Lecture No. 19: Production Strategy

1. What Is Production Strategy?

2. Constituent of Production Strategy

3. Thoughts on Production Strategy

Takahiro Fujimoto

Department of Economics, University of Tokyo

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1. What Is Production Strategy?

**Business strategy**

- **Corporate strategy** (company-wide strategy)
- **Business strategy** (competitive strategy)
- **Functional strategy** (production, marketing, technology, etc.)

**Manufacturing strategy**

--- pattern of decision making with certain *consistency*
regarding to production
(consistency on maintenance/enhancement of competitiveness)
Hierarchy Structure of Management Strategy

- **company level**
  - corporate strategy
    - (diversification strategy)
    - (product --- market strategy)
  - competition strategy

- **business division level**
  - business strategy
    - production strategy
    - research and development strategy
    - marketing strategy
    - other

- **department level by function**
  - functional strategy
2. Constituent of Production Strategy

(1) **Structural item (hard)**

Requiring large investment decision, involving determination by top management

(2) **Substructural item (soft)**

Steady **buildup** of small decisions
Gradually formed as action pattern of all employees
Investment in corporate **knowledge/information asset** (intangible)
Constituent of Production Strategy

**Structural (hard)**
- decision of production capacity
- factory net work/design
- selection of production technology
- vertical integration

**Substructural (soft)**
- personnel/labor management
- purchase/supplier management
- production plan/control
- quality control
- costing, IE, improvement
- management organization
Concept of "Strategy": Plan and Pattern

Strategy as **plan** (vision)

'---- strategy as "what top management says"

Strategy as **pattern** (action pattern)

'---- including "quiet man of action"

total production system with consistency on competition

--- which by itself is a "strategy as pattern".
Steps of Establishing Production Strategy

1. Industry Analysis (Environment)
   - Competitors
   - Cost Structure
   - Technology

2. Enterprise Resources and Capabilities
   - Skills
   - Resources
   - Products
   - Engineering
   - Technology...

3. Business Strategy

4. Production Department's Goals
   (Productivity, Quality, Service, ROI...)

5. Resources and Enterprise Capability Evaluation

6. Production Strategy
   - Scope of Engineering
   - Scope of Products
   - Selection of Engineering Type
   - Location
   - Control System
   - Organization

7. Production Department Head's Implementation Responsibilities
   - Production Planning, Standards
   - Quality Management, Cost Management
   - Operations

8. Results (Performance)
   (Productivity, Quality, Service, ROI)
   (Feedback)

Author making (reference: 'Skinner, W., Manufacturing: The Formidable Competitive Weapon, John Wiky & Sons')
Reference: Takahiro Fujimoto 'Introduction to Production Management' Nihon Keizai Shimbun, Inc. 2001 (I p347)
Structural Production Strategy (1):
Decision of Production Capacity

Expansion of **production capacity**: 2 functions

(1) to fill product customer's demand for product
(2) signal effect

(superiority for first-come; believability in intimidation; sunk cost)

**Lumpiness** of capital investment

→ priority investment type
lagging investment type
in-balance type (application of critical fracture)
Types of Production Capacity Expansion Strategy (demand growth period)

1. Priority investment type
   - low out-of-stock cost
   - quick delivery
   - easy share increase
   - low capacity-operating rate

2. In-balance type
   mid point between 1 and 3

3. Lagging investment type
   - high out-of-stock cost
   - prone to late delivery
   - risk of share decrease
   - high capacity-operating rate
Structural Production Strategy (2): Factory Network Strategy

(1) Factory scale and number of factories
Optimum scale of factory

**economics of scale** (short term, medium term, long term, dynamic)

vs.

**diseconomics of scale**
- transportation cost
- recruitment cost
- organizational rigidification
- confusion in production
- risk of concentrated production
Economics of Scale (scale economy)

1. Short-term scale economy
2. Medium-term scale economy
3. Long-term scale economy
4. Learning effect

Takahiro Fujimoto 'Introduction to Production Management' Nihon Keizai Shimbun, Inc. 2001 (I p354 figure.9.6)
Concept of Optimum Factory Size (Sherer)

- Average factory size
- Optimum factory size
- Total cost per unit
- Cost per unit in long term
- Product-transportation cost per unit
- Factory size
Factory Network of Press-to-Assembly System

USA I
- Detroit
  - Press
  - Welding (1 module)
  - Body shell
  - Assembly (1 line)

USA II
- Detroit
  - Press
  - Welding
  - Panel

Japan
- Press
  - Welding
  - Assembly

Takahiro Fujimoto 'Introduction to Production Management' Nihon Keizai Shimbun, Inc. 2001 (I p355 figure.9.8)
(2) Factory Location

Factory location research --- in parallel to new factory plan/business plan

Check points:
- distribution of consumption market/material maker, local labor market
- transportation method, community, utility environment, preferential measure of local government, and others

Country → area → local → property

Location strategy of new factory (refer to the diagram)

Case: Local North American Factory of Japanese Automobile Maker
Location Strategy of New Factory

Consumer market

Existing factory.

- Low wage region.
- Abundant skilled worker regions.
- Raw material home.
- Supplier accumulation.
- Research and development base.
- New factory

New factory

- Low wage region. Abundant skilled worker regions.
- Raw material home.
- Supplier accumulation.

Takahiro Fujimoto
'Introduction to Production Management'
Nihon Keizai Shimbun, Inc. 2001 (I p357 figure 9.9)

'Automobile engineering of 1999 Japan' Japan Automobile Manufacturers Association, Inc.
Reference: Takahiro Fujimoto 'Introduction to Production Management' Nihon Keizai Shimbun, Inc. 2001 (I p358)
Midwest: close to center of market and parts industry pool in Detroit

West Cost: cost up due to passing over Rocky Mountains
(3) Specialization of Factory (focus)

Factory specialized by process (process focus)

vs.

Factory specialized by product (product focus)

Factory for whole country (national plant)

vs.

Plural factories by local region (regional plants)

Development factory (close to R&D sector, trial and initial productions)

vs.

Volume production factory (satellite factory; local expansion)
Focus (Specialized) Strategy of Factory

a. Product focus.
(specialization according to product)

b. Process focus.
(specialization according to process)

○顧客ニーズに迅速に対応
○新製品導入が比較的容易
○市場セグメント別専門化が可能
○原価計算が比較的容易
○ジャスト・イン・タイムを導入しやすい
●生産工程の重複による非効率
●製品の工場間での移管が困難
●製品ごとの好不調によって稼働率にばらつき
●専門技能養成が軽視される傾向

○生産技術の蓄積が早い
○工程の重複による非効率が少ない
○規模の経済。高稼働率を維持しやすい
○生産技術の標準化を促進
○製品別の売れ行きのばらつきを吸収
●市場、技術の変化への対応が遅い
●生産リードタイムが長い
●在庫が多い
●工場間の調整コストが高い

Takahiro Fujimoto 'Introduction to Production Management' Nihon Keizai Shimbun, Inc. 2001 (1 p359 figure.9.11)
Locations of plural-factory-network are influenced by the difference in policies on the network building

<table>
<thead>
<tr>
<th>Network</th>
<th>Strategy</th>
<th>Location</th>
<th>Advantage.</th>
<th>Disadvantage.</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>It surpasses it by enhancing the factory until setting up a factory in the heartland, and reaching critical limit. Afterwards, the second factory is built for the first time. (center factory)</td>
<td>The first factory is built in &quot;Center of gravity&quot; of the market. This is enlarged.</td>
<td>○ Scale economy.</td>
<td>● It is possible to reel it to a local small factory in the remote place. ○ It is pre-emp as for the rival. (If the other party is a carpenter place. )</td>
</tr>
<tr>
<td>②</td>
<td>It sets up a factory one after another in other emphasized regions instead of enhancing the first factory. (making to network)</td>
<td>It thinks about the effect when the factory network is completed, and the factory is distributed to various places.</td>
<td>○ Even power is demonstrated in various places.</td>
<td>● The factory network is complex and time-consuming to coordination. ● (There is no scale advantage. ) Is the first move taken away by the other party?</td>
</tr>
</tbody>
</table>
4. Management of Factory Network

Flow of money

(local procurement/transfer-in? reinvestment/transfer-out? borrowing local currency/dollar/Yen)

Flow of Mono (parts/material/finished product)

(by-product/by-part; for local regions, for Japan, for globe)

Flow of human

(temporary transfer, dispatch --- from Japan)

Flow of information/technology/knowledge

(application/adaptation; reverse transfer back to Japan?)

Example: home country's factory and local factory --- age of mutual learning
Figure removed
due to copyright restrictions
Does "Trade Off" Exist?

Cost vs. quality

Cost vs. lead-time

Cost vs. flexibility

Among various cost factors (EOQ, etc.)

Among various functional factors (controllability vs. ride quality, etc.)

Position of static balance $\rightarrow$ emphasis on tradeoff

vs.

Position of dynamic improvement $\rightarrow$ without premise of tradeoff
Trade Off

- Design quality: low (capability) → high
  - Low cost → high long lead-time
  - Flexibility: small → large
  - Low cost → high low cost of set-up switch
  - High inventory cost → low high ride quality
  - Low low controllability → high

Takahiro Fujimoto 'Introduction to Production Management' Nihon Keizai Shimbun, Inc. 2001 ( I p367 figure 9.14)
3. Thoughts on Production Strategy

Two points of view (One's superiority to another is up to an industry and times.)

(1) "Loud" view of production strategy
    high-powered, active top management, significant decision making

(2) "Steady" view of production strategy
    at a glance, non-strategic action in operation level
    Meticulous buildup in long term → hardly detectable to rival

Was this a strength of Japanese companies?
(Abernathy)

A balance between these two is important.