

Operations Management

Process Strategy
Chapter 7

Outline

- ☑ ***Four Process Strategies***
 - ☑ ***Process Focus***
 - ☑ ***Repetitive Focus***
 - ☑ ***Product Focus***
 - ☑ ***Mass Customization Focus***

Outline – Continued

- ☑ ***Process Analysis And Design***
 - ☑ ***Flow Diagrams***
 - ☑ ***Time-Function Mapping***
 - ☑ ***Value Stream Mapping***
 - ☑ ***Process Charts***
 - ☑ ***Service Blueprinting***

Outline – Continued

- ☑ ***Service Process Design***
 - ☑ ***Customer Interaction and Process Design***
 - ☑ ***More Opportunities to Improve Service Processes***
- ☑ ***Process Selection***

Outline – Continued

- ☑ ***Production Technology***
 - ☑ ***Machine Technology***
 - ☑ ***Process Control***
 - ☑ ***Vision Systems***
 - ☑ ***Automated Storage and Retrieval System***
 - ☑ ***Automated Guided Vehicle (AGV)***
 - ☑ ***Flexible Manufacturing System (FMS)***
 - ☑ ***Computer-Integrated Manufacturing (CIM)***

Outline – Continued

- ☑ ***Technology In Services***
- ☑ ***Process Redesign***
- ☑ ***Ethics And Environmentally Friendly Processes***

Process Strategies

- ☑ ***How to produce a product or provide a service that***
 - ☑ ***Meets or exceeds customer requirements***
 - ☑ ***Meets cost and managerial goals***
- ☑ ***Has long term effects on***
 - ☑ ***Efficiency and production flexibility***
 - ☑ ***Costs and quality***

Process Strategies

Four basic strategies

- Process focus*
- Repetitive focus*
- Product focus*
- Mass customization*

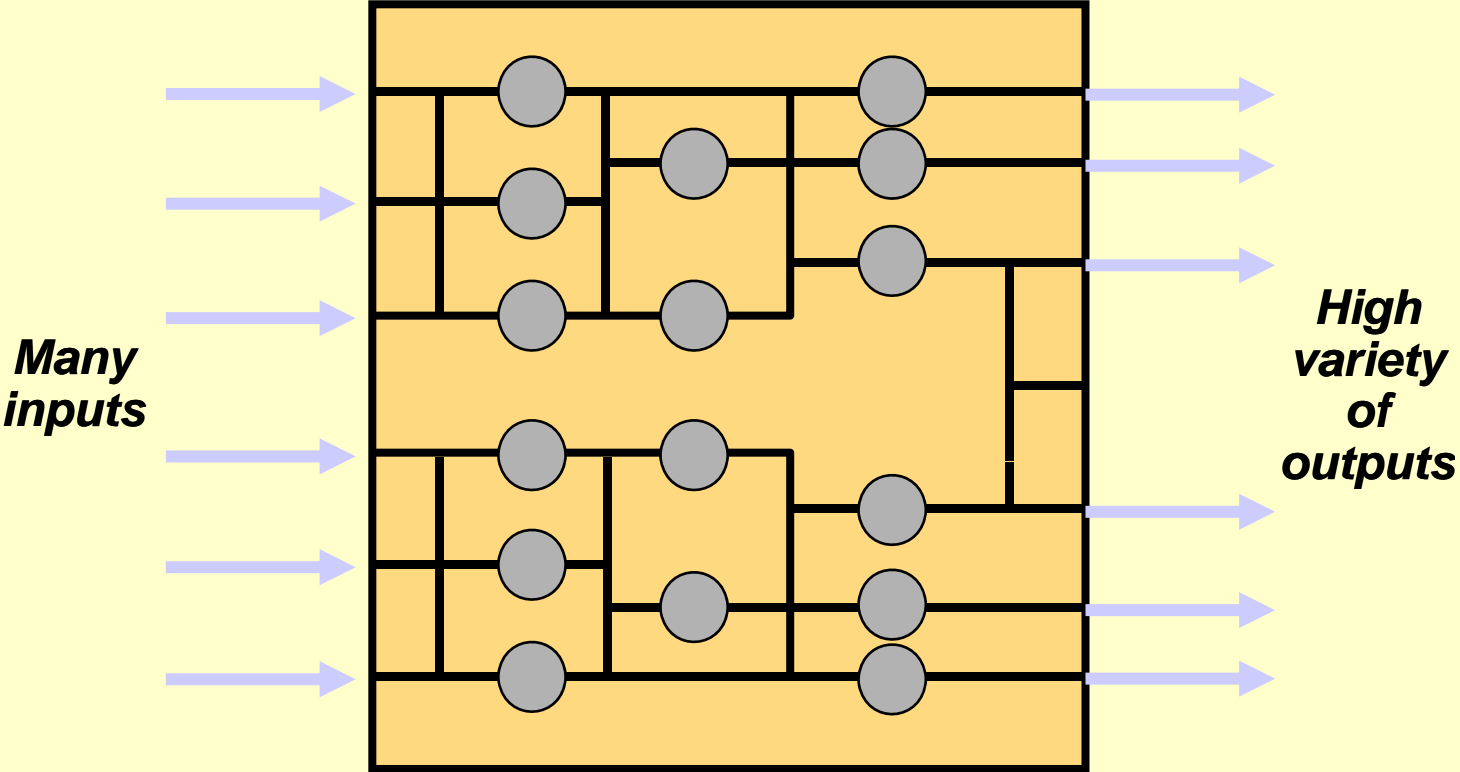
Process Focus

- ✓ ***Facilities are organized around specific activities or processes***
- ✓ ***Low volume, but high variety of product***
- ✓ ***General purpose equipment and skilled personnel***
- ✓ ***High degree of product flexibility***
- ✓ ***Typically high costs and low equipment utilization***
- ✓ ***Product flows may vary considerably making planning and scheduling a challenge***

