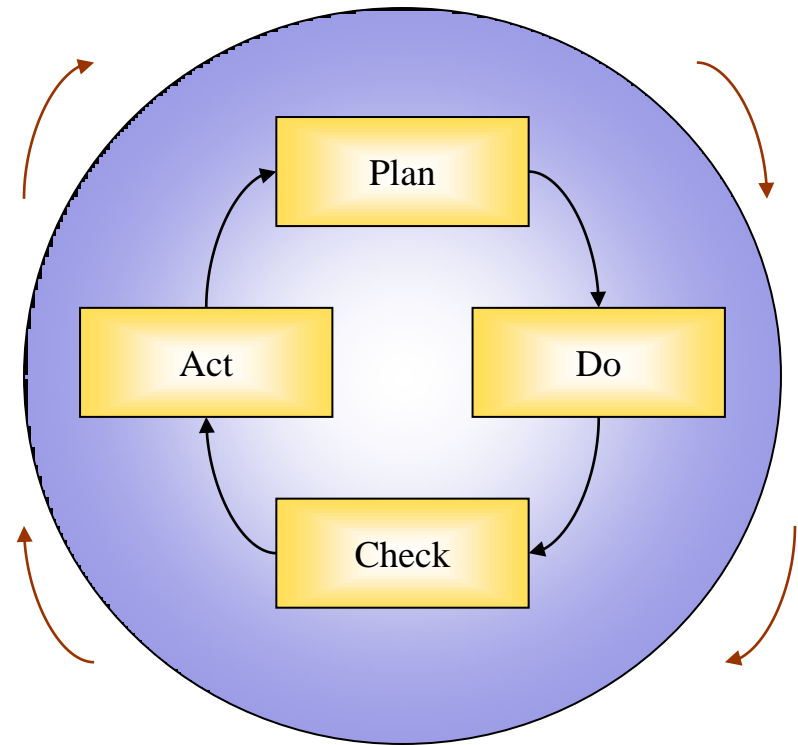


# Operations Management...

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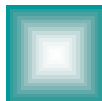
100 Slides



# Key Words...

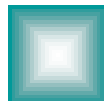
Transformation Process – In-Output – Macro  
Operations – Physical Buffering – Operations Strategy  
– Process Design – Manufacturing – Supply Chain  
Management – Vertical Integration – Assembly  
Operations – Capacity Leading Strategy – Product  
Technology – CAD – Job Design – Capacity Planning –  
Inventory Management – Economic Order Quantity –  
Pareto Curve – ABC Analysis – Material Management –  
Master Production Schedule – Layouting – Production  
Plan – Just-in-Time – Quality Management – PDCA  
Cycle – Process Reengineering – Cause Effect  
Diagram – Pareto Diagram – Why Why Analysis – TQM  
– Operations Network – Buffer Inventory

# Operations Function: Narrow Definition



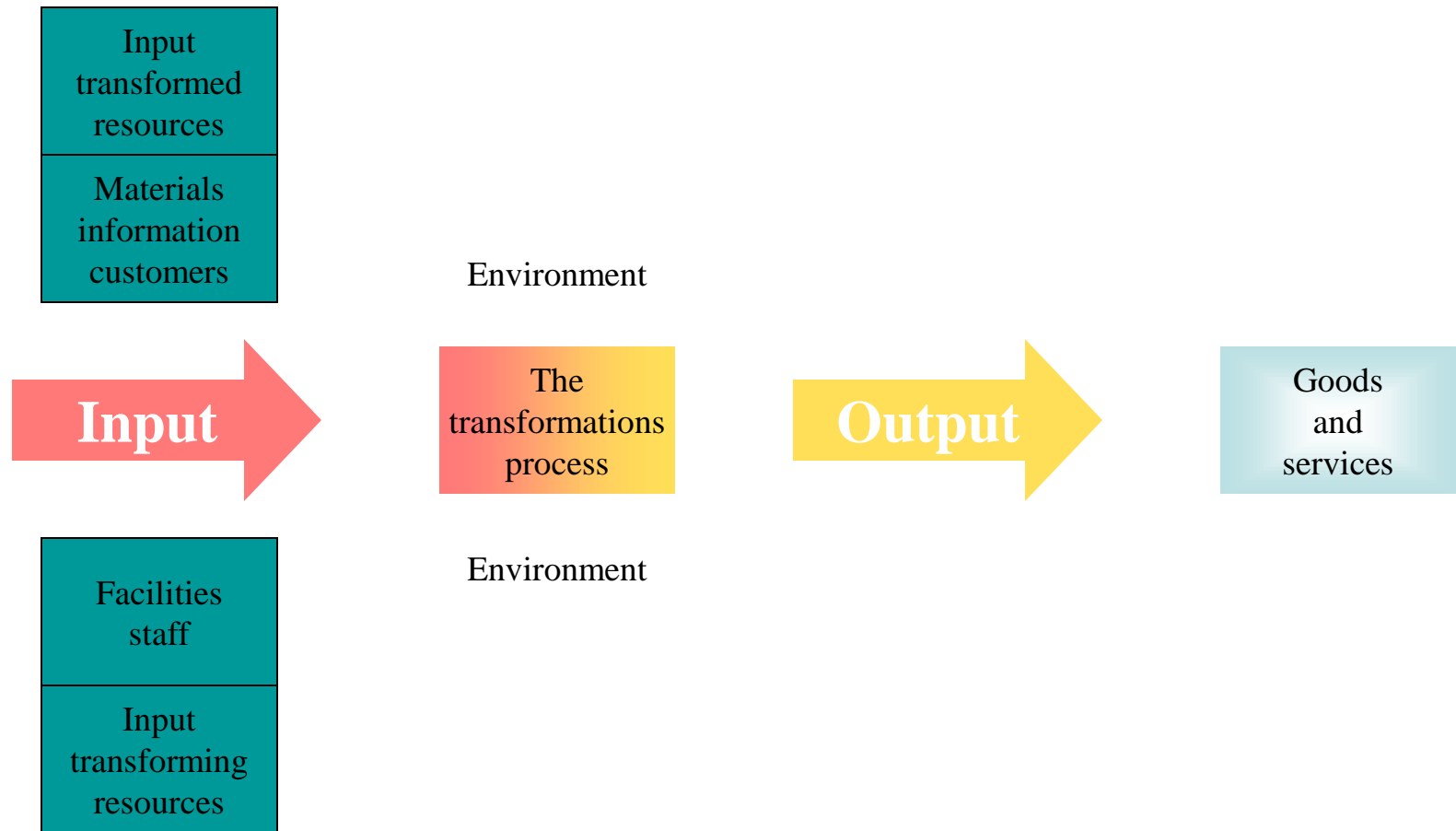
Extent of the operations  
function

# Operations Function: Broad Definition

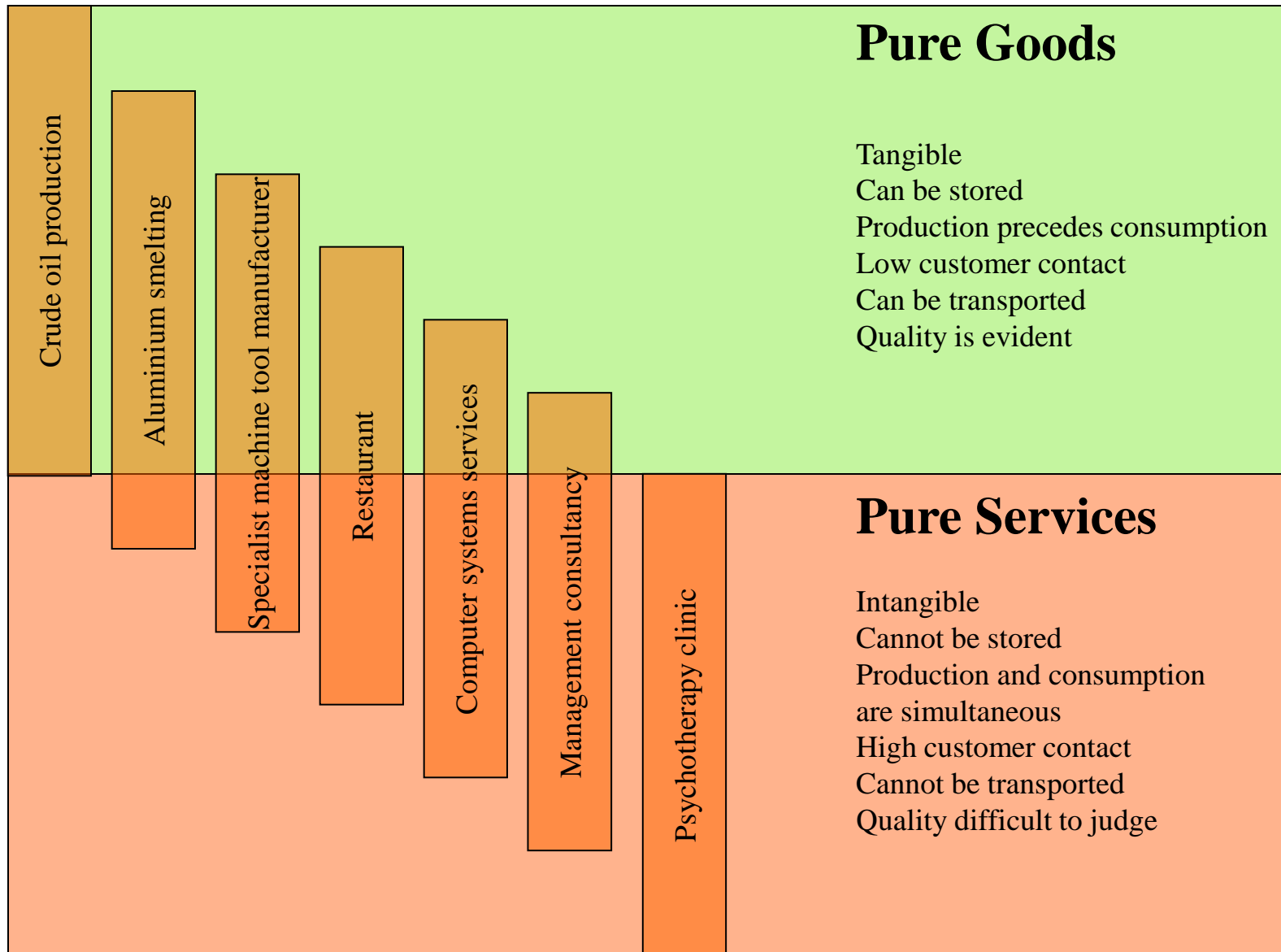


Extent of the operations  
function

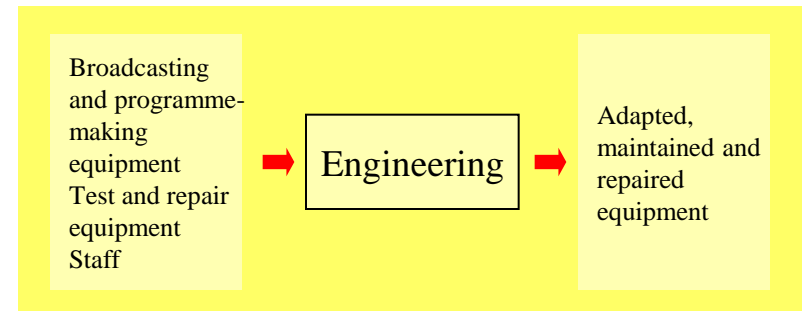
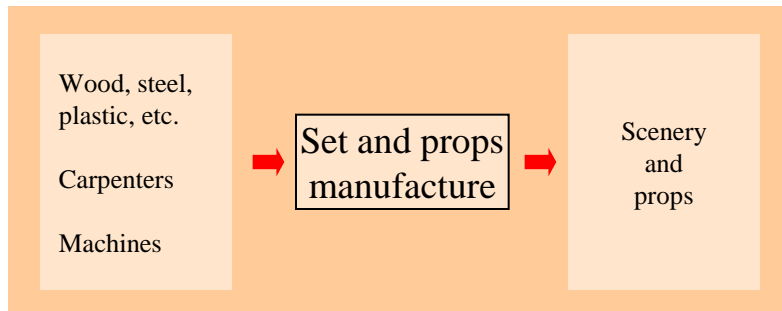
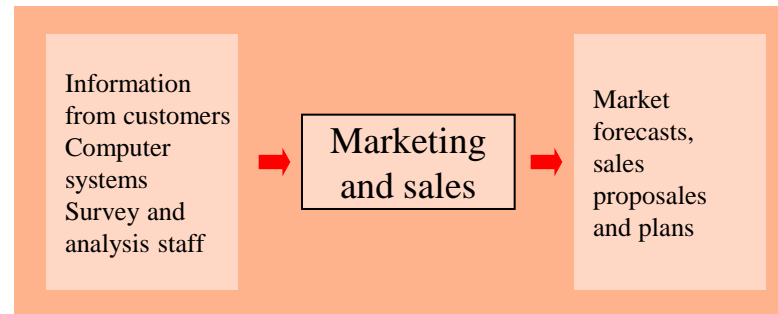
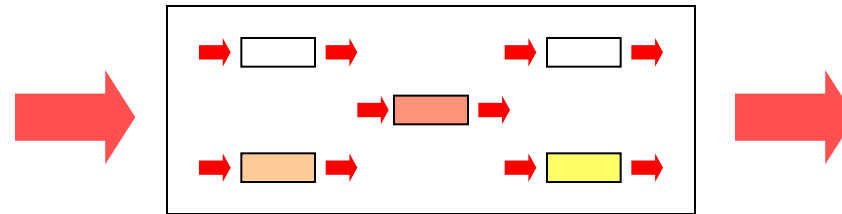
# Input-Transformation-Output Processes



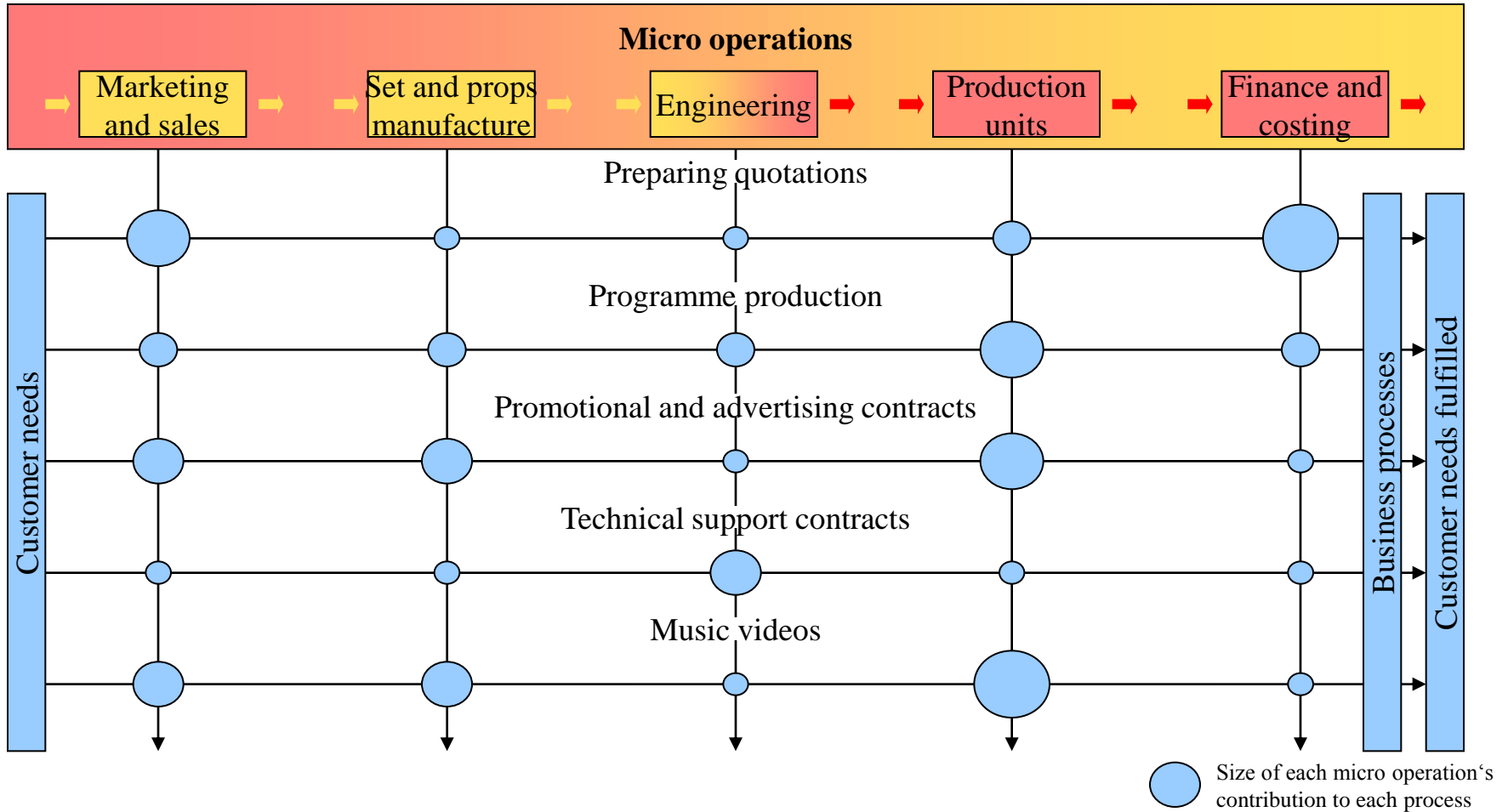
# Output: A Mixture of Goods and Services



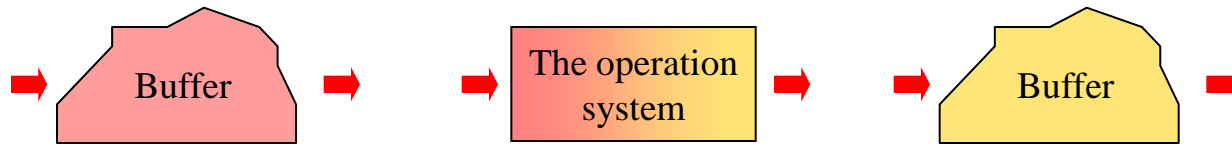
# Macro and Micro Operations



# Micro Operations and Business Processes

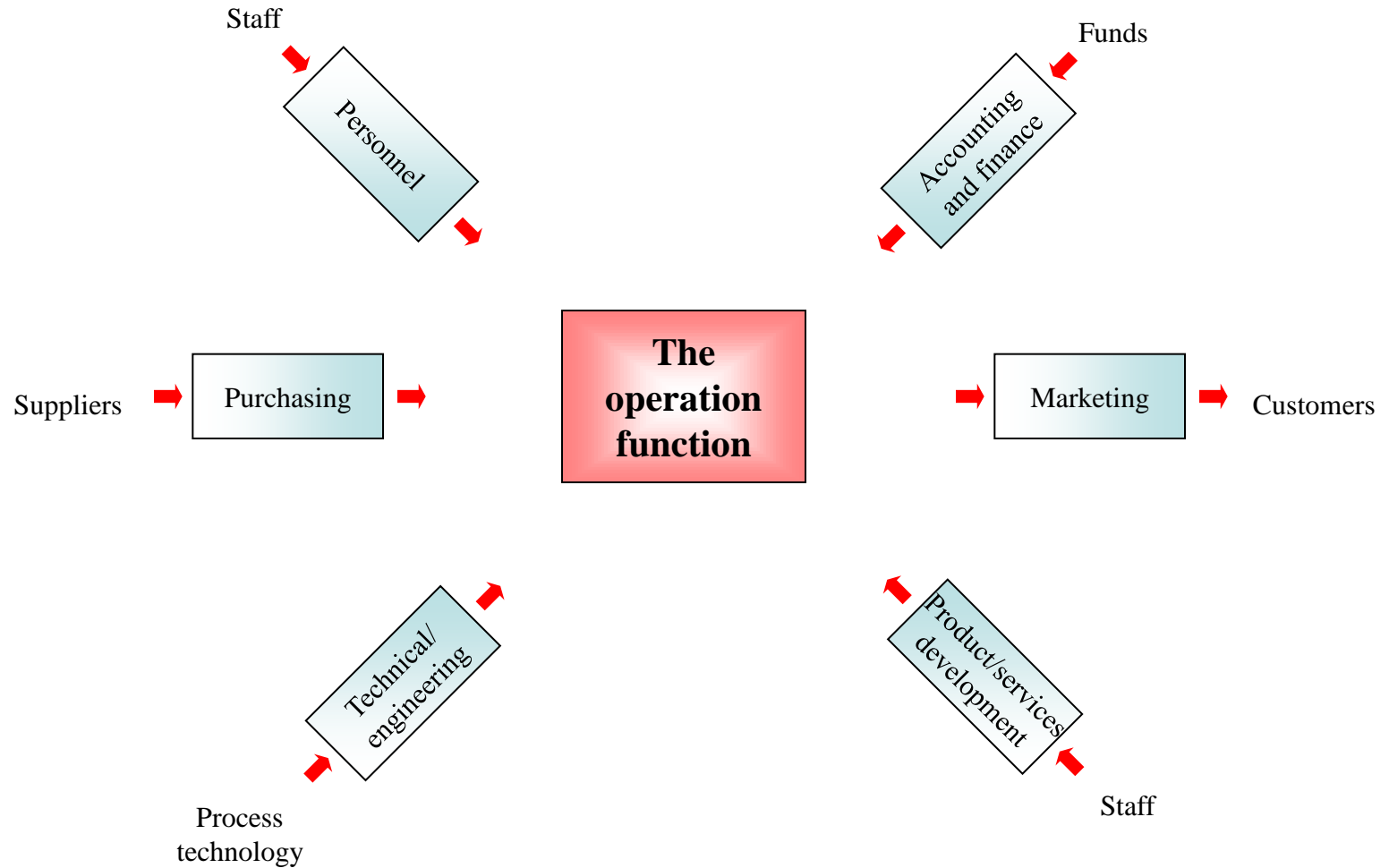


# Physical Buffering



e.g. Physical inventories of raw materials and components	<b>Material processors</b>	e.g. Physical inventories of finished goods
e.g. Databases in national and local government	<b>Information processors</b>	e.g. On-line subscriber services of financial data
e.g. Queues and waiting lists at hospitals	<b>Customer processors</b>	Not applicable

# Organizational Buffering



# A Typology of Operations

## Implication

Low repetition  
Each staff member performs more of job  
Less systemization  
High unit costs



## Implication

High repeatability  
Specialization  
Systemization  
Capital intensive  
Low unit costs

Flexible  
Complex  
Match customer needs  
High unit costs



Well defined  
Routine  
Regular  
Low unit costs

Changing capacity  
Anticipation  
Flexibility  
In touch with demand  
High unit costs



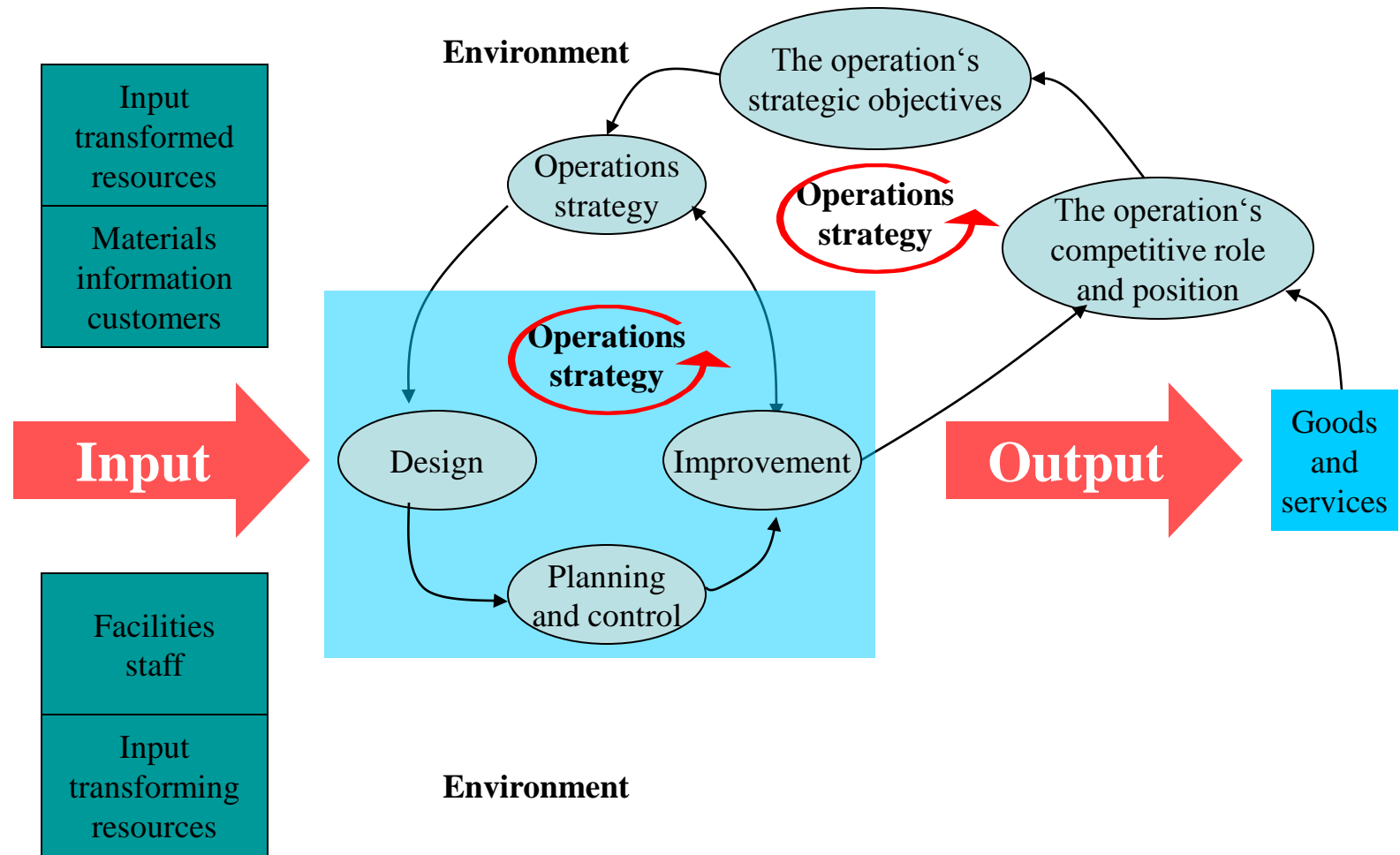
Stable  
Routine  
Predictable  
High utilization  
Low unit costs

Short waiting tolerance  
Satisfaction governed by customer perception  
Customer contact skills needed  
Received variety is high  
High unit costs

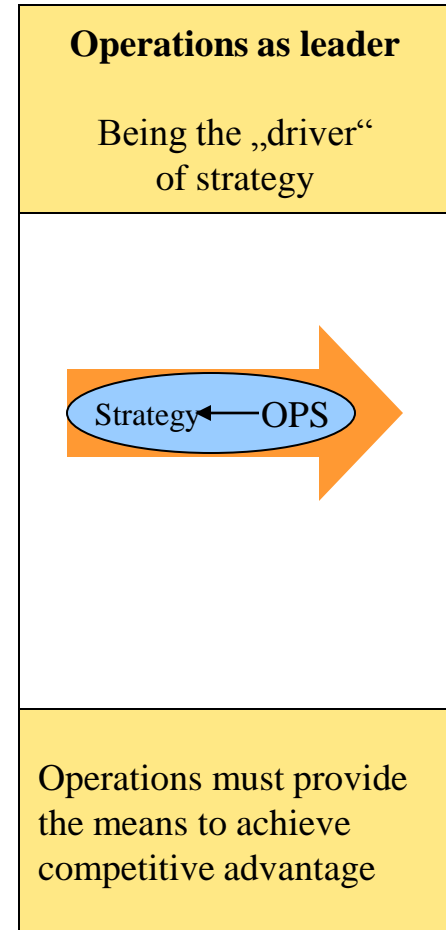
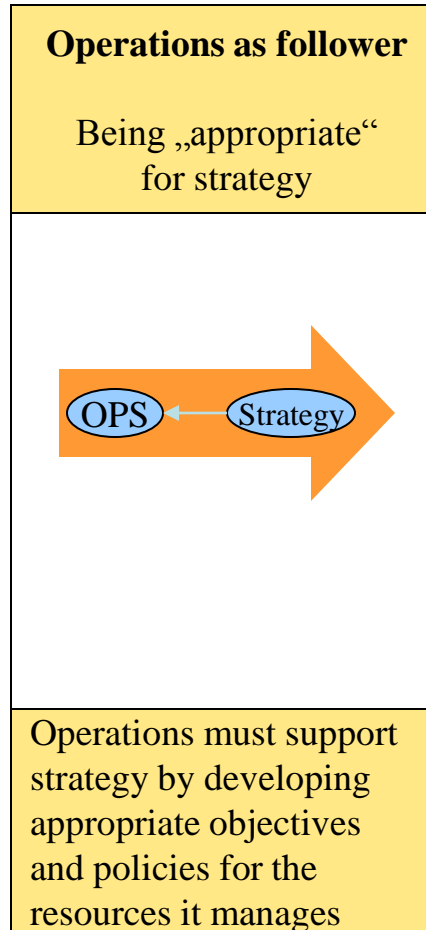
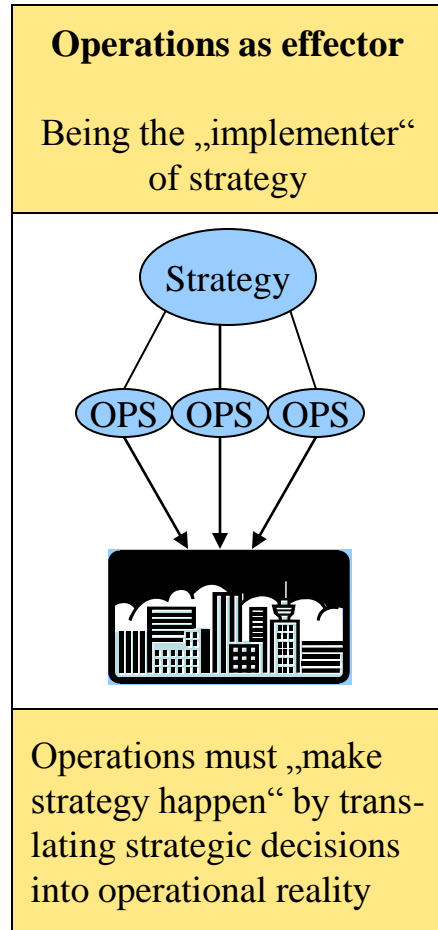


Time lag between production and consumption  
Standardized  
Low contact skills  
High staff utilization  
Centralization  
Low unit costs

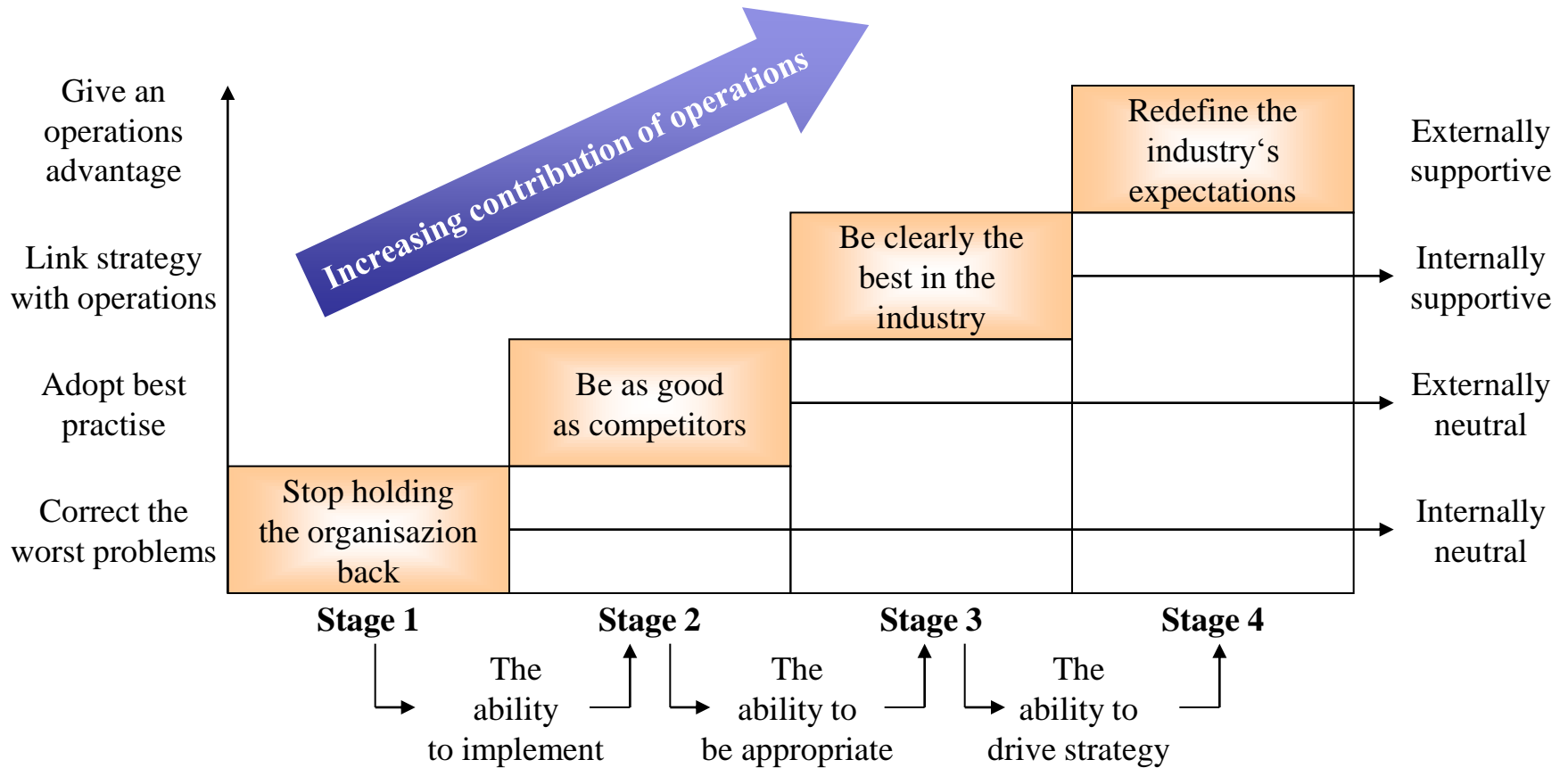
# Operations Management and Strategy



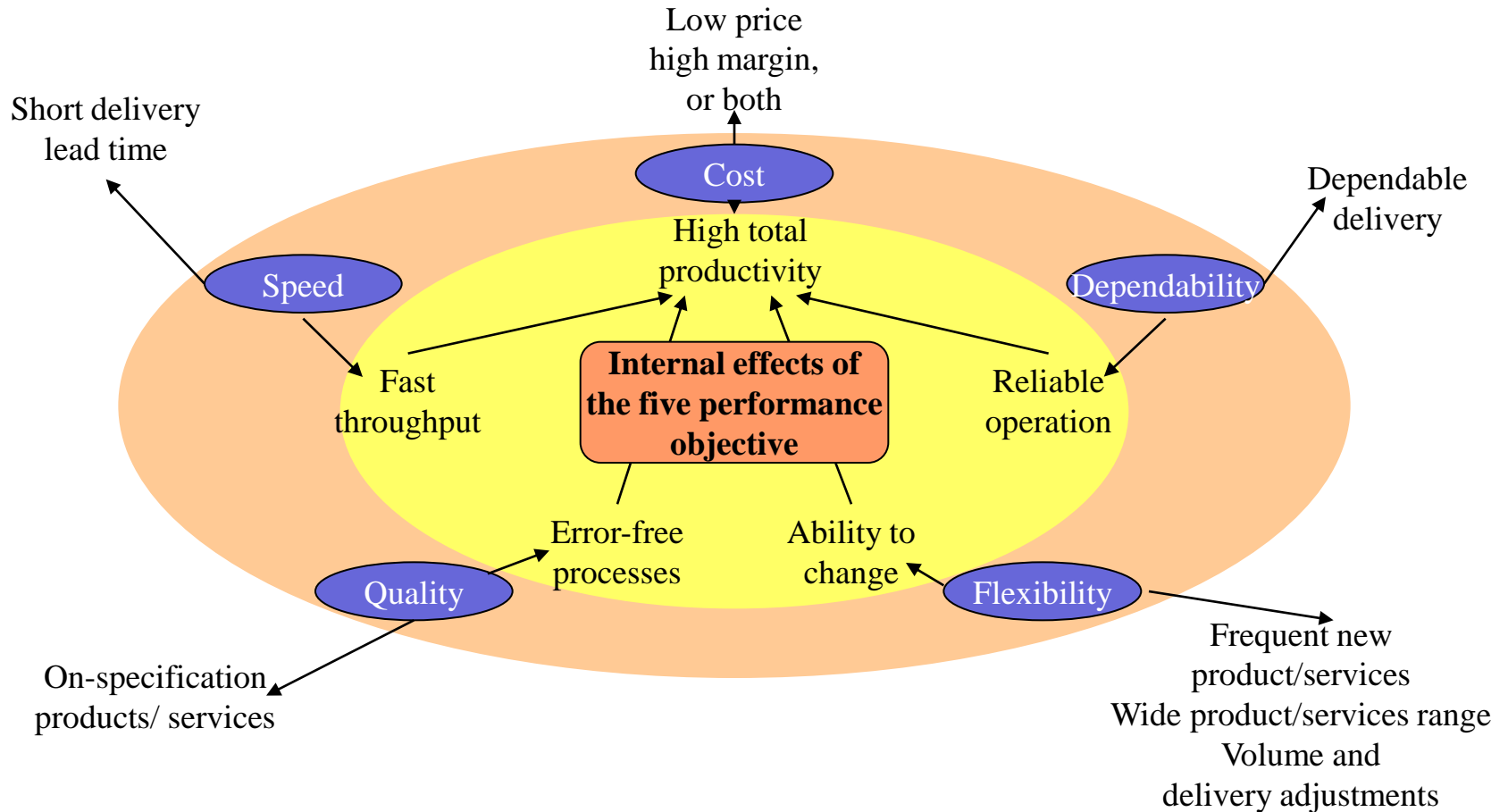
# The Three Roles of the Operations Function



