ISM 270
Service Engineering and Management
Lecture 2: April 14, 2009
Notes

➤ Video of class available from website
  • Username:
  • Password:

➤ Homework 1 due April 28, 2009

➤ Office hours 5pm room 2052

➤ Computer access to SOE account available
  • Please fill in forms

➤ Reader
  • List of cases available on Class website
  • Reader in Print
Homework 1: Due next week

Three sections:
- Statistics Review
- Spreadsheet programming
- Data Envelopment Analysis

Warning: This homework is fairly long, and designed to remind you of things you may not have used for several years!
- Don’t be discouraged if there are some things you cannot remember
Statistics Review

- Probability and Random Events
- Distribution Functions
- Central Limit Theorem
Probability

- In a random event problem where all events are equally likely
- \[ P \text{ [condition A]} = \frac{\# \text{ Events satisfying A}}{\# \text{ possible events}} \]
Density functions

- PDF = probability density function
  - = probability of random variable equal to each value
- CDF = cumulative distribution function
  - = probability of random variable being less than or equal to each value
  - = integral of PDF up to that value
Conditional Probability

P [Event1|Event2] = \frac{\text{Prob[Both Events]}}{\text{Prob[Event2]}}

 Conditional PDF

- f(x|y) = \frac{f(x,y)}{f(y)}
Data Envelopment Analysis (DEA)

- Method for evaluating efficiency of similar venues/products
  - Incorporates inputs and outputs – not just one dimensional
  - Uses LINEAR PROGRAMMING (LP)

- KEY IDEA:
  - Weight the inputs and outputs to make one unit as efficient as possible, relative to all others
  - If this is 100% efficient, then the unit is on the frontier of efficiency;
  - If less than 100%, there are other units that could utilize the SAME inputs for MORE outputs
Theory of Strategic Advantage
Understanding the Competitive Environment of a Company

Companies do not exist in a vacuum:

It is necessary to understand the competitive environment to assess the current competitive position of a company.

It has become increasingly necessary to posture a company for challenges in its future.
Porter Competitive Model

- Potential New Entrants
- Intra-Industry Rivalry
- Bargaining Power of Suppliers
- Strategic Business Unit
- Bargaining Power of Buyers
- Substitute Products and Services
Competitive Model Focus

• What is driving competition in the current or future industry?

• What are current or future competitors likely to do and how can a company respond?

• How can a company best posture itself to achieve and sustain a competitive advantage?
Competitive Model Forces

Intra-industry Rivals: Strategic Business Unit (SBU) and major rivals.

Buyers: Categories of major customers.

Suppliers: Categories of major suppliers that play a significant role in enabling the SBU to conduct its business.

New Entrants: Companies that are new as competitors in a geographic market or existing companies that through a major shift in business strategy will now directly compete with the SBU.

Substitutes: An alternative to doing business with the SBU.
Porter Competitive Model Education Industry – Universities U.S. Market

Intra-Industry Rivalry
SBU: UCSC
Rivals: UC campuses, CSU, Private universities, Community Colleges

Potential New Entrants
• Foreign Universities
• Shift in Strategy by Universities or Companies

Substitute Products and Services
• Internet Distance Learning
• Books and Videotapes
• Computer-Based Training
• Company Education Programs

Bargaining Power of Buyers
• Students
• Parents
• Businesses
• Employers
• Legislators

Bargaining Power of Suppliers
• Faculty
• Staff
• Equipment and Service Suppliers
• Alumni
• Foundations
• Governments
• IT Vendors
Role of Technology through Porter perspective: Can we...

1. Build barriers to prevent a company from entering an industry?

2. Build in costs that would make it difficult for a customer to switch to another supplier?

3. Change the basis for competition within the industry?

4. Change the balance of power in the relationship that a company has with customers or suppliers?

5. Provide the basis for new products and services, new markets or other new business opportunities
Porter Competitive Strategies

- Cost Leadership Strategies
- Differentiation Strategies
- Innovation Strategies
- Growth Strategies
- Alliance Strategies

Primary Strategies

Supporting Strategies
Porter Primary Strategies

Differentiation—customer values the differences that you provide in products, services or capabilities.

Cost—is least cost. If this is the primary strategy, over time there will only one ultimate winner.
Porter Supporting Strategies

**Innovation**—either with business strategies or use of information systems or both.

**Growth**—deals with growth in revenue and other business volumes. Can be a key factor in establishing a market position. Can also be a major requirement to offset high fixed operating costs.