Process Focus



Print Shop

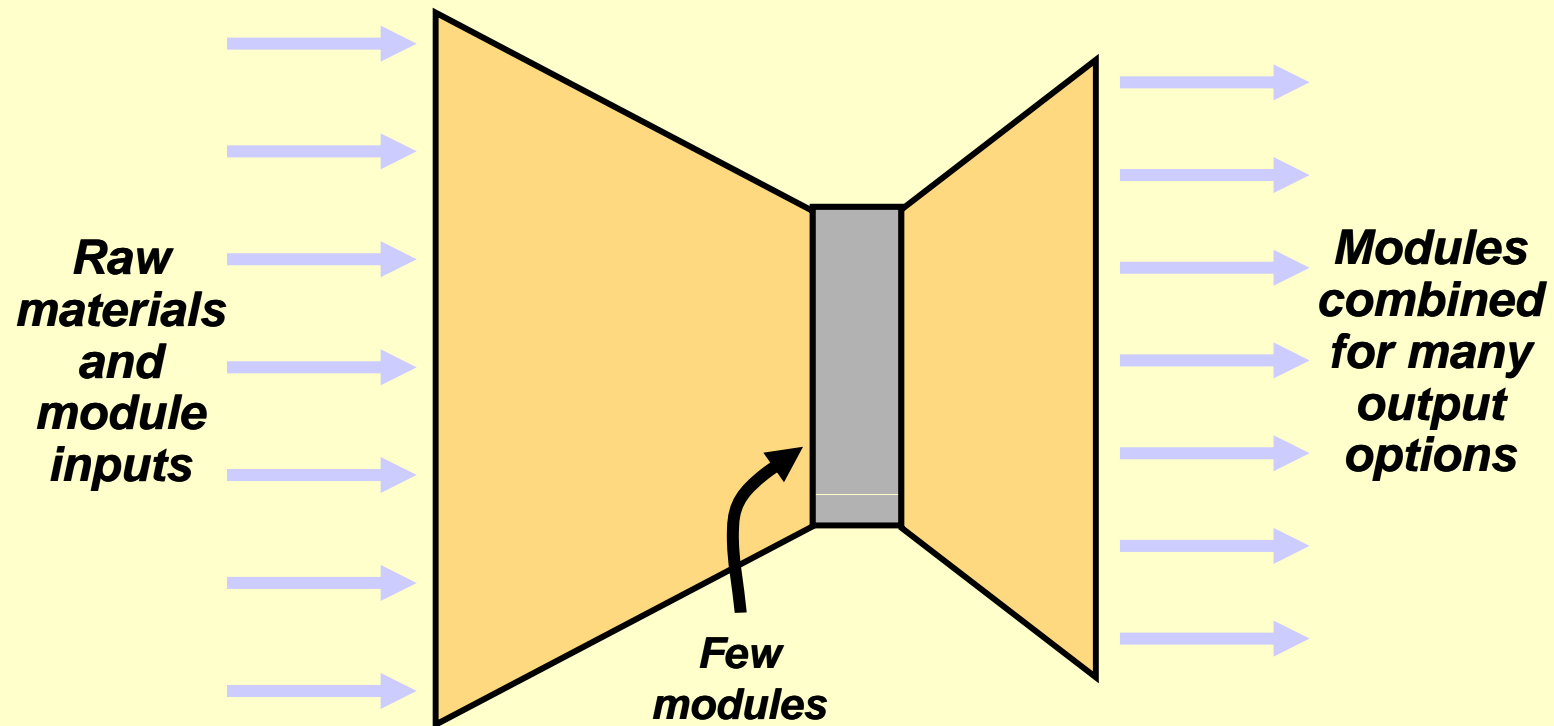


Repetitive Focus

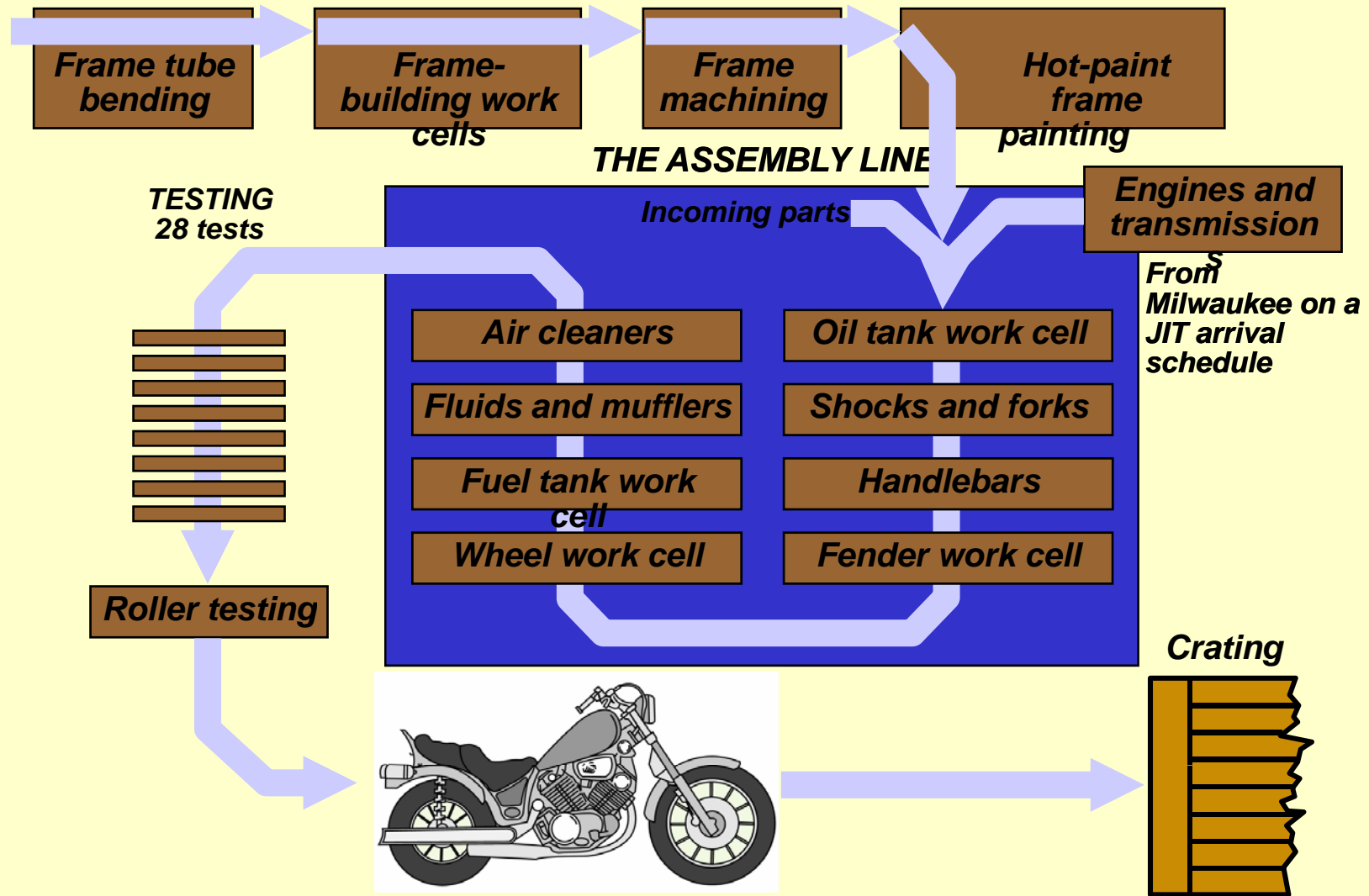
- ☑ ***Facilities often organized as assembly lines***
- ☑ ***Characterized by modules with parts and assemblies made previously***
- ☑ ***Modules may be combined for many output options***
- ☑ ***Less flexibility than process-focused facilities but more efficient***

