

Service Operations Management (SOM)

Managing Waiting Lines

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Who's the biggest villain in Operations?



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Where does variability come from?

- Arrival variability
 - Provide generous staffing or require reservations
- Capability variability
 - Adapt to customer skill levels or target customers based on capability
- Request variability
 - Cross-train employees or limit service breadth
- Effort variability
 - Do work for customers or reward increased effort
- Subjective preference variability
 - Diagnose expectations or persuade customers to adjust

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Need to understand waiting lines

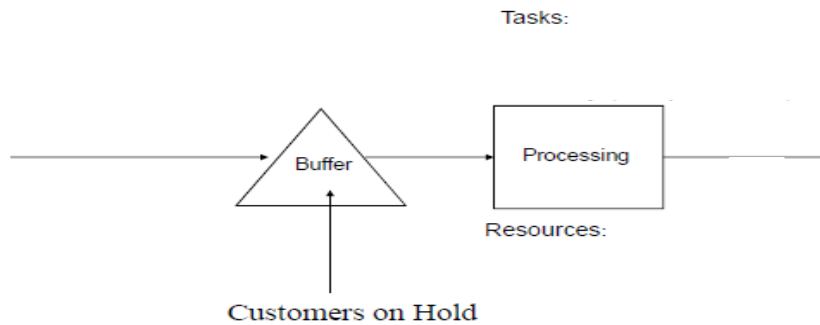
- Customers waiting are like WIP inventory
- Waiting times can have a halo effect on how customers view the rest of the service encounter
- Staffing decisions needs to consider the impact of waiting
- Every second waiting in the queue is a non-value added activity

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Elements of a waiting line



Little's Law : Number in system = arrival rate X average time spent in system

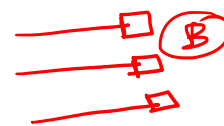
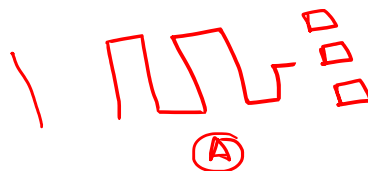
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Agree?

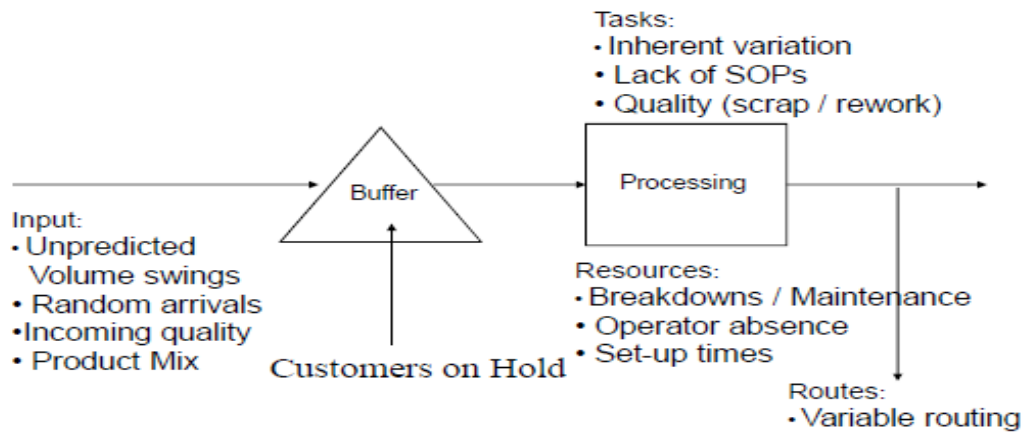
- If service rate is higher than arrival rate then there would not be any queue
- With one server if X is the average number of people in the queue, with two servers, the average number of people in the queue would be $X/2$



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Where does the variability come from?



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Essential features of queuing systems

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

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In-class exercise

- To understand the impact of queue pooling

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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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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

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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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