Business Processes

Chapter 4

4 Chapter Objectives

Be able to:

- Explain what a business process is and how the business perspective differs from a traditional, functional perspective.
- Create process maps for a business process and use them to understand and diagnose a process.
- Calculate and interpret some common measures of process performance.
- Discuss the importance of benchmarking and distinguish between competitive benchmarking and process benchmarking.
- Describe the Six Sigma methodology, including the steps of the DMAIC process.
- Use and interpret some common continuous improvement tools.
- Explain what the Supply-Chain Operations Reference (SCOR) model is and why it is important to businesses.

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4 Business Processes

- **Process – A set of logically related tasks or activities performed to achieve a defined business outcome.** © 2010 APICS Dictionary
  - Primary process – A process that addresses the main value-added activities of an organization.
  - Development process – A process that seeks to improve the performance of primary and support processes.
  - Support process – A process that performs necessary, albeit not value added activities.

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4 Improving Business Processes

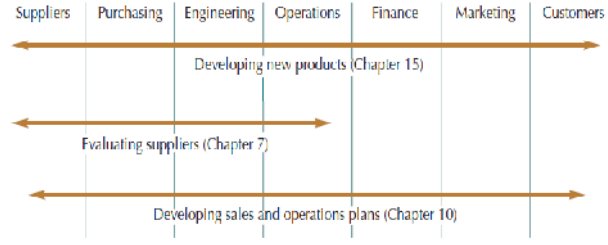

Figure 4.3

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4 Mapping Business Processes

- **Mapping – The process of developing graphic representations of the organizational relationships and/or activities that make up a business process.**
- **Process Map – A detailed map that identifies the specific activities that make up the informational, physical, and/or monetary flow of a process.**

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4 Purposes of Mapping

- **Create a common understanding of the processes, activities, and results.**
- **Define the boundary of the process.**
- **Provide a baseline to measure the impact of improvement efforts.**

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4 Process Mapping Guidelines

- **Identify the entity that will serve as your focal point.**
  - Customer?
  - Order?
  - Item?
- **Identify clear boundaries and starting and ending points.**
- **Keep it simple**
  - Does this detail add any insight?
  - Do we need to map every exception condition?

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4 Process Mapping Symbols

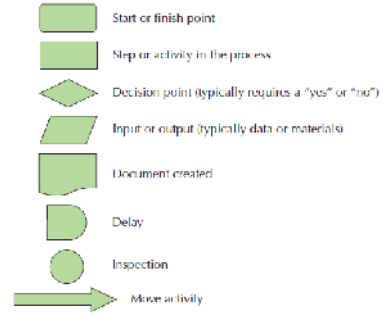

Figure 4.4

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4 Process Mapping Example

- **San Diego Distribution Center (DC)**
- **Process:**
  - Dealer faxes order to DC. One out of 25 orders lost because of paper jams.
  - Fax sits in "In Box" around 2 hours (up to 4) until internal mail picks it up.
  - Internal mail takes about one hour (up to 1.5 hours) to deliver to the picking area. One out of 100 faxes are delivered to the wrong place.
  - Order sits in clerk's in-box until it is processed (0 to 2 hours). Processing time takes 5 minutes.
  - If item is in stock, worker picks and packs order (average = 20 minutes, but up to 45 minutes).
  - Inspector takes 2 minutes to check order. Still, one out of 200 orders are completed incorrectly.
  - Transport firm delivers order (1 to 3 hours).

4 Let's Map the Process!

- **What is the focal point of the mapping effort?**
- **What are the boundaries of the process map?**
- **What detail is missing from this simple example?**

4 One Possible Solution

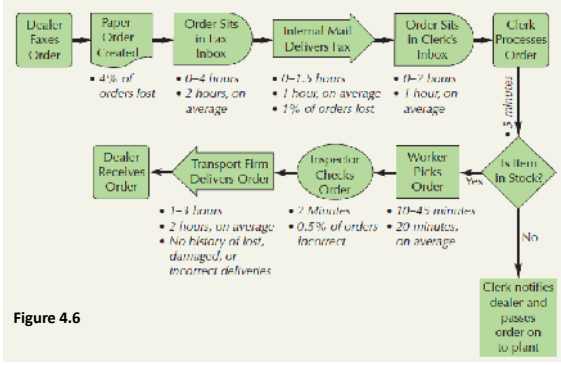

Figure 4.6

4 Guidelines for Process Improvement

- **Examine each delay symbol**
  - Cause, Length, Possible to Reduce?
- **Examine each activity symbol**
  - Necessary? What is the value? How can we prevent errors?
- **Examine each decision symbol**
  - Can it be eliminated?
- **Look for loops**
  - Would better quality eliminate them? Costs?

4 Swim Lane Process Maps

- Swim lane process map – A process map that graphically arranges the process steps so that the user can see who is responsible for each step.

4 Swim Lane Process Example

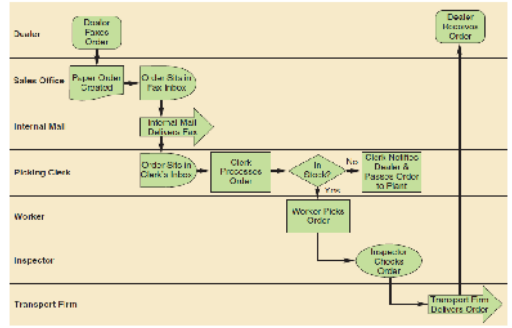

Figure 4.7

4 Measuring Process Performance

- Quality
- Cost
- Time
- Flexibility

4 Productivity

- Productivity – A measure of process performance.
- Productivity = $\frac{\text{Outputs}}{\text{Inputs}}$

4 Productivity

- Single-factor productivity – A productivity score that measures output levels relative to single input.
- Multifactor productivity – A productivity score that measures output levels relative to more than one input.

4 Examples

Single-factor productivity ratio: $\frac{\text{Batteries Produced}}{\text{Direct Labor Hours}}$

Multifactor: $\frac{\text{Batteries Produced}}{\text{Machine Hours + Direct Labor Hours}}$

Total multifactor: $\frac{\text{Total Nightly Sales (\$)}}{\text{Total Nightly Costs (\$)}}$

4 Another Example

	Quantity	$/Unit
Car X	4,000 cars	$8,000/car
Car Y	6,000 cars	$9,500/car
Total labor for building X	20,000 hours	$12/hour
Total labor for building Y	30,000 hours	$14/hour

4 Productivity Example

What is the Labor Productivity *in hours* for Each Car?

Car X: (4,000 cars / 20,000 hrs) = ?

Car Y: (6,000 cars / 30,000 hrs) = ?

How might these measures be affected by capital substitution?

4 Productivity Example

What is the Labor Productivity *in hours* for Each Car?

Car X: $\frac{(4{,}000 \times \$8{,}000)}{(20{,}000 \times \$12)} = ?$

Car Y: $\frac{(6{,}000 \times \$9{,}500)}{(30{,}000 \times \$14)} = ?$

4 Productivity Example

Car X: (4,000 cars / 20,000 hrs) = .2

Car Y: (6,000 cars / 30,000 hrs) = .2

Car X: (4,000 × $8,000)/(20,000 × $12) = 133.33

Car Y: (6,000 × $9,500)/(30,000 × $14) = 135.72

What are the benefits/drawbacks?

4 Efficiency

- **Efficiency – A measure of process performance; the ratio of actual outputs to standard outputs.**
- **Standard output – An estimate of what should be produced, given a certain level of resources.**

4 Efficiency

Efficiency =
100% (actual outputs / standard outputs)

OR: Efficiency =
100% (standard time/actual time) for one unit

4 Cycle Time

- **Cycle Time – The total elapsed time needed to complete a business process.**
- **Percent Value-Added Time – The percentage of total cycle time that is spent on activities that actually provide value.**

Percent Value-Added Time =
100% (value-added time)/(total cycle time)

4 Benchmarking

- **Benchmarking – The process of identifying, understanding, and adapting outstanding practices from within the same organization or from other businesses to help improve performance.**
- **Competitive Benchmarking – The comparison of an organization's processes with those of competing organizations.**

4 Competitive Benchmarking

AIRLINE CARRIER	PERCENTAGE OF FLIGHTS ARRIVING ON TIME	PERCENTAGE OF FLIGHTS CANCELLED	MISHANDLED BAGGAGE REPORTS PER 1,000 PASSENGERS
American	79.6%	2.7%	3.82
Continental	81.4%	3.3%	2.65
Delta	77.4%	4.9%	3.49
Frontier	81.4%	0.6%	2.58
Hawaiian	92.5%	0.0%	2.23
JetBlue	75.7%	8.7%	2.48
Pinnacle	78.5%	8.2%	6.30
Southwest	79.5%	2.3%	3.43
United	85.2%	2.2%	3.40
US Airways	83.0%	2.5%	2.56

Source: U.S. Department of Transportation, "Air Travel Consumer Report," February 2011. http://airconsumer.dot.gov/reports/2011/February/2011FebruaryATCR.PDF

Table 4.7

4 The Six Sigma Methodology

- **Six Sigma – A business improvement methodology that focuses an organization on:**
  - Understanding and managing customer requirements
  - Aligning key business processes to achieve those requirements
  - Utilizing rigorous data analysis to understand and ultimately minimize variation in those processes
  - Driving rapid and sustainable improvement to the business processes.

4 Six Sigma People

- **Champion**
- **Master Black Belt**
- **Black Belt**
- **Green Belt**
- **Team Members**

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4 Six Sigma Methodology

- **DMAIC**
  - Define the goals of the improvement activity
  - Measure the existing process
  - Analyze the process
  - Improve the process
  - Control the new process
- **DMADV**
  - Define, Measure, Analyze, Design, Verify (Ch 15)

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4 Continuous Improvement Tools

- **Root cause analysis**
  - Cause-and-effect diagrams
  - Five Whys
- **Scatter plot**
- **Check sheet**
- **Pareto Chart**
- **Run Chart**
- **Bar Chart**
- **Histogram**

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4 Root Cause Analysis

- **Root cause analysis – A process by which organizations brainstorm about possible causes of problems and then narrow the focus to a root case.**

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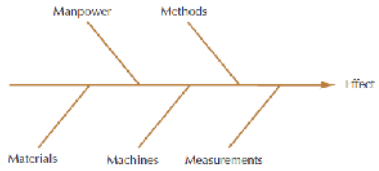
4 Cause-and-Effect Diagram

Branches are organized around the Five Ms



Commonly known as a fishbone or Ishikawa diagram

Figure 4.8

4 Five Whys

- **Five Whys - An approach used in root cause analysis to brainstorm successive answers to the question "why is this a cause of the original problem?"**

4 Scatter Plot

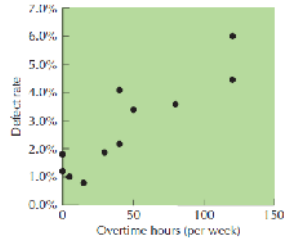


Figure 4.10

4 Check sheet - Example

CAUSE	FREQUENCY
Price check	142
Register out of money	14
Bagger unavailable	33
Register out of tape	44
Customer forgot item	12
Management override needed due to incorrect entry	86
Wrong item	52
Other	8
Total Delays	391

Table 4.9

4 Pareto Chart

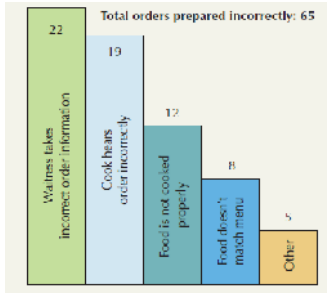


Figure 4.17

4 Bar Graph

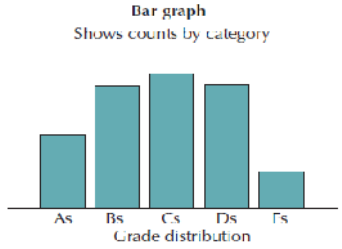


Figure 4.12

4 Run Chart

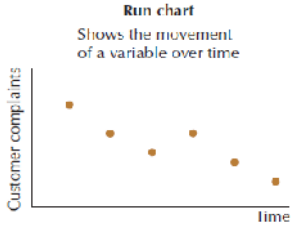


Figure 4.12

4 Histogram

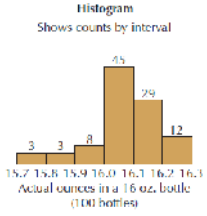


Figure 4.12

4 Understanding Variability

- **How Standardized Should Processes Be?**
  - Some consider tools such as process mapping and DMAIC to be "overused" and applied in environments where variation is valued.
- **Four Types of Processes**
  - Mass processes – same output every time
  - Mass customization – controlled variation
  - Artistic processes – variability in process and outputs are valued
  - Nascent (broken) process – mismatch between customer wants and process deliverable

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4 Business Process Reengineering (BPR)

- **Business Process Reengineering – A procedure that involves the fundamental rethinking and radical redesign of business processes to achieve dramatic organizational improvements in cost, quality, service, and speed.**

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4 The SCOR Model

- **Five core processes for Level 1**
  - Source
  - Make
  - Deliver
  - Return
  - Plan

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4 The SCOR Model

- **Level 2 Processes – Break down Level 1 processes into more detail.**
  - Make to stock
  - Make to order
  - Engineer to order
- **Level 3 Processes – Describe in detail the actual steps required to execute level 2 processes.**

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4 The SCOR Model

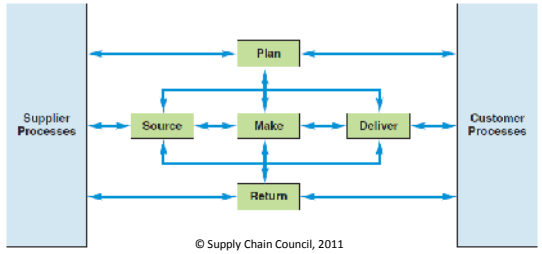

Figure 4.18

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Business Processes Case Study

Swim Lane Process Map for a Medical Procedure

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