John Bowen

**Director** – Global Partnerships, Computer Aid, Inc. – 2009-present

**CIO** – PPL Global - 1999-2009

**President** – Management Envision – 2012-present - research and consulting

Lived in Argentina and Chile for four years

Project management experience:
Multinational projects in Latin America, Europe, Middle East, Asia, Africa

- 4-year project in US and UK (WMS, OMS, GIS, CIS, MMS)
- 5-year project in 8 companies in 5 countries (ERP, CIS, GIS, WMS, SCADA)

Education: DePauw University - Mathematics, Computer Science, Symbolic Logic

Visiting lecturer: Lehigh University, Iacocca Institute, Global Village, Drexel University, DePauw University, DeSales University, Muhlenberg College – Information Engineering, International IT, Global Business, Project/Program/Portfolio/Process Management
Computer Aid, Inc.

Lehigh Valley, PA based privately-held corporation, founded in 1981
3,000+ employees: 6 continents, 15 countries
IT services: software solutions, application development, application maintenance, management consulting, system engineering, project/program/portfolio management, IT outsourcing, process engineering
1. To establish the need for monitoring the metrics that really matter.
2. To identify why this is such a challenge.
3. To identify the types of metrics that really matter.
4. Show how familiar framework can be adapted for metrics identification (and communication).
5. Give you enough to use back at your office to improve your metrics program.
Agenda

1. The Innovative Metrics Opportunity
2. Why Do These Opportunities Still Exist?
3. What Metrics Should We Monitor?
4. Working With Conditions Data
5. Developing Innovative Metrics for Your Organization
Part One

The Innovative Metrics Opportunity
The Innovative Metrics Opportunity

- Despite Everything We’ve Tried, Project Success Rates Little Changed in 30 Years
  - McKinsey (17% threaten)
  - IBM (40% met 10X range)
  - KPMG (70% orgs)
  - Standish CHAOS Report

“So many software projects fail in some major way that we have had to redefine success to keep everyone from becoming despondent...”
Source: Tom DeMarco in his book, Controlling Software Projects
The Innovative Metrics Opportunity

• There is **Plenty of Opportunity** for Improving *Challenged* Project Success Rates

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>29%</td>
<td>35%</td>
<td>32%</td>
<td>37%</td>
<td>39%</td>
</tr>
<tr>
<td>Failed</td>
<td>18%</td>
<td>19%</td>
<td>24%</td>
<td>21%</td>
<td>18%</td>
</tr>
<tr>
<td>Challenged</td>
<td>53%</td>
<td>46%</td>
<td>44%</td>
<td>42%</td>
<td>43%</td>
</tr>
</tbody>
</table>

• It’s About Competitive Capability

Organizations **with a mature PMO outperform** those with an immature PMO by:

- **28%** for on-time project delivery;
- **24%** for on-budget delivery; and
- **20%** for meeting original goals and business intent of projects.

Source: [www.metier.com](http://www.metier.com), According to PMI
The Innovative Metrics Opportunity

• It’s About Competitive Capability

Software-development performance varies significantly across development groups and companies.

Index: average performance = 100

**Productivity**
Complexity unit per person-week

- Bottom quartile
- Average
- Top quartile

**Development throughput**
Complexity unit per week

- Bottom quartile
- Average
- Top quartile

**Quality**
Residual design defects

Source: Numetrics-embedded software project (a McKinsey Solution), October 2013, including data on software-development projects at 1,300 companies across global markets
The NEW Software Reality

“We believe that every industrial company will become a software company.”


It’s Happening NOW

– Number of top 100 product and service companies - that are now dependent on software – has DOUBLED (to nearly 40%) in the past 20 years.

– Revenues from digitized products and channels are expected to exceed 40% in industries such as insurance, retailing and logistics.
Part Two

Why Do These “Opportunities” Still Exist?
Why Do These Opportunities Still Exist?

Self-deception
People (including PMs) are predisposed to see a perfect end state (e.g., successful project completion, and tend to practice self-deception (confirmation bias, fact filtering, etc.) to support this expectation.
It’s Who We Are

• Outside of IT for Neurophysiological Perspective
  – Anthropology Research
  – Psychology Research
In fact, all humans self-deceive:

- “self-deception is a kind of strategy which allows us to better deceive others by first deceiving ourselves…”
- “self-deception occurs as a social intelligence strategy”
- “there is a neuro-physiological basis for self-deception in humans.”

Paper by: James Sage, Ph.D, Vice Chancellor @ Univ. of Wisconsin
Research by: Robert Trivers, Ph.D, Evolutionary Biologist, Crafoord Prize recipient
Research by: V.S. Ramachandran, Ph.D, Neuroscientist, Center for Brian and Cognition
Quick Survey

• How many people consider themselves to be above average drivers?

“For driving skills, 93% of the U.S. sample and 69% of the Swedish sample put themselves in the top 50%”

“almost 80% of participants had evaluated themselves as being an above-average driver.”
We Just Proved It

• “A survey of university professors found that 94% thought they were better at their jobs than their average colleague”

• “A survey of 1 Million high school seniors found that all thought they were above average [in their] ability to get along with others”

- Thomas Gilovich, 1993, *How We Know What Isn’t So*
The “Problem State” Takeaways

1. Stop expecting PMs to ‘do the right thing’.
   Despite all the training and encouragement, PMs are still human and will tend to self-deceive (and then pass it on).

   Provide PMs with timely, objective, action-compelling information.

3. Make ignoring important information impossible.
   Provide PM management with information necessary to hold PMs accountable.
Part Three

What Metrics Should We Monitor?
What Metrics Should We Monitor?

- **Backward Looking**
  - Lagging Indicators
  - Tracking Progress

- **Forward Looking**
  - Leading Indicators
  - Managing Risk
Tracking Progress
Looking Backward

What **did** we do?

• Volume
• Quality
• Cost
Tracking Progress
Looking Backward – Enterprise Level

- Alignment of IT Investments to Business Strategy
- Cumulative Business Value of IT Investment
- IT Spend Ratio – New Versus Maintenance
- Critical Business Services
  - Customer Satisfaction
  - Service Level Performance
- Operational Health
  - Outages
  - Security Incidents
  - Project Success Rate
  - Average Defect Rate

Source: Craig Symons, Forrester Research, 4-4-08
## Tracking Progress
Looking Backward – Project Level

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope Change Requests</td>
<td># of scope changes requested by the client or sponsor</td>
</tr>
<tr>
<td>Scope Change Approvals</td>
<td># of scope changes that were approved</td>
</tr>
<tr>
<td>Overdue tasks</td>
<td># of tasks that were started but not finished on time</td>
</tr>
<tr>
<td>Tasks</td>
<td># of task that should have started but have been delayed</td>
</tr>
<tr>
<td>Over budgeted tasks</td>
<td># of tasks that have cost more to complete than expected</td>
</tr>
<tr>
<td>Earned Value</td>
<td>Budgeted Cost of Work Performed (BCWP)</td>
</tr>
<tr>
<td>Over allocated Resources</td>
<td># of resources assigned to more than one task.</td>
</tr>
<tr>
<td>Turnover</td>
<td># of project team members who quit or terminated.</td>
</tr>
<tr>
<td>Training Hours</td>
<td># of training hours per project team member.</td>
</tr>
</tbody>
</table>

http://www.slideshare.net/anandsubramaniam/project-metrics-measures
Managing Risk
Looking Forward – Experts Agree on EWS

What should we do?

The Four Horsemen of IT Project Doom
Material Financial Risks of IT Projects: The Early Warning Signs of Failure
Leon A. Kappelman, Ph.D.

Risk factors in enterprise-wide/ERP projects
MARY SUMNER
School of Business, Southern Illinois University, Campus Box 1106, Edwardsville, IL 62026, USA
Managing Risk
Looking Forward – Kappelman Research

- Kappelman Research
  - Derived List of
    - Six People Factors
    - Six Process Factors
  - For In-process Audits
## Managing Risk

### Looking Forward – Dominant Dozen

<table>
<thead>
<tr>
<th>The Deadly Dozen EWSs</th>
<th>The Four Horseman of IT Project Doom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People-Related Risks</strong></td>
<td>Stakeholders</td>
</tr>
<tr>
<td>1. Lack of top management support.</td>
<td></td>
</tr>
<tr>
<td>2. Weak project manager.</td>
<td>X</td>
</tr>
<tr>
<td>3. No stakeholder involvement.</td>
<td>X</td>
</tr>
<tr>
<td>4. Weak commitment of project team.</td>
<td></td>
</tr>
<tr>
<td>5. Team members lack requisite knowledge and/or skills.</td>
<td></td>
</tr>
<tr>
<td>6. Subject matter experts overscheduled.</td>
<td>X</td>
</tr>
<tr>
<td><strong>Process-Related Risks</strong></td>
<td></td>
</tr>
<tr>
<td>7. Lack of documented requirements and/or success criteria.</td>
<td></td>
</tr>
<tr>
<td>8. No change control process or change management.</td>
<td></td>
</tr>
<tr>
<td>9. Ineffective schedule planning and/or management.</td>
<td></td>
</tr>
<tr>
<td>10. Communication breakdown among stakeholders.</td>
<td></td>
</tr>
<tr>
<td>11. Resources assigned to higher priority project.</td>
<td>X</td>
</tr>
<tr>
<td>12. No business case for the project.</td>
<td>X</td>
</tr>
</tbody>
</table>

*CAI Computer Aid, Inc.*
Managing Risk
PMI Knowledge Areas

• PM Competency Conditions
  – 10 Knowledge Areas
  – Things You Should Know
  – Things You Should Do
So, then…What Metrics Should We Monitor?

• In addition to traditional
  – Key Performance Status

• What To Collect
  – Key Performance Conditions
    • Intra-process Conditions
    • Inter-process Conditions
  – Key Process/Practice Compliance
What Metrics Should We Monitor?

• How Collect the Metrics that Matter
  – Intuition
  – MBWA
  – Survey Software
  – Purpose Designed Software
Part Four

Working with Conditions Data
(The Tale of the Four Missing Metrics)
Managing Risk
You Need “ESP” to Know “PRP”

Three Important CONDITIONS to Monitor

• Expectations Management
• Sponsor Involvement
• Process Compliance

To Minimize One Project Risk Factor

• Project Rework Probability

According to the Carnegie Mellon Software Engineering Institute, “Data indicate that 60-80% of the cost of software development is in rework.”

The Four Missing Metrics

• SMART – Are expectations clear?
• SMPL – Is sponsor engaged?
• PAL – Are processes being followed?
• PRPL – Are causes of Rework being avoided?
The SMART Level

SMART Level

Tracks the clarity of assignments. The higher the SMART Level, the higher the level of understanding of what is expected. Therefore, less Rework and less management intervention required.
The SMPL Line

SMPL Line

Tracks the participation level of the senior management and/or sponsor.
PAL

Measures likely level of process adherence based on conditions that would tend to lead to ‘short cuts’ on process.
The PRPL Line

PRPL Line

Tracks the ‘probability’ of Rework based on changes in the conditions that are known to cause Rework.
Part Five

Developing Innovative Metrics for Your Organization
How Did You Get Here?

In one of these?
A Gauge for Every Condition

Automotive Engineers Long Ago Defined the Critical Measures for Safe, Effective Engine Operation.

Fuel Gauges
Fuel pressure, fuel level or combustion—if it has to do with monitoring the go-juice, you'll find it here.

Air/Fuel Ratio Gauges: By measuring and analyzing the fuel to air ratio, the vehicle’s engine can be tuned to run efficiently and smoothly.

Wide Band AFR Gauge: A Wide Band AFR Gauge is helpful when accurate readings are needed for high-performance vehicles. Narrow Band air/fuel gauges are aimed at the ideal ratio of 14.7:1.

Fuel Level Gauges: One of the easiest gauges to read, Fuel Level Gauges are indispensable to monitoring the fuel level in your vehicle. For many years, these gauges have been a staple of any vehicle.

Electrical Gauges: Nothing knocks your ride out of commission like a dead battery or a weak alternator.

Voltmeter: Meet the ammeter’s in-law: the voltmeter. It measures the voltage output of your battery and can help you determine if your alternator is functioning properly.

Timers:

Tachometers: Tachometers are essential for ensuring your engine is running at the optimal speed for efficient operation.

When the pressure's on to take the time to check these gauges.

Pressure Gauges:

Oil Pressure Gauges: From a single source, your engine's lifeblood—oil—flows through the engine. An Oil Pressure Gauge is a great way to monitor overall engine health.

Transmission Temperature Gauges: Excessive automatic transmission temperatures can signal some expensive repairs are coming your way. A Transmission Temperature Gauge keeps tabs on the temps, especially when you're towing or racing, and lets you know to let off the gas before meltdown.

Water Temperature Gauges: If you've ever been that guy on the side of the road, hood open with steam spewing out like an old locