Competitive Advantage with New Product Development

Implications for Lifecycle Theory

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Provide background on thesis areas for Mitch & John

-Mitch – knowledge-based theory of the firm as it relates to technology startups
-John – branding theory in media companies
Three key areas for discussion
Theoretical Foundations
Competitive Advantage

What is Competitive Advantage?
- key success factors that are not easily replicated by the competition
- Differs depending on time and environment

Historical Success Factors
- Economies of scale and scope
- Integration and non-integration
- Process based core competencies


Scale & Scope prevalent in 60’s & 70’s – rooted in market position

Scale – steep economies of scale exist where there are high fixed costs vs variable costs. Spread the fixed costs over large volumes. PLC = mature markets

Scope – Product line breadth to dominate a market position. Competitive advantage of this type can be lost when technology or market changes remove barriers to building product breadth.

- recently popular to have vertical integration, now seen to slow you down (Acer vs. Cisco)

Vertical Integration and non-integration – rooted in business model
- to outsource, a company must be able to specify what it needs, technology must be reliable and accessible, and be able to react to variations in the supply chain.
- New technologies must be made in house
- PLC = move from non-integrated to vertically integrated

Core competence and Competitive Advantage (rooted in processes)
- The KEY IS that competitive advantages are temporary, even process based core competencies
Two major causes of variations in product behaviour during the life cycle:

- Instability of demand
- Instability of supply (i.e. competitive position)

Two major theories help explain this instability

- Diffusion process of innovations theory
- Theory of monopolistic competition

Diffusion of Innovation Theory: Explains why consumers get into and out of the market

Monopolistic Competition: Explains why there are different numbers of firms in the market

- At introduction, monopoly like competition, because business people reluctant to take high risk in new market
- In growth, there is competition, but many of the products are substitutes for each other (firms attempt to segment or differentiate their products)
- At maturity, acts more like an oligopoly, barriers prevent new firms from entering

PLC Stages: Reflects the impact of these two theories – the intersection of supply & demand
Diffusion of Innovation Curve

Theory based on unstable demand and consumer behavior

Cumulative % of Potential Adopters

Innovators  Early Adopters  Early Majority  Late Majority  Laggards

Time

Product Life Cycle Curve

Theory based on unstable sales

Mapping of Christensen’s concept of Competitive Advantage onto the Product Life Cycle

<table>
<thead>
<tr>
<th>Phase</th>
<th>Economies of Scale</th>
<th>Economies of Scope</th>
<th>Vertical Integration</th>
<th>Product Competencies</th>
<th>Process Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Few</td>
<td>Few</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Growth</td>
<td>Increasing</td>
<td>Increasing</td>
<td>Increasing</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Maturity</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
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<tr>
<td>Decline</td>
<td>High</td>
<td>High</td>
<td>High</td>
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<td>High</td>
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</tbody>
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Order? Right after competitive advantage slide?
Discuss some background on New Product Development itself, before moving to the competitive strategies that firms can undertake.
NPD Background

- How is NPD Success Measured?
- What drives this success?
- Structuring the NPD Process
- Absorptive Capacity
- Firm Size and Innovation
Success Factors Group in three areas (based on factor analysis):

1. Financial Performance
2. Efficiency
3. Window of Opportunity (technical success also in here)

Similar to Cooper and Kleinschmidt’s view, is Stock, Greis and Fischer (2001):

Process Efficiency
- Speed
- Productivity
- Flexibility

Product Effectiveness
- Profitability
- Market Share
- Product Revenue
- Product Quality
What Drives NPD Success?

- Superior Product Features
- Up-front homework before development gets underway
- Quality of the Project team
- Perceived Risk at the start of the project
- Proficient execution of technical activities
- Customer influence over company
- Proficient Execution of Marketing activities
- Company influence over customer
- Marketing Synergy