**Alliances**—importance of establishing a strong relationship with suppliers and other business partners often on a contractual basis.
Dell, Inc. Strategies

Primary Strategy:

- Differentiation
- Least Cost

Supporting Strategies:

- Innovation
- Growth
- Alliances
IT Significance

Information Technology can change the way that an organization (business or public sector) competes.

• As the foundation for organizational renewal.

• As a necessary investment that should help achieve and sustain strategic objectives.

• As an increasingly important communication network among employees and with customers, suppliers, business partners and even competitors.
Strategic Roles of Information Systems

Specific Examples:
- Lower Costs
- Differentiate
- Innovate
- Promote Growth
- Develop Alliances
- Improve Quality and Efficiency
- Build an IT Platform
- Support (enable) other Strategies
Characterizing Services
An Integrated Approach to Service Management

The Eight Components
- Product Elements
- Place, Cyberspace, and Time
- Promotion and Education
- Price and Other User Outlays
  + Process
  + Productivity and Quality
  + People
  + Physical Evidence

Require the Integration of Marketing, Operations, and Human Resources
### Goods or Services?
**Service/Product Bundle**

<table>
<thead>
<tr>
<th>Element</th>
<th>Core Goods Example</th>
<th>Core Service Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business</td>
<td>Custom clothier</td>
<td>Business hotel</td>
</tr>
<tr>
<td>Core</td>
<td>Business suits</td>
<td>Room for the night</td>
</tr>
<tr>
<td>Peripheral Goods</td>
<td>Garment bag</td>
<td>Bath robe</td>
</tr>
<tr>
<td>Peripheral Service</td>
<td>Deferred payment plans</td>
<td>In house restaurant</td>
</tr>
<tr>
<td>Variant</td>
<td>Coffee lounge</td>
<td>Airport shuttle</td>
</tr>
</tbody>
</table>
The Service Process Matrix

<table>
<thead>
<tr>
<th>Degree of Interaction and Customization</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Service factory:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Airlines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Trucking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Hotels</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Resorts and recreation</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Service shop:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Hospitals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Auto repair</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Other repair services</td>
<td></td>
</tr>
</tbody>
</table>

Degree of labor Intensity

- Low
- High

- Low: Service factory:
  - Airlines
  - Trucking
  - Hotels
  - Resorts and recreation

- High: Mass service:
  - Retailing
  - Wholesaling
  - Schools
  - Retail aspects of commercial banking

- Professional service:
  - Doctors
  - Lawyers
  - Accountants
  - Architects
The Service Package

- **Supporting Facility**: The physical resources that must be in place before a service can be sold. Examples are golf course, ski lift, hospital, airplane.

- **Facilitating Goods**: The material consumed by the buyer or items provided by the consumer. Examples are food items, legal documents, golf clubs, medical history.

- **Information**: Operations data or information that is provided by the customer to enable efficient and customized service. Examples are patient medical records, seats available on a flight, customer preferences, location of customer to dispatch a taxi.

- **Explicit Services**: Benefits readily observable by the senses. The essential or intrinsic features. Examples are quality of meal, attitude of the waiter, on-time departure.

- **Implicit Services**: Psychological benefits or extrinsic features which the consumer may sense only vaguely. Examples are privacy of loan office, security of a well lighted parking lot.
Distinctive Characteristics of Services

- **Customer Participation in the Service Process:** attention to facility design but opportunities for co-production

- **Simultaneity:** opportunities for personal selling, interaction creates customer perceptions of quality

- **Perishability:** cannot inventory, opportunity loss of idle capacity, need to match supply with demand

- **Intangibility:** creative advertising, no patent protection, importance of reputation

- **Heterogeneity:** customer participation in delivery process results in variability
# Strategic Service Classification

