

Course Code 205 Course Name – Operations & Supply Chain Management

Course Outcomes: On successful completion of the course the learner will be able to CO# COGNITIVE ABILITIES COURSE OUTCOMES

Unit 1



- 1. Understanding Services:
- The Service Economy,
- Service Definitions, Facilitating Role of Services in an Economy, Economic Evolution, Stages of Economic Development, Nature of the Service Sector, The Experience Economy,
- Consumer Service Experience,
- Business Service Experience,



- Service-Dominant Logic,
- Distinctive Characteristics of Service
 Operations Customer Participation,
- Simultaneity. Perishability, Intangibility,
 Heterogeneity, Non-transferrable Ownership
- The Service Package, Grouping Services by Delivery Process, Open-Systems View of Service Operations Management

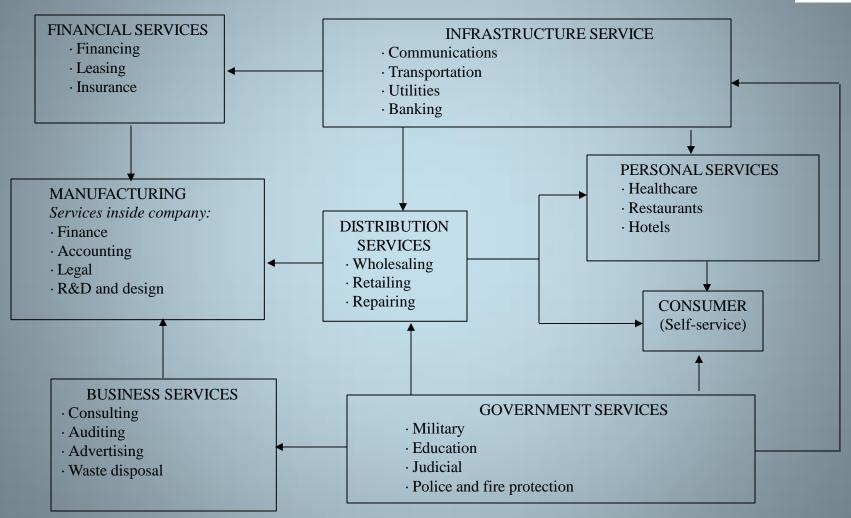
Definitions of Service



- Services are economic activities offered by one party to another, most commonly employing time-based performances to bring about desired results in recipients themselves or in objects or other assets for which purchasers have responsibility.
 - In exchange for their money, time, and effort, service customers expect to obtain value from access to goods, labor, professional skills, facilities, networks, and systems; but they do not normally take ownership of any of the physical elements involved. (Christopher Lovelock and Lauren Wright)
- A service is a time-perishable, intangible experience performed for a customer acting in the role of a coproducer. (James Fitzsimmons)

Role of Services in an Economy





Sources of Service Sector Growth

DIMR

- Information Technology (e.g. Internet)
 - **Innovation**
 - Push theory (e.g. Post-it)
 - Pull theory (e.g. Cash Management)
 - Services derived from products (e.g. Netflix)
 - Exploiting information (e.g. Auto part sales)
 - Difficulty of testing service prototypes

Changing Demographics

- Aging of the population
- Two-income families
- Growth in number of single people
- Home as sanctuary

Key Operations Principles



Aggregation Principle

The higher the level of aggregation of resources and information, the more predictable operations becomes (e.g. forecasts of total resources needed tend to be more accurate than forecasts of individual resources). This is a manifestation of the Central Limit Theorem.

Uncertainty Principle

The more uncertainty in operations, the greater the need to employ extra resources to cope with this uncertainty. Alternatively, the greater the stability and predictability, the more efficiently operations can function.

Efficiency Principle

 All else being equal, operations should function as efficiently as possible.

Distinctive Characteristics of Services

• Customer participation in the service process: attention to facility design, opportunities for co-production, concern for customer and employee behavior

• Simultaneity: process and outcomes are coupled, customer- facing activities cannot be inventoried, increased importance of matching capacity to demand

Perishability: opportunity loss of idle capacity, capacity utilization is a significant managerial challenge due to variable customer demand and lack of inventory for absorbing fluctuations

• Intangibility: customers cannot assess quality a priori, importance of reputation



 Heterogeneity: customer involvement in delivery process results in variation in service from customer to customer Compared to manufacturing, these characteristics introduce more uncertainty into the operating system with fewer options for managing uncertainty and create an operational focus on managing the customer experience throughout the service delivery process.

Service

Package



The service package is a bundle of goods and services with information that is provided in some environment. The bundle consists of:

- 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.

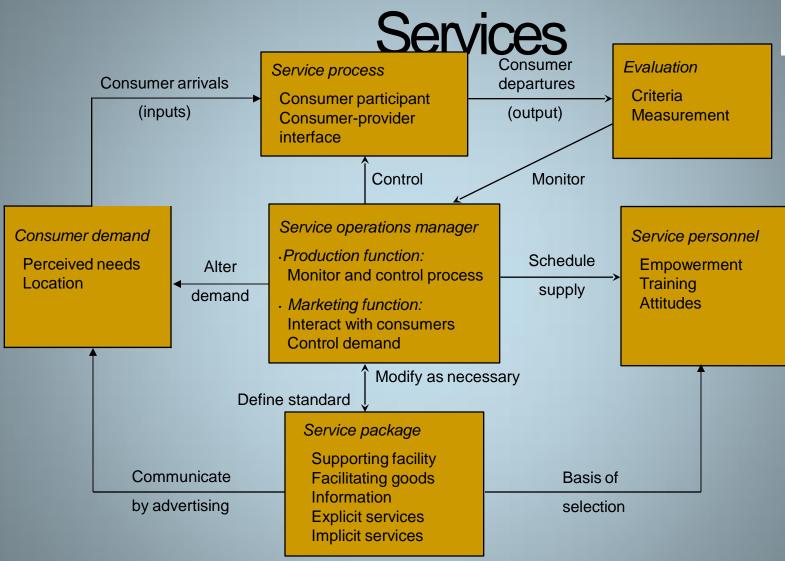
Service Package (cont.)



- **Explicit Services**: Benefits readily observable by the senses. The essential or intrinsic features. <u>Examples</u> 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.

Open Systems View of







The Service Package

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The Service Package (cont.)

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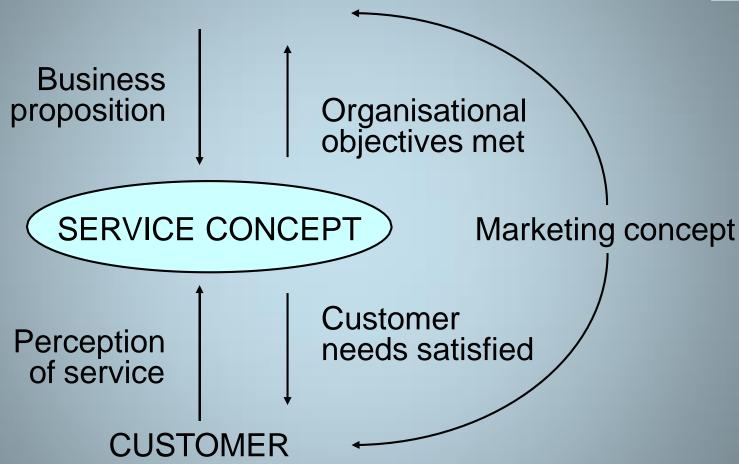


Figure: The marketing concept



Single experience No frills

OUTCOME

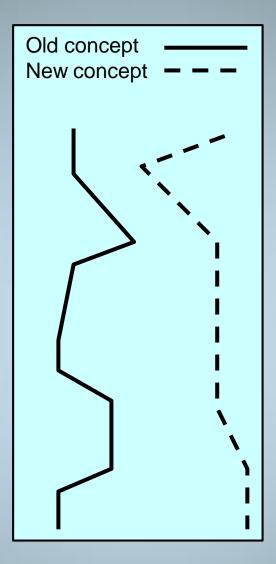
Learning Work support/scholarship

OPERATION

Taxonomic displays
Serious
Minimalist service

VALUE

Comprehensive collection In-depth study opportunity Professional resource



Multi-levelled experience Full service

Enthusiasm for geology Leisure

Staged narrative
Dramatic
Support services

'Star' exhibits
Education/indulging curiosity
Entertainment

Figure: Changing the service concept of a museum of geology



Distinctive Characteristics of Services

<u>Customer Participation in the Service Process</u>: attention to facility design but opportunities for co-production

<u>Simultaneity</u>: opportunities for personal selling, interaction creates customer perceptions of quality

<u>Perishability</u>: 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 Nature othe Service Act)



Nature of the Service Act

People Things
People's bodies: Physical possessions:

Tangible actions

Health care
Passenger transportation
Beauty salons
Exercise clinics
Restaurants

Freight transportation
Repair and maintenance
Veterinary care
Janitorial services
Laundry and dry cleaning

Intangible assets:

Intangible actions

Education
Broadcasting
Information services
Theaters
Museums

People's minds:

Banking Legal services Accounting Securities

Insurance

St Strategic Service Classification n (R(Relationship with Customers))



Type of Relationship between Service Organization and Its Customers

Nature	of	Ser	vice
Deliver	y		

"Membership" relationship

No formal relationship

Continuous delivery of service

Insurance
Telephone subscription
Electric Utility
Banking

Police protection
Lighthouse
Public Highway

Radio station

Discrete transactions

Long-distance phone calls
Theater series tickets
Transit pass
Sam's Wholesale Club
Airline frequent flyer

Restaurant
Pay phone
Toll highway
Movie theater
Public transportation

St/Strategic Service Classification n (Customization and Judgment)t)



