Lecture 9: INCUMBENT FAILURE AND NEW FIRMS

3/7/00

Lecture

• Why do incumbent firms fail
  – Architectural innovation
  – Disruptive Technology
• Assignment
  – You will be asked “why can’t company X do what you are doing” Need to justify the inability for incumbent firms to compete
  – What is your long term strategy
    • Start in incubator markets?
    • Create new markets?
Innovator’s dilemma

- Many “great” companies that are well run, fail when faced with a new technology
  - DEC, Prime, Sears
  - IBM
  - Disk drive companies
- Large companies have a hard time implementing technologies
  - Desk top computers
  - Disk drives
  - New stepper technologies
  - CS-II
  - Boeing/Airbus on determinate assembly & generic fixtures

Types of innovation

<table>
<thead>
<tr>
<th>Core technology</th>
<th>Incremental</th>
<th>Sustaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>modular</td>
<td>Disruptive</td>
</tr>
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<td>Architectural</td>
<td></td>
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<tr>
<td>Radical</td>
<td></td>
<td>Christensen</td>
</tr>
<tr>
<td>Henderson</td>
<td></td>
<td></td>
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</tbody>
</table>
Types

- Incremental
  - Minor changes
  - Reinforces existing capability
- Modular
  - Able to slot in new tech.
- Architectural
  - Have to change the interactions
- Radical
  - Opens new markets
  - Redefines new markets
  - Large org. can’t compete

Disruptive Technologies

- Two types of innovation
  - Incremental
    - Sustaining changes
    - Within a single “value network”
    - Continual improvements along a single performance
  - Disruptive
    - New technologies
    - Tend to incubate in other market segments
    - Change the performance criteria
Questions

• What are the major differences between the two approaches?
• Are they conflicting?
• Are they compatible?

Effects in architecture

• Companies are unable to adopt to new technologies because they can’t get them integrated into their existing architecture
• Channels
  – Who talks to who when
• Filter
  – What are the key issues, what information is important
• Strategies
  – How to solve problems
  – How to respond
Examples of architectural changes

- Photolithography
  - Contact
  - Proximity
  - Scanner
  - Stepper
- Determinate assembly
- Common architecture across aircraft lines
- Change in door frame

DFM problem

- The innovation can be including manufacturing issues in design
- Many companies solve the problem by putting manufacturing on the teams but
- Don't create new filters
- Don't create new strategies
- Keep doing the same work and have the same problems.
Four principles of Disruptive technologies

- Companies depend on current customers for resources
  - can’t go outside the current customer base because of the need to continually grow
- Small markets don’t solve the growth needs of large companies
- Markets that don’t exist can’t be analyzed
- Technology supply may exceed market demand

Sustaining technology with incremental improvement

- Performance improvement of one metric
- Rate of technology improvement exceeds the customer needs
- Inflexible in other performance metrics (size etc)
Disruptive technology

• Compete on new performance criteria
• Sacrifice performance on current market drivers
• Developed in small, entrepreneurial settings
  – Typically bootlegged in existing companies
  – Able to come up the learning curve
• Create a new market for the technology
• Existing companies put $ where the highest ROI is
• When faced with new technology, can’t come up the learning curve.

Examples

• Disk Drives
  – Continual increase in drive capacity
  – Smaller drives
  – Continual changes in the lead players
• Back Hoes
  – shift from cable driven to hydraulic
Steps in Disruptive technology

- Sustaining technology performs well and is being improved in response to customer demands
- Disruptive technology is developed but does not meet performance requirements
- Alternative markets are found/created where the performance/cost point fits new technology
- Disruptive technology matures to a state where the original markets can be entered and compete on a new performance criteria (i.e. size)

Innovator’s dilemma by C. Cristensen
Steel Technology

• Integrated mills
  – Produce from raw ore
  – Use blast furnaces - large optimal capacity (sizes the whole system)
  – High quality

• Mini-mills
  – Produce from scrap
  – Use electric arc furnaces - smaller optimal capacity
  – Low quality commodity parts

Two processes

O2, limestone, coke and iron ore

Blast furnace

Bessemer converters ->
open hearth -> basic O2 furnaces

ingots -> continuos casting

Cool

Store

Re heat

Rolled through 10-12 rollers

scrap metal

Electric arc

2" long strips

4-5 rollers
Steel production

- Cont. casting
- Huge capacity
- Higher costs
- Produce steel (limited by scale of blast furnace)
- Upgrade can be stages (easier)
- Higher quality
- CSP
- Limited capacity
- Lower costs
- Use scrap steel (use electric arc furnaces)
- Requires fundamental changes
- Quality?

Justification

- New technology implemented when new capacity added.
- Chances that new technology will be put in competitors site is minimal
- Their cost benefit was from other sources (labor, fuel, scrap metal)
- Looked at the technology and rejected it
- ??? They are being forced to upgrade their system to make it competitive.
Discussion questions

• Is the mini-mill a disruptive technology?
• Is the mini-mill an architectural change

• It seems obvious that they should implement it. Why can’t USS steel make the decision to do the investment.

• What would you do?

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Next lecture: Prototyping