

Innovate2011

The Premier Software and Product Delivery Event



Measured Improvement in Software Economics

Walker Royce

Chief Software Economist

IBM Software, Rational

Software Delivery is an Economic Discipline



Level 5: Completely irreducible uncertainty

Level 4: Partially reducible uncertainty

Level 3: Fully reducible uncertainty

Level 2: Risk without uncertainty

Level 1: Complete certainty

Engineering →
Engineering →
Engineering →
Engineering →

Software →
Software →
Software →
Software →



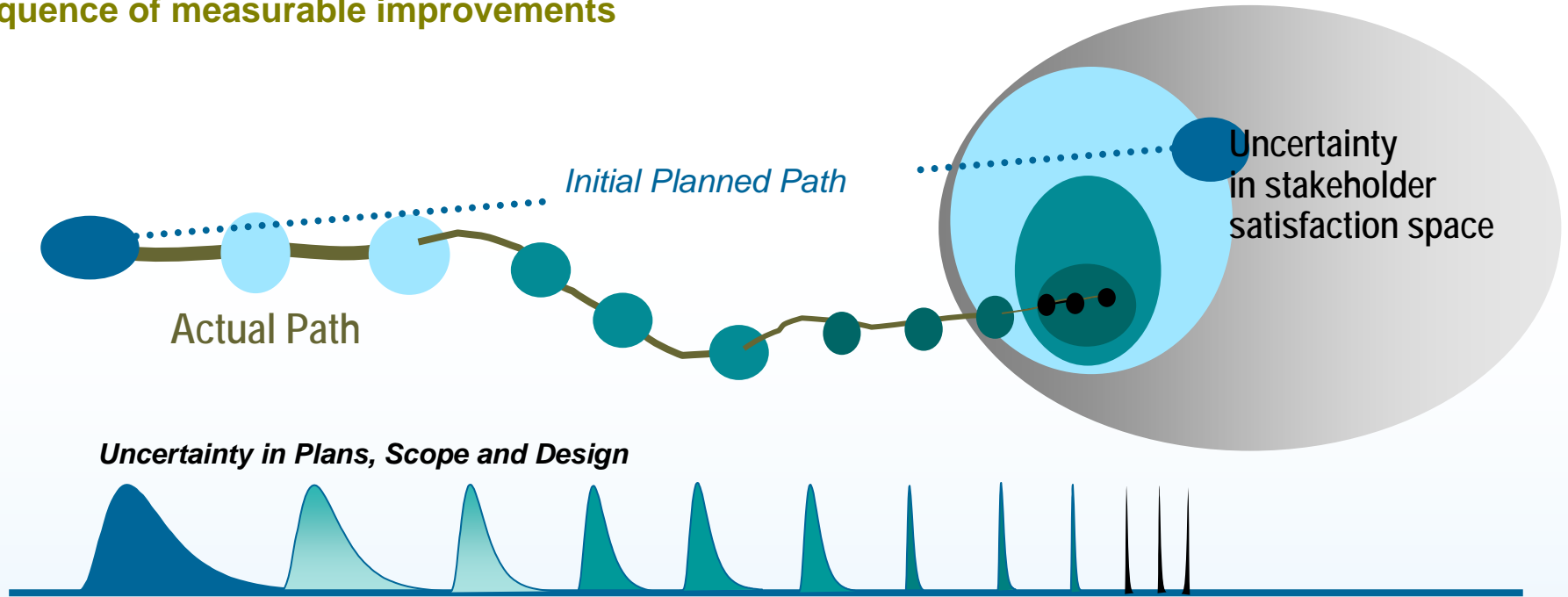
Religion
Philosophy
History
Economics
Biology
Chemistry
Physics
Mathematics

Lo, Andrew, and Mark Mueller. MIT Sloan School of Management,
Moody's/NYU 6th Annual Credit Risk Conference, New York, March 2010.

