Process Strategy

Overview
- Process strategies
- Service process design
- Process Analysis And Design
  - Flow charts
  - Service system mapping
  - Time-Function Mapping
  - Value Stream Mapping
  - Process Charts
  - Service Blueprinting

Announcements
- We will not cover all of chapter 7.
- We will concentrate on pp. 254-270 8th edition

Process, Volume, and Variety

Comparison of process strategies

<table>
<thead>
<tr>
<th>Project</th>
<th>Job-shop</th>
<th>Batch</th>
<th>Assembly</th>
<th>Continuous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
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<tr>
<td>Flexibility</td>
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<tr>
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<td>Variable cost</td>
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<td>Labor content</td>
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<tr>
<td>Labor skill</td>
<td></td>
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</tr>
<tr>
<td>Volume</td>
<td></td>
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</table>

Process Strategies
- A continuum
- Within a given facility, several or blend of strategies may be used
- These strategies are often classified as:
  - Process-Focused
  - Repetitive-Focused
  - Product-Focused

Process Focus
- Job shops (machine, print, carpentry)
- Standard Register

Repetitive
- Autos, motorcycles
- Harley Davidson

Low Variety
- Poor Strategy (Both fixed and variable costs are high)

High Variety
- Mass Customization
- Dell

Low Volume
- Process Focus

High Volume
- Product Focus
  - Commercial baked goods, steel, glass
  - Nucor Steel
Process-Focused Strategy Examples

- Job shop
- Facilities are organized by process
- Similar processes are together
  - Example: All drill presses are together
- Low volume, high variety products
- 'Jumbled' flow

![Machine Shop](image)

Repellent-Focused Strategy - Examples

- Assembly line / Production line
- Facilities often organized by assembly lines
- Characterized by **modules**
  - Parts & assemblies made previously
- Modules combined for many output options

![McDonald’s](image)

Process Focused Strategy - Characteristics

- **Positives**
  - Greater product flexibility
  - More general purpose equipment
  - Lower initial capital investment
- **Negatives**
  - More highly trained personnel
  - More difficult production planning & control
  - Low equipment utilization (5% to 25%)

![Clothes Dryer](image)

Repetitive Focused Strategy - Characteristics

- More structured than process-focused, less structured than product focused
- Enables quasi-customization
- Using modules, it enjoys economic advantage of continuous process, and custom advantage of low-volume, high-variety model

![Fast Food](image)
Assembly process

THE ASSEMBLY LINE

incoming parts

Air cleaners
Oil tank work cell
Fluids and mufflers
Shocks and forks
Fuel tank work cell
Handbars
Wheel work cell
Fender work cell

Testing

28 tests

Roller testing

Crating

Oil tank work cell

Figure 7.3

Product-Focused Examples

Soft Drinks
(Continuous, then Discrete)

Light Bulbs
(Discrete)

Paper (Continuous)

Nucor Steel Plant – continuous process

Product-Focused Strategy

- Continuous production
- Facilities are organized by product
- High volume, low variety products
- Where found
  - Discrete unit manufacturing
  - Continuous process manufacturing

Product A & B

Operation

Product-Focused Strategy - Characteristics

- Positive
  - Lower variable cost per unit
  - Lower but more specialized labor skills
  - Easier production planning and control
  - Higher equipment utilization (70% to 90%)

- Negative
  - Lower product flexibility
  - More specialized equipment
  - Usually higher capital investment

Nucor Steel Plant - continuous process

Continuous caster
Sheared into 24-ton slabs
Hot tunnel furnace
- 300 ft
Hot mill for finishing, cooling, and coiling
Scrap
Ladle of molten steel
Electric furnace

Process Design

Customization at high volume
Mass Customization
(Dell Computer’s PC)

Product-focused
Continuous
(jewel, beer, paper, bread)

Repetitive (modular)
focus
Assembly line
(Cars, appliances, TVs, fast-food restaurants)

Process-focused
Job Shops
(Print shop, emergency room, machine shop, fine dining)

High

Low

Volume

Mass vs. Volume
### Comparison of process strategies

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<td>Low</td>
<td>Low</td>
<td>High</td>
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<td>Low</td>
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<td>High</td>
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<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Volume</td>
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<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

### Mass Customization

- Using technology and imagination to rapidly mass-produce products that cater to sundry unique customer desires.
- Under mass customization, the three process models become so flexible that distinctions between them blur, making variety and volume issues less significant.

