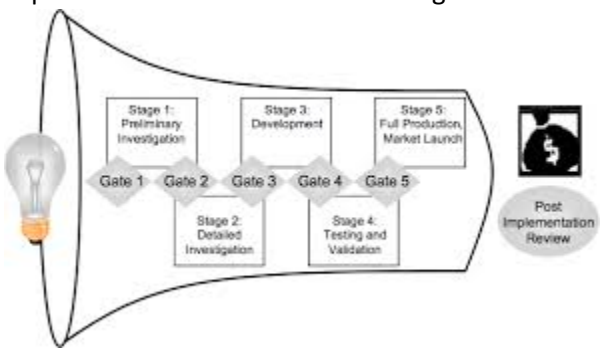
A Perspective Regarding Experimentation, Data, Analysis, Statistics in Industry

April 19, 2017

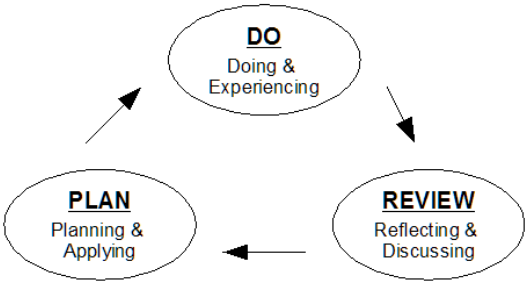
BIG PICTURE CONSIDERATIONS

1. Deliverables of Engineering, Research include:
    a. (Re-)usable knowledge
    b. Decisions creating (operational) value

2. Consider how decisions are made. What is the process for decision making? What data is needed to support expected decisions? How are findings distilled to recommendations?



3. What is the timeline and cycle time for your engineering and research work?



4. Consider who is making the decisions. Who is your audience? What is the audience's frame of reference? What are we comparing to? What is the "control"?

Stakeholder Names and Roles	How Important ? (Low – Med – High)	Current Level of Support? (Low – Med – High)	What do you want from stakeholders ?	What's important to stakeholders?	How could stakeholders block your efforts?	What is your strategy for enhancing stakeholder support?

5. How will you integrate various elements of a project? How to bring together all data? Summarize & support. (Key messages. Recommendations. Executive Summary. Body. Appendices)

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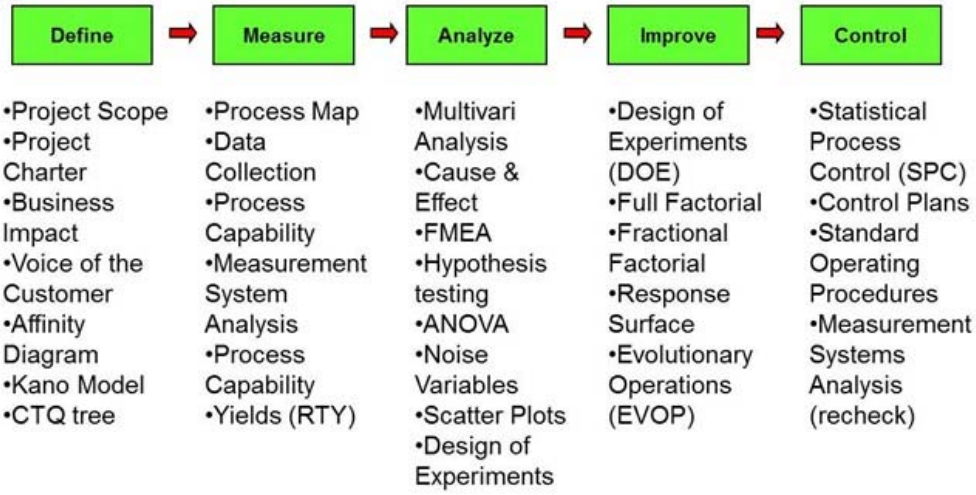
WHERE IN BUSINESS OR EXPERIMENTAL PROCESS ARE YOU?

1. Where are you starting from? Consider appropriate selection of experimental, data, statistical techniques



2. The basics:
    a. data sources, sampling, planning, controls
    b. clear, concise data tables & graphs
    c. sample size, mean, standard deviations
    d. experimental & test methods
    e. text, slides, conclusions, recommendations from data results

RESEARCH PHASE TECHNIQUES

Graphical Analysis - X-Y plots, Contour plots, Multi-vari charts, Time plots

Design of Experiments - fractional-factorial, response surface designs

Modeling – regression analysis, fixed vs. random

Data mining – decision trees, etc.

Cluster Analysis - Hierarchical, k-means, etc.

Partial Least Squares - Wide datasets

Precision / Gauge R&R Studies - Test Method Development

PROCESS CONTROL PHASE TECHNIQUES

Control Charts - Xbar& S, Individuals, p, c, etc.

Capability Studies/Analysis - Sampling Plan construction, specification generation

Variance Components - Variability charts, "Multi-vari" charts

Design of Experiments - fractional-factorial, response surface designs

Acceptance Sampling - Variables, attributes

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