

Services Science Management

COMP5138



Lecture 11: Services Science Management
Dr. Eric Chu, Semester 1, 2011-12, PolyU

Contents

- Quality Management
- The Six Sigma
- Defining, Measuring and Controlling
- Analyzing and Improving

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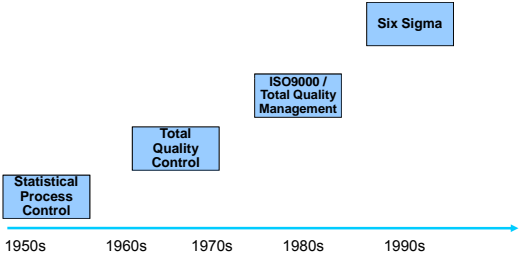
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Quality Management



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Development of Quality Management



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Process Improvement

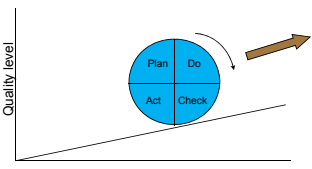


Plan:
Choosing control subjects and setting goals

Do:
Running the process

Check:
Sensing and monitoring

Act:
Take corrective actions



Quality level


Time

Edward Deming PDCA Cycle

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Deming's 14-Point Program



- Create constancy of purpose for improvement of product and service
- Adopt the new philosophy
- Cease dependence on mass inspection
- End the practice of awarding business on price tag alone
- Constantly and forever improve the system of production and service
- Institute modern methods of training on the job
- Institute modern methods of supervising
- Drive out fear
- Break down barriers between departments
- Eliminate numerical goals for the workforce
- Eliminate work standards and numerical quotas
- Remove barriers that hinder hourly workers
- Institute a vigorous program of education and training
- Create a structure in top management that will push everyday on the above 13 points

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Foundations for Continuous Improvement

- Individual development – ensure that job skills are taught in a consistent manner
- Management training – different levels of management are continuously reminded for the process
- Human resources planning – employee selection and performance review
- Standards of performance – instructions to employees specifying their performance
- Career progression – job advancement to stimulate conformance
- Opinion surveys – customer and colleague opinions as a source of monitoring

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The Six Sigma

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The Six Sigma

- A business improvement concept that is built upon a well-defined and robust infrastructure which directly involves personnel from several management levels targeting quality and process improvement projects to drive a company's continual improvement efforts
- Sigma (σ) is used to represent the standard deviation of a statistical population. The term "six sigma process" comes from the notion that if one has six standard deviations between the process mean and the nearest specification limit, there will be practically no items that fail to meet specifications

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Main Characteristics of the Six Sigma Methodology

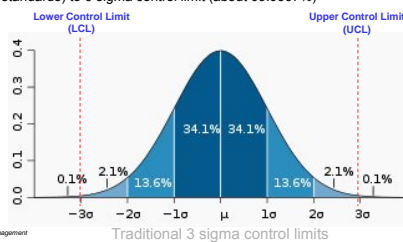
- Strategic alignment
- Top down approach
- Customer focus
- Management and staff involvement
- Project management
- Measurement and improvement

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Statistical Process Control

- Statistical process control (SPC) involves using statistical techniques to measure and analyze the variation in processes. Most often used for manufacturing processes, the intent of SPC is to monitor product quality and maintain processes to fixed targets.
- The Six Sigma method strengthened the traditional 3 sigma control limit (about 99% within quality standards) to 6 sigma control limit (about 99.9997%)

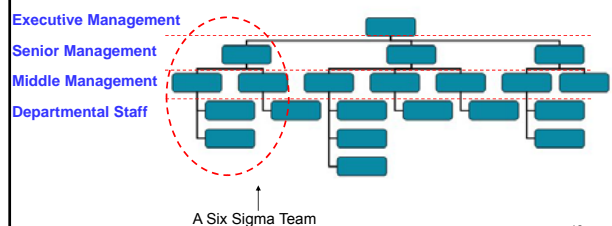


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Multi-levels Alignments

The Six Sigma method stresses the involvements of different levels of management to involve within a quality improvement team



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Six Sigma Belt System and their Roles

Six Sigma Role	Position	Main responsibilities
Executive Champion	CEO/Managing Director	Decision making
Champion	GM/Directors	Implementation within division
Master Black Belt	Process improvement specialist	Coaching, consulting, training and support
Black Belt	Managers	Project management
Green Belt	Assistant Managers	Process improvement