### Mass Customization - More Choices

<table>
<thead>
<tr>
<th>Item</th>
<th>Early 1970s</th>
<th>Late 1990s</th>
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<tbody>
<tr>
<td>Vehicle models</td>
<td>140</td>
<td>260</td>
</tr>
<tr>
<td>Vehicle styles</td>
<td>18</td>
<td>1,212</td>
</tr>
<tr>
<td>Bicycle types</td>
<td>8</td>
<td>19</td>
</tr>
<tr>
<td>Software titles</td>
<td>0</td>
<td>380,000</td>
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<tr>
<td>Web sites</td>
<td>0</td>
<td>9,865,982</td>
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<tr>
<td>Movie releases</td>
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<td>458</td>
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<tr>
<td>New book titles</td>
<td>40,530</td>
<td>77,440</td>
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<tr>
<td>Houston TV channels</td>
<td>5</td>
<td>851</td>
</tr>
<tr>
<td>Breakfast cereals</td>
<td>160</td>
<td>340</td>
</tr>
<tr>
<td>Items in supermarkets</td>
<td>14,000</td>
<td>20,000</td>
</tr>
</tbody>
</table>

### Service Process Matrix

<table>
<thead>
<tr>
<th>Degree of Customization</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retailing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholesaling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial banking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Factory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airlines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotels</td>
<td></td>
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</tr>
<tr>
<td>Professional Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawyers</td>
<td></td>
<td></td>
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<tr>
<td>Accountants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Shop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto repair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other repair services</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### To summarize:

- **Products**
  - Job-shop process
  - Batch/assembly process
  - Continuous/line process
  - Mass customization
- **Services**
  - Service Factory
  - Service Shop
  - Mass service
  - Professional service
What is a Business Process?

Traditional Process definition in OM literature

A process specifies the transformation of inputs to outputs

Different types of transformations
- Physical (Ex. raw material → finished product)
- Locational (Ex. flying from Denver to L.A.)
- Transactional (Ex. depositing money in a bank)
- Informational (Ex. accounting data → financial statement)

Illustration: Process Types and Hierarchies

Understanding the Existing Process

1. Describe the process architecture
   - Inputs/outputs
   - Flow units
   - Resources
   - Network activities and buffers
   - Information system

2. Identify the process owner/stakeholders

3. Understand the customer

Describe the process architecture

Inputs and Outputs

- Identify the process boundaries ⇒ easy to identify the **Input consumed** from the environment in order to produce the desired **Output**
- Process inputs and outputs can be
  - Tangible (Ex. raw material, cash, products, customers)
  - Intangible (Ex. Information, time, energy, services)
Describe the process architecture

Flow units
- A flow unit is a transient entity or a job that proceeds through the network of activities and buffers and exits the process as a finished output
- Typically, the identity of a flow unit changes across the process
- Examples of common flow units: materials, orders, files, documents, customers, products, cash, transactions...

Transformational activities
- The work performed on a job moving through a process can be divided into an ordered sequence of activities
- The buffers represent storage or waiting points where the job waits before moving to the next activity (queues, waiting rooms, etc.)
- Different types of jobs ⇒ different paths through the network

Describe the process architecture

Resources
- Tangible assets utilized to perform activities in a process
- Can be divided into:
  - Capital assets – real estate, machinery, equipment, IT systems...
  - Labor – people and their knowledge and skills
- Resources are utilized while inputs are consumed

Information structure
- Specifies the information required for making decisions and performing activities in a process
- Limited information availability is a common cause for process inefficiencies
  - Information enables coordination!

The 5w2h framework – use to describe a process

<table>
<thead>
<tr>
<th>Classification</th>
<th>5w2h questions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>Who?</td>
<td>Who is performing the activity? Could/should someone else perform the activity?</td>
</tr>
<tr>
<td>Subject matter</td>
<td>What?</td>
<td>What is being done in this activity? Can the activity in question be eliminated?</td>
</tr>
<tr>
<td>Sequence</td>
<td>When?</td>
<td>When is the best time to perform this activity? Does it have to be done at a certain time?</td>
</tr>
<tr>
<td>Location</td>
<td>Where?</td>
<td>Where is this activity carried out? Does it have to be done at this location?</td>
</tr>
<tr>
<td>Purpose</td>
<td>Why?</td>
<td>Why is this activity needed? Clarify its purpose.</td>
</tr>
<tr>
<td>Method</td>
<td>How?</td>
<td>How is the activity carried out?</td>
</tr>
<tr>
<td>Cost</td>
<td>How much?</td>
<td>How much does it currently cost?</td>
</tr>
</tbody>
</table>

Process Analysis Tools

Flowcharts provide a view of the big picture
- Time-function mapping adds rigor and a time element
- Value stream analysis extends to customers and suppliers
- Process charts show detail
- Service blueprint focuses on customer interaction
Flow Charts

- One of the fundamental graphical tools for process analysis and design
  - Typically depicts activities sequentially from left to right
  - Can help to identify, loops, multiple alternative paths, decision points etc.
- Symbols to use in flowcharting
  - Operation
  - Storage
  - Transportation of a physical item
  - Inspection
  - Delay
  - Transportation of information

Illustration of a Sample Flow Chart

- Operator takes phone order.
- Orders wait to be picked up.
- Orders are moved to supervisor's in-box.
- Supervisor inspects orders.