- factors in decreasing order of significance

- A superior product, offering unique benefits to users; higher quality, with excellent price/performance characteristics and easy to explain benefits
- Initial screening, preliminary market and technical assessments, market studies, concept development and concept testing and business analysis.
- A dedicated, committed team leader, a cross-functional, multi-disciplinary team accountable for the project from idea to launch and dedicated team members
- A medium level of risk combined with some difficulties determining customer problems and identifying the product’s features at the beginning. Too much perceived risk is detrimental.
- Technical assessment, product development, internal product testing, trial production and production start-up
- Where the developing firm is closely aligned with customers and they have considerable influence over the developing company’s technology, product and even promotion and distribution
- Preliminary market assessment, concept development, concept testing, customer field trials and market launch.
- The company has impact over general R&D activities in the market; attracts technologically competent allies and considerably influences its main customers in terms of their technology and their products
- Leveraging the company’s resources in the area of marketing research,
-there are different ways in which the NPD process works
-With more competitive and faster global markets, there is a greater need for flexibility and speed
-The tendency today is movement towards more holistic approaches such as the rugby approach
- Tendency to use more holistic approaches the more that flexibility and speed are required
1. Overlapping development phases: as seen in the previous slide – tendency is towards more “holistic” approaches such as the rugby approach.

2. Give the team a BROAD GOAL or STRATEGIC DIRECTION, and create pressure. HONDA: “I believe creativity is born by pushing people against the wall and pressuring them to the extreme.”

3. Give the team autonomy (team sets own direction-limited top management involvement); Self-transcendence (team keeps reaching for the limits, resolves contradictions by overriding the status quo); Cross-fertilization: heterogeneous team.

4. Learning at different levels: individual, team learning and broad organizational learning. Multifunctional learning: experts are encouraged to accumulate experience in areas other than their own. THIS is a primary construct of knowledge creation.

5. Management checkpoints to prevent instability, ambiguity and tension from turning into chaos.

6. Transfer of learning from this project to others in the organization in order that future projects learn from their successes and failures.

Takeuchi & Nonaka: focus is on learning, but they argue that this method can be a great method for change management.
Absorptive Capacity & NPD

- NPD benefits from External Information
- Absorptive Capacity
  - “the ability of a firm to recognize the value of new information, assimilate it, and apply it to commercial ends”
- > Absorptive Capacity = Improved NPD
- Study found U-shaped effect
  - diminishing returns on investments in R&D on product technical capability
- I.E. There is a learning-curve like effect in new product development performance


1. NPD benefits from external information – REFER to Cooper – what drives success – 2nd most important is up-front homework
2. Cohen & Levinthal (1990) article on absorptive capacity is seen as critical to technology development
3. Paper argued that increased absorptive capacity (as measured by R&D intensity or R&D as a % of sales) should lead to improved technical performance of products (as measured by bits per second capability of a modem)
4. Results show that more spending on R&D is good up to a point and then money just doesn’t drive better technical performance
5. Similar to Takeuchi & Nonaka, learning is seen as important, but learning curve still in effect
Interesting finding in performance of modems
- Product had very little performance improvement over a long period of time
- Then new use for modem as connector to internet
- Product life cycle was renewed and large uptake in performance
- This shows “Technology Performance Curve” which should mirror the Product Life Cycle curve (in 1990’s, modems took off to support Internet use)
- Shows Link between technology performance and Life Cycle.
**Firm Size and Innovation**

**Findings**
- Large firms account for proportionally more innovations

**Advantages**
- Customer knowledge
- Customer franchise
- Market power
- Resources

**Disadvantages**
- Perceived Incentives
- Organization Filters
- Organizational Routine


**Method**
- 150 years of radical innovations
- Firm size captured by number of employees

**Results**
- Probabilistically, one might expect small firms to generate more innovations than larger firms, however, this is not the case.
- Incumbents accounted for half the radical innovations
- Incumbents are more likely to innovate now than before WWII.

**Large Firms**
- Dynamic orgs (decentralized structures mimic small firms)
- Tech capabilities

**Small Firms**
- Research spillovers from larger firms
- Partner with other orgs. To gather tech expertise of financial resources.

**Advantages**
- Know the customer very well, based on long experience
Innovation, Firm Size and the PLC

Firm Size and Incumbency Progression Along the PLC

Sales?

Introduction  Growth  Maturity  Decline

Small Firms  Large Firms
Non-incumbent  Incumbent

Depends on how you view “SALES” on the product life cycle curve:

- if viewed as an individual product & brand (then everyone starts at beginning)

- if viewed as the whole industry for a related product class, then the PLC is really made up of a series of very small individual product curves and the mature organizations are the ones adding the most to the curve

Size is an antecedent to innovation. Therefore, prior to the introduction phase of the PLC in the individual product context.

