The Innovator’s Dilemma Revisited

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Management of Technology Seminar
November 5, 2003
Outline

- Basics – Who, what, relationship to course
- Analytics – Why?
- Case studies
- Other issues
- Conclusions
Basics
The Title

The Innovator’s Dilemma
When New Technologies Cause Great Firms to Fail

Clayton Christensen
HBS Press, 1997
“This book is about the failure of companies to stay atop their industries when they confront certain types of market and technological change. It’s not about the failure of simply any company, but of good companies – the kinds that many managers have admired and tried to emulate, the companies known for their abilities to innovate and execute.”
Good Companies

- Sears
- Digital Equipment Corporation
- Xerox
- IBM
- …and so on
The Dilemma

“…the logical, competent decisions of management that are critical to the success of their companies are also the reasons why they lose their positions of leadership.”
Relationship to Course

- The development, management, and commercialization (DMC) of technology
- Dilemma is how to handle all of these tasks in the face of disruptive technologies
- Disruptive technologies may change industries in the long run
- Conflicts can arise within organizations
  - Across functional departments
  - Across technologies in the firm’s portfolio
  - Across market segments
  - Across time (short and long run)
Analytics
The Key Concept

“There is a strategically important distinction between what I call *sustaining* technologies and those that are *disruptive*.”

“These concepts are very different from the incremental-versus-radical distinction that has characterized many studies…”
Sustaining Technologies

- Sustaining technologies foster improved product performance.
  - They can be discontinuous or radical, or they can be incremental.
  - Always improve performance of established products along dimensions valued by mainstream customers in major markets.
Disruptive Technologies (1)

- Disruptive technologies result in worse product performance, at least in the near term.
  - Emerge occasionally
  - Bring to market a different value proposition than available previously
  - Underperform established products in mainstream markets
  - Have features that fringe/new customers value
“Products based on disruptive technologies are typically cheaper, simpler, smaller, and frequently more convenient to use”

- Small off-road motorcycles
- Transistors and transistor radios
- HMOs (!)
Additional Factors

“…technological progress can, and often does, outstrip what markets need.”

“…customers and financial structures of successful companies color heavily the sorts of investments that appear to be attractive to them, relative to certain types of firms.”
Markets and Technologies (1)

- Sustaining technologies may overshoot

- Disruptive technologies may eventually be good enough
  - Servers vs. mainframes
  - Wal-Mart vs. Sears
Markets and Technologies (2)

- Sustaining technological progress
- High-end market demand
- Low-end market demand
- Disruptive innovation
- Product performance
- Time
Principles of Disruptive Innovation

1. Companies depend on customers and investors for resources
2. Small markets don’t solve the growth needs of large companies
3. Markets that don’t exist can’t be analyzed
4. Technology supply may not equal market demand
“…companies find it very difficult to invest adequate resources in disruptive technologies – lower-margin opportunities that their customers don’t want – until their customers want them. And by then it is too late.”

Solution: “…set up an autonomous organization charged with building a new and independent business around the disruptive technology.”
Resource Dependence (2)

• This is an argument about internal incentives within an organization
• These incentives play an important role in determining the cost structure, which Christensen argues differs across high and low margin businesses
• Think of the airlines and their unions – it’s not just a question of margins, but of being locked into cost structures that cannot be varied across different lines of business within a company, especially if those lines are close
Market Size

- First mover advantages in emerging markets
- Harder for big companies to enter small new markets
- Growth targets to satisfy investors bias efforts toward large markets
- So this assumes that firms are not long run profit maximizers – maybe a key requirement for Christensen’s argument to work
Market Analysis

- If markets for disruptive technologies cannot be quantified, this biases resource allocation away from them.
- There is an implicit assumption here about internal incentives and individual risk-taking within an organization.
- In large organizations, this may lead to risk aversion in decision-making.
- The argument may also be couched in terms of policies and procedures, or organizational inertia, a kind of lock-in, perhaps.
Supply and Demand

- Competition leads to oversupplying performance relative to what customers want.
- Leaves room at the low end of the market for products based on disruptive technologies.
- This implicitly assumes that firms cannot simultaneously produce different products (i.e., vertical product differentiation).
- Goes back to internal organizational constraints, or to reputational spillovers.
Case Studies
Case Study: Disk Drives (1)

- Sustaining technological changes
  - Grinding ferrite heads finer (incremental)
  - Smaller, more finely dispersed oxide particles (incremental)
  - Innovation in product architecture (14” Winchester drives – discontinuous)

- Disruptive innovations (series)
  - Further shrinking the drives (8”, 5.25”, 3.5”)

Case Study: Disk Drives (2)

- For minicomputer manufacturers, 8” drive was superior to 5.25” drive
  - Capacity
  - Cost per megabyte
  - Access time

- For PC makers, though, 5.25” drive was
  - Small
  - Lightweight
  - Relatively cheap
Case Study: Disk Drives (3)

- Seagate was innovator in 5.25” drives
- Seagate personnel showed 3.5” drives to customers for evaluation
- Opposition came from marketing and executives, who argued that the market wanted higher capacity and lower cost per megabyte
- Existing customers showed little interest
- Seagate finally shipped 3.5” drives three years late
- Cannibalization versus new markets
- Fear of cannibalization can become a self-fulfilling prophecy
Other Cases

- Variety and discount retailing
- Mechanical and hydraulic excavators
- Laser jet and ink jet printers
- Mainframes, minicomputers and PCs
Other Issues
Value Networks

- Existing value networks support sustaining innovations
- Disruptive technologies get their start in new value networks
- There is an implicit argument here about lock-in through irreversible investments upstream
- Value networks increase lock-in, but lock-in can occur even with internal irreversible investments
- Downstream, the value network involves customers with differing wants
Services vs. Products

- Disruptive innovations can be in services as well as products
  - Retailing
  - Airlines
- In either case a want is being satisfied, with the disruptive innovation providing an innovative mix of characteristics
- Disruptive innovations in services will involve process innovation, more so than in products
- Process innovation may put more strain on existing organizational structures
Conclusions
Conclusions (Christensen’s Dilemma)

- Christensen has a precise notion of disruptive technologies, which is often misrepresented, and confused with discontinuities.
- Underlying his arguments are some economic issues that need to be looked at in more detail:
  - Internal organizational incentives and attitudes, including risk aversion and fairness.
  - Assumptions about how capital markets work, possibly promoting short-termism and risk aversion.
  - Lock-in and irreversibility seem to be key underlying factors in the “innovator’s dilemma.”
Conclusions (DMC)

- Dilemma is how to handle DMC of technology in the face of disruptive innovation
- Disruptive technologies may be industry-changing
- Conflicts can arise
  - Across functional departments
  - Across technologies in the firm’s portfolio
  - Across market segments
  - Across time (short and long run)
- Incentive structures (internal) and market structures (external) are key to these conflicts