Extent to Which Service Characteristics Are Customized

Extent to Which Personnel Exercise Judgment in Meeting **Customer Needs**

Hiah Low

igh	Surgery Taxi services Gourmet restaurant	Preventive health programs Education (large classes) Family restaurant	
ow	Telephone service Hotel services Retail banking Cafeteria	Public transportation Spectator sports Movie theater Institutional food service	

Hie

SStrategic Service Classification (Nature of of Deman Demand and Supply)

Extent of Demand Fluctuation over Time

Extent to which Supply Is Constrained

Peak demand can usually be met without a major delay

Peak demand regularly exceeds capacity

<i>Wide</i>	Narrow
Electricity Telephone Police emergency Hospital maternity unit	Insurance Legal services Banking Laundry and dry cleaning
Tax preparation Passenger transportatio Hotels and motels	Fast food restaurant Movie theater Gas station

SStrategic Service Classification (Method of Service DeService Delivery)



Availability of Service Outlets

Nature of Interaction between Customer and Service Organization

Customer travels to service organization

Service provider travels to customer

Transaction is at arm's length

Single site

Multiple site

Theater Barbershop	Bus service Fast-food chain
Taxi Pest control service Taxi	Mail delivery AAA emergency repairs
Credit card company Local TV station	Broadcast network Telephone company

Open Systems View of Services



The role of the service operations manager includes the functions of both production and marketing in an open system with the customer as a participant.

Marketing performs two important functions in daily-service operations: (1) educating the customer to play a role as an active participant in the service process; and (2) 'smoothing' demand to match service capacity.

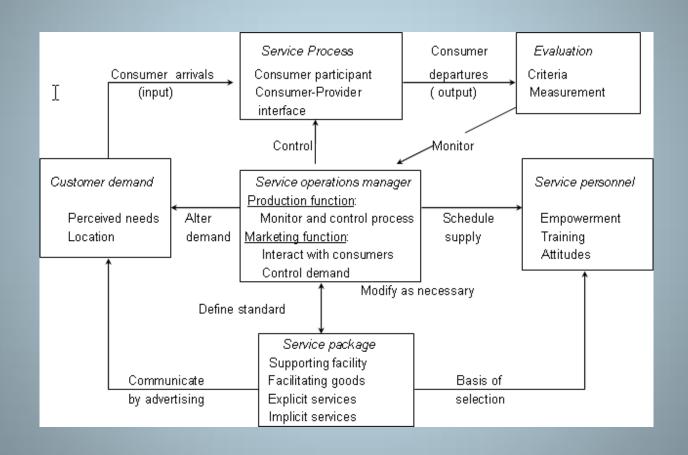
This marketing activity must be coordinated with scheduling staff levels and with controlling and evaluating the delivery process. By necessity, the operations and marketing functions are integrated for service organizations.

For services, the process is the product, need for extensive training and employee empowerment.

Customer impressions of service quality are based on the total service experience, not just on the explicit service that is performed.



Open Systems View of Services





Village Volvo



Village Volvo's Service Package

Supporting Facility

Facilitating

Goods

Information

Explicit Services

Implicit Services



Supporting facility

The new Butler building with ample service bays (two bays per mechanic) and comfortable waiting room promotes the customer's positive perception of the organization.

The suburban location could mean difficult access and the possible need for a shuttle.

Facilitating goods

Specialized tools and an inventory of select auto parts are obvious items in this element.

Information

The unique and possibly differentiating feature is the Custom Care Vehicle Dossier (CCVD), which serves as a powerful information tool for both mechanic and customer. The CCVD acts as a prompt to the customer to seek continuing service in a pattern (mileage or time). Analysis of customer patterns can assist Village Volvo in predicting demand and scheduling its operations to make full use of capacity.



Explicit services

The two owners of Village Volvo are former authorized Volvo dealer mechanics and have 22 years of combined experience between them. They have earned respect, reputation and satisfied customer following. Service availability is enhanced by the use of "express times" when customers can come in and get quick, routine jobs done while they wait.

Implicit services

The owners' attitudes and emphasis on customer satisfaction is illustrated by encouraging inspection of replaced parts. The policy of confirming work prior to commencement is essential to the customer's perception of reliability and participation in the service process.

Village Volvo's Distinctive Service Characteristics



Intangibility

Perishability

Heterogeneit

y

Simultaneity

Customer Participation in the Service Process



Customer participation in the service process The client brings his or her car to Village Volvo for specific

needs or routine services during scheduled times. There is continuous interaction between the client and the service manager and the assigned mechanic as evidenced by the discussion of problems and the test drive of the vehicle prior to the time when the repair work is done. Once the repair is complete, the client does the quality control inspection and is furnished with the worn parts.

Simultaneity

For routine repairs, customers may wait in the attractively furnished waiting area. In most cases the customers drop off their vehicles early in the morning and return for pickup at the end of the day. This allows Village Volvo some latitude in scheduling the daily work. For repair services, production and consumption of the service need not occur simultaneously, because the service is performed on the customer's property, which can be inventoried.



Perishability

Village Volvo is aware of this problem and has taken action to smooth demand, first by encouraging clients to make appointments for diagnosis and repair of specific problems and then by scheduling "drop in" times for Wednesday afternoon and Thursday morning. During peak hours, all mechanics are asked to deal with customers to reduce customer-waiting time.

Intangibility

Most customers are unable to judge the quality of an automobile repair service and thus, reputation becomes very important. If Village Volvo did not have such a good reputation, it would be difficult to persuade customers to use the private garage rather than the dealership. Village Volvo tries to reduce this intangibility by providing customers with their worn out parts.

Heterogeneity

Village Volvo is a service shop with the

capability to handle a variety of auto repair problems. The mechanics treat each customer's problem individually by explaining to the customer exactly what has occurred and what will happen.

Village Volvo's Service Classification



Nature of the service act

Relationship with

customers Customization

and judgement Nature of

demand and supply

Method of service delivery



- ·Car repair represents a tangible action performed on an object and therefore, is a service directed at a physical possession.
- ·By keeping a Custom Care Vehicle Dossier (CCVD) on customers' vehicles, Village Volvo is attempting to develop a "membership" relationship. The repair service itself is a discrete transaction, but sending reminders for routine maintenance gives the appearance of continuous monitoring.



- For routine maintenance (e.g., oil changes) customization and judgment are limited in scope. However, for major repairs the opposite is true.
- Demand for emergency auto repairs can vary considerably, but reservations for work is common and a loaner car can be provided for extended repairs. Routine maintenance can be scheduled to fill low demand periods.
- · Village Volvo has a single site and requires customers to bring their cars (or have them towed) to the facility.



Managing Village Volvo

How could Village Volvo manage its back office (repair operations) like a factory?



After receiving the cars for repair at the beginning of the day, the scheduling of repairs can be planned in accordance with the availability of the mechanics and the promised delivery times.

Thus, the back office can be run much like a manufacturing job shop. Routine work like brake pad replacement and minor tune-ups can be delegated to apprentice mechanics in order to achieve cost savings.



How can Village Volvo differentiate itself from Volvo dealers?



Dealers have traditionally neglected their service departments because more money was made in the sale of vehicles.

The turnover of dealer mechanics has also been high because good mechanics leave to open their own shops such as Village Volvo. The appeal of the independent mechanic is the personal relationship and trust that develops between vehicle owner and mechanic.

The Custom Care Vehicle Dossier is a method that Village Volvo uses to establish the customer's loyalty.



Xpresso Lube

Xpresso Lube Facility







Xpresso Lube's Service Package

Supporting Facility

Facilitating

Goods

Information

Explicit Services

Implicit Services



Supporting facility: Xpresso Lube has a fixed amount of operational capacity because it has a limited number of service lifts - two to be exact. Other components of its supporting facility are tools and equipment, an equipment storage area, a spacious waiting room, chairs, a service counter, street access and parking.

Facilitating goods: oil, filters, auto parts, coffee, snacks, cups, napkins, sugar and milk.

Information: for regular customers a reminder card could be sent for routine maintenance.



Explicit services: a car with new oil and filter, maintenance checks of the car, and a cup of coffee.

Implicit services: trust, a feeling of not "getting screwed," a feeling of keeping the car maintained, the satisfaction that comes from taking care of one's car, the good feeling that comes from recycling the old oil, a caffeine lift, and the satisfaction of drinking good coffee while you wait.

Xpresso Lube's Distinctive Service Characteristics



Intangibility

Perishability

Heterogeneit

y

Simultaneity

Customer Participation in the Service Process



Customer Participation in the Service Process: Customers bring their car to Xpresso Lube and wait for the oil change. Customers are invited to inspect the car while on the lift to observe other needed repairs.

Simultaneity: Using the coffee shop as a pleasant diversion allows Xpresso Lube to partially reduce the need for immediately working on arriving cars. Providing a shuttle service to nearby University and State Capital would further allow scheduling oil changes.

Perishability: the number of car lifts at the shop limits Xpresso Lube's capacity. This oil change business also owns an auto repair facility next door so the two businesses can deploy mechanics between them to best utilize labor capacity.



Intangibility: When an oil change is done in a typical pit, the customer cannot actually see the process and, after the service, the car's performance probably will not be noticeably different. In this situation, customers rely on the word of the oil change service person. Xpresso Lube's car lift design allows customers to watch its service, which gives customers more assurance that their needs are being met.

Heterogeneity: Different cars provide some variability in the oil change routine. Some customers even come for only the coffee.