Existing claims process for auto glass

1. Client notifies a local agent that she wishes to file a claim. She is given a claims form and is told to obtain a cost estimate from a local glass vendor.
2. When the claims form is completed the local agent verifies the information and forwards the claim to a regional processing center.
3. The processing center logs the date and time of the claim’s arrival. The data is entered into a computer-based system (for record keeping only) by a clerk. The claim is then placed in a hard copy file and passed on to a claims representative.
4. a) If the claims representative is satisfied with the claim it is passed along to several others in the processing chain and eventually a check is issued and sent to the client.
   b) If there are problems with the claim the representative mails it back to the client for necessary corrections.
5. When the client receives the check she can go to the local glass vendor and replace the glass.

Service System Mapping (I)

- An extension of traditional flowcharting
  - Documents the role played by the customer in the service delivery process
  - A combination of service blue printing and traditional flowcharting
  - Build consistent perceptions of customer’s experience with core processes
  - Identify all points of contact between the process and its customers
  - Identify opportunities within the process

Service System Mapping

- SSM Horizontal Bands
  - The purpose is to organize activities according to the people or “players in the process.” – Who does what?
- An SSM typically consists of 5 bands
  1. Customer band – end user
  2. Frontline or distribution channel band
  3. Back-room activity band
  4. Centralized support or information systems band
  5. Vendor or supplier band
SSM Journal Paper Submissions

1. Authors send manuscripts to the Journal Editorial Office (JEO).
2. JEO sends a letter of acknowledgement and sends manuscript to editor-in-chief (EIC).
3. EIC selects associate editor (AE) to handle manuscript and notifies JEO.
4. JEO sends manuscript to AE.
5. AE reads manuscript and selects 2 referees. AE notifies JEO.
6. JEO sends copies to referees.
7. Referees review and send reports to JEO.
8. JEO forwards reports to AE.
9. AE reads reports and decides reject, accept, revise. Decision sent to JEO.
10. If rejected, JEO sends letter to authors.
11. If accepted, JEO forwards manuscript to production. JEO notifies authors and EIC.
12. If revise, JEO forwards reports to authors.
13. Authors revise and resubmit to JEO.
14. JEO sends resubmit to AE.
15. AE decides accept or 2nd review.

Time-Function Mapping or Process Mapping

Figure 7.7

Process chart symbols

Figure 7.7

Process chart: Requisition for petty cash

Figure 7.7
1. Field sales personnel called in requests for financing to a group of 14 people.
2. The person taking the call logged information on a piece of paper.
3. The paper was taken upstairs to the credit department.
4. A specialist:
   a) Entered the information into a computer system
   b) Did a credit check
5. The results of the credit check were:
   a) Written on a piece of paper
   b) Sent to the business practices department
6. Standard loan contracts were modified to meet customer requirements.
7. The request was:
   a) Sent to a ‘pricer’
   b) ‘Pricer’ determined interest rate
8. The interest rate was:
   a) Written on a piece of paper
   b) Sent to a clerical group
9. A quote was developed.
10. The quote was sent to field sales via FedEx.

**IBM Credit Process Flow**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Value code</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>10</td>
<td></td>
<td>No. 1: Quote sent to Field Sales</td>
</tr>
<tr>
<td>V</td>
<td>15</td>
<td></td>
<td>No. 2: Quote is developed by clerks</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td></td>
<td>No. 3: Paper sent to clerical group</td>
</tr>
<tr>
<td>N</td>
<td>2</td>
<td></td>
<td>No. 4: Pricer writes interest rate on piece of paper</td>
</tr>
<tr>
<td>N</td>
<td>6</td>
<td></td>
<td>No. 5: Results written on piece of paper</td>
</tr>
<tr>
<td>N</td>
<td>1,440</td>
<td></td>
<td>No. 6: Specialist does a credit check</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td></td>
<td>No. 7: Specialist enters info in computer</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td></td>
<td>No. 8: Paper taken to Credit Department</td>
</tr>
<tr>
<td>C</td>
<td>320</td>
<td></td>
<td>No. 9: Agent logs info on paper</td>
</tr>
<tr>
<td>V</td>
<td>120</td>
<td>120</td>
<td>No. 10: Field sales personnel call in requests</td>
</tr>
</tbody>
</table>

**IBM Credit Process Activity Chart**

<table>
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**Service Blueprint**

- **Focuses on the customer and provider interaction**
- ** Defines three levels of interaction**
- **Each level has different management issues**
- **Identifies potential failure points**

- **Activities under the control of the customer**
- **Interaction between the customer and service provider**
- **Activities performed invisibly to the customer**