MSIN0095: Operations Analytics
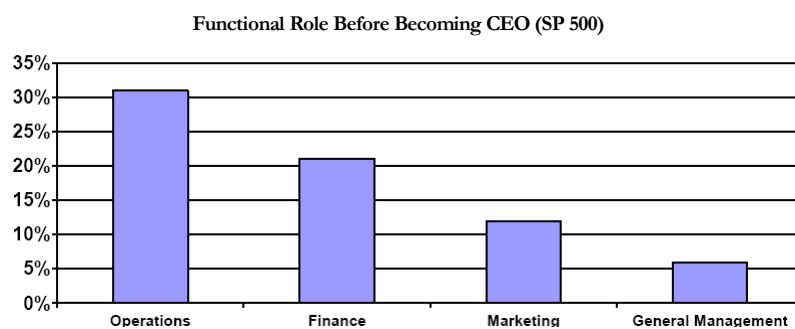
Class 1
Introduction to OM and Process Analysis

Mengzhenyu Zhang

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Career Paths of SP 500 CEOs

Functional Role Before Becoming CEO (SP 500)

Bar chart showing: Operations ≈ 31%, Finance ≈ 21%, Marketing ≈ 12%, General Management ≈ 6%.

Source: SpencerStuart

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Objectives of this course

Articulate OM concepts

Use analytics tools

Apply to real business problems

Have fun!

3

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Learning Objectives: Class 1

- **What is operations?**
- Strategic role of operations in a company

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What is Operations Management?

- **Operations management** is the organization and control of fundamental business activities that provide goods and services to customers.

Supply ? Demand

5

Operations are everywhere

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If supply and demand don't match

Excess supply   = Wasted resources

Excess demand = Lost revenue

Example 1: Supermarket

Example 2: Call center

- Excess demand: Customer waiting to be served by a representative
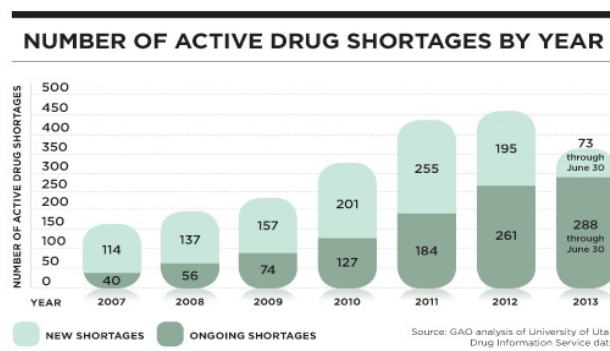- Excess supply: Numerous representatives waiting unproductively for consumers to call.

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Example 3: Drug Shortage

- **A Scary Reality**

  Drug shortage seems unfathomable in our high-tech medical system, but in 2012, 456 drugs were in shortage, according to the U.S. Government Accountability Office.

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Amazon

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Why should we care about Operations?

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Learning Objectives: Class 1

- What is operations?
- **Strategic role of operations in a company**

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Viva las vegan

Salads UP   Convenience store salad

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Order Winners in a Competitive Marketplace

- **Order Winners** are the four dimensions that can differentiate one firm from another.

1. **Price** (e.g. upfront cost, lifecycle cost of owning)
2. **Quality** (e.g. features, reliability, luxury)
3. **Speed** (e.g. time to deliver product/service, time to launch new product)
4. **Flexibility or Variety** (e.g. breadth of product line, customization)
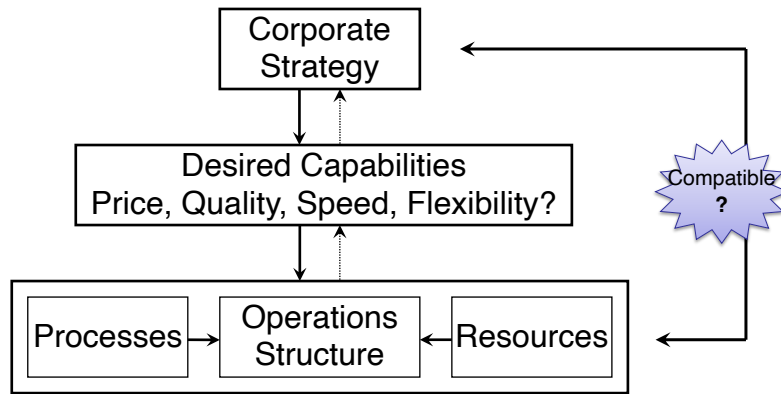
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Different Strategies, Different Operations

- Salads UP
  - Quality, Variety ➔ Made-to-order

- Convenience store salad
  - Price ➔ Mass production
    Speed ➔ Distribution network

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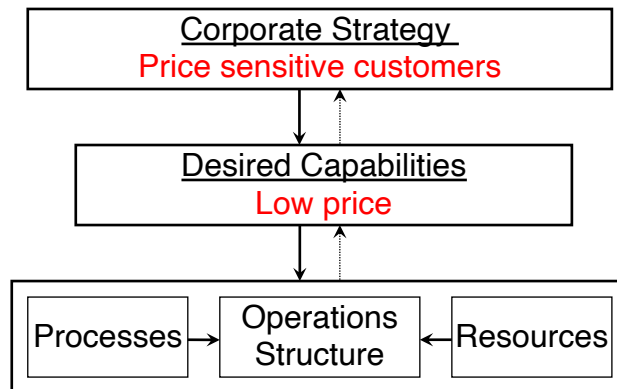## Operations Strategy and Corporate Strategy

Corporate Strategy

Desired Capabilities
Price, Quality, Speed, Flexibility?

