Class 19: Course Wrap-up

1. **Course Main Concepts and Simulation Debriefing**

2. **Sloan Evaluation Forms**

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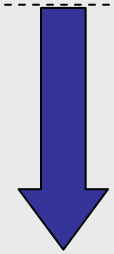
3. **Final Feedback Survey**

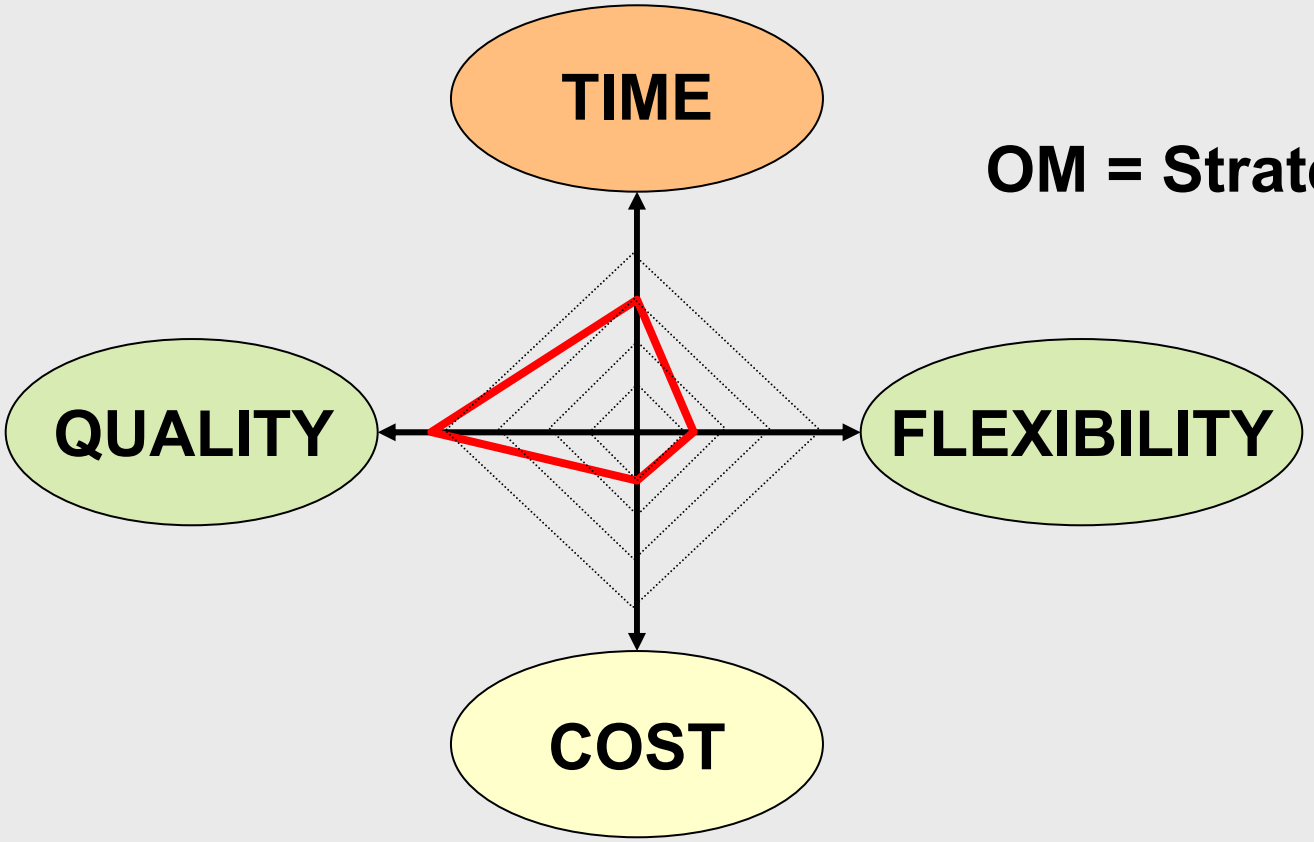


after class

Intro to Ops At-a-Glance

#	Day	Date	Contents	Readings	Assignments	Sim
1	Mon	29-Mar	Course Introduction	Course Syllabus		
2	Wed	31-Mar	Case: Burger King + McDonald's	Types of processes		
3	Fri	2-Apr	Lecture: Capacity	Wait-in-line blues	1 Ex. Buildup, 1 Ex. Queueing	
4	Mon	5-Apr	Case: National Cranberry			
5	Wed	7-Apr	Case: Webvan			
6	Fri	9-Apr	Lecture: Inventory	Automate or Die	1 Ex. EOQ, 1 Ex. Newsboy	
7	Mon	12-Apr	Case: Barilla	Managing Supply-Chain Inventory		
8	Wed	14-Apr	Case: Sport Obermeyer	Rocket Science Retailing	Case Write-up	
9	Fri	16-Apr	Lecture: Production Control	Growth in MRP, Control of JIT	1 Ex. Kanban, 1 Ex. Commonality	
10	Wed	21-Apr	Case: Hewlett-Packard			
11	Fri	23-Apr	Book: The Goal	The Goal	Book Review	
12	Mon	26-Apr	Lecture: Quality	Hank Kolb case	1 Ex. SPC, 1 Ex. 6 Sigma	
13	Wed	28-Apr	Case: Toyota			
14	Fri	30-Apr	Lecture: Process Design	Reengineering Work, ERP Tech. Note		
15	Mon	3-May	Case: Global Financial Corporation			
16	Wed	5-May	Lecture: Supply Chain Design	Chapter 8 Clockspeed		
17	Fri	7-May	Lecture: Product Design			
18	Mon	10-May	Case: Sega Dreamcast		Simulation Write-up	
19	Wed	12-May	Simulation & Course Wrap-up			

What is Operations Management?



OM = Strategy Execution!

