Fall 2018
Innovation Champion
Class 3

September 14, 2018

Modules to Cover

• Variable Relationship Analysis
• Calculating Metrics
• Process Mapping

DMAIC

Define Measure Analyze Improve Control
Why do we measure current state?

Why do we analyze?

What are we looking for?
Defining Waste

Value added + Non-value added but necessary + Waste = Output (products or service)

The Value Stream

Customer

Information

Materials or Supplies

Process

Steps

Time to complete step

Time waiting between steps

Inventory Count

Value added total time

Waste time total

Calculating Metrics

"Bell Curve" Standard Normal Distribution

2-Score Standard Deviation

Cumulative Percent

0.1% 2.0% 15.9% 68.1% 97.7% 99.9%
**DPMO**

Total number of defects in sample ____________________________ X 1,000,000

Sample size X # of defect opportunities per unit in the sample

Seattle Example – Permits from 2016-2018

\[ \text{DPMO} = \left( \frac{4959}{18903} \right) \times 1,000,000 = 262,339 \text{ Defects Per Million Opportunities} \]

**Sigma Level**

**Sigma Level Conversion Table**

Seattle Sigma Level = 2.15

**Sigma Level by year**

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Opportunities</td>
<td>8045</td>
<td>7595</td>
<td>3263</td>
</tr>
<tr>
<td>Defects</td>
<td>2495</td>
<td>2145</td>
<td>319</td>
</tr>
<tr>
<td>Sigma Level</td>
<td>1.97</td>
<td>2.05</td>
<td>2.75</td>
</tr>
</tbody>
</table>
Calculating Metrics – Dispersion vs. Central Tendency

Small standard deviation
Large standard deviation

Which one is better?

Seattle Permits Distribution

MEAN = 66
MEDIAN = 20
MODE = 0
What can we change?

![Graph showing the average days to issue and count of permit classes.](image)

**Foundational Concept**

Independent Variables

- People
- Machines & tools
- Process

= Product or service

Variable Relationship Analysis

- Why do we want to look conduct a relationship analysis with data?

- What mistakes can we make in relationship analysis?

- How can we avoid those mistakes?
Relationship Analysis – Seattle Permits

Days to Issue + EstProjectCost

Days to Issue = Dependent Variable

Estimated Cost of project = Independent Variable

Relationship Analysis – Seattle

Days to Issue + Housing Units Added

Days to Issue

Housing Units Added

Comparing the Right Data
<table>
<thead>
<tr>
<th>Team Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How are you doing compared to the milestones you outlined in your charter?</td>
</tr>
<tr>
<td>• Do you need help with data analysis or process mapping?</td>
</tr>
<tr>
<td>• Have you been adequately keeping your stakeholders informed of your progress and developments?</td>
</tr>
<tr>
<td>• What do you need to be successful?</td>
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