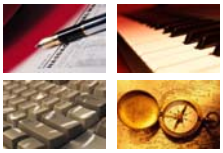
Management of Technology

B03-1. Technology Strategy



- Code: 166125-01
- Course: Management of Technology
- Period: Spring 2013
- Professor: Sync Sangwon Lee, Ph. D

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01. Technology Strategy

- Strategy
  - Companies must be flexible to respond rapidly to competitive and market changes.
  - Can rivals quickly copy any market position?

01. Technology Strategy

- Strategy
  - Competitive strategy is about “Being Different”.
    - We should distinguish between operational effectiveness and strategy.
    - Operating effectiveness means performing similar activities better than rivals perform them.
    - Operational effectiveness is important but not enough.
      - Rapid diffusion of best practices
      - Competitive convergence
    - Strategic positioning means performing different activities from rivals’ or performing similar activities in different ways.

01. Technology Strategy

- Strategic Importance of Technology
  - Technology as competitive weapon
    - Technology could decide competitive power of product/service.
      - ➔ Core technology
    - Technology could heighten entry barrier of a new enterprise.
    - Technology could be a competitive weapon to destroy entry barrier of existing enterprises and to enter a new business.

01. Technology Strategy

- Strategic Importance of Technology
  - Technology as driver of strategy
    - Supporting
      - Technology strategy could be a means to achieve management strategy.
    - Driving
      - Technology strategy could play a role to lead management strategy.

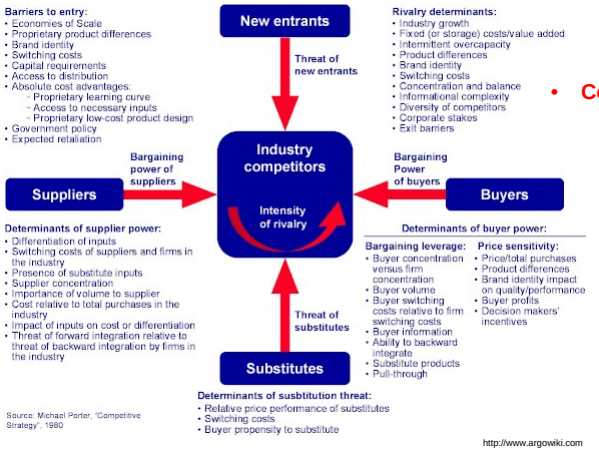
01. Technology Strategy

- Strategic Importance of Technology
  - Technology as driver of strategy

Supporting	Driving
Understanding market	Acquiring technology
Understanding competitive points and KSF * KSF: Key Success Factor	Understanding applicable potential
Understanding core technology	Understanding KSF and technology competitive power * KSF: Key Success Factor
Understanding competitive power of core technology	Deciding target applications and market
Establishing technology strategy	Establishing technology strategy
Unifying technology strategy and management strategy	Establishing management strategy

01. Technology Strategy

- Importance of Technology as Substitute



- **Porter's 5 Forces Analysis Model**
  - **➔ Substitute or**
  - **➔ Complements**

- **Competitiveness**
  - **Among industries**
  - **Among technologies**
  - **Among standards**
  - **Among enterprises**

01. Technology Strategy

- Roles of Technology Strategy
  - Dimension of technology effects
    - Product innovation
      - Improving product value
      - Differentiating product
    - Process innovation
      - Pursuing economy of scale
      - Achieving general cost advantage
    - Acquiring basic/core technology
      - Pursuing economy of scope
      - Improving technology productivity and competitive power
    - Implementing entry barrier
      - Heightening entry barrier of new entrants
      - Heightening switching cost of new buyers

01. Technology Strategy

- Roles of Technology Strategy
  - Bargaining power of technology and industry structure factors
    - Bargaining power of technology and suppliers
      - Reducing purchasing necessity from powerful suppliers
      - Useful for rear integration
    - Bargaining power of technology and buyers
      - Affecting product differentiation and switching cost
      - Useful for front integration
    - Bargaining power of technology and new entrants
      - Strengthening/Weakening entry barrier
    - Bargaining power of technology and substitutes
      - Introducing new products with low price and switching cost
    - Bargaining power of technology and industry rivals
      - Affecting price competition, differentiation, and removing barrier
    - Scope of technology and industry
      - Expanding/Abridging/Specializing industry scope

01. Technology Strategy

- Roles of Technology Strategy
  - Survival inequation
    - Satisfying benefits
      - Consumer benefit = product value – production price
        - ➔ Generating purchasing when value > price
      - Producer profit = product price – product cost
        - ➔ Generating production when price > cost
    - Leading innovations
      - Product innovation ➔ value creation (economy of scope)
      - Process innovation ➔ cost reduction (economy of scale)

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01. Technology Strategy

- Scope of Technology Strategy
  - Strategy = goal + means + action

01. Technology Strategy

- Scope of Technology Strategy
  - Ford's scope of technology strategy
    - Phase 1: Strategy for technology acquisition
      - Make ➔ in-house development, imitation
      - Buy ➔ outsourcing, OI(Open Innovation), C&D(Connect and Development)
      - M&A ➔ M&A(Merger and Acquisition)
    - Phase 2: Strategy for technology management
      - ➔ Technology/Knowledge management systems
      - Technology evaluation ➔ technology/competiveness assessment
      - Technology security ➔ technology security, human resource management
    - Phase 3: Strategy for technology exploitation
      - Sell ➔ licensing-out
      - Department ➔ CVU(Corporate Venture Unit), ICV(Internal Corporate Venture)
      - Incorporate ➔ spin-out