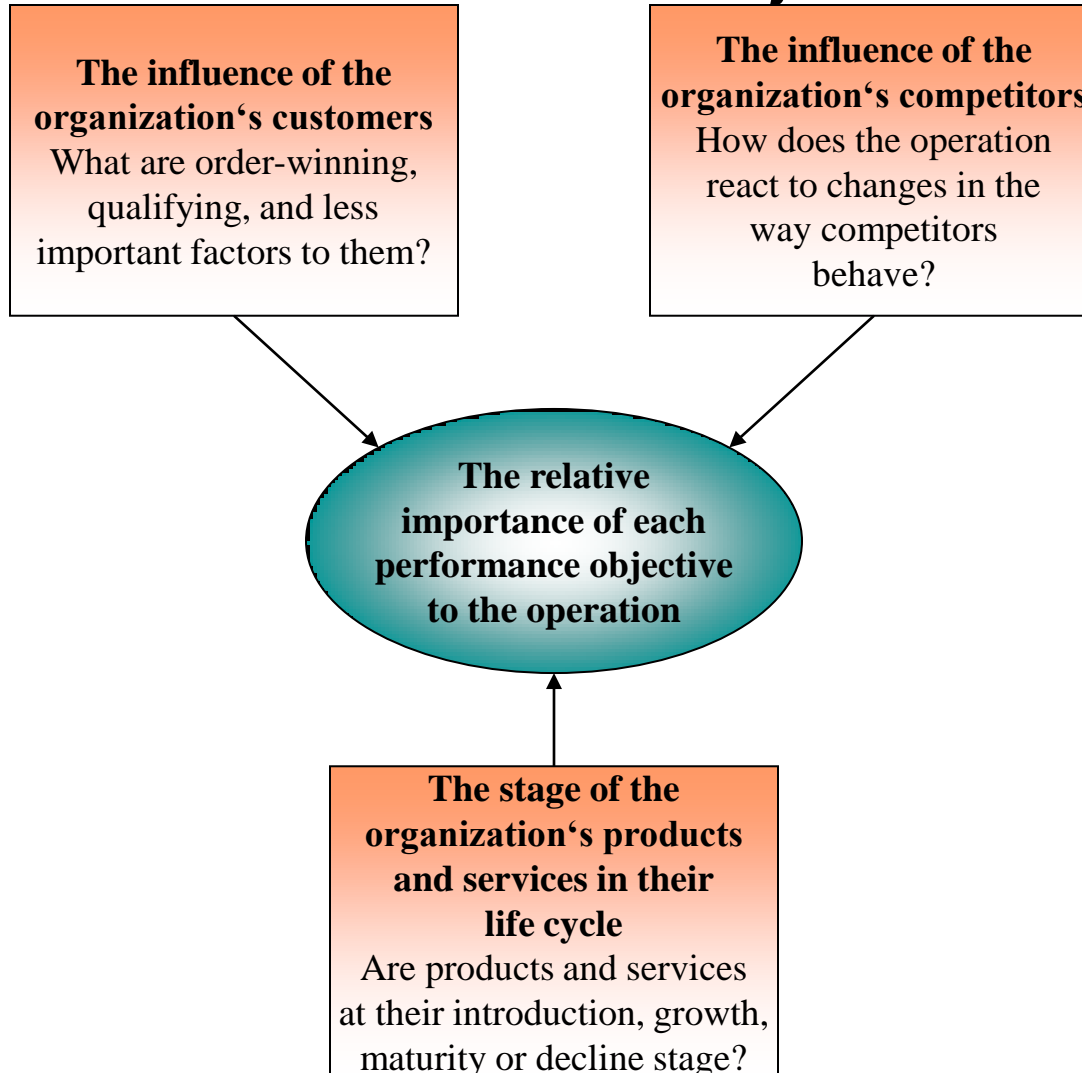
# The Role and the Contribution of the Operations Function



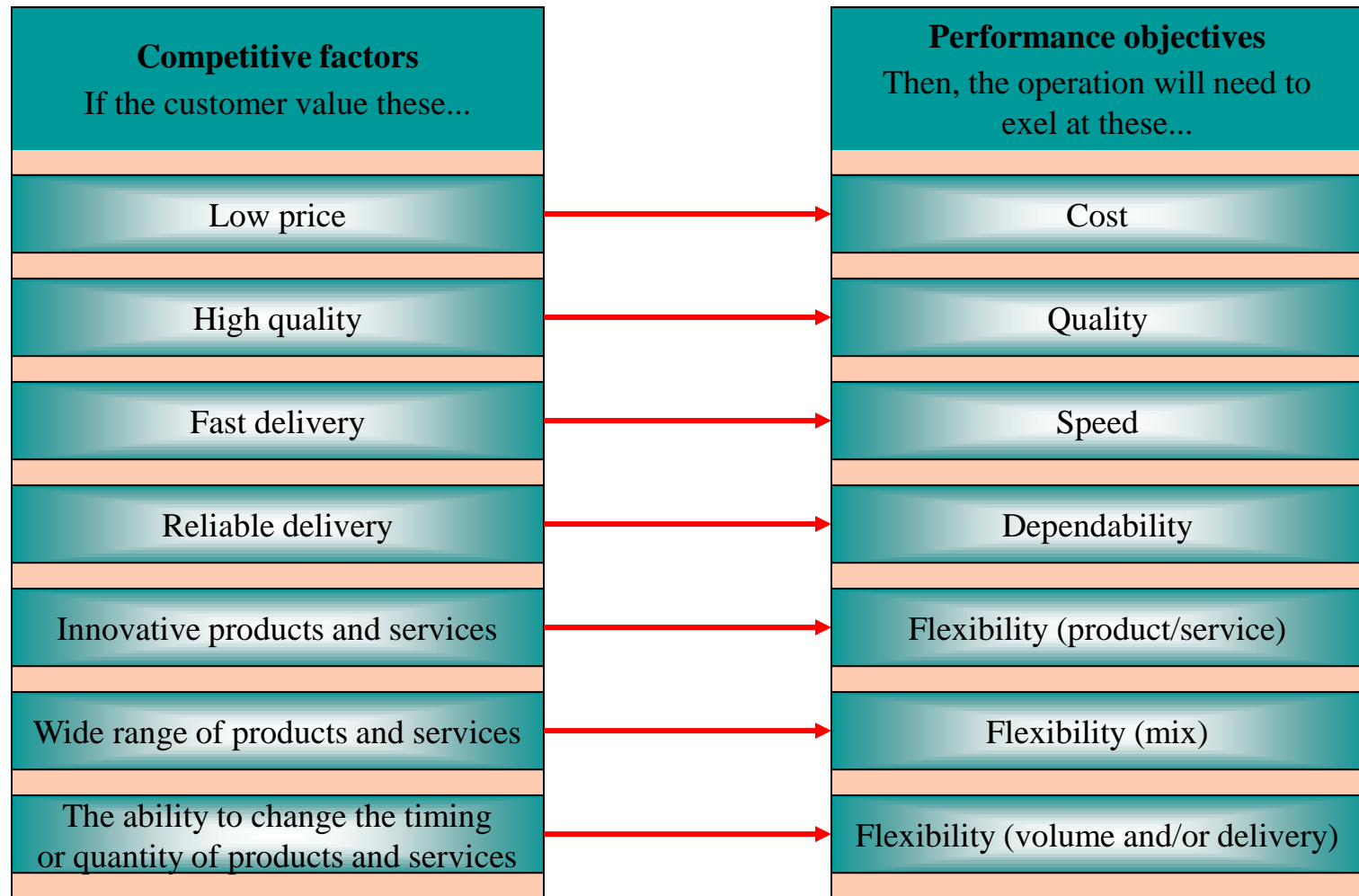
# External and Internal Effects on the Performance Objectives



# The Influences on the Relative Importance of Performance Objectives



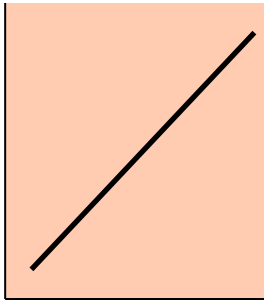
# Different Competitive Factors and Performance Objectives



# Order-winning and Qualifying Objectives

**Order-winning  
factors**

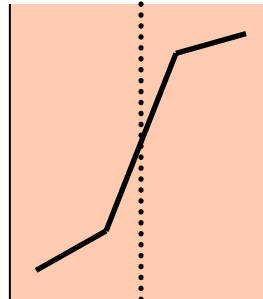
Competitive  
benefit



Performance

**Qualifying  
factors**

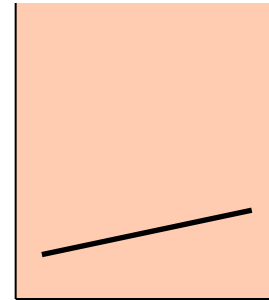
Competitive  
benefit



Performance

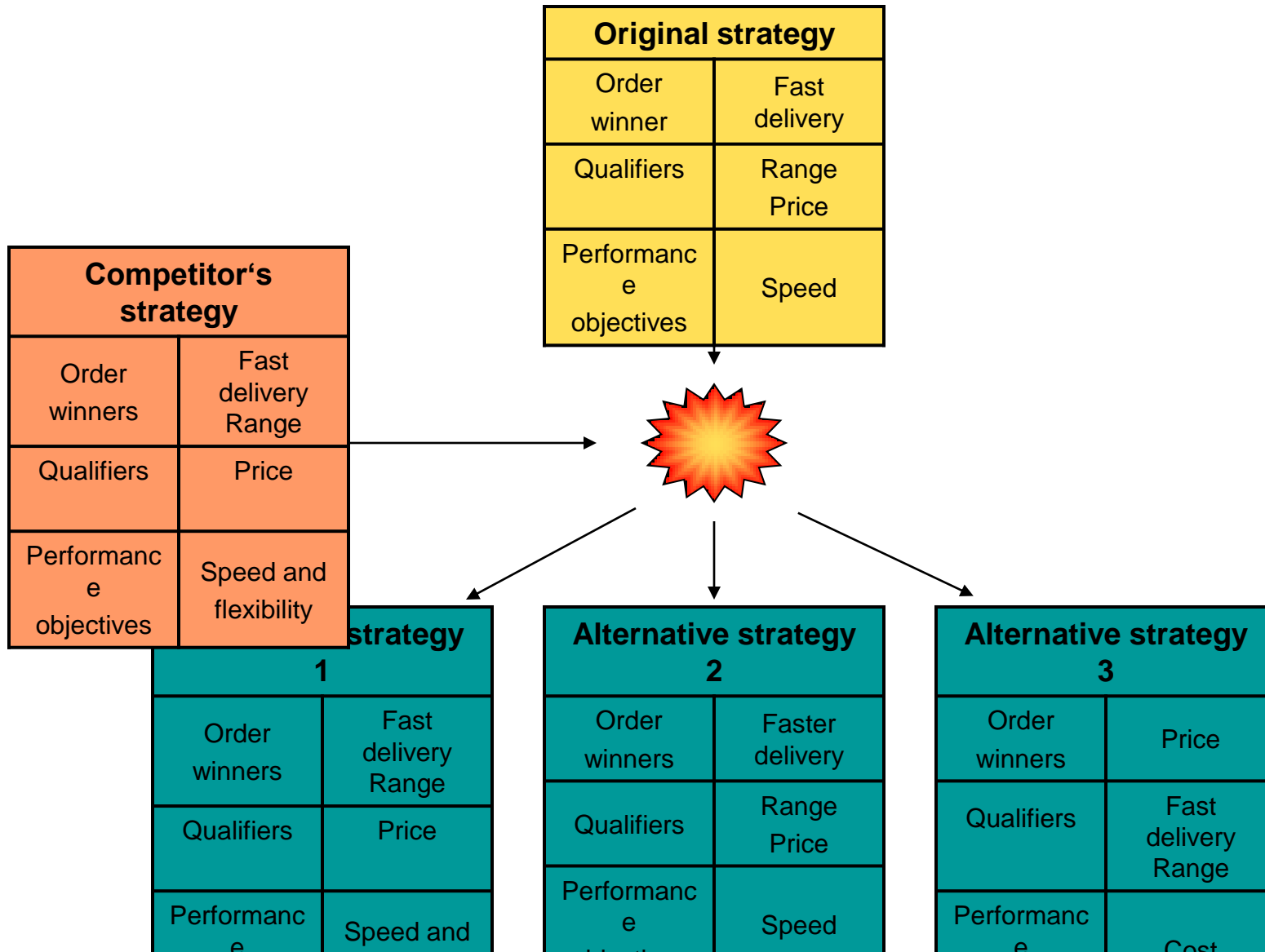
**Less important  
factors**

Competitive  
benefit



Performance

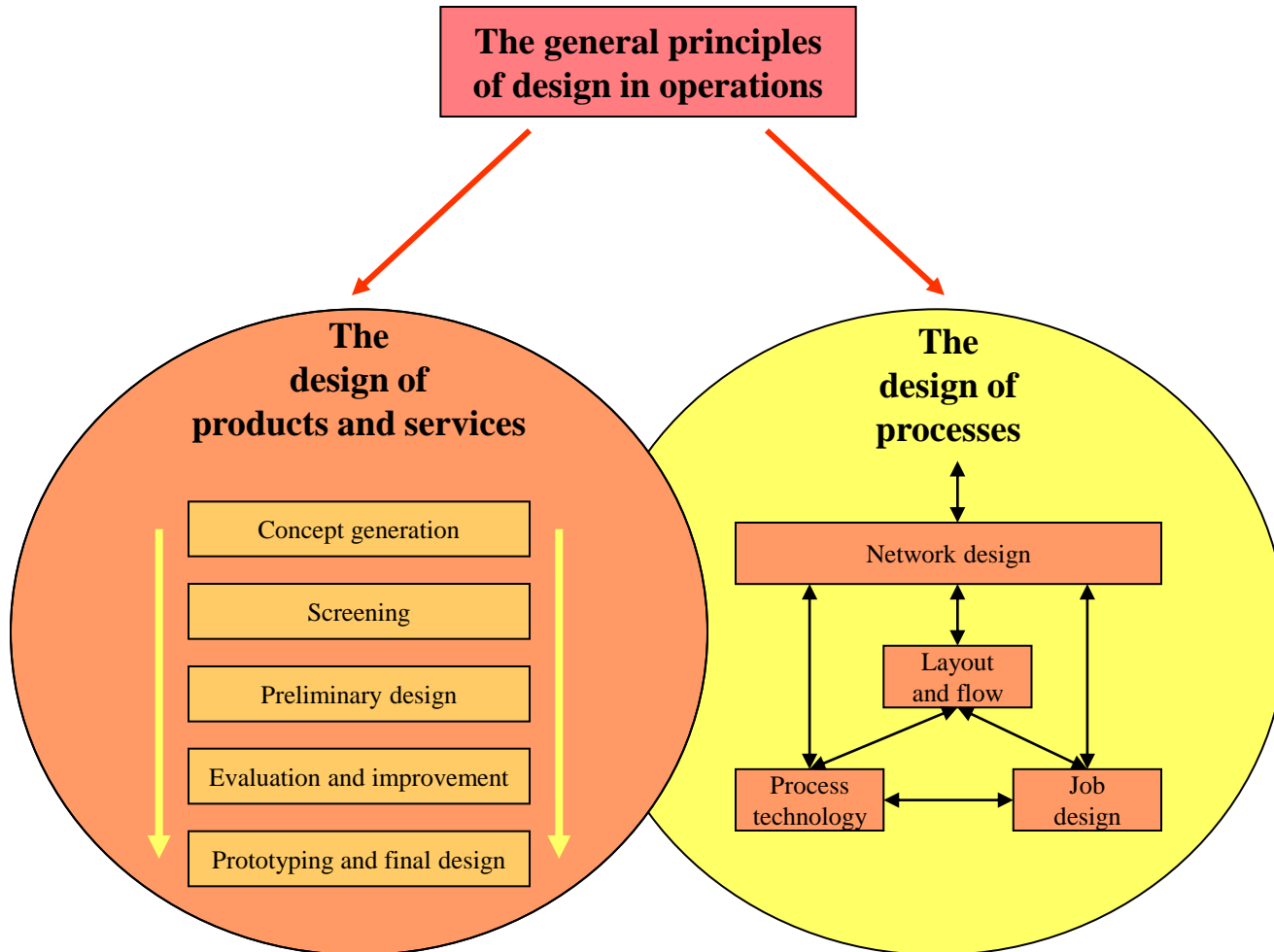
# Competitor Activity and the Influence on Performance Objectives



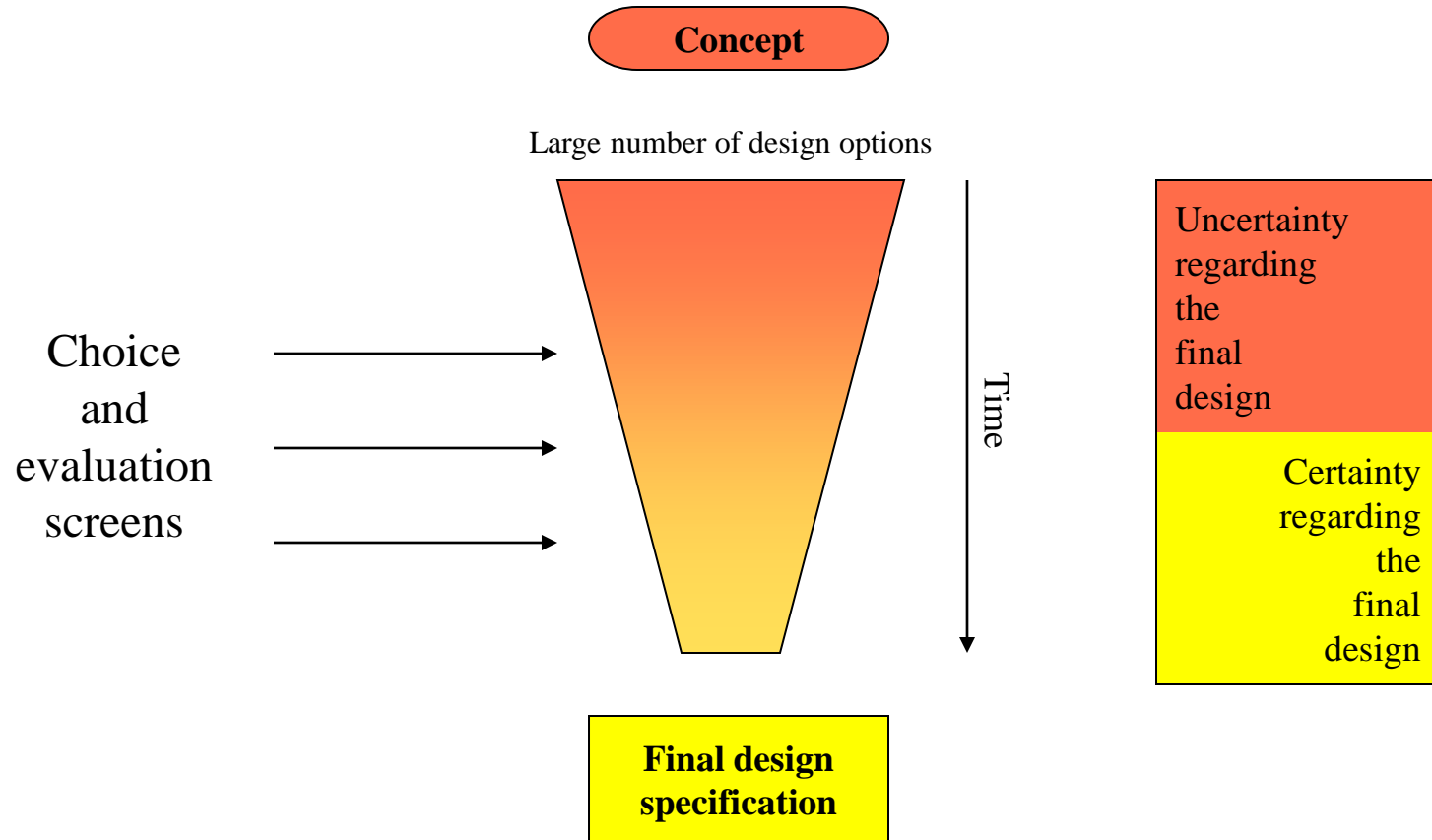
# Effects of the Product/Service Life Cycle

	Introduction	Growth	Maturity	Decline
	Product/ service first introduced to market	Product/ service gains market acceptance	Markets needs start to be fulfilled	Market needs largely met
<b>Volume</b>	Slow growth in sales	Rapid growth in sales volume	Sales slow down and level off	Sales decline
<b>Customers</b>	Innovators	Early adoptors	Bulk of market	Laggards
<b>Competitors</b>	Few/ none	Increasingly number	Stable number	Declining number
<b>Variety of product/service designs</b>	Possible high customization or frequent design changes	Increasingly standardized	Emerging dominant types	Possible move to commodity standardization
<b>Likely order winners</b>	Product/ service characteristics performance or novelty	Availability of quality products/ services	Low price dependable supply	Low price
<b>Likely qualifiers</b>	Quality Range	Prince Range	Range Quality	Dependable supply
<b>Dominant operations performance objectives</b>	Flexibility Quality	Speed Dependability Quality	Cost Dependability	Cost

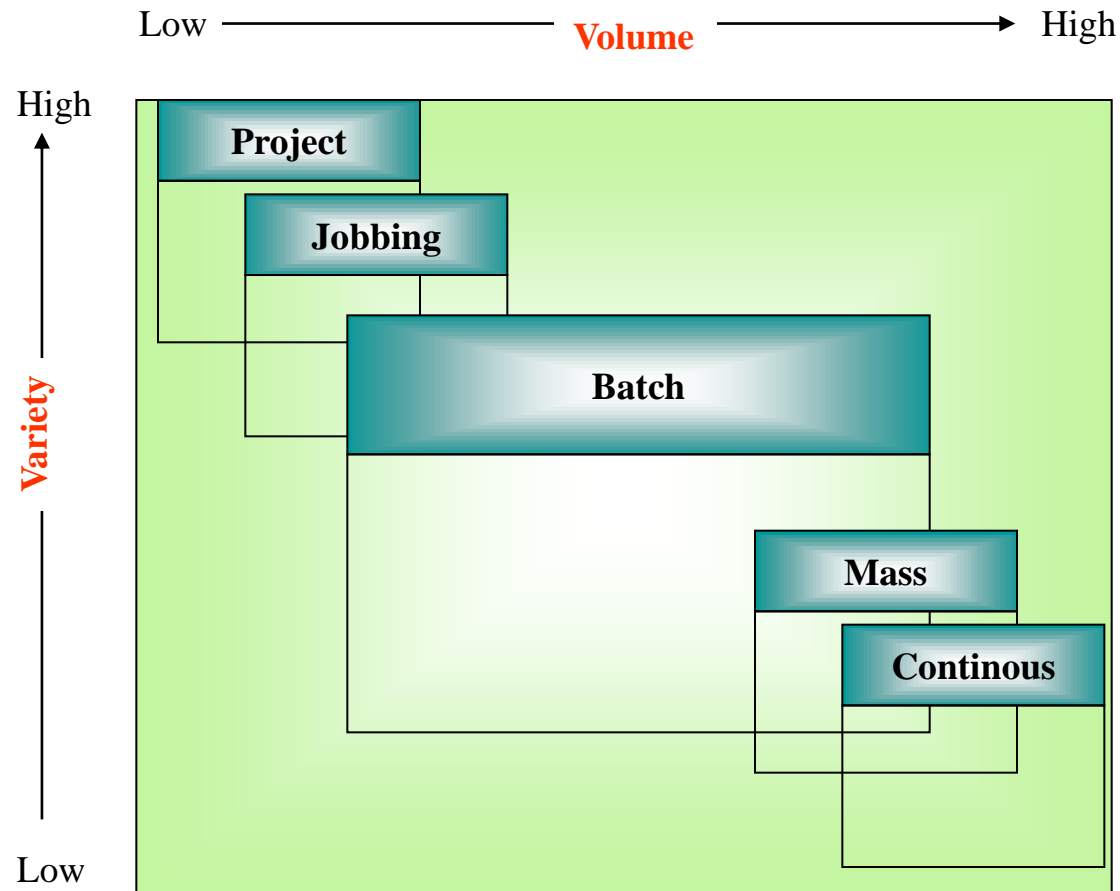
# Design Activities in Operations Management



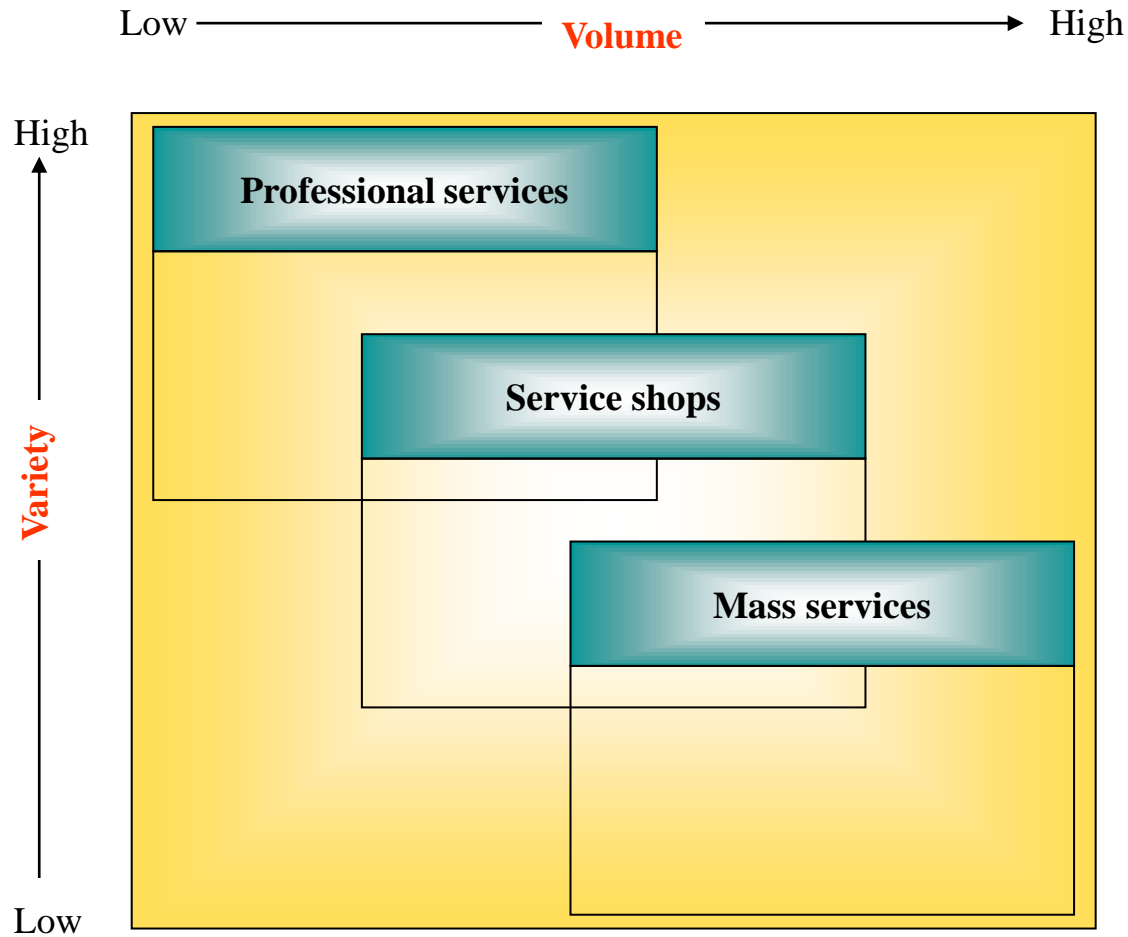
# Design Screening



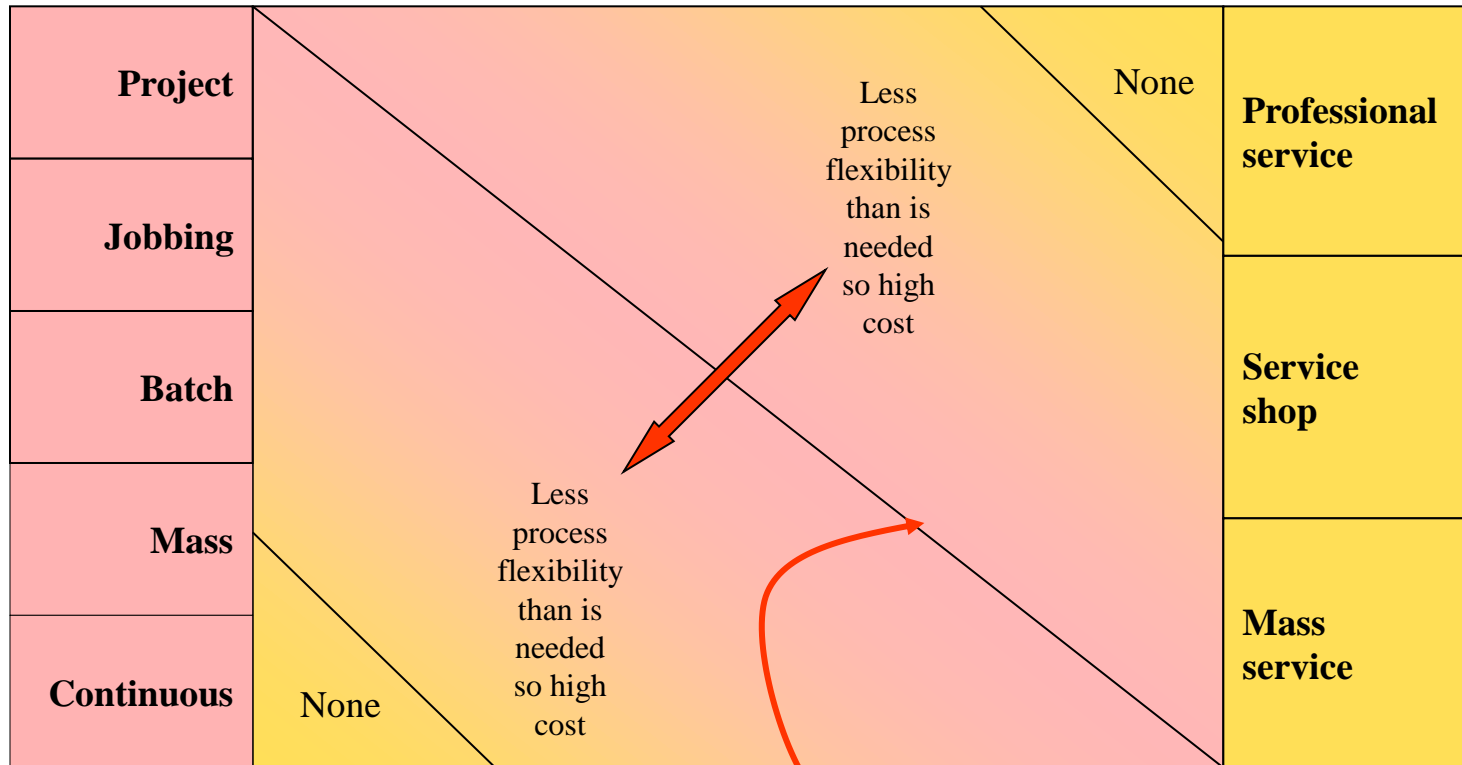
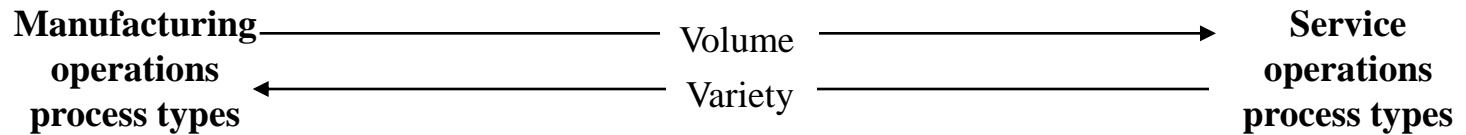
# Process Types in Manufacturing Operations