Repetitive Focus

Automobile Assembly Line



Process Flow Diagram

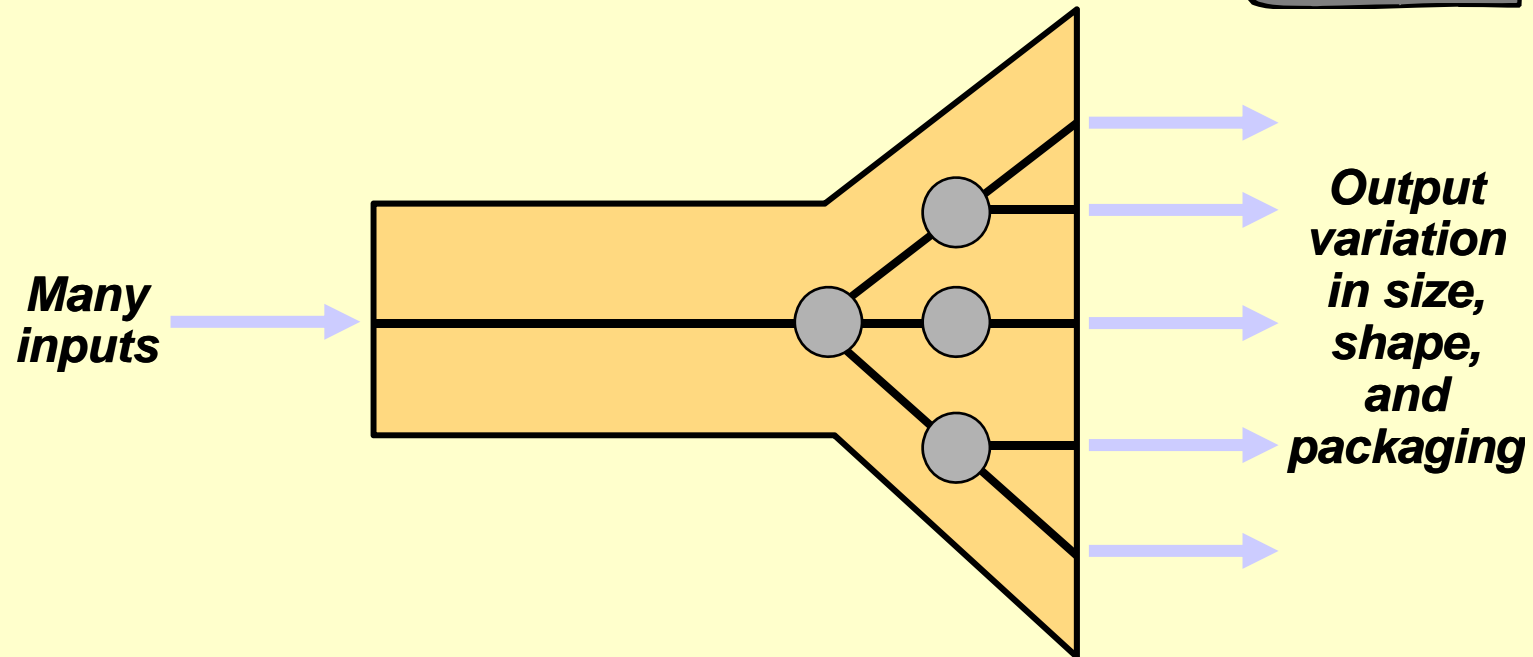
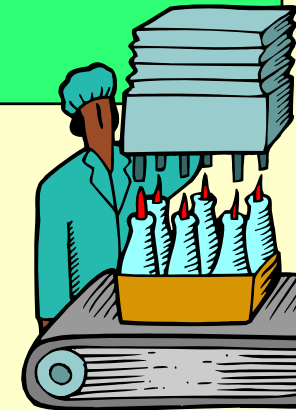


Product Focus

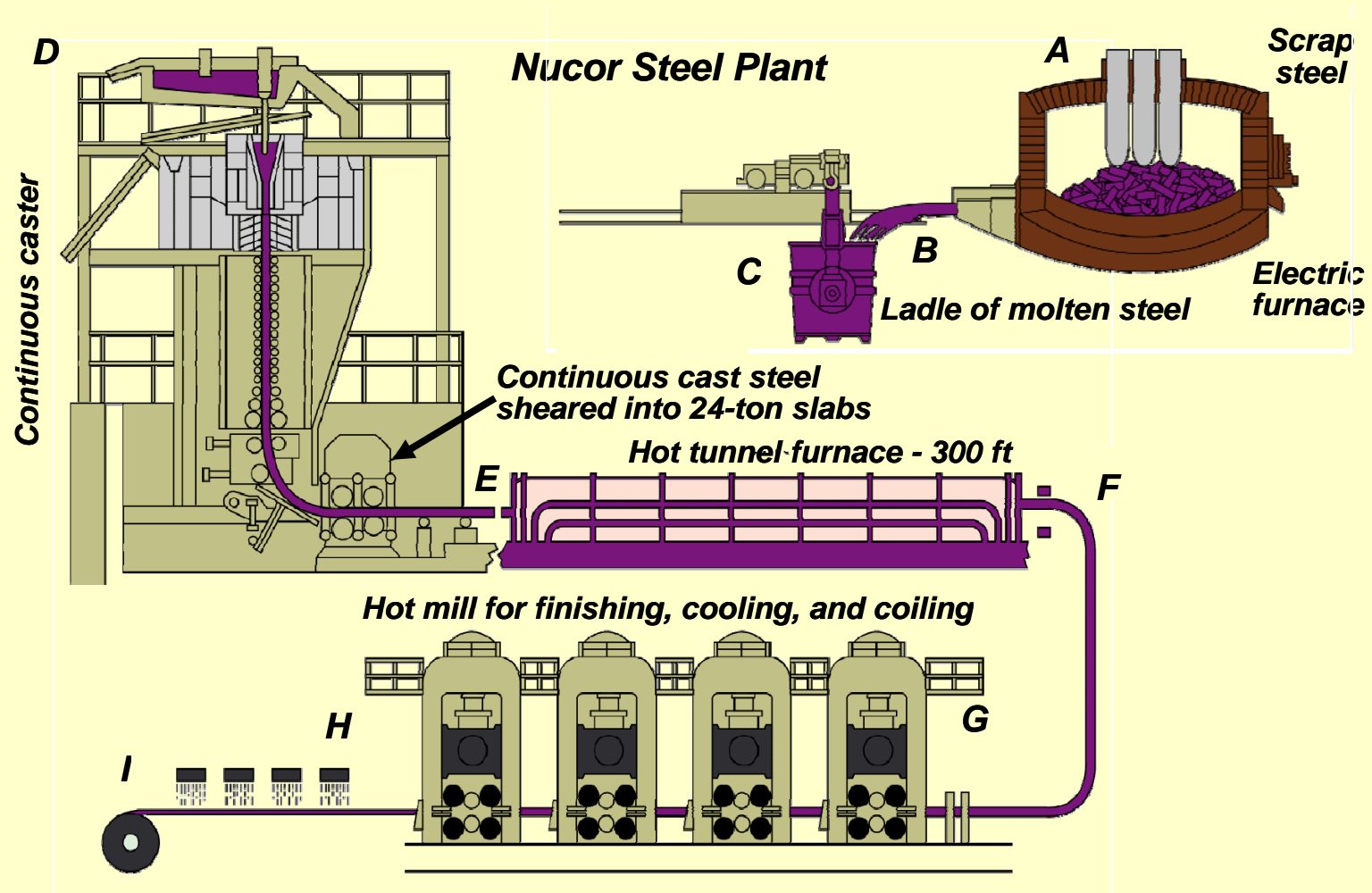
- ☑ ***Facilities are organized by product***
- ☑ ***High volume but low variety of products***
- ☑ ***Long, continuous production runs enable efficient processes***
- ☑ ***Typically high fixed cost but low variable cost***
- ☑ ***Generally less skilled labor***

