

Operations Management: Modeling, Analyzing & Optimizing Processes

Part I: Introduction, Definitions, Examples and Framework

Professor Kumar Rajaram
Decision, Operations and Technology Management
UCLA Anderson School

© Professor Kumar Rajaram

Class Outline

- What is a Process?
- The Process Oriented View
- Why Study Process Analysis?
- Basic Definitions in Process Analysis
- Example: Serial Process
- Kristen Cookies
- A Framework for Process Analysis
- Summary
- Guidance for Shouldice Case Analysis

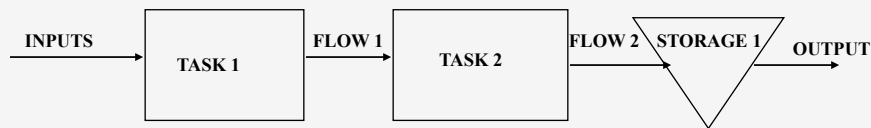
© Professor Kumar Rajaram

Operations Management: Part I

2

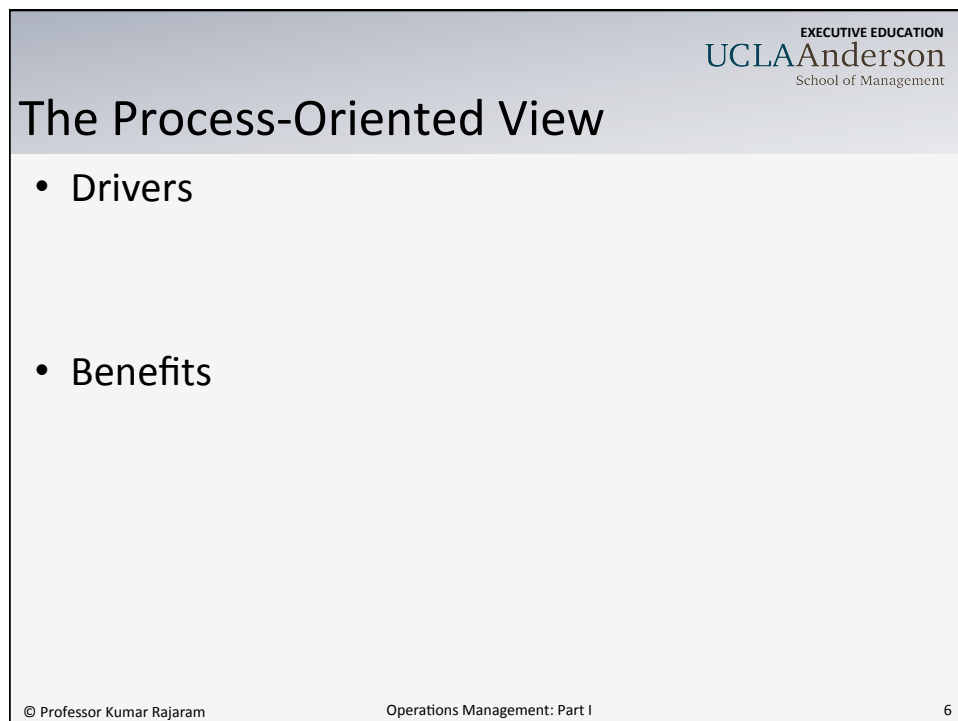
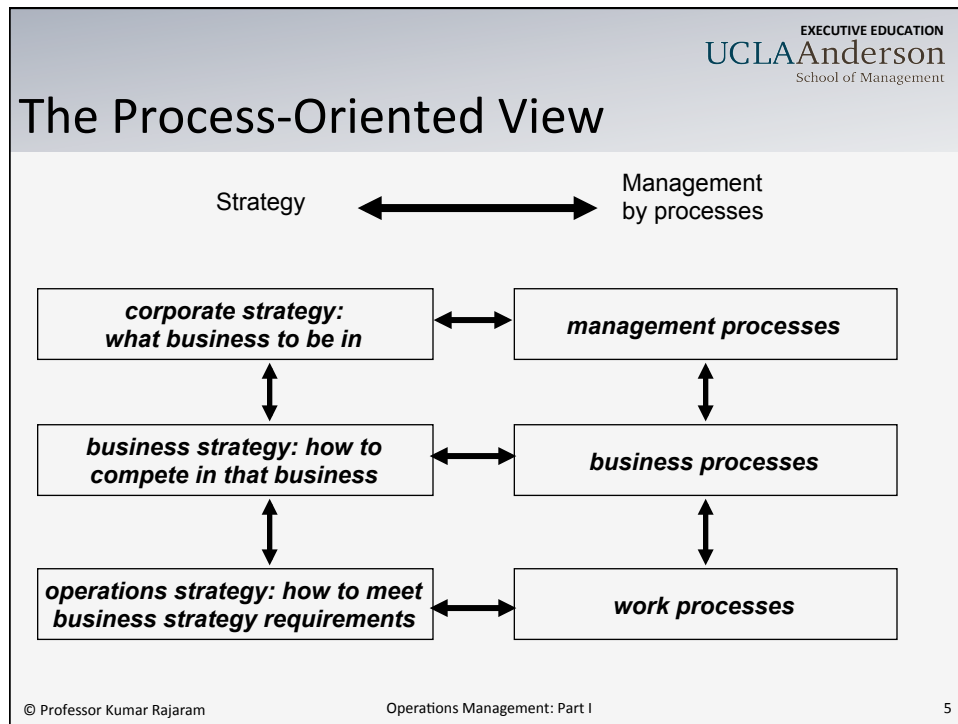
What is a Process?