# Process Types in Service Operations

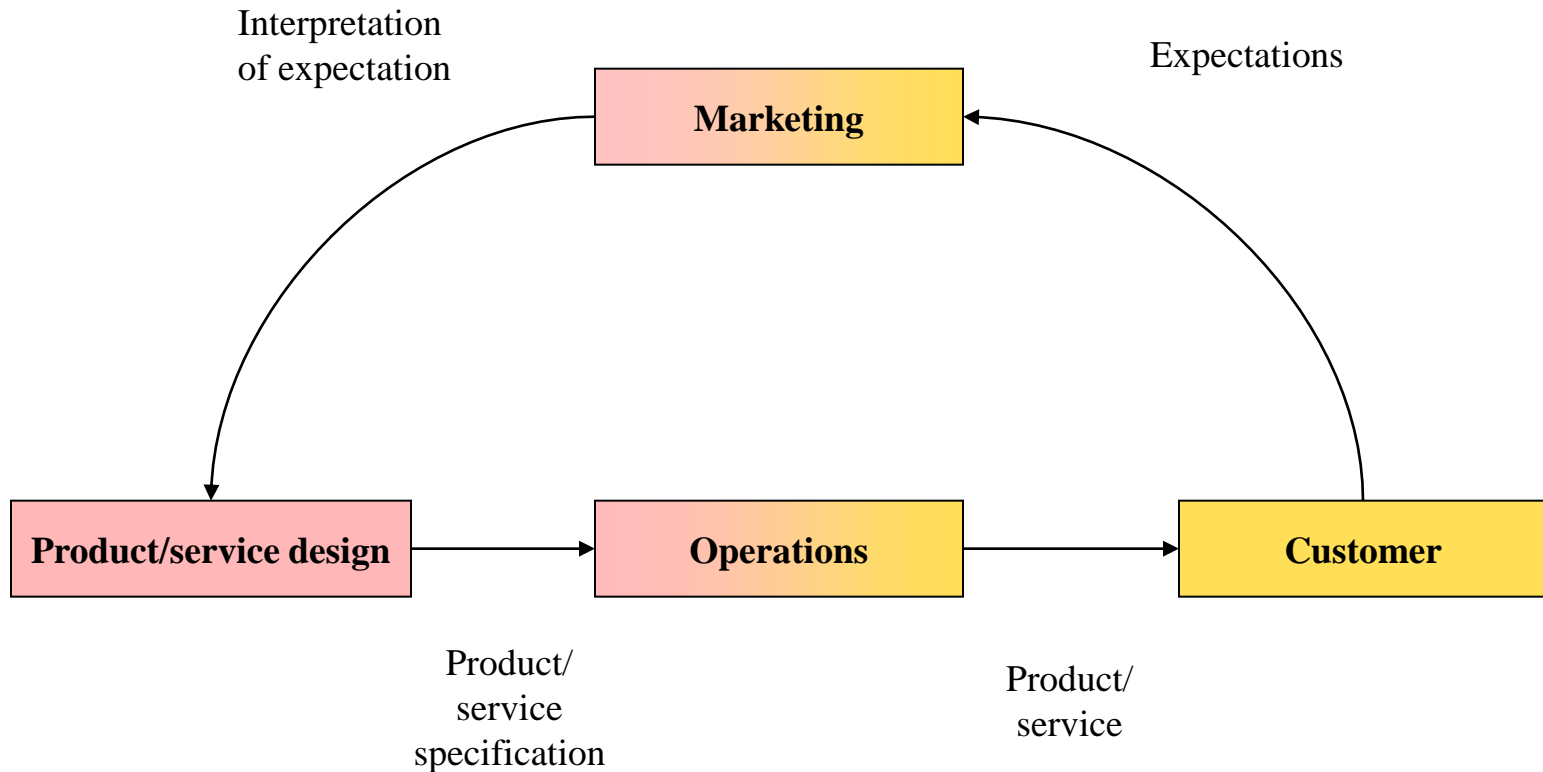


# Line of Fit of Process to Volume/Variety Characteristics

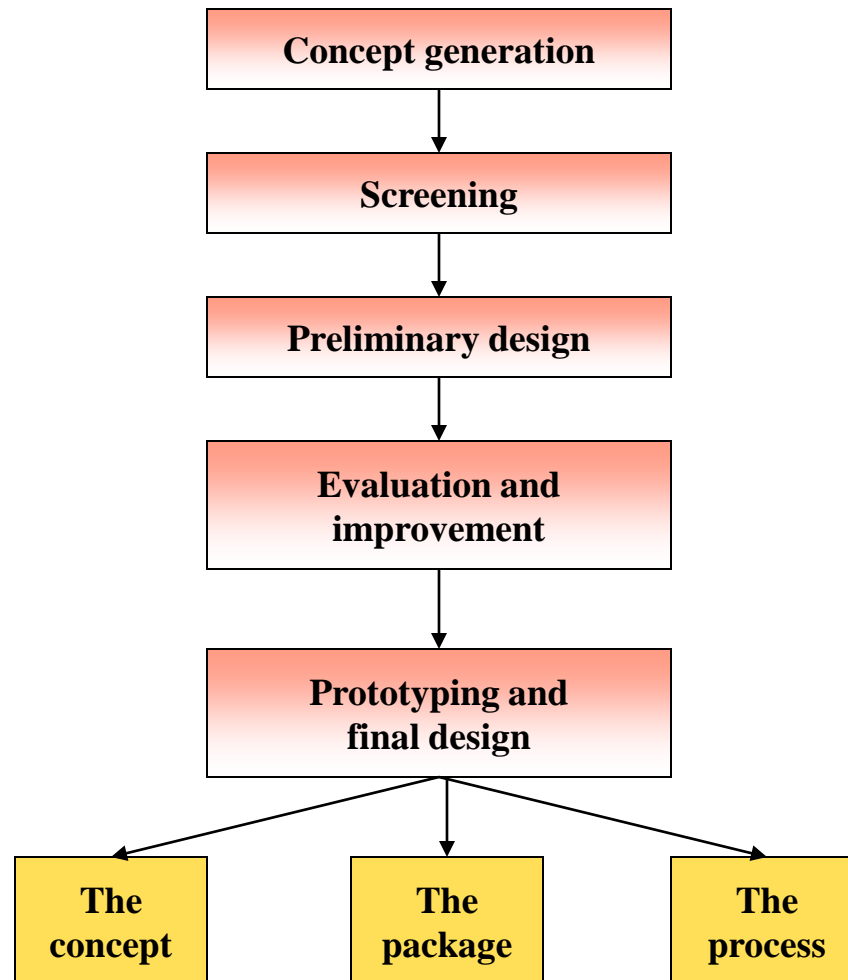


The natural line of process to volume variety characteristics

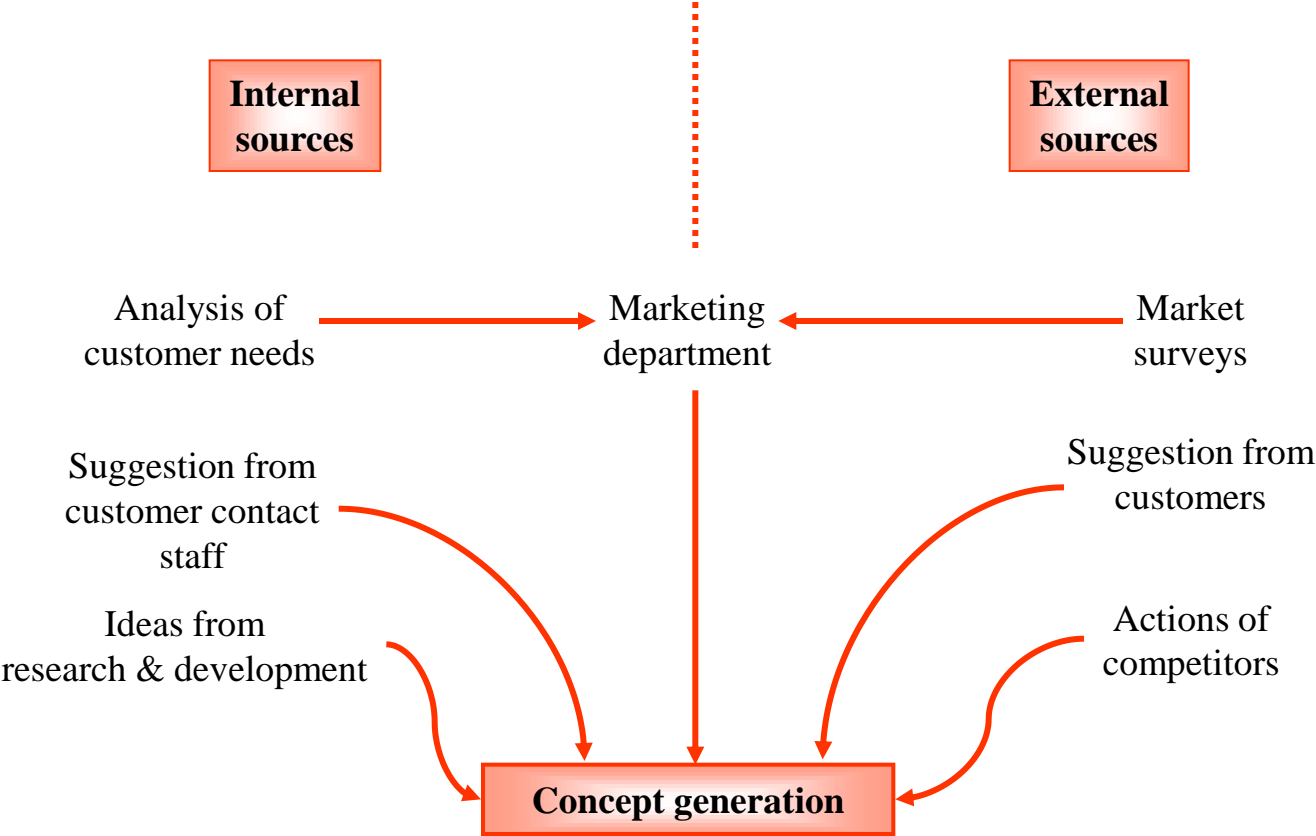
# The Customer-Marketing-Design Feedback Loop



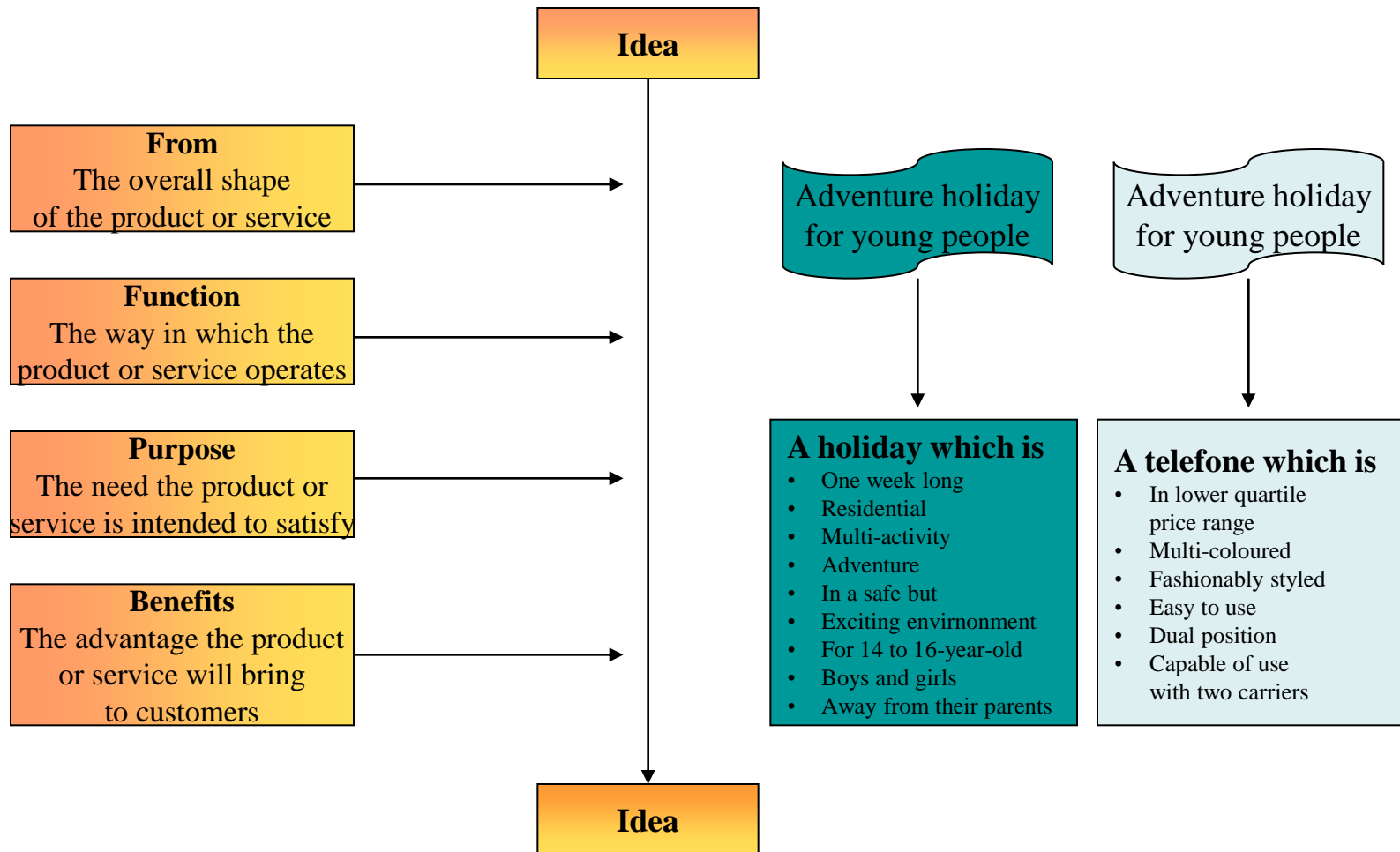
# Stages of Product/Service Design



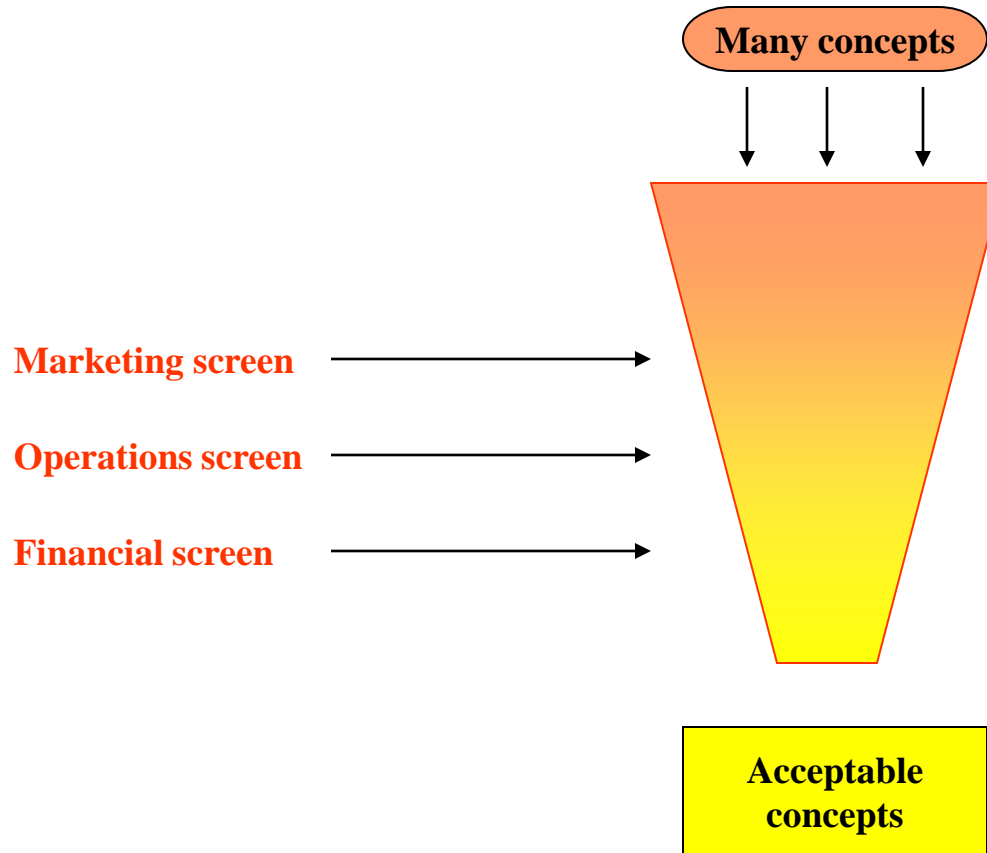
# Concept Generation from Internal and External Sources



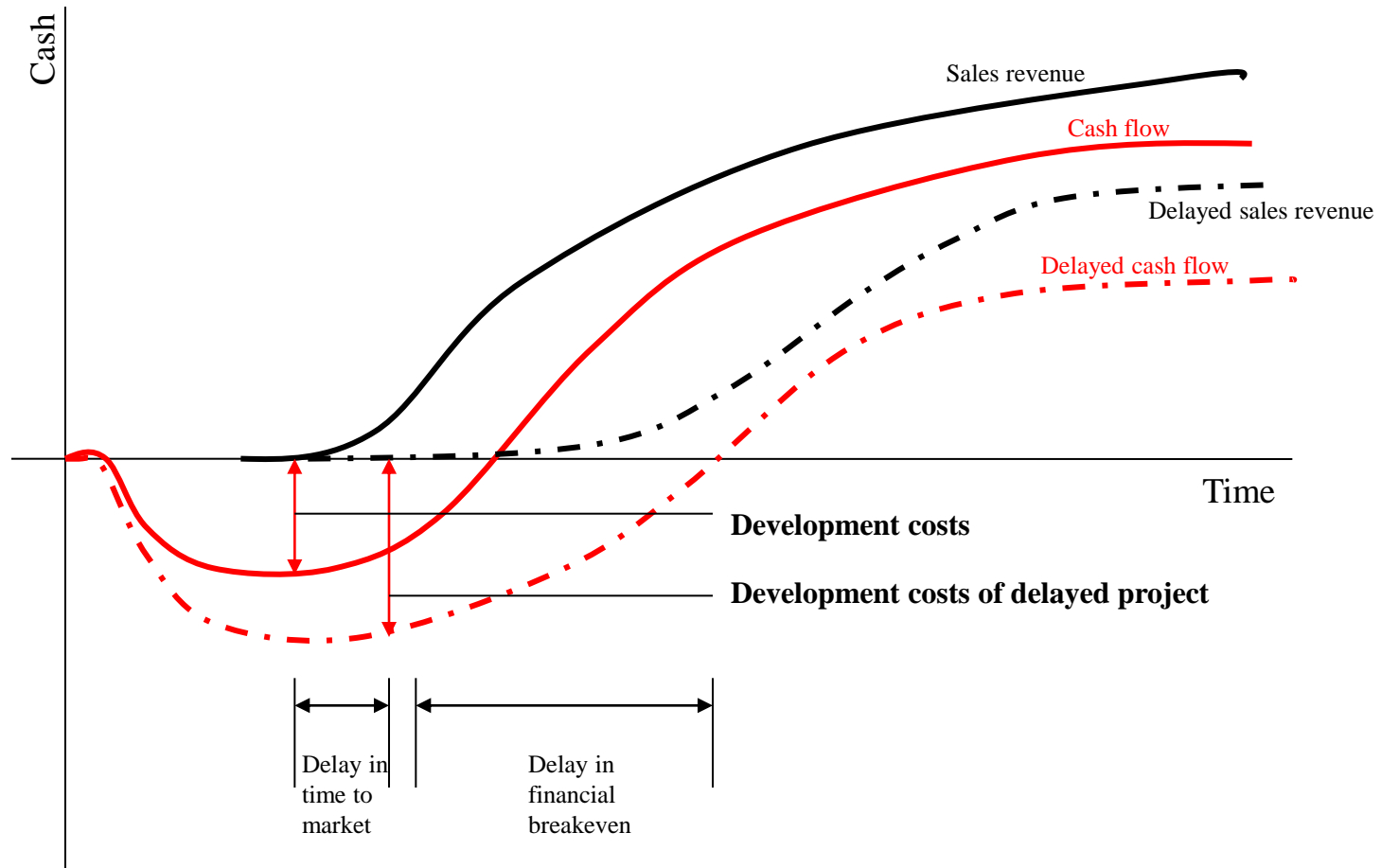
# From an Idea to a Concept



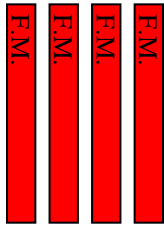
# Concept Screening



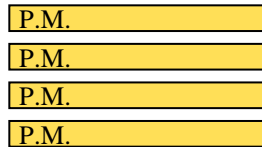
# Effect of a Delay in Time to Market



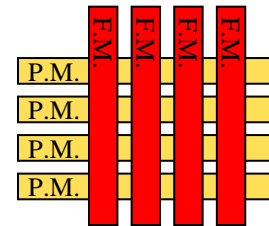
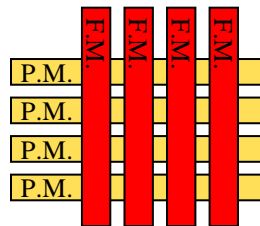
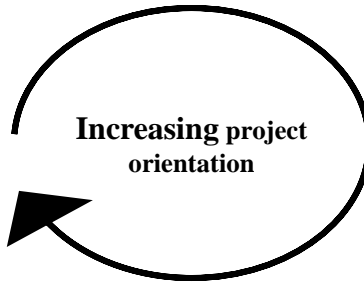
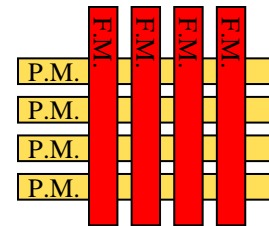
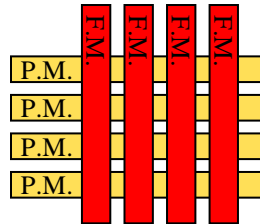
# Organization Structures for Design Activity



Pure functional organization

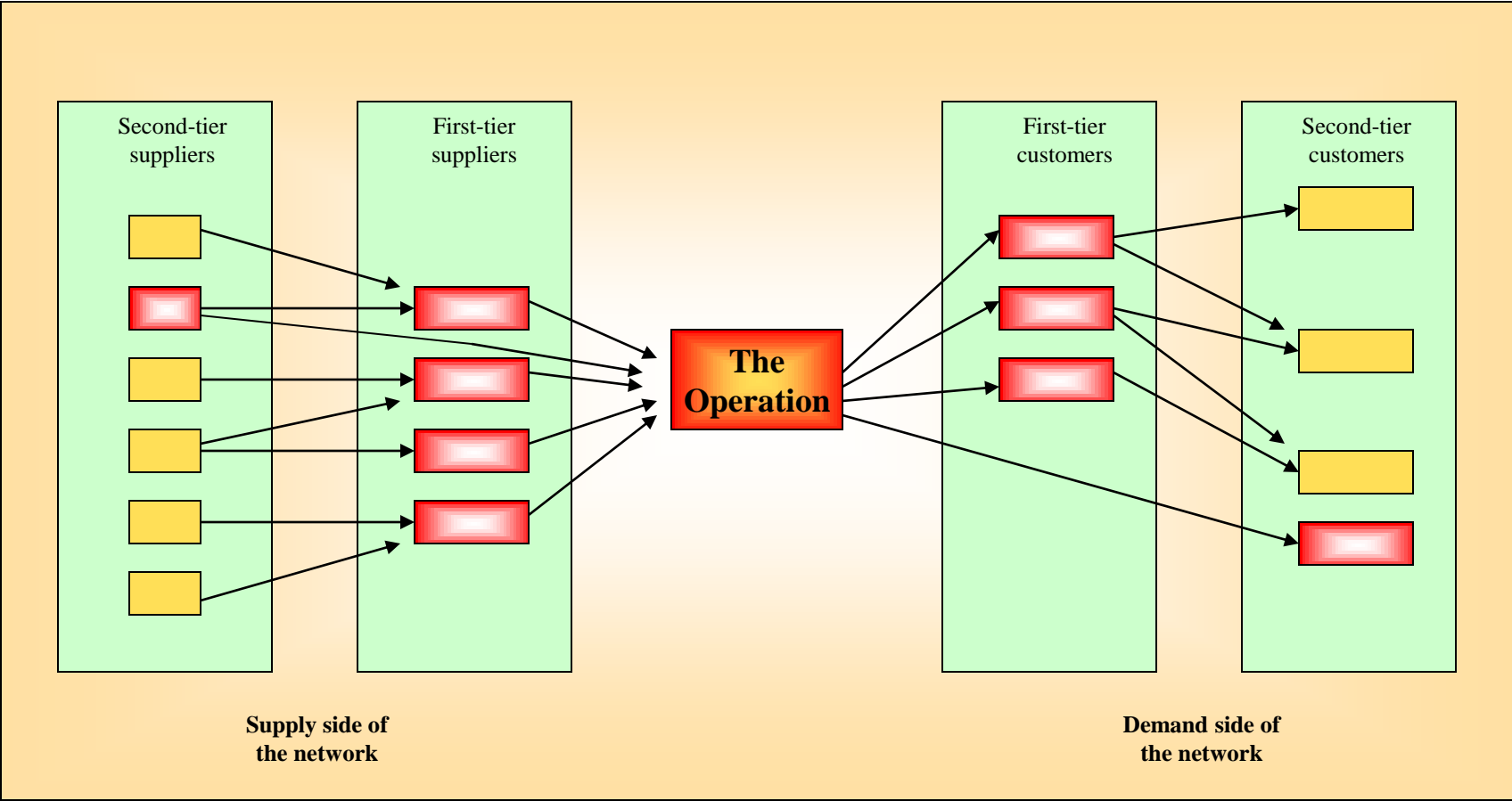



Pure project organization




F.M. = Functional Manager  
P.M. = Project Manager

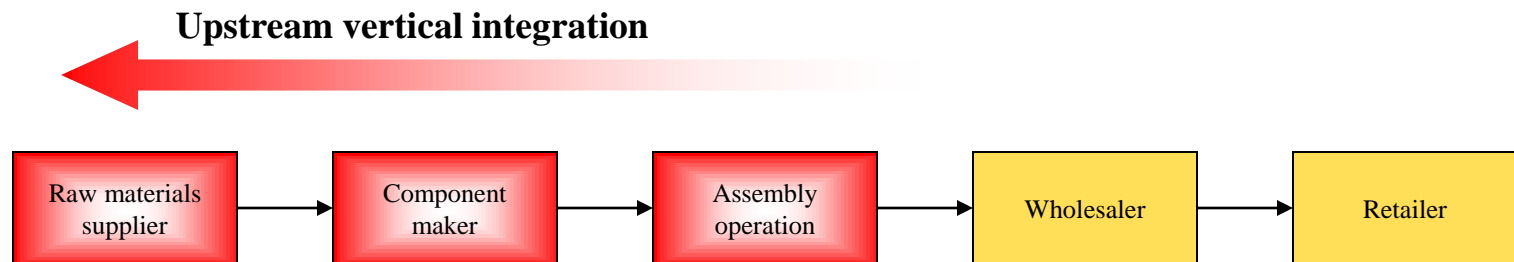
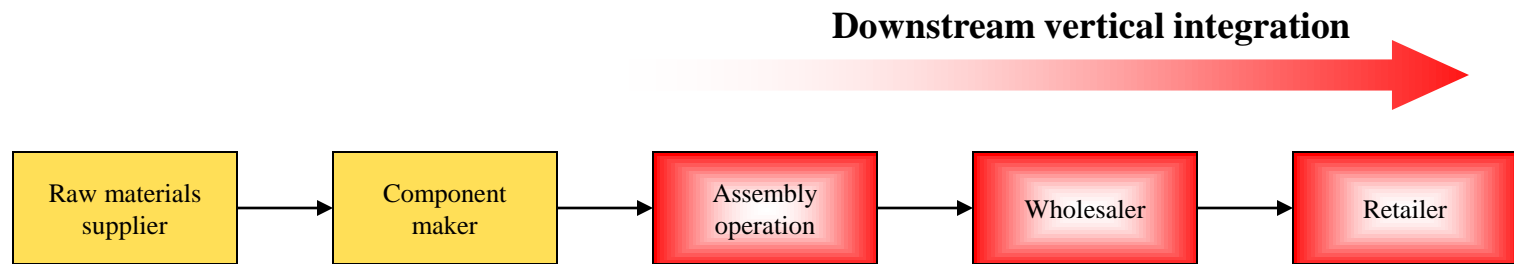
# Total and Immediate Supply Networks




 The immediate supply network

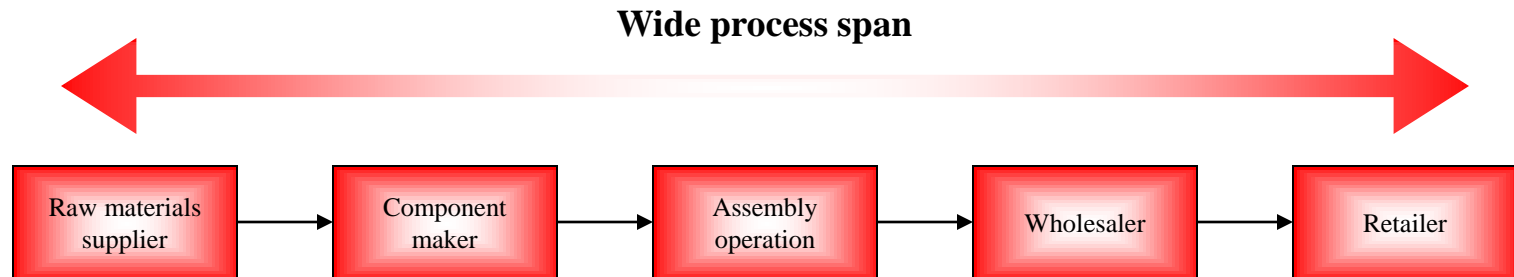
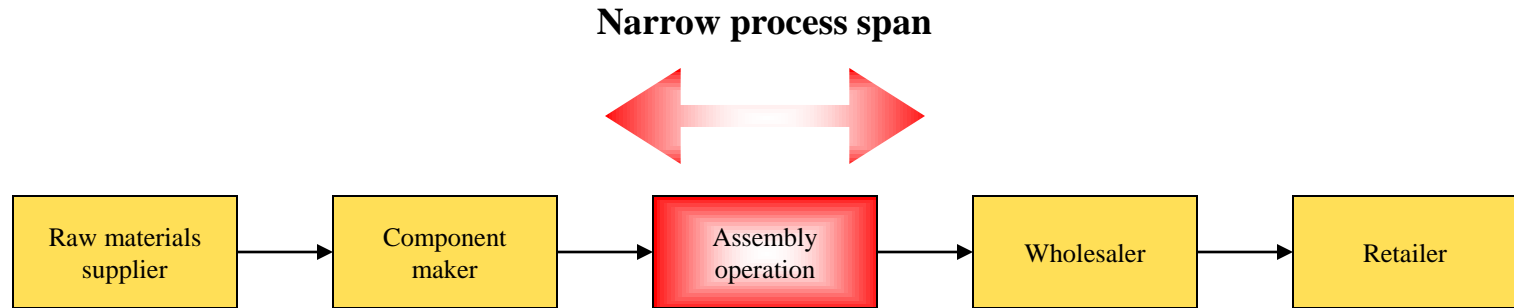
 The total supply network


# Vertical Integration for an Assembly Operation



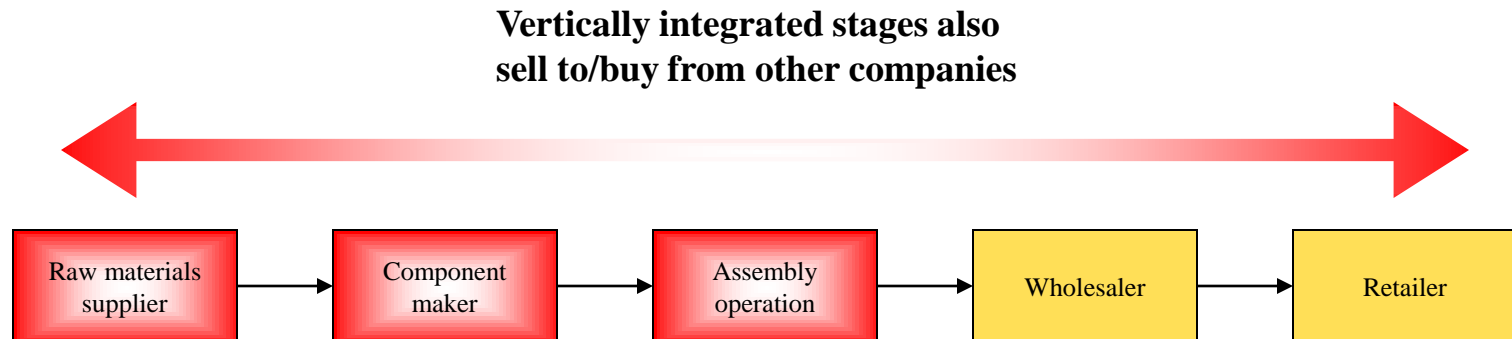
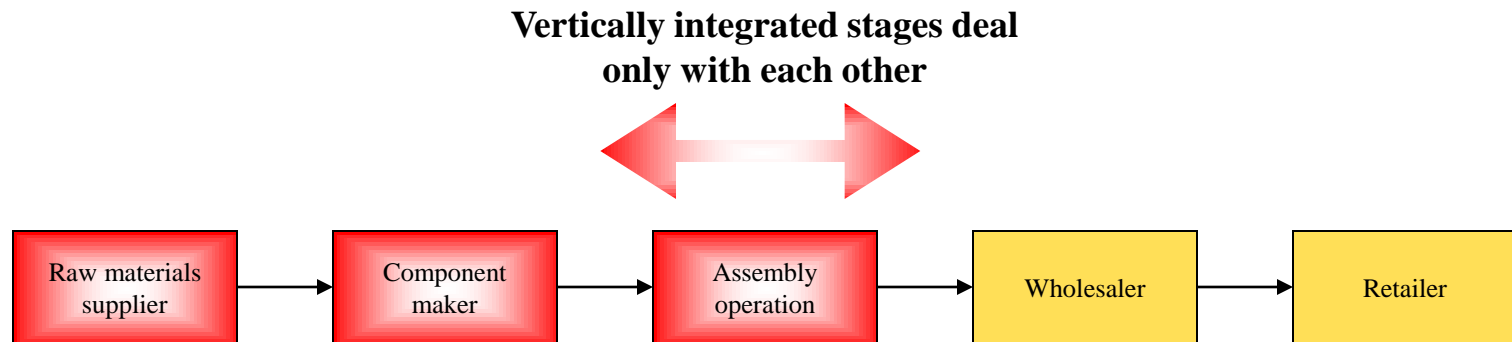
 Stages owned by the organization


# The Extent of Process Span of Vertical Integration



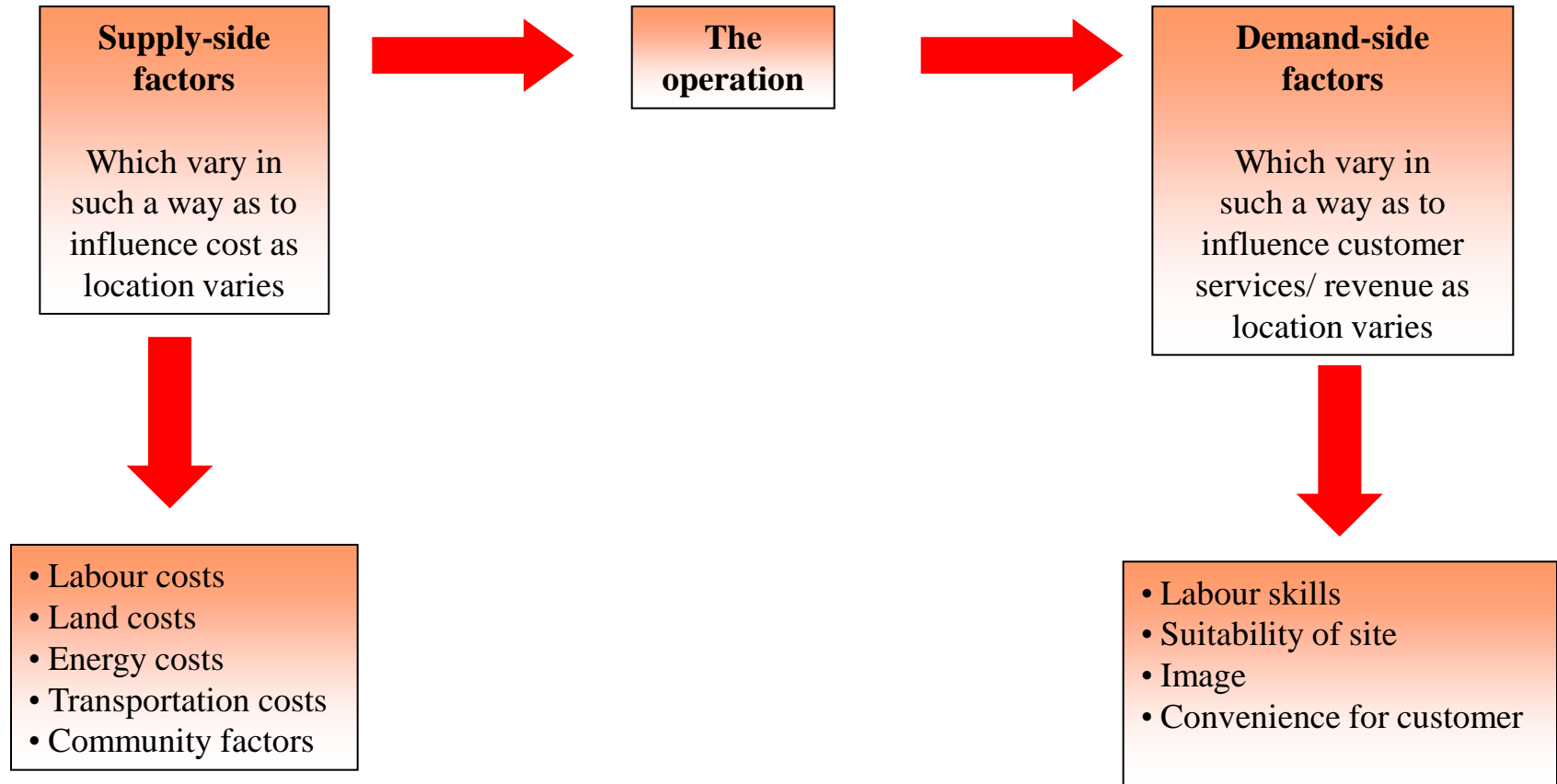
 Stages owned by the organization

# The Balance of Internal/External Trade

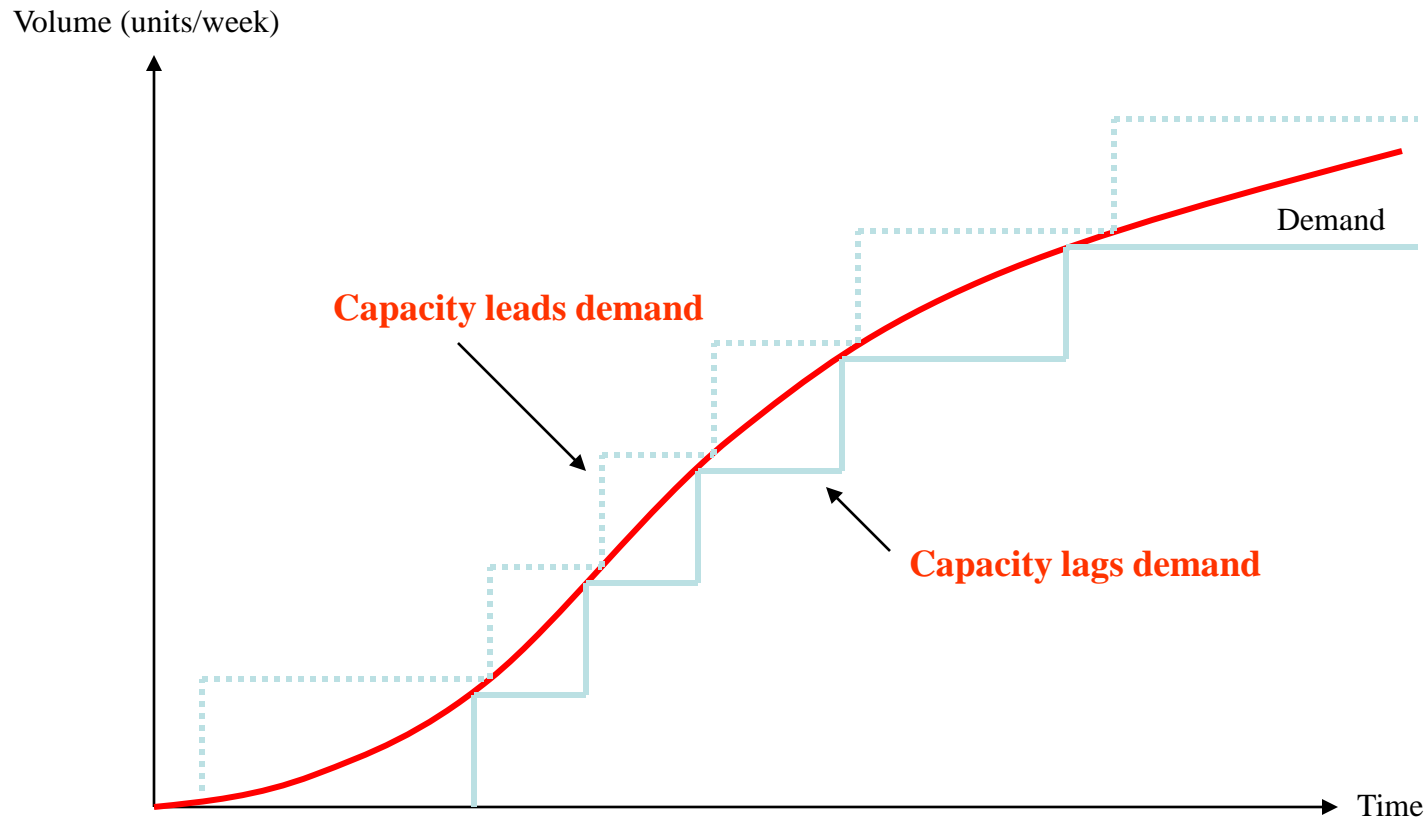


 Stages owned by the organization

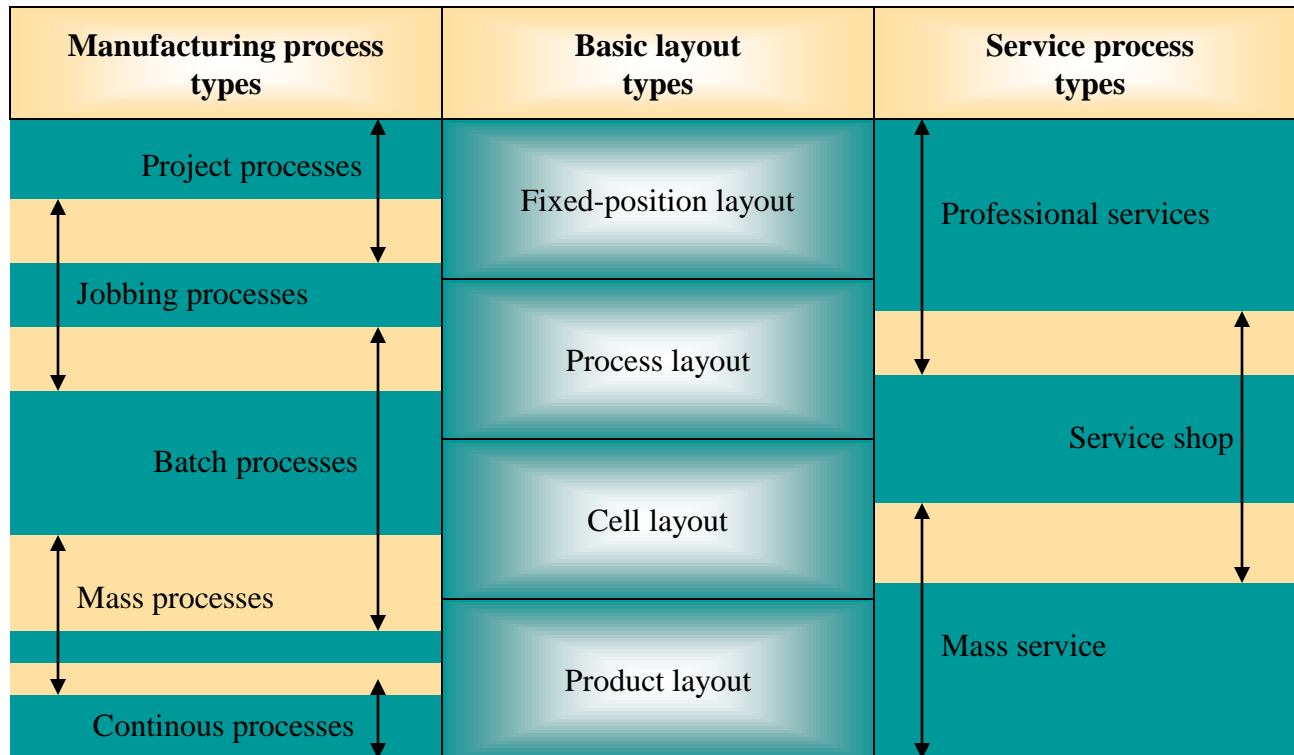
# Supply- and Demand-Side Factors in Location Decisions