Product Focus

Bottling Plant



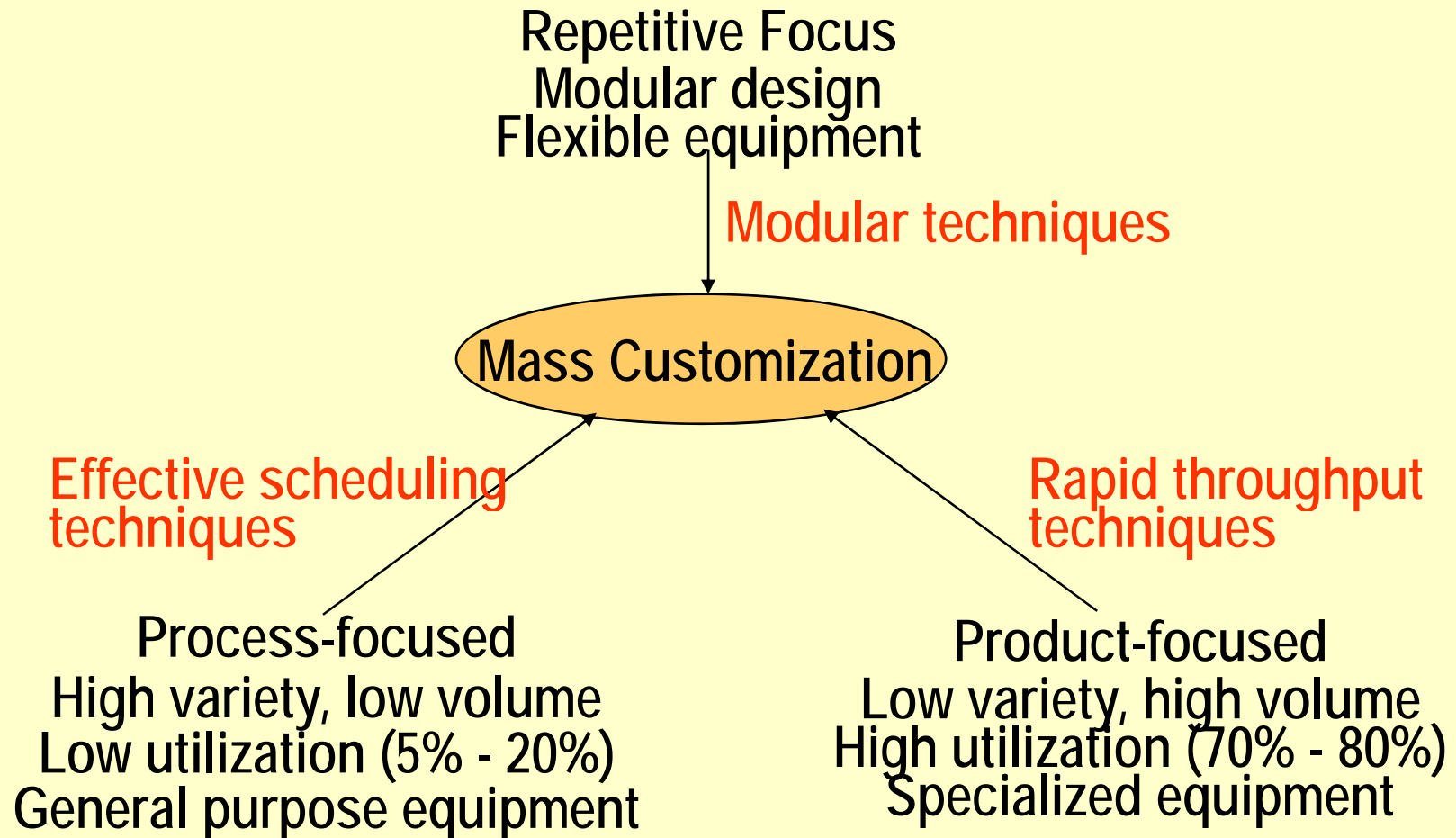
Product Focus



Mass Customization

- ☑ ***The rapid, low-cost production of goods and service to satisfy increasingly unique customer desires***
- ☑ ***Combines the flexibility of a process focus with the efficiency of a product focus***

Process Strategies



Comparison of Process Choices

<u>Process Focus</u> (Low volume, High variety)	<u>Repetitive Focus</u> (Modular)	<u>Product focus</u> (High-volume, low-variety)	<u>Mass Customization</u> (High-volume, high-variety)
1. Small quantity, large variety of products	Long runs, standardized product, from modules	Large quantity, small variety of products	Large quantity, large variety of products
2. General purpose equipment	Special equipment aids in use of assembly line	Special purpose equipment	Rapid changeover on flexible equipment

A Comparison (2)

<u>Process Focus</u>	<u>Repetitive Focus</u>	<u>Product focus</u>	<u>Mass Customization</u>
3 Broadly skilled operators	Modestly trained employees	Operators less broadly skilled	Flexible operators trained for customization
4 Many instructions because of change in jobs	Reduced training and number of job instructions	Few work orders and job instructions	Custom orders require many instructions
5 Raw material high relative to product value	JIT techniques used	Raw material low relative to product value	Raw material low relative to product value

A Comparison (3)

<u>Process Focus</u>	<u>Repetitive Focus</u>	<u>Product focus</u>	<u>Mass Customization</u>
6 WIP high relative to output	JIT techniques used	WIP low relative to output	WIP driven down by JIT, kanban, lean production
7 Units move slowly thru plant	Movement measured in hours & days	Units move swiftly thru facility	Goods move swiftly thru facility
8 Finished goods made to order, not stored	Finished goods made to frequent forecasts	Finished goods made to forecast, then stored	Finished goods made to order

A Comparison (4)

<u>Process Focus</u>	<u>Repetitive Focus</u>	<u>Product focus</u>	<u>Mass Customization</u>
9 Scheduling complex and concerned with trade-off between inventory, capacity, and customer service	Scheduling based on building models from a variety of forecasts	Scheduling relatively simple, concerns establishing sufficient rate of output to meet forecasts	Scheduling sophisticated to accommodate customization
10 Fixed costs low, variable costs high	Fixed costs dependent on flexibility of facilities	Fixed costs high, variable costs low	Fixed costs high; variable costs must be low

A Comparison (5)

<u>Process Focus</u>	<u>Repetitive Focus</u>	<u>Product focus</u>	<u>Mass Customization</u>
11 Costing, done by job, is estimated prior to doing job but only known after doing job	Costs usually known based on experience	Because of high fixed costs, cost dependent on utilization of capacity	High fixed costs and dynamic variable costs

Process Selection

	Total Fixed cost	\$ per account report
Software A	\$ 200,000	\$ 60
Software B	\$ 300,000	\$ 25
Software C	\$ 400,000	\$ 10