However, you could argue that a larger firms’ centre of gravity on the PLC is likely in the mature or declining phase of the PLC. When an incumbent firm’s centre of gravity is in this phase, it extends its PLC presence downward, although the centre of gravity is relatively unchanged.
NPD Strategies
NPD Strategies

1. Pioneer Strategy
2. Imitator Strategy
3. Rapid Innovation
4. Disruptive Technology

Introduction

5. Pre-Announcement
6. Partnering
7. Standard Setting
8. Use of Platforms
NPD Strategy 1 - Pioneer

- Get first crack at the market
- Obtain patent
- Create legal hurdles for others
- Match/surpass imitators' product features
- Dominate/saturate the market with more brands
- Be offensive
- Promote product as industry standard


WHAT: Be first to market – get first mover advantage
- start to introduce barriers
- keep ahead of imitators
- try to create a standard

PLC: Obviously, right at the beginning
WHAT: Points made above

• Try not to take the risk of establishing the market
• Issue is being able to keep up with the pioneer

• Faster and earlier NPD will lead to a greater shareholder wealth effect. Therefore, incentive to get out there quick. (tradeoff is that the earlier you are, the more risk & may not know if market will fly)
• Rivals can adversely effect the first mover advantages by imitating the new product
• First mover advantages were completely destroyed by the sum effect of early and late imitation
• Late imitators diminish the “new product” label and turn the product into a commodity

WHY:
Speed leads to greater shareholder wealth
Adversely affect the first mover
Destroy first mover advantages
Diminish the “new product” label and turn the product into a commodity
Early imitators

- Erodes first mover advantages – we saw this with a previous article’s mapping against the PLC. The advantages disappear after the growth period of the PLC
- A fast second imitator can actually produce stronger results than the first mover. Likely aided by learning from eth first mover’s mistakes.

Late Imitator

- Completely destroy, with early imitators the first mover advantages
- Diminish the “new product” label and turn the product into a commodity, cost based competition is indicative of the mature stage of the lifecycle
First Mover Advantages

- Pioneering firms reap positive economic profits

First Mover Advantages arise from 3 factors:
1. Technology Leadership
2. Preemption of assets
3. Buyer switching costs


Four First Mover Disadvantages

1. Free Riders
2. Resolution of Tech and Market Uncertainty
3. Technological Discontinuity
4. Incumbent Inertia

Advantages

Technology Leadership
- strong advantage if technology can be patented
- Diffusion of technology to other firms erodes the advantages based on the company’s learning curve. Therefore, protect it.

Preemption of Scarce Assets
- Benefit from input resources at low cost since there is less demand prior to the market’s evolution
- Geographic/Space advantages result from being able to pick prime locations
- Investment in plant or equipment to mass produce goods at a lower cost to prepare for cost based competition

Switching Costs
- Late entrants will incur higher costs associated with attracting new customers
- In low cost “convenience goods”, the first mover advantage via brand loyalty is significant

Disadvantages

Free Ride
- cheaper to imitate than to actually innovate products
Technology Leadership – early part of the curve since there is monopolistic situation, however, can continue with continuous improvement through the PLC

Preemptive Assets – early in PLC, input costs become driven up as competition increases into the growth part of the PLC

Switching Costs – protect the first mover through the initial stages of new entrants but is lost as the market matures (I.e. standardization)

Free Ride – Imitators can enter the young but growing market with relatively low entry costs

Resolution of Tech/Market Uncertainty – standardized maturing market, with regards to consumer preferences and product offerings, leads to price based competition.

Tech Discontinuity – Shift in technology or preferences away from the first mover’s technology/product signals the beginning of PLC decline

Incumbent Inertia – the first mover is locked into its position of technology/product as the PLC is in decline.
NPD Strategy 3 – Rapid Innovation

- Gain competitive advantage by shortening the planning loop in the product development cycle
- Make smaller increments of improvement, but introduce them more often
- "Newness and freshness" become important product attributes for customers
- New product features increase technological sophistication of your products
- Competitive products begin to look old and out of date


For example, custom door manufacturer offered shorter lead times for customized requirements. Result was they could charge more and deliver faster – having higher margins.