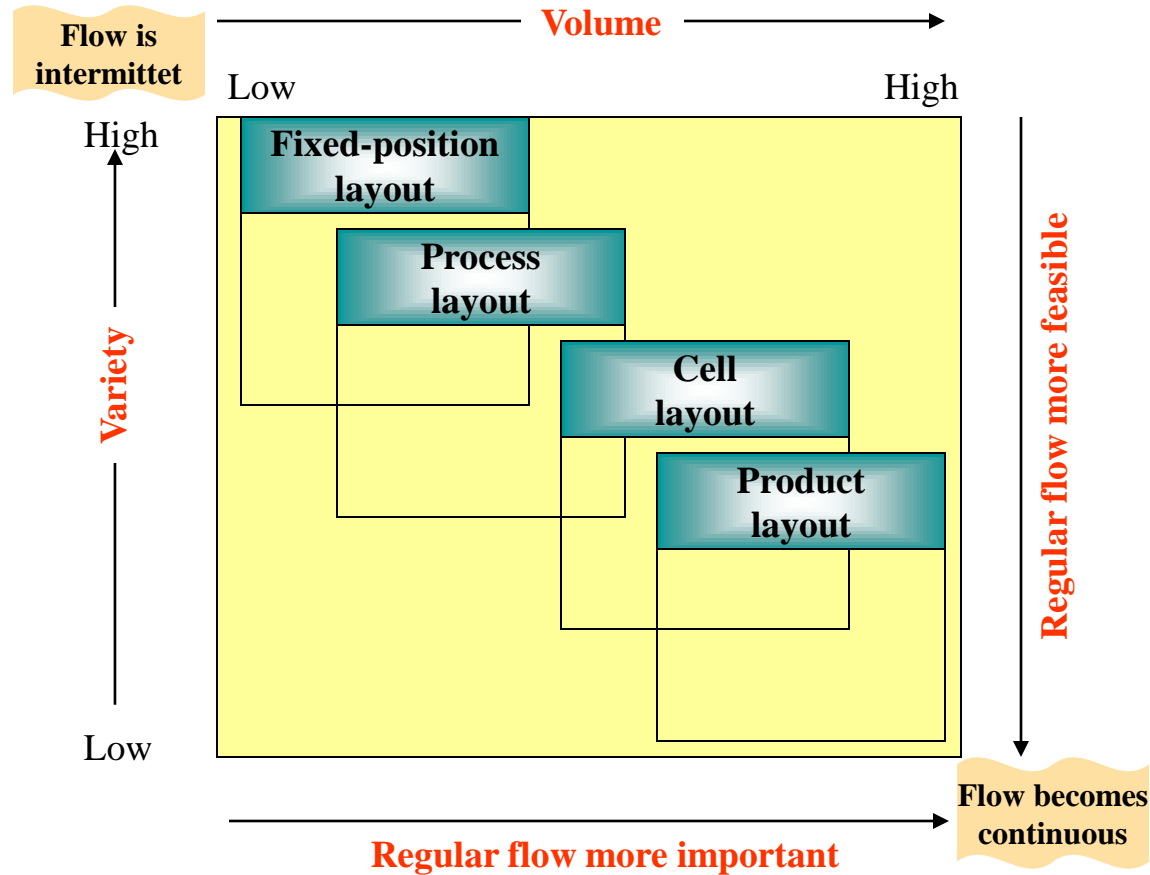
# Capacity-Leading and Capacity-Lagging Strategies



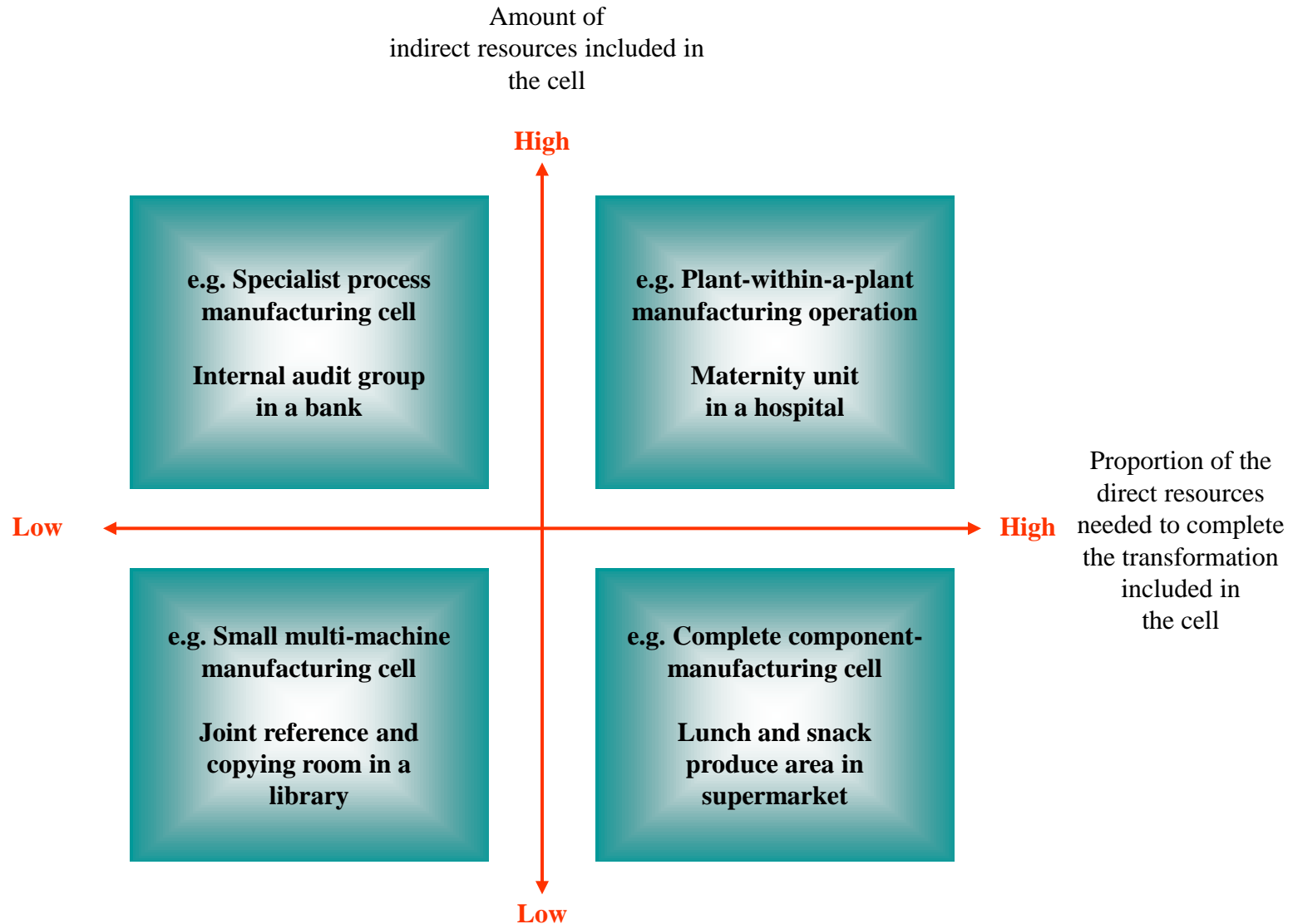
# Relationship Between Process and Basic Layout Types



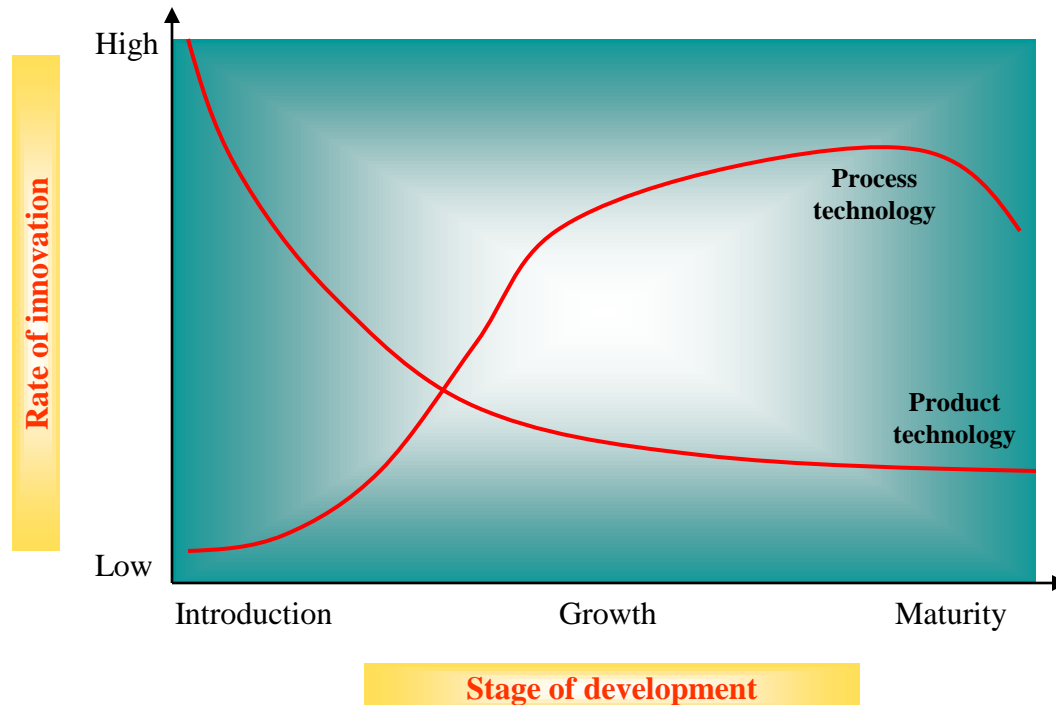
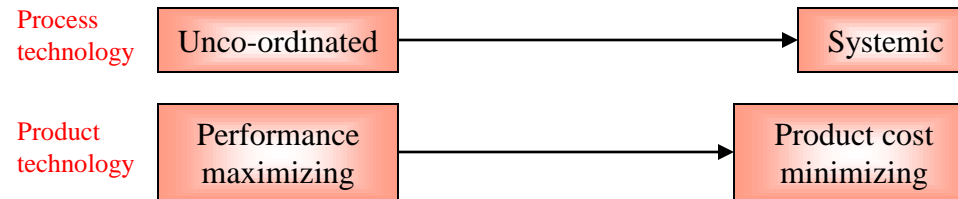
# Volume Variety and Layout Type



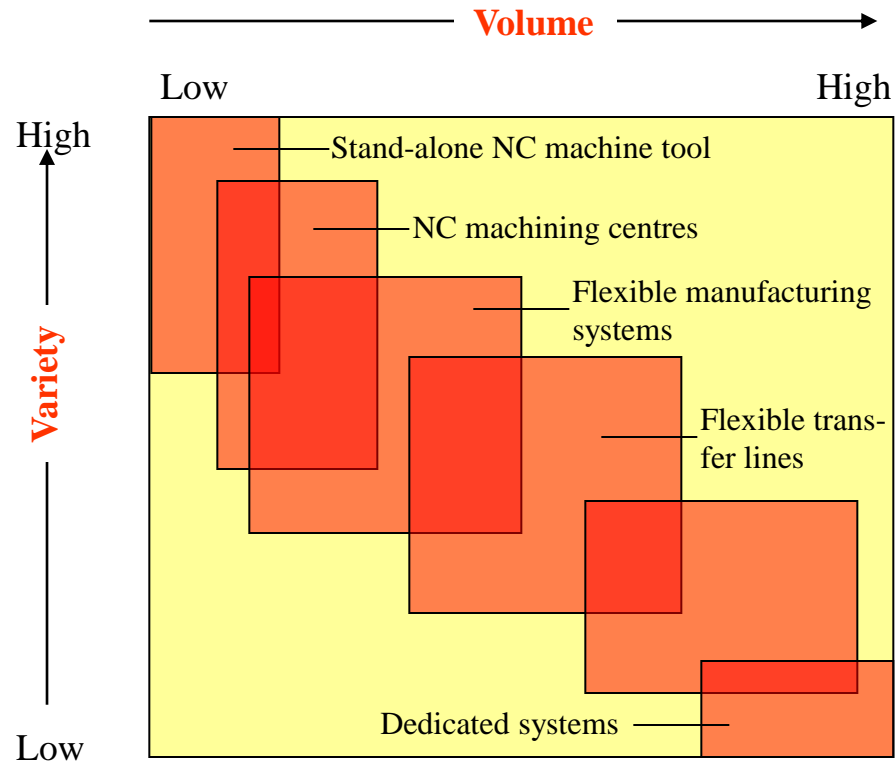
# Types of Cell



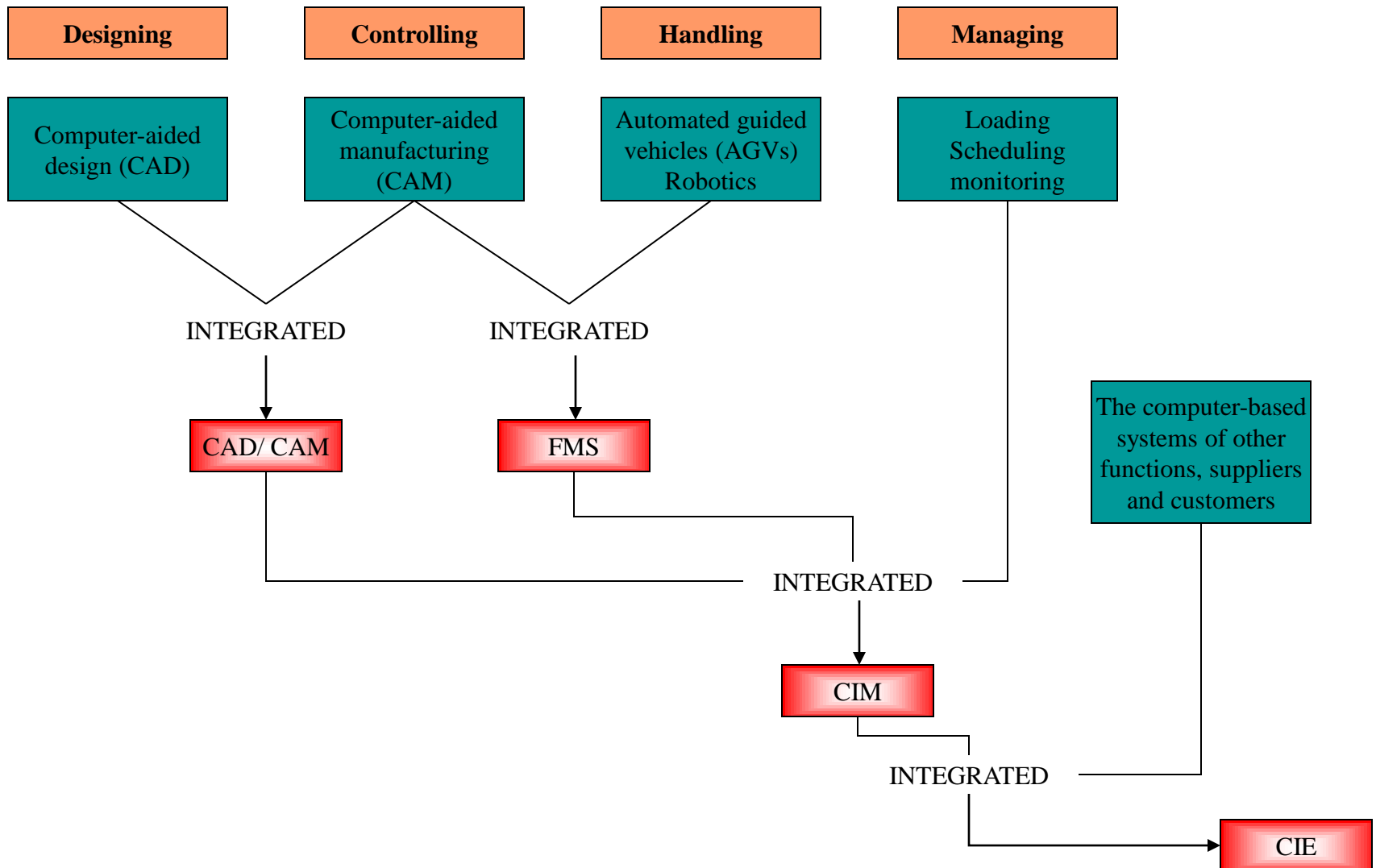
# Relative Rates of Innovation for Product and Process Technology



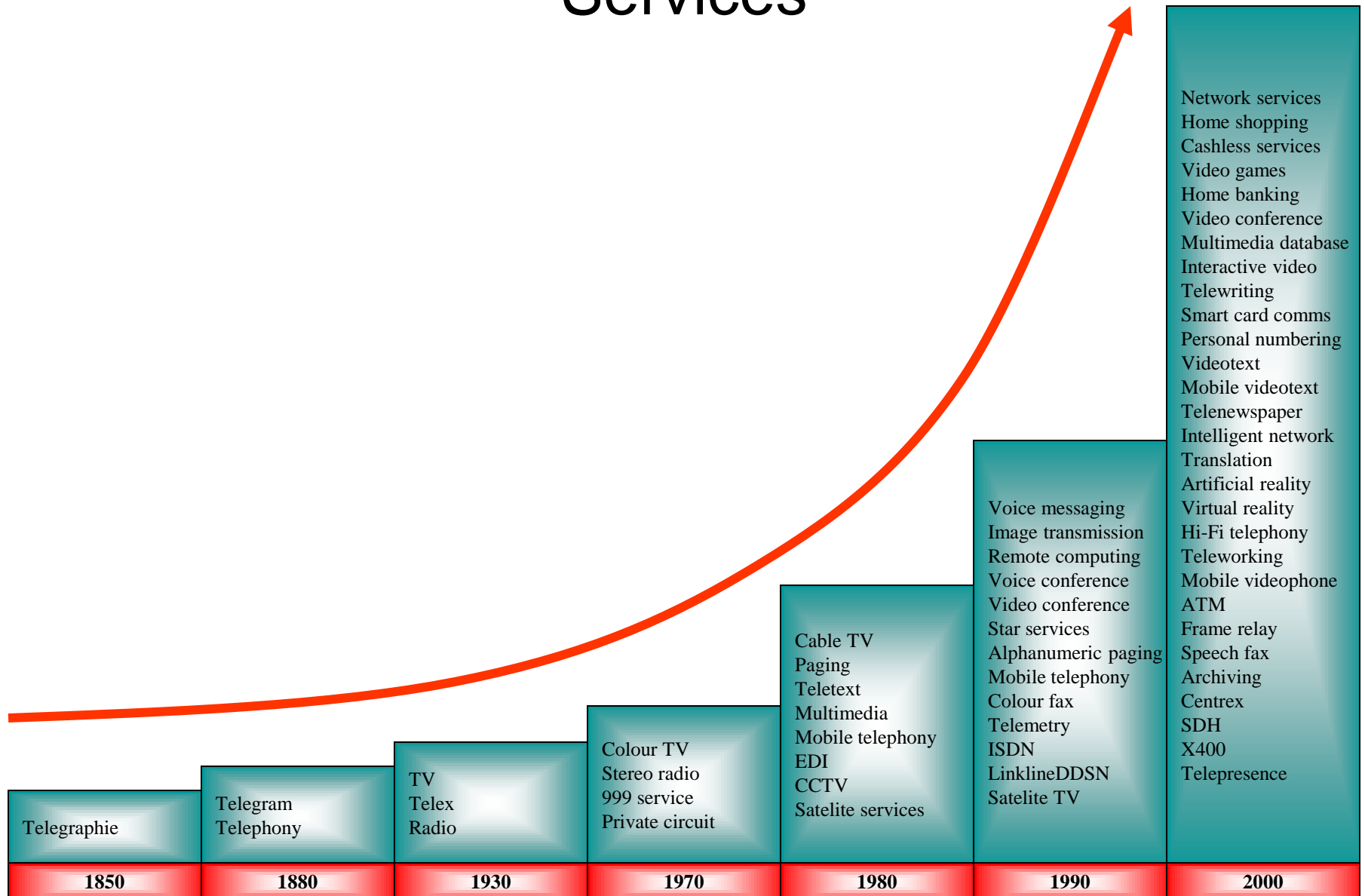
# Volume and Variety Characteristics



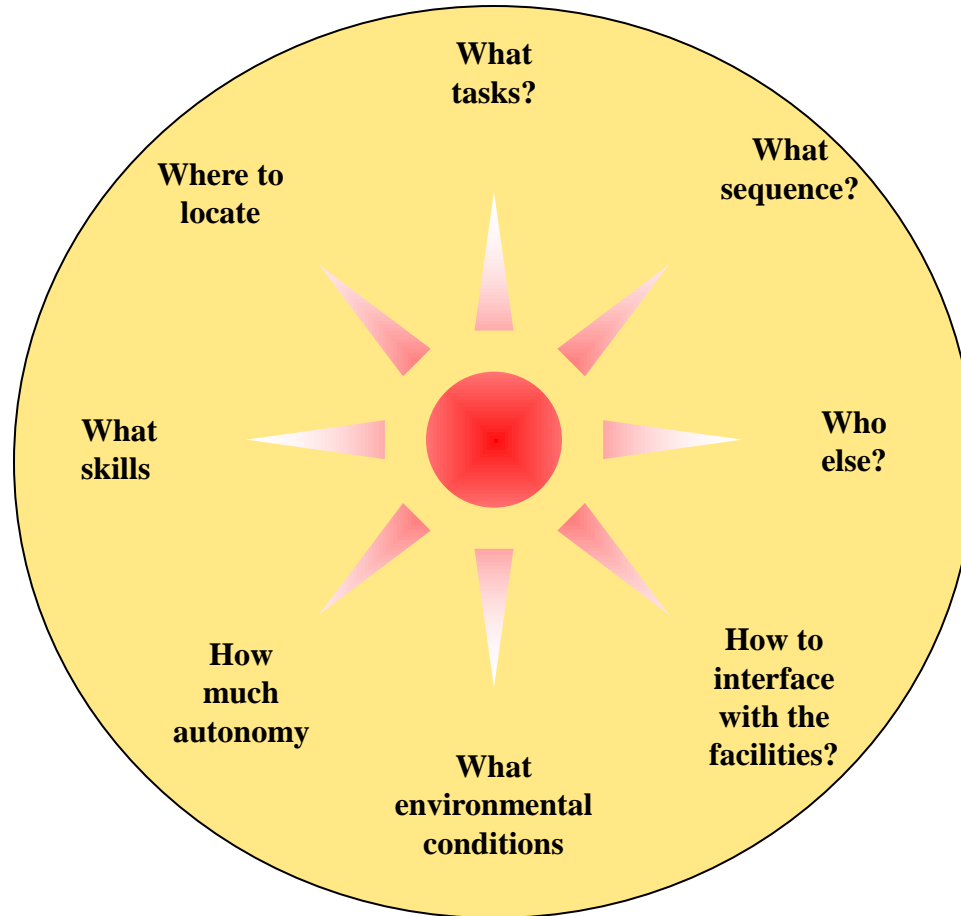
# Increasing Integration of Manufacturing Technologies



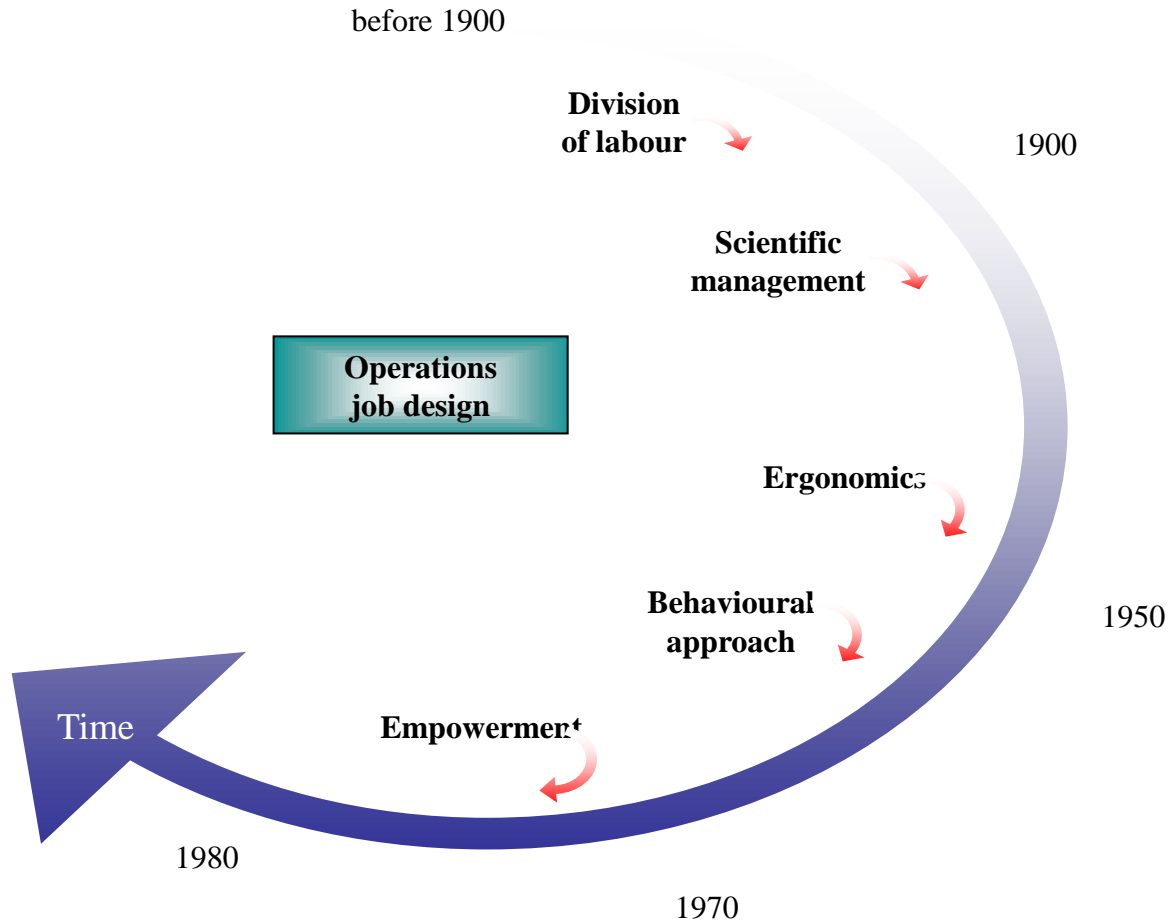
# The Growth in Telecommunication Services



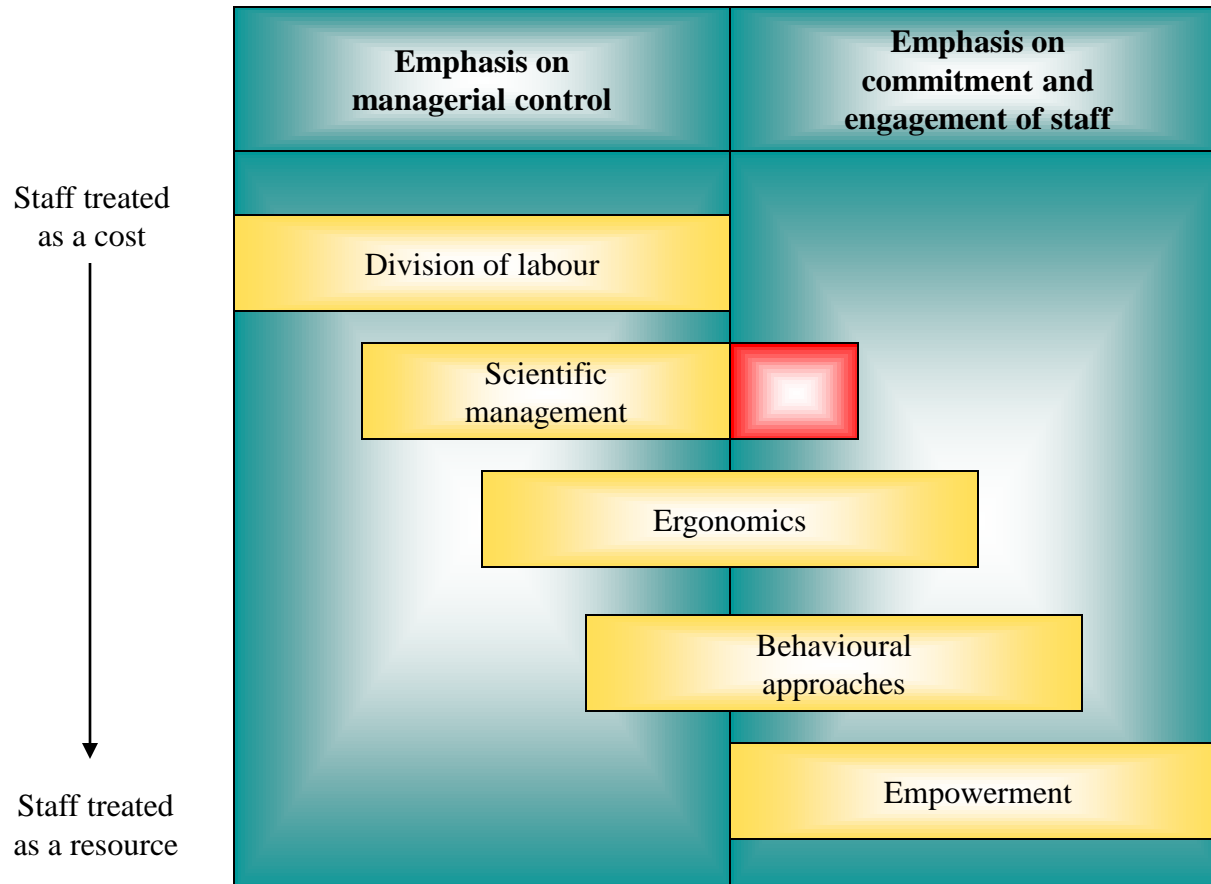
# The Elements of Job Design



# The Chronology of the Different Approaches to Job Design

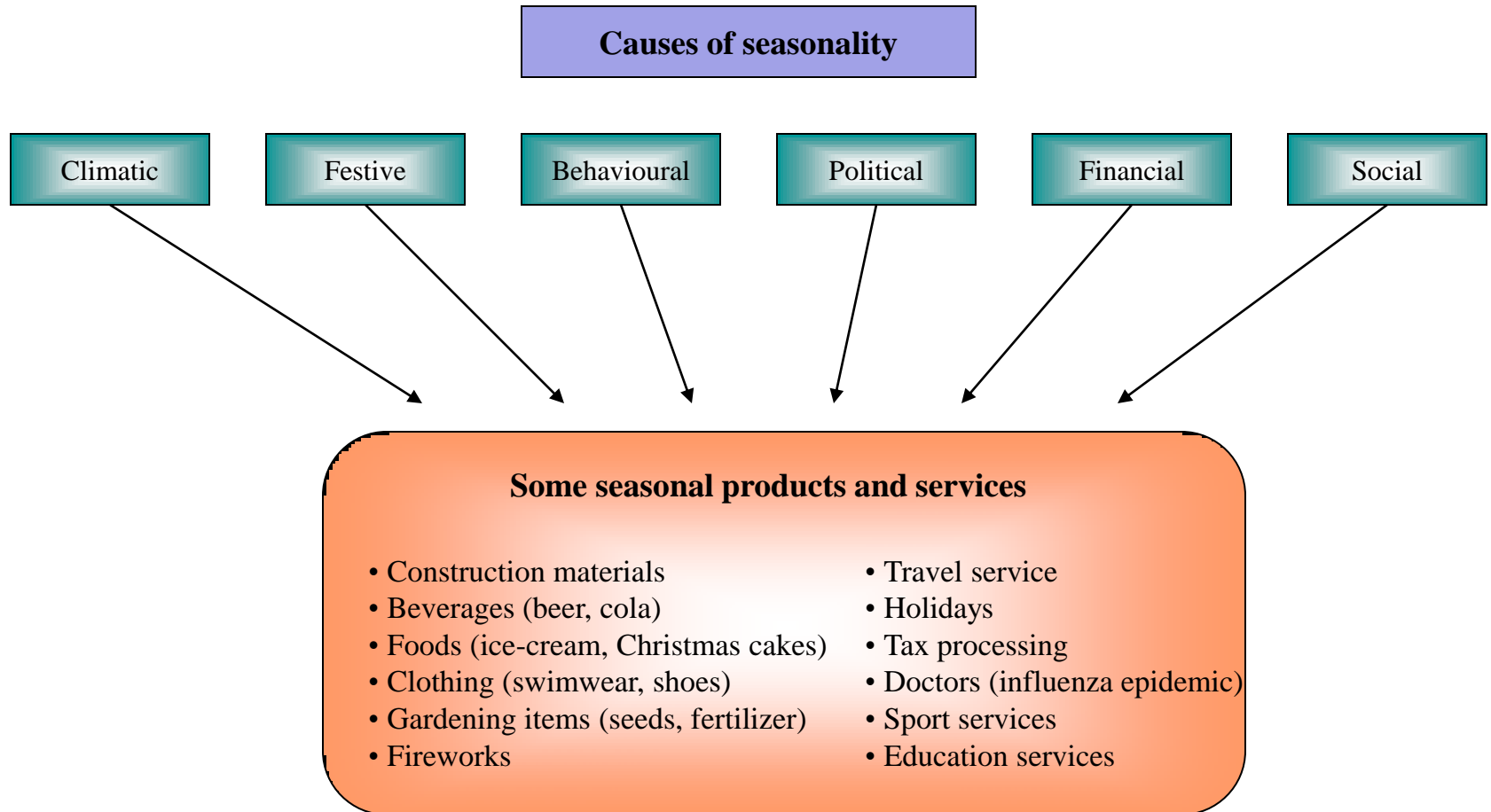


# Different Approaches to Job Design

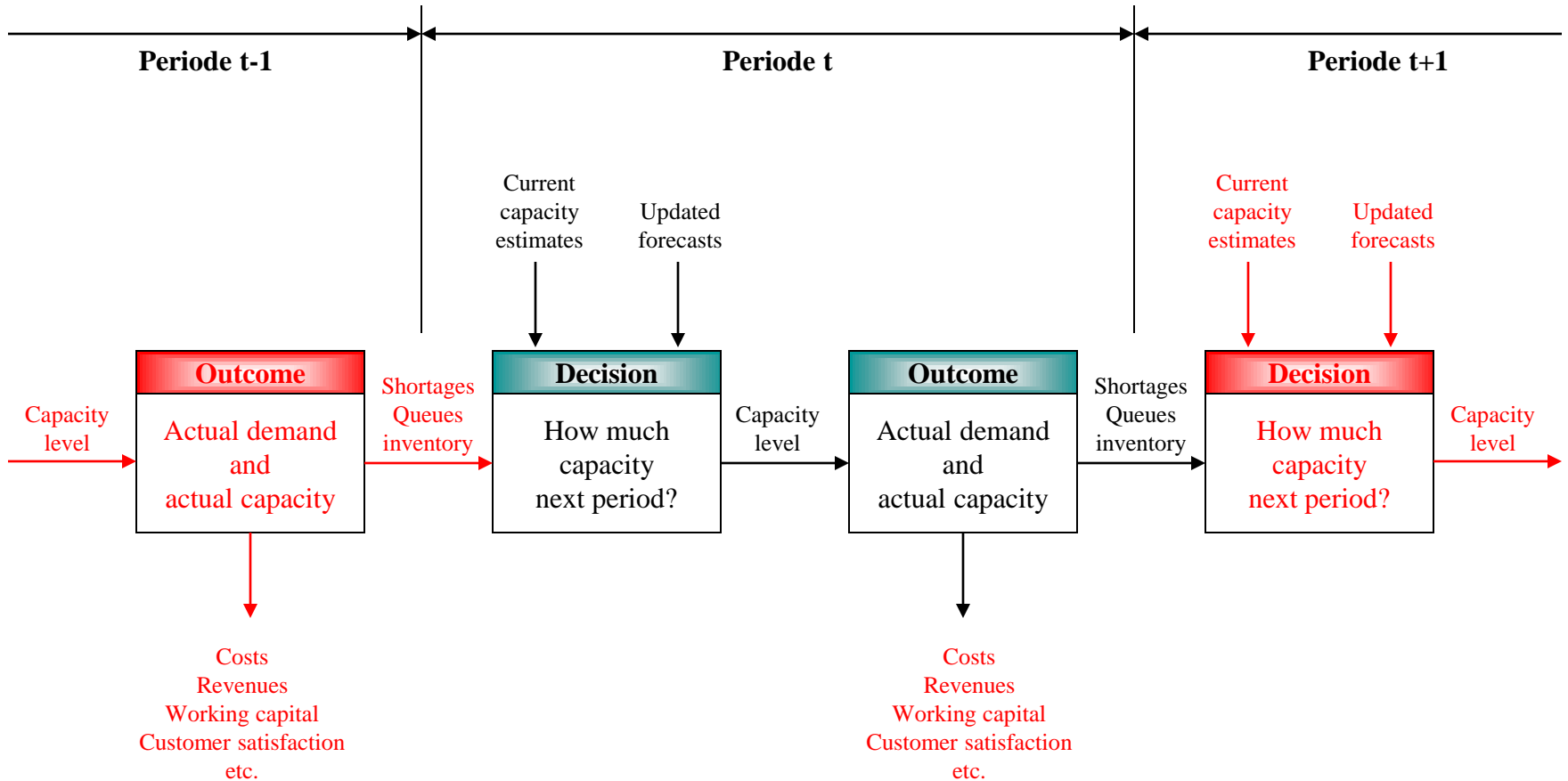


 Self-managed method study

# Causes of Seasonality



# Capacity Planning and Control



# Dynamics of Capacity Planning

## Short-term outlook

POOR Outlook < 1	NORMAL Outlook = 1	GOOD Outlook > 1
---------------------	-----------------------	---------------------

