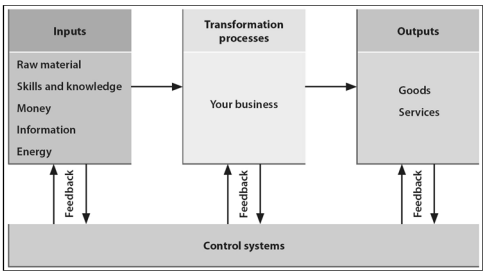
# Managing Small Business

## Chapter 18

Operations Management

## Figure 18.1: Control Systems



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## Automation

- Flexible Production
  - Allows quick retooling of production machines so that shorter batches (product runs) can be produced profitably.
- Mass Customization
  - Allows products to be produced specifically to meet the needs of individual customers.



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## Operations Management for Service Businesses

- Service providers offer products; manufacturers offer services.
- Service and manufacturing operations differ in the amount of customer contact involved.
- Services
  - Are consumed immediately and cannot be stored.
  - Are provided when and where the customer desires.
  - Are usually labor intensive.
  - Are intangible, making it difficult to evaluate customer satisfaction.



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## Table 18.1: Product and Service Operations Systems

| Inputs | Transformation | Outputs | Feedback |
|---|---|---|---|
| **Restaurant** | | | |
| Food | Cooking | Meals | Leftovers |
| Hungry people | Serving | Satisfied people | Complaints |
| Equipment | | | |
| Labor | | | |
| **Factory** | | | |
| Machinery | Welding | Finished products | Defects |
| Skilled labor | Painting | Services | Returns |
| Raw material | Forming | Waste products | Market share |
| Engineering | Transporting | | Complaints |
| Management | | | |
| Buildings | | | |



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## What is Productivity?

- Productivity
  - Is the measure of output per worker, and can be described numerically as the ratio of inputs used to outputs produced, such as output per labor-hour.
- Increasing Productivity
  - Look for more efficient ways to increase outputs while keeping inputs constant.
  - Keep outputs constant while decreasing inputs.



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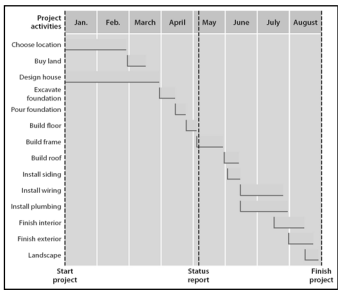
## What is Productivity? (cont'd)

- Measurement of Productivity
  - Total productivity
    - Total Productivity Ratio = $\frac{\text{Total Outputs}}{\text{Total Inputs}}$
    - $\frac{\text{Outputs}}{\text{Labor + Capital + Raw Materials + All Other Inputs}}$
  - Materials productivity
    - Materials Productivity = $\frac{\text{Outputs}}{\text{Materials}}$




## Figure 18.2: The Gantt Chart







## Quality Centered Management (cont'd)

- Six Sigma
  - Is the tolerance range in which only 3.4 defects per million are allowed (99.99966% in specification).
  - Is the term that has come to signify the quality movement.
- Defect Rate
  - Is the number of goods produced that were out of the firm's accepted tolerance range.
- Tolerance Range
  - Is the boundaries that managers set in determining acceptable product quality.




## Table 18.2: Sigma Levels and Defect Rates

| Sigma Level | Defects per Million |
|---|---|
| 3.0 | 66,810.0 |
| 3.5 | 22,750.0 |
| 4.0 | 6,750.0 |
| 4.5 | 1,350.0 |
| 5.0 | 233.0 |
| 5.5 | 32.0 |
| 6.0 | 3.4 |




## Basic Components of a Six-Sigma Program

1. Define products and services by describing the actual products or services that are provided to customers.
2. Identify customer requirements for products or services by stating them in measurable terms.
3. Compare products with requirements by identifying gaps between what the customer expects and what the customer is actually receiving.
4. Describe the process by providing explicit details.
5. Improve by simplification and mistake-proofing.
6. Measure quality and productivity by establishing baseline values and then tracking improvement.




## Six-Sigma Program Measurements

- Quality Measurements
  - Process mean and standard deviation
  - Capability index
  - Defects per unit
- Variance Analysis
  - Multivariate analysis (MANOVA)
  - Analysis of variance (ANOVA)
- Regression Analysis

## Six-Sigma Quality Activities and Tools

- Management Processes
  - Participative management
  - Short-cycle manufacturing
  - Designing for manufacturing benchmarking
  - Statistical process control
  - Supplier qualification



## Six-Sigma Quality Activities and Tools (cont'd)

- Improvement Tools and Analytical Techniques
  - Flowcharts
  - Pareto charts
  - Histograms
  - Cause-and-effect diagrams
  - Experimental design
- Quality Circles



## Concurrent Quality Controls

- Compliance with ISO 9000 Standards
  - Certifies that a business is using processes and principles in order to ensure the production of quality products.
  - Does not address the quality of specific products.
  - Shows customers how a firm tests its products, how its employees are trained, how it keeps records, and how it fixes defects.



## Concurrent Quality Controls (cont'd)

- Statistical Process Control (SPC)
  - Is the process of gathering, plotting, and analyzing data to isolate problems in a specified sample of products.
  - Uses statistical analysis to determine the probability of a deviation's being a simple, random, unimportant variation or a sign of a problem in the production process that must be corrected.



## Concurrent Quality Controls (cont'd)

- Benchmarking
  - The process of comparing key points within your business with comparable points in another external entity.
- Benchmarking Opportunities

Production Process
- Methodology
- Facility needs
- Equipment needs
- Personnel needs
- Assembly time
- Quality control
- Inspection
- Cost considerations
- Parts availability
- Repair and returns

Customer Service
- Goods and services availability
- Returns, repair, and replacement
- Warranties and guarantees
- Feedback mechanisms (surveys, toll-free numbers)
- Cost considerations



## Figure 18.3: The Control Chart