Technology Acquisition → Technology Management → Technology Exploitation

01. Technology Strategy

- 10 Agendas of Technology Strategy

기술획득 (Technology Acquisition)	기술관리 (Technology Management)	기술활용 (Technology Exploitation)
1. R&D 미션/비전/Portfolio 정립 ① R&D 미션 ② R&D 비전 ③ R&D Portfolio ④ R&D/CTO 역할 ⑤ R&D 투자규모	5. 기술축적/핵심기술역량관리 ① 기술(지식) 축적 시스템 구축 ② 핵심기술역량 파악 및 관리	9. 기술적용 ① 기술적용대상 선정 ② 기술적용수준 결정 ③ 기술적용방법 결정 (자체생산 또는 외주생산) ④ 제품출시시기 결정
2. 기술선택 (What to Do) ① 기술목표 설정 ② 기술범위 설정 ③ Technology Roadmap (TRM) ④ R&D Portfolio	6. 기술예측 및 평가 ① 기술예측 ② 기술평가 ③ 기술선별 메커니즘/프로세스	10. 기술판매 및 분사 ① 기술판매 (Licensing-out) ② 기술마케팅 ③ 사내벤처 (ICV) ④ 분사 (Spin-Out) ⑤ 합작 (Joint Venture)
3. 기술획득방법 선택 (How to Do) ① 자체개발 (Make) ② 외부기술활용 (Buy) ③ 인수합병 (M&A)	7. 기술보안 및 기술자산관리 ① 기술보안 ② 기술자산관리 (특허관리)	
4. R&D 프로젝트 관리시스템 구축	8. R&D 인력/조직관리 ① R&D 인력관리 ② R&D 조직관리	

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01. Technology Strategy

- Strategic MOT

Technology Acquisition	→	Technology Management	→	Technology Exploitation
Asset Creation		Asset Management		Asset Exploitation
Technology Investment		Technology Advancement		Profit Creation
Technology Development		Technology Accumulation		Technology Asset Utilization
Technology Securement		Technology Evaluation		
		Technology Security		

01. Technology Strategy

- An Example (Car Industry) of Strategic MOT
  - Phase 1: Technology acquisition
    - Make vs. buy
    - Assembler vs. part-supplier
    - Academic-industrial cooperation
    - Technology convergence
  - Phase 2: Technology management
    - Managing core technology ability
    - Evaluating technology level and competitive power
    - Managing technology information and document
  - Phase 3: Technology exploitation
    - Applying technology
    - Selling technology
    - Transferring technology

01. Technology Strategy

- 7 Questions of Strategic MOT
  - Which technologies should be used to implement core product design concepts and how should these technologies be embodied in products?
  - How and how much should external technologies be sourced and utilized?
  - At what level, should the organization invest in technology development?
  - When and how should new technology be introduced to the market?
  - Which CTC(Core Technological Competencies) and capabilities are necessary to establish competitive advantage and how should IPR(Intellectual Property Right) be managed strategically?
  - How should creative culture and manpower be cultivated and supported?
  - How should technology and innovation be organized and managed?

01. Technology Strategy

- Analysis of Organization Ability
  - Christensen's RPV(Resource-Process-Value) theory
    - A framework to evaluate organizational ability

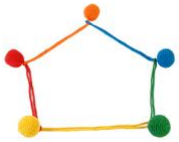
Resource	+	Process	+	Value
Visible/Invisible Assets		Business Methods		Standards of Property
Human Resource Technology Product Information Tool Cash Brand Distribution Channel		Employment and Training Production Process Manufacture Planning Budgeting Market Research New Business Process Resource Allocation Process Evaluation Process		Core Value Demand Cost Structure P/L Structure Opportunity Potentiality Enterprise Image Enterprise Culture Ethics

01. Technology Strategy

- Dimension of Technology Strategy

1) Competitive strategy stance

2) Value chain stance



4) Management stance

5) R&D strategy stance

3) Resource commitment stance

01. Technology Strategy

- Dimension of Technology Strategy
  - 1) Competitive strategy stance
    - [Technology choice] what technology is applied to a product?
      - Core design concept and physical implementation
      - Components and architecture
    - [Technology leadership] what level of technology is set to goal?
      - Relative advantage
      - Pioneering role vs. monitoring role
    - [Technology entry timing] First mover or follower?
      - First mover advantages vs. disadvantages
      - Appropriability regime and complementary assets
    - [Technology licensing] In-house or licensing?

01. Technology Strategy

- Dimension of Technology Strategy
  - 2) Value chain stance
    - [Scope of technology strategy] what technology is developed and what technology is purchased?
      - Sourcing
      - Outsourcing
      - Economies of scale, scope, and learning

01. Technology Strategy

- Dimension of Technology Strategy
  - 3) Resource commitment stance
    - [Depth of technology strategy] what standard and degree is set for investment on technology development?
      - Intensity of its resource commitment to technology

01. Technology Strategy

- Dimension of Technology Strategy
  - 4) Management stance
    - [Organizational fit] What is policy for R&D?
      - Choice of management approach and organizational design
      - Centralization or distribution of research center?

01. Technology Strategy

- Dimension of Technology Strategy
  - 5) R&D strategy stance
    - investment scale of R&D and R&D portfolio
      - Ex. Pure research: applied research: development = 10:30:60
    - Importance of R&D
    - Time horizon of R&D
    - Organization of R&D
    - Policy of R&D

01. Technology Strategy

- Why is it Difficult to Set Up Technology Strategy?
  - Technological Illiteracy
  - High-tech Syndrome
  - Communication
  - Time Scale