Xpresso Lube's Service Classification

Nature of the service act

Relationship with

customers Customization

and judgement Nature of

demand and supply

Method of service delivery



Changing the oil is the primary function of Xpresso Lube. This is a tangible action performed on the car, but the secondary service is serving coffee, which recognizes the personal needs of the owners.

Xpresso Lube's service relationships consist of discrete, one-time transactions, but the company's focus on fostering customer trust and a pleasant waiting environment might lead to more long-term customers.



Fairly low customization is possible, but the accessibility of the service area and the mechanics can lead to customization opportunities if there are problems with the cars.

There is a significant demand fluctuation based on the obvious convenience of having the work performed after work or during the weekend. This peaked demand pattern can easily exceed Xpresso Lube's capacity.

But Xpresso Lube's service environment encourages people to accept longer waits and, by providing transportation, it enables customers to drop off their cars in the morning and retrieve them later in the day. The supply of the service cannot be altered very easily, given the company's fixed number of two carports and lifts.

Beyond Xpresso Lube



What elements of Xpresso Lube's location contribute to its success?



Xpresso Lube is located on the main thoroughfare leading to the University of Texas and thus provides excellent visibility.

The immediate business area is a bustling and diverse that attracts a broad spectrum of visitors.

It's also an area where customers don't mind waiting because they can walk to a variety of popular shops (e.g., Wheatville Co-Op and Half-Priced Books).



Given the example of Xpresso Lube, what other services could be combined to "add value" for the customer?

Beyond Xpresso Lube



Many examples exist in today's business environment.

One common service combination is selling concessions - candy, popcorn or beer, for example - with showing movies, sports events or concerts.

Others include the combination of bookstores and coffeehouses, gaming activities such as pool or bowling with alcohol sales and prepared food (e.g., Dave & Busters), fast food and gasoline (e.g., Exxon and McDonald's).



All of these combinations support one another and marry related customer needs. In the case of gas and hamburgers, for example, customers are in a hurry and the service combination provides them additional reasons to stop.

Other examples take advantage of unfilled waiting time. By locating in a shopping mall, a one-hour eyeglass store provides its customers something to do while they wait for their glasses (i.e., shop at other mall stores).

Illustrate the "distinctive characteristics of service operations" for a service with whichyou are familiar, such as a Nursing Home

Customer participation in the service process



- Some ways in which the client can influence the service process include being either cooperative or uncooperative and providing some self-care.
- One component of a nursing home's quality is the degree to which it recognizes individual differences in the clients' abilities to participate in the service process.





In nursing homes, this means that round-theclock staffing is necessary.





- Unfortunately, this means that highly trained professionals (such as physicians) are seldom available for patient care, because their expensive services are not needed a large proportion of the time.
- The property of time perishable capacity also gives rise to scheduling problems.
- For example, a nursing home policy may say that each client will be bathed each morning. In order to accomplish this goal it may be necessary to begin the baths at 4:00 a.m. so that they will all be finished by noon.





Nursing homes are regulated because their clients often are not in a position to judge the quality of a home before they enter it and usually have difficulty changing homes if the services they receive are unsatisfactory.





Every patient is an individual with unique patient care requirements.

As a result of the difficulty of measuring acceptable care, for example, Texas regulatory agencies only recently have formulated widely accepted standards for the quality of care in nursing homes.



Course Name Service Operations Management – I , Course Code 205

Course – Operations & Supply Chain
Management
Course Outcomes: On successful completion
of the course the learner will be able to

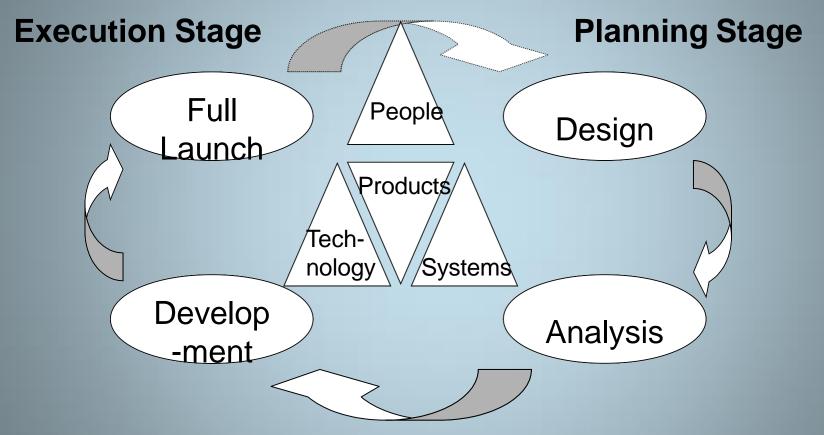
Unit II



- Designing the Service Enterprise: New Service Development, Sources of Service Sector Growth, Information Technology, The Internet as a Service Enabler, Innovation, Changing Demographics, Innovation in Services, New Service Development, Technology in Service Innovation, Challenges of Adopting New Technology in Services,
- Readiness to Embrace New Technology, Service Design Elements, Customer Value Equation, Strategic Positioning through Process Structure, Service Blueprinting, Taxonomy for Service Process Design, Degree of Divergence, Object of the Service Process, Type of Customer Contact, Generic Approaches to Service System Design, Production-Line Approach, Customer as Co-producer, Customer Contact Approach, Information Empowerment, Intellectual Property

NEW SERVICE DEVELOPMENT CYCLE









Radical Service Innovation

- Requires a different process and design approach than incremental innovation
- Innovative service firms require enablers to facilitate the process
- Nature of change will dictate where resources are allocated
- Radical innovations imply increased risk and resource investment





- Service Decision Factors
 - Facility Location (based upon proximity to customers)
 - Facility Layout (depends on the presence of the customer at the location)
 - Product and Process Design (Covers both the intangible and tangible aspects of the service offering)
 - Scheduling (how the workers are assigned to the service)
 - Quality Control, Measures and Time Standards (focus is on the needs of the customer)





- Service Decision Factors
 - Demand/Capacity Planning (depends on the type of service and the immediacy of matching supply to demand)
 - Customer Contact Level (physical presence and length of time that a customer spends with a service provider)
 - Industrialization (the substitution of technology for people)
 - Front Line Personnel Discretion (denotes the flexibility of the service employee while interacting with a customer)





Service Decision Factors

- Worker Skills (depend on service strategy and concept, customer contact level and industrialization level)
- Sales Opportunities (coincide with high customer contact and employee discretion)
- Standardization of Service Offering (level of uniformity provided in the service)
- Customer Participation (substitution of consumer labor for provider labor)

SERVICE SYSTEM DESIGN AND



- INNOVATION Supporting facilities must be in place prior to offering a service
- Facilitating goods such as a product or other tangible features are part of the service
- Sensual and psychological benefits are associated with the service offering
- Services might be bundled into one supporting facility
- Must differentiate between core and ancillary services

SERVICE SYSTEM DESIGN AND INNOVATION



Low

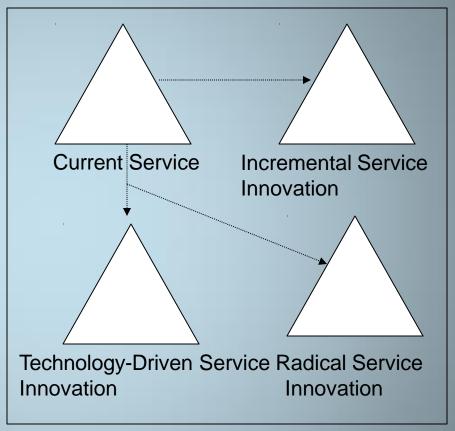
High

Face to Face Delivery

dustrialization Leve

Telephone or Courier Delivery

Technology Based Self-Service



Low High

Standardization of Service Offering

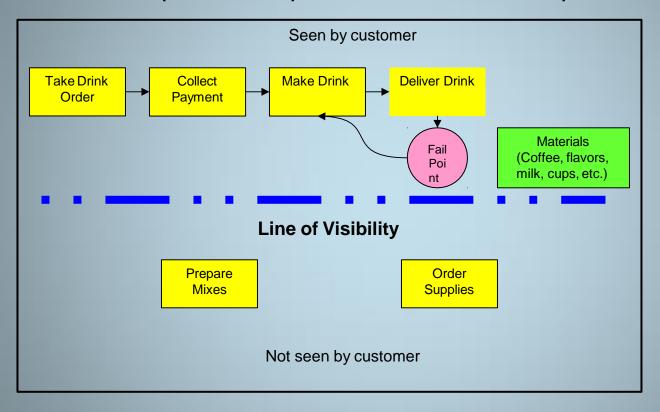


Service Blueprinting

- Design tool based on the process flow diagram
 - Delineate front office from back office operations
 - Determine standard or maximum execution times, materials and the exact process for each step
 - Identify potential failure points and generate mitigation plans to prevent or recover from a failure

SERVICE SYSTEM DESIGN TOOLS

Service Blueprint for Espresso and Coffee Shop





Customer Utility Models

- Success depends upon customer's perceived utility or benefit provided by the service's price or non-price attributes
- Promise of customer utility measurement is the ability to optimize the design of a service
- Satisfaction with the quality of service affects customer loyalty and repurchase intent

SERVICE SYSTEM DESIGN Tools



Customer Utility Models

- Service quality can be measured along five principle dimensions
 - Reliability, responsiveness, assurance, empathy and the tangible aspect of the service
 - Improving reliability can result in increased labor and training costs
 - Responsiveness may be enhanced by reducing queue times
 - Empathy and assurance can be influenced by the ability of service providers to convey knowledge, courtesy and impressions of caring
 - Enhancing the tangible attributes of a service increases costs of consumables