Benchmark Companies

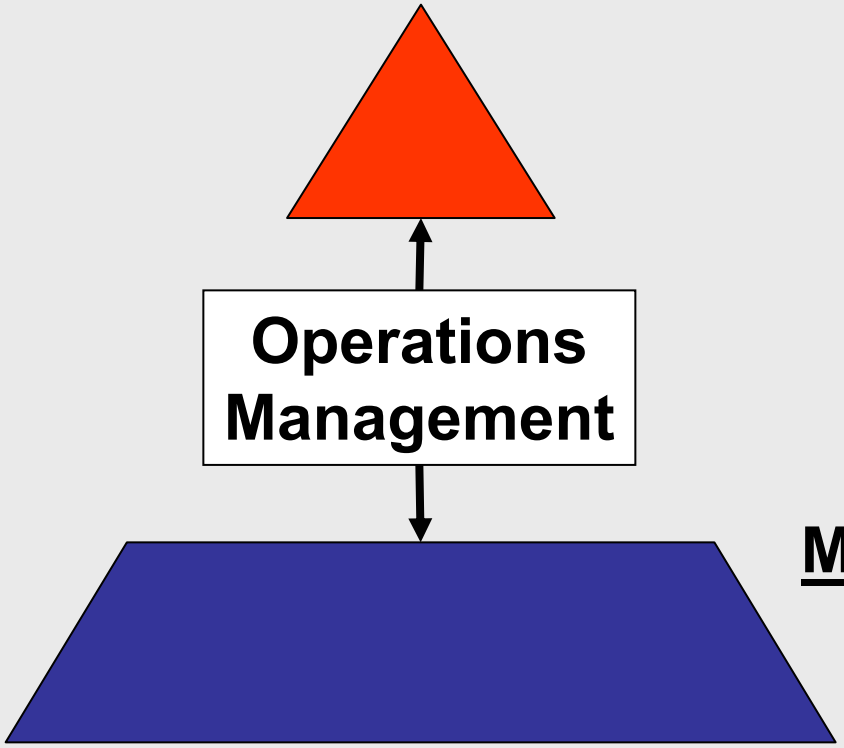
• Toyota	Lean Manufacturing
• FedEx (Webvan)	Hub & Spoke
• Dell	Direct-to-Consumer
	ATO technology
• Walmart (Barilla)	Vendor-Managed Inventory
• Sport Obermeyer	Quick Response
• Zara	Assortment Optimization

Operations Management History

- 1920's: Ford & Taylor
  Moving Production line and standardized work
- 1930's: Shewhart
  Statistical Control of Quality
- 1960's: Ohno
  Lean Production System
- 1980's: Goldratt
  Theory of Constraints
- 1990's: Hammer
  Reengineering & Process Focus
- 2000's: 15.760 Alumni
  Storytelling

A Translation Challenge

Corporate Structure



<u>Top Management</u>
speaks the language of
MONEY

<u>Mid-Mgt., Associates, Workers</u>
speak the language of
THINGS

OM merges physical and financial analyses, and requires great care to people issues!

Operations Management Architecture

Product

Integral Vs. Modular:

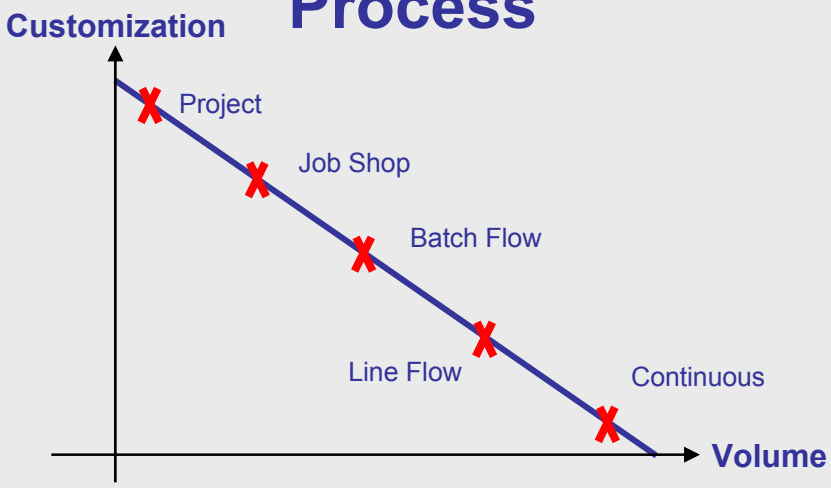
- *Functions*
- *Interface*
- *Interchangeability*

Supply-Chain

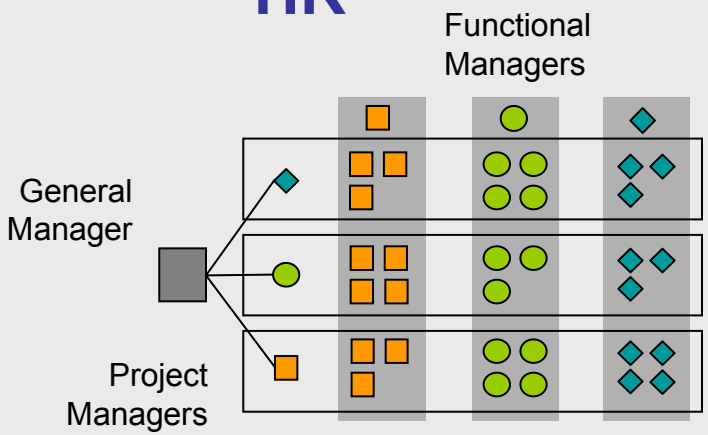
Integral Vs. Modular:

- *Geography*
- *Organization*
- *Culture*
- *Communication*

Process



HR



Operations Management Activities

Set of responsibilities:

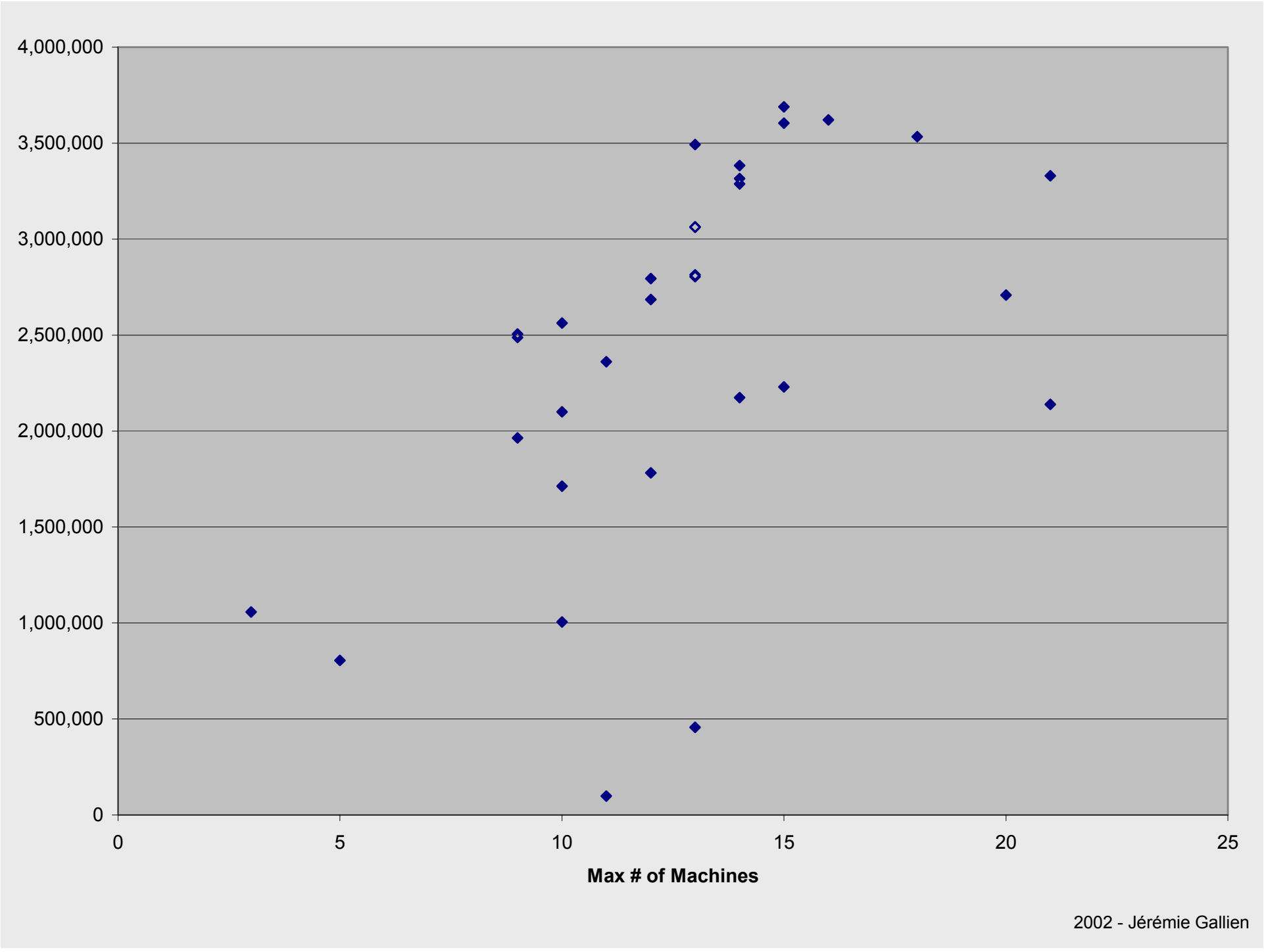
1.	**DESIGN**	Product, Process, Supply-Chain, HR
2.	**PLANNING**	Demand (forecast), Supply (Capacity)
3.	**CONTROL**	Inventory, Production Control, Suppliers Pricing, LT Quote, Quality, HR
4.	**IMPROVEMENT**	Time, Cost, Flexibility, Quality

Operations Management Tools

	Product Design & Devlpt.	*Process*	*Supply Chain*
Design	*Product Architecture* *Development Process Reengineering* *Market Positioning*	*Process Architecture* *Reengineering*	*SC Architecture* *Strategic Sourcing*
Planning	*CPM* *DSM*	*Capacity Analysis* *ERP, CPM*	*Quick Response Capacity* *CPM*
Control	*CPM* *Critical Chain*	*Inventory* *TOC, CPM, ERP* *Production Control* *TQM*	*Inventory Theory* *VMI (JITD)* *Production Control* *TQM*
Improvement	*TQM* *TPS*	*TOC (The Goal)* *TQM, TPS &* *Lean Manufacturing*	*TPS,* *Lean Manufacturing*

Factory Simulation Skills

	Product Design & Devlpt.	*Process*	*Supply Chain*
Design		***Process Architecture*** ***Process Flow Diagram***	
Planning		***Forecasting*** ***Capacity Analysis*** ***Cycle Time Analysis***	
Control		***Inventory Control*** ***Team Organization***	
Improvement		***TOC (The Goal)*** ***TPS***	



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Capacity Analysis

Processing Time (hours):

