 2012 (2010, sA\$1M, t\$5M) Face Recognition Program \$ 0.1B
- **WhatsApp** Feb 2014 (2008, t\$50M) Mobile Instant Messaging \$ 19B
- **Oculus VR** Mar 2014 (2012, KS, t\$90M) Virtual Reality technology \$ 2 B

Google

- **Dropcam** Jun 2014 (2009, \$50M) Home Monitoring \$ 0.5 B
- **Nest Labs** Jan 2014 (2010) Home Automation \$ 3.2 B

Amazon, Facebook, Google
...the New Conglomerates
...or the New Platform owners...or ?

**Changes are coming
at an amazingly RAPID rate!**

Entrepreneurship – some definitions

- In response to identified opportunities, the practice of
 - starting new organizations/businesses or
 - revitalizing mature organizations....*Wikipedia*
- Innovation applied to the creation of a new product, a new production method or a new market
.....*QuickMBA*
- Entrepreneurship creates significant wealth, rapidly and involves significant risk taking
.....*QuickMBA*

- Entrepreneurs BUILD BUSINESSES through INNOVATIVE SOLUTIONS to UNMET CUSTOMER NEEDS.
- “Above all, innovation is not invention. It is a term of economics not technology.” *
- Entrepreneurs create discontinuities – They obsolete accepted practices and change behavior.

StreetSmart Entrepreneuring www.zeniengroup.com

Microsystems are omnipresent! ...Many Innovation and Entrepreneurial Opportunities



Architecture
Software
Hardware
Apps
...

So, What's the Problem?

Most Startups are not successful!

Some Success criteria:

Be Profitable ...before you run out of Resources/Funds

Get acquired

Go Public

***Most Startups focus
on the Solution, and Not the CUSTOMER ☹️***

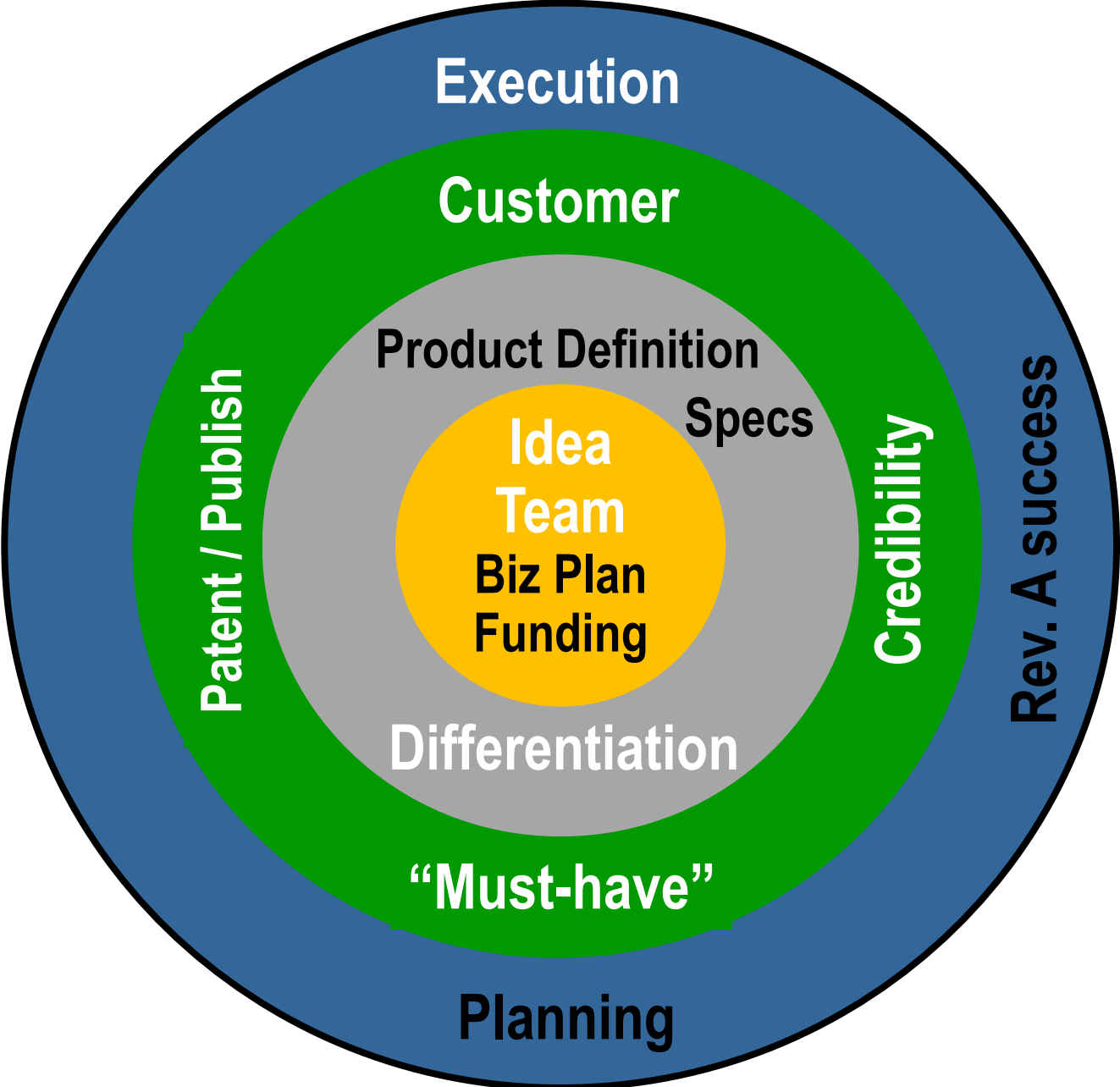
Top reasons for failure – Fabless Startups

Create product that solves a
real Customer Problem...
A “must-have” for the customer
...a Differentiated solution

- **No customer engagement** until it's too late
- Not understanding and meeting **customer expectations**
- Overly **aggressive product specifications**
- The **“kitchen-sink syndrome”**
- Poor management of the **Supply Chain**

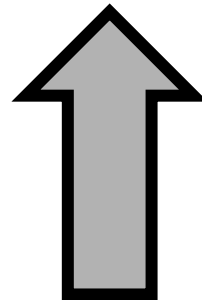
A systematic approach to
planning and execution

Entrepreneurial Checklist



The New Focus

SHOULD
it be Built ?

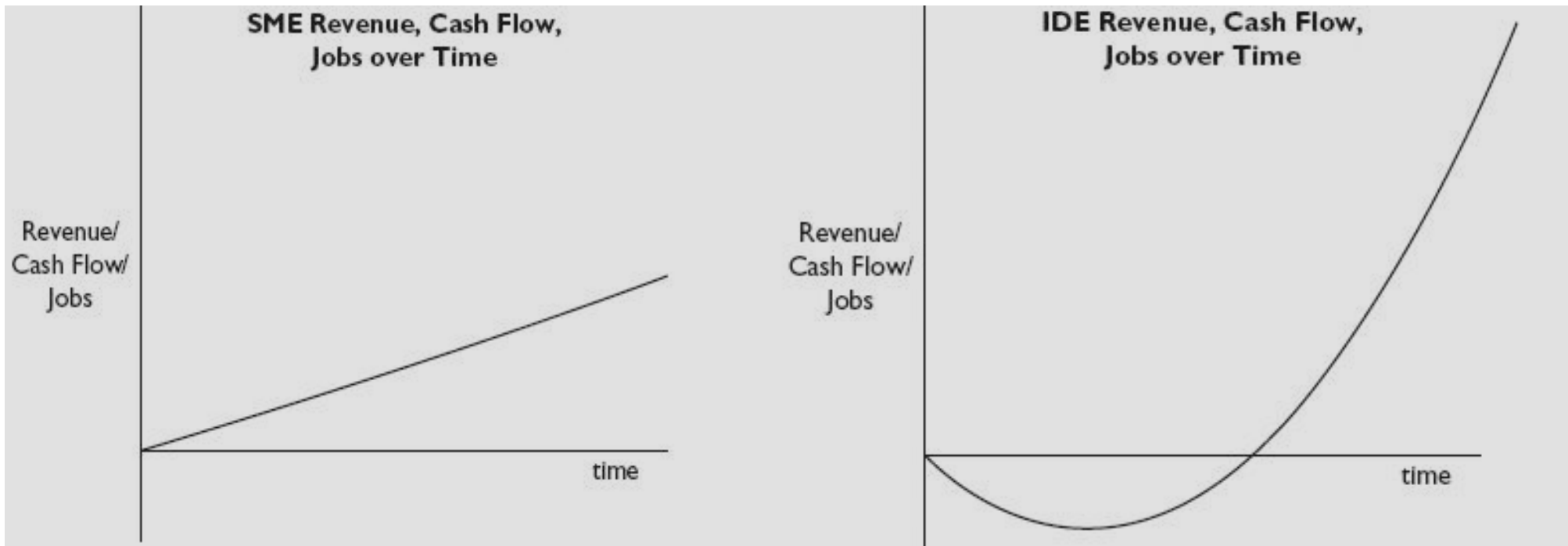


CAN
it be Built ?

Two distinct types of Entrepreneurship

SME (Small Medium Enterprises)

IDE (Innovation Driven Enterprises)



Ref: Bill Aulet, "Disciplined Entrepreneurship"

Entrepreneur Traits Checklist

- Confidence
- Self-Motivation
- Tenacity
- Understand your Limits
- Healthy disrespect for Rules
- Willingness to Fail

**PASSION!
on a MISSION!**

Ref: Jenny Q.Ta, Founder and CEO of C

<http://www.forbes.com/sites/womensmedia/2014/09/03/checklist-for-entrepreneur/>

ask WHY?

Startup Success Story...You can do it, too!



<https://www.youtube.com/watch?v=mHVJF9VaWfo>

Ref: Stanford Graduate School of Business

In-Class Quiz 1

Your top 2 reasons for taking CSE190D:

1. I have an IDEA now that I am PASSIONATE about implementing
2. I have an IDEA
3. I do not have an Idea, but would like to start a company some day
4. I just want to learn about Entrepreneurship

**Please POST your Idea on Sneha's spreadsheet asap
Everyone – Please select your “Like's” by Thursday afternoon!**

HW 1 – Individual Entrepreneurial Inventory

Due on Thursday, April 2nd

Be prepared to make a 1 minute presentation...we will call on ~10-15 presenters

1. Your Entrepreneurial IDEA?
2. What Customer problem does your idea solve?
3. Who are the potential Customers?
4. Who is your Competition? How will you DIFFERENTIATE your product?
5. Who will make it?
6. How big a company do you want to build? Revenue? # people?

HW 1 – Bonus (optional)

Due on Thursday, April 9th

1. Research one successful startup company (e.g., Face.com, Dropcam, Nest Labs,...)
2. Prepare a 1-page summary
 1. History – when founded, by who,..
 2. Funding – amount, major investors,..
 3. Product
 4. Who are their major customers?