SERVICE SYSTEM DESIGN TOOLS

Customer Utility Models

- Conjoint analysis (CJA) and discrete choice analysis (DCA) are used to model customer behavior
 - Discrete choice experiments involve careful design of service profile choice sets
 - Design of a new airport restaurant requires the following
 - Identification of important attributes
 - Specification of attribute levels
 - Experimental design
 - Presentation of alternatives of respondents
 - Estimation of choice model

Sources of Service Sector Growth

- Customer suggestions
- Frontline employees
- Mining customer database



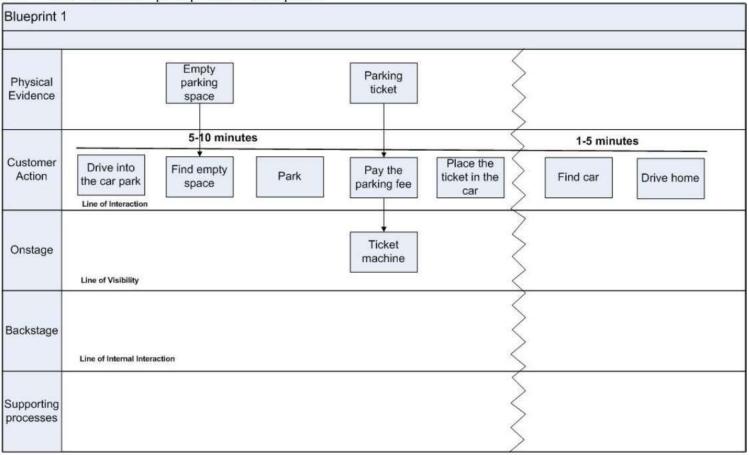
Blueprinting: What is it?

- O Bringing "order to chaos": systematically structurizing the customer journey along with the structures and processes needed from the service provider's part. (Shostack, 1982)
- O Usually considers both perspectives: the customer and the service provider.
- O In practice: we make a **flowchart** of the service process. (In software development, this is called providing specification or requirements. In marketing, it's called a brief.)



Example: Parking (customer)

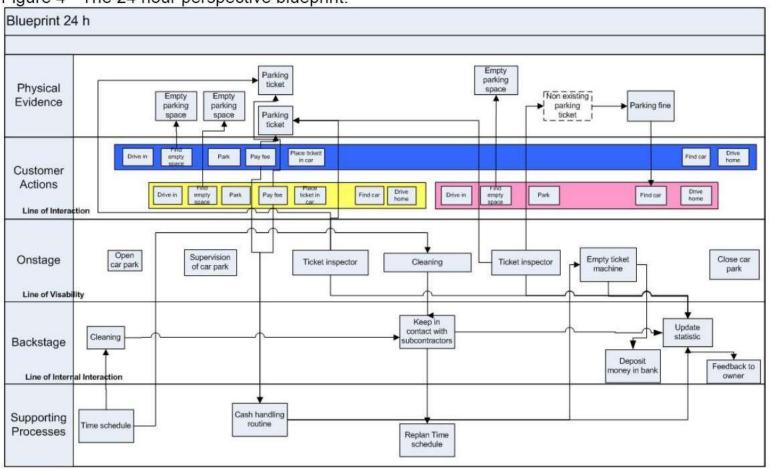
Figure 3 - The customer perspective blueprint.





Example: Parking (both)

Figure 4 - The 24 hour perspective blueprint.



Wreiner et al. (2009)



Where can it be applied?

- O Events (Service Jam)
- O Automates (VR ticket buying)
- O Software (mobile applications)O Retail stores (IKEA)
- O Hotels (Hotels.com & actual hotel)
- O Experience services (Spa)
- O Public services (library, school, hospital, KELA...)
 - → both physical and digital services
 - → both public and private services
 - → both low and high touch services
 - → both existing and novel service

	Pre-event	Arrival	Participation
Physical evidence	signs, website, marketing channels	signs, wardrobe, breakfast table	working space, material, presentation equipment
Customer interaction s	 finding about the event signing up 	 parking entering the building putting clothes to wardrobe eating breakfast meeting people 	 listening to presentation s finding a group doing group work presentin g results
Front stage	ticket sales	greeting	presentations , mentoring
Back stage	answering questions of participants	serving breakfast	tweeting
Support processes	marketing, setting up the website + social media	hiring the concierge; catering	recruiting presenters and mentors, preparing all material, testing equipment



1. Physical evidence

- O **Definition** = all the tangibles that customers are exposed to that can influence their quality perceptions. (Also known as servicescape.)
- O Questions
 - O How to support customer journey with physical evidence?
 - O venues (environment)
 - O visual cues & guidance (instructing)
 - **O UX elements** (conventions)
 - 0 icons, symbols (informing)
 - O How to signal the expected quality?
 - O How to ensure the sensory experience?



2. Customer actions

- O Definition = The steps that customers take as part of the service delivery process.
- **O** Questions
 - O What are the steps customers take as a part of the service process? (Customer journey, touchpoints)
 - O Uniformity: do all customers use the service same way?
 - → customer personas
 - O Multichannel: in which channels is the service being used?



[Help: Customer personas]

• O Customer personas = idealized characterizations of the intended customers; usually written down as a profile with demographic and psychographic details. (E.g., does he/she want quick or thorough service? Is he pleased with high/low automatization? What channels for service provision does he/she prefer?)



[Help: Touchpoint analysis]

- O Make a SWOT on each individual touchpoint to better understand its importance
- O Questions
 - OHow important is this touch point relative to others?
 - OHow to make sure **expected quality** is provided? (Or surpassed, if that is the strategy.)
 - What are the possible WOW moments and why?
 - OWhat are the possible **fail points** and why? (Fail point = results in harm to the customer or the service provider.)
 - OWhen things go wrong, how to manage **service recovery**?



3. Front stage

- O Definition = face-to-face actions between employees and customers.
- O Questions
 - O How to measure the delivery efficiency?
 - O How to measure the service quality? (Perceived vs. objective)
 - O What is the degree of standardization vs. customization?
 - O What is the degree of **human touch**? (Low tech vs. high tech)
 - O What actions can be carried out with (digital) self-service?
 (Thus replacing human work → startups)



MOST NEW SERVICES TAKE AWAY JOBS THROUGH TECHNOLOGY. HERE'S A CHALLENGE – WHY NOT THINK OF SERVICES THAT ADD JOBS, NOT REDUCE THEM?





- O Usually the two are seen as alternatives, so that adding one reduces the other (=summing them up adds to one).
- O But, it is possible to have a **hybrid model** as a strategy, therefore focusing on either the multichannel (omnichannel) perspective or high customer satisfaction (consider Zappos.com).



4. Back stage

- O Definition = The 'line of visibility' separates
 the onstage from the Backstage actions.
 Everything that appears above the line of
 visibility can be seen by the customers, while
 everything under the line of visibility is invisible
 for the customers.
- O Questions
- What resources are needed?
- O How are the resources divided between human and tech?
- O How are backstage activities integrated to frontstage
 - activities, so that customer experience remains satisfactory?



5. Support processes

O Definition = all the activities carried out by individuals and units within the company who are not contact employees.

O Questions

- O What are the necessary processes that enable and enhance customer journey?
- O How can the support processes be **linked to** a) customer touchpoints and b) front stage activities?
- O How costly are they in comparison with front stage activities (budgeting)?



Blueprinting process

- 1. Decide the customer and his or her problem
- 2. Think of the **customer perspective** (what are the actions he or she wants?)
- 3. Think of the service provider perspective (how can the customer wants be satisfied?)
- 4. Think of the **support services** (what is needed to make customer encounters successful?)
- 5. Think of the **tangibles** (how can each touchpoint be supported with physical evidence?)



Once the blueprint is ready...

- 1. test in a controlled environment
- 2. put into "production" (remember staff training)
- 3. monitor how well your ideas of wow moments and failure points take place.

Taxonomy for Service Process Design

- Service processes can be classified using the concept of Divergence
- the object toward which service activity is directed
- Degree of customer contact

Challenges of Adopting New Technology in Services



- Dealing with multiple contacts in the organization.
 Consultants may have to work with a wide range of employees in their client organizations and so maintain relationships at different levels in the organization
- Working with a complex set of relationships. The users or recipients of a service will frequently not be the purchasers, and this purchasing group may in turn be different from those who commission or specify the service standards
- B2B relationships may last for a long time. The challenge here is for the relationship not to become too 'cosy', with the customer or supplier being taken for granted.

Generic Approaches to Service System Design

 this approach attempts to translate a successful manufacturing concept into the service sector. limited discretionary action of personnel a feature that contributes to the production line approach's success.

Production-Line Approach



- Manufacturing systems are designed with control of the process in mind. The output often is machine-paced, and jobs are designed with explicit tasks to be performed.
- Special tools and machines are supplied to increase worker productivity. A service taking this production-line approach could gain a competitive advantage with a cost leadership strategy
- Hence for the benefits this technocratic service delivery system is adapted. Every detail is accounted for through careful planning and design.
- The production-line approach to service system design attempts to translate a successful manufacturing concept into the service sector, and several features contribute to its success.

Key points of Production-Line Approach



- Limited Discretionary Action of Personnel
- Division of Labor
- Substitution of Technology for People
- Service Standardization

Customer as Co-producer



- For most service systems, the customer is present when the service is being performed.
- Instead of being a passive bystander, the customer represents productive labor just at the moment it is needed, and opportunities exist for increasing productivity by shifting some of the service activities onto the customer (i.e., making the customer a co-producer).
- Customer participation can increase the degree of customization.