Compatible
?

Processes → Operations Structure ← Resources

Example: Walmart

Walmart's strategy:
Everyday low prices

Example: Walmart

```
┌─────────────────────────────────────┐
│        Corporate Strategy           │
│      Price sensitive customers      │
└─────────────────────────────────────┘
              │    ↑
              ↓    
┌─────────────────────────────────────┐
│        Desired Capabilities         │
│             Low price               │
└─────────────────────────────────────┘
              │    ↑
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┌──────────┐ ┌──────────┐ ┌──────────┐
│Processes │→│Operations│←│Resources │
│          │ │Structure │ │          │
└──────────┘ └──────────┘ └──────────┘
```

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Secrets of Success

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Can't be good at everything…

	Wal-Mart	K-Mart	Target
Quality of products	44%	5%	**51%**
Cleanliness	30%	3%	**67%**
Checkout	40%	10%	**50%**
Price	**84%**	6%	11%

Strategic Trade-offs and Efficient Frontier

Strategic Trade-offs and Efficient Frontier
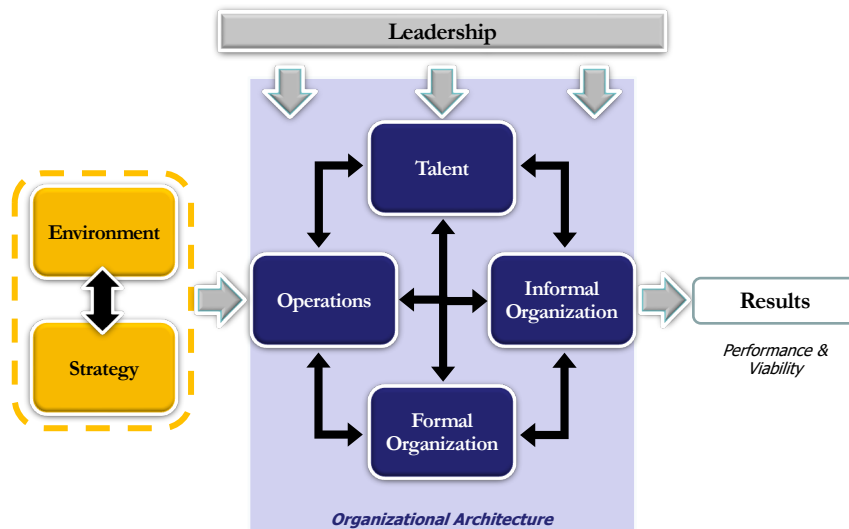
High Quality

Improvement
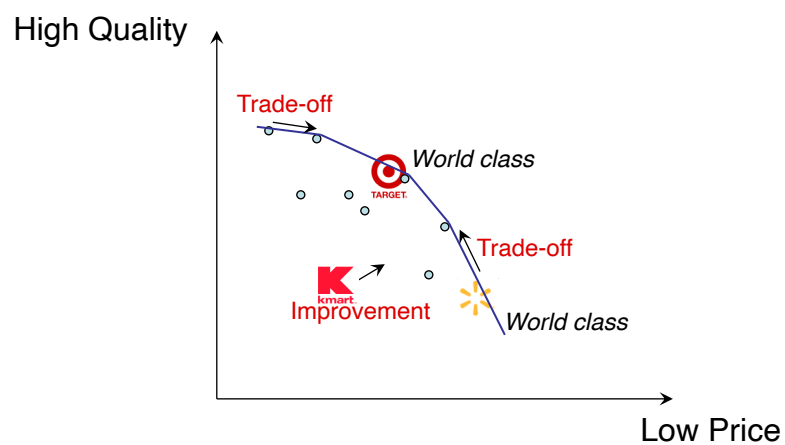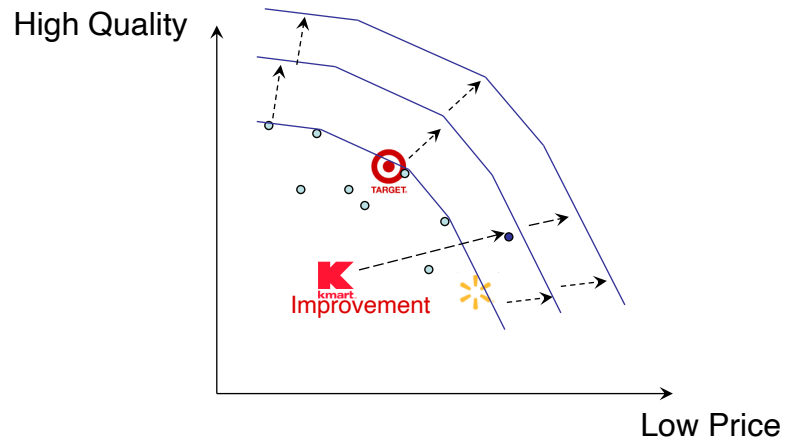
Low Price