Economic Governance: Measurement and Steering



Sequence of measurable improvements



Managing uncertainty requires
MEASUREMENT



Measurement builds
TRUST



Trust improves
EFFICIENCY

Pivotal Culture Shifts



Integrate

Plans/management

Plan for integration to precede unit testing

Avoid false precision in plans and requirements

Collaborate

Progress measures

Quantify progress trends from the integrated code and test base

Don't attack the easy things first

Optimize

Quality measures

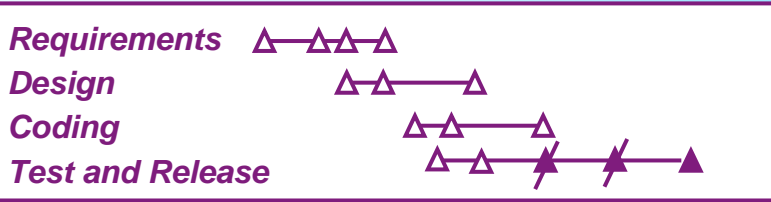
Quantify cost-of-change trends to demonstrate true agility

Don't rely on subjective and speculative measures

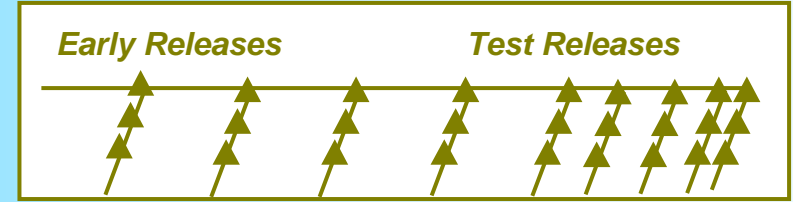
Measured Improvement: Progress Econometrics



Conventional Engineering Governance



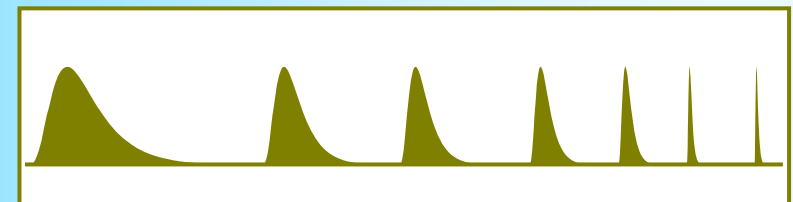
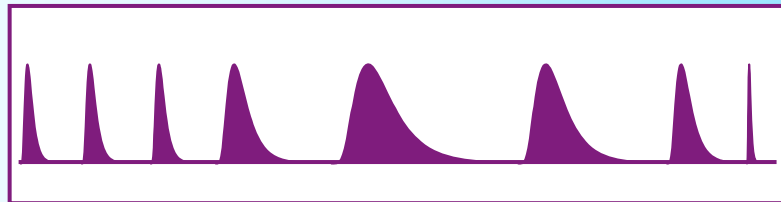
Modern Economic Governance



