

Service Operations (SO)

Post Graduate Program for Working Executives 2014-15

Week 5

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09/11/2014

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Agenda

- Recap
- Managing waiting lines

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Recap

- Service characteristics
- Service classifications
- Service economy
- Strategic service vision
- Service package
- Service blueprinting

MANAGING WAITING LINES

Waiting lines are ubiquitous

- Banks
- Doctors
- Call centers
- Insurance agencies

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Typical capacity decisions

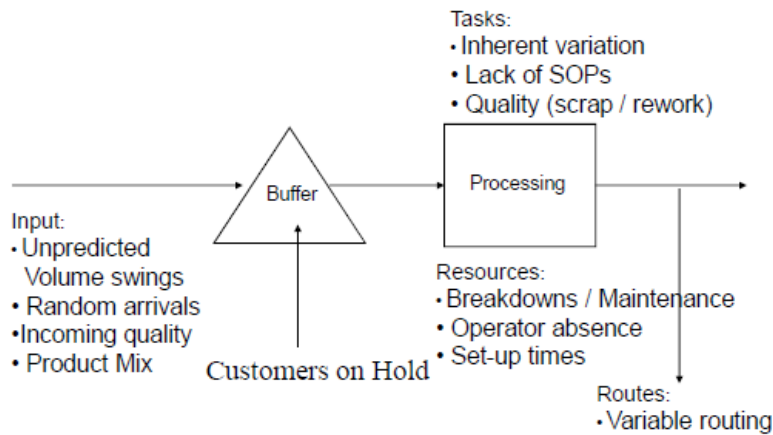
- How many additional beds should a hospital add to limit patient backlog below 50?
- What should be the size of a call centre such that no calling customer waits more than 30 seconds?
- What is the probability that when a customer walks into a bank she finds at least one teller free?
- How will an additional runway at Mumbai airport reduce aircraft waiting time?

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Where does the variability come from?



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Need to understand waiting lines

- Customers waiting are like WIP inventory
- Waiting times can have a halo effect on how customers view the rest of the service encounter
- Staffing decisions needs to consider the impact of waiting
- Every second waiting in the queue is a non-value add activity

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Essential features of queuing systems

- Arrival process: rate and population
- Service process: rate and capacity
- Queue configuration
- Queue discipline
- Service process

Agree?

- If service rate is higher than arrival rate then there would not be any queue
- With one server if X is the average number of people in the queue, with two servers, the average number of people in the queue would be $X/2$

Performance metrics of a M/M/1 queue

Server utilisation

In the case of single server: $\rho = \frac{\lambda}{\mu}$

In the case of multiple servers: $\rho = \frac{\lambda}{S\mu}$

Little's Formula

Average time customer spends in system $W_s = \frac{L_s}{\lambda}$

Average time customer spends in queue $W_q = \frac{L_q}{\lambda}$

In the case of a Single Server

Average number of customers in system $L_s = L_q + \frac{\lambda}{\mu}$

The psychology of waiting

- Waiting is an integral part of our lives
 - But causes so much grief!
- Perception is more important than reality
- Unoccupied time feels longer than occupied time
 - Distract and entertain

The psychology of waiting

- Pre-process waits feel longer than in-process waits
 - Communicate as soon as possible and get customers in process
 - Wait in the bar!
- Uncertain or unexplained waits feel longer than known waits
 - Communicate frequently
 - Impact of anchoring and prospect theory
- Solo Waits feel longer than group waits

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What's new in queuing theory

- Diseconomies of queue pooling in the emergency department
<http://hbswk.hbs.edu/item/7425.html>

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THANK YOU

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