Honda: in competition with Suzuki in motorcycle market. Introduced 100 models in short period of time and made Suzuki retreat.

Companies are systems, time connects all the parts
Use response advantages to attract the most profitable customers
Based on similar time-based strategies for flexible manufacturing (short production runs & small lot sizes)
Use cross-functional teams that span development and production
Time-based Innovation & the Life Cycle Curve

Sales

Original Product LCC

New Innovation LCC

Time

Revised Original Product LCC
NPD Strategy 4 – Disruptive Technologies

• Sustaining innovation: maintains a steady rate of product improvement

• Disruptive Innovation:
  – Sacrifices performance
  – Offers different package of attributes
  – Not yet valued by mainstream customers (i.e. no market)
  – Typically don't offer attractive financial returns compared to sustaining innovations

Discuss study of Disk Drive Industry
Disruptive Technology Strategies

- Determine if technology is disruptive or sustaining
- Define the strategic significance of the disruptive technology (previous chart)
- Locate the initial market for the disruptive technology
- Place responsibility for disruptive technology in an independent organization
- Keep the disruptive organization independent
  - Let the new technology cannibalize the life cycle of the old technology


- Disruptive versus sustaining determination usually comes from technical staff and not marketing and finance (in fact if they are arguing, that is a good sign)
- The best way to locate the market is not through market research but by trying to launch a product in the marketplace
- Independent organization is only required 1. When the new technology has a lower profit margin and 2. When the new technology addresses a different customer
- If you don’t let the new technology cannibalize the old one, your competition will
Similar effect to rapid innovation strategy – you end up pulling down the sales of the original product, once the disruptive technology surpasses the technological requirement in the market.
NPD Strategy 5 – Pre-announcement Strategies

- Preempt competitors in an effort to stop their new product development (perceptual barriers to entry)
- Create an industry standard by pre-announcing
- Increase customers’ switching costs
- Strategic Communication Tool
- Fund Raising Tool
- Competitive Games


Study showed that the stock market discounts pre-announcements unless there is substantive proof in the announcement (e.g. we bought a building, we invested X dollars) – some irreversible commitment

1a. Set future pricing as deterrent
1b. Give capacity announcement that hints at market oversupply
1c. Freeze the market (while customers wait for competition)

2a. Particularly true for products with high network externality (product only good if many others use it)
2b. Industry standard aids in product diffusion
2c. E.g. Microsoft’s Internet Explorer

3a. Why switch to competitor’s product when your new product is coming soon (switching has training costs)

4a. Signals the company’s future intentions
4b. Need to contain some evidence or else seen as a bluff

5a. As strategy to aid in raising funds from financial markets (pre-
Strategic Alliances Advantages
- Reduce/share large development costs
- Lessen risk of product introduction
- Access technology not "owned" by the firm

Single firm vs. Cooperating firms
Horizontal vs. vertical cooperation
Between Industries vs. Within Industry


Coop vs single firm - Products of cooperating firms tended to be less innovative than products of a single firm

Horiz. Vs. vert. – horizontal partnerships tended to be more innovative than vertical association.

Firms cooperating with companies outside their industry tended to be more innovative than firms cooperating with partners from within the same industry.

Critism
-authors’ model, although linkages were sig., had very weak explanatory power.

-NEWBRIDGE example
Since cooperation can lead to poorer innovativeness than a single firm, partnering should be left to those who cannot “go alone”. Therefore, alliances should only be pursued by the smaller firms where they can pool resources to accomplish innovation.

Competence Sharing

This would place the topic on the earlier part of the PLC, in terms of firm’s centre of gravity.

This study measures NPD success, but another benefit is just knowledge acquisition (i.e. absorptive capacity increases by “sucking” knowledge from your alliance partners)
NPD Strategy 7 – Technology Standards

- Competition differs before & after standard set for products with positive network externalities
- Positive Network Externalities: The more buyers of COMPATIBLE goods, the greater the perceived value of all goods


Article studied the PC industry
Before the standard is set, it is in the interests of similar technologies to work together to establish their version of the standard.