- Process is a collection of tasks connected by a flow of goods and information that transforms inputs to outputs



The Elements of a Process

- Inputs: Labor, Materials, Energy, Capital, Intellectual
- Outputs: Products composed of finished goods and/or services
- Task: An activity on input which makes it closer to the output
- Flow: Movement of goods and/or information in the process
- Storage: No task is being performed and good and/or is not being transported

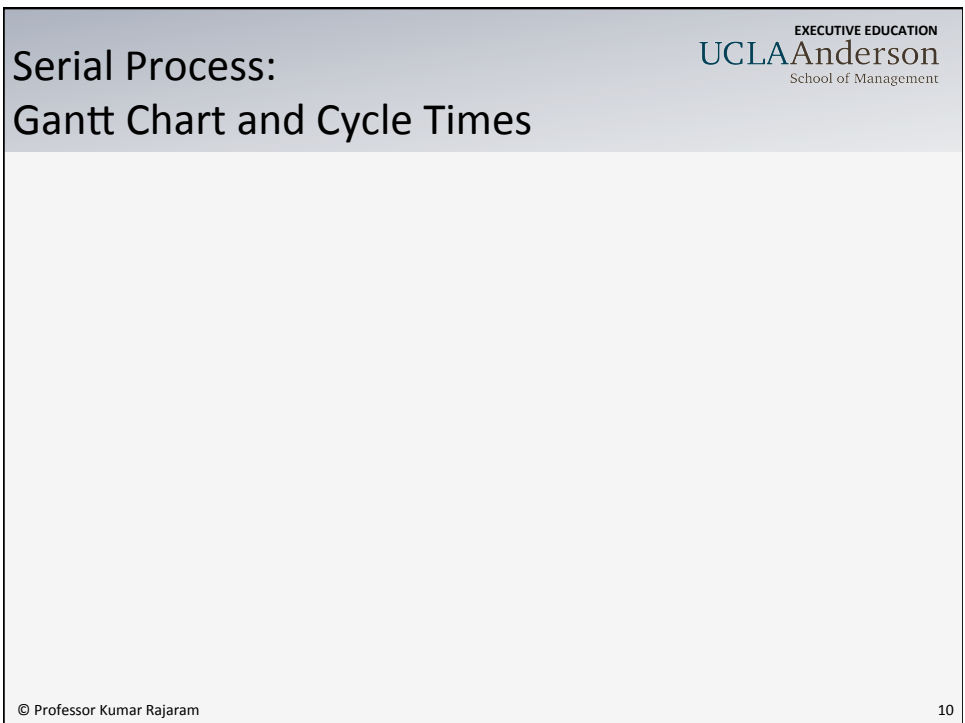
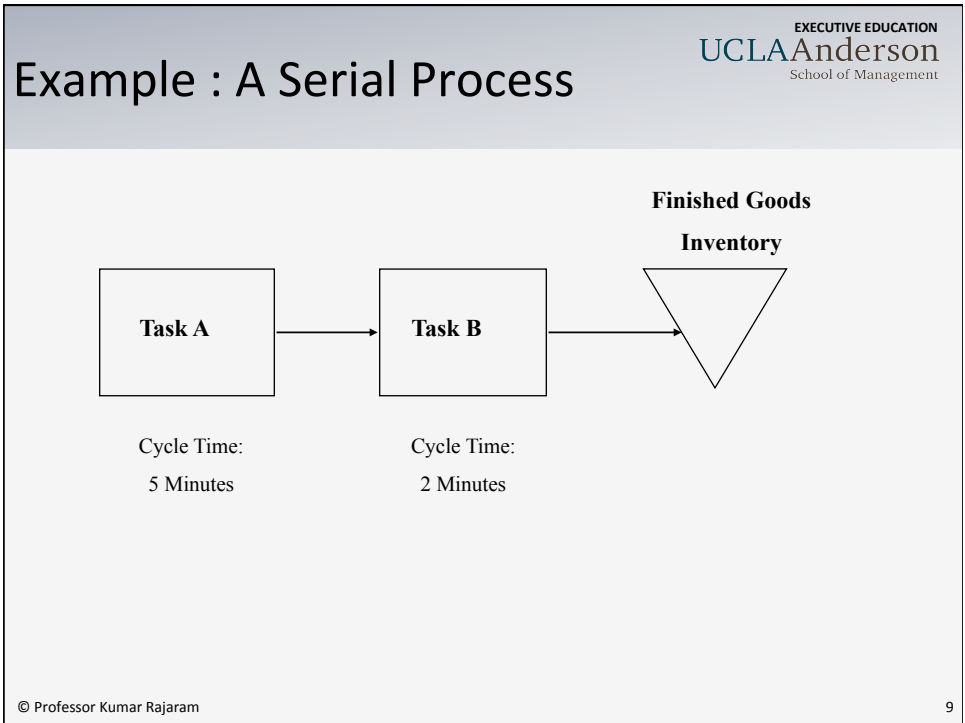