Planning Progress



Technical Progress



Economic Progress

Measured Improvement: Quality Econometrics

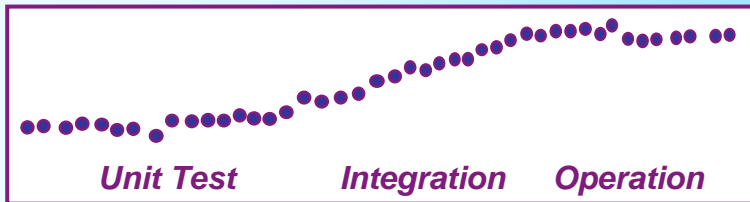


Conventional Engineering Governance

Modern Economic Governance



Maturity
Defect Trend



Modularity
Change Volume Trend



Adaptability
Cost of Change Trend

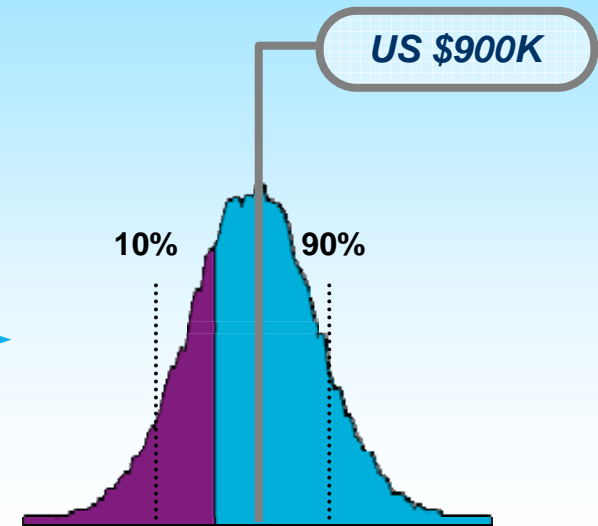
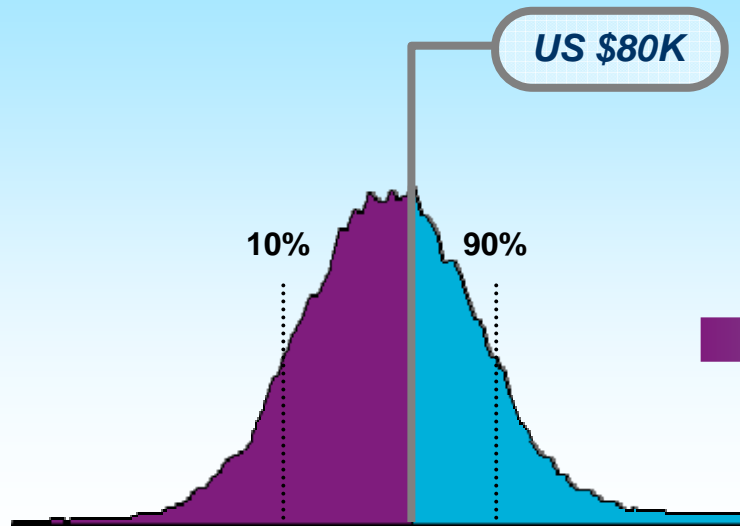


Measured Improvement: Quality Econometrics



Net Present Value using Conventional Governance

Net Present Value using Economic Governance



Improving Software Economics



VOLUME OF CODE

- Quality/Performance
- Integration first
- Manage scope
- Asset-based reuse

PROCESS

- Steering
- Good practices
- Maturity
- Domain knowledge

Resources = Complexity *Agility* * Collaboration * Automation

TEAMWORK

- Synchronization
- Skills
- Experience
- Motivation

TOOLING

- Process enactment
- Measurement
- Instrumentation
- Manage complexity

Productivity Improvement Leverage



Reduce Complexity

Productivity:
2x – 10x
Timeframe is Years

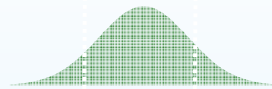
Cost to Implement:
25%-50%
Much culture change



Increase Agility

Productivity:
25-100%
Timeframe is Quarters

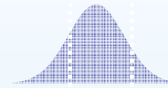
Cost to Implement:
10%-35%
Some culture change



Improve Collaboration

Productivity:
15-35%
Timeframe is Months

Cost to Implement:
5%-10%
Predictable



Add Automation

Productivity:
5-25%
Timeframe is Weeks

Cost to Implement:
<5%
Very predictable



Economic Impacts

Organization

Project

Team

Individual

The Moral of This Story



Better software economics is a result of:

1. Measured improvement for improved predictability

- The foundation of economic governance
- Measurement helps you manage uncertainty

2. Agility for improved operational efficiency

- Best measured by cost of change trends
- Best achieved by accelerating integration testing

***If you play better defense
you can play more offense!***



Software. Everywhere.

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