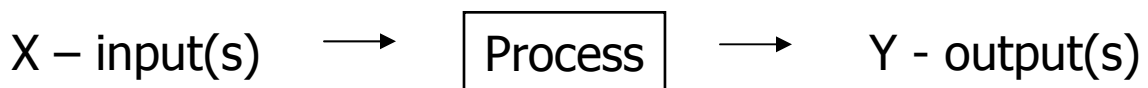


ANALYSIS TOOLS

Measure Phase:



Qualitative Process Description Tools:

Process Flow Chart (VA Vs. NVA) / Process Map (As-Is)

Variable Identification (inputs, outputs)

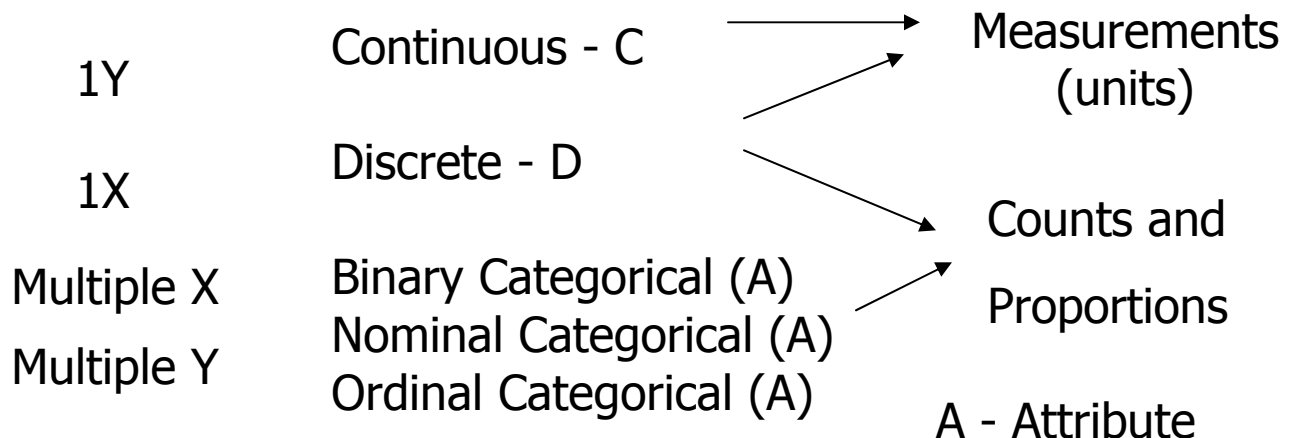
Data Collection Plan

VOC Analysis / Quality Function Deployment

Input/Output:

Variable Types:

Data Usage Type:



Descriptive Measurement Tools:

Descriptive Statistics (n, Mean, S , Range, Min, Max)

Yield (first time yield, rolled throughput yield)

Process Capability (DPM, DPMO, Sigma, Cp, Cpk, Pp, Ppk)

Distribution ID (Frequency Table, Histogram, Boxplot)

Distribution Fit (Normal, Skewed, Exp, Binomial, Poisson)

Measurement System Analysis (Gage R&R, Attribute Study)

KEY Tasks:

Identify output and quantify/ describe current performance.

Identify process input and outputs (data collection plan).

Assess measurement system capability (data collection ability).

Identify target level or improvement goal for your metric(s).

ANALYSIS TOOLS ROADMAP

Analyze Phase (1 Y, 1 X):



Qualitative Process Analysis Tools:

Process Flow Chart (VA Vs. NVA) / Process Map (As-Is)

Variable Identification (inputs, outputs)

Cause-and-Effect (Fishbone) Diagram

Affinity Diagram, Tree Diagram, SIPOC Diagram

Failure Mode and Effects Analysis

Qualitative Analysis Tools:

1Y or 1X only

Descriptive Measurement Tools

1Y (C,D, or A) and
1X (> 2 levels)

Correlation / Simple Regression

Stratification Analysis

Scatter Plot

Multiple Box Plots

Pareto Analysis

1Y (C,D, or A) and
1X (X- time, order)

Process Stability/ Control Chart Analysis

Run Chart (X-axis: time, order)

Reliability Analysis (Y: Survive/ Fail)

1Y (C,D, or A) and
1X(A) (2 groups)

Mean Comparison Test (t-test)

Variance Comparison Test (F-test)

Proportion Tests

1Y (C,D, or A) and
1X(A) (> 2 groups)

One-Way ANOVA (Single Factor)

1Y (A only) and
1X (2 or more groups)

Categorical Regression

ANALYSIS TOOLS ROADMAP

Analyze Phase (1 Y, Multiple X's):



Qualitative Process Analysis Tools:

Process Flow Chart (VA Vs. NVA) / Process Map (As-Is)
Variable Identification (inputs, outputs)
Cause-and-Effect (Fishbone) Diagram
Affinity Diagram, Tree Diagram
Failure Mode and Effects Analysis

Qualitative Analysis Tools:

1Y and
Multiples X's
(X's not correlated)

Multiple Regression
Tolerance Analysis
Design of Experiments (DOE)/
ANOVA (General Linear Model)
(note: continuous X variables may be
treated as attributes (High, Med, Low))

1Y and
Multiples X's
(X's correlated)

Stepwise Regression
(Separate Analysis of X's)

Multiple Y's – for this course, we will treat independently.
Advanced Black Belts – may use multivariate analysis tools.

Multiple Correlated X's to Multiple Correlated
Y's outside scope of course

ANALYSIS TOOLS ROADMAP

Improve and Control Phase:

Improvement Tools:

Alternative Solution Evaluation Techniques
Poke-yoke Analysis (mistake proofing)
Future State Process Map
Brainstorming
Failure Mode and Effects Analysis
Quality Function Deployment

Control Tools:

Poke-yoke Analysis (mistake proofing)
Verifying results (see measure and analysis tools)
Process Control Plans
Statistical Process Control (SPC)
Check Systems
Process Standards