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Reasons to implement the Six Sigma

- Reduce cost and waste
- Improve productivity
- Transform and drive the organization to a new direction
- Response to competitive pressure
- Benchmarking with other market leaders
- Pressure from customers to improve the quality of products and services

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The Six Sigma Method

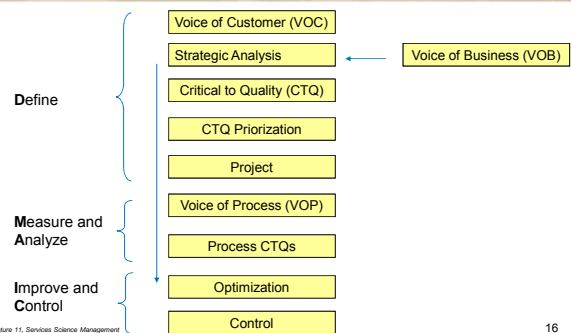
The DMAIC Approach

- **D**efine high-level project goals and the current process
- **M**easure key aspects of the current process and collect relevant data
- **A**nalyze the data to verify cause-and-effect relationships
- **I**mprove or optimize the process based upon data analysis
- **C**ontrol to ensure that any deviations from target are corrected before they result in defects. Set up pilot runs to establish process capability

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A Typical DMAIC Six Sigma Project



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Defining, Measuring and Controlling

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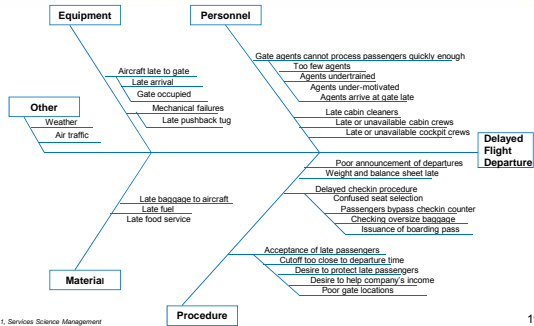
Quality Tools for Defining and Controlling

- Cause-and-Effect Diagram
- Check Sheet
- Run Chart
- Histogram
- Pareto Chart
- Scatter Diagram
- Quality Function Deployment

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Cause-and-Effect Diagram (Fish Bone Diagram)



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Check Sheet

A check sheet is a historical record of observations and source of data for problem identifications.

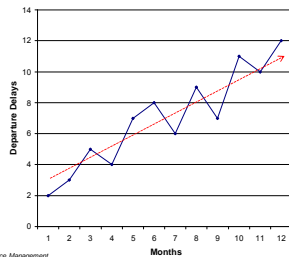
Month	Lost	Departure Luggage	Mechanical Delay	Overbooked	Other
January	1	2	3	3	1
February	3	3	0	1	0
March	2	5	3	2	3
April	5	4	4	0	2
May	4	7	2	3	0
June	3	8	1	1	1
July	6	6	3	0	2
August	7	9	0	3	0
September	4	7	3	0	2
October	3	11	2	3	0
November	2	10	1	0	0
December	4	12	2	0	1
Total	44	84	24	16	12

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Run Chart

A run chart tracks changes in a important process variable over time to detect trends or cycles in performance.

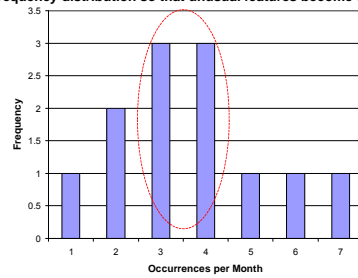


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Histogram

A histogram presents data collected over a period of time as a frequency distribution so that unusual features become obvious.

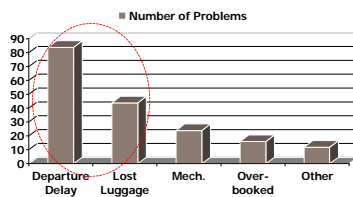


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Pareto Chart

A Pareto chart orders problems by their relative frequencies so as to spot the greatest potential for improvement. It is commonly found that 80% of the problems are just contributed by the top 20% of frequently happened errors. Pareto chart prompt attentions for high frequency events.

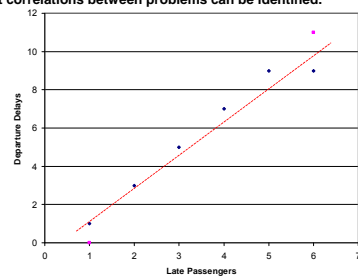


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Scatter Diagram

A scatter diagram visually shows the relationship between two variables so that correlations between problems can be identified.

