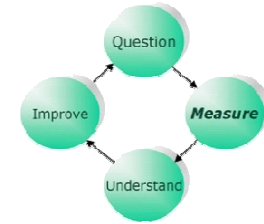




SOFTWARE
PRODUCTIVITY
RESEARCH

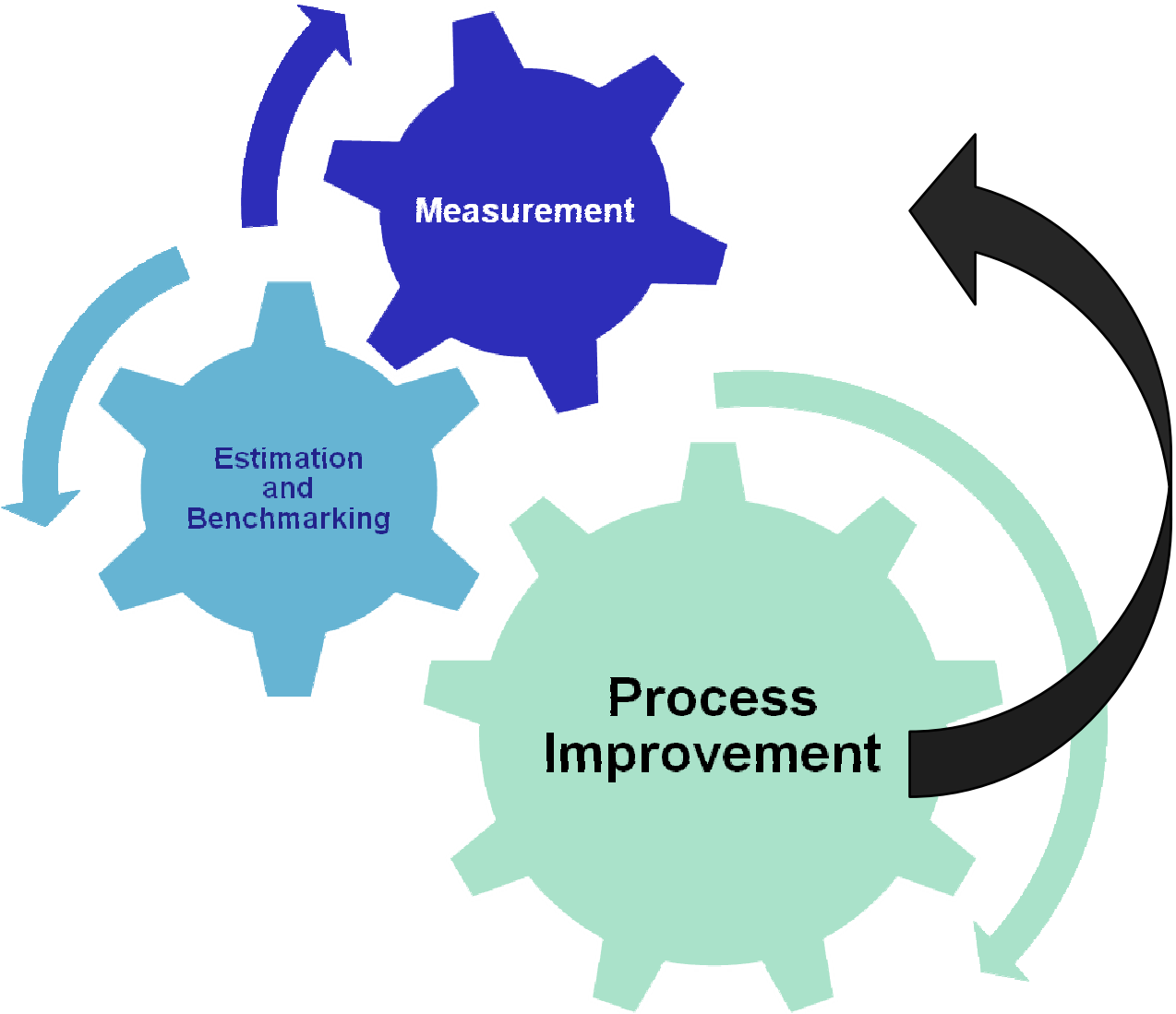
ACOSM 2008



**Using Measured Data for Formal Estimation:
Methods, Tools, and Approaches**
ACOSM 2008 Conference
Melbourne, Australia
14 November 2008