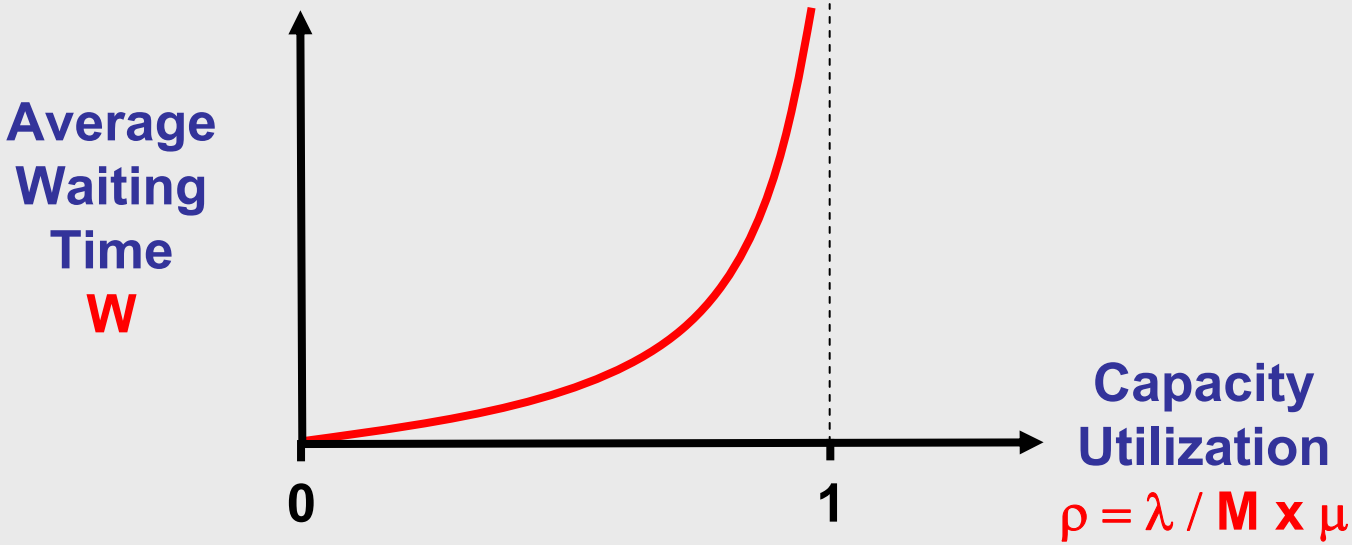
Step	Station	Set-up time (per lot)	Operation time (per unit)
1	1	0	0.062777
2	2	0	0.02
3	3	1.5	0.001666
4	2	0	0.021388

+ ***FORECAST***

Capacity Utilization

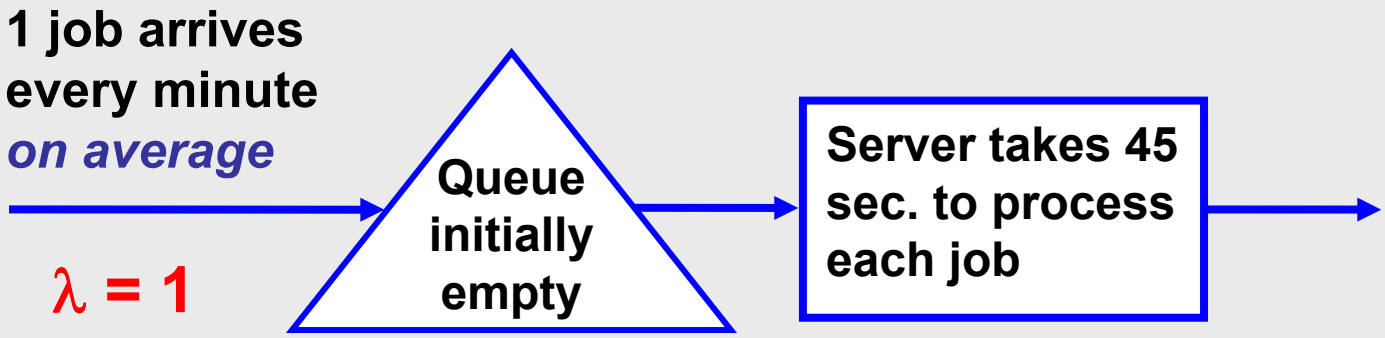
$$\rho = \lambda / \mathbf{N} \times \mu$$