Key points in Customer as a Coproducer



- Self-Service
- Smoothing Service Demand
- Customer-Generated Content

Customer Contact Approach



- The manufacture of products is conducted in a controlled environment. The process design is totally focused on creating a continuous and efficient conversion of inputs into products without consumer involvement.
- One approach is to separate the service delivery system into high and low-contact customer operations. The lowcontact, or back-office, operation is run as a plant, where all of the production management concepts and automation technology are brought to bear.
- This separation of activities can result in a customer perception of personalized service while in fact achieving economies of scale through volume processing.

Key points in Customer Contact Approach



- Degree of Customer Contact
- Separation of High- and Low-Contact
 Operations



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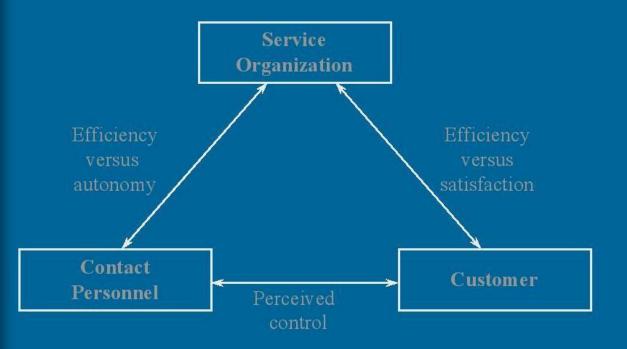
Unit 3



- The Service Encounter: Concept of the Service Encounter,
 Role of Technology, The Emergence of Self-Service,
- The Service Encounter Triad, Encounter Dominated by the Service Organization, Contact Personnel-Dominated Encounter, Customer-Dominated Encounter,
- The Service Organization, Culture, Empowerment, Control Systems, Customer Relationship Management, Contact Personnel - Selection & Training, Creating an Ethical Climate.
- The Customer Expectations and Attitudes, The Role of Scripts in Coproduction, Creating a Customer Service Orientation, Service Profit Chain



The Service Encounter Triad



Culture



- Schwartz and Davis (1981) Culture is a pattern of beliefs and expectations shared by the organization's members. Mintzberg (1989)
 - Culture is the traditions and beliefs of an organization that distinguish it from others. Hoy and Miskel (1991) Culture is shared orientations that hold the unit together and give a distinctive identity.

Contact Personnel



- 1. Abstract Questioning
- 2. Situational Vignette
- 3. Role Playing
- 4. Training Unrealistic customer expectations Unexpected service failure



customer expectations are rising and will continue to do so!



the influence of 'word of mouth' is increasing



the influence of 'word of mouth' is increasing

and will continue to do so!



SO.... what are you going to do?



1.

be easy to find, 'deal with' and **'buy** from'!







spot 'disappointment'

and....







'delight' your customers!



'surprise' them with the level of service you provide!



DIMR

'delight' your customers!



'surprise' them with the level of service you provide!

'positively' please!



do stuff



that gets people shouting about you to others....





do stuff



that gets people shouting about you to



others....again, 'good' stuff please!





do these things consistently!







do these things consistently!

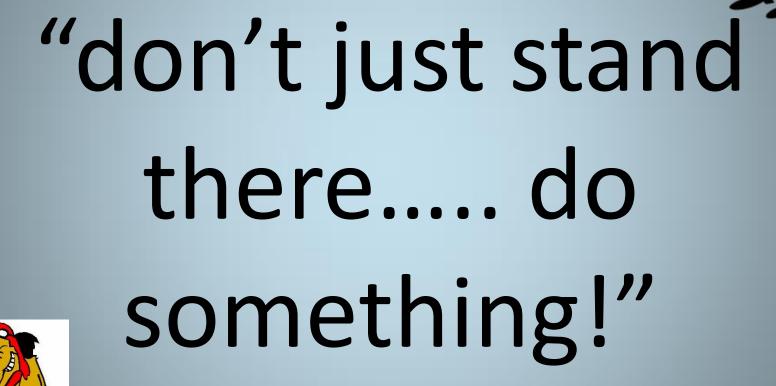


encourage, engage and empower your people!

"a journey of a thousand miles begins with a first step..."

lau-tzu





dick dastardly



take action, not notes!



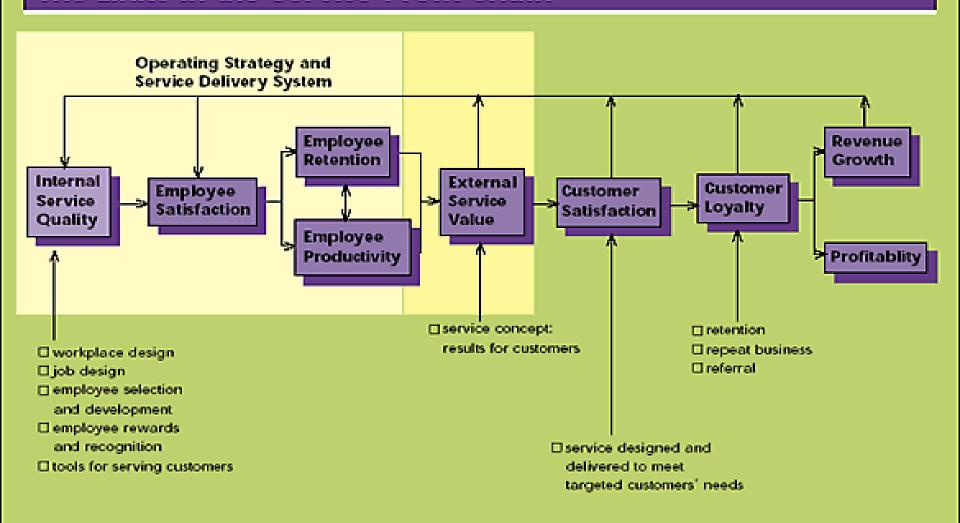
take action,



Service-Profit Chain



The Links in the Service-Profit Chain



Internal Service Quality



- You might have already noticed the beginning of the chain – Internal Service Quality. It becomes clear that employee satisfaction and loyalty are directly proportional to the service they provide to your customers.
- Your business success depends on how you cultivate your employees into a productive, passionate, quality-oriented team.

Customer Loyalty



- Based on the Service Profit Chain model, profitability and growth are determined primarily by maximizing the lifetime value of your customers, and that value is fully realized only when you earn the customer's loyalty.
- In one study, a 5% increase in customer loyalty produced profit increases from 25% to 85%.
- A loyal customer is one who obeys the three R's: Retention, Repeat Sales, and Referrals.



- Service that is good, but not exceptional, can be your worst enemy.
- The difference between "good" and "exceptional" is the difference between a customer who "might" buy from you again and one who will "definitely" buy from you again...and again.
- Xerox conducted a study which found that a "highly satisfied" customer is six times more likely to buy again as one who is simply "satisfied".



- The basic premise of these findings is that customers who say they are "satisfied" or "don't complain" will not necessarily come back to you when they upgrade their equipment or want to install a new distributed audio system.
- They are easily swayed by your competition or by "great deals" on the Internet. "Satisfied" is simply no longer acceptable.



- Building loyalty means resolving to deliver superior quality and service at every customer touch point. That passion must extend from the highest levels of management to the front lines of your sales staff and installers.
- If you're serious about gaining loyal customers, you need to gain customer feedback and document your results. More importantly, you must respond to that feedback quickly with service improvements.



- Building loyalty means resolving to deliver superior quality and service at every customer touch point. That passion must extend from the highest levels of management to the front lines of your sales staff and installers.
- If you're serious about gaining loyal customers, you need to gain customer feedback and document your results. More importantly, you must respond to that feedback quickly with service improvements.



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CO# COGNITIVE ABILITIES COURSE OUTCOMES

Unit IV



- Service Facility Location: Strategic Location Considerations, Competitive Clustering, Saturation Marketing,
- Marketing Intermediaries, Substitution of Communication for Travel, Separation of Front from Back Office, Impact of the Internet on Service Location, Site Considerations,
- Geographic Information Systems, Facility Location Modeling Considerations, Geographic Representation, Number of Facilities, Optimization Criteria, Facility Location Techniques ,Cross-Median Approach for a Single Facility, Huff Model for a Retail Outlet,
- Location Set Covering for Multiple Facilities, Regression Analysis in Location Decisions.



Service Facility Location







Learning Objectives

- Explain the different between competitive clustering and saturation marketing.
- Explain the impact of the Internet on location decisions.
- Describe how a geographic information system is used in service location decisions.
- Differentiate between a Euclidian and metropolitan metric approach to measuring travel distance.
- Locate a single facility using the cross-median approach.
- Use the Huff retail location model to estimate revenue and market share for a potential site.
- Locate multiple facilities using the set covering model.



Introduction

 From marketing perspective service location focuses on attracting customers to a site because of convenience (fast food restaurant on a high traffic street) or physical attributes (resort on a beautiful beach).

 Location also effects the service delivery design and has an impact on employees.

Strategic Location Dimensions



- Competitive positioning: refers to methods by which the firm can establish itself relative to its competitors. Prime location can be barrier to entry.
- Demand management: is the ability to control the quality, quantity and timing of demand. E.g., a hotel can control demand by locating neer a diverse set of market generators that supply a steady demand regardless of the economic condition



Strategic Location Dimensions-2

- Flexibility of a location is a measure of the degree to which the service can react to changing economic situations.
- plan for future economic changes and portfolio effect e.g., locating sites in a number of states could reduce the overall risk of a financial crises resulting from regional economic downturns.



Strategic Location Dimensions-3

Focus: can be developed by offering the same narrowly defined service at many locations. Many multisided service firms develop a standard (or formula) facility that can be duplicated at many locations. While this approach makes expansion easier, sites that are located in close proximity could siphon business from each other.