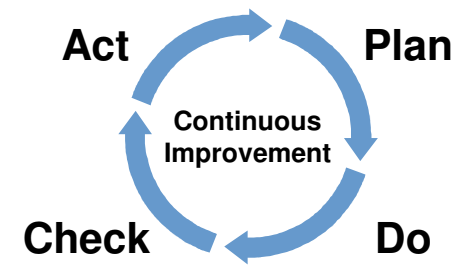
Michael A. Bragen
Software Productivity Research

The Reciprocity Cycle



Traditional Benchmarking Process Model

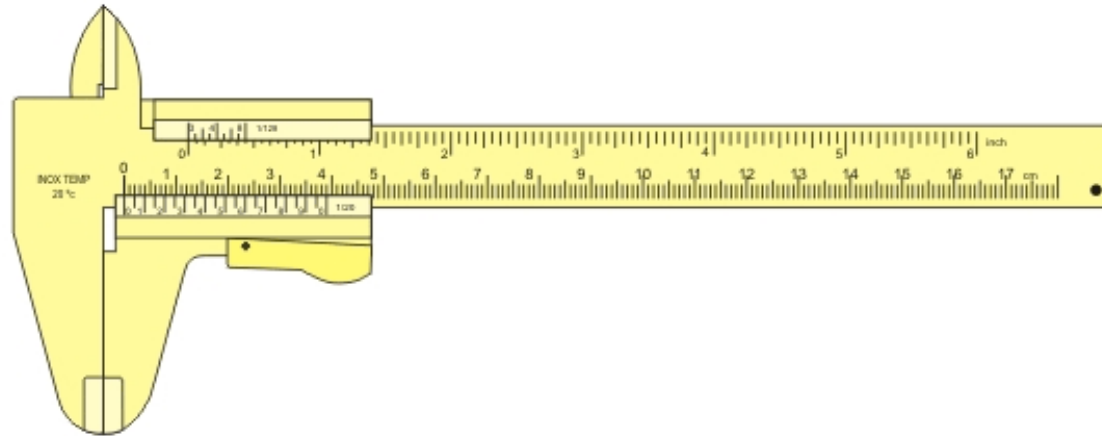
1. Identify process	Plan
2. Identify partner	Do
3. Collect data	Check (Measure)
4. Determine gap	
5. Project future performance	
6. Gain support	Act
7. Set goals	
8. Develop plans	
9. Implement plans	
10. Recalibrate benchmarks	



Does Measurement Matter?

