Successful Entrepreneurship for Microsystems

Rakesh Kumar, Ph.D., Life Fellow IEEE
March 31, 2014
rakeshk@eng.ucsd.edu
rakesh@tcxinc.com
858.945.3758

Teaching assistant – Kashyap Tumkur
ktumkur@cs.ucsd.edu
http://cse.ucsd.edu/~ktumkur

Course presented at UCSD CSE 190, Spring Quarter 2014
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
- TC.X 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
- 40 years Semiconductor Industry Experience
  - TC.X (13 years)
  - Cadence Design Systems (6 years)
  - Unisys (19 years)
  - Motorola (2 years)

  - 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 – Kashyap Tumkur

- Graduate student, UCSD Computer Science and Engineering
- MIT-Google Global Startup Labs winner, 2013
- Undergraduate involvement – E-cell on campus – all India champs, 2011-13
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

Biz  Customer  Marketing  Sales  Finance  ……

µ Systems

SW
Architecture
Apps
Chip Design
Process
Packaging
Test
Reliability
Quality

©2014 TCX Inc
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%
CSE 190 Syllabus

Note – details are likely to be modified/adjusted

Week 1: Course Introduction, Developing a Microsystem idea – key success elements
Student Individual Presentations 0 (initial thoughts of an Idea/Product?)

Week 2: Typical Microsystems, Industry background, Microsystem Value Chains, Market drivers, and
development Lifecycle
Student TEAM presentations 1

Week 3: Innovation and Start-up Lifecycle, Typical reasons for failure, possible Business models, funding and
exit strategies. Considerations in developing a Business Plan, and a vision for the end-in-mind.

Week 4: Case studies (Large, Medium, Start-up companies), Guest Lecturers, Lean Startup, Business Model
Canvas

Week 5: Student TEAM Presentations 2 (Revised thoughts about your Idea/Product? Who is the Customer? Do
you have a “must-have” opportunity?)

Week 6: Anatomy of a successful start-up company

Week 7: The holistic view - It’s not just the Technology…th e “peripherals” – Marketing, Sales, Finance, IP,…..

Week 8: Who’s the Competition? How to Differentiate your product. How to Protect your Idea.

Week 9: Guest Lecturers

Week 10: Student TEAM Presentations 3 (Startup Business Plan/Canvas)
Wednesday, June 4th, EBU3B 1202, 5-8pm, Guest judges from the industry, and within UCSD

Week 11: Final Report due
CSE 190 - Reference Texts

- Rakesh Kumar, “Fabless Semiconductor Implementation”, McGraw Hill
- Ash Maurya, “Running Lean”, O’Reilly Media
- Harvard Business Review articles online
CSE 190 Logistics

- We will use Piazza.com
- **Office Hours:**
  - Kumar – Mondays and Wednesdays 3pm – 4:45pm, EBU3B 2208
  - Tumkur – Wednesdays and Fridays 10am – 11am, EBU3B B250A
- **Discussion Session:**
  - Tumkur – Fridays 2pm – 2:50pm, SOLIS 111
- **Class Hours:**
  - Monday, Wednesday 5:00 – 6:20pm, (Peterson Hall) PETER 102
  - Wednesday, June 4 5:00 – 8:00pm, EBU3B 1202
- **Finals:**
  - Friday, June 13, 7-10pm
CSE 190 Grading

- We will be using GradeSource.com

- Class Participation  30%
- Home Work / Reports  40%
- Presentations
  - TEAM  20%
  - Individual  10%
Successful Entrepreneurship for Microsystems

Rakesh Kumar, Ph.D., Life Fellow IEEE

March 31, 2014

rakeshk@ucsd.edu
rakesh@tcxinc.com
858.945.3758

Course presented at UCSD CSE 190, Spring Quarter 2014

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”
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.zeniegroup.com*
Microsystems are omnipresent!
...Many Innovation and Entrepreneurial Opportunities

Architecture
Software
Hardware
Apps
...

©2014 TCX Inc
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

Execution

Customer

Product Definition

Specs

Team

Biz Plan

Funding

Rev. A success

Patent / Publish

Credibility

Differentiation

“Must-have”

Planning
The New Focus

SHOULD it be Built?

CAN it be Built?

©2014 TCX Inc
HW 1 – Individual Entrepreneurial Inventory

Due on Wednesday, 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?