

# 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?