**(Nature of the Service Act)**

<table>
<thead>
<tr>
<th>Nature of the Service Act</th>
<th>Direct Recipient of the Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tangible actions</strong></td>
<td>People</td>
</tr>
<tr>
<td>People's bodies:</td>
<td>People</td>
</tr>
<tr>
<td>Health care</td>
<td></td>
</tr>
<tr>
<td>Passenger transportation</td>
<td>Physical possessions:</td>
</tr>
<tr>
<td>Beauty salons</td>
<td>Freight transportation</td>
</tr>
<tr>
<td>Exercise clinics</td>
<td>Repair and maintenance</td>
</tr>
<tr>
<td>Restaurants</td>
<td>Veterinary care</td>
</tr>
<tr>
<td></td>
<td>Janitorial services</td>
</tr>
<tr>
<td></td>
<td>Laundry and dry cleaning</td>
</tr>
<tr>
<td><strong>Intangible actions</strong></td>
<td>People's minds:</td>
</tr>
<tr>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Broadcasting</td>
</tr>
<tr>
<td></td>
<td>Information services</td>
</tr>
<tr>
<td></td>
<td>Theaters</td>
</tr>
<tr>
<td></td>
<td>Museums</td>
</tr>
<tr>
<td></td>
<td>Intangible assets:</td>
</tr>
<tr>
<td></td>
<td>Banking</td>
</tr>
<tr>
<td></td>
<td>Legal services</td>
</tr>
<tr>
<td></td>
<td>Accounting</td>
</tr>
<tr>
<td></td>
<td>Securities</td>
</tr>
<tr>
<td></td>
<td>Insurance</td>
</tr>
</tbody>
</table>
# Strategic Service Classification (Relationship with Customers)

<table>
<thead>
<tr>
<th>Nature of Service Delivery</th>
<th>Continuous delivery of service</th>
<th>Discrete transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Relationship between Service Organization and Its Customers</strong></td>
<td><strong>“Membership” relationship</strong></td>
<td><strong>No formal relationship</strong></td>
</tr>
<tr>
<td></td>
<td>Insurance</td>
<td>Radio station</td>
</tr>
<tr>
<td></td>
<td>Telephone subscription</td>
<td>Police protection</td>
</tr>
<tr>
<td></td>
<td>Electric Utility</td>
<td>Lighthouse</td>
</tr>
<tr>
<td></td>
<td>Banking</td>
<td>Public Highway</td>
</tr>
<tr>
<td></td>
<td>Long-distance phone calls</td>
<td>Restaurant</td>
</tr>
<tr>
<td></td>
<td>Theater series tickets</td>
<td>Pay phone</td>
</tr>
<tr>
<td></td>
<td>Transit pass</td>
<td>Toll highway</td>
</tr>
<tr>
<td></td>
<td>Sam’s Wholesale Club</td>
<td>Movie theater</td>
</tr>
<tr>
<td></td>
<td>Airline frequent flyer</td>
<td>Public transportation</td>
</tr>
</tbody>
</table>

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## Strategic Service Classification

*(Customization and Judgment)*

### Extent to Which Service Characteristics Are Customized

**Extent to Which Personnel**

**Exercise Judgment in Meeting**

**Customer Needs**

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>Preventive health programs</td>
</tr>
<tr>
<td>Taxi services</td>
<td>Education (large classes)</td>
</tr>
<tr>
<td>Gourmet restaurant</td>
<td>Family restaurant</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone service</td>
<td>Public transportation</td>
</tr>
<tr>
<td>Hotel services</td>
<td>Spectator sports</td>
</tr>
<tr>
<td>Retail banking</td>
<td>Movie theater</td>
</tr>
<tr>
<td>Cafeteria</td>
<td>Institutional food service</td>
</tr>
</tbody>
</table>

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## Strategic Service Classification
(Nature of Demand and Supply)

### Extent of Demand Fluctuation over Time

#### Extent to which Supply Is Constrained

<table>
<thead>
<tr>
<th></th>
<th>Wide</th>
<th>Narrow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak demand can usually be met without a major delay</td>
<td>Electricity, Telephone, Police emergency, Hospital maternity unit</td>
<td>Insurance, Legal services, Banking, Laundry and dry cleaning</td>
</tr>
<tr>
<td>Peak demand regularly exceeds capacity</td>
<td>Tax preparation, Passenger transportation, Hotels and motels</td>
<td>Fast food restaurant, Movie theater, Gas station</td>
</tr>
</tbody>
</table>

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## Strategic Service Classification

