

# Services Science Management

COMP5138

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Contents

- Service Capacity Planning
- Managing Queues
- Course Review
- Exam. Questions Review

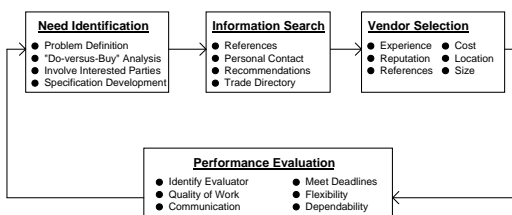
Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Service Capacity Planning

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Outsourcing Process

Outsourcing: to hire the services of another company to manage all or parts of the services that otherwise would be rendered by a functional unit of the organization. Outsourcing provides additional capacity to an organization.



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Outsourcing Services

- **Benefits**
  - Allows the firm to focus on its core competence
  - Service is cheaper to outsource than perform in-house
  - Provides access to latest technology
  - Leverage benefits of supplier economy of scale
- **Risks**
  - Loss of direct control of quality
  - Jeopardizes employee loyalty
  - Exposure to data security and customer privacy
  - Dependence on one supplier compromises future negotiation leverage
  - Additional coordination expense and delays
  - Atrophy of in-house capability to perform service

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Outsourcing Considerations

- **Focus on Physical**
  - Facility support service
    - Low cost
    - Identify responsible party to evaluate performance
    - Precise specifications can be written
  - Equipment support service
    - Experience and reputation of vendor
    - Availability of vendor for emergency response
    - Designate person to make service call and to check that service is satisfactory

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Outsourcing Considerations

### • Focus on People

- Employee support service
  - Contact vendor clients for references
  - Specifications prepared with end user input
  - Evaluate performance on a periodic basis
- Employee development service
  - Experience with particular industry important
  - Involve high levels of management in vendor identification and selection
  - Contact vendor clients for references
  - Use employees to evaluate vendor performance

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Outsourcing Considerations

### • Focus on Process

- Facilitator service
  - Knowledge of alternate vendors important
  - Involve end user in vendor identification
  - References or third party evaluations are useful
  - Have user writing detailed specifications
- Professional service
  - Involve high level management in vendor identification and selection
  - Reputation and experience very important
  - Performance evaluation by top management

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Balancing Utilization and Financial Return

### • Yield Management

- Actual Return
- Potential Return

### • Challenges and Risks

- Loss of competitive focus
- Customer alienation
- Employee morale problems
- Incompatible incentive and reward systems
- Lack of employee training
- Inappropriate organization of the yield management function



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

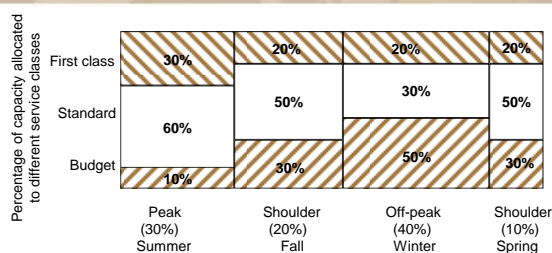
## Yield Management

- Yield management is an approach aimed at minimizing wastages due to idle facilities in an attempt to maximize profitability. Followings are common characteristics that lead to the application of yield management:

- Relatively Fixed Capacity
- Ability to Segment Markets
- Perishable Inventory
- Product Sold in Advance
- Fluctuating Demand
- Low Marginal Sales Cost and High Capacity Change Cost

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Seasonal Allocation of Facilities



Optimal allocation of Rooms for a Hotel

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Inventory in Services

### • Role of Inventory

- Decoupling inventories
- Seasonal inventories
- Speculative inventories
- Cyclical inventories
- In-transit inventories
- Safety stocks

### • Considerations in Inventory Systems

- Type of customer demand
- Planning time horizon
- Replenishment lead time
- Constraints and relevant costs

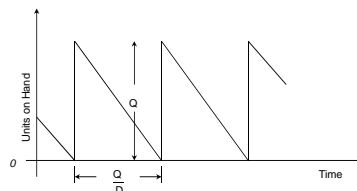
Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Inventory Models

- Economic Order Quantity (EOQ)
- Special Inventory Models
  - With Quantity Discounts
  - Planned Shortages
- Demand Uncertainty
  - Safety Stocks
- Inventory Control Systems
  - Continuous-Review
  - Periodic-Review

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Inventory Levels For EOQ Model