◆ A and B

$$200,000 + 60 X = 300,000 + 25 X$$

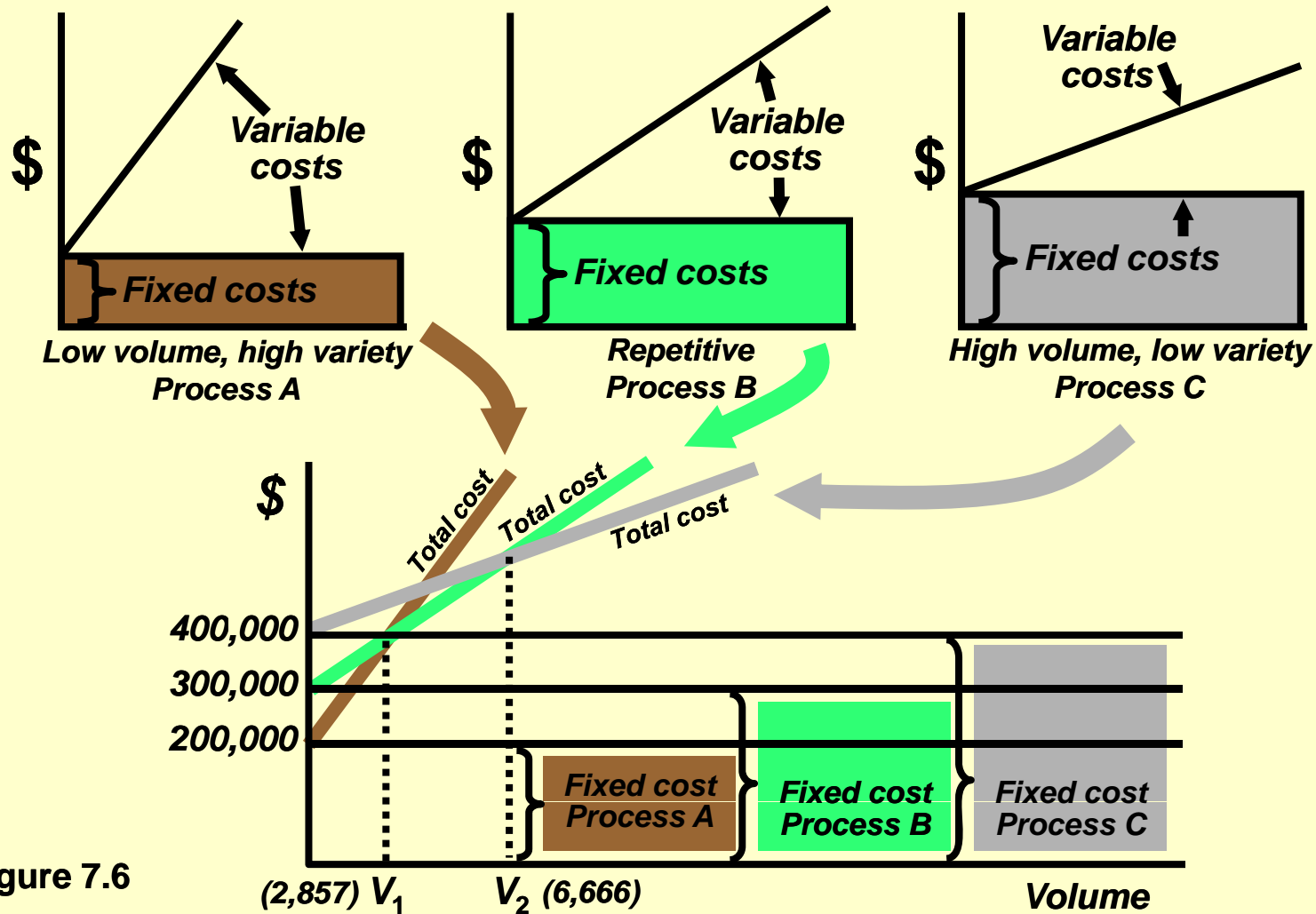
$$X = 2,857$$

◆ B and C

$$300,000 + 25 X = 400,000 + 10 X$$

$$X = 6,666$$

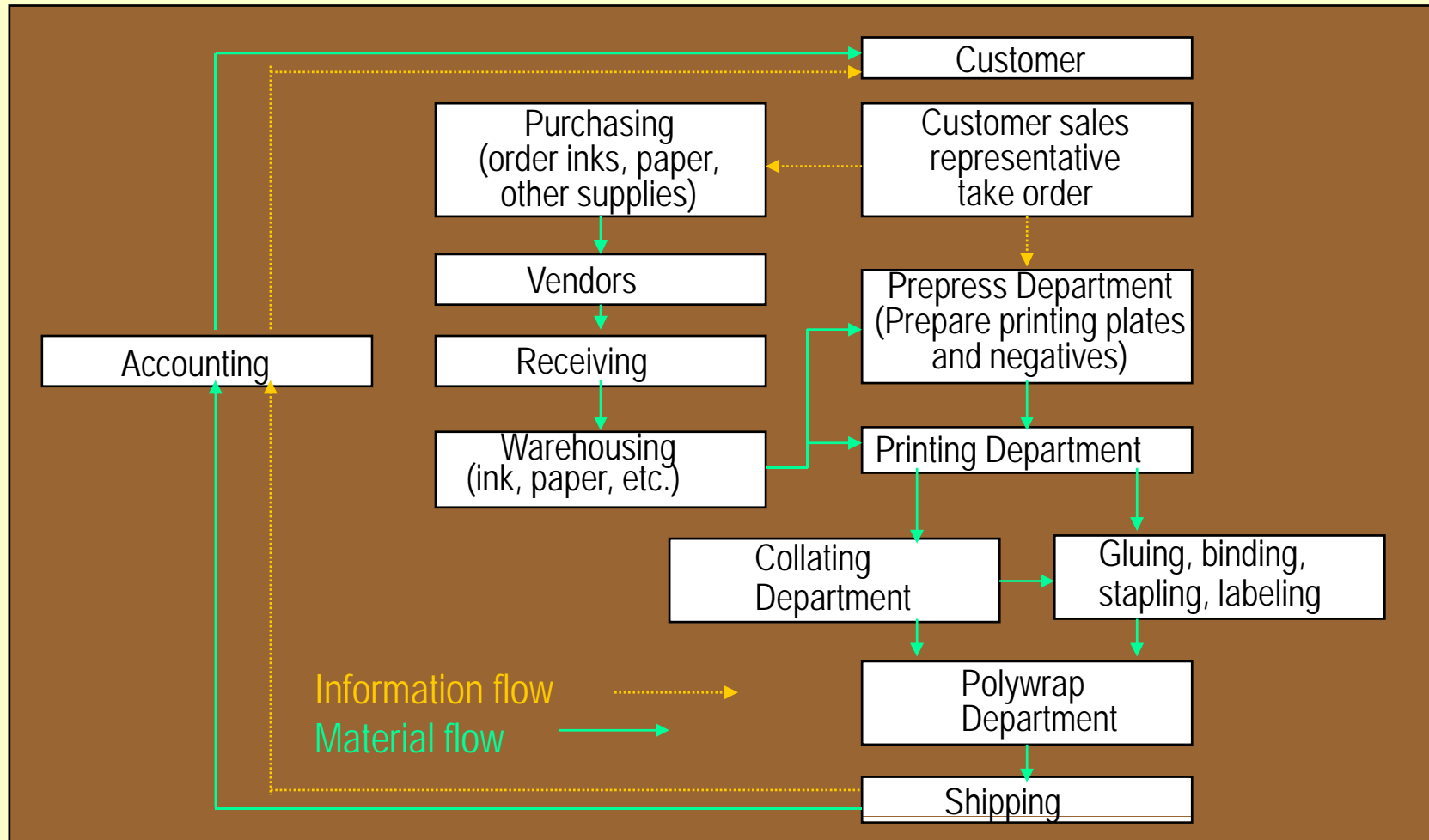
Crossover Charts



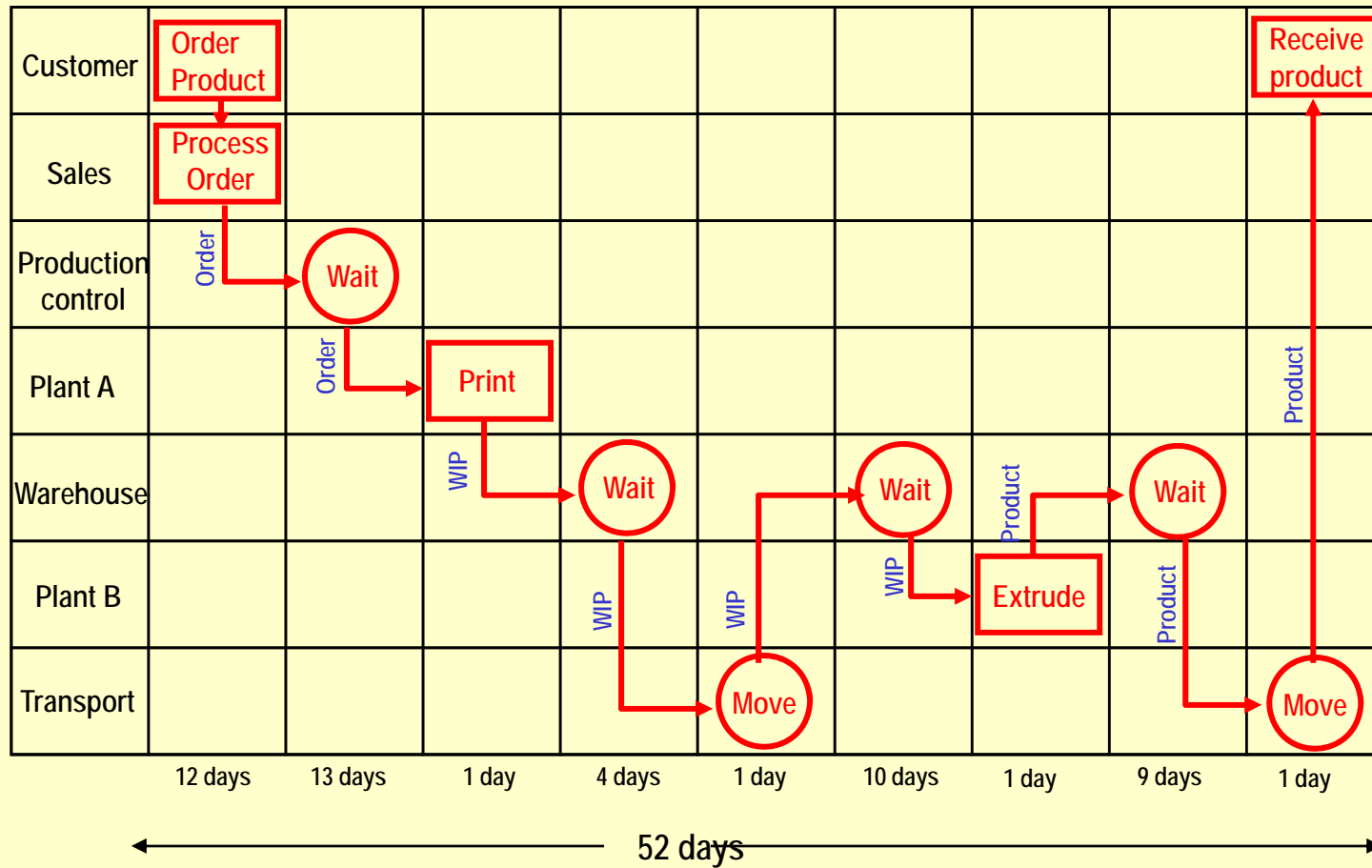
Process Analysis and Design

- ✓ **Flow Diagrams** - Shows the movement of materials
- ✓ **Time-Function Mapping** - Shows flows and time frame
- ✓ **Process Charts** - Uses symbols to show key activities
- ✓ **Service Blueprinting** - focuses on customer/provider interaction

Flow Diagram



Time Function Map



Process Chart

Present Method

PROCESS CHART

Proposed Method

SUBJECT CHARTED Hamburger Assembly Process

