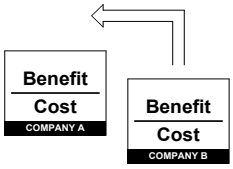
INTRODUCTION TO OPERATIONS

IVEY

"Thanks Operations!"



To be chosen by customers a company must provide a better value (benefits / cost) than competitors

It is the job of OPERATIONS to make this happen

VALUE - MORE FOR LESS

Fact		Operation's Goals
▪ Quality is improving	⇔	▪ EFFECTIVENESS – Better meeting customer needs
▪ Costs are decreasing	⇔	▪ EFFICIENCY – Producing at lower costs

OPERATIONS FRAMEWORK

Understand the Problem

- **Task Analysis**
  - What is important to the customer?
  - Are we currently meeting their needs?
- **Process Identification**
  - Where do we fall on the continuum?
  - Should we consider a shift to better service the customers?

Solve the Problem

- **Process Analysis**
  - What are our capacities?
  - Where are our bottlenecks?
  - Are changes necessary to meet/sustain demand?
- **Trade-Off Analysis**
  - Costs vs. Benefits
  - Pros vs. Cons

- Decision Proposal

TASK ANALYSIS

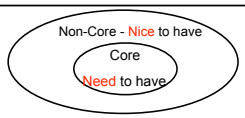
TASK ANALYSIS

- We must identify the **customer's needs** before organizing the operation
  - What is most important to the customer?
  - **Goal**: to provide the right product, in the right quantity, at the right price, in the right place, the way the customer expects to receive it

TASK ANALYSIS

Based on the customer's needs, prioritize your outcomes

Quality	Does the customer want a high quality product?
Quantity	Are there enough products available to satisfy customer needs?
Price	What are they willing to pay?
Service	Product warranty, delivery, franchising arrangements, check-ups, customization, etc
Function	Does the customer demand any specific features?



What implications does this have for production?

PROCESS IDENTIFICATION

PROCESS CONTINUUM

	Project	Job Shop	Batch	Line Flow	Continuous Flow
LABOUR	Experts, Trades people	High / Moderate Skill		Low Skill	
EQUIPMENT	Unique, One function, High investment	General, Less automation, Low investment		Specialized, High degree of automation, High investment	
PRODUCTION TRIGGERS	Customer Triggered		Produce to Anticipated Demand		
PRODUCT VARIATIONS	Unique design, One of a kind	Very high	High	Low	None
PRODUCT VOLUMES	One or very few	Low volumes	Low volumes	High volumes	Very high volumes

PROCESS ANALYSIS

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PROCESS FLOW DIAGRAMS

- A process flow diagram is a picture of the steps involved in a process
- The diagram is a visual tool that can help you identify opportunities to improve the process.

PROCESS ANALYSIS – Key Concepts

- Capacity
  - **Theoretical**
    - The output the equipment/system is built to produce
  - **Operating**
    - The output the equipment/system actually achieves
- Bottleneck
  - The slowest step in the process. Its speed determines the speed/output of the entire system
- Line balancing
  - Assigning work across work stations in a line so that the desired output is achieved and the process is efficient
  - Reduce/eliminate bottlenecks

PROCESS ANALYSIS

- Capacity is the volume of output that a process can produce. It is *dependent* on the slowest step in the process (**the bottleneck**)
- Calculate the capacity at *each stage* of production and compare this to demand
  - If capacity (500/day) > demand (200/day) = excess
  - If capacity (500/day) < demand (750/day) = bottleneck
- Convert all numbers to common units
- Determine the bottleneck
- Implications? Recommendations?

TRADE-OFF ANALYSIS

TRADE-OFF ANALYSIS [STEPS]

1. Calculate the total costs for each option
2. Which option is the best financially?
   - **Net Benefit** - Describes the incremental financial benefit that the option will yield
   - **Payback** = Describes how long it will take the option to pay for itself through the benefits
3. Consider the qualitative pros and cons of each of the options.
4. Select the best option in light of the evidence

Financial Tools

- **Net Benefit:**
  Incremental Benefits
  – Incremental Costs
  = Net Benefit
- **Payback**:

$$\frac{\text{Investment}}{\text{Net Benefit}}$$

HOW TO AVOID GETTING LOST IN THE NUMBERS IN OPERATIONS

- Understand BEFORE calculating
- Convert to common units
  - E.g. compare “bottles/hour” to “bottles/hour”
- Use words and sentences to explain calculations
  - E.g. 15 ÷ 3 = 5??????
  - E.g. 15 widgets per day divided by 3 workers = 5 widgets per worker, per day

KEY LEARNING POINTS

- Operations’ most important task is to improve effectiveness (quality) and efficiency (cost)
- Understand what is important to the customer; focus operations on these elements
- Moving from Project to Continuous Flow, you increase efficiency, decrease product variations and decrease the level of skill required of employees

KEY LEARNING POINTS

- The bottleneck is the slowest step in the process and determines your capacity
  - If you want to increase overall capacity you need to add capacity to this step
- Performing a trade-off analysis will help you choose amongst different options