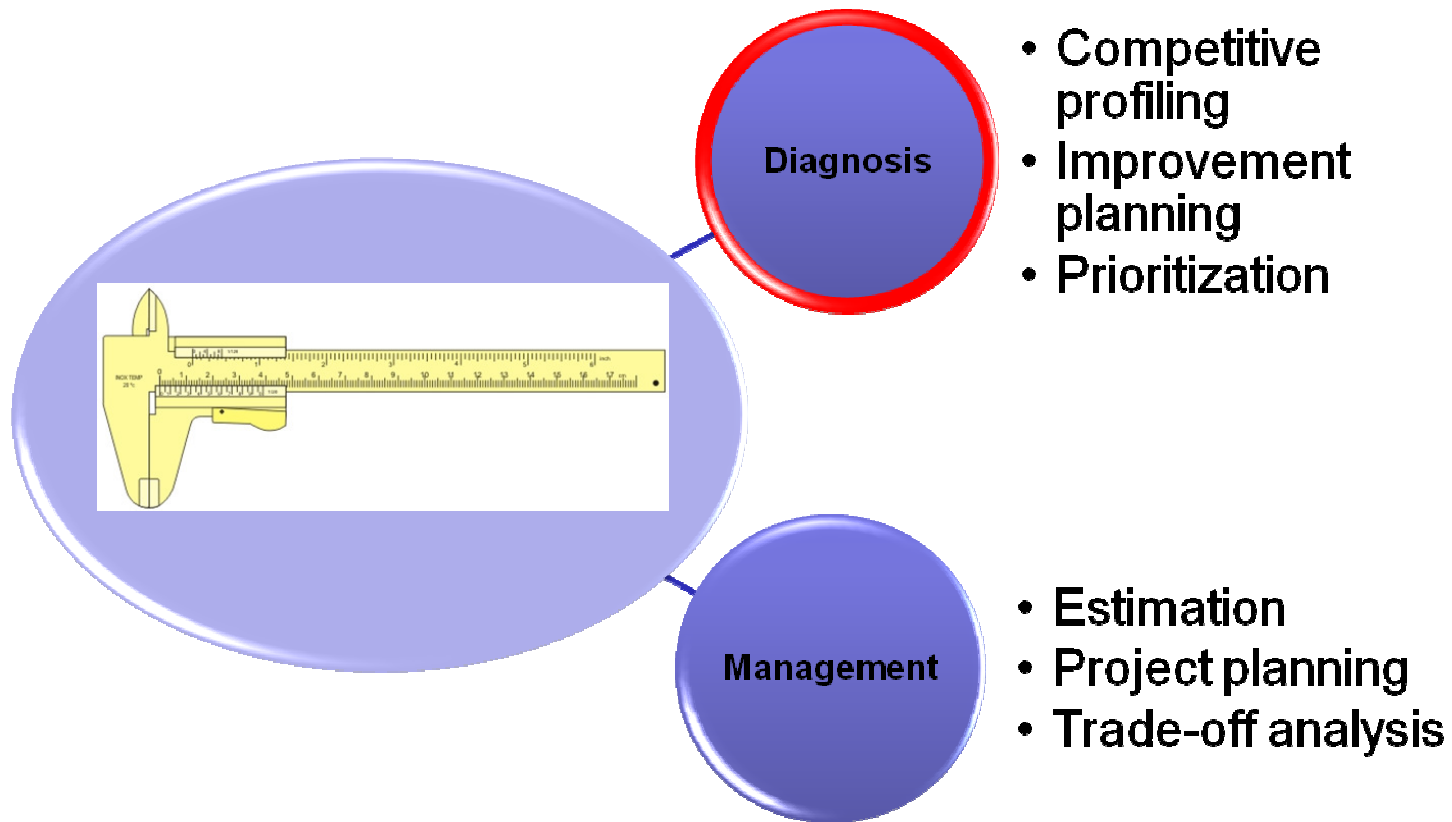
Activity	Successful Projects	Cancelled Projects
Sizing	Good	Poor
Planning	Very good	Very poor
Estimating	Very good	Very poor
Milestone tracking	Good	Very poor
Measurement	Good	Very poor
Change control	Excellent	Poor
Quality analysis	Excellent	Very poor
Risk analysis	Good	Very poor

Measurement for Process Improvement



- What to measure
- How to use measured data
 - Benchmarking
 - Planning and estimation
- How to improve process

Measured Data and Diagnosis



The purpose of measurement: Provide information...

- To improve decision-making capability
- Timely – must be early enough to allow action that will positively affect the outcome
- To monitor the cost and benefit of improvements
 - Compliance with new processes
 - Costs of deployment
 - Results after deployment



Without good measurement, progress is unlikely

- Function point analysis of entire portfolio
- Annual function point benchmarks
- Life-cycle quality measures
- User satisfaction measures
- Development and maintenance productivity measures
- Soft factor assessment measures
- Hard factor measures of costs, staffing, effort, schedules
- Measurements used as management tools

Benefits and Costs of Measurement



- Benefits are not always quantifiable and clear-cut
 - Financial business cases may take time to emerge
 - A “chicken and egg” problem
- A key factor in any measurement program is visionary management
 - Support for the effort based on conceptual understanding must exist in the near term

External Factors

- Marketplace competitiveness
- Industry standards
- Maintain industry respect level
- Competition
- Regulatory compliance
- Meet customer expectations and satisfaction

Internal Factors

- Meet company commitments
 - Productivity/financial
 - Delivery/performance
 - Quality
- Support projected growth objectives
 - Company integration
 - Internal customer satisfaction

High Process Formality Example (CMMI Level 3+)

- Establish achievable quantitative project quality and performance goals
- Establish defined processes and plans that have the capability to achieve the goals
- Understand, reduce, and control process variation
- Statistically predict results of work efforts
- Statistically predict project results against goals
- Perform ongoing corrective actions so that goals are achieved