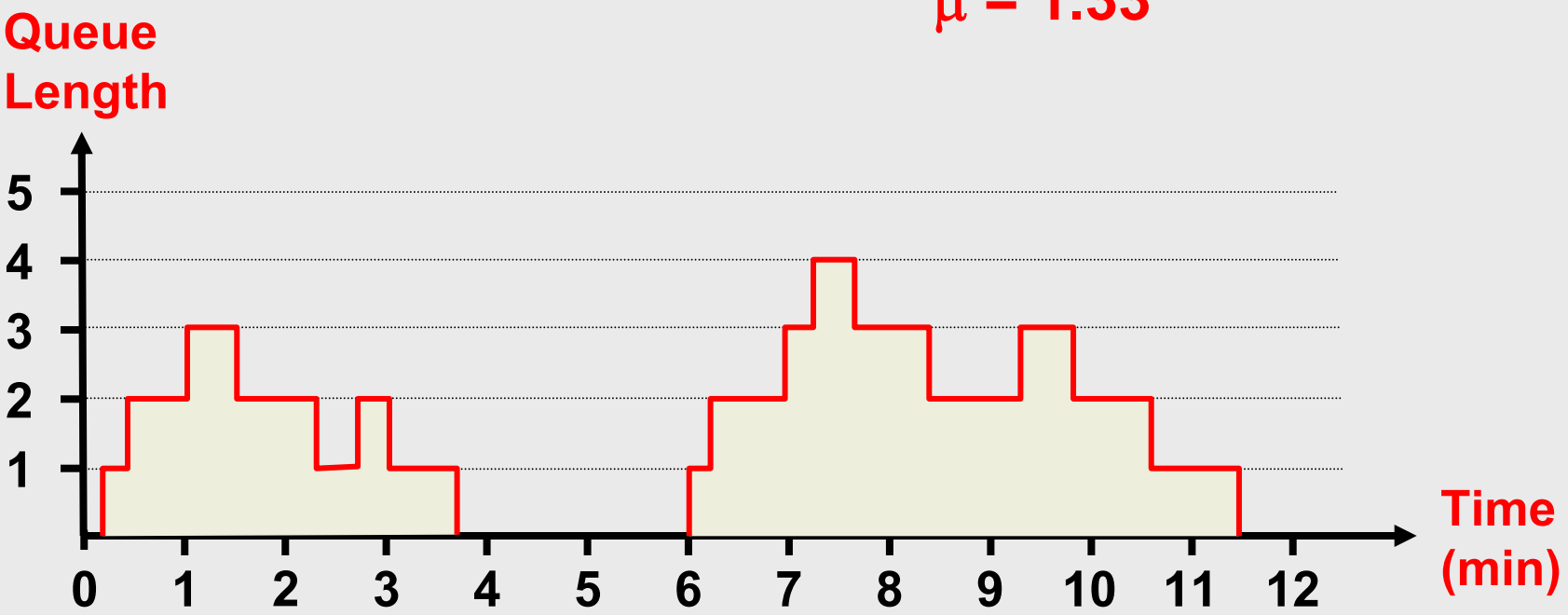
... and Queueing Theory



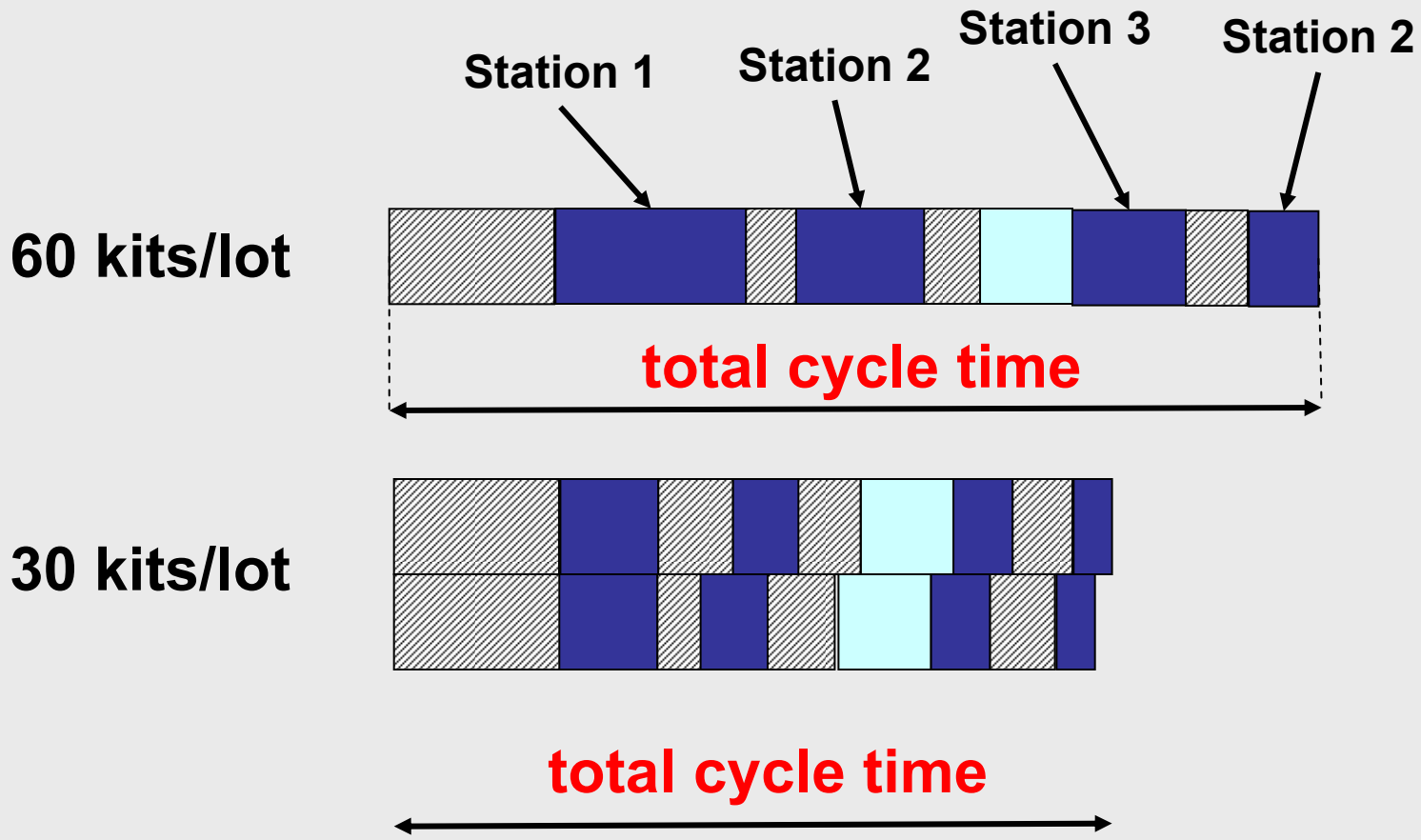
$$W = \frac{1}{\lambda}\frac{\rho^{\sqrt{2(S+1)}}}{1-\rho} \times \frac{C_A^2 + C_S^2}{2}$$