After the standard is set, full competition exists

Further explanations on next slide
Technology Standards

When Standards are forming:

- Competing technologies try to grab market share
- Experimentation and confusion exist in market
- Companies can benefit from imitation by competitors (i.e. develop low barriers to imitation – licensing)

A “dominant design” emerges (Technology Standard)
Firms shift focus to market segmentation and low costs

Competition now focuses on erecting entry barriers:
product pre-announcements, market control, competitive pricing, distribution, proprietary technology


Natural Tendency towards competitive homogeneity as standard is set

Use example of BETA vs. VHS as licensing strategy
NPD Strategy 8 – Platform Setting

3 Types of Companies
1. Platform Leaders
2. Wannabes
3. Complementors

4 Levers of Platform Leadership
1. Scope
2. Product Technology
3. Relationships with external complementors
4. Internal Organization


Use example of Microsoft Office

Types
Platform Leaders – drive industry wide innovation for an evolving system of separately developed pieces of technology
Wannabes – desire to be platform leaders. Offer second solutions (e.g. Corel)
Complementors – make the ancillary products that expand the platform’s market. You can only develop as fast as these guys can keep up.

Levers of Platform Leadership – ways in which the platform leader can influence the market for its benefit.
1. Scope – internal innovation versus outsider innovation
2. Product technology – regarding architecture or platform (e.g. modularity, openness of interfaces, outside disclosure of info)
3. Relationship with complementors – competitive or collaborative (strike a balance between consensus seeking and decision influencing) - you can only introduce new platforms as fast as your complementors can
4. Internal Org – how groups are defined, type of org culture, communication. (essentially an org that encourages healthy debate is good) – Need to have the right internal organization to be an effective platform leader – depends on similar or conflicting goals related to the platform.
Platform Leadership is situated in the growth phase, although benefits of this leadership carry on to the end of the PLC.

Platform Leadership begins in the growth phase of the PLC. In fact, it is the complementors of the platform that help grow the market with their products that generate interest and sales in the core platform.

The importance of platform leadership is heightened by competitive pressures of many new entrants and the slowing of growth in the marketplace.

The established platform leader will likely remain for the eventual decline of the product.
<table>
<thead>
<tr>
<th>NPD Strategies &amp; the Life Cycle</th>
<th>Introduction</th>
<th>Growth</th>
<th>Maturity</th>
<th>Decline</th>
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<tr>
<td><strong>Pioneer Strategy</strong></td>
<td>First Mover Advantage</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Imitator Strategy</strong></td>
<td>Strong Benefit</td>
<td>Decreasing Benefit</td>
<td>Only Useful if Cost Advantages</td>
<td>Only Useful if Cost Advantages</td>
</tr>
<tr>
<td><strong>Rapid Innovation</strong></td>
<td>First Mover Advantage</td>
<td>Steal Competitors Growth</td>
<td>Extend Life Cycle</td>
<td>Limited Benefit</td>
</tr>
<tr>
<td><strong>Disruptive Technology Introduction</strong></td>
<td>Create New Market – First Mover Advantage</td>
<td>Strong Benefit</td>
<td>Terminate Incumbents</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Pre-Announcement Strategies</strong></td>
<td>Financing Strategy</td>
<td>Perceptual Barriers</td>
<td>Standard Setting</td>
<td>Switching Costs</td>
</tr>
<tr>
<td><strong>Partnering</strong></td>
<td>Strong Benefit – Absorptive Capacity</td>
<td>Strong Benefit – Growth &amp; Learning</td>
<td>Limited Benefit – Cost Only</td>
<td>Limited Benefit – Cost Only</td>
</tr>
<tr>
<td><strong>Standard Setting</strong></td>
<td>Cooperate until technology legitimation</td>
<td>Standard Set/Market Segmentation &amp; Cost</td>
<td>Competitive Phase – Erect Entry Barriers</td>
<td>Competitive Phase</td>
</tr>
<tr>
<td><strong>Use of Platforms</strong></td>
<td>Limited Applicability</td>
<td>Strong Aid to Growth</td>
<td>Critical Component Of Survival</td>
<td>Weakens but some Lasting Benefits</td>
</tr>
</tbody>
</table>