DATE 8/1/05

CHART BY KH

CHART NO. 1

DEPARTMENT _____

SHEET NO. 1 OF 1

DIST. IN FEET	TIME IN MINS.	CHART SYMBOLS	PROCESS DESCRIPTION
	—	○ → □ ▢ ▽	Meat Patty in Storage
1.5	.05	○ → □ ▢ ▽	Transfer to Broiler
	2.50	○ → □ ▢ ▽	Broiler
	.05	○ → □ ▢ ▽	Visual Inspection
1.0	.05	○ → □ ▢ ▽	Transfer to Rack
	.15	○ → □ ▢ ▽	Temporary Storage
.5	.10	○ → □ ▢ ▽	Obtain Buns, Lettuce, etc.
	.20	○ → □ ▢ ▽	Assemble Order
.5	.05	○ → □ ▢ ▽	Place in Finish Rack
		○ → □ ▢ ▽	
3.5	3.15	2 4 1 - 2	TOTALS

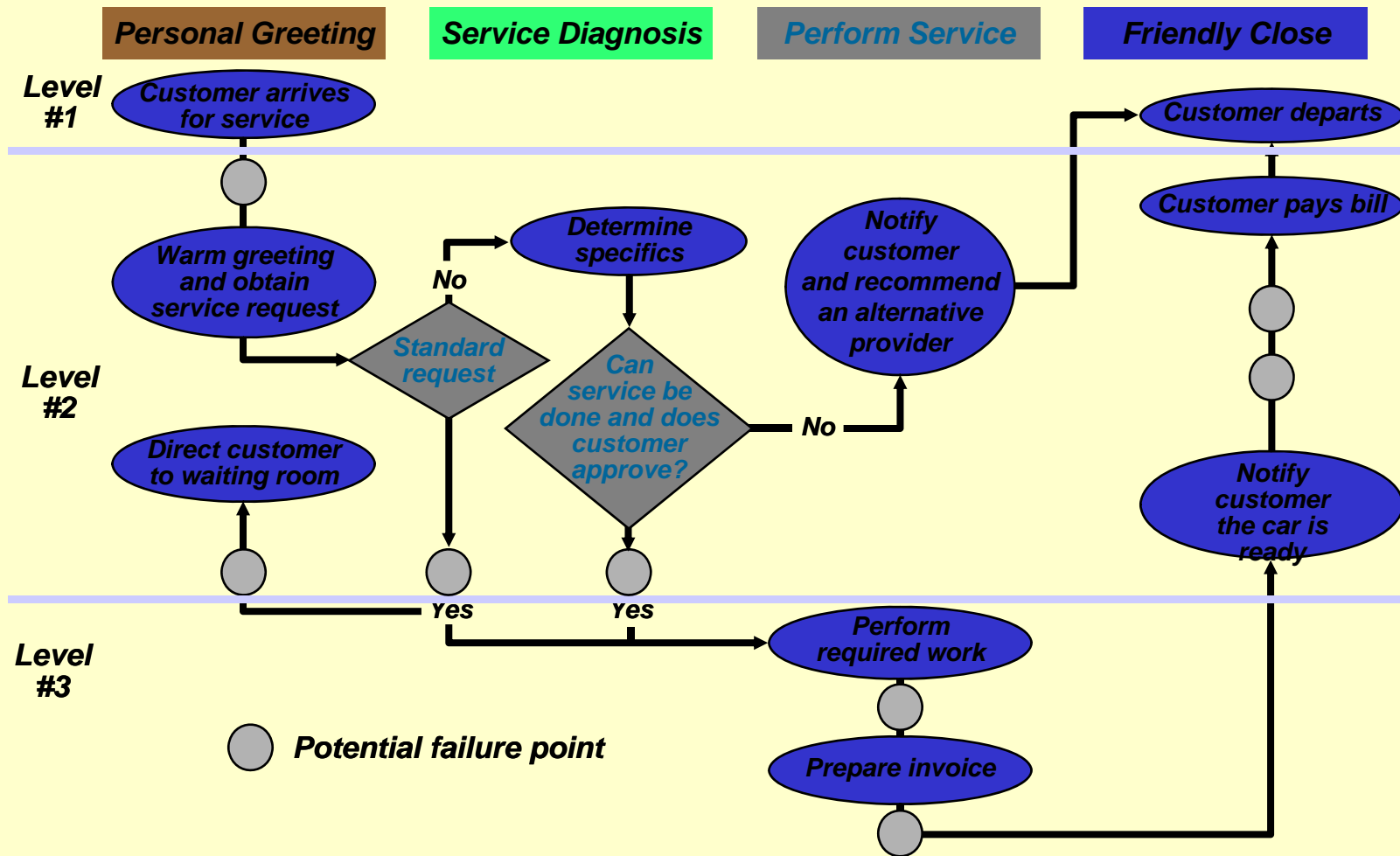
Value-added time = Operation time/Total time = (2.50+.20)/3.15 = 85.7%

○ = operation; → = transportation; □ = inspection; ▢ = delay; ▽ = storage.