Strategic Location Considerations

- Competitive Clustering: is a reaction to observed consumer behavior when they are choosing among competitors. When shopping for items such as automobiles customer like to make comparisons, and for convenience, seek out the area of town where many dealers are concentrated.
- Saturation Marketing: The idea is to group outlets of the same firm tightly in urban and other high traffic areas (e.g. Au Bon Pain, Ice Cream Vendors)



Strategic Location Considerations-2

- Marketing Intermediaries: Service channels of distribution have involved that use separate organizational entities as intermediaries between the producer and the customer. (e.g. Credit Cards, HMO)
- Substitute Communication for Travel: an appealing alternative to moving people from one place to another is the use of telecommunications.

(e.g. telecommuting, e-Commerce)

Strategic Location Considerations-3

- Impact of the Internet on Service Location A web site has become the virtual location of pure e-commerce firms. The concept of "edistance", the barrier created by internal and external navigation, arises from the desire to attract customers to a web site.
 - (e.g. Amazon.com, eBay, FedEx)
- Separation of Front from Back Office: (e.g., Dry cleaning, ATM, shoe repair)



Strategic Location Considerations-4

	Front Office	Back Office
External Customer (consumer)	Is travel out to customer or customer travel to site? Can electronic media substitute for physical travel? Is location a barrier to entry?	Is service performed on person or property? Is co-location necessary? How is communication accomplished?
Internal Customer (employee)	Availability of labor? Are self-service kiosks an alternative?	Are economies of scale possible? Can employees work from home? Is offshoring an option?



Site Selection Considerations

1.Access:

- Convenient to freeway, exit and entrance ramps
- · Servedegypatisiofftransportationarking

2.Visbiexpansion:

- •Set pack from street expansion Surrounding clutter Sign place membediate
- 3.Traffi&urroundings

Regression Model for Motel Location (La Quinta Motor Inns)

The management of the motel, a national chain of hotels commissioned a study to determine the direction of its expansion efforts. It wanted to know which factors determined a profitable hotel location and, thus would allow management to screen available real estate for new hotel sites. Investigators collected data on many factors at existing locations, such as traffic count, number of competitive rooms nearby, visibility of signs, local airport traffic, types of neighboring businesses, and distance to the central business district. In all 35 factors, or independent variables, were considered.

Regression Model for Motel Location

- Competitive Factors: Room rate, hotels within one mile, competitive room rate
- <u>Demand Generators</u>: College, Hospital beds within one mile, Annual tourists
- Area Demographics: Family income, residential population
- Market Awareness: State population per inn, Distance to nearest inn
- Physical Attributes: Sign visibility, Distance to downtown, Accessibility

Regression Model for Motel Location (La Quinta Motor Inns)

- The Inn's operating margin, obtained by adding depreciation and interest expenses to the profit and than dividing by the total revenue, was chosen as the most reliable measure, or dependent variable Y, on which to base a forecast.
- A statistical analysis of the data for all the variables in Table 10.3 allowed the investigators to identify four critical factors STATE, PRICE, INCOME, and COLLEGE to be used in forecast model.

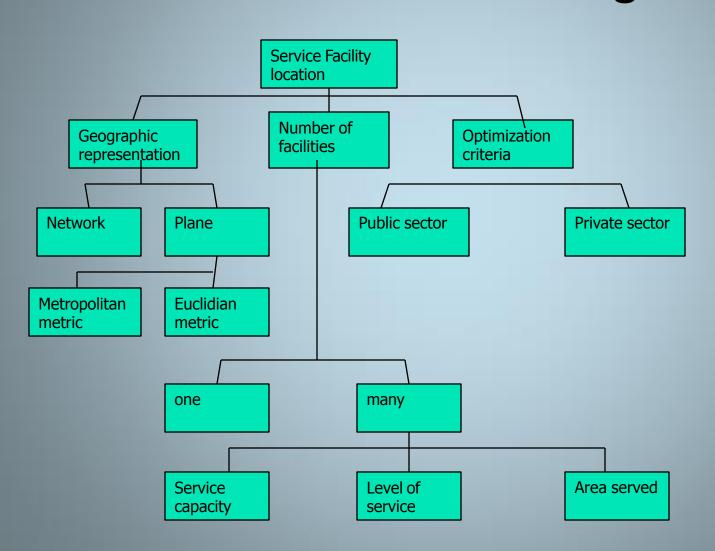
Y= 39 + (-5.41)STATE + (5.86)PRICE + (-3.09)INCOME + (1.75) COLLEGE

Classifications of Service Facility Location issues



- Many factors enter into the decision to locate a service facility. Fig. 10.2 classifies location issues that will be used to guide our discussion.
- The broad categories are:
 - geographic representation,
 - number of facilities
 - 3. Optimization criteria.

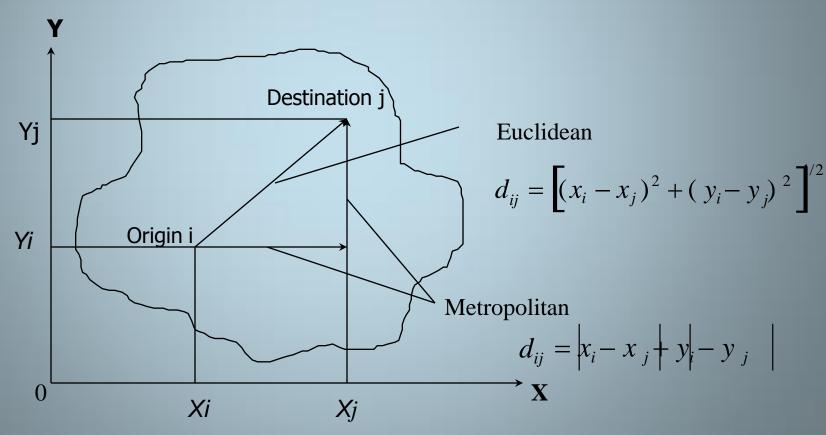
Classifications of Service Facility Classification issues-Fig. 10.2





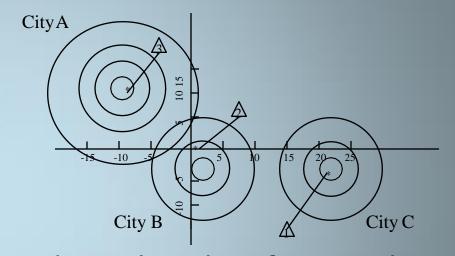
Geographic Representation

Location on a Plane



Effect of Optimization Criteria





1. <u>Maximize Utilization:</u> maximize the total number of visits to the centers

(City C: elderly find distance a barrier)

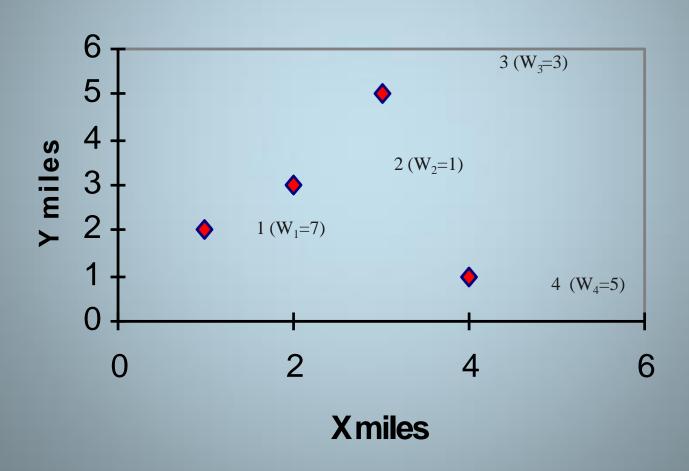
2. <u>Minimize Distance per Capita:</u> minimize the average distance per capita to the closest center

(City B: centrally located)

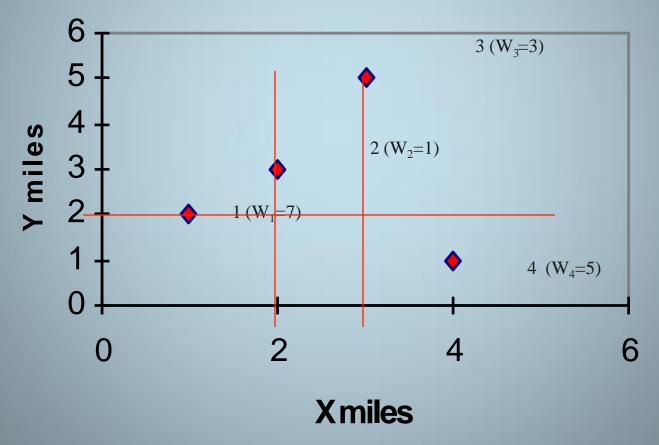
3. <u>Minimize Distance per Visit:</u> minimize the average per-visit travel distance to the nearest center.

(City A: many frequent users)

Single Facility Location Using Cross Median Approach



Single Facility Location Using Cross Median Approach



Solution is line segment y=2, x=2,3



<u>First</u>, a gravity analogy is used to estimate attractiveness of store j for customers in area i.

A_{ij} = Attraction to store j for customers in area i

 S_j = Size of the store (e.g. square feet)

 T_{ij} = Travel time from area i to store j lambda = Parameter reflecting propensity to travel

$$A_{ij} = rac{S_j}{T_{ij}^{\lambda}}$$



<u>Second</u>, to account for competitors we calculate the probability that customers from area i will visit a particular store j.

$$P_{ij} = rac{A_{ij}}{\displaystyle\sum_{j=1}^{n} A_{ij}}$$



Third, annual customer expenditures for item k at store j can now be calculated.

