Introduction to Technology Management

-Student material-

Manuel Lorenzo Hernández
Head of Technology & Innovation, Ericsson España S.A.
E-mail: manuel.lorenzo@ericsson.com

Last updated: 16 March 2010

with a big Thank You to Chalmers University
Outline

- Introduction 10’
- The Dynamics of High Technology 50’
- Market & Technology 25’
- Strategy & Technology 25’
- Questions 10’
The Dynamics of High Technology
Technology Adoption/ Diffusion of Innovations

- How does adoption of technology evolve with time?
The Dynamics of High Technology
Technology Adoption/ Diffusion of Innovations

- s-shaped Curve / Bass Diffusion model (F. Bass)

The Dynamics of High Technology Technology Adoption/ Diffusion of Innovations

- s-Curve for Cumulative Adoption & Bell Curve for New Adoption

The Dynamics of High Technology
Technology Adoption/ Diffusion of Innovations

- What is the social Influence on Technology Adoption?
The Dynamics of High Technology
Technology Adoption/ Diffusion of Innovations

- Social Model for Technology Adoption (E. Rogers)

The Dynamics of High Technology Technology Adoption/ Diffusion of Innovations

- Case of Discontinuous Technology Changes (Moore):
  - Between Early Adopters (visionaries) and Early Majority (pragmatists) there is a *chasm* that only some technologies and business models succeed in crossing.
  - Techniques to successfully cross the "chasm," include choosing a niche target market, understanding the whole product concept, positioning the product, building a marketing strategy and choosing the most appropriate distribution channel and pricing.

The Dynamics of High Technology
Technology LifeCycle: Innovation

- Performance Evolution vs. Time (or Engineering Effort)
The Dynamics of High Technology
Technology LifeCycle: Innovation

- Performance Evolution vs. Time (or Engineering Effort)
The Dynamics of High Technology
Technology LifeCycle: Innovation

- The conventional Technology S-Curve

The Dynamics of High Technology
Technology Lifecycle: Innovation

- Disruptive Technology S-Curve

The Dynamics of High Technology
Technology LifeCycle: Innovation

- The impact of Sustaining and Disruptive technological change

The Dynamics of High Technology
Technology LifeCycle: Innovation

- The impact of Sustaining and Disruptive technological change

The Dynamics of High Technology
Learning Cycles & Competition
The Dynamics of High Technology
Learning Cycles & Competition

- A number of technologies (most of them disruptive) prolifere. Different companies bet on different ones.
- At the end a particular technology (e.g. gasoline engine in the car industry) dominates and the many companies that bet on a different technology disappear.

The focus shifts to manage complementarities: synergies with other products and businesses, networks with partners, ...

- At this stage performance is measured primarily on a single dimension (e.g. image resolution). Competition is often focused solely on that single dimension.
- The competitive advantage goes to the company able to execute the learning cycles faster.

- As product performance improves, certain customer segments start valuing different product dimensions – price, availability, ...
- The winners are those companies that are able to read the market and understand the differences across market segments.

- As the technology market is becoming mature, competing players focus more and more in efficiency and sustaining technologies
- Radical innovations may appear and force the start a new lifecycle.

Market and Technology
The Business Model construct

Business Model?

Technical Inputs
- Feasibility
- Performance
- Other

Measured in Technical Domain

Economic Outputs
- Value
- Price
- Profit
- Other

Measured in Social Domain

Market and Technology
The Business Model construct

A new cool Technology does not have a value per se; a suitable Business Model must be found and applied

**Business Model:**
- Value proposition
- Market Segment
- Position in the Value Chain
- Cost Structure and Target Margins
- Value network
- Competitive strategy

**Technical Inputs**
- Feasibility
- Performance
- Other

**Economic Outputs**
- Value
- Price
- Profit
- Other

Measured in Technical Domain

Measured in Social Domain

Market and Technology
The Business Model construct

- **VALUE PROPOSITION**: What?
- **MARKET SEGMENT**: Who to?
- **POSITION IN VALUE CHAIN**: Where?
- **COST STRUCTURE AND MARGINS**: How much?
- **VALUE NETWORK**: Who with?
- **COMPETITIVE STRATEGY**: How to?
Market and Technology
Business Model Examples

- Subscription business model
- Razor and blades business model (bait and hook)
- Pyramid scheme business model
- Multi-level marketing business model
- Network effects business model
- Monopolistic business model
- Cutting out the middleman model
- Auction business model
- Online auction business model
- Bricks and clicks business model
- Loyalty business models
- Collective business models
- Industrialization of services business model
- Servitization of products business model
- Low-cost carrier business model
- Online content business model
- Freemium business model
- Premium business model
- Direct sales model
- Value Added Reseller model
- Professional open-source model
- Various distribution business models

Strategy and Technology

What is strategy?

“the match an organization makes between its internal resources and skills…and the opportunities and risks created by its external environment.”

Source: Hofer and Schendel (1978)
Strategy and Technology

- The two basic principles of Strategic Management of Technology are:
  
  1. Focus on your Customers
  
  2. Leverage your Core Competencies
Strategy and Technology
Make or Buy?
Strategy and Technology
Make or Buy?

![Diagram showing the decision matrix for make or buy of technology based on in-house level of knowledge and business application. The matrix is divided into four quadrants: Research, Development, Buy-In, and Optimize and/or Outsource. The axes are labeled Technology/Knowledge on the y-axis and Business Application on the x-axis. The diagram illustrates the process from Research to Development to Buy-In to Optimize and/or Outsource.]
Strategy and Technology

Adaptability

Defining and executing a strategy is a must

... but unplanned things happen ...

and adaptability is equally important
Strategy and Technology
Adaptability: Core Competencies & Core Rigidities

The development and use of competencies and resources are guided by the firm’s dominant management logic

Competencies become routines, which are difficult to change

Core Competencies become Core Rigidities

Companies miss out innovation opportunities

So sometimes (only sometimes, but sometimes) it is right:

- Not to ask your customer… and review the business landscape around
- Not to stick to your core competencies… and learn again
Strategy and Technology
R&D Long-term & Short-term (Ericsson Approach)

Development Units

Ericsson Research Group Function R&D

External Research Cooperations

Universities
Operators
EU FP projects

Focus
Now  5 years  10 years

Strategic and New Areas
Strategic Direction
Business Decision

Introduction to Technology Mgmt - Student Material 2010-03-16
M.Lorenzo
References

- **Christensen, C.** (1997). *The Innovator’s dilemma*. Collins Business Essentials