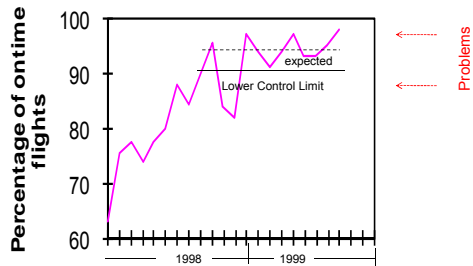


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Control Chart

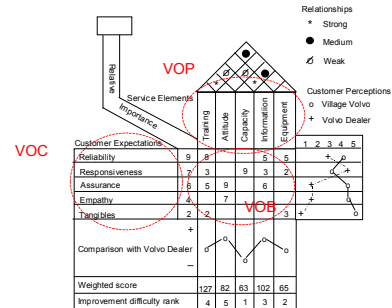
Control chart uses to monitor processes that are under performance.



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Quality Function Deployment (House of Quality)



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Analyzing and Improving

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Tools for Analyzing and Improving Problems

- Project Design and Management
 - The Gantt Chart
 - Critical Path Method (CPM)
- Process Analysis
 - Customer Contacts
 - Service Encounters
 - Blueprinting
 - Process Flow Chart
 - Process Allocation

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Analyzing and Improving: Project Design and Management

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Project Design

- Project can vary widely in their complexity, resource requirements, time needed for completion, and risk. Common project varies across different issues:
 - Characteristics of Projects: purpose, life cycle, interdependencies, uniqueness, and conflict.
 - Project Management Process: planning (work breakdown structure), scheduling, and controlling.
 - Selecting the Project Manager: credibility, sensitivity, ability to handle stress, and leadership.
 - Building the Project Team: Forming, Storming, Norming, and Performing.
 - Principles of Effective Project Management: direct people individually and as a team, reinforce excitement, keep everyone informed, manage healthy conflict, empower team, encourage risk taking and creativity.
 - Project Metrics: Cost, Time, Performance

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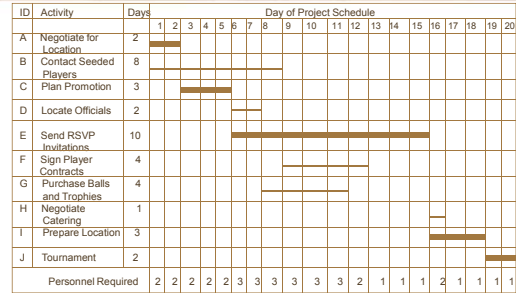
Techniques for Project Management

- The Gantt Charts
 - By breaking down the project into distinct activities, the Gantt chart establish the time line for each project activities against a calendar view
- Critical Path Method (CPM)
 - A mathematical modeling method that tries to optimize the starting and finishing time of different activities of a project. The common method for the optimization process is presented in form of a PERT diagram (Program Evaluation & Review Technique)
- Both methods can adopt probabilistic measures in minimizing the influences of unexpected problems

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The Gantt Chart

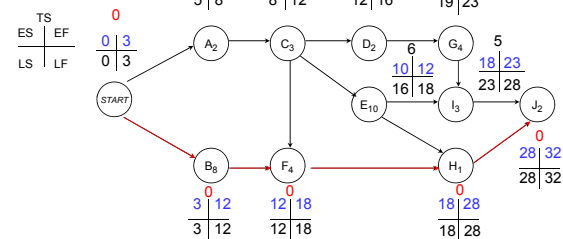


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The PERT Diagram

TS – Total Slack
 ES – Earliest Start
 EF – Earliest Finish
 LS – Latest Start
 LF – Latest Finish



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Projects Requiring Probabilistic Measures

Cost	Time	Performance
<ul style="list-style-type: none"> Difficulties require more resources Scope of work increases Initial bids or estimates were too low Reporting was poor or untimely Budgeting was inadequate Corrective control was not exercised in time Price changes of inputs 	<ul style="list-style-type: none"> Delay owing to technical difficulties Initial time estimates were optimistic Task sequencing was incorrect Required resources not available as needed Necessary preceding tasks were incomplete Client-generated changes Unforeseen government regulations 	<ul style="list-style-type: none"> Unexpected technical problems arise Insufficient resources are available Insurmountable technical difficulties Quality or reliability problems occur Client requires changes in specifications Complications with functional areas A technological breakthrough occurs

