Six Sigma

The Method of Champions
Objectives

- Define “quality”
- Explain key performance objectives
- Define key quality terms
- Illustrate process improvement using Six Sigma
- List quality considerations at DTCC
What is “quality”?

• John Ruskin
  Quality is never an accident; it is always the result of intelligent effort.

• Henry Ford
  Quality means doing it right when no one is looking.

• Peter Drucker
  Quality in a product or service is not what the supplier puts in. It is what the customer gets out and is willing to pay for.
  Quality is the result of work efforts divided by total costs.

• W. Edwards Deming

• Jack Welch
  Quality means reducing costs and increasing sales.
Key performance objectives

- Quality
- Speed
- Dependability
- Flexibility
- Cost

6σ
Six Sigma history

- Developed by Motorola and GE in 1980s to improve manufacturing processes
- Extended to financial services in late 1990s
- Adopted by DTCC in 2001
<table>
<thead>
<tr>
<th>Metric</th>
<th>Standard of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to resolve a customer issue</td>
<td></td>
</tr>
<tr>
<td>Percentage of budget spent on design</td>
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<tr>
<td>Average phone hold time</td>
<td></td>
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<td>Number of customer complaints</td>
<td></td>
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<td>Customer acquisition and retention rates</td>
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Key quality terms

**Defect**  
Failure to conform to requirements

- 20% of customer issues resolved in more than 2 minutes
- 3.5% of budget spent on product redesign
- 10% of customers on hold for more than 30 seconds
- 5% more customer complaints per month
- Drop in customer acquisition and retention rates by more than 0.5%
Key quality terms

**Sigma (σ)**  
Measure of variability

- Time to resolve a customer issue: 2.34σ
- Percentage of budget spent on product design: 3.31σ
- Average phone hold time: 2.78σ
- Number of customer complaints: 3.14σ
- Customer acquisition and retention rates: 4.08σ
What is a sigma level?

<table>
<thead>
<tr>
<th>σ</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Defects per 1,000</td>
<td>690</td>
<td>308.5</td>
<td>66.8</td>
<td>6.21</td>
<td>0.23</td>
<td>0.034</td>
</tr>
<tr>
<td>Percentage yield</td>
<td>31%</td>
<td>69.15%</td>
<td>93.3193%</td>
<td>99.379%</td>
<td>99.9767%</td>
<td>99.99966%</td>
</tr>
<tr>
<td>Industry average</td>
<td>Apparel industry</td>
<td>Financial services</td>
<td>Car tire manufacturers</td>
<td>Drug quality assurance</td>
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</table>

DPMO = \( \frac{(1,000,000 \times \text{Number of actual defects})}{(\text{Number of units} \times \text{Defect opportunities})} \)

σ = statistical conversion of DPMO
Comparison of sigma levels

<table>
<thead>
<tr>
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<tr>
<td>Lost letters</td>
<td>133,600 per hour</td>
<td>12,420 per hour</td>
<td>466 per hour</td>
<td>6.8 per hour</td>
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<tr>
<td>Incorrect surgical operations</td>
<td>33,400 per week</td>
<td>3,100 per week</td>
<td>117 per week</td>
<td>1.7 per week</td>
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<tr>
<td>Short or long landings</td>
<td>13 each day</td>
<td>1 each day</td>
<td>17 each year</td>
<td>1 every 5 years</td>
</tr>
<tr>
<td>Wrong prescriptions</td>
<td>1,336,000 each year</td>
<td>124,200 each year</td>
<td>4,660 each year</td>
<td>68 each year</td>
</tr>
</tbody>
</table>

Examples are for illustration only and are based on U.S. data.
Sample process improvement

Annual post-payable adjustments

7500 securities

- 4 participants per security
- 10 customers per participant

$7500 \times 4 \times 10 = 300,000$

security holders affected

Rework
- Fielding customer inquiries
- Potential financial loss

$4.11 \sigma$
Sample process improvement

Annual post-payable adjustments

3750 securities

4 participants per security

10 customers per participant

3750 x 4 x 10 = 150,000 security holders affected

5.6% increase

4.34σ
Internal and external sigmas

Internal sigmas
Track and eliminate defects caused internally

External sigmas
Track and partner to eliminate defects caused externally
Six Sigma at DTCC

Since adopting Six Sigma in 2001, DTCC has

- Certified a cross-functional population of employees as belts (Yellow, Green, Black, and Master Black)
- Instituted Balanced Business Scorecard
- Won several global Six Sigma industry awards
- Launched process excellence initiative enterprisewide
The method of champions

DTCC

- Shares internal and external performance data with process partners
- Collaborates with process partners to improve industrywide business processes
Summary

- Defined “quality”
- Explained key performance objectives
- Defined key quality terms
- Illustrated process improvement using Six Sigma
- Listed quality considerations at DTCC
“How DTCC Built A Culture of Quality”

www.dtcc.com/leadership/research

For more information on DTCC’s quality program, contact your relationship manager or e-mail BusinessReengineeringAndQuality@dtcc.com.