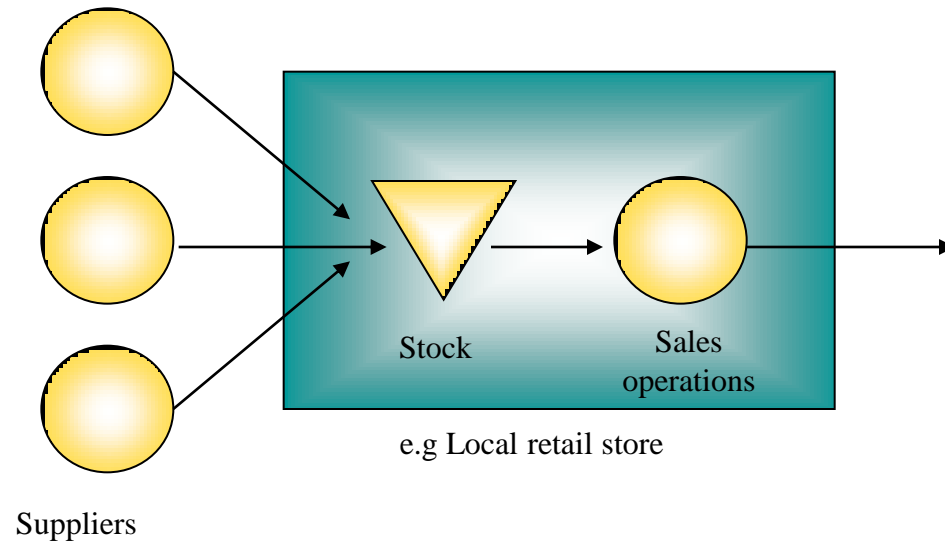
## Long-term outlook

POOR Outlook < 1	<b>Lay-off staff</b>	<b>Delay any action</b>	<b>Overtime</b> <b>Hire temporary staff</b>
NORMAL Outlook = 1	<b>Short-time</b> <b>Idle time</b>	<b>Do nothing</b>	<b>Overtime</b> <b>Hire temporary staff</b>
GOOD Outlook > 1	<b>Make for inventory</b> <b>Short time</b>	<b>Hire and make for inventory</b> <b>Start to recruit</b>	<b>Hire staff</b>

Outlook = Forecast demand / Forecast capacity

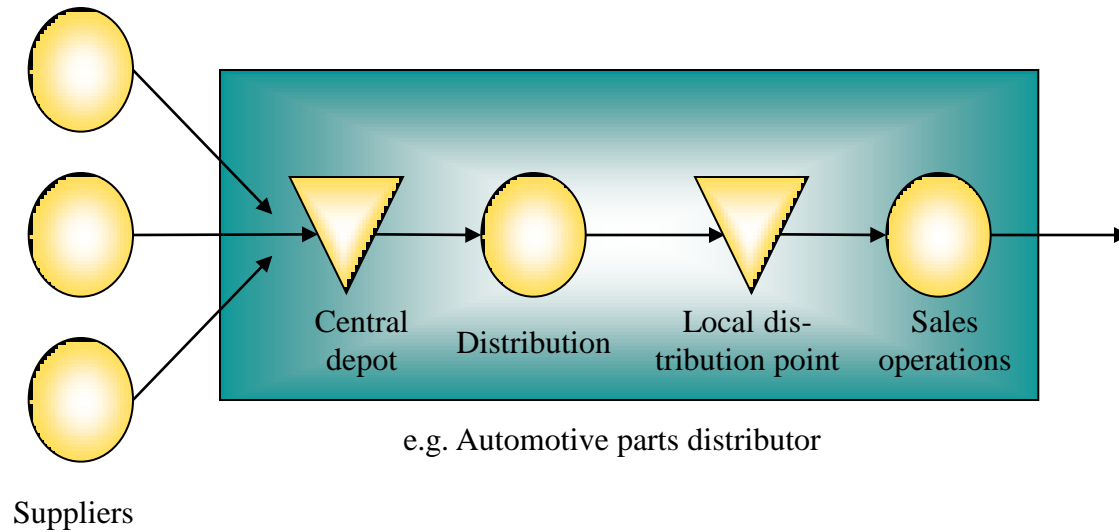
# The Position of Inventory I

**(a) single-stage inventory system**



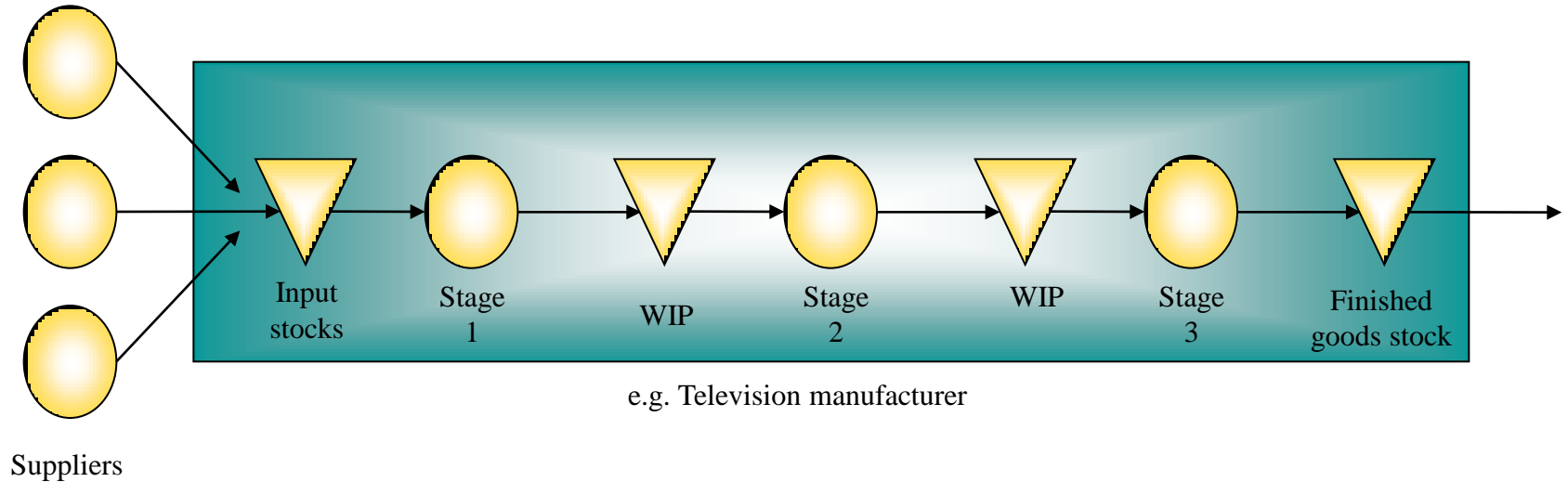
# The Position of Inventory II

## (b) Two-stage inventory system



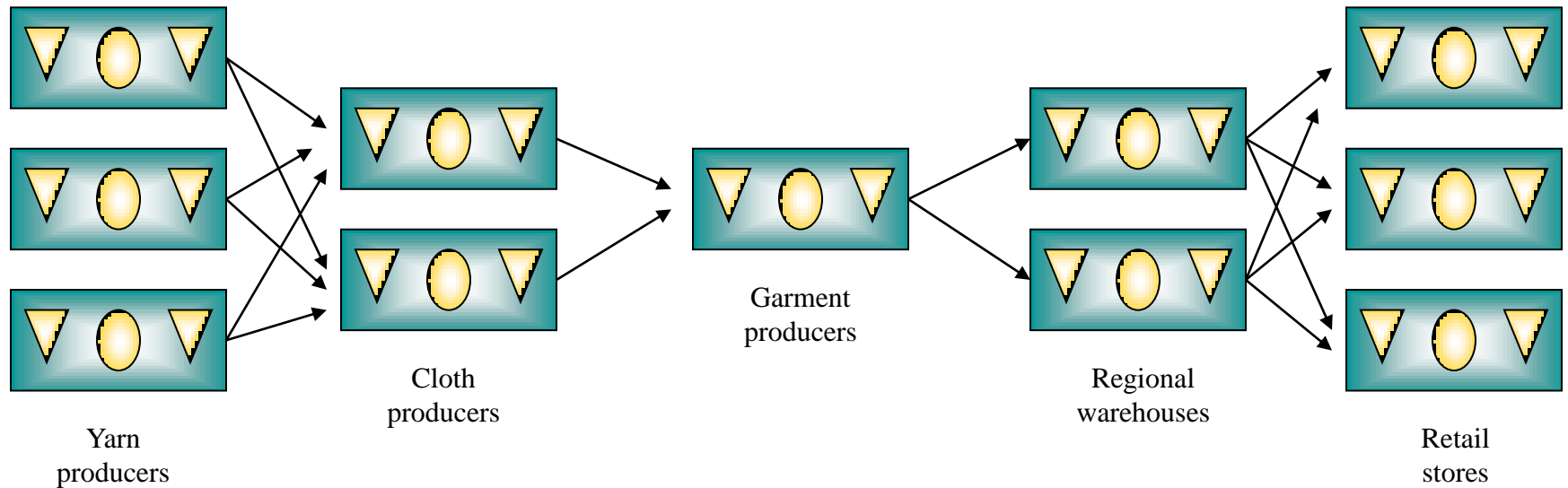
# The Position of Inventory III

## (c) Multi-stage inventory system

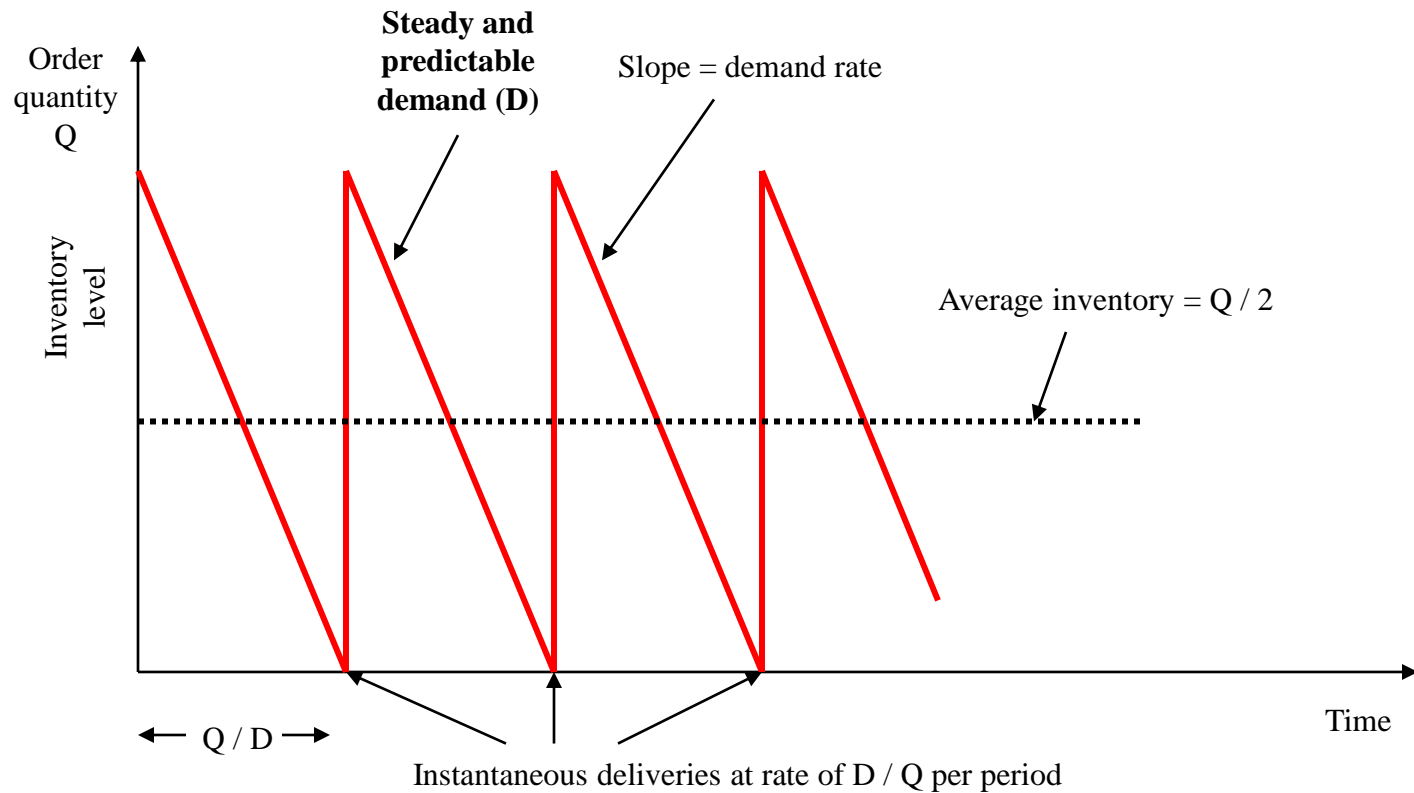


# The Position of Inventory IV

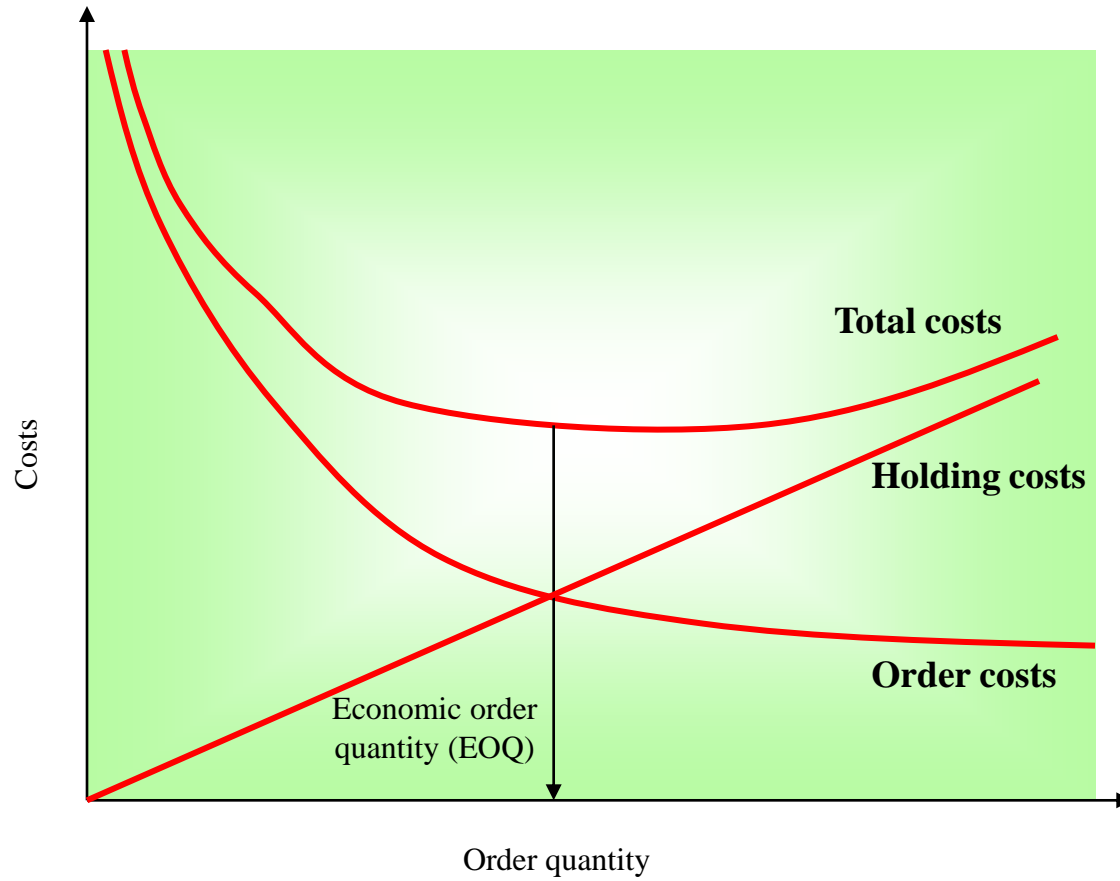
(d) Multi-echelon inventory system



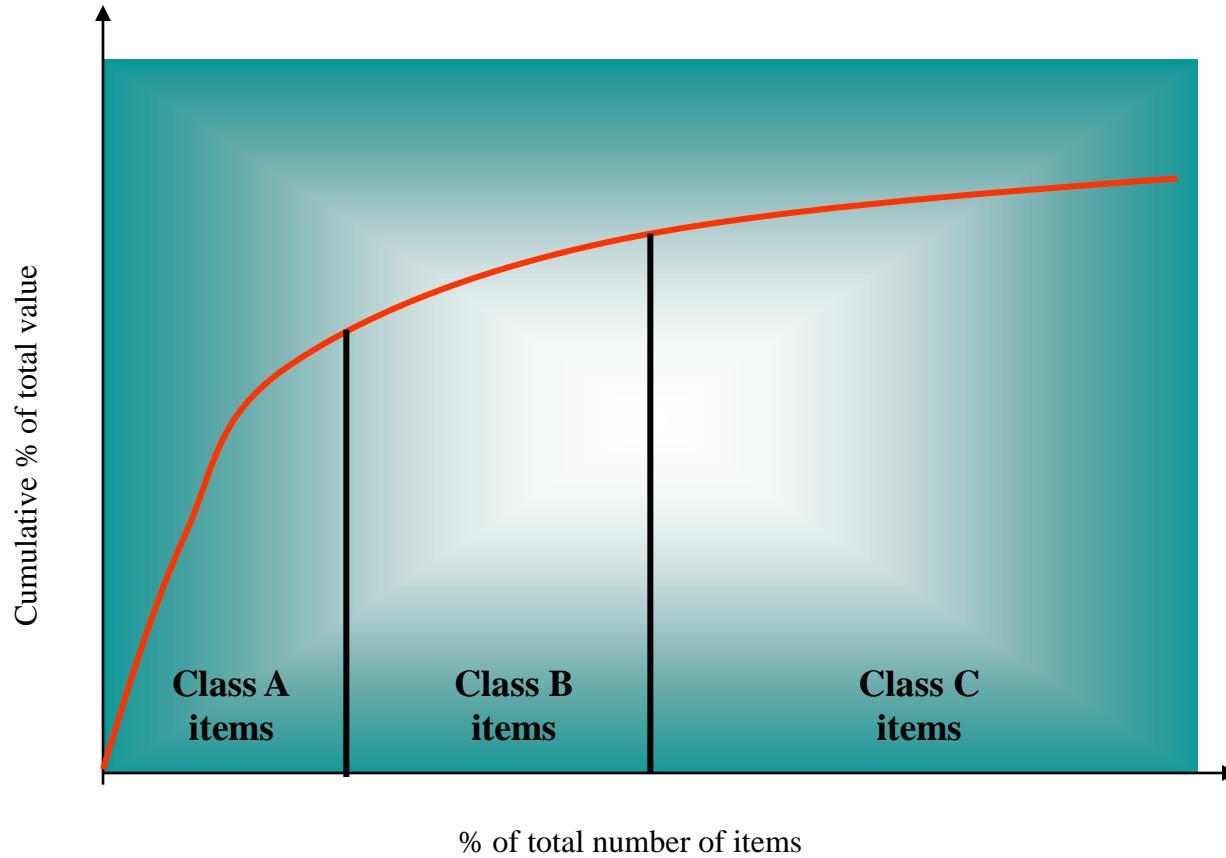
# Inventory Profile



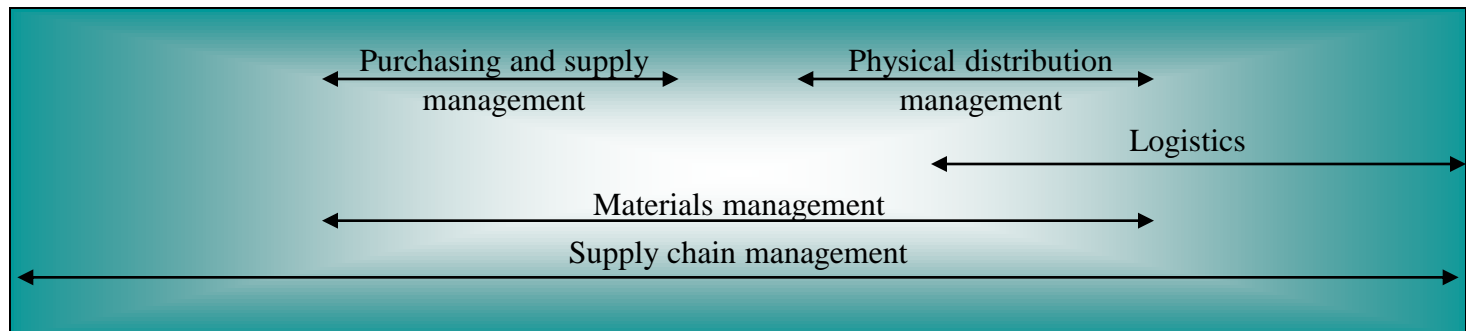
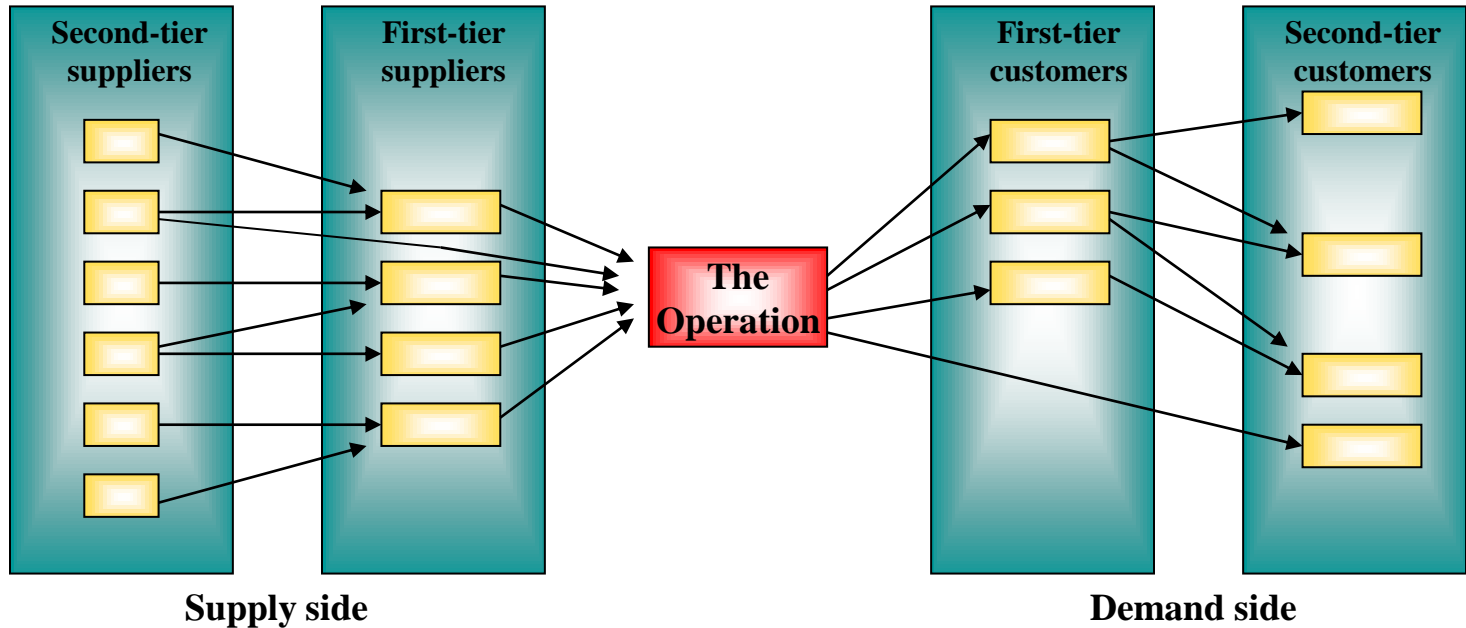
# Economic Order Quantity