Service Blueprint

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

Service Blueprint



Service Blueprint

FIGURE 4.7 A simple service blueprint for a restaurant

Customer actions	Arrive	Seated	Order	Eat	Pay and leave	
line of information						
Contact persons	Greeted by hostess Hostess checks reservation Hostess escorts customers to their table	Greeted by server Server provides menus Server fills water glasses	Server describes specials Server takes orders	Dinners are served	Server occasionally checks to see if any problems Server brings the check Server receives payment	Busboy clears table
line of visibility						
Backstage contacts			Kitchen staff prepares food		Dishes are washed	
line of internal interaction						
Support	Reservation system		Ordering food		Cashier Laundry service	

Machine Technology

- ✓ *Increased precision*
- ✓ *Increased productivity*
- ✓ *Increased flexibility*
- ✓ *Improved environmental impact*
- ✓ *Reduced changeover time*
- ✓ *Decreased size*
- ✓ *Reduced power requirements*
- ✓ *Computer numerical control (CNC): machinery
With its own computer and memory*

Automatic Identification Systems (AIS)

- ☑ ***System for transforming data into electronic form: bar code, RFID (Radio Frequency Identification)***
- ☑ ***Improved data acquisition***
- ☑ ***Reduced data entry errors***
- ☑ ***Increased speed***
- ☑ ***Increased scope of process automation***

Process Control

- ☑ ***Use of IT to monitor and control physical process: moisture, thickness, pressure, temperature***
- ☑ ***Increased process stability***
- ☑ ***Increased process precision***
- ☑ ***Real-time provision of information for process evaluation***
- ☑ ***Data available in many forms: printer, signals, graph, digital***

Vision Systems

- ✓ ***Systems that use video cameras and computer technology in inspection roles***
- ✓ ***Particular aid to inspection***
- ✓ ***Replaced inspections performed by human***
- ✓ ***Consistently accurate***
- ✓ ***Never bored***
- ✓ ***Modest cost***
- ✓ ***Superior to individuals performing the same tasks***

Robots

- ☑ ***Flexible machine with ability to hold, move, or grab items***
- ☑ ***Function through electronic impulses that activate motors and switches***
- ☑ ***Perform monotonous or dangerous tasks***
- ☑ ***Perform tasks requiring significant strength or endurance***
- ☑ ***Generally enhanced consistency and accuracy***

Automated Storage and Retrieval Systems (ASRS)

- ☑ ***Computer controlled warehouses that provide automatic placement and withdrawal of parts and products into and from designated places***
- ☑ ***Reduced errors and labor***

Automated Guided Vehicle (AGV)

- ☑ ***Electronically guided and controlled carts used in manufacturing to move parts and materials***
- ☑ ***Used for movement of products, individuals, mails in office and hospitals and meals in jails***

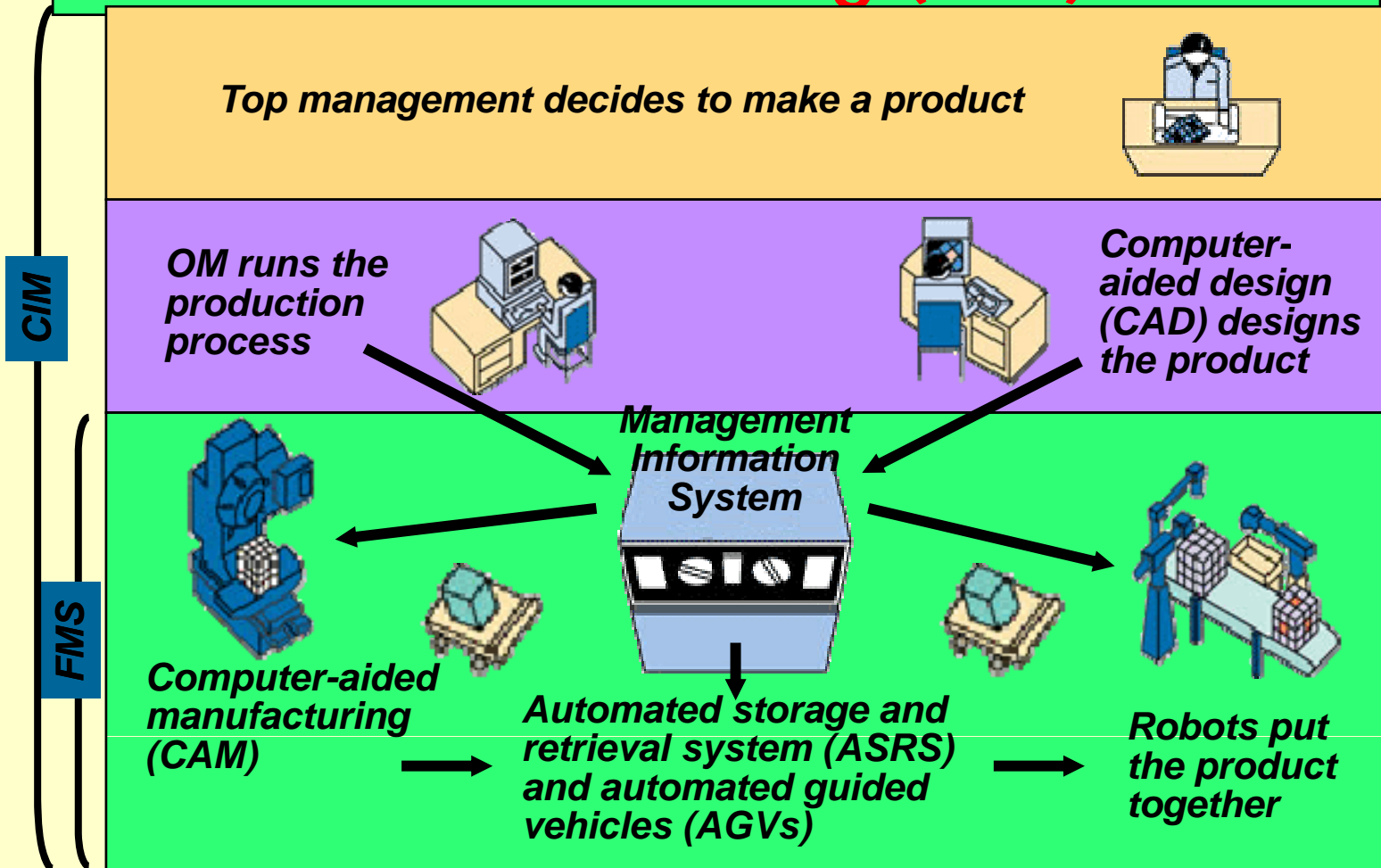
Flexible Manufacturing Systems (FMS)