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Analyzing and Improving: Process Analysis

- Process analysis tries to identify bottleneck operations, determines the system capacity that are fundamental in the service operations and making improvement on the overall process
- Key focus on improvements are:
 - Bottlenecks of the operations
 - Total slacks available in the process
 - Consolidation of activities

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Process Design

Front-end Planning

- Business strategy development or review
- New service strategy development
- Idea generation
 - Screen ideas against new service strategy
- Concept development and evaluation
 - Test concept with customers and employees
- Business analysis
 - Test for profitability and feasibility

Implementation

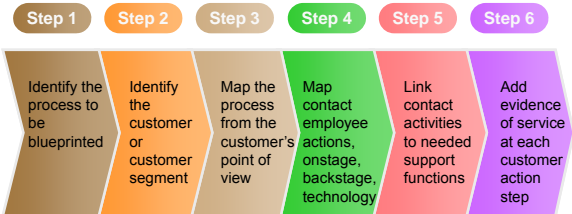
- Service development and testing
 - Conduct service prototype test
- Market testing
 - Test service and other marketing-mix elements
- Commercialization
- Post introduction evaluation

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Service Blueprinting

A tool for simultaneously depicting the service process, the points of customer contact, and the evidence of service from the customer's point of view



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Service Blueprint Components

- Customer Actions**
- Define standards for front-stage activities
 - Specify physical evidence
 - Identify principal customer actions

line of interaction (customers and front-stage personnel)

"Onstage" Contact Employee Actions

line of visibility (between frontstage and backstage)

"Backstage" Contact Employee Actions

line of internal interaction (between backstage and other Department)

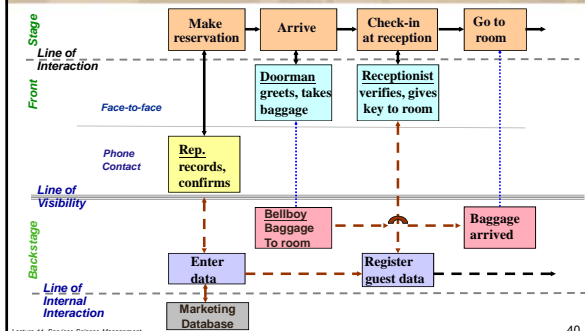
- Support Processes**
- Support processes involving other service personnel
 - Support processes involving IT

*** Where appropriate, show fail points and risk of excessive waits ***

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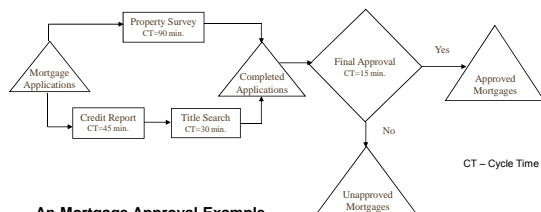
Process Blueprinting



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Process Flow Diagram



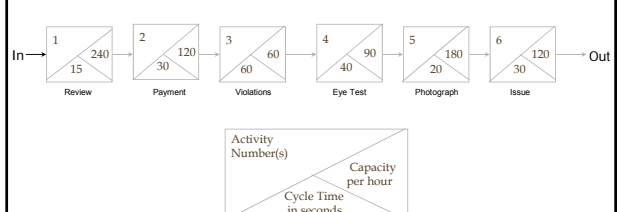
An Mortgage Approval Example

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Process Allocation

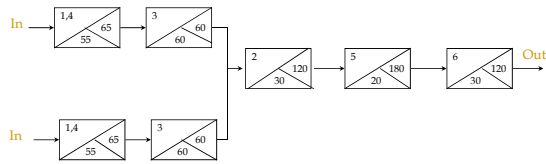
Automobile Driver's License Office



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Improved Process



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Analyzing and Improving: Facilities Management

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Facility Layouts

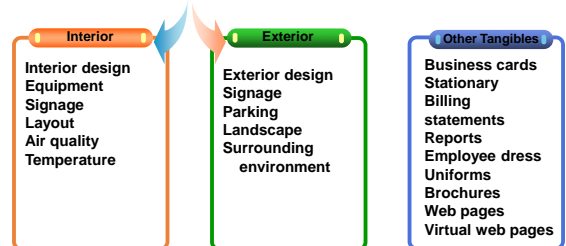
- Service operations can be directly affected by the design of the facility. The facility layouts represent the supporting component of the service package and it should be convenient to both the customers and the service provider.

