Operations Management

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Textbook

Krajewski, "Operations Management: Processes and Supply Chains", 11th Edition, Pearson.

Supplements
新聞報導與企業案例資料

Reference
Stevenson, "Operations Management", 12th ed., McGraw-Hill.

Software
Excel, OM Explorer, LEKIN

Grading

Homework	0%	4次作業 (有演習課，免繳交)
Test	30%	2次隨堂測驗
Midterm	35%	期中考
Final Exam	35%	期末考

助教：簡慈萱 f108115116@nkust.edu.tw

期中與期末考可攜帶壹張A4尺寸小抄，
不可黏貼影印資料或其他物品

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Course Outline I

1. USING OPERATIONS TO CREATE VALUE
2. PROCESS STRATEGY AND ANALYSIS
4. PLANNING CAPACITY
   SUPPLEMENT A, B: DECISION TOOLS

5. MANAGING PROCESS CONSTRAINTS
8. FORECASTING DEMAND

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Course Outline II

9. MANAGING INVENTORY
   SUPPLEMENT C. SPECIAL INVENTORY MODELS
10. PLANNING AND SCHEDULING OPERATIONS part 1

11. EFFICIENT RESOURCE PLANNING
10. PLANNING AND SCHEDULING OPERATIONS part 2
6. DESIGNING LEAN SYSTEMS

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Course Policy

- 上課鈴響5分鐘後，請停止在教室內進食
- 上課時請勿上網，並將手機改為震動模式
- 身心疲憊時勿勉強在教室睡覺，請回家安心休養
- 上課時請勿跟同學搏感情或聊八卦，以免干擾教學

  - 缺考者應在24小時內申請補考，壹週內完成補考，成績以八折計算
  - 考試作弊者依規定處理，學期成績不會以零分計算

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Study Suggestions

1. 投影片是輔助教學的教材，不是教科書的替代品
2. 上課要做筆記，考試不會只考投影片內容
3. 分辨管理觀念的差異與優缺點，練習數學方法的應用
4. 懶人包沒有用，不可能秒懂。
5. 助教演習課與加強計算分析能力

Chapter 1 Using Operations to Create Value

- OM的角色
- OM與企業競爭力
- 績效衡量

What is Operations Management?

The systematic design, direction, and control of processes that transform inputs into services and products for internal, as well as external, customers

Physical: manufacturing

Location: transportation

Exchange: retailing

Storage: warehousing

Physiological: health care

Informational: telecommunications

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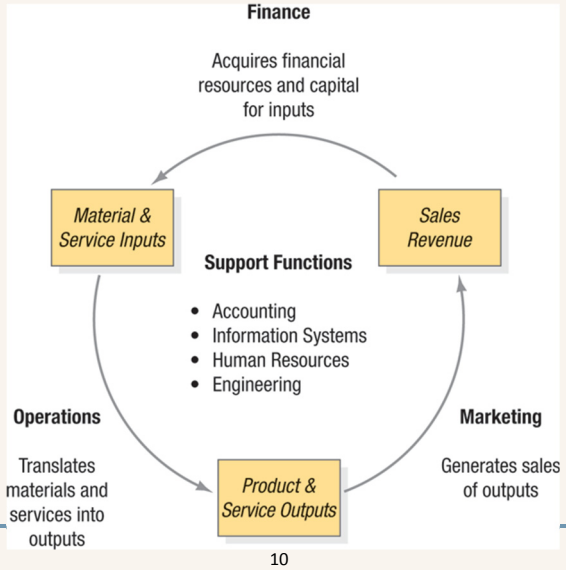
Role of Operations in an Organization



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Operations Management

- Process

  Any activity or group of activities that takes one or more inputs, transforms them, and provides one or more outputs for its customers

- Operation

  A group of resources performing all or part of one or more processes

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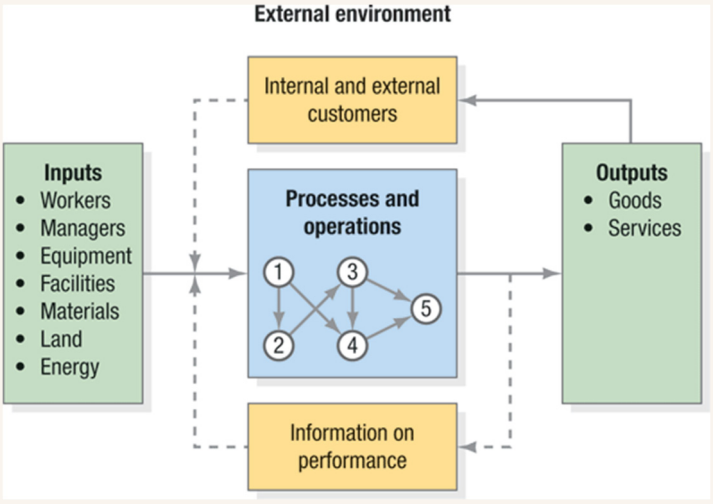
How Processes Work