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Managing Queues

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

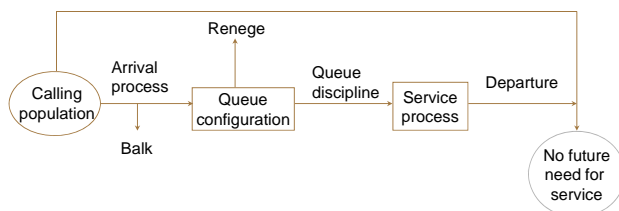
## Inventorying of Demand

- Services, being performances, normally cannot be stored for later use
- In businesses where demand regularly exceeds supply, managers can often take steps to inventory demand
  - By asking customers to wait in line, usually on a first-come, first-served basis
  - By offering customers the opportunity of reserving or booking space in advance



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Essential Features of Queuing Systems



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Alternative Queuing Configurations

Single line, single server, single stage

Single line, single servers at sequential stages

Parallel lines to multiple servers

Designated lines to designated servers

Single line to multiple servers ("snake")

"Take a number" (single or multiple servers)

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Tailoring Queuing Systems



- Urgency of job
  - Emergencies vs. Non-emergencies
- Duration of service transaction
  - Number of items to transact
  - Complexity of task
- Payment of premium price
  - First class vs. Economy class
- Importance of customer
  - Frequent and loyal customers vs. others



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Avoiding Burdensome Waiting Time



- Add extra capacity so that demand can be met at most times
- Rethink design of queuing system to give priority to certain customers or transactions
- Redesign processes to shorten transaction time
- Manage customer behavior and perceptions of wait
- Install a reservations system

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Minimizing Perception of Waiting Time



1. Unoccupied time feels longer
2. Pre-process/post-process wait feels longer than in-process
3. Anxiety makes waiting seem longer
4. Uncertain waiting is longer than known, finite waiting
5. Unexplained waiting seems longer
6. Unfair waiting is longer than equitable waiting
7. People will wait longer for more valuable services
8. Waiting alone feels longer than in groups
9. Physically uncomfortable wait feels longer
10. Waiting seems longer to new or occasional users

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Effective Reservation System



- Reservations are supposed to guarantee that service will be available when the customer wants it
- A reservation system offers many benefits for firms
  - Enables management to keep free some time for handling emergency jobs that carry a premium price
  - Pre-sells service
  - Controls and smoothes demand in a more manageable way
  - Informs and educates customers in advance of arrival
  - Customers avoid waiting in line for service (if service times are honored)
  - Data capture helps organizations prepare financial projections
- The challenge in designing reservation systems is to make them fast and user-friendly for both staff and customers

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Well-Designed Reservations Systems



- Fast and user friendly for customers and staff
- Can answer customer questions
- Offers options for self service (e.g. Web)
- Accommodates preferences (e.g., room with view)
- Deflects demand from unavailable first choices to alternative times and locations
- Includes strategies for no-shows and overbooking
  - Requiring deposits to discourage no-shows
  - Canceling unpaid bookings after designated time
  - Compensating victims of over-booking
- Maximize yield through accurate demand projection



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## References



- Fitzsimmons, J. and Fitzsimmons M., *Service Management: Operations, Strategy, Information Technology*, McGraw-Hill/Irwin, 6th edition, 2008.
- Juran, J.M., *Juran's Quality Handbook* (5th Edition), McGraw-Hill, 1999.
- Winston, W.L., *Operations Research: applications and Algorithms*, Duxbury, 1994.

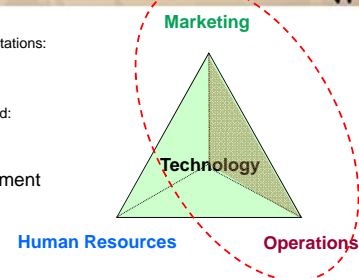
Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Course Review

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Functional Processes Along the Service Triangle

- **Service Marketers**
  - creating realistic customer expectations:
    - service system design
    - promotion
- **Operations Management**
  - rendering the service as promised:
    - managing fail points
    - training systems
    - quality control
- **Human Resources Management**
  - empowering the human element:
    - job descriptions
    - selection criteria
    - appraisal systems
- **System Technology**
  - providing necessary tools:
    - system specifications
    - personal preference databases