- ✓ ***System that uses an automated work cell controlled by electronic signals form a common centralized computer facility***
- ✓ ***Computer controls both the workstation and the material handling equipment***
- ✓ ***Enhance flexibility to produce customized product and improve response***
- ✓ ***Can economically produce low volume at high quality***
- ✓ ***Reduced changeover time and increased utilization***

Computer Integrated Manufacturing (CIM)

- ☑ ***Manufacturing system in which CAD, FMS, inventory control, warehousing and shipping are integrated***
- ☑ ***Extension of flexible manufacturing systems***
 - ☑ ***Backwards to engineering and inventory control***
 - ☑ ***Forward into warehousing and shipping***
 - ☑ ***Can also include financial and customer service areas***
- ☑ ***Reducing the distinction between low-volume/high-variety, and high-volume/low-variety production***

Computer Integrated Manufacturing (CIM)



Process Redesign

- ✓ *The fundamental rethinking of business processes to bring about dramatic improvements in performance*
- ✓ *Relies on reevaluating the purpose of the process and questioning both the purpose and the underlying assumptions*
- ✓ *Requires reexamination of the basic process and its objectives*
- ✓ *Focuses on activities that cross functional lines*
- ✓ *Any process is a candidate for redesign*

Ethics and Environmentally Friendly Processes

Address ethics, social responsibility, environmental concerned

- Encourage recycling*
- Efficient use of resources*
- Reduction of waste by-products*
- Use less harmful ingredients*
- Use less energy*

Service Process Design

Service Process Matrix

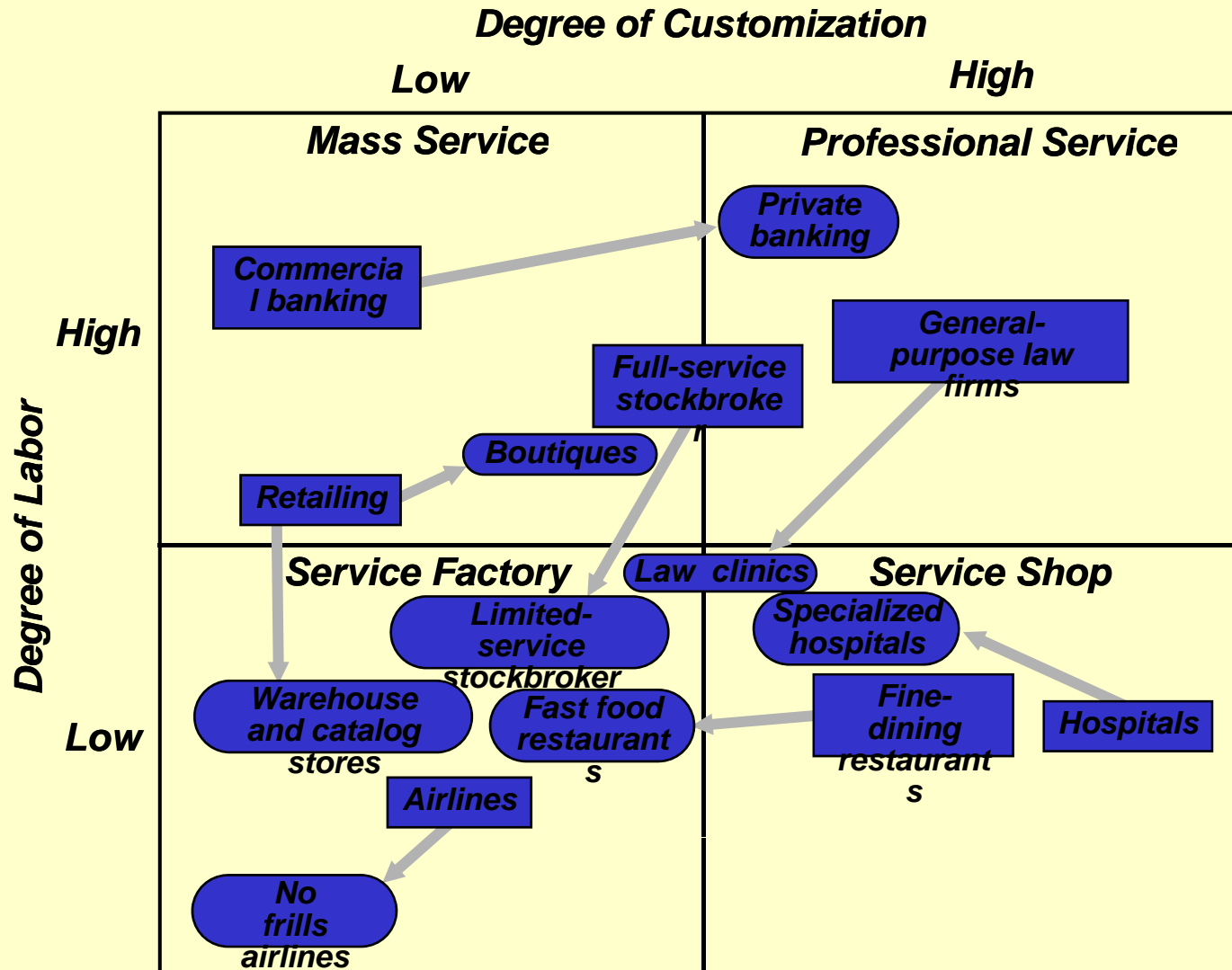
Mass Service and Professional Service

- ✓ ***Labor involvement is high***
- ✓ ***Selection and training highly important***
- ✓ ***Focus on human resources***
- ✓ ***Personalized services***

Service Factory and Service Shop

- ✓ ***Automation of standardized services***
- ✓ ***Low labor intensity responds well to process technology and scheduling***
- ✓ ***Tight control required to maintain standards***

Service Process Matrix



Improving Service Productivity

Strategy	Technique	Example
Separation	Structure service so customers must go where service is offered	Bank customers go to a manager to open a new account, to loan officers for loans, and to tellers for deposits
Self-service	Self-service so customers examine, compare, and evaluate at their own pace	Supermarkets and department stores, internet ordering

Improving Service Productivity

Strategy	Technique	Example
Postponement	Customizing at delivery	Customizing vans at delivery rather than at production
Focus	Restricting the offerings	Limited-menu restaurant
Modules	Modular selection of service, modular production	Investment and insurance selection, prepackaged food modules in restaurants

Improving Service Productivity

Strategy	Technique	Example
Automation	Precise personnel scheduling	Automatic teller machines
Scheduling	Precise personnel scheduling	Scheduling ticket counter personnel at 15-minute intervals at airlines
Training	Clarifying the service options, explaining how to avoid problems	Investment counselor, funeral directors, after-sale maintenance personnel

Technology in Services

Service Industry	Example
Hotels	Electronic check-in/check-out, electronic key/lock system
Wholesale/retail trade	Point-of-sale terminals, e-commerce, electronic communication between store and supplier, bar coded data
Transportation	Automatic toll booths, satellite-directed navigation systems
Health care	Online patient-monitoring, online medical information systems, robotic surgery
Airlines	Ticketless travel, scheduling, Internet purchases

Technology in Services

Service Industry	Example
Financial Services	Debit cards, electronic funds transfer, ATMs, Internet stock trading
Education	Electronic bulletin boards, on-line journals
Utilities and government	Automated one-man garbage trucks, optical mail and bomb scanners, flood warning systems
Restaurants and foods	Wireless orders from waiters to kitchen, robot butchering, transponders on cars that track sales at drive-throughs
Communications	Electronic publishing, interactive TV