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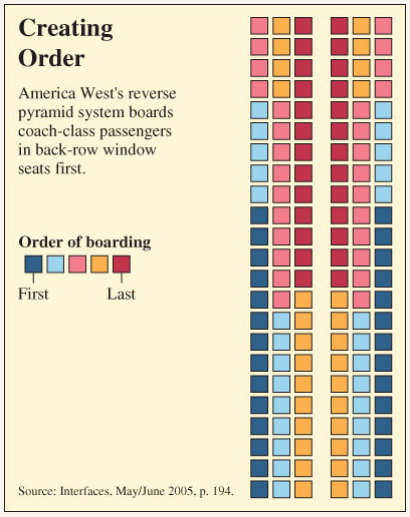
OM: It's the Details that Count

旅客登機過程會影響

Service Queuing Explained in Words and Pictures



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Service and Manufacturing Processes

Differ Across Nature of Output and Degree of Customer Contact

More like a manufacturing process ⟷ More like a service process

- Physical, durable output
- Output can be inventoried
- Low customer contact
- Long response time
- Capital intensive
- Quality easily measured

- Intangible, perishable output
- Output cannot be inventoried
- High customer contact
- Short response time
- Labor intensive
- Quality not easily measured

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典型的OM職務

入門

- 管理專櫃人員，督導商品陳列與賣場整潔
- 管理現場人員與機器設備，確保訂單達交
- 計算物料需求與管制進出

進階

- 銷售預測、銷售活動籌備
- 產能規劃、訂單接單與管理
- 建廠規畫、設施佈置

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Why Study Operations Management?

- 服務業是發展趨勢，我需要學製造業的管理技術嗎？
  詐騙集團也有標準作業流程與控管制度
- 我立志不找製造業的工作，真的要學嗎？
  服務業多數基層工作都跟OM相關，還是要管庫存與訂單
- 作業管理是企業經營的細節，我要學更有用的…
  請先設法昇到中階主管…

- 作業費用占企業直接成本的60~80%
- 作業能力影響顧客服務，決定企業競爭力
- 先進國家貿易出口所賺取的外匯仍然來自於製造業

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History of Operations Management

1770s Steam engines & Industrial Revolution

1800s Charles Babbage (Adam Smith) and Eli Whitney
division of labor, interchangeable parts

1910s Frederic Taylor, Frank and Lillian Gilbreth
time study, motion study, industrial psychology

1910s Henry Ford and mass production
moving assembly line
www.youtube.com/watch?v=cTZ3rJHHSik

1930s Alfred Sloan and General Motors
forecasting, inventory control

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1930s Elton Mayo and Hawthorne Studies
worker motivation and productivity

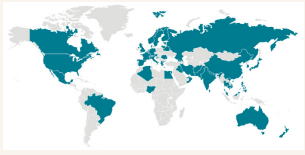
1970s McDonald
service quality and productivity

1980s Japanese Manufacturing Management
Quality and lean production (JIT)

Taiichi Ohno

1990s SAP, Oracle
Enterprise Resource Planning

2000s Walmart, Apple
Supply Chain Management



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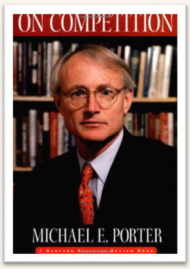
Strategy vs. Competencies

- Corporate Strategy specifies the business or businesses the company will pursue, …, identifies growth objectives.
- Operations Strategy: the means by which operations implements the firm's corporate strategy and helps to build a customer-driven firm

Low cost, Responsiveness, Differentiation

- 迅速反應市場需求的變化
- 提供具有特色的產品/服務
- 產品/服務的價格能被市場接受



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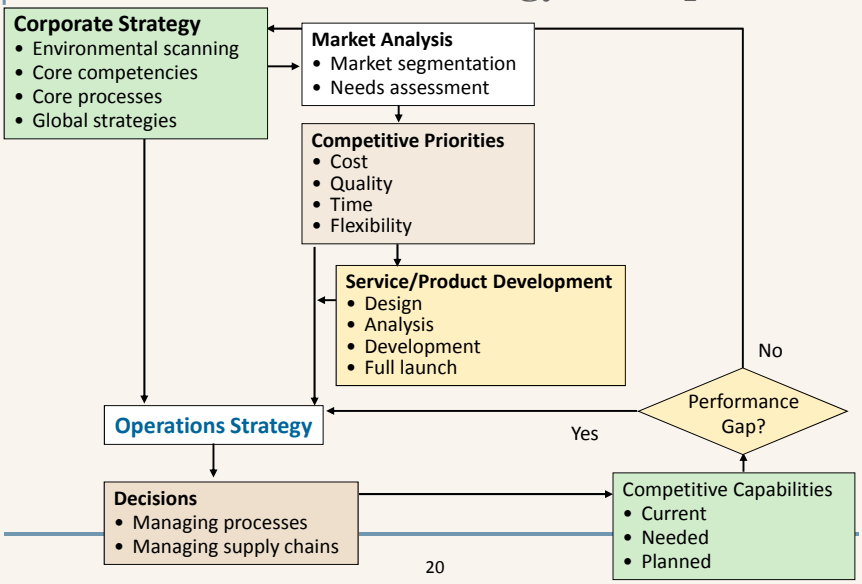
Connection Between Strategy and Operations



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Competitive Priorities and Capabilities

Competitive Priorities The critical dimensions that a process or supply chain *must* possess to satisfy its internal or external customers, both now and in the future.

Competitive Capabilities The cost, quality, time, and flexibility dimensions that a process or supply chain *actually* possesses and is able to deliver.

Order Qualifiers Minimum level required from a set of criteria for a firm to do business in a particular market segment.

Order Winners A criterion customers use to differentiate the services or products of one firm from those of another.

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Examples of Competitive Priorities 1/3

COST	Definition	Process Considerations	Example
1.Low-cost operations	Delivering a service or a product at the lowest possible cost	Processes must be designed and operated to make them efficient	Costco
QUALITY			
2.Top quality	Delivering an outstanding service or product	May require a high level of customer contact and may require superior product features	Rolex
3.Consistent quality	Producing services or products that meet design specifications on a consistent basis	Processes designed and monitored to reduce errors and prevent defects	McDonald's

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Examples of Competitive Priorities 2/3

TIME	Definition	Process Considerations	Example
4.Delivery speed	Quickly filling a customer's order	Design processes to reduce lead time	Netflix
5.On-time delivery	Meeting delivery-time promises	Planning processes used to increase percent of customer orders shipped when promised	United Parcel Service (UPS)
6.Development speed	Quickly introducing a new service or a product	Cross-functional integration and involvement of critical external suppliers	Zara

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Examples of Competitive Priorities 3/3

FLEXIBILITY	Definition	Process Considerations	Example
7.Customization	Satisfying the unique needs of each customer by changing service or product designs	Low volume, close customer contact, and easily reconfigured	Ritz Carlton
8.Variety	Handling a wide assortment of services or products efficiently	Capable of larger volumes than processes supporting customization	Amazon
9.Volume flexibility	Accelerating or decelerating the rate of production of services or products quickly to handle large fluctuations in demand	Processes must be designed for excess capacity and excess inventory	

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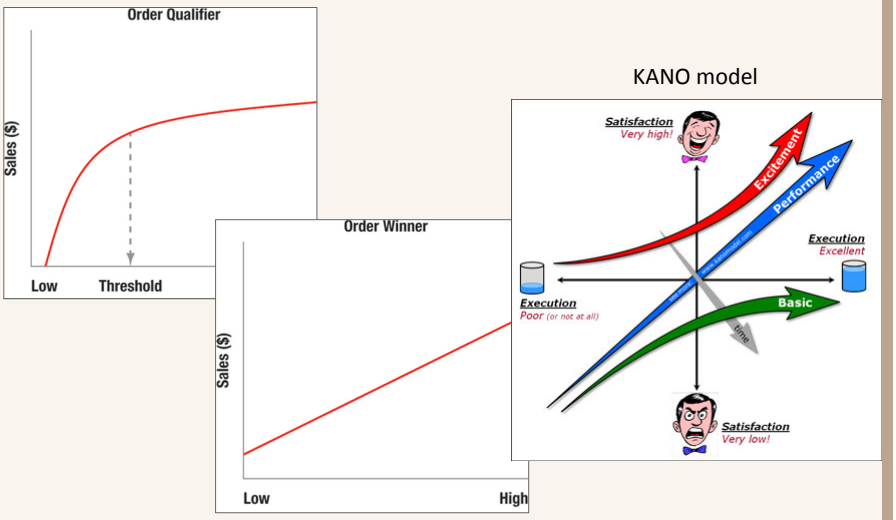
Order Qualifiers vs. Order Winners



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Southwest Airlines 以作業能力實現策略目標