**Defect Detection – Time To Market Reduction
– Cost reduction – Staff Reduction**

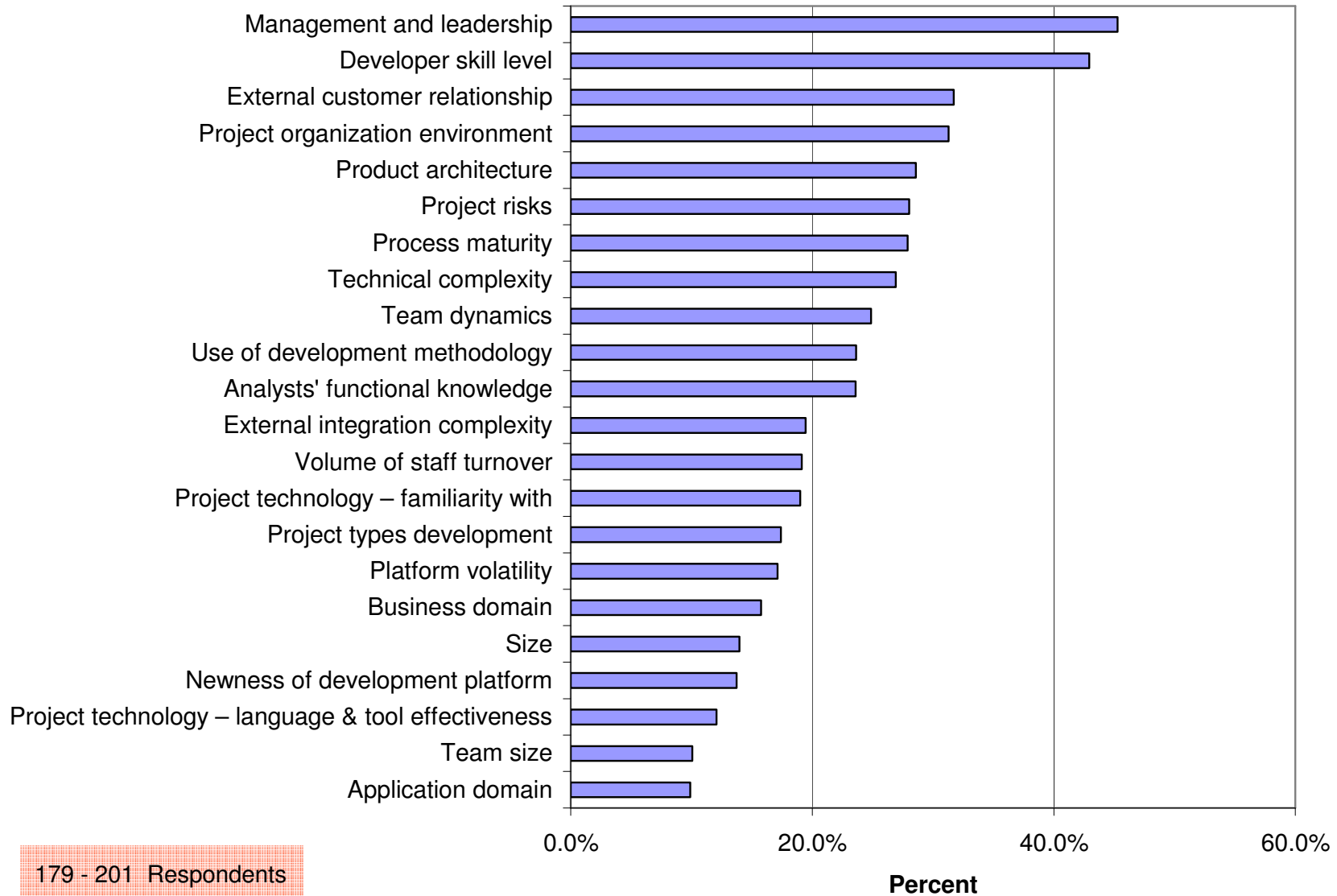


There are three very hazardous practices that are widely used that can cause trouble with benchmark results. These apply to any attempt to quantify project influence factors and management findings:

- Utilization of “lines of code” metrics – Metrics Paradox
- Utilization of project-level data rather than activity-based data
- Utilization of questionnaires for data without validation

Large Impacts – SEI PBC Study (2006)

“Performance Benchmarking Consortium”



179 - 201 Respondents



Improvement Prioritization

Improvement Priorities		Improvements Needed To Reach:			
		Level 2	Level 3	Level 4	Level 5
ATTRIBUTES	RATING	Degree Improvement Required			
Design Automation	2.57	OK	Minor	Minor	Major
CASE Integration	1.00	OK	OK	OK	OK
Source Code Library	2.46	OK	OK	Minor	Major
Project Documentation Library	2.89	OK	OK	Minor	Major
Software Tools Familiarity	1.71	OK	OK	OK	Minor
Development Platform Computing Support	3.93	OK	Major	Major	Major
Release Control Methods	1.00	OK	OK	OK	OK
Problem Tracking & Reporting	1.00	OK	OK	OK	OK
Replacement & Restructuring Planning	1.00	OK	OK	OK	OK
Requirements Methods	2.53	OK	Minor	Minor	Major
Prototyping Methods	3.70	Minor	Major	Major	Major
Analysis Methods	3.21	OK	Minor	Major	Major
Data Administration	3.21	OK	Minor	Major	Major
System Development Methodology	3.07	OK	Minor	Major	Major
Productivity Measurements	3.39	OK	Minor	Major	Major
Formal Review Training	3.14	OK	Major	Major	Major
Development Personnel Design Experience	2.34	OK	Minor	Minor	Major
Formal Review Meetings	3.39	OK	Major	Major	Major
Test Training	3.07	OK	Major	Major	Major
Test Function	2.64	OK	Minor	Minor	Major
Test Planning	1.21	OK	OK	OK	Minor
Test Reviews	2.00	OK	OK	Major	Medium
Test Methods	3.14	OK	Minor	OK	Major
Quality Assurance Function	1.89	OK	OK	Minor	Minor
Quality Assurance Process	2.18	OK	Minor	Major	Major
Quality and Defect Measurement	2.29	OK	Minor	Minor	Major

Tangible Financial Rate of Return factors

- Decrease in defect rate and rework cost
- Predictable/reliable schedules and cost
- Improved time-to-delivery
- Projects stay within budget
- Earlier detection of defects

Intangibles

- Improved employee morale
- Fewer overtime hours
- Decrease in employee turnover
- Increased customer satisfaction
- Pride in continuous measured improvement

Software Measurement ROI

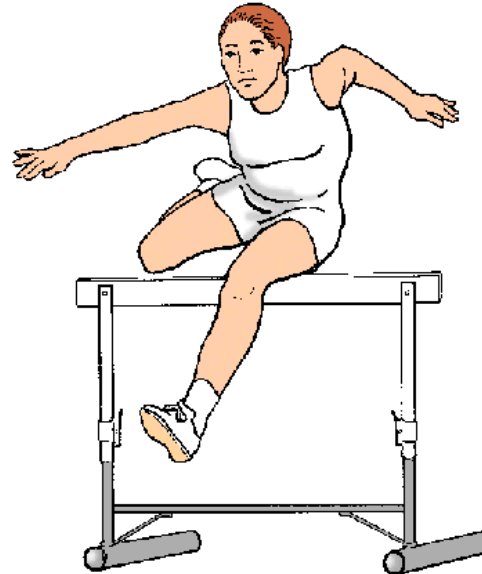
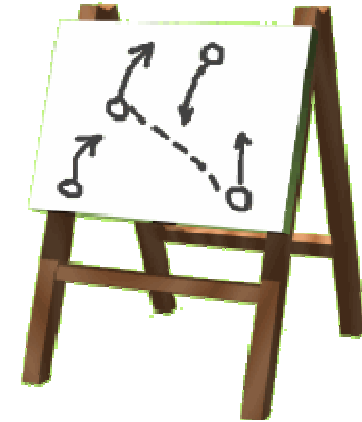
(Return on Investment Index)

	Assessment	Productivity	Quality	TOTAL
Year 1	1.25	1.50	1.75	4.50
Year 2	1.75	2.00	2.50	6.25
Year 3	2.50	2.75	3.50	8.75
Year 4	3.25	3.25	5.00	11.50
Year 5	4.00	4.00	7.00	15.00

Measurement has an
excellent ROI!

Benchmarking – Sources of Data

- Normative
- Objective / Stretch (Best-In-Class)



- Your organization
- Other, similar organizations
- Industry collections
 - Best-in-class
 - Average projects for an industry
 - Location-specific



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