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Service Evaluation

- **Service characteristics**
  - Intangible, Inseparable, Inconsistent, Inventory
- **Service management**
  - People, Process, Physical
- **Expectation and Perception**
  - Disconfirmation
    - Zone of tolerance bounded by desire and adequate service
  - Service quality
    - The five Servqual dimensions (RATER)
  - E-S-Qual
    - The seven online service quality dimensions
- **Technology Adoptions**
  - DeLone and McLean Model
  - Technology Acceptance Model

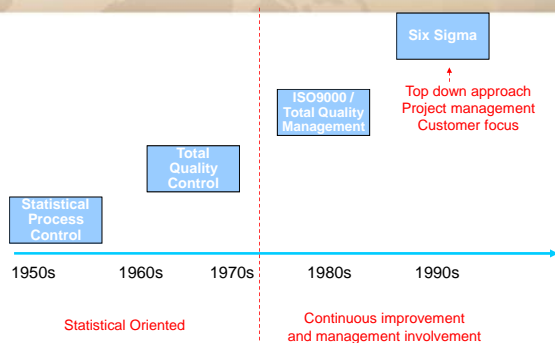
Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Services Marketing

- **Gaps Model of Service Quality**
  - Customer Gap (Source of customer dissatisfaction)
    - Differences between expectation and perception
  - Provider Gap (Ideas to close the customer gap)
    - Gap 1
      - Knowledge of customers
    - Gap 2
      - Design of standards
    - Gap 3
      - Performance
    - Gap 4
      - Communication

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Development of Quality Management



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU

## Services Management

- **Six Sigma**
  - Define
  - Measure
  - Analyze
  - Improve
  - Control
- Different operational tools for different stages

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12, PolyU



## Comparisons of Service Management Frameworks

Service Concepts	Gaps Model	Six Sigma	ITIL
<ul style="list-style-type: none"> <li>4Is</li> <li>3Ps</li> <li>Service quality evaluation</li> <li>5 dimensions <ul style="list-style-type: none"> <li>Responsiveness</li> <li>Assurance</li> <li>Tangibles</li> <li>Empathy</li> <li>Reliability</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Gap 1: Knowledge</li> <li>Gap 2: Design</li> <li>Gap 3: Performance</li> <li>Gap 4: Communicate</li> </ul>	<ul style="list-style-type: none"> <li>Define</li> <li>Measure</li> <li>Analyze</li> <li>Improve</li> <li>Control</li> </ul>	<ul style="list-style-type: none"> <li>Improvement</li> <li>Strategy</li> <li>Transition</li> <li>Design</li> <li>Operation</li> </ul>

**Steps for problem design:**

- Analyze a problem with general service concepts
- Identify the key problem of the service process (e.g. **Responsiveness**)
- Go through the Gaps Model and identify key gap issue (e.g. **Gap 2**, poor service design)
- Go through 6 Sigma stages and focus on key issue (e.g. **Analyze**, Blueprint and process allocation)
- Go through ITIL lifecycle and focus on key issue (e.g. **Design**, Service Level Management, Availability Management)

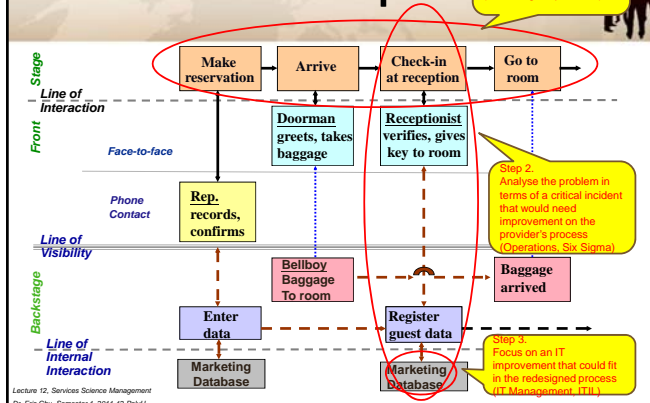
Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Scope of Different Frameworks

- Gaps Model attempts to identify a general customer problem that creates customer dissatisfaction. The analysis try to direct attention of managers to a specific 'service process' that created by one of the provider's gap (Step 1. Marketing management).
- Six Sigma attempts to improve on the general problem identified in the above. Linkages of internal process to the customer process will provide ideas for redesign and improvements (Step 2. Operations Management).
- ITIL will just focus on the IT improvement involved in the previous steps of a specific service process (Step 3. IT Management).