**Method of Service Delivery**

<table>
<thead>
<tr>
<th>Nature of Interaction between Customer and Service Organization</th>
<th>Availability of Service Outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer travels to service organization</strong></td>
<td><strong>Single site</strong></td>
</tr>
<tr>
<td><strong>Service provider travels to customer</strong></td>
<td><strong>Multiple site</strong></td>
</tr>
<tr>
<td><strong>Transaction is at arm’s length</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Single site</strong></th>
<th><strong>Multiple site</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus service</td>
<td>Fast-food chain</td>
</tr>
<tr>
<td>Barbershop</td>
<td></td>
</tr>
<tr>
<td>Taxi</td>
<td>Mail delivery</td>
</tr>
<tr>
<td>Pest control service</td>
<td>AAA emergency repairs</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit card company</td>
<td>Broadcast network</td>
</tr>
<tr>
<td>Local TV station</td>
<td>Telephone company</td>
</tr>
</tbody>
</table>

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Service Strategy
Strategic Service Vision

Target Market Segments

- What are common characteristics of important market segments?
- What dimensions can be used to segment the market, demographic, psychographic?
- How important are various segments?
- What needs does each have?
- How well are these needs being served, in what manner, by whom?
Strategic Service Vision

Service Concept

- What are important elements of the service to be provided, stated in terms of results produced for customers?
- How are these elements supposed to be perceived by the target market segment, by the market in general, by employees, by others?
- How do customers perceive the service concept?
- What efforts does this suggest in terms of the manner in which the service is designed, delivered, marketed?
Strategic Service Vision

Operating Strategy

- What are important elements of the strategy: operations, financing, marketing, organization, human resources, control?
- On which will the most effort be concentrated?
- Where will investments be made?
- How will quality and cost be controlled: measures, incentives, rewards?
- What results will be expected versus competition in terms of, quality of service, cost profile, productivity, morale/loyalty of servers?
Strategic Service Vision

Service Delivery System

- What are important features of the service delivery system including: role of people, technology, equipment, layout, procedures?
- What capacity does it provide, normally, at peak levels?
- To what extent does it, help insure quality standards, differentiate the service from competition, provide barriers to entry by competitors?
Competitive Environment of Services

- Relatively Low Overall Entry Barriers
- Economies of Scale Limited
- High Transportation Costs
- Erratic Sales Fluctuations
- No Power Dealing with Buyers or Suppliers
- Product Substitutions for Service
- High Customer Loyalty
- Exit Barriers
Competitive Service Strategies
(Overall Cost Leadership)

- Seeking Out Low-cost Customers
- Standardizing a Custom Service
- Reducing the Personal Element in Service Delivery (promote self-service)
- Reducing Network Costs (hub and spoke)
- Taking Service Operations Off-line
Competitive Service Strategies (Differentiation)

- Making the Intangible Tangible (memorable)
- Customizing the Standard Product
- Reducing Perceived Risk
- Giving Attention to Personnel Training
- Controlling Quality

Note: Differentiation in service means being unique in brand image, technology use, features, or reputation for customer service.
Competitive Service Strategies (Focus)

- Buyer Group: (e.g. USAA insurance and military officers)

- Service Offered: (e.g. Shouldice Hospital and hernia patients)

- Geographic Region: (e.g. Austin Cable Vision and TV watchers)
Customer Criteria for Selecting a Service Provider

- **Availability** (24 hour ATM)
- **Convenience** (Site location)
- **Dependability** (On-time performance)
- **Personalization** (Know customer’s name)
- **Price** (Quality surrogate)
- **Quality** (Perceptions important)
- **Reputation** (Word-of-mouth)
- **Safety** (Customer well-being)
- **Speed** (Avoid excessive waiting)
Service Purchase Decision

- **Service Qualifier:** To be taken seriously a certain level must be attained on the competitive dimension, as defined by other market players. Examples are cleanliness for a fast food restaurant or safe aircraft for an airline.

- **Service Winner:** The competitive dimension used to make the final choice among competitors. Example is price.

- **Service Loser:** Failure to deliver at or above the expected level for a competitive dimension. Examples are failure to repair auto (dependability), rude treatment (personalization) or late delivery of package (speed).
## Competitive Role of Information in Services

### Strategic Focus

<table>
<thead>
<tr>
<th>External (Customer)</th>
<th><strong>Creation of barriers to entry:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reservation system</td>
</tr>
<tr>
<td></td>
<td>Frequent user club</td>
</tr>
<tr>
<td></td>
<td>Switching costs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal (Operations)</th>
<th><strong>Revenue generation:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yield management</td>
</tr>
<tr>
<td></td>
<td>Point of sale Expert systems</td>
</tr>
</tbody>
</table>

