Top Ten Things Everybody Should Know About High Maturity

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November 2008
Understanding is Evolving

From
Central themes
• Baselines
• Control Charts
• Statistical management of subprocesses

To
Central themes
• Process Performance Models
• Understanding and use of variation

Supporting themes
• Baselines
• Control Charts
• Statistical management of subprocesses
Making Informed Decisions

- Based on quantitative knowledge of
  - Risk
  - Impact
  - Affect on achieving goals
  - ROI
  - Cost
  - Side-effects/ potential suboptimization

- Aided by
  - Understanding variation
  - PPMs
Need to Know More Than Range of Variation

Customer wants the product in 10 weeks
Historical range is 9-11 weeks
Should the job be accepted?

Probably Not

![Frequency distribution forProbably Not](image)

Frequency: 

![Probability distribution for Probably Not](image)

Probably Should

![Frequency distribution for Probably Should](image)

Frequency: 

![Probability distribution for Probably Should](image)
Quantify Risk by Understanding Variation

Forecast: Schedule =
Percentile Forecast values
0%  7.6
10% 9.4
20% 9.7
30% 10.0
40% 10.2
50% 10.4
60% 10.6
70% 10.8
80% 11.1
90% 11.5
100% 14.0
Statistically Managing a Subprocess

Controllable Factors:
- # People
- Preparation Time
- Experience

Uncontrollable Factors:
- Size
- Latent Defects
- Complexity
- Platform

Outcomes:
- Cost
- Quality
- Duration

Subprocess
Build a Process Performance Model

Predict
- Achievement of objectives
- Effects of a change
- Outcome of a decision

Avoid suboptimization
- Side effects of a change
- Multi-factor affects of a change
- Interactions of multiple changes

Identify opportunities for improvement

Make informed decisions

\[ Y = A + \frac{C}{(1 + Te^{-B(x-M)})^{1/T}} \]
Its not the Data/Chart, it is How it is Used

A wall full of control charts does not make a Level 4

- Who is using them for management
- How are they using them
- How timely is the use
  - Retrospective vs. real-time
  - As the events occur vs. end-of-phase

Using natural bounds

- Natural bounds vs. trial bounds
- Natural bounds vs. specification limits
Don’t Ignore Data from Unstable Processes

Only a small number of processes will be stable

• Not using data from unstable processes would severely limit the number of and thus usefulness of baselines and models
• Additionally, not all attributes of a “stable process” may be stable

Needs to be clearly documented so the consumer understands the additional risk
Watch out for Suboptimization

- Optimizing for one factor causes another to exceed objectives
- Fixing one problem causes another
- PPMs by modeling the relationships between processes and factors makes suboptimization visible
- Changes ripple through processes, projects, and products
When Data Speaks, HM Organizations Listen

Analyses of the data leads to

- What subprocesses are critical
- What models are needed
- When decisions are necessary
- When decisions are not necessary

Helps answer

- Was the change significant
- What is the ROI/benefit/impact of this change
- Where are the biggest opportunities for positive change
- Which change will help achieve the objectives
How Much Measurement Error is There?
Analyses and decisions will only be as good as the data

Things to consider

- Determine and understand the Measurement System Error
- Have clear, unambiguous operational definitions
- Train the collectors of the data
- Train the analyzers of the data
- Train the consumers of the analyses

![Graph showing accuracy and precision](image)
Access to Statistical Help is Critical

Easy and timely access to statistical help is critical

- Mistakes can be costly
- Sometimes they can be subtle mistakes
- Particularly early in the early uses of a new technique

People become frustrated if they have to wait hours or days

- May stop using
- May become passive-aggressive
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