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Process Blueprint



Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Exam. Questions Review

### Q.1

- a) Explain the key differences of the Six Sigma methodology as compare to traditional quality management techniques such as statistical process control and total quality management (6%);
- b) Briefly describe the DMAIC approach and operational tools applied in each of the Six Sigma stages. Illustrate two of the tools along the Define stage with examples (8%);
- c) Compare and contrast the Six Sigma Method with the Gaps Model of Service Quality in services quality improvement approaches (6%).

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

### Q.1 Answer

- 2a) Students are expected to describe the development of quality management in the past few decades starting with the **statistical process control** and **total quality control** that focused on statistical methods, **total quality management** that focused on continuous improvements and management involvement, and finally **Six Sigma** that focus on top-down project management approach;
- 2b) The DMAIC should be explained and relevant tools should be summarized in each of the stages. Two relevant tools in Define stage such as Cause-and-Effect diagrams, different graphical methods, services research and service recovery techniques could be illustrated in details.
- 2c) Brief comparisons on different stages of the Six Sigma (DMAIC) and the Gaps Model in relation to the operations and marketing management are expected. In particular, the student should be able to map different gaps in the Gaps Model with corresponding stages in the Six Sigma wherever relevant.

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Q.2

- a) Illustrate the concept service encounter with a customer going to a bank depositing money over a cashier counter. (10%)
- b) What are the implications to different management functions over the service encounter? (8%)
- c) What could be the role of IT management in terms of the above service encounters? (7%)

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Q.2 Answer

- a) The answer should illustrate different service processes which can be seen by the customer. Explanation should be given in terms of the moments of truth, critical incidents and the drama approach roles and scripts in the design of the service process
- b) Different functions will be responsible for different process: **marketing management** will try to create realistic customer expectations along the line of interaction and visibility; **operations management** will try to render the service as promised along the line of interaction and visibility; **human resources management** will try to empower the human elements; **IT management** will try to provide the necessary tools along different lines of interaction;
- c) IT will have a supporting role for automation of the process along the service encounter. It could make the process more responsive, reliable, tangible and more consistent. But on the other hand, designers have to aware that IT could lower the empathy and consider the role of customers in automation projects.

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Q.3

- a) Illustrate the concept of service encounters in mapping the customer experience in food purchase with a fast food restaurant (with no more than 10 contacts); (5%)
- b) Describe different components of a blueprint and illustrate how the customer experience is connecting with different functional operations in light of the services triangle and service encounters (2a in the above). Illustrate the concepts with a blueprint diagram; (10%)
- c) Critically evaluate the role of blueprinting along with the Six Sigma and the Gaps Model of Service Quality (10%).

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Q.3 Answer

- a) The process between customer and the service organization should be described in terms of **customer contact, moments of truth, critical encounters**. Alternative descriptions of the process with a drama approach (roles and scripts) are also acceptable
- b) A blueprint integrates the service encounters in the above is expected. Different processes should be linking with each of the customer service encounters across the **line of interactions, visibility, and internal interaction**. In addition, the service triangle should highlight the roles of marketing, operations, human resources, and IT functions in providing a customer service. The role of different functional units along different lines of interactions should also be explained. E.g. **Marketing function deals with issues above the line of interactions**; **HR and Operation functions deal with below the line of interactions and above the line of internal interactions**; **IT function deals with issues below the line of internal interactions**
- c) Describe different stages of the Six Sigma (DMAIC) and the Gaps Model in relation to the operations and marketing management are expected. In particular, the student should be able to identify and explain how blueprinting fit into the **'Analyse'** stage of the Six Sigma and **'Gap 2'** of the Gaps Model

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Q.4

- a) Define the concept of service encounter and the drama approach with example of a customer checking into a hotel room service (10%).
- b) Define the concept of blueprinting by extending the service encounter in the above question and explain its implications for service design for different functional units (15%).

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU

## Q.4 Answer

- a) The process between customer and the service organization should be described in terms of **customer contact, moments of truth, and critical encounters** (5%). Descriptions of the process with a **drama approach** including **roles, scripts and role congruence** (5%).
- b) The answer should illustrate different service processes involved along the **line of interaction, line of visibility, and the line of internal interaction**. A flowchart should be drawn to include different service employees, processes, and relationships between different processes (7%). Different functional units will be responsible for different processes: marketing management will try to create realistic customer expectations along the line of interaction and visibility; operations management will try to render the service as promised along the line of interaction and visibility; human resources management will try to empower the human elements; and IT management will try to provide the necessary tools along different lines of interaction (8%).

Lecture 12, Services Science Management  
Dr. Eric Chu, Semester 1, 2011-12 PolyU