Lecture 9

Google 2017 Case

November 14, 2017
This and That

- Last Weeks Lectures- comments
- This week
- Next week and rest of quarter
- Issues?
Nov 14
Ken Pickar Case 4 Google  Schedule a visit to LA Techweek

Nov 16
Midcourse Discussion 2  Review of Team effectiveness
Schedule Team Private Reviews

Nov 21 KAP  Ethical Issues with Technologies  Schedule Team Private Reviews

Nov 23  Thanksgiving Day

Nov 28 KAP Lecture: summary and Conclusion- What did we learn? Writing a Good Paper and Management of Yourself

Nov 30 Final Presentation to class. These should take 20 minutes. Include a slide on Team interactions/lessons learned (~15 ppt slides

Dec 1
Final Report due. The Final report should be maximum 15-20 pages double-spaced
Dear Ken,

We met at Max Levchin's talk last month --
You said that you had several student teams with healthcare-related startup projects. I offered to connect them with the SoCalBio network.

(We just presented our Digital Health Summit on IoMT, and I moderated a panel on the Operational Impact of IoMT with Kaiser's CIO Jim Crawford)

Please send your student's contact info, or have them contact me directly. Phone calls are encouraged!

Looking forward to catching up with you and talking more about entrepreneurial education at Caltech!
Best,
~ Scott

PS -- I'm working with a Caltech-related continuous glucose sensor firm, 'Integrated Medical Sensors,' on their upcoming pitches at Stanford and WeWork NYC.
Presentation of Google Case
Case

- Issues affecting Google:
  - + autonomous vehicles
  - - monopoly
  - - anti trust and price
  - - privacy
  - - bias
  - - competing with apple
  - - diversification is tbd
  - - net neutrality
  - - competition
Case

• Issues affecting Google:
  • Political Environment
    – Europe fines
    – Corporate moving around and hiding funds
    – Monopoly target
    – Missouri Lawsuit
  • Shift to Mobile
  • Automotive revolution
  • Consumer or commercial
In Search of Excellence
Peters and Waterman 1983

Results from highly regarded companies

• Bias for Action
• Close to the Customer
• Autonomy and Entrepreneurship
• Productivity through people
• Hands-on value-driven
• Stick to the knitting
• Simple form, lean staff
• Simultaneous loose-tight properties
In Search of Excellence Peters and Waterman 1983

  DEC
  IBM
  3M
  Amdahl
  Gould
  Westinghouse
  Rockwell
  Eastman Kodak
  Boeing
  K Mart
  Data General
  Wang Labs
  Polaroid
  Revlon
  United Technologies

DEC    Missed PC boat RIP
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DEC Missed PC boat RIP
IBM Near Death early 90s

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- Rockwell Broken up
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- Wang Labs
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Revlon  Long decline
United Technologies Doing OK
IBM and Boeing vs Dow
What happened?

• Innovation not competitive?
• Became obsolete
• Didn’t focus on the right markets
• Didn’t follow “fashion” trends
• Didn’t execute
• too big
• Poor leadership
Who were candidates 5-10 years ago for extinction?

Well-known companies that no one will have heard of in 5-10 years

5 years ago

• Many Banks
• Book stores
• Newspapers  LA Times
• Aerospace  (static?)
• Transportation effect of autonomous?
• Consumer  Best Buy
• Communications Land Line
Who are candidates *today* for extinction?

*Well-known companies that no one will have heard of in 5-10 years*

- Microsoft enterprize
- Intel
- Cable tv
- Newspaper
- Cell phone
- Twitter
- Fed ex UPS
- GE
- Facebook
- Social media
Post-PC era means mass extinction for personal computer OEMs

Summary: HP is laying off more than 27,000 employees and Dell's Q1 2012 earnings were weak across the board. What does this mean for the future of Personal Computer OEMs?

The Post-PC world represents a displacement of computing from the traditional, 30 year-old Intel architecture used on desktop to the Datacenter and the Cloud. In essence, we are returning to a very similar highly centralized model that was popular in the late 60's and mid-1970's with mainframe-based computing.
Importance of being First

Chipmaker price-slashing surprises many. Computerworld (4/21, Gaudin) reported that "Intel Corp. is slashing the price of some of its processors up to 50 percent, a slap in the face to rival Advanced Micro Devices Inc., (AMD) long known as the low-price alternative in the chip market." An Intel spokesman "noted that most of the processors on the price-cut list were built on 65 nanometer technology," which the company "is phasing out in favor of its new 45 nanometer chips." Dan Olds, an analyst at Gabriel Consulting Group Inc., pointed out that it is "fairly common for Intel to trim some chip prices," but that he is "surprised that the company would make such big cuts on so many chips at once." Last week, AMD stated "that it's on track to ship its first 45 nanometer chips in volume in the fourth quarter. If that is when AMD enters the 45 nanometer race, the company will be about a year behind Intel, which shipped its first 45 nanometer Penryn chip this past November."

PC World (4/21, Hachman) noted that "Intel's 45-nanometer fabrication processes theoretically allow the company to produce its processors more cheaply than rival AMD." To maintain its profit margin, AMD was forced "to play an increasingly complex game of minimizing its manufacturing costs while maintaining as high as selling price as possible," so the company could "fund future development and manufacturing."
Death Spiral

1. Values Change demanding that growth ventures become very big very fast

2. An aggressive strategy is the only way to get the numbers to work

3. Massive investments of resources are required to get big fast

4. Resources spent on growth are wasted making the need to grow more urgent
In some cases – Disruptive Technologies

Why do some good companies fail?