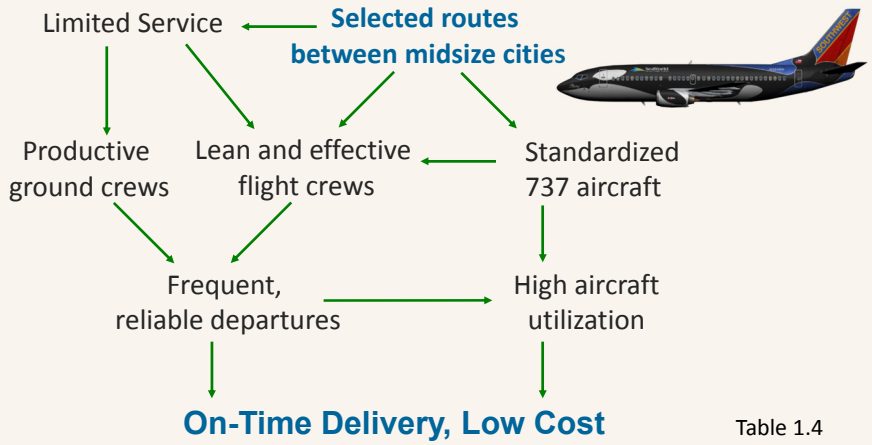

Table 1.4

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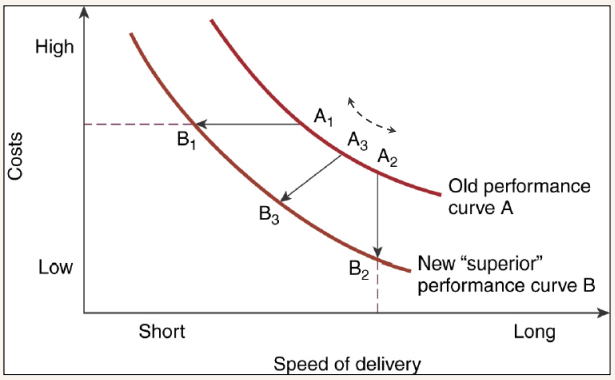
Value vs. Tradeoffs

How customers define value? $\text{Value} = \frac{\text{Quality}}{\text{Cost}}$

客貨運

$\frac{\text{Speed}}{\text{Cost}}$



Measuring Performance

- 客戶重視甚麼？ 企業生存關鍵是甚麼？

- Cost: 總成本、單位成本、員工生產力、設備使用率
- Time: 訂單周期時間、交期表現、顧客等候時間
- Quality: 產品維修率、顧客流失率、資料正確率
- Flexibility: product mix, 每年的新產品/服務的種類
- Service: 顧客滿意度、缺貨率、服務頻率

Productivity: effective use of resources

- Productivity = $\frac{\text{Output}}{\text{Input}}$
- efficiency ≠ effectiveness ≠ productivity
- A relative measure $\frac{P_1 - P_0}{P_0} \times 100$

- 本公司全年的碳排放量從2015年的1200萬噸降至2016年的1120萬噸，可見本公司在節能減碳上的成果顯著

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Measuring Productivity

- Multifactor Productivity

$$\frac{\text{number of products}}{\text{Labor(\$)} + \text{Materials(\$)} + \text{Energy(\$)} + \text{Overhead(\$)} + \ldots}$$

$$\frac{\text{Value of all products (\$)}}{\text{Labor(\$)} + \text{Materials(\$)} + \text{Energy(\$)} + \text{Overhead(\$)} + \ldots}$$

- Partial measures

$$\frac{\text{Output}}{\text{Labor}} \text{ or } \frac{\text{Output}}{\text{Capital}} \text{ or } \frac{\text{Output}}{\text{Machine}}$$

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OPERATIONS STRATEGY ASSESSMENT OF THE BILLING AND PAYMENT PROCESS				
Competitive Priority	Measure	Capability	Gap	Action
Low-cost operations	Cost per billing statement	$0.0813	Target is $0.06	Eliminate microfilming and storage of billing statements
	Weekly postage	$17,000	Target is $14,000	Develop Web-based process for posting bills
Consistent quality	Percent errors in bill information	0.90%	Acceptable	No action
	Percent errors in posting payments	0.74%	Acceptable	No action
Delivery speed	Lead time to process merchant payments	48 hours	Acceptable	No action
Volume flexibility	Utilization	98%	Too high to support rapid increase in volumes	Acquire temporary employees Improve work methods

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Summary

- OM負責設計與控制將inputs轉換為outputs的過程
- OM策略與決策必須能支持企業的整體策略
- OM改造流程以提升商品或服務的價值
- OM的績效反映出企業競爭力
- CSR企業社會責任: ethics, workforce, environment
- Globalization使企業必須在全球市場競爭，也必須面對來自全球各地的競爭者

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