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The Service Environment

Servicescape – The man-made, built surroundings of a service environment



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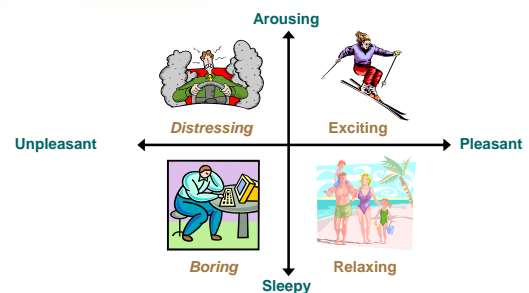
Roles of the Servicescape

- Package
 - conveys expectations
 - influences perceptions
- Facilitator
 - facilitates the flow of the service delivery process
 - provides information
- Socializer
 - facilitates interaction between:
 - customers and employees
 - customers and fellow customers
- Differentiator
 - sets provider apart from competition in the mind of the consumer

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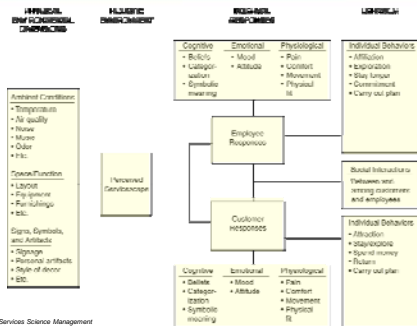
The Russell Model of Affect



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Bitner's ServiceScape Model



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Dimensions in the Servicescape Model

- **Ambient Conditions**
 - Ambient conditions refer to those characteristics of the environment pertaining to our five senses
- **Spatial Layout and Functionality**
 - Layout refers to size and shape of furnishings and the way it is arranged
 - Functionality is the ability of those items to facilitate performance
- **Signs, Symbols and Artifact**
 - Explicit or implicit signals to communicate the firm's image, help consumers find their way and to convey the rules of behavior

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The Impact of Ambient Conditions

- The ambient environment composed of literally hundreds of design elements and details in the service environment
- Ambient conditions include:
 - Lighting and color schemes
 - Size and shape perceptions
 - Sounds such as noise and music
 - Temperature
 - Scents
- These conditions can elicit desired behavioral responses among consumers



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The Impact of Music

- Music can have a powerful effect on perceptions and behaviors, even if played at barely audible volumes
- The various structural characteristics of music such as tempo, volume, and harmony are perceived holistically, and their effect on internal and behavioral responses is moderated by respondent characteristics
 - Fast tempo music and high volume music
 - increases arousal levels
 - People tend to adjust their pace, either voluntarily or involuntarily, to match the tempo of music

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The Impact of Scent

- An ambient smell is one that pervades an environment
 - May or may not be consciously perceived by customers
 - Not related to any particular product
- The presence of scent can have a strong impact on mood, affective and evaluative responses, and even purchase intentions and in-store behaviors
- Suitable and approximate scents can enhance employee productivity



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The Impact of Color

- Colors have a strong impact on people's feelings
- Color is stimulating, calming, expressive, disturbing, impressional, cultural, exuberant, symbolic
- People are generally drawn to warm color (red, orange and yellow) environments
- Warm colors encourage fast decisions making for low-involvement decisions or impulse purchases
- Cool colors (blue and green) are favored when consumers need time to make high-involvement purchases

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The Impact of Signs and Symbols



- Use signs, symbols and artifacts to guide customers clearly through the process of service delivery
 - Customers (especially first time ones) will automatically try to draw meaning from the signs, symbols and artifacts to guide them through the service environment and service process
 - Unclear signals from a servicescape can result in anxiety and uncertainty about how to proceed and obtain the desired service



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Elements of Environmental Design



- There is a multitude of research on the perception and impact of environmental stimuli on behaviour, including:
 - People density, crowding
 - Lighting
 - Sound/noise
 - Scents and odours
 - Queues
- No standard formula to designing the perfect combination of these elements
- Design from the customer's perspective!



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Tools to Guide in Servicescape Design



- Keen Observation of Customer Behavior and Responses to the service environment by management, supervisors, branch managers, and frontline staff
- Feedback and Ideas from Frontline Staff and Customers using a broad array of research tools ranging from suggestion boxes to focus groups and surveys.
- Field Experiments can be used to manipulate specific dimensions in an environment and the effects observed.
- Blueprinting or Service Mapping – extended to include the physical evidence in the environment



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