• Companies that
  – are well-managed and progressive
  – listen to their customers
  – study and act on market trends
  – invest significant resource in R&D
  – allocate capital to provide the best return

• in short do all the “right things” and are held as paragons for their success

... and then collapse
Disruptive Vs Sustaining Technology

Sustaining Technology

• can be incremental or radical
• improve the performance of established products along the trajectory that mainstream customers have historically valued
Disruptive Vs Sustaining Technology

Disruptive Technology

• Result in worse product performance
• Underperform existing products in mainstream markets
• have features that a few fringe customers value
• typically smaller, cheaper, simpler, convenient to use
Examples of Sustaining Technologies

• Semiconductor process technologies
• Automotive technologies e.g. IC engines—will this be dead?
• DRAM, CISC microprocessor
• Jet Engines
• Construction
• Factory automation
Examples of Disruptive Technologies?

- Internet
- MEMS
- Genetic Engineered foods
- Genetic Engineered drugs
- Wal-Mart, Dell inventory management (still disruptive)
- Hybrid Vehicles
- Battery powered vehicles
- Fuel Cells?

What companies are Vulnerable?
## Disruptive Technologies and Exploitative Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco</td>
<td>Packet switching</td>
</tr>
<tr>
<td>Dell Computer</td>
<td>Direct to customer retailing and high asset turns</td>
</tr>
<tr>
<td>Pixar</td>
<td>Digital animation</td>
</tr>
<tr>
<td>eBay</td>
<td>Internet auctions</td>
</tr>
<tr>
<td>E-mail (ISPs)</td>
<td>Internet</td>
</tr>
<tr>
<td>Endoscopic surgery (Many)</td>
<td>Fiber optics</td>
</tr>
<tr>
<td>Sharp</td>
<td>Flat Panel Displays</td>
</tr>
<tr>
<td>Ford (Model T)</td>
<td>Assembly Line</td>
</tr>
<tr>
<td>Kodak</td>
<td>Simple point and shoot</td>
</tr>
<tr>
<td>DEC, Prime, Data General</td>
<td>minicomputers</td>
</tr>
<tr>
<td>GE Plastics, Dupont, Dow</td>
<td>plastics</td>
</tr>
<tr>
<td>Sony</td>
<td>solid state</td>
</tr>
<tr>
<td>GE medical</td>
<td>MRI, CT</td>
</tr>
<tr>
<td>Xerox</td>
<td>Xerography</td>
</tr>
</tbody>
</table>
Disruptive technologies

Figure 1.4  Impact of New Head-Write Head Technologies in Sustaining the Trajectory of Improvement in Recording Density

Source: Data are from various issues of Disk/Trend Report.
Why do good companies miss the revolution?

1. Companies depend on investors and customers for resources
   • requires high profits
   • requires following the lead of customers who may themselves be blindsided
     – mainframe industry
     – minicomputer industry

2. Markets that don’t exist can’t be analyzed

3. Technology Supply may not meet market demand
Additional Reasons

- **Wrong Value Network**
  - Context of corporation’s business environment leads to missing competition arising from outside

- **Organizational Structure**
  - Companies organized by a products substructure fail when fundamental architecture changes

- **Core Competencies**
  - Firms fail when a technological change destroyed the value of competencies previously cultivated and succeeded when new technologies enhanced them

- **Technology S-curves**
  - Firms fail when they miss inflection points along their main product thrust and specifically when they miss technologies advancing in related fields

- **Wishful thinking**
Are these companies clueless?

• Not every technology that looks disruptive is feasible.
• You cannot chase every possible disruptive technology to cover all your bets.
• Even technologies which are well-researched and appear to be potentially disruptive can be very difficult to bring to market.
• Companies are unable to allocate sufficient resource to test marketing them because they will always fail any rational allocation process (e.g. portfolio management to be discussed in the future).
  – Their normal customers aren’t interested.
  – The markets seem small and uncertain.
  – Resource for main line technologies will receive the dominant share to maintain sales growth and profits.
Does this mean that you must drop what you are doing and pursue these future threats?

- You can’t abandon your present customers

- You could be wrong about identifying the inflection point of your present technologies and the reality of the threat

- Examples
  - Semiconductor lithography transition from optical to x-ray, e-beam
  - Electric Car transition from IC engine
  - Supersonic transport transition from subsonic
  - Nuclear energy transition from steam turbine
  - Others?
Is all lost?
If you are an established, successful company, how do you counter?

• Choose 1 or 2 disruptive technologies that concern you the most and participate
• Set up separate organization in separate location with constrained funding
• Alternatively, invest in start-ups
• Manage expectations as markets are found for disruptive technologies by trial and error
Shaping ideas to become disruptive: litmus tests

- Population of people who historically have not had the money, equipment or skill to do this thing themselves
- Have gone without or have had to pay someone with more expertise to do it for them.
- To use the product or service, do customers need to go to an inconvenient centralized location?
- Are there customers at the low end of the market who would be willing to purchase the product at a low price with less (but good enough) performance?
- Can we earn money at this low price?
- Is the innovation disruptive to *all* the significant incumbents?
Some Lessons Learned

To commercialize a disruptive technology, there are two choices

• Push to its limits to serve an established market or
• Accept current capabilities and seek a market which values the inherent attributes of that technology

Customer input can be extremely misleading

• need a less risky, less expensive way of learning market needs

For new technology, need to assess probability of success of collateral technologies

• The total probability equals the product of the individual probabilities

New markets need time to develop

• Incubation period needed
• Inconsistent with meeting high corporate expectations
Apply all this to Google

• Apply to Amazon, Microsoft, Facebook, Apple