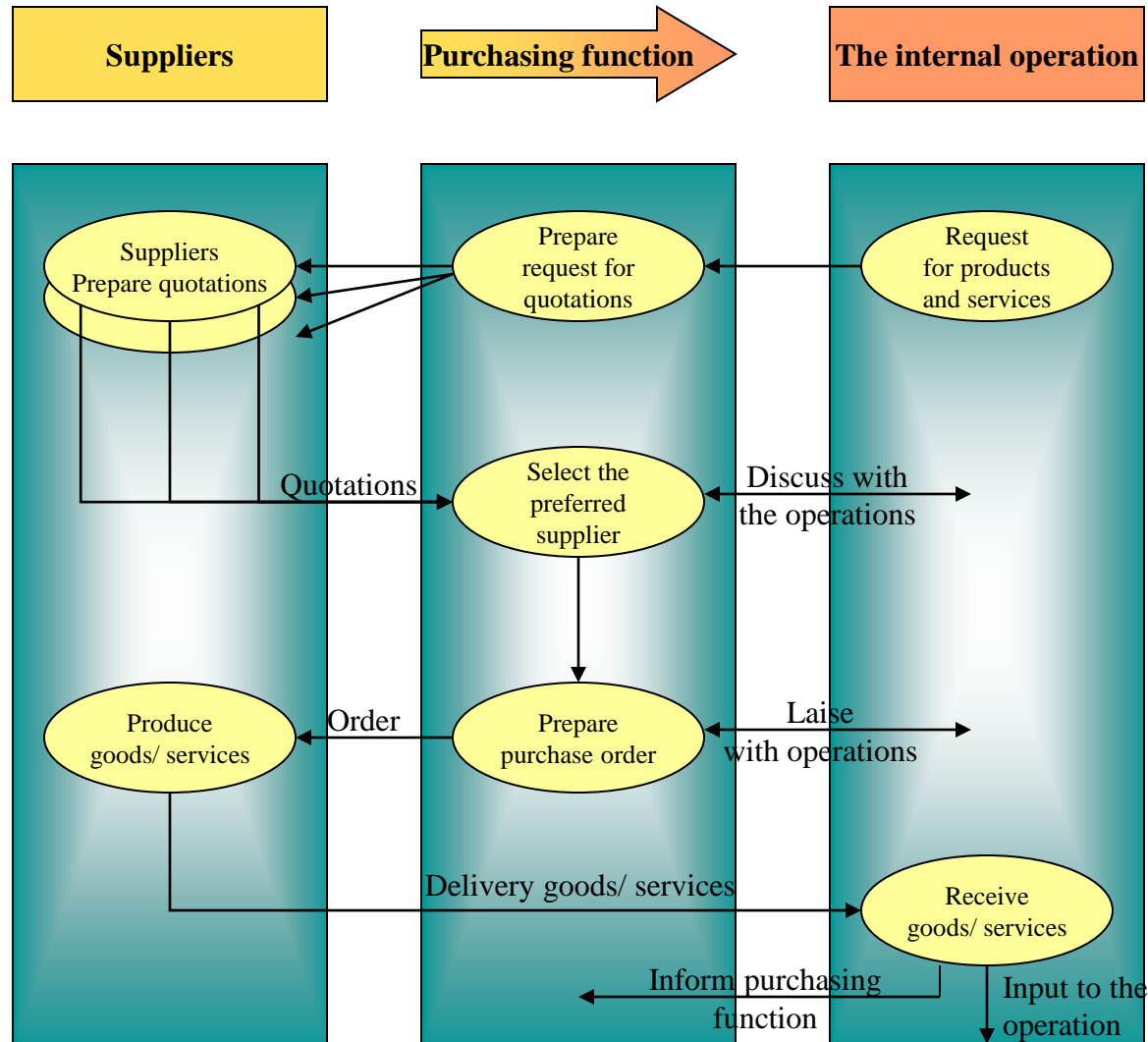
# Pareto Curve for Items in a Warehouse



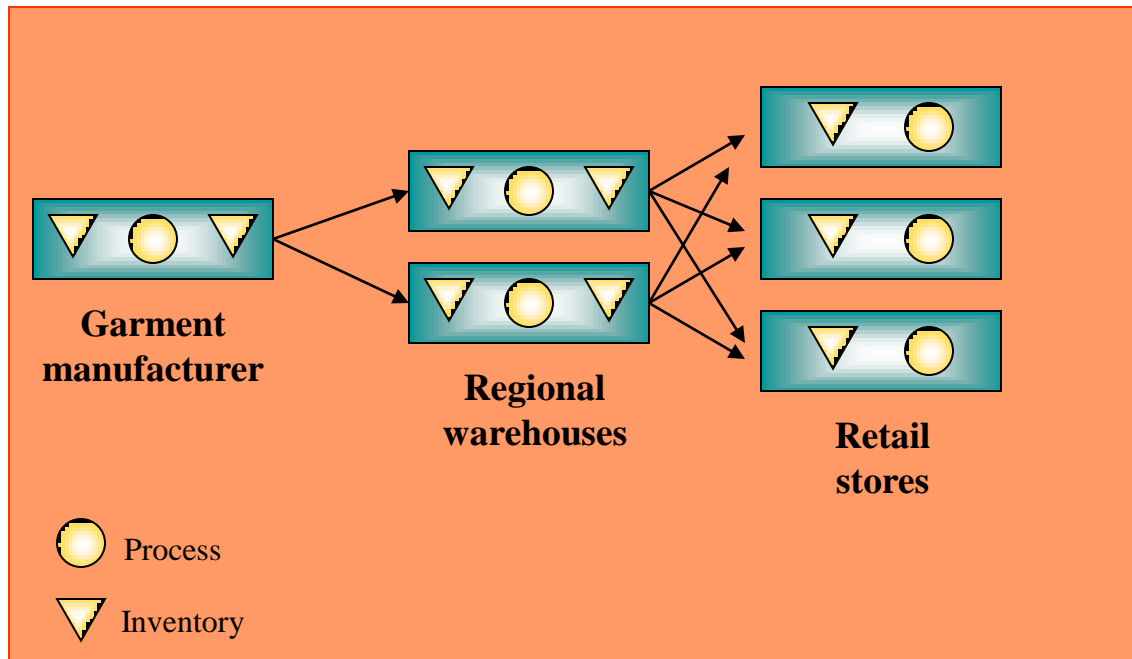
# Supply Chain Management



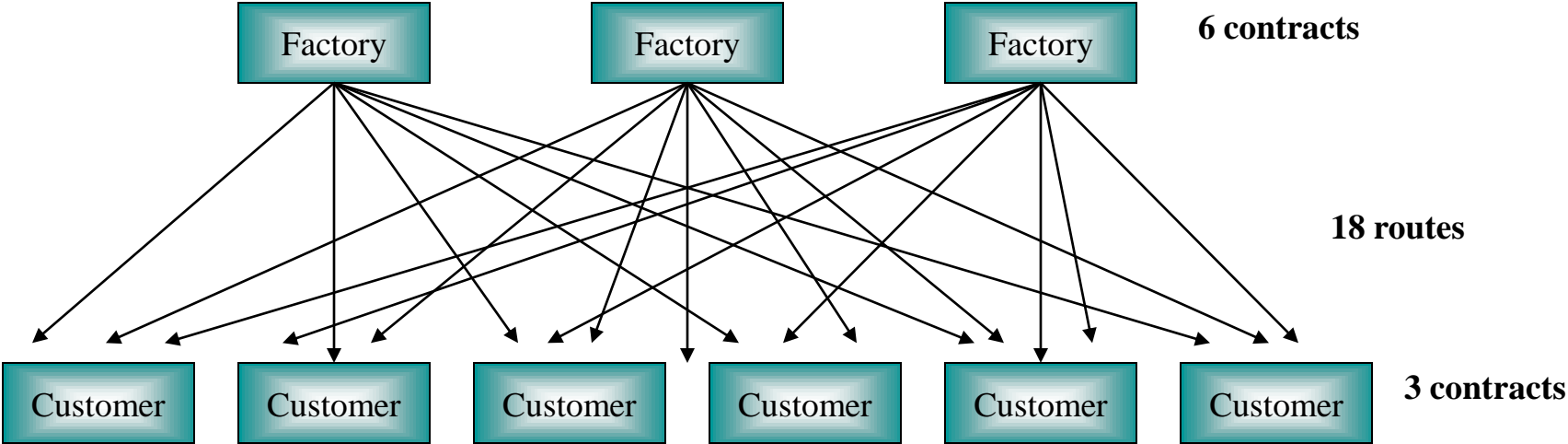
# The Purchasing Function



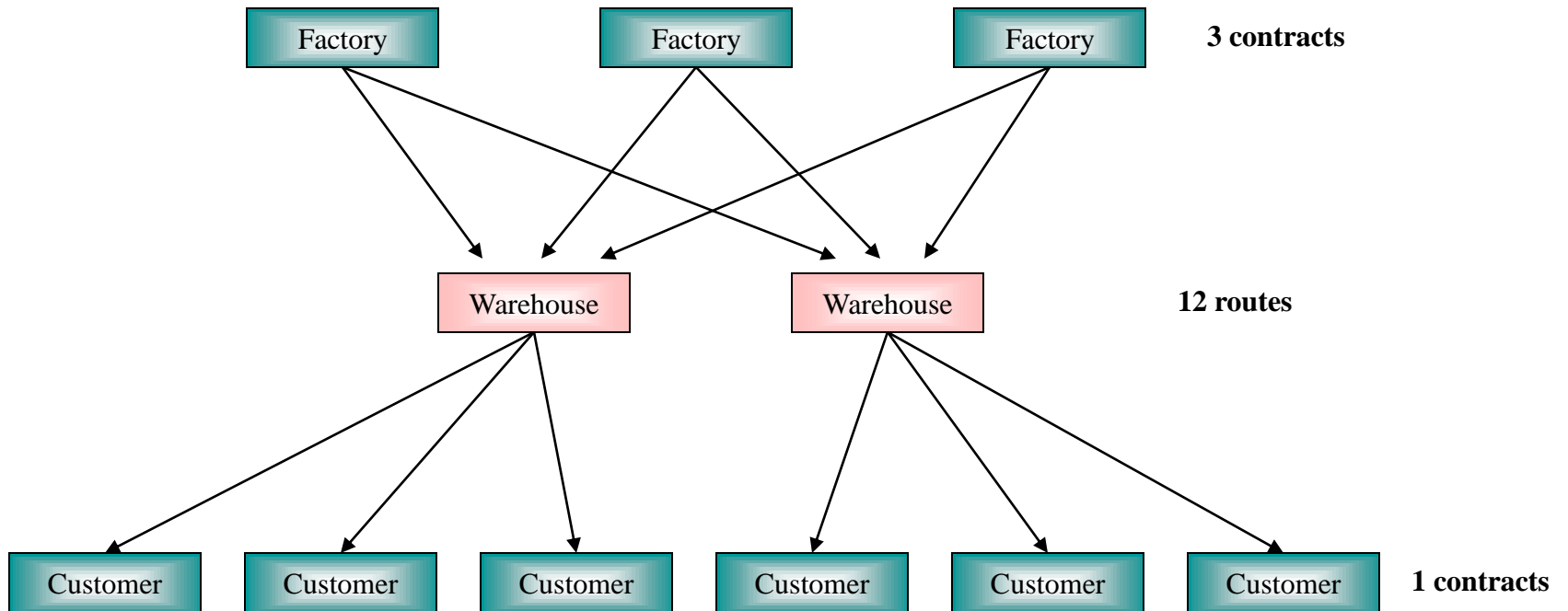
# The Multi-Echelon Physical System I



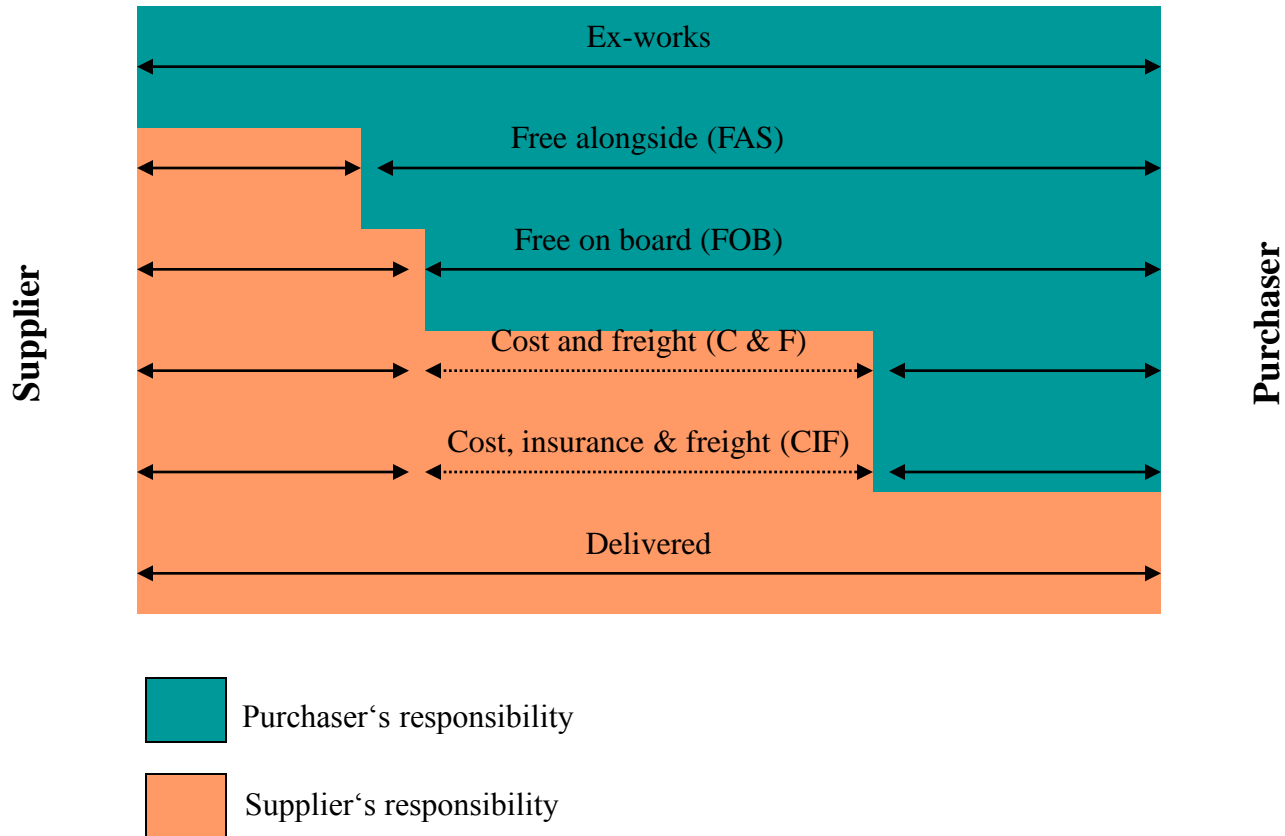
# Multi-Echelon Physical System II



# Multi-Echelon Physical System III



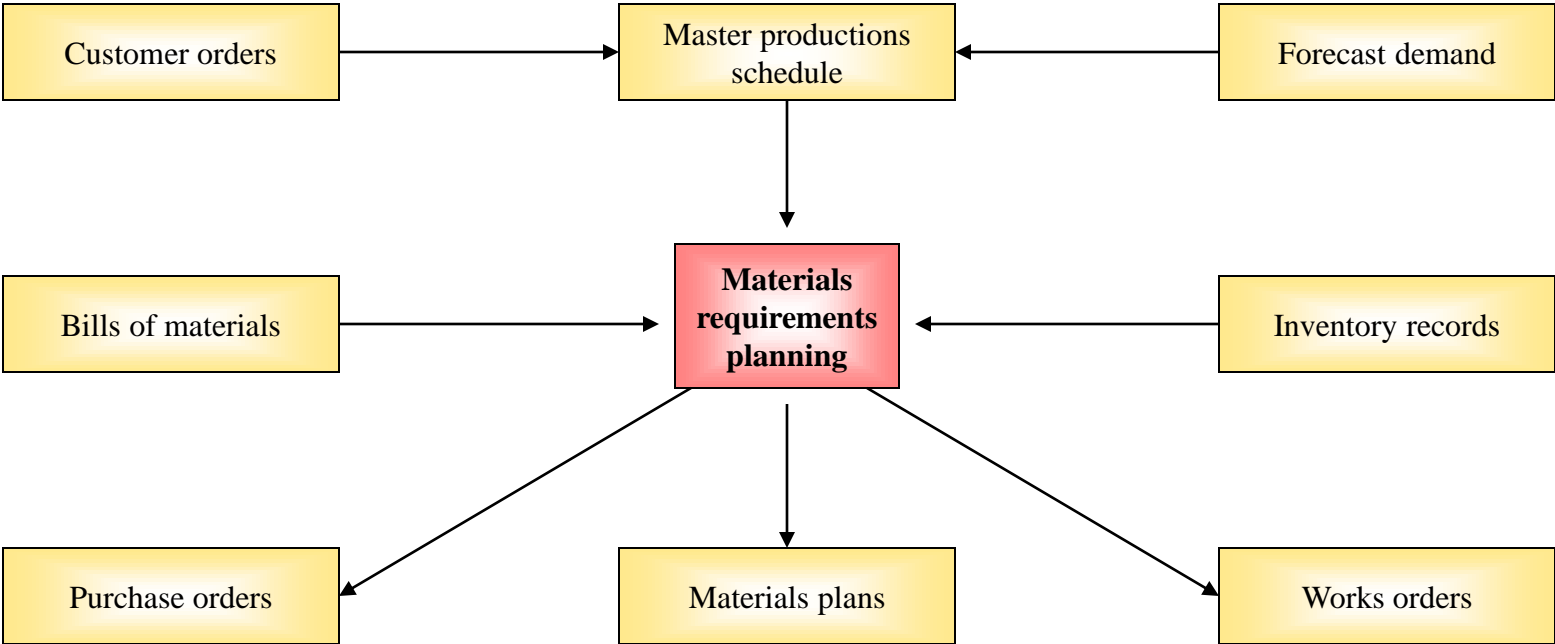
# Responsibilities of Supplier and Purchaser



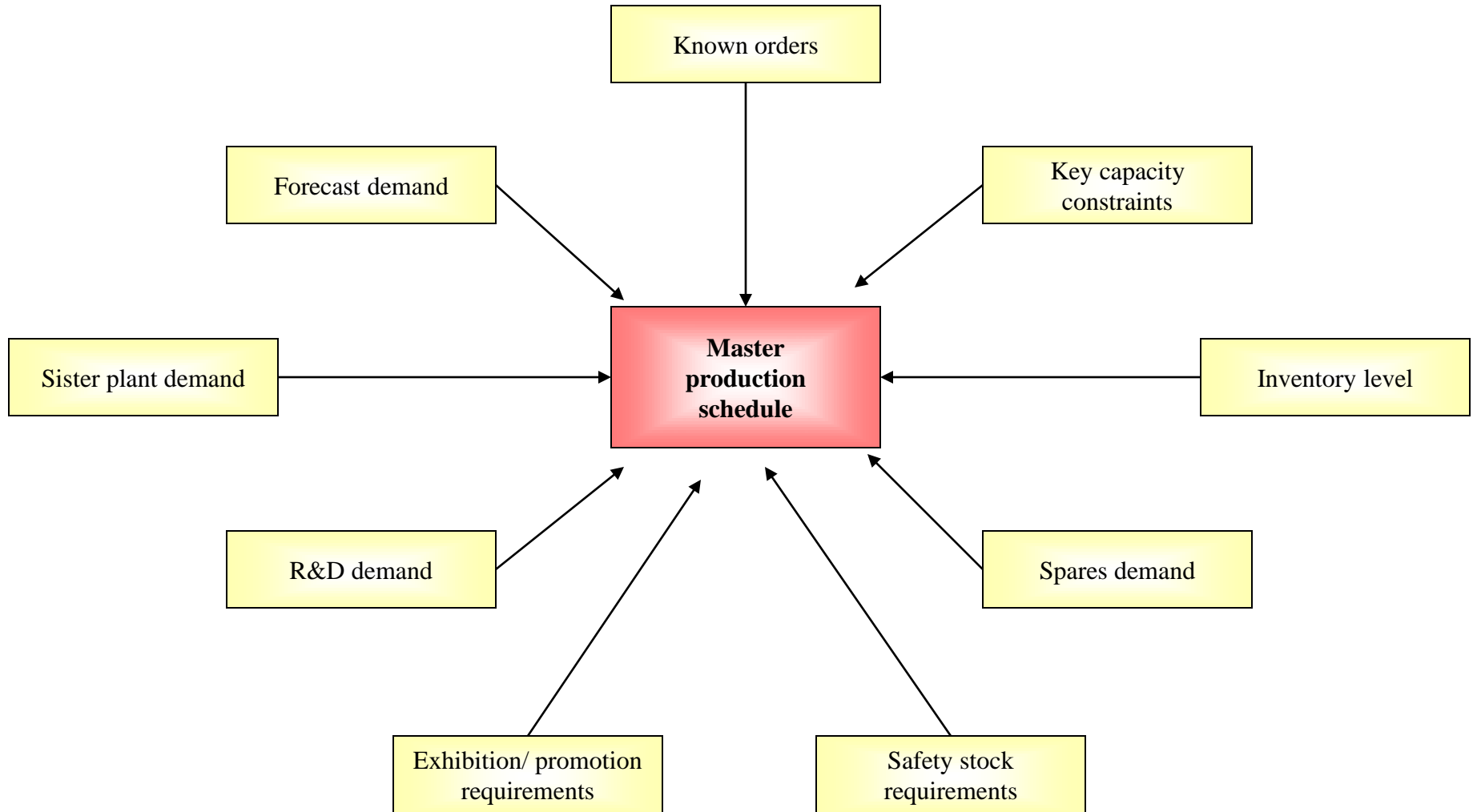
# Materials Management



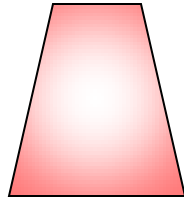
# Material Requirement Planning



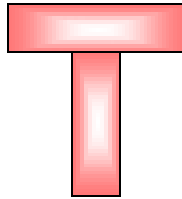
# Inputs into the Master Production Schedule



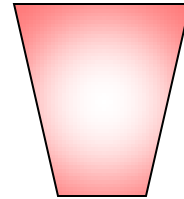
# Different Shapes of Product Structure



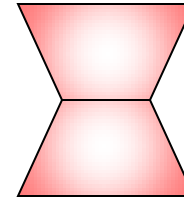
A-shape  
product structure



T-shape  
product structure

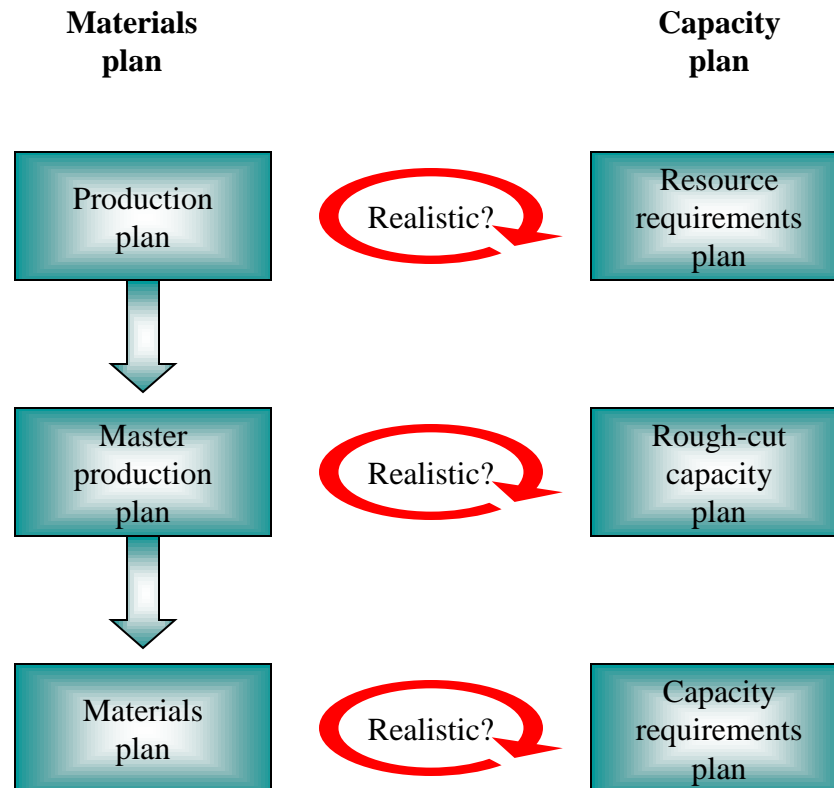


V-shape  
product structure



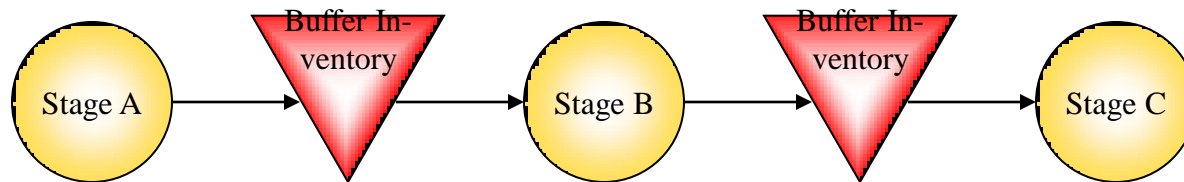
Hourglass or X-shape  
product structure

# Closed-Loop MRP



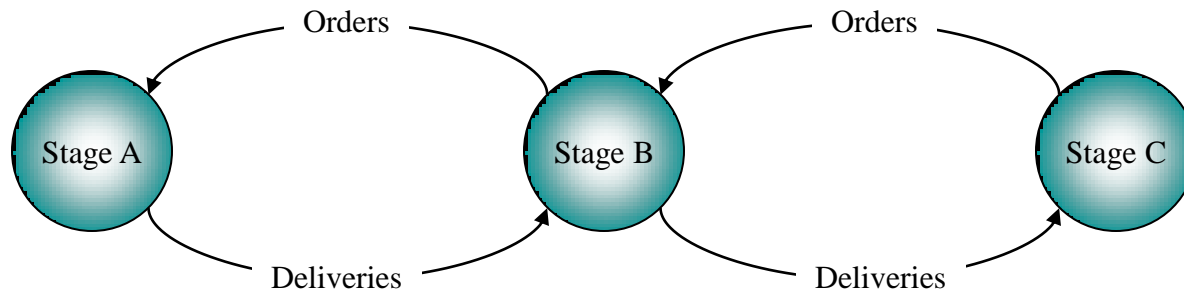
# Traditional Flow

**(a) Traditional approach – buffer separate stages**

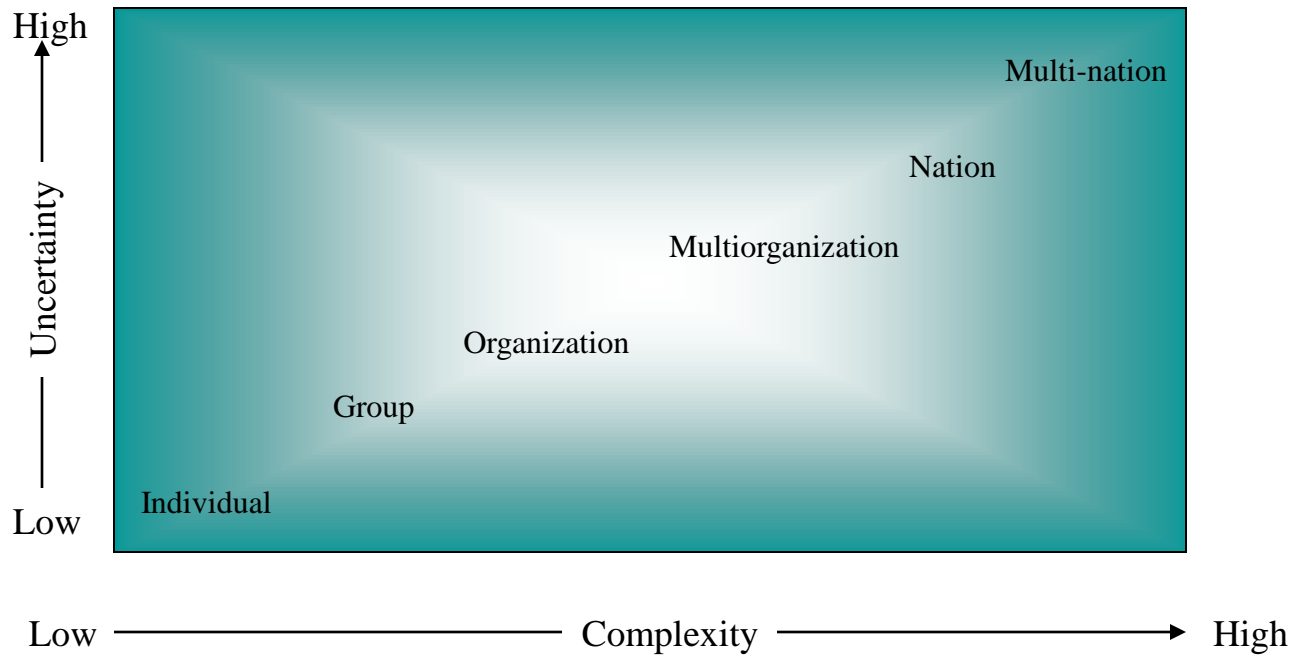


# Just-in-time (JIT) Flow

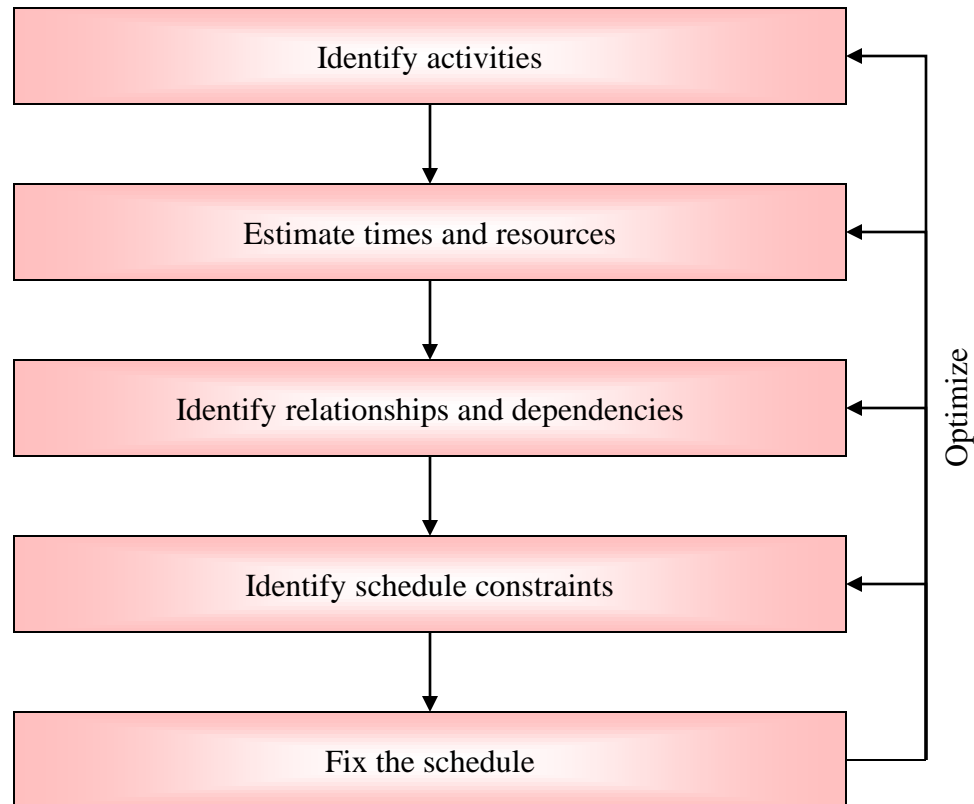
**(b) JIT approach – deliveries are made on request**



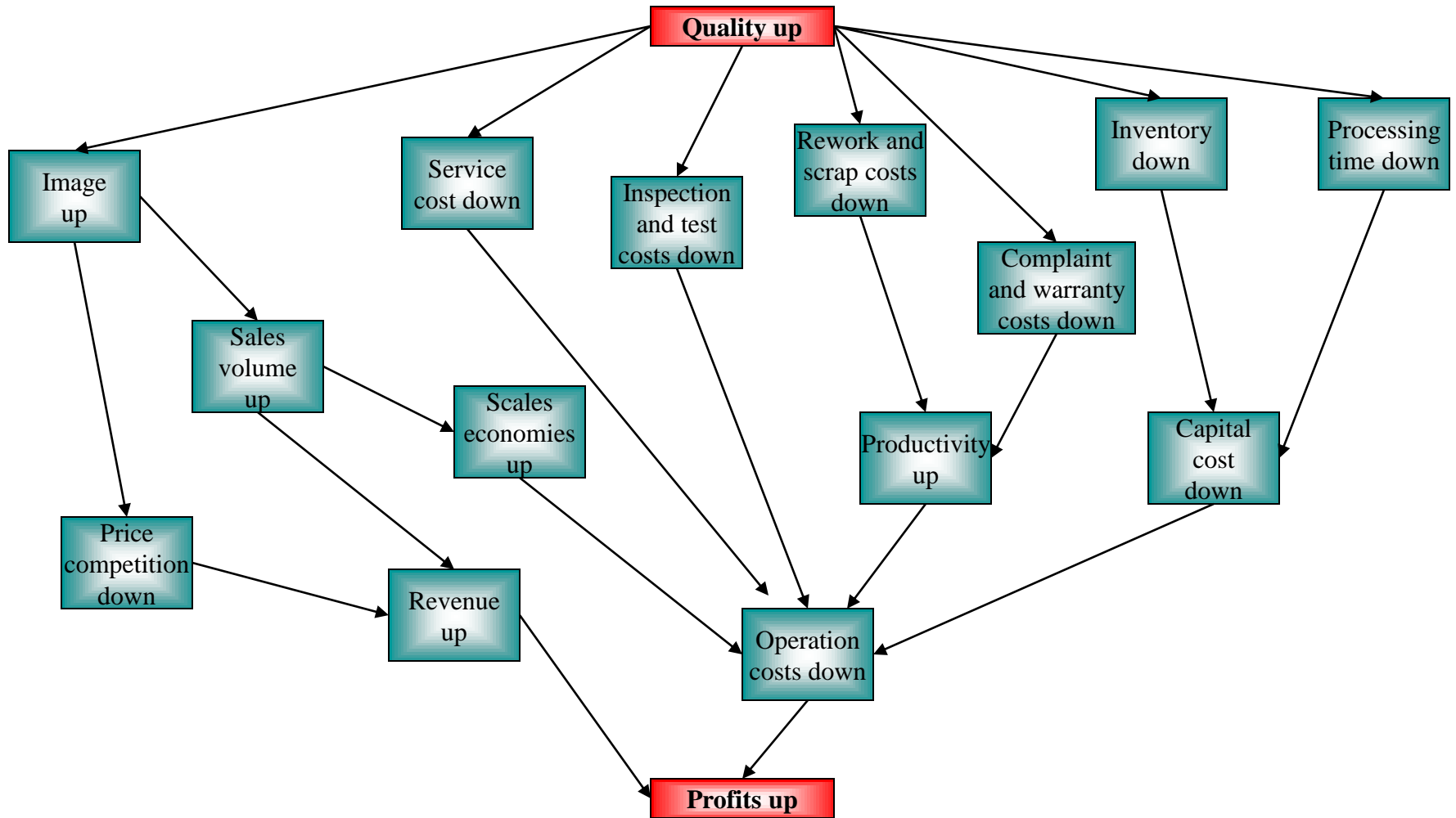
# A Typology of Projects



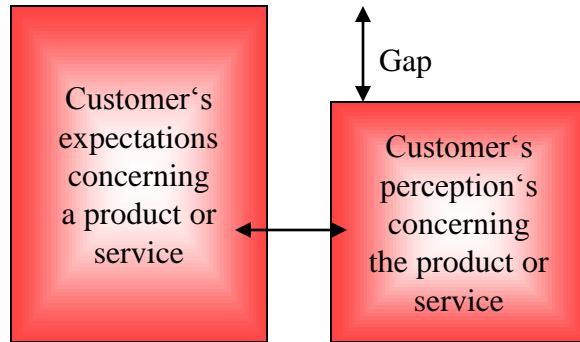
# The Process of Project Planning



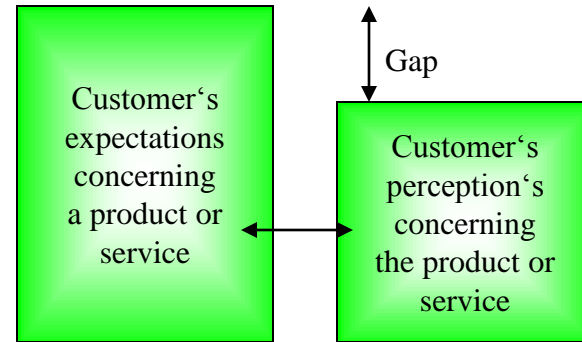
# Effect of Higher Quality on Revenue and Cost