 P_{ii} = Probability customers from area i travel to store j

 C_i = Number of customers in area i (e.g. census track)

 B_{ik} = Annual budget for product k for customers in area i

m = Number of customer areas in the market region

$$E_{jk} = \sum_{j=1}^{m} \left(P_{ij} C_i B_{ik} \right)$$



• Fourth, market share of product k purchased at store j can now be calculated.

$$M_{jk} = \frac{E_{jk}}{\sum_{i=1}^{m} (C_i B_{ik})}$$

Example 10.2 Copying Service: Huff Analysis



- Assume that copying center has been established at (x=2,y=2) i.e., at A.
- Further assume that each customer order represents an expenditure of approximately \$10.
- Because convenience would be an important customer criteria, assume that λ=2
- If we wish to open a competing store at location (x=3,y=2) i.e., at B with twice the capacity of the existing copying center.
- Using the travel distances given in Table 10.8 as input to the Huff model, calculate monthly expenditure and market share for the proposed copying center.

Example 10.2 Copying Service: Huff Analysis-2



Travel distances in miles (T_{ij}) using Metropolitan metric

Customer Location (i)

Site(j) 1	2	3	4
Proposed(3,2) 2	2	3	2
Existing (2,2) 1	1	4	3



Table 10.9 Attractions (Aii)

Customer Location (i)

Site(j)	1	2	3	4
Prop	$osed(S_1=2)$	0.5	0.5	0.2222	0.5
Exist	ing $(S_2=1)$	1.0	1.0	0.0625	0.111
Total	attraction	1.5	1.5	0.2847	0.611



TABLO 1.10 Probabilişty (Pij)

Customer Location (i)

Site(j)	1	2	3	4
Proposed	.33	.33	.78	.82
Existing	.67	.67	.22	.18

Tablo 10.11 Montly Expenditures(E_{jk}), Market Shares(M_{jk})



Customer Expenditure								
Site(j)	1	2	3	4 M	ontly	M _{jk}		
				To	otal			
Proposed	\$2333	333	333 2	2340	9106	.57		
Existing	4667	667	660	900	6894	.43		
Total	7000	1000	3000	5000	1600	0 1		

Multiple Facilities:Location Set covering Problem



We want to find the minimum number and location of facilities that will serve all demand points within some specified maximal service distance; this is known as the "location set covering" problem

Example 10.3 Rural Medical cliniks



A state department of health is concerned about the lack of medical care in rural areas, and a group of nine communities has been selected for a pilot program in which medical clinics will be opened to serve primary health care needs. It is hoped that every community will be within 30 miles of at least one clinic. The planners would like to determine the number of clinics that are required and their location. Any community can serve as a potential clinic site except community 6, because facilities are unavailable there. Fig. 10.7 shows a network identifying the cities as numbered circles; lines drawn between the sites show the travel distance in miles.

Example 10.3 Rural Medical clinics-2



- Step 1: Identify for each community the other communities that can be reached from it within the 30-mile travel limit (beginning with community 1, we see that 2,3,4 can be reached within 30 miles). They are listed in the second column of the Fig. 10.12.
- Step 2: Identify the set of potential sites that could cover a given community (third column in the Fig.10.12)

Example 10.3 Rural Medical clinics-3



Step 3: Identify and circle the subsets which represents subset of other potential locations (e.g., community 2 can only be served by sites 1,2,3, one of these sites must be selected for a clinic location). Identifying these subsets reduces the problem size while ensuring that restrictions are satisfied.



Topics for Discussion

- Pick a particular service, and identify shortcomings in its site selection.
- How would you proceed to estimate empirically the parameter λ in the Huff retail location model for a branch bank?
- What are the characteristics of a service that would make communication a good substitute for transportation?
- What are the benefits of using intermediaries in the service distribution channel?
- Go to http://www.mapinfo.com/ and find the definition of "location intelligence." What use can be made of geographic information?

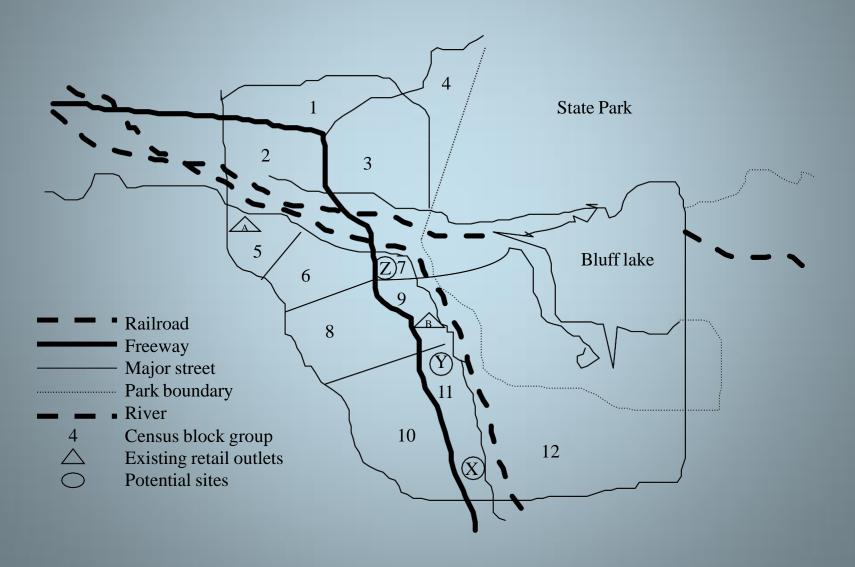


Interactive Exercise

•The class breaks into small groups and each group comes up with examples of service facility locations that seem to defy the analytical models discussed in the chapter.

Athol Furniture





Athol Furniture Data



COMPETITORS' STORE SIZES

Store	Sales area, sq ft
A	10,000
В	15,000

MAXIMUM SIZE LIMIT OF SITES

Site	Maximum sales area, sq ft
X	15,000
Υ	20,000
Z	10,000

MINIMUM TRAVEL TIME BETWEEN POTENTIAL AND EXISTING SITES AND BLOCK GROUPS, Min

Census block group

Site	1	2	3	4	5	6	7	8	9	10	11	12
А	7	5	5	9	1	3	4	5	7	10	14	17
В	10	8	8	10	7	3	3	2	1	4	2	5
Χ	16	14	14	16	13	8	7	6	4	3	2	2
Υ	12	10	10	12	9	5	4	3	2	3	2	4
Z	7	5	5	7	4	2	1	4	3	8	10	13
X Y	16 12	14 10	14 10	16 12	13 9	8 5	7 4	6 3	4 2	3 3	2 2	4

RELATIONSHIP OF STORE SIZE TO MARGIN ON SALES, EXPENSES, AND NET OPERATING PROFIT AS % OF SALES

Sales area, sq ft	Margin on sales	Expenses	Net operating profit before taxes
10,000	16.2	12.3	3.9
15,000	15.6	12.0	3.6
20,000	14.7	11.8	2.0

Athol Furniture Demographics

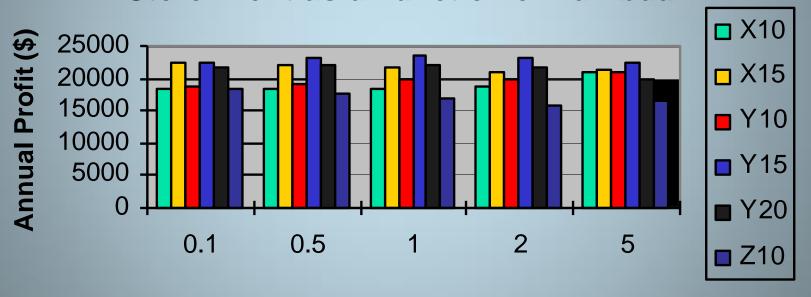
MARKET DATA

Census block group	Number of households	Average annual income	Average annual furniture expenditures per household
1	730	\$65,000-\$70,000	\$180
2	1130	45,000-50,000	125
3	1035	80,000-85,000	280
4	635	150,000-over	350
5	160	25,000-30,000	75
6	105	20,000-25,000	50
7	125	20,000-25,000	60
8	470	40,000-45,000	115
9	305	30,000-35,000	90
10	1755	75,000-80,000	265
11	900	85,000-90,000	215
12	290	150,000-over	370



Store Site Selection

Store Profit as a Function of Lambda





Market Share Analysis

	Now	<u>X15</u>	<u>Y15</u>	<u>Y20</u>
A	33%	23%	22%	19%
В	67%	40%	39%	35%
Athol		37%	39%	46%

Are there any shortcoming in the use of the Huff mode?

Facility Location Modeling Considerations



 The load-distance method is a mathematical model used to evaluate locations based on proximity factors. The objective is to select a location that minimizes the total weighted loads moving into and out of the facility. The distance between two points is expressed by assigning the points to grid coordinates on a map.



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Unit 5



- Service Facility and Process Flows:
- Environmental Psychology and Orientation, Servicescapes,
- Behaviors in Servicescapes, Environmental Dimensions of Servicescapes,
- Facility Design, Nature and Objectives of Service Organizations,
- Land Availability and Space Requirements, Flexibility, Security, Aesthetic Factors, The Community and Environment.



- Process Analysis,
- Types of Processes, Flowcharting,
- Gantt Chart, Process Terminology, Facility Layout,
- Flow Process Layout and the Work Allocation Problem,
- Job Shop Process Layout and the Relative Location Problem.