Pushing out the frontier

- Walmart introduced smaller format stores
- Provide convenience at low price

Operations compatible with rest of organization?

MSIN0095: Assumed Knowledge

How Much Do You Need to Know?

- Basic algebra, calculus
- Basic probability and statistics (Lina's course)

Contact Information

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- **E-mail:** zhenyu.zhangmeng@ucl.ac.uk
- **Office Hours:**
  - Tuesdays, 16:00 – 17:00 (L38 NW4)
- **E-mail: put "MSIN0095" in the subject line for fast turnaround**
  - e.g. MSIN0095: Cannot submit homework as my cat chewed the internet cable

Microsoft Teams:
MSIN0095
Team Code: dceln5r

- **TA:** Adrian Gauci
- **E-mail:** a.gauci@ucl.ac.uk
- **Office Hours:** Wednesday, 9:00 – 10:00 am (Zoom https://ucl.zoom.us/j/8586350653)

MSIN0095 course grade

- **Cases (40%)**
  - 1 case report
  - Group Case Presentation
- **Exams (60%)**
  - Final exam
- **Class participation**
  - Willingness to participate in a professional/academic manner
  - Courtesy and politeness (no cellphone, no web-browsing, Facebook)
  - Relevance of your comments, not frequency
  - **Attend the class and do your homework**

Ground rules

- Be respectful by not disrupting class.
  - Arrive to class on time.
  - Let me know if you need to miss class.
  - Use electronics (laptops, iPads, …) politely.
- Do your own work.
  - Using materials from past years is cheating and is a serious offense (see Honor Code).
- Participate in class discussion.
  - Don't be afraid to ask questions.

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Case due: Kristen's Cookies Co.

- Finish reading the case and case questions before **Tuesday, Jan 17 class**.
- How to ace the case? (for presentation)
  - Grapple with ambiguity and complexity.
  - Make reasonable assumptions and **state them clearly** in your slides. Often there are no definitive answers with a case, so show your reasoning.
  - out for hints in my emails!

ASSIGNMENTS ON SYLLABUS ARE CLOSER THAN THEY APPEAR

ASSIGNMENT ON SYLLABUS ARE CLOSER THAN THEY APPEAR

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Group case presentations

- **The setup**
  - Each case is a real business problem with 3-5 major questions to be addressed.
  - The company hires 3-5 consulting teams, one for each question.
- **The presentation**
  - Your team will have up to 5 minutes to present your recommendations and convince management (the class).
- **How will you be graded?**
  - Recommendations convincing and supported by analysis?
  - Did you consider other alternatives and risk factors?
  - Quality of discussion (Q&A) [affects grade of whole class]

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Make a convincing presentation

- Case presentation guidelines
  - 1. Diagnosis of problem.
  - 2. Clearly state your recommendation.
  - 3. Support your recommendation.
  - 4. Discussions of alternative factors and risks
- You do not need to follow exactly the sequence, but try to cover these major points to make a convincing case.

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This term at a glance…

Course Topics	Selective Concepts	Analytical Tools	Cases
Process Analysis	Flow Rate, Flow Time, Inventory, Buffer, Capacity, Bottleneck, Throughput	Process Diagram Gantt Chart Bottleneck Analysis Little's Law Marginal analysis	Kristen's Cookie Co., National Cranberry
Waiting Time Analysis	Variability, Arrival Rate, Service Rate, Waiting Time, Queue Length, Queue Pooling	Inventory Diagram VUT equation Little's Law	Logan Airport
Quality Management	Waste, Total Quality Management Capability, Six Sigma	Statistical Process Control	
Demand Forecasting	Sources of uncertainty demand forecasting model Forecasting errors	Time series analysis Multiple linear regression	Caesars Entertainment
Inventory Management	Variability, Critical Ratio, Service Level, Safety Stock, Pipeline Inventory, Cycle Inventory, Exposure Period, Lead time, Inventory Pooling, Component Commonality	Newsvendor Model Periodic Review Model	Amazon.com
Revenue Management	Revenue management in practice, dynamic pricing	Dynamic pricing models	New York Health Club
Supply Chain Management	Bullwhip Effect, Information Sharing, Vendor Managed Inventory, Efficiency vs. Responsiveness		

Any question on class expectations, deliverables, or schedule?