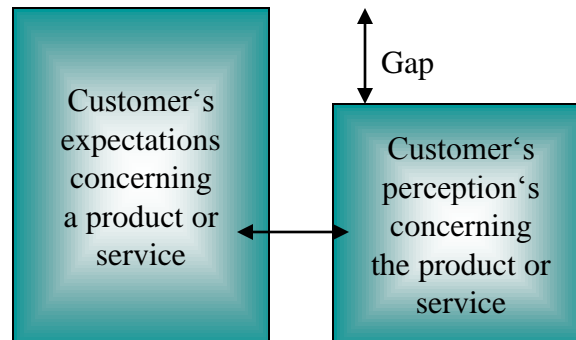
# The Customer's Views of Quality



Expectation > perceptions  
Perceived quality is poor

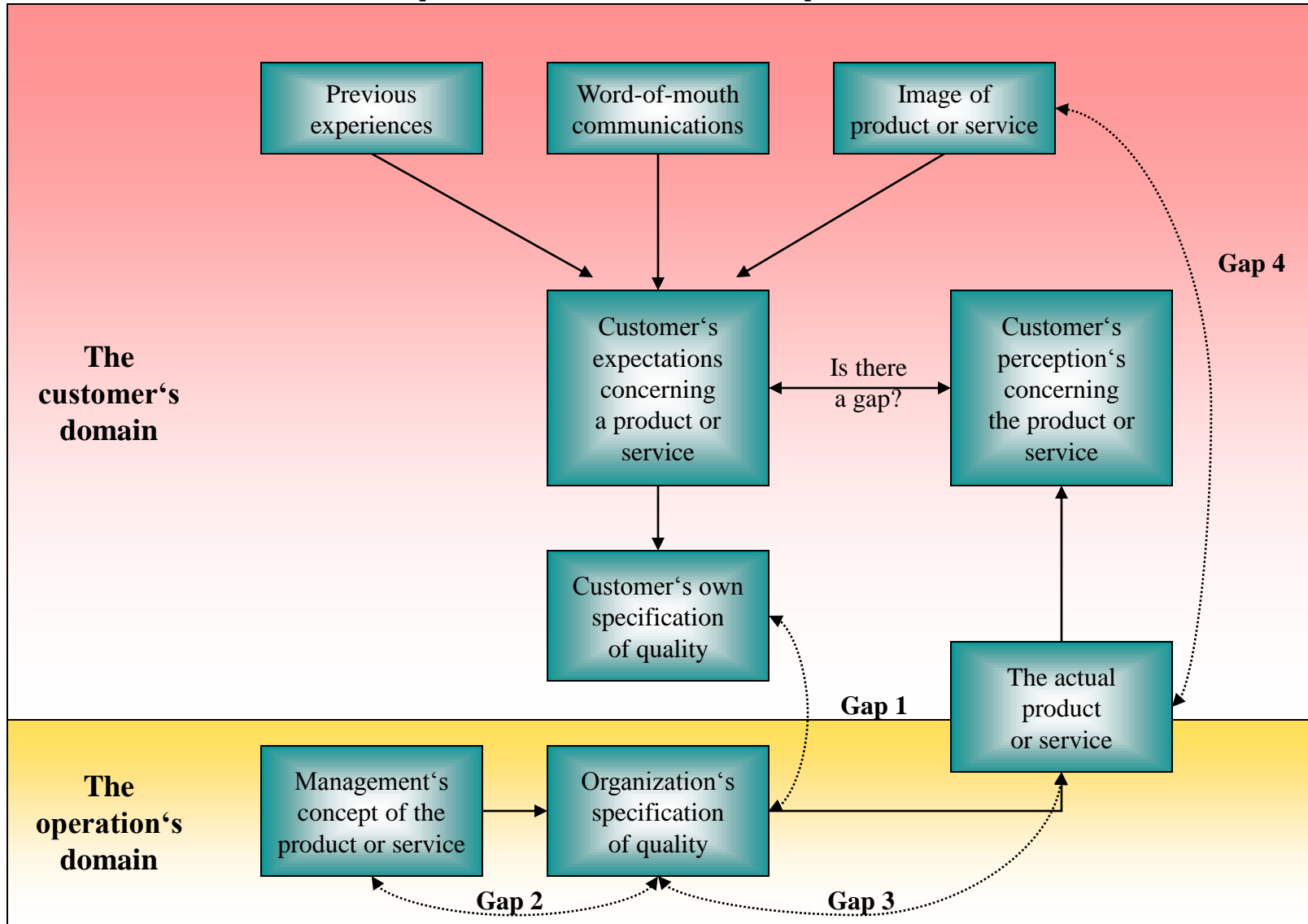


Expectation < perceptions  
Perceived quality is good

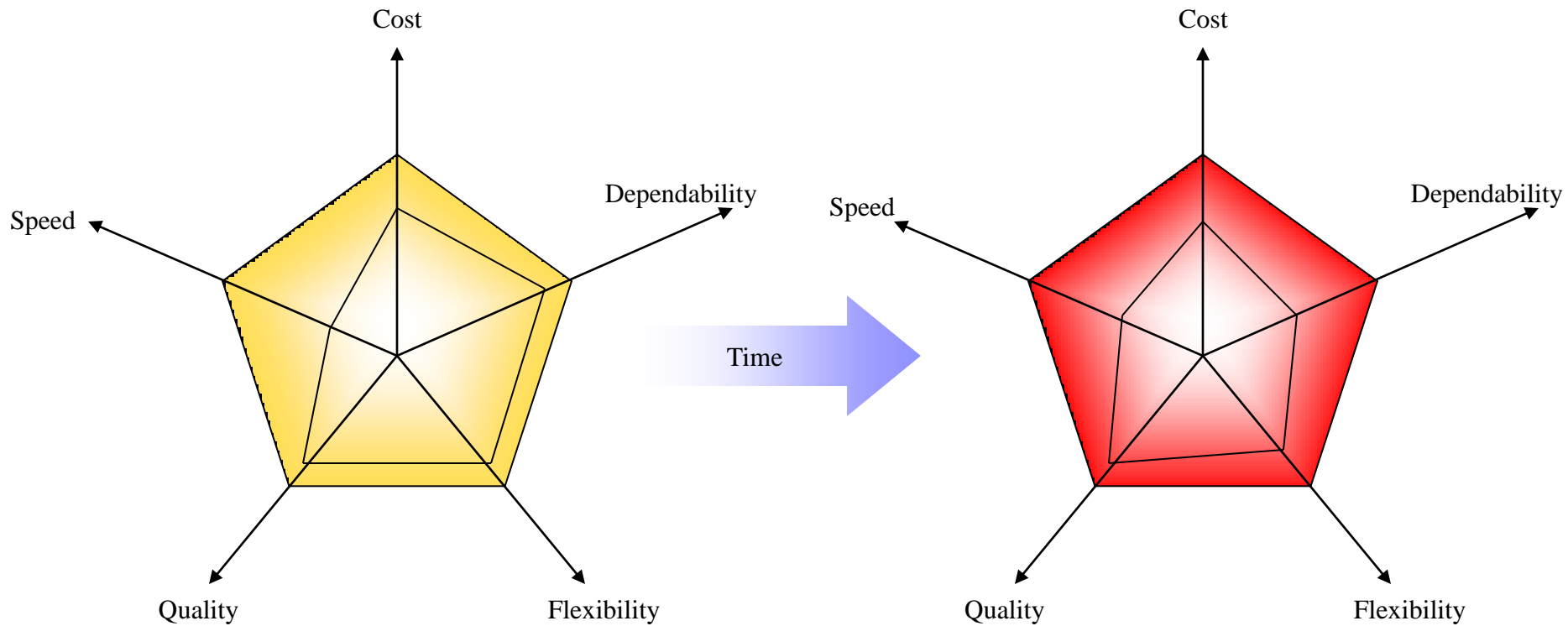


Expectation = perceptions  
Perceived quality is acceptable

# Gap Analysis Between Customers' Perception and Expectation



# Change in Customers' Needs and the Operation's Performance over Time

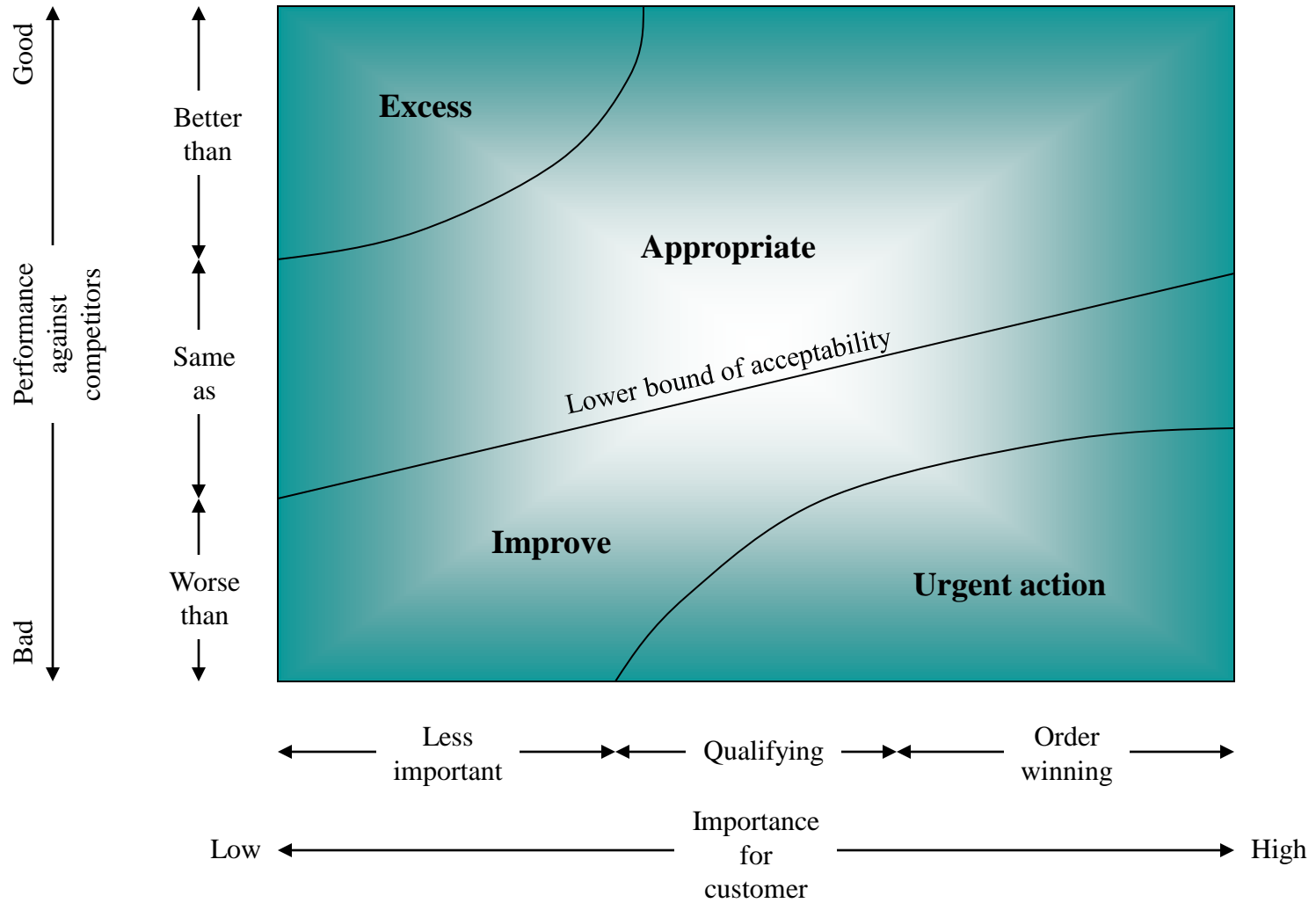


Performance of the operation

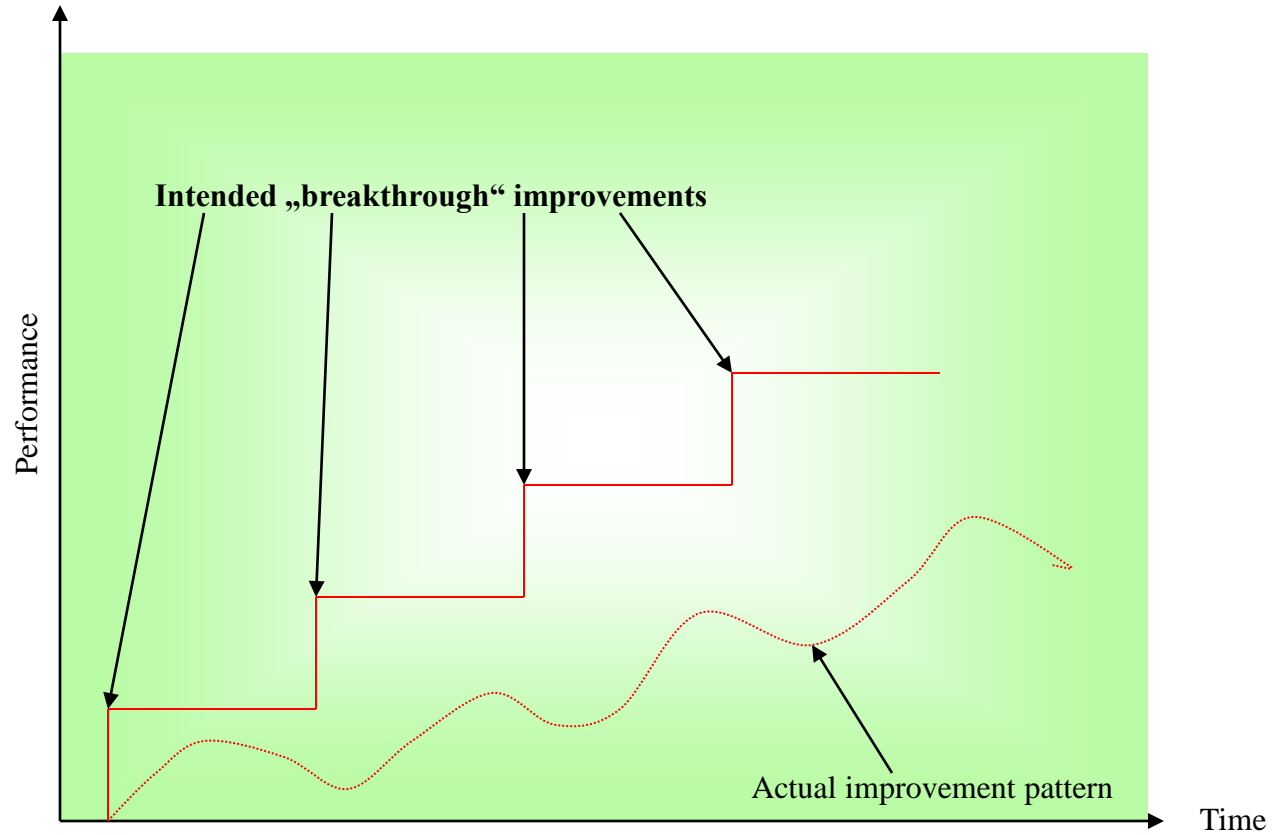


Performance of the market

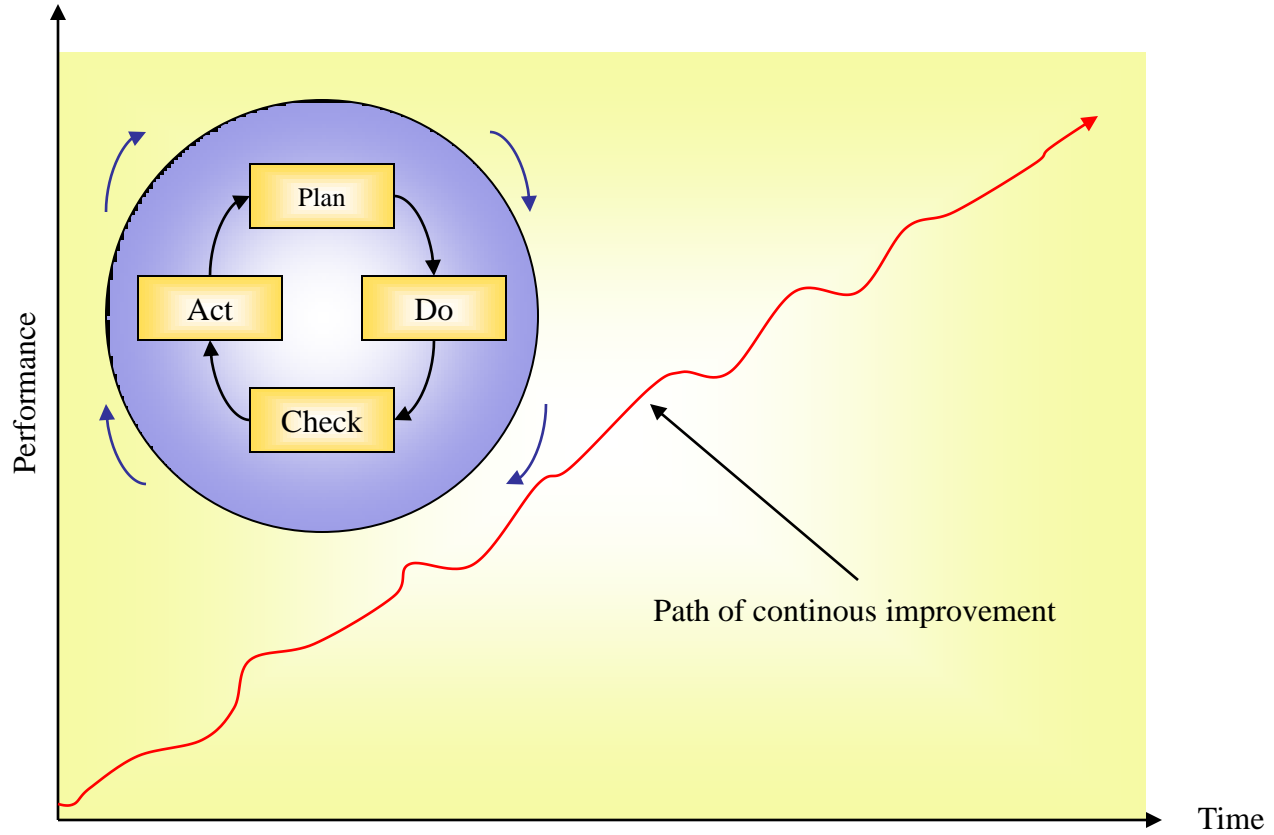
# The Importance-Performance Matrix



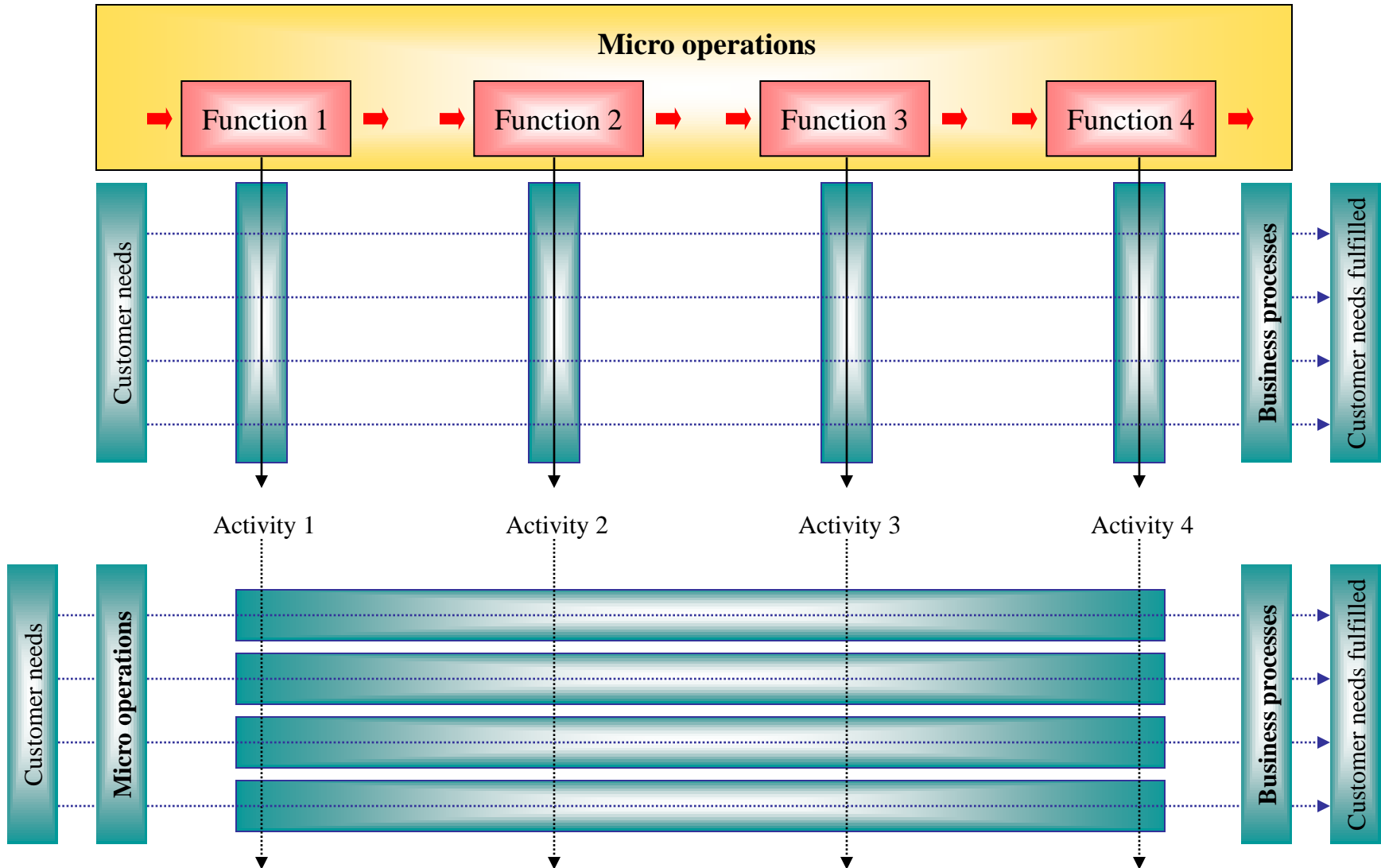
# Breakthrough Improvement



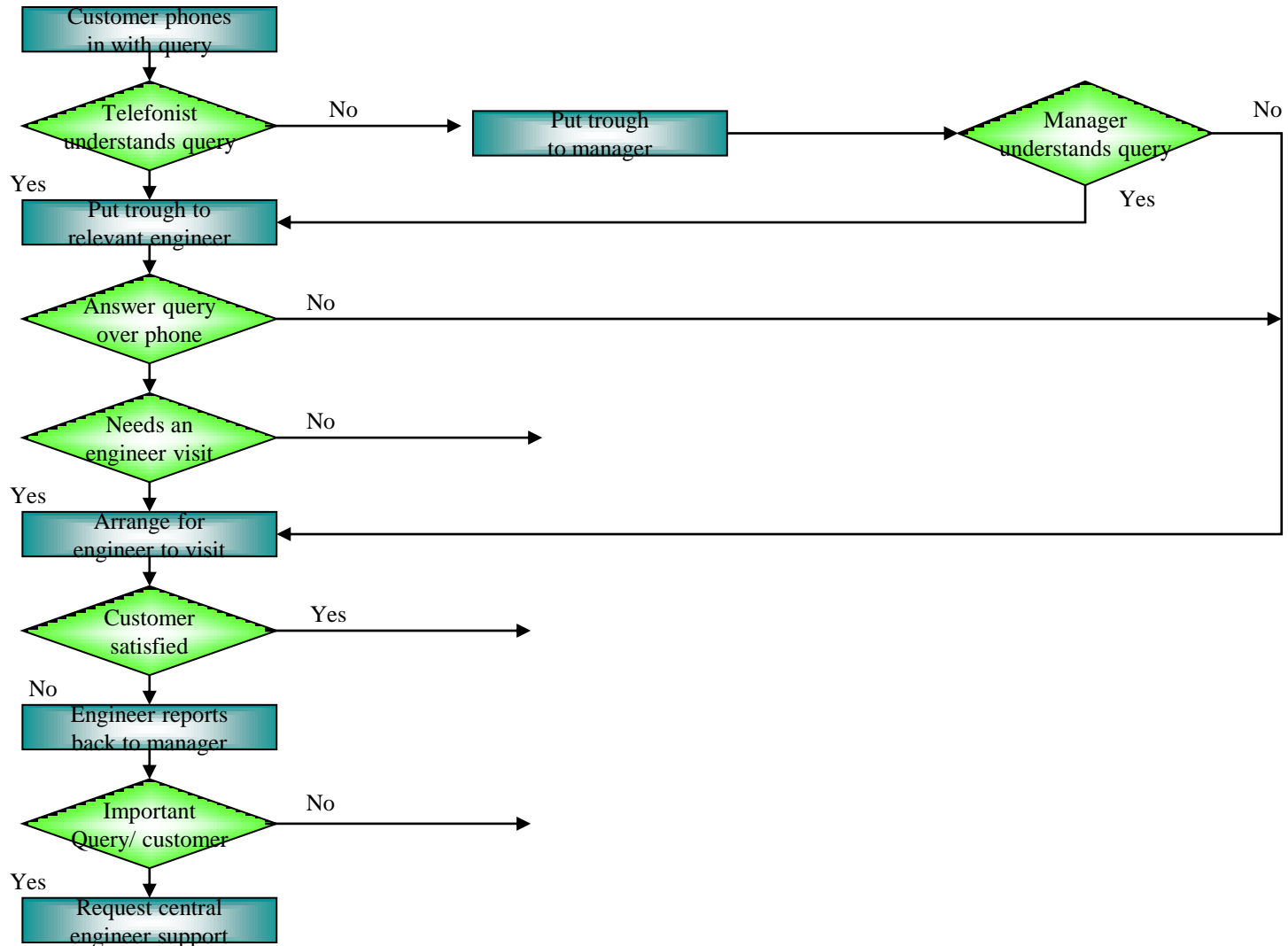
# The PDCA Cycle



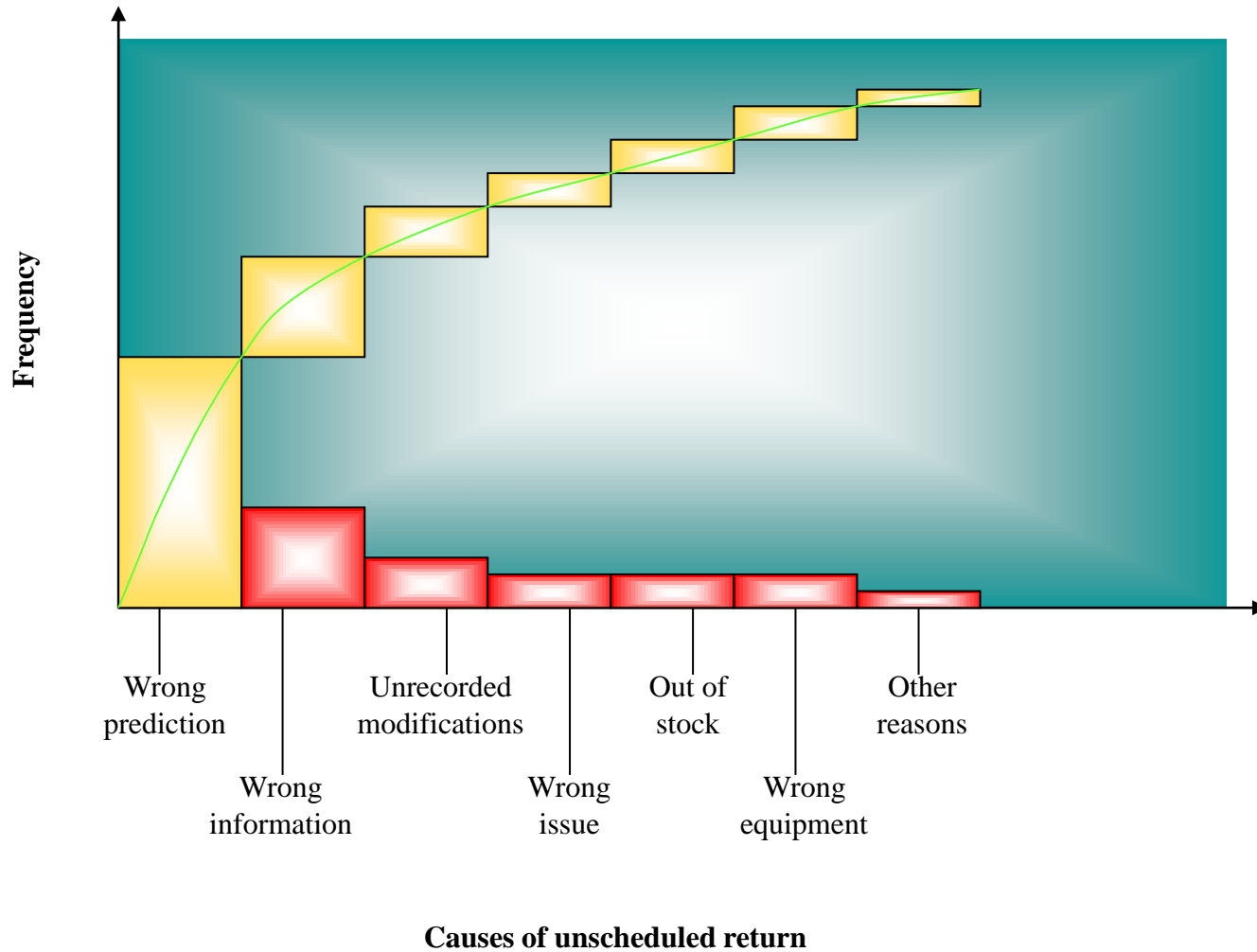
# The Business Process Re-engineering Approach