### Competitive Use of Information

<table>
<thead>
<tr>
<th>On-line (Real time)</th>
<th>Off-line (Analysis)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data base asset:</strong></td>
<td></td>
</tr>
<tr>
<td>Selling information</td>
<td></td>
</tr>
<tr>
<td>Development of services</td>
<td></td>
</tr>
<tr>
<td>Micro-marketing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Productivity enhancement</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory status</td>
</tr>
<tr>
<td>Data envelopment analysis (DEA)</td>
</tr>
</tbody>
</table>
The Virtual Value Chain

- **Marketplace vs Marketspace**
- **Creating New Markets Using Information**
  - (Gather, Organize, Select, Synthesize, and Distribute)
- **Three Stage Evolution**
  - 1st Stage (Visibility): See physical operations more effectively with information – Ex. USAA “paperless operation”
  - 2nd Stage (Mirroring Capability): Substitute virtual activities for physical – Ex. USAA “automate underwriting”
  - 3rd Stage (New Customer Relationships)
  - Draw on information to deliver value to customer in new ways – Ex. USAA “event oriented service”
Limits in the Use of Information

- Anti-competitive (Barrier to entry)
- Fairness (Yield management)
- Invasion of Privacy (Micro-marketing)
- Data Security (Medical records)
- Reliability (Credit report)
Using Information to Categorize Customers

- **Coding** grades customers on how profitable their business is.
- **Routing** is used by call centers to place customers in different queues based on customer code.
- **Targeting** allows choice customers to have fees waived and get other hidden discounts.
- **Sharing** data about your transaction history with other firms is a source of revenue.
# Stages in Service Firm Competitiveness

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers patronize service firm for reasons other than performance.</td>
<td>Customers neither seek out nor avoid the firm.</td>
<td>Customers seek out the firm on the basis of its sustained reputation for meeting customer expectations</td>
<td>The company’s name is synonymous with service excellence. Its service doesn’t just satisfy customers; it delights them and thereby expands customer expectations to levels its competitors are unable to fulfill.</td>
</tr>
<tr>
<td>Operations is reactive, at best.</td>
<td>Operations functions in a mediocre, uninspired fashion.</td>
<td>Operations continually excels, reinforced by personnel management and systems that support an intense customer focus.</td>
<td>Operations is a quick learner and fast innovator; it masters every step of the service delivery process and provides capabilities that are superior to competitors.</td>
</tr>
<tr>
<td>SERVICE QUALITY is subsidiary to cost, highly variable.</td>
<td>Meets some customer expectations; consistent on one or two key dimensions.</td>
<td>Exceeds customer expectations; consistent on multiple dimensions.</td>
<td>Raises customer expectations and seeks challenge; improves continuously.</td>
</tr>
</tbody>
</table>
## Stages in Service Firm Competitiveness

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BACK OFFICE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counting room.</td>
<td>Contributes to service, plays an important role in the total service, is given attention, but is still a separate role.</td>
<td>Is equally valued with front office; plays integral role.</td>
<td>Is proactive, develops its own capabilities, and generates opportunities.</td>
</tr>
<tr>
<td><strong>CUSTOMER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified, to be satisfied at minimum cost.</td>
<td>A market segment whose basic needs are understood.</td>
<td>A collection of individuals whose variation in needs is understood.</td>
<td>A source of stimulation, ideas, and opportunity.</td>
</tr>
<tr>
<td><strong>INTRODUCTION OF NEW TECHNOLOGY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When necessary for survival, under duress.</td>
<td>When justified by cost savings.</td>
<td>When promises to enhance service.</td>
<td>Source of first-mover advantages, creating ability to do things your competitors can’t do.</td>
</tr>
<tr>
<td><strong>WORKFORCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative constraint.</td>
<td>Efficient resource; disciplined; follows procedures.</td>
<td>Permitted to select among alternative procedures.</td>
<td>Innovative; creates procedures.</td>
</tr>
<tr>
<td><strong>FRONT-LINE MANAGEMENT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls workers.</td>
<td>Controls the process.</td>
<td>Listens to customers; coaches and facilitates workers, works to enhance their career.</td>
<td>Is listened to by top management as a source of new ideas. Mentors</td>
</tr>
</tbody>
</table>

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Business Continuity

IBM Case Study

- Read
Next week:

- Technology in Services