An Example for Insight

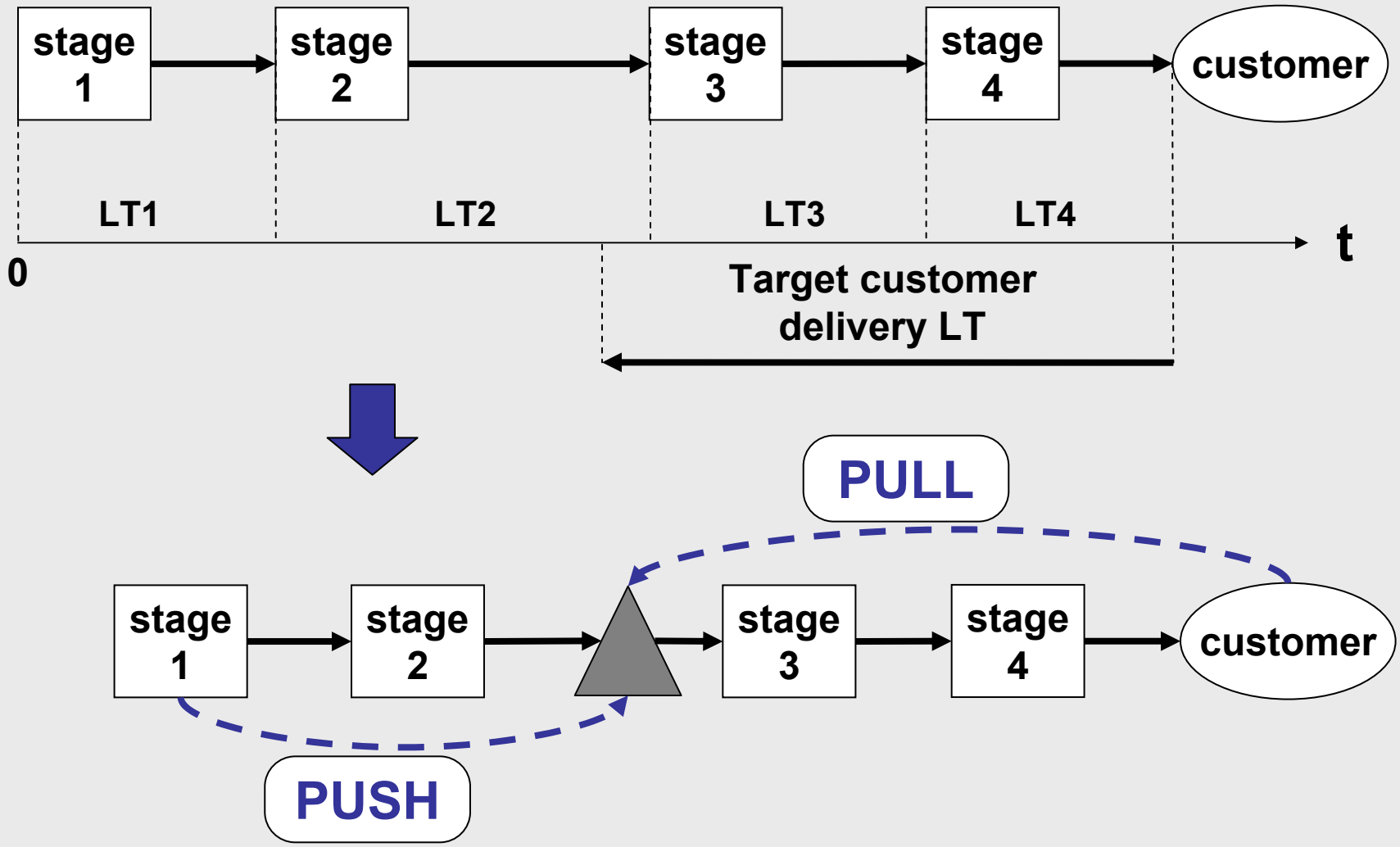




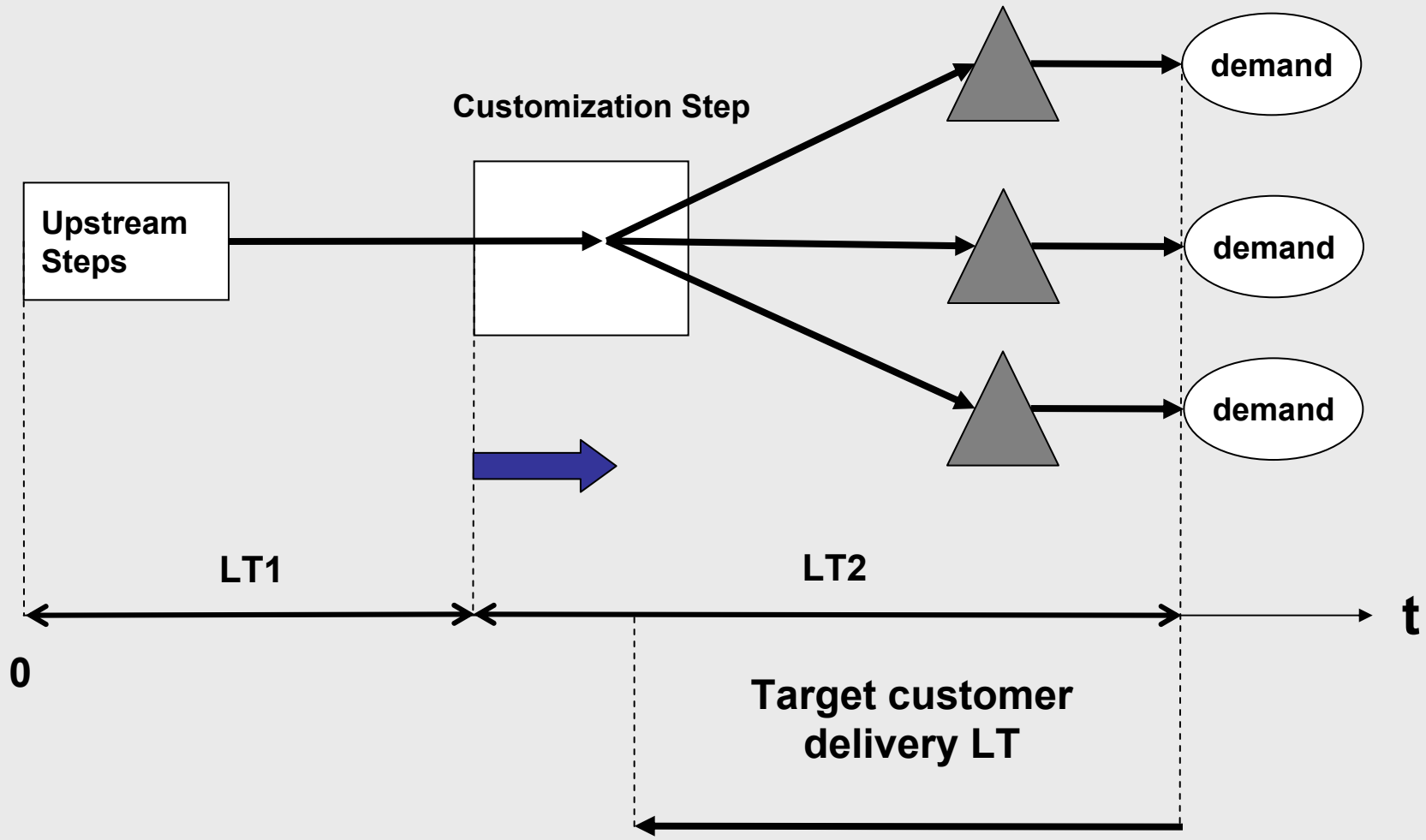
Cycle Time Analysis



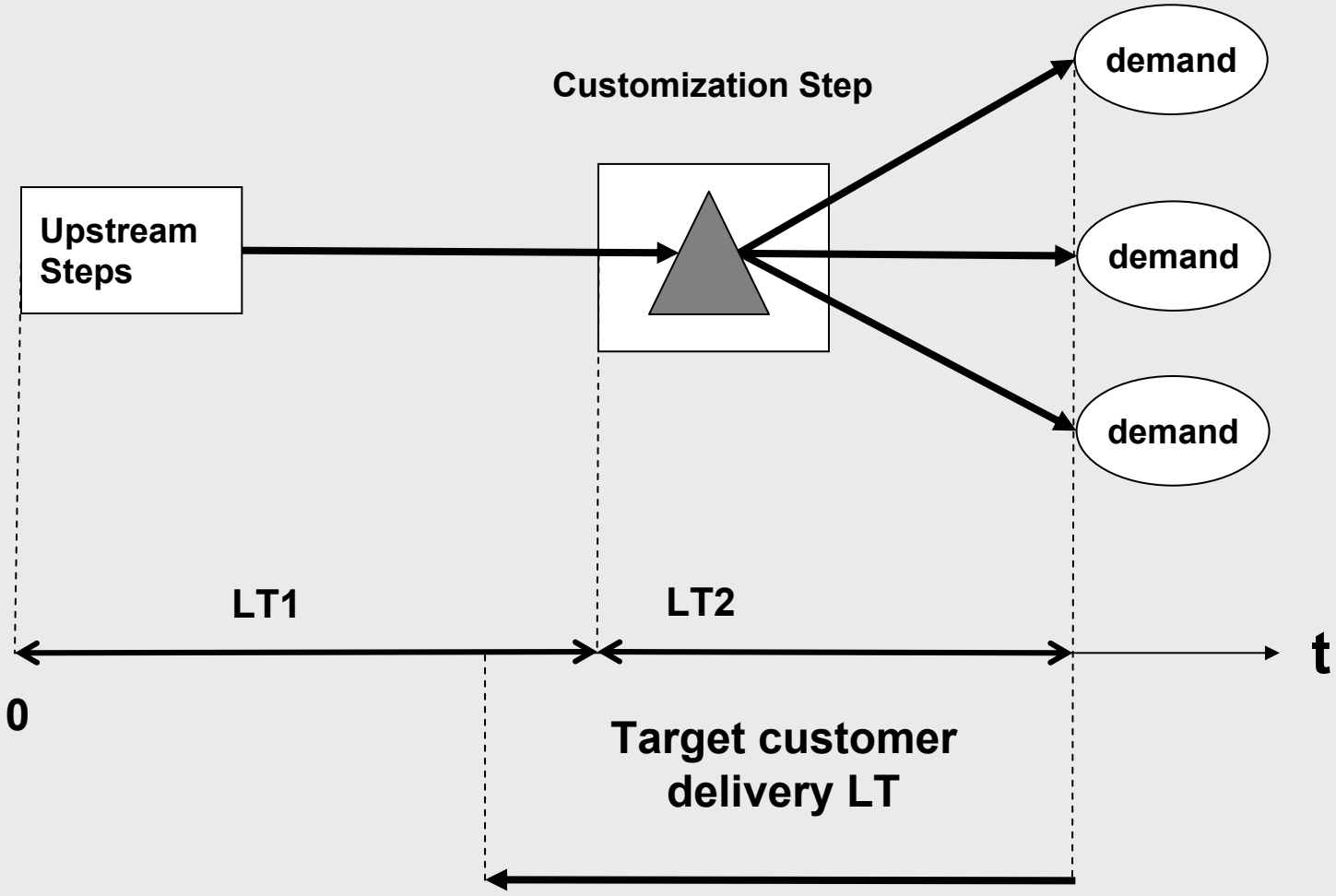
Customer and Process Timeline



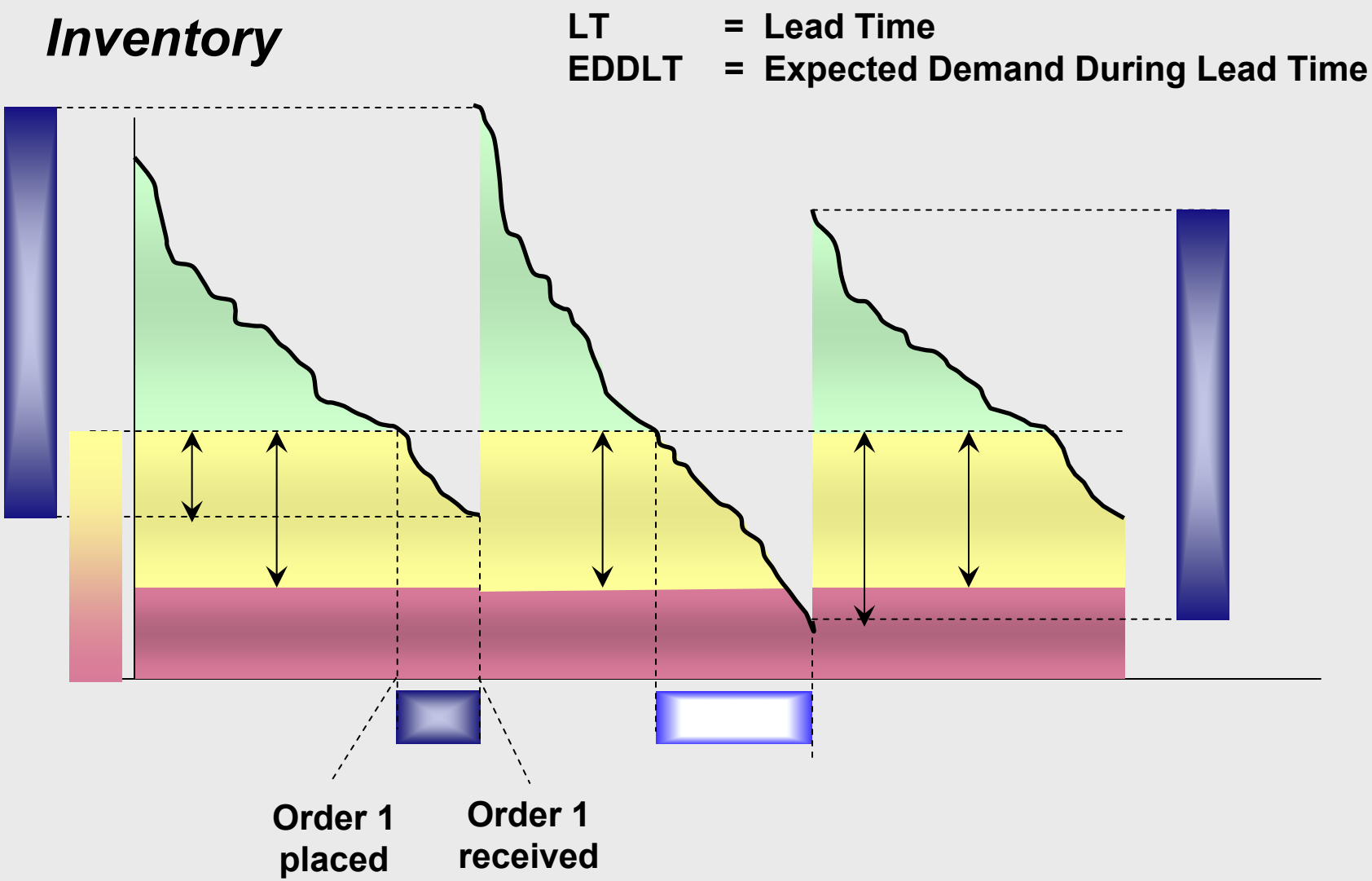
Delayed Differentiation



Delayed Differentiation



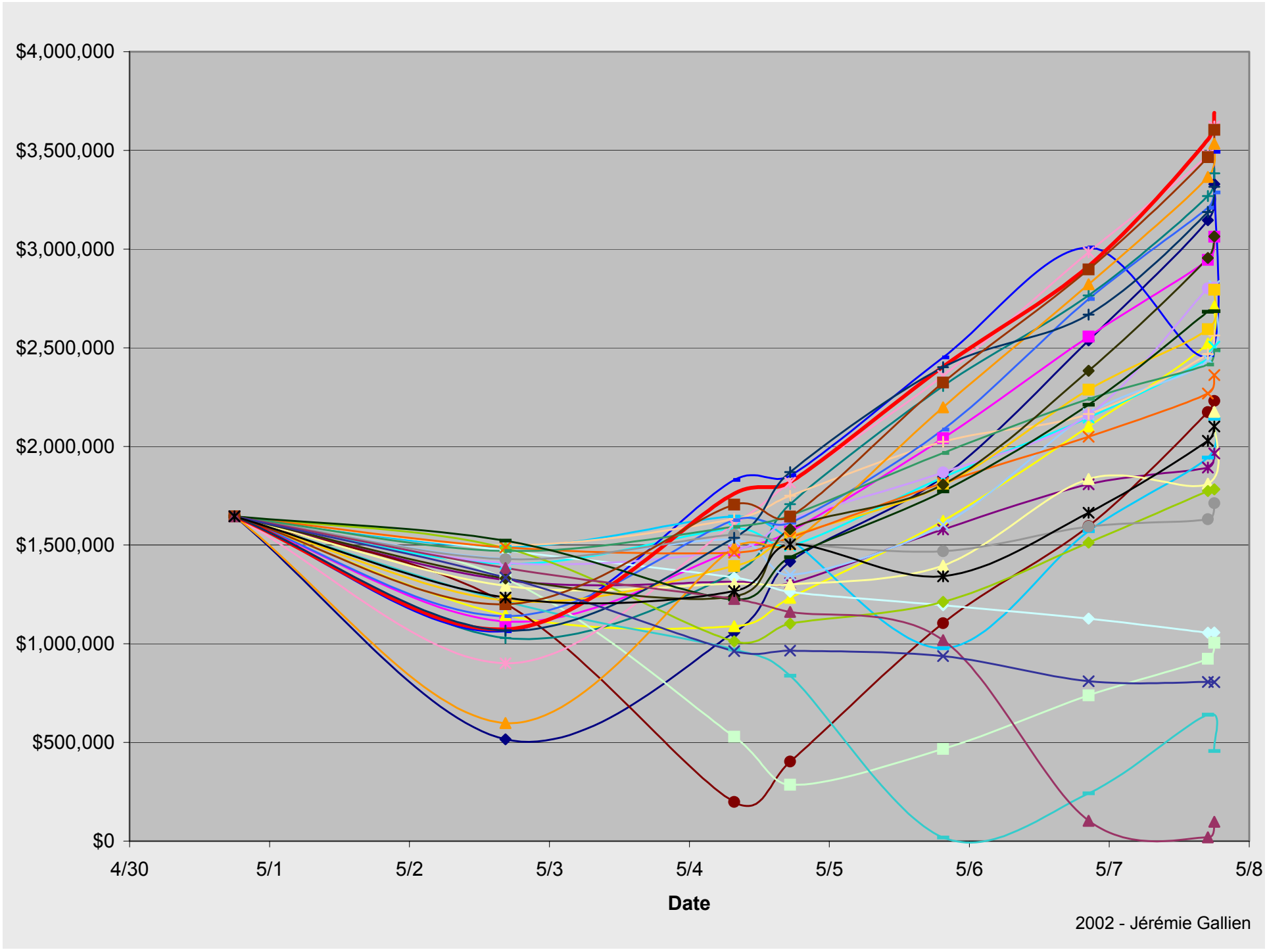
Inventory Theory...



Slide courtesy of Prof. Thomas Roemer, MIT.

... and Inventory Practice

- EOQ Model
- ROP/ROQ
- Newsboy Model
- Continuous Review/Periodic Review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4/30
5/1
5/2
5/3
5/4
5/5
5/6
5/7
5/8
Date
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Simulation Performance Drivers

- **Proactive Vs. Reactive Strategy: this is what models allow!!!**
- **Extent of quantitative analysis does have an impact BUT describing qualitatively the correct trade-offs brings you a long way…**
- **Understanding financial impact of operational data (lead time, utilization, queues, etc…) had a huge impact!**

Final Words

Do Keep in Touch and…
GOOD LUCK!!!