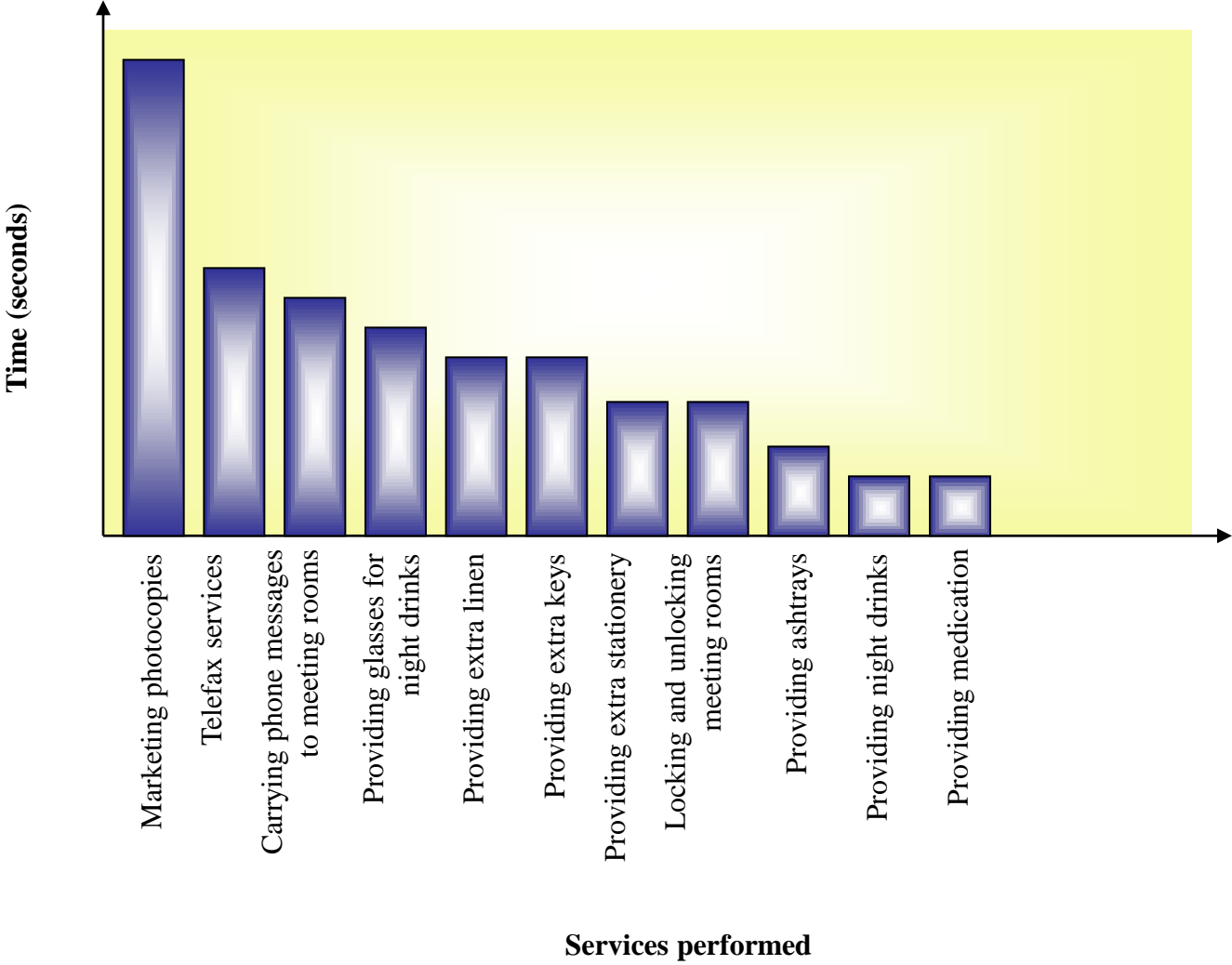
# Flow Chart for Customer Query



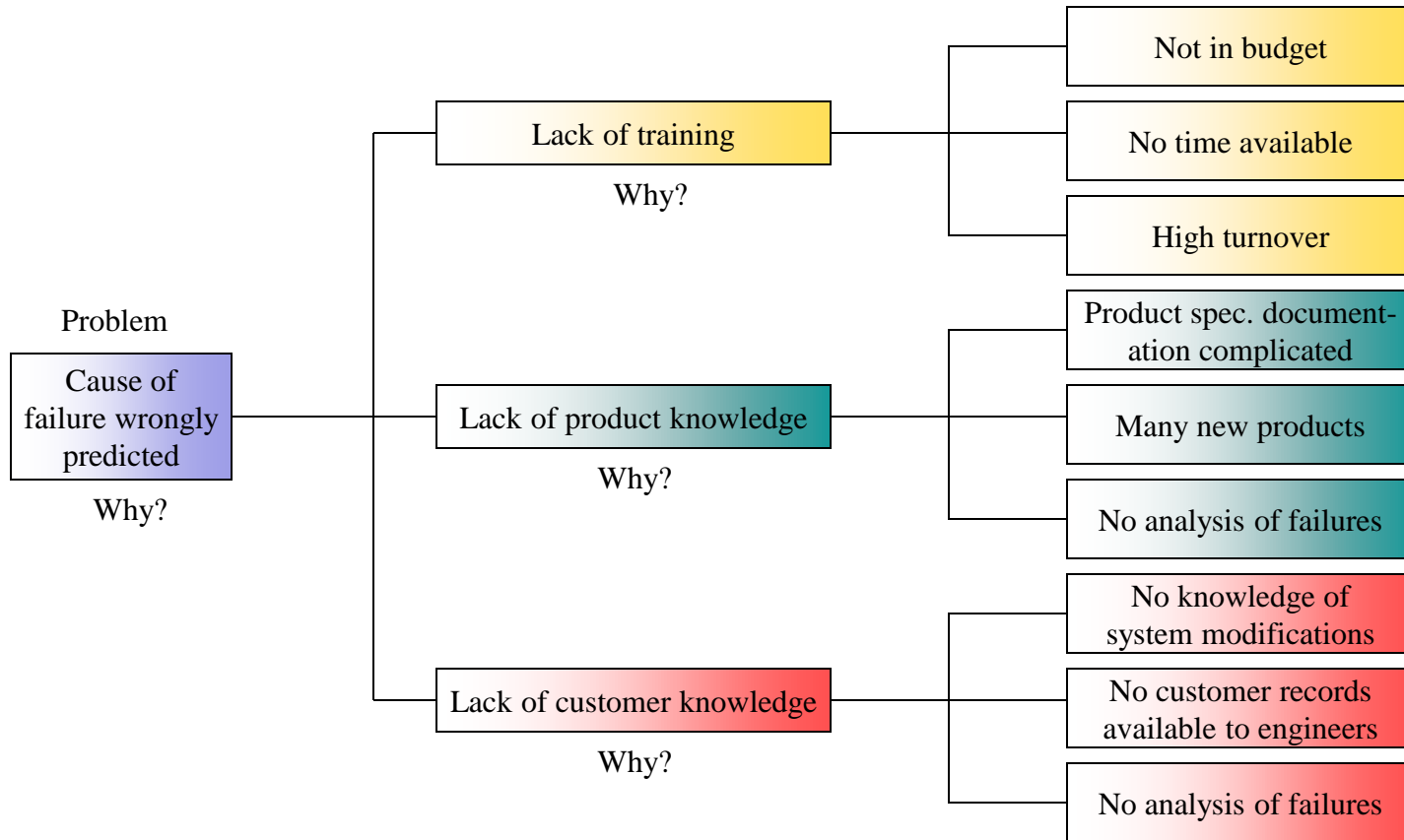
# Cause-Effect Diagram



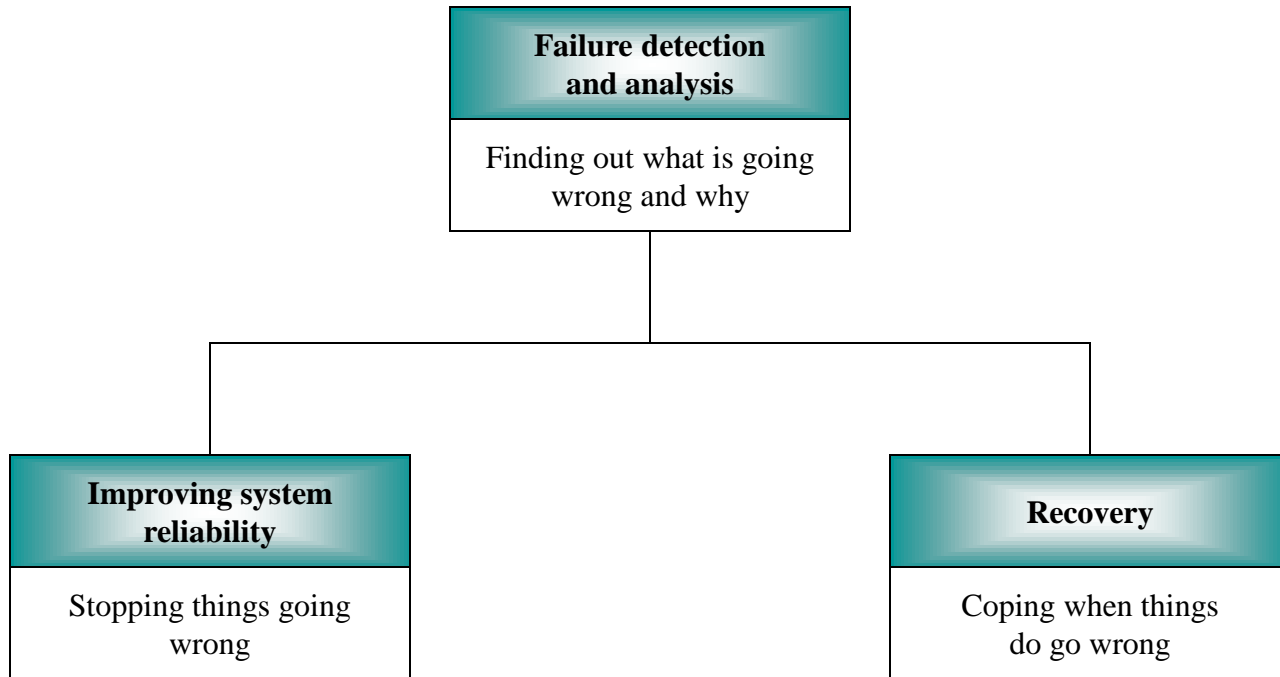
# Pareto Diagram



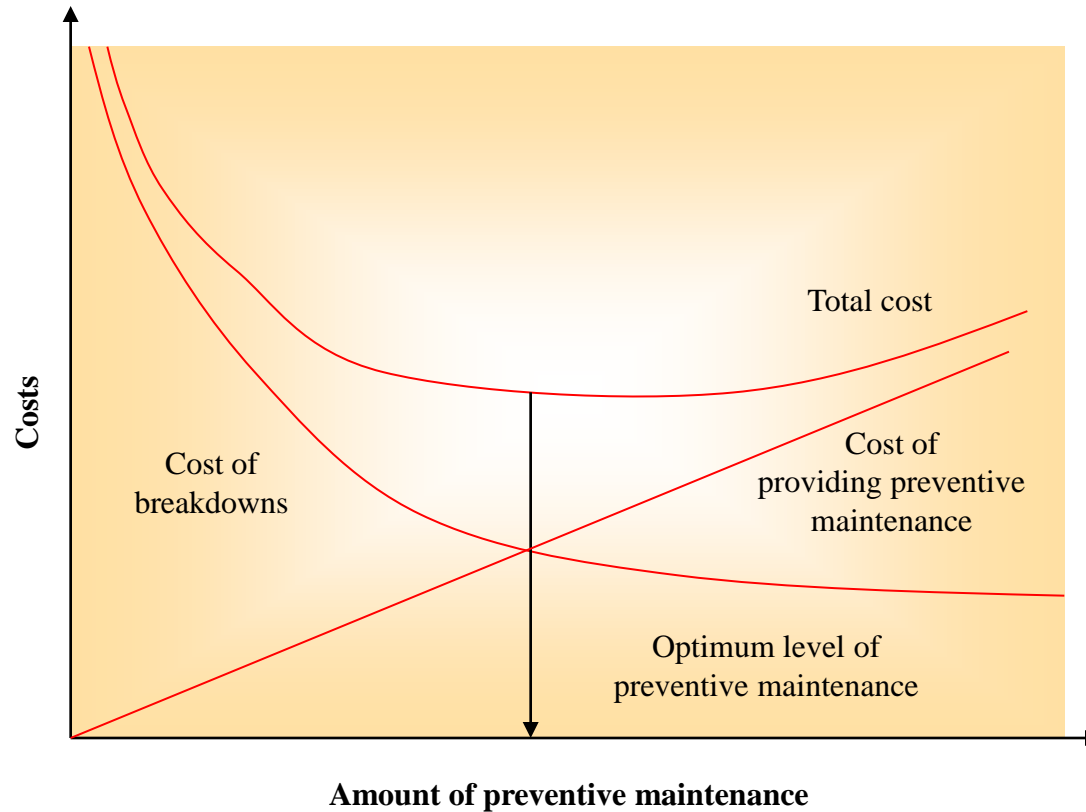
# Why-Why Analysis



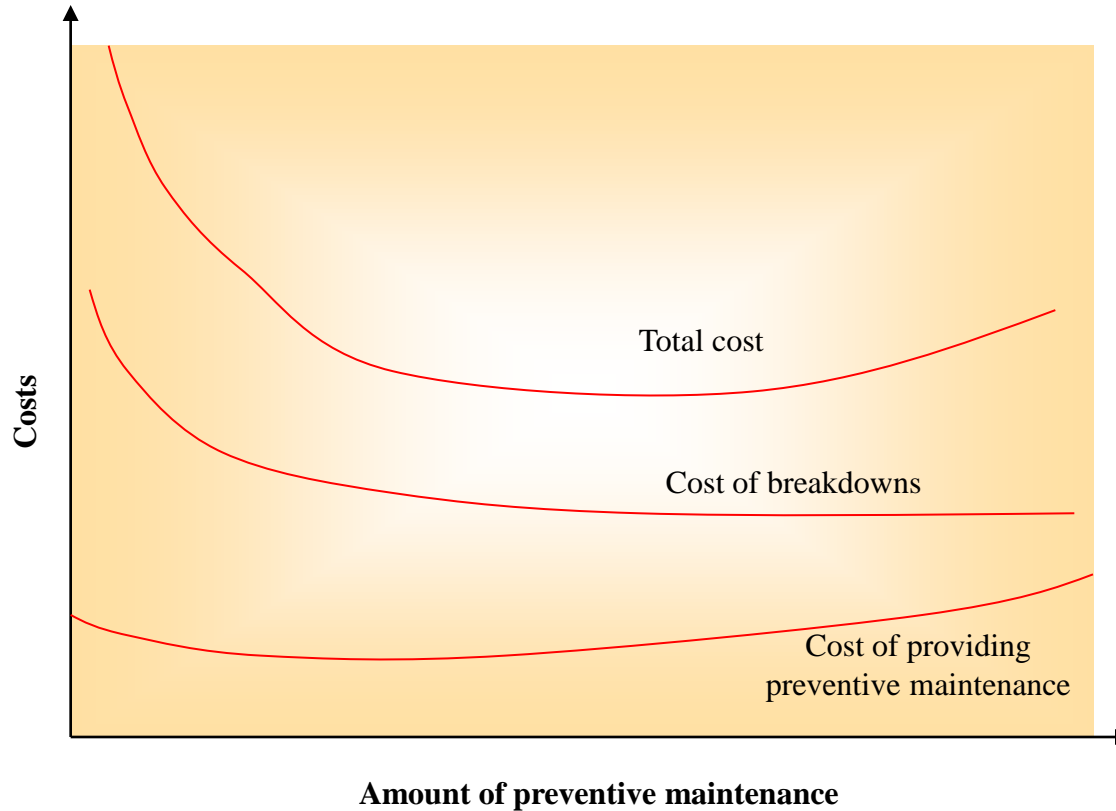
# Failure Prevention and Recovery



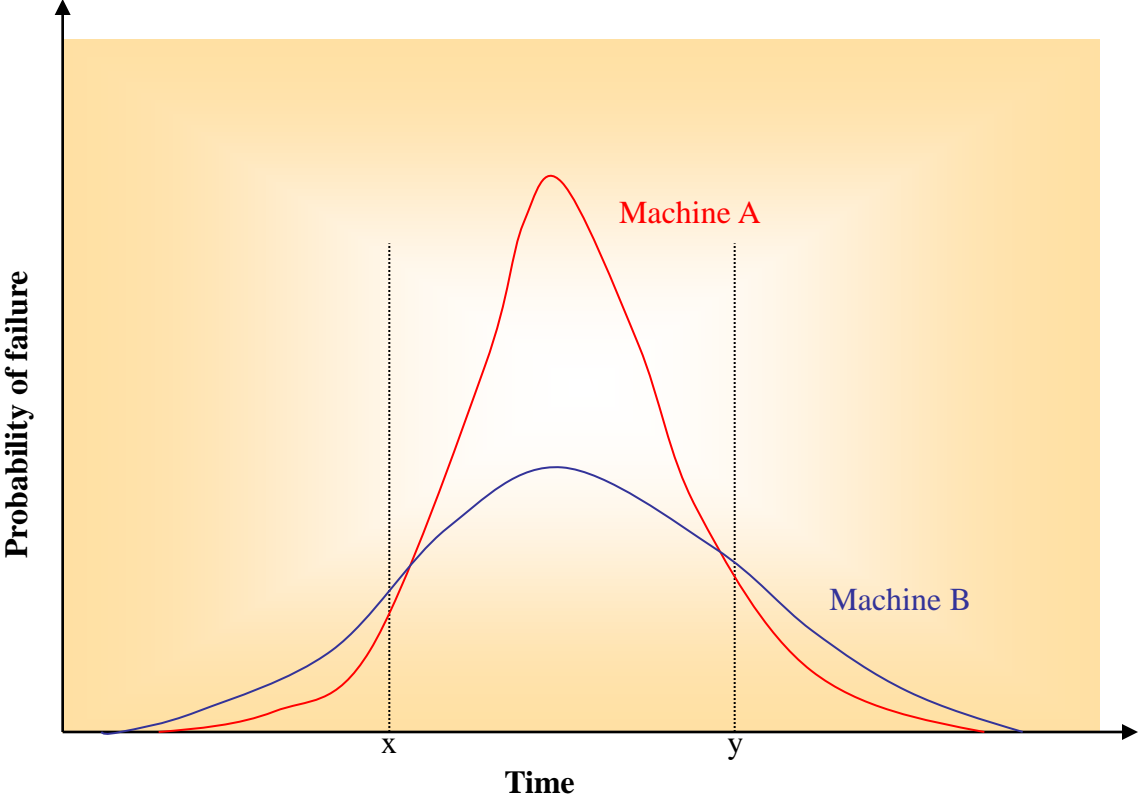
# View of Maintenance Costs I



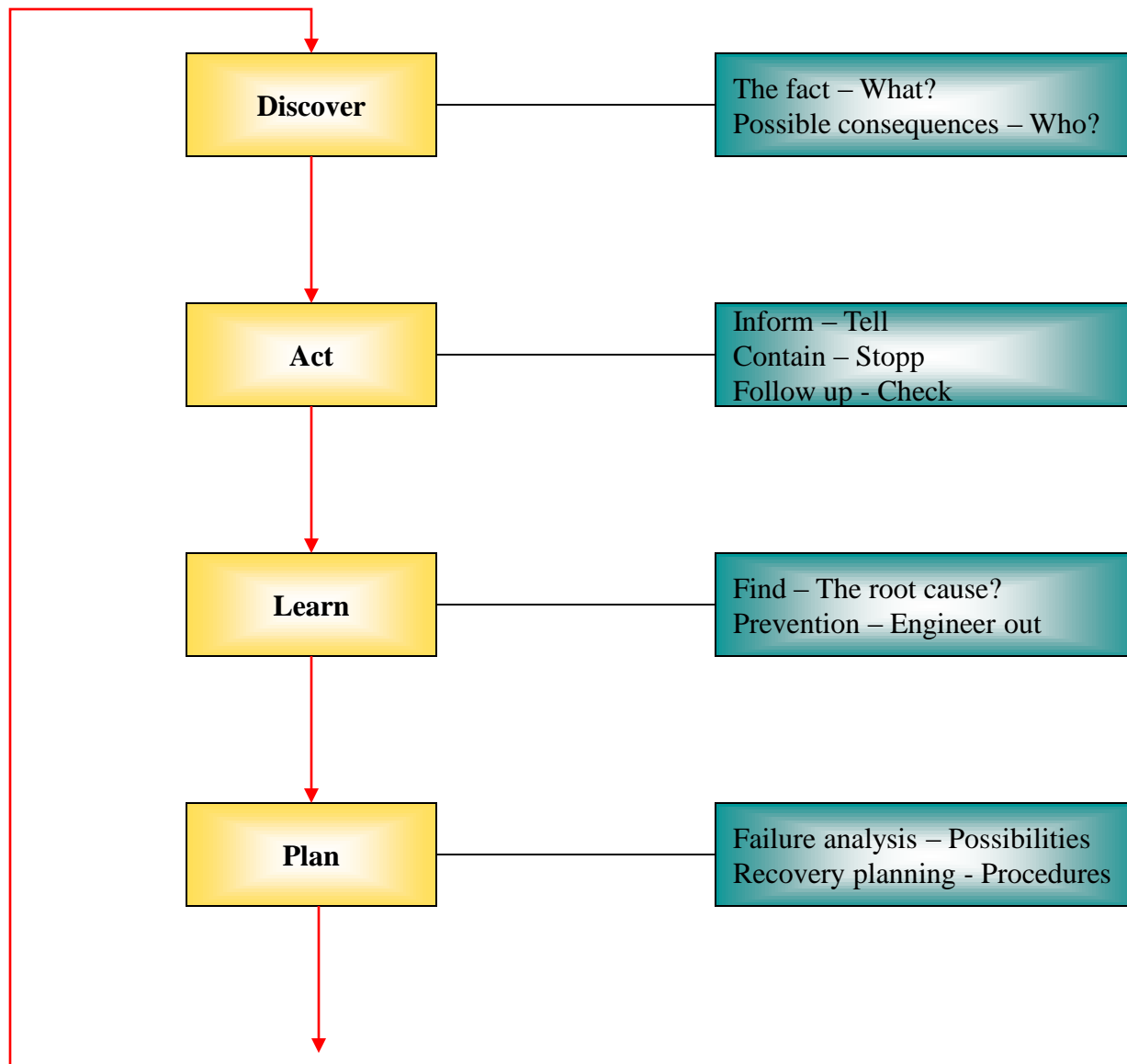
# View of Maintenance Costs II



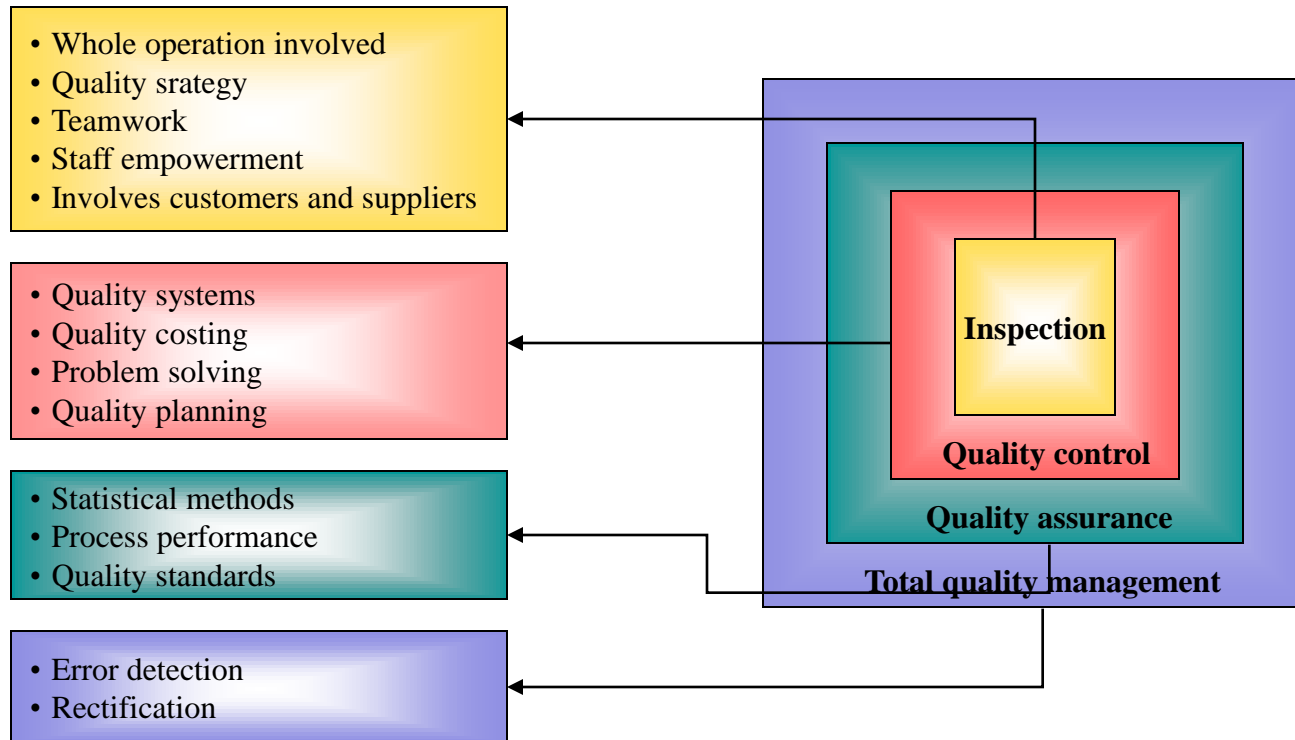
# Failure Curves for Two Machines



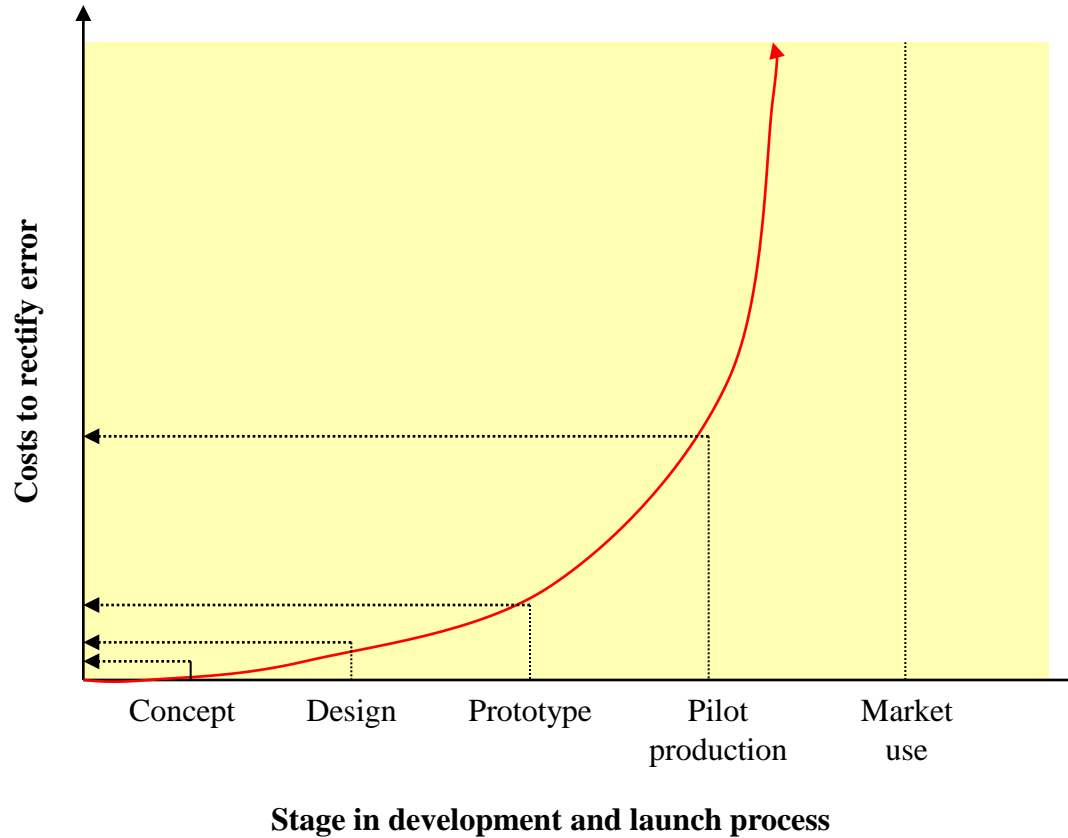
# The Stages in Failure Planning



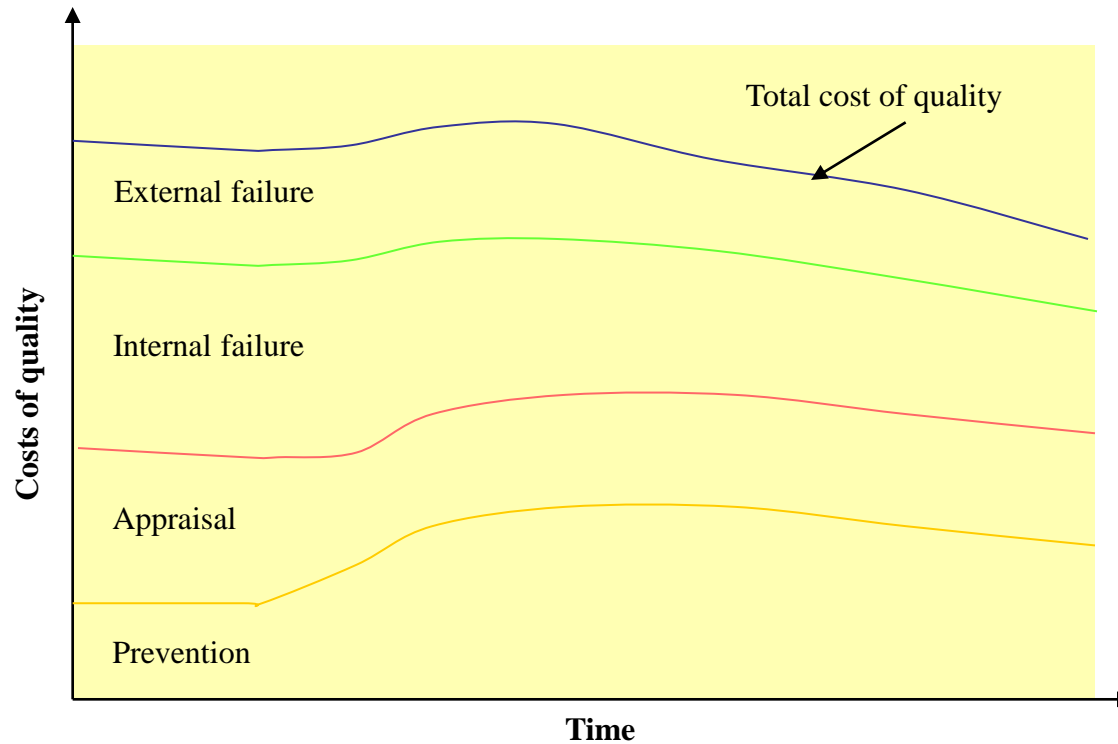
# Total Quality Management



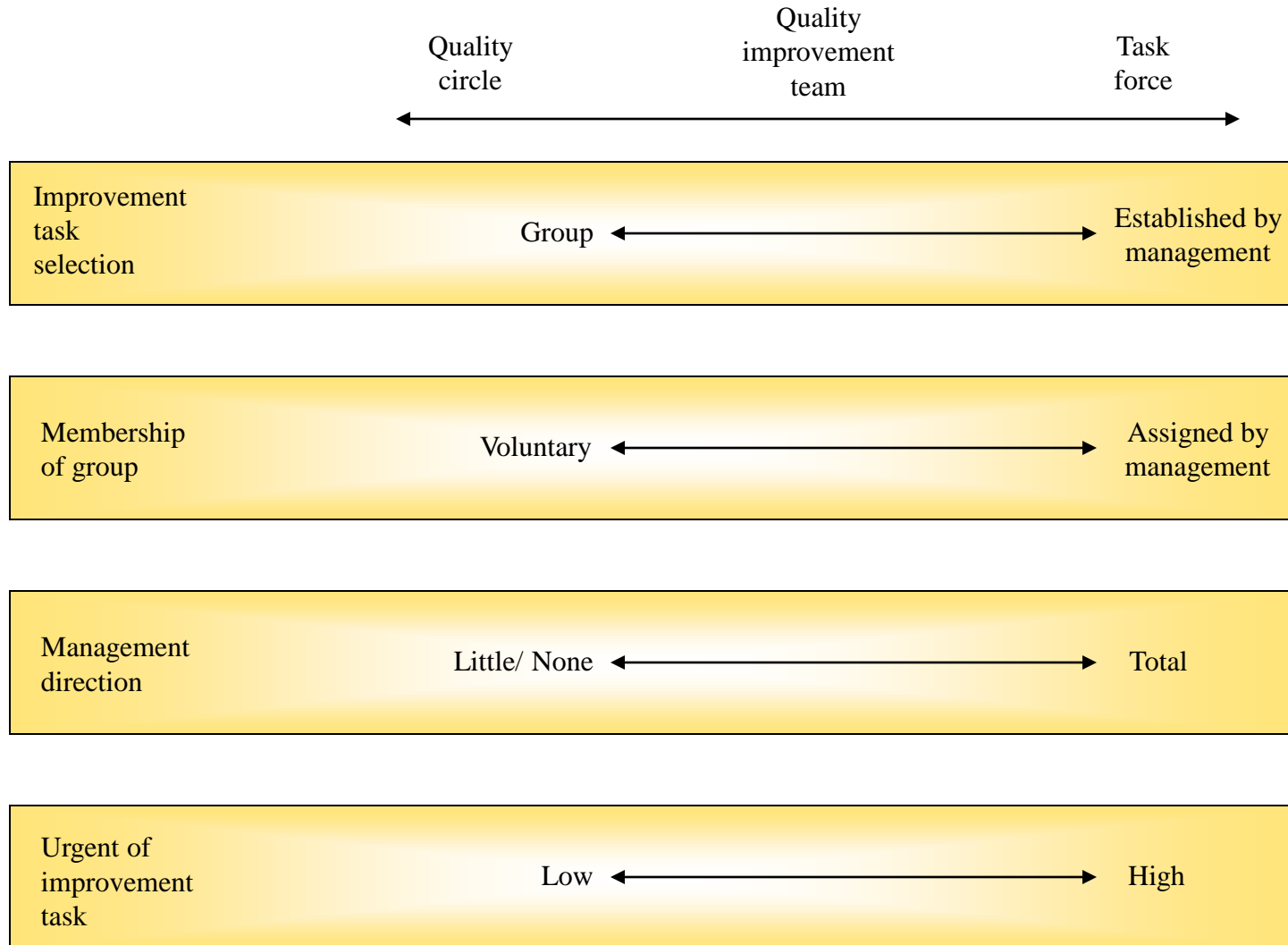
# The Cost of Errors in Different Development Stages



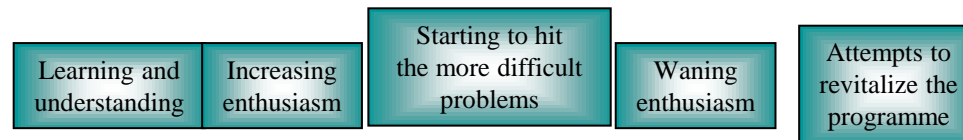
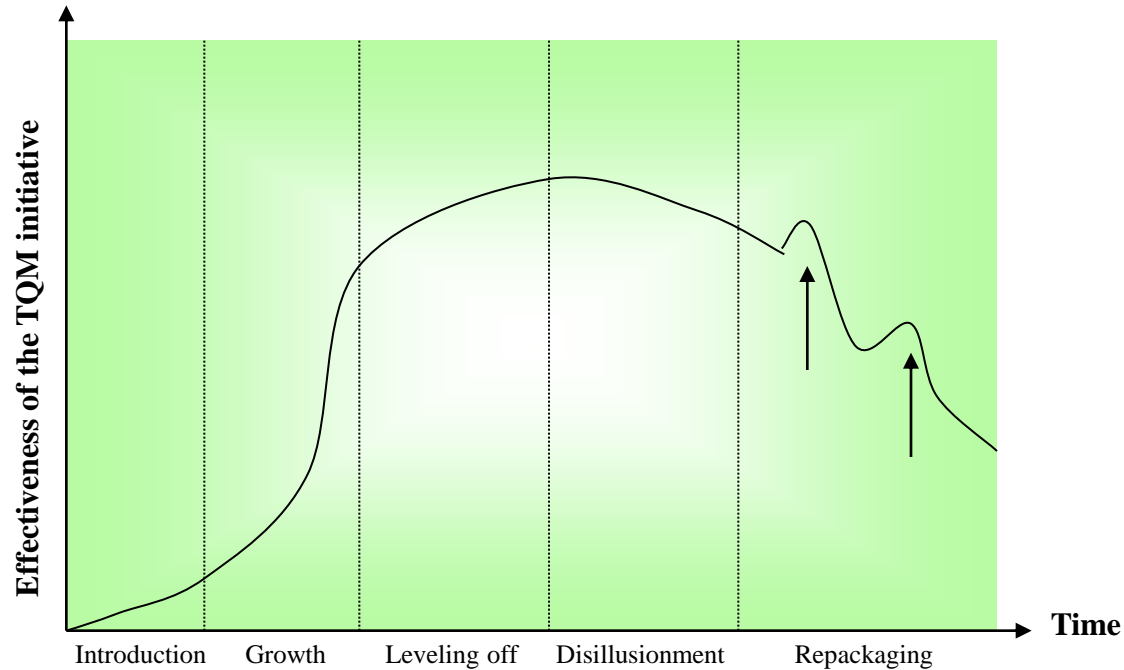
# The TQM Quality Cost Model



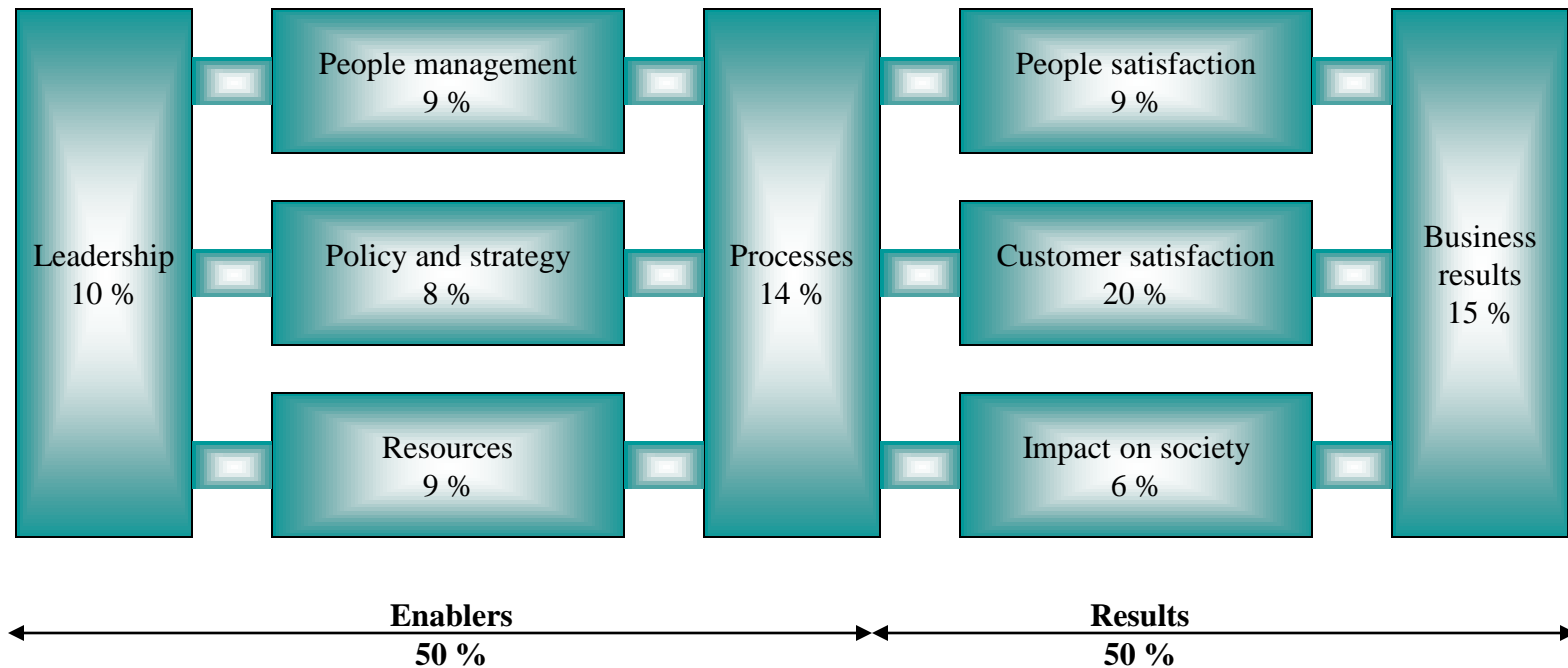
# Group-based Improvement



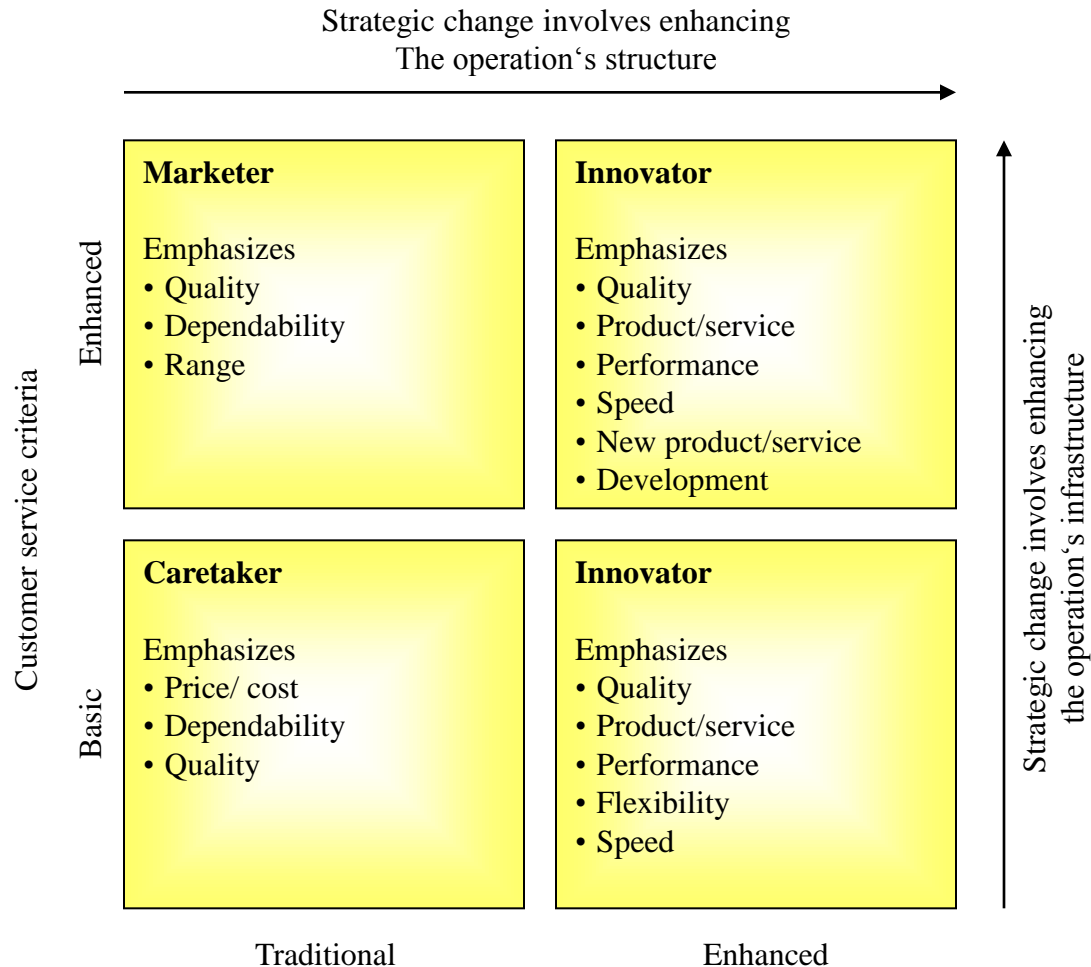
# The Effectiveness of the TQM Initiative



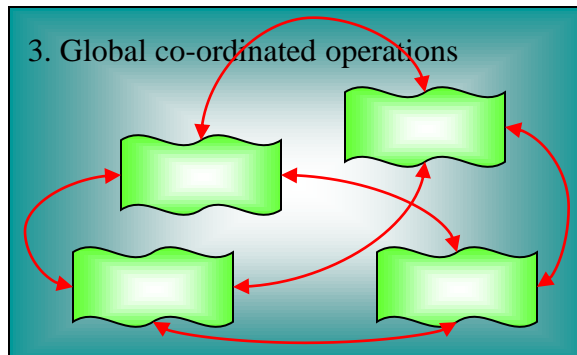
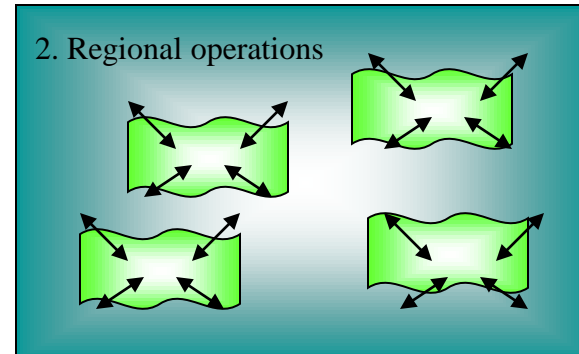
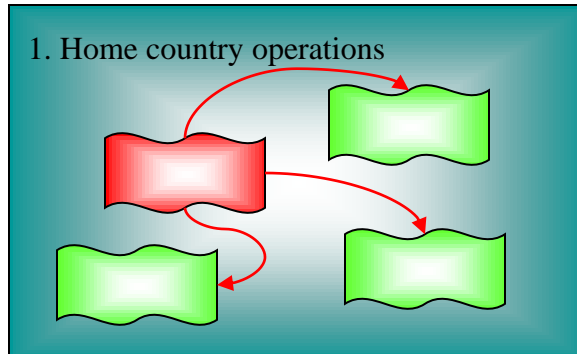
# The European Quality Award Model



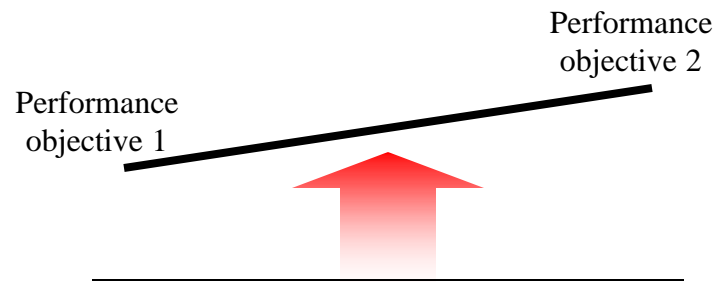
# Sweeney's Generic Strategies



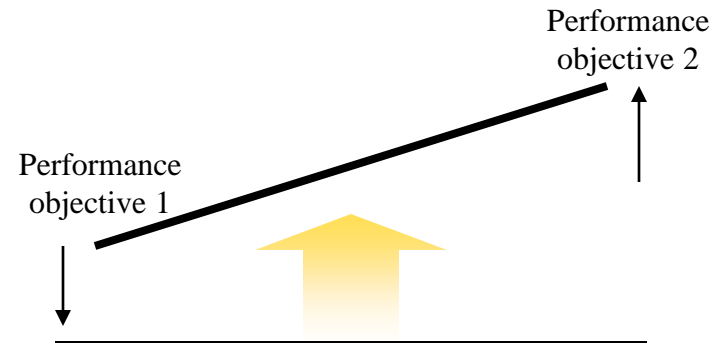
# International Operations Network Configurations



# The Performance Objective Trade-Off



In the short term  
one performance objective  
can be traded off  
with another



So one aspect of  
performance can be  
improved at the  
expense of others

# Common Forecasting Techniques

## Non-causal techniques

## Causal techniques

### Objective techniques

#### Time series analysis

- Moving-average smoothing
- Exponential smoothing

#### Regression

Economic models

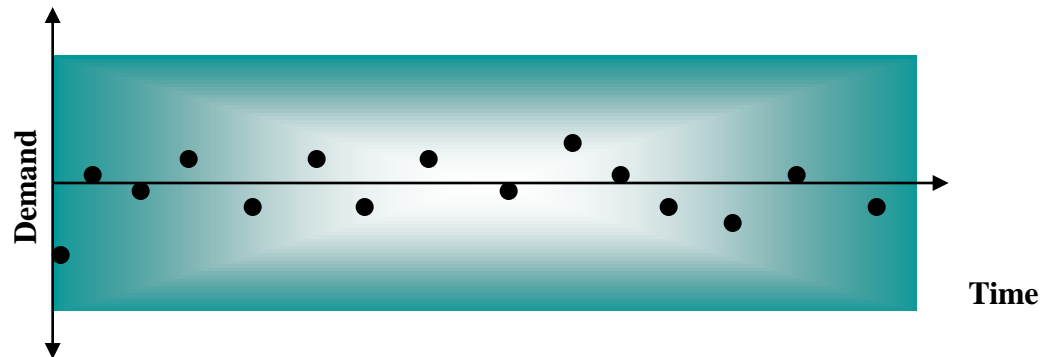
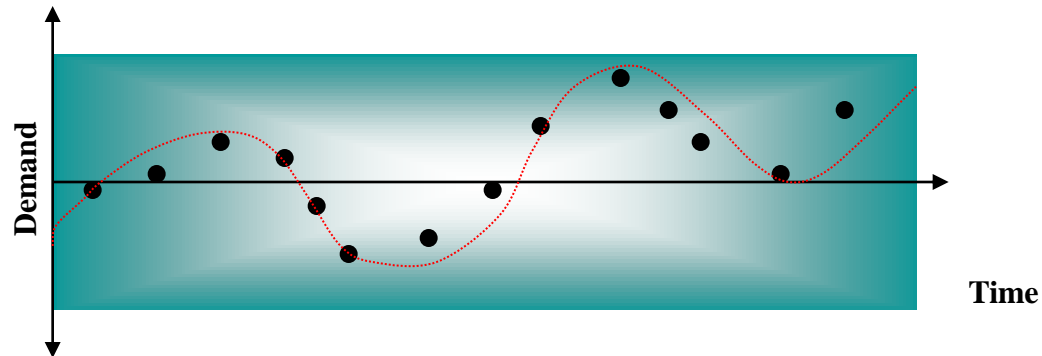
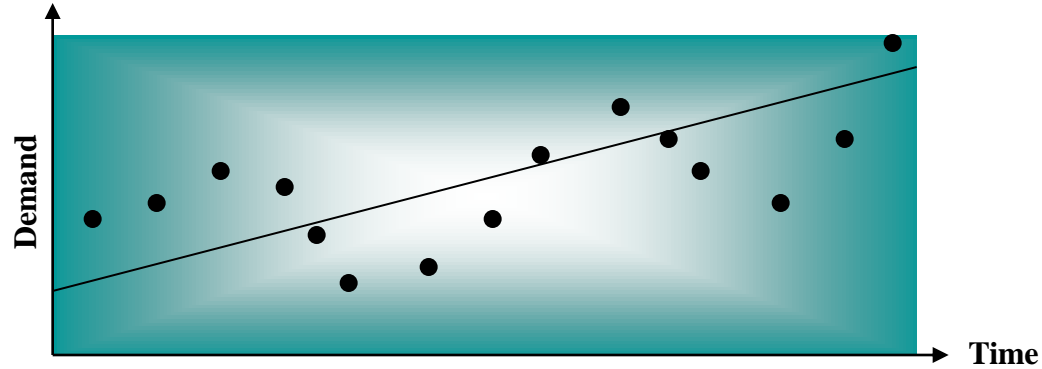
### Subjective techniques

#### Intuition

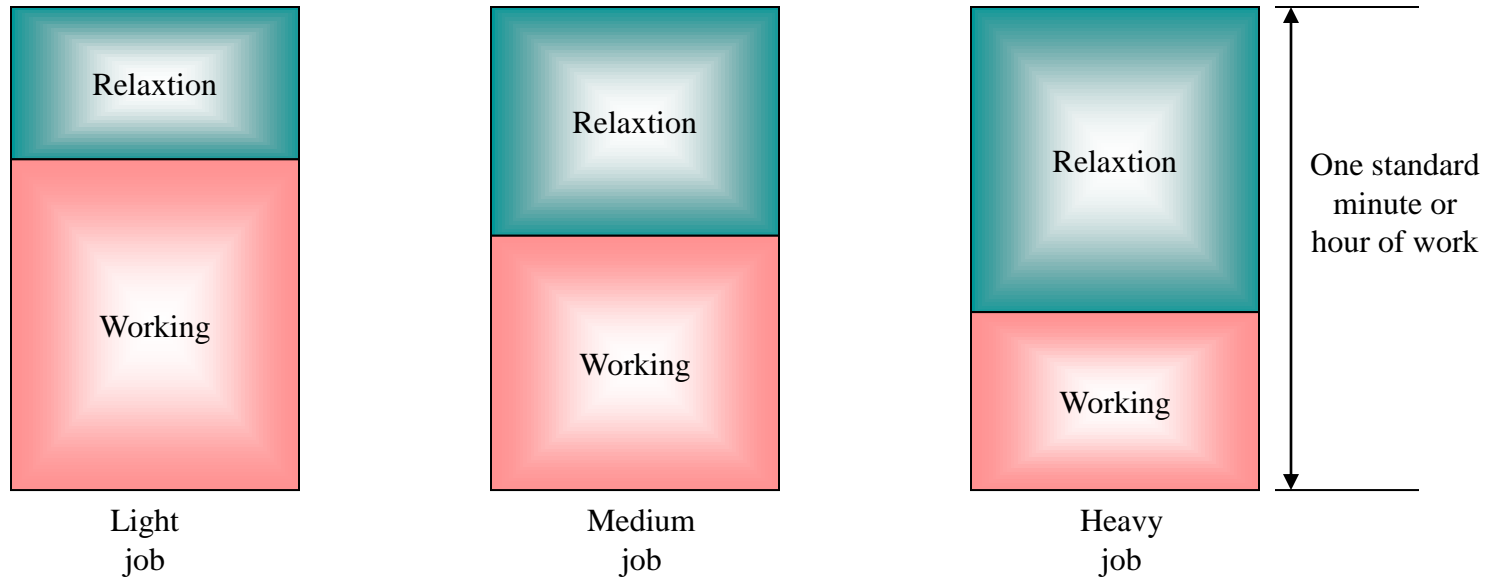
#### Individual expert opinion

Group expert opinion  
(e.g. Delphi forecasting)

# Trend-, Seasonality and Random Variation Analysis



# The Standard Time Approach



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