The Process-Oriented View

- Challenges in implementation

Why Study Process Analysis

- Business strategy defines where to compete: the price, quality, variety and delivery lead-time of a product
- Operations strategy ensures that we meet the business strategy by developing and running the required processes
- Process analysis is used to determine whether these process align operations strategy with business strategy and change these processes if necessary to achieve the alignment and improve the aligned process



Process Oriented Definitions and Calculations for Serial Process

EXECUTIVE EDUCATION
UCLA Anderson
School of Management

- Cycle Time:
- Capacity:
- Bottleneck:
- Balance/Imbalance:

Labor Oriented Definitions and Calculations for Serial Process

EXECUTIVE EDUCATION
UCLA Anderson
School of Management

- Idle Time:
- Direct Labor Content:
- Direct Labor Utilization:

Product Oriented Definitions and Calculations for Serial Process

EXECUTIVE EDUCATION
UCLA Anderson
School of Management

- Throughput Time or Lead Time:
- Lot (Batch) Size:
- Setup Time:
- Run Time:

© Professor Kumar Rajaram 13

**Kristen's Cookies:
Process Flow Diagram**

EXECUTIVE EDUCATION
UCLA Anderson
School of Management

© Professor Kumar Rajaram 14

**Kristen's Cookies:
Gantt Chart and Cycle Times**

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

© Professor Kumar Rajaram 15

Process Oriented Definitions and Calculations for Kristen's Cookies

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

- Cycle Time:
- Capacity:
- Bottleneck:
- Balance/Imbalance:

© Professor Kumar Rajaram 16

Labor Oriented Definitions and Calculations for Kristen's Cookies

- Idle Time:
- Direct Labor Content:
- Direct Labor Utilization:

Product Oriented Definitions and Calculations for Kristen's Cookies

- Throughput Time or Lead Time:
- Lot (Batch) Size:
- Setup Time:
- Run Time:

**Kristen's Cookies:
How Many Dozen Batches in 4 hours?**

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

© Professor Kumar Rajaram 19

**Kristen's Cookies:
Economics of Cookie Production**

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

© Professor Kumar Rajaram 20

**Kristen's Cookies:
Run with Single Operator**

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

© Professor Kumar Rajaram 21

**Kristen's Cookies:
Rent Another Oven**

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

© Professor Kumar Rajaram 22

A Framework for Process Analysis

- Draw a Process Flow Diagram
- Determine Capacity for Each Resource in the Process
- Identify the Bottleneck
- Calculate Relevant Process Measures
- Understand the Process Economics
- Consider Changes to Improve System Performance

Summary of Part 1

- Understood what is a process and why we need process analysis
- Understood the basic definitions in process analysis
- Applied definitions to analyze a serial process
- Analyzed the operation at Kristen cookies
- Developed a framework for process analysis

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

The Product-Process Matrix

© Professor Kumar Rajaram Operations Management: Part I 25

EXECUTIVE EDUCATION
UCLAAnderson
School of Management

Guidance for Shouldice Case Analysis

- Answer questions in syllabus
- Use appropriate measures and framework for process analysis to come up with ways to expand the hospital's capacity
- Do not use all definitions/measures: use the product process matrix to figure out the appropriate measures
- Understand the implications of your change on the overall strategy of the company

© Professor Kumar Rajaram Operations Management: Part I 26