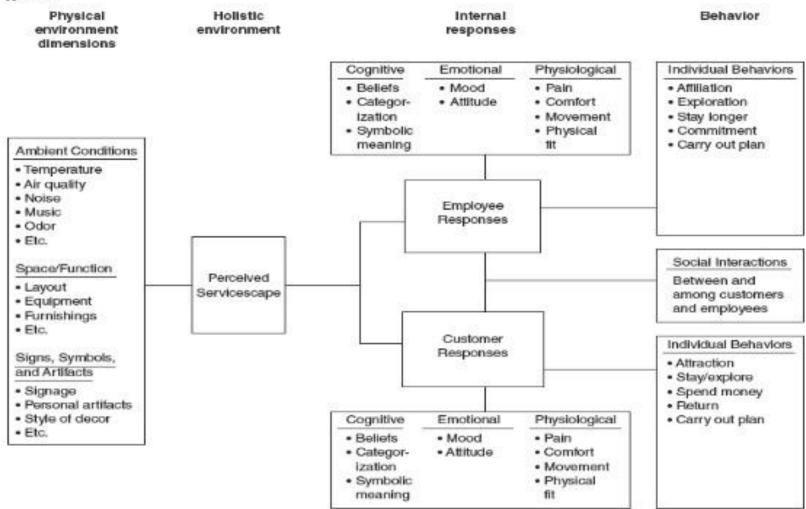


- Physical facility should be designed with an image and feel that is congruent with the service concept; because the design of the physical surroundings positively affect employee and customer behavior.
- The internal response measured cognitively, emotionally, and physiologically is moderated by one's personal mood.
- A well conceived servicescape will encourage a proper social interaction between and among customers and employees

SERVICESCAPE FRAMEWORK

FIGURE 10.1 A Framework for Understanding Physical Environment-User Relationships in Service Organizations

Source: Adapted from M. J. Bitner, "Servicescapes: The Impact of Physical Surroundings on Customers and Employees," Journal of Marketing 56 (April 1992), pp. 57-71.



ENVIRONMENTAL DIMENSIONS OF SERVICESCAPE

- Ambient Conditions: background characteristics such as noise level, music, lighting, temperature, and scent.
- Spatial Layout and Functionality: reception area, circulation paths of employees and customers, and focal points.
- Signs, Symbols, and Artifacts: selection, orientation, location, and size of objects.

FACILITY DESIGN CONSIDERATIONS.

- Nature and Objectives of Service Organization
- Dictate the Parameters of its design
- Engender Immediate recognition
- External Design should immediately give the clue on the nature of services being provided

- Land Availability and Space Requirements
- Constraints such as Costs, Zoning Requirements and Actual Area
- Urban Areas warrant more creativity since expansion is vertical
- Governed by laws and ordinances of the local bodies like parking, exterior appearance of structures.



- Flexibility (Design for Future)
- Adaptability to changes in quantity and nature of demand
- Incur additional expenses initially but will save the cost in the long run
- Provide for growth that otherwise may not have been possible
- E.g. Airports at Pune, Bangalore etc.,



- The Community and Environment
- Enough Parking space so as not to jam the neighbourhood
- No undue Noise or Odor
- Adherence to zoning regulations and ordinances of the local body.

FACILITY DESIGN CONSIDERATIONS – THE SERVICE PACKAGE "EXTRAS"



FACILITY DESIGN CONSIDERATIONS – THE SERVICE PACKAGE "URGENT"





Nature and Objectives of Service





Security







Aesthetic Factors





Process Analysis



- Process Analysis Terms
- Process: Is any part of an organization that takes inputs and transforms them into outputs
- Cycle Time: Is the average successive time between completions of successive units
- Utilization: Is the ratio of the time that a resource is actually activated relative to the time that it is available for use.

Process Flowcharting Defined



- Process flowcharting is the use of a diagram to present the major elements of a process
- The basic elements can include tasks or operations, flows of materials or customers, decision points, and storage areas or queues
- It is an ideal methodology by which to begin analyzing a process

The Purpose of a Gantt Chart:



- To illustrate the relationship between project activities & time.
- To show the multiple project activities on one chart
- To provide a simple & easy to understand representation of project scheduling

Gantt Chart

					Serv	other		October				November				Deservices	
				96-12h	1301-1901	20th-26th	2781-216	4th-10th	19th-17th	18th - 24th	250-160	tet-7th	89-14b	tion-2hot	Jönd - 28th	29m-5m	60-120
	Topic / Task	mun	tione	1	2	3	4	- 5	- 6	7	- 6	9	10	11	12	13	34
niroductory	FOR STREET	- 1,0	57		_												
	Lecture Series - 1	1	2														
	Lecture Series - 2	2	2	. / A													
	Lecture Series - 3	3	3	1													
	Prepare Learning Contract	4	4			-											
	Sign Contract	5	5														
Research & Writing	Types of Stop Motion	5	5 6														
	History	5	5														
	Modern Stop Motion	6	6														
	Software	6	6								1						
	Animation Principles	7	7														
	Anthropomorphism	7	7														
	Staryteling Techniques	8.	8							-							
	Case Study	8	10														
	Photography	9	8 10 10					-									
	Lighting	9	10														
	Design of a S.M. Set	9	10														
	S.M. Filming Process	11	11														
	3.M. Filming Techniques	11	11														
	Loose Ends	11	14														
	T.	83	3.91														
Ongoing	Scriphwriting	11	14														
	Storytoording	11	14														
	Supervisor Meeting - Thurs	1	14														
	Blog - ThurutSun	1	14														
	Interview - Email Contacts	6	14														



Example of a simple Gantt Chart

You will see that a Gantt Chart is basically a Bar Chart.
 Representing project activities against time.

Process Terminology:



- Cascade: A control system with 2 or more controllers, a "Master" and "Slave" loop. The output of the "Master" controller is the set point for the "Slave" controller.
- Dead Time: The amount of time it takes for a process to start changing after a disturbance in the system.
- Derivative Control: The "D" part of a PID controller. With derivative action the controller output is proportional to the rate of change of the process variable or error. Error: In process controls, error is defined as
- Error = set point process variable. Integral Control: The "I" part of a PID controller. With integral action the controller output is proportional to the amount and duration of the error signal.

Process Terminology



- PID Controller: PID controllers are designed to eliminate the need for continuous operator attention. They are used to automatically adjust system variables to reduce error and hold a process variable close to the set point. Error is defined above as the difference between set point and process variable.
- Proportional Control: The "P" part of a PID controller.
 With proportional action the controller output is proportional to the amount of the error signal.
- Set point: The set point is where you would like a controlled process variable to be.

Facility Layout



- Facility layout considers available space, final product, safety of users and facility and convenience of operations.
- Facility layout looks at physical allocation of space for economic activity in the plant.

Factors affecting Facility Layout



- Facility layout designing and implementation is influenced by various factors. These factors vary from industry to industry but influence facility layout. These factors are as follows:
- The design of the facility layout should consider overall objectives set by the organization.
- Optimum space needs to be allocated for process and technology.
- A proper safety measure as to avoid mishaps.
- Overall management policies and future direction of the organization

Design of Facility Layout



- Principles which drive design of the facility layout need to take into the consideration objective of facility layout, factors influencing facility layout and constraints of facility layout. These principles are as follows:
- Flexibility: Facility layout should provide flexibility for expansion or modification.
- Space Utilization: Optimum space utilization reduces the time in material and people movement and promotes safety.
- Capital: Capital investment should be minimal when finalizing different models of facility layout.

Flow of Process layout



- Process layout design determines the best relative locations of functional work centers. Work centers that interact frequently, with movement of material or people, should be located close together, whereas those that have little interaction can be spatially separated. One approach of designing an efficient functional layout is described below.
- List and describe each functional work centre.
- Obtain a drawing and description of the facility being designed.
- Identify and estimate the amount of material and personnel flow among work centers
- Use structured analytical methods to obtain a good general layout.
- Evaluate and modify the layout, incorporating details such as machine orientation, storage area location, and equipment access.

Work allocation problem



- Allocation problems involve the distribution
 of resources among competing alternatives in order to
 minimize total costs or maximize total return.
- Such problems have the following components:
- a set of resources available in given amounts;
- a set of jobs to be done,
- each consuming a specified amount of resources;
- and a set of costs or returns for each job and resource.
 The problem is to determine how much of each resource to allocate to each job.



- If more resources are available than needed,
- the solution should indicate which resources are not to be used,
- taking associated costs into account.
- Similarly, if there are more jobs than can be done with available resources,
- the solution should indicate which jobs are not to be done, again taking into account the associated costs.



- Job Shop
- Flow jumbled flow
- Flexibility high
- Products many
- Capital investment low
- Variable cost high
- Labor content and skill high
- Volume low



- A job shop is a flexible operation that has several activities through which work can pass. In a job shop, it is not necessary for all activities to be performed on all products, and their sequence may be different for different products.
- To illustrate the concept of a job shop, consider the case of a machine shop. In a machine shop, a variety of equipment such as drill presses, lathes, and milling machines is arranged in stations. Work is passed only to those machines required by it, and in the sequence required by it. This is a very flexible arrangement that can be used for wide variety of products.



 A job shop uses general purpose equipment and relies on the knowledge of workers to produce a wide variety of products. Volume is adjusted by adding or removing labor as needed. Job shops are low in efficiency but high in flexibility. Rather than selling specific products, a job shop often sells its capabilities.

Relative Location Problem.



- Relative location refers to the position of a place or entity based on its location with respect to other locations. For example, the location of the US Capitol is located about 38 miles southwest of Baltimore. Relative location can be expressed in terms of distance, travel time, or cost.
- Relative location can also be used to provide geographic context. For example, overview or locator maps show the relative location of a place or entity based on a larger geographic view. For example, the inset map below, shows the relative location of the state of Texas within the United States.

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