Continuous Improvement Toolkit

Cost of Quality
- Cost of Quality

- It’s an initial financial analysis conducted for the improvement project.
- Losses due to poor performance and quality range from 20% to 30% of gross sales.
- Having such information allows an organization to determine the potential savings to be gained by implementing process improvements.
- Cost of Quality

Four Major Categories:

- Internal failure
- External failure
- Prevention
- Appraisal

Cost of Poor Quality
Cost of Good Quality
Prevention:

- Prevention costs are associated with preventing defects before they happen.

- They include:
  - The cost of redesigning the process to remove the cause of poor performance.
  - Redesigning the service or product to make it simpler to produce.
  - Training employees in the methods of continuous improvement.
  - Working with suppliers to increase the quality of purchased items or contracted services.
  - Equipment to better control processes.
- Cost of Quality

Appraisal:

- Appraisal costs are incurred when the management assess the level of performance of the processes.
- They refers to any systems, processes or procedures that exist only to look for problems.

Examples:

- Auditing processes.
- Testing and inspection.
- Dealing with the suppliers’ quality problems.
- Cost of Quality

Internal Failure:
- Internal failure costs result from defects that are discovered during the production of a service or product.
- Two main categories, Rework and Scrap.
- **Rework incurred if:**
  - Some aspect of a service must be performed again.
  - A defective item must be rerouted to some previous operation to correct the defect.
- **Scrap incurred if** a defective item is unfit for further processing.
- Cost of Quality

External Failure:

- External Failure Costs arise when a defect is discovered after the customer receives the service or product.
- Encountering defects and correcting them in this case is costly.
- External failure costs erode market share and profits.
- Dissatisfied customers talk about bad service or products to their friends, who in turn tell others.
- Cost of Quality

What About:

- Maintenance costs.
- Downtime losses.
- Extra material used.
- Extra utility used.
- Cost of lost opportunity.
- Complaints investigation.
- Cost of extra handling.
- Cost of extra storage.
- Damage due to transport.
- Damage caused by storage.
Example:

- If you have the oil changed in your car and that the oil filter is improperly installed, causing the oil to drain onto your garage floor.

- What are the COPQs that may result:
  - The cost the additional oil and filter
  - The additional time spent correcting the mistake
  - Your loyalty / lost of future revenue
  - Reputation / lost of future revenue
## Cost of Quality

<table>
<thead>
<tr>
<th>COPQ that are Recognized Easily</th>
<th>COPQ that are Difficult to Recognize</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejects</td>
<td>Excessive overtime</td>
</tr>
<tr>
<td>Rework</td>
<td>Excess inventory</td>
</tr>
<tr>
<td>Inspection</td>
<td>Cost to customer</td>
</tr>
<tr>
<td>Testing</td>
<td>Employee turnover</td>
</tr>
<tr>
<td>Customer returns</td>
<td>Billing errors</td>
</tr>
<tr>
<td>Customer complaints</td>
<td>Pricing errors</td>
</tr>
<tr>
<td>Recalls</td>
<td>Late paperwork</td>
</tr>
<tr>
<td>etc.</td>
<td>etc.</td>
</tr>
</tbody>
</table>

etc.
- Cost of Quality

The Iceberg Model:

- Scrap
- Returns
- Rejects
- Rework
- Inspection
- Warranty Claims
- Complaints
- Late paperwork
- Employee turnover
- Overdue Receivables
- Unused Capacity
- Billing errors
- Time with Dissatisfied Customer
- Cost to customer
- Excessive overtime
- Excess inventory
- Time Value of Money
- Lost Customer Loyalty
- Lost Sales
- Planning Delays
- Complaint Handling

15 – 25% of Total Cost
- Cost of Quality

**Approach:**

- Identify all activities that exist only because of poor quality.
- Identify where the cost of each activity is experienced.
- Determine the method you will use to calculate COQ:
  - Total resources calculation.
  - Unit cost calculation.
- Collect the data and estimate the costs.
- Involve the finance department when estimating the costs.
### Cost of Quality

#### Example – Total Resources Calculation:

<table>
<thead>
<tr>
<th>Activity Resulting from Quality</th>
<th>Cost Location</th>
<th>Total Cost of Resources</th>
<th>% of Resources to Counter Poor Quality</th>
<th>Total Cost for Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Inspection</td>
<td>- Wages &amp; Benefits</td>
<td>$127,000</td>
<td>80%</td>
<td>$101,600</td>
</tr>
<tr>
<td></td>
<td>- Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rework</td>
<td>- Wages &amp; Benefits</td>
<td>$78,500</td>
<td>12%</td>
<td>$10,500</td>
</tr>
<tr>
<td>Customer Complaint Resolution</td>
<td>- Wages &amp; Benefits</td>
<td>$63,750</td>
<td>100%</td>
<td>$63,750</td>
</tr>
<tr>
<td></td>
<td>- Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System Maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total COQ</td>
<td></td>
<td></td>
<td></td>
<td>$175,850</td>
</tr>
</tbody>
</table>
## Example – Unit Cost Calculation:

<table>
<thead>
<tr>
<th>Activity Resulting from Quality</th>
<th>Cost Location</th>
<th>Frequent of Activity Per Year</th>
<th>Average Cost</th>
<th>Total Cost for Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Inspection</td>
<td>- Wages &amp; Benefits</td>
<td>12</td>
<td>$8,125</td>
<td>$97,500</td>
</tr>
<tr>
<td></td>
<td>- Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rework</td>
<td>- Wages &amp; Benefits</td>
<td>7</td>
<td>$2,600</td>
<td>$18,200</td>
</tr>
<tr>
<td>Customer Complaint Resolution</td>
<td>- Wages &amp; Benefits</td>
<td>37</td>
<td>$2,050</td>
<td>$75,850</td>
</tr>
<tr>
<td></td>
<td>- Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- System Maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total COQ</td>
<td></td>
<td></td>
<td></td>
<td>$191,550</td>
</tr>
</tbody>
</table>
- Cost of Quality

Further Information:

- It is important to involve the finance department in a review of the benefits of the project.
- Although the business case of the project will be based on the hard benefits, the softer benefits such as improved customer satisfaction shouldn’t be ignored.
- It may be possible to convert them to hard benefits.
- There are usually many different COQs for each problem.