Managing the Innovation Process

Market Changes
Overview

• Take-Away
• Required Readings
• Supplemental Readings
• Caveats
Take-Away

• Innovation through architecture is distinct

• Innovation can be radical and discontinuous

• Innovation follows cycles of technological change

• Innovation maps onto a technology S-curve
(Henderson & Clark, 1990)

• “Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms”

• Architectural Innovation
  (not incremental or radical, but rather changes in the architecture of a product without changing the components)

• Example
  (semiconductor photolithographic alignment equipment industry)

• Implication
  (architectural changes are difficult for firms to recognize/correct)
(Utterback, 1994)

- "Mastering the dynamics of innovation – Chapter 7: Invasion of a stable business by radical innovation (pp. 145-166)"

- Radical Technological Innovation
  (technology that invades – and eventually overwhelms – the established technology)

- Example
  (America’s ice industry: machine-made replaced harvested)

- S-Curve
  (development slow at first, and then accelerates with a dominant design, and then slows again as efforts shift to new technology)
(Anderson & Tushman, 1991)

- “Managing through cycles of technological change”

- **Cycles Of Technological Change**
  (technology progresses in cycles that hinge on discontinuities and emergence of dominant designs)

- **Creative Destruction**
  (fundamental to capitalist progress – Schumpeter)

- **Competency-Destroying**
  (obsolete existing know-how, nullify mastery of old)
(Foster, 1986)

• “Innovation: The attacker's advantage – Chapter 4: The S-curve: A new forecasting tool (pp. 89-111)”

• **S-Curves**
  (learning followed by diminishing returns; repeated)

• **Examples**
  (artificial hearts, pocket watches)

• **Forecasting Tool**
  (competitive analysis of effort put in and results achieved)
(Christensen, 1992)

- "Exploring the limits of the technology S-curve. Part I: Component technologies"

- **S-Curve Scope**
  (more applicable at the industry level than firm level)

- **Reverse Causality**
  (lack of technological progress may be the result, rather than cause, of a forecast that a technology is maturing)

- **Component Innovation**
  (attacking firms have a disadvantage with new components)
Caveats

• What about reconfiguring existing service innovations?

• When are radical innovations not worth pursuing?

• How do firms manage multiple competencies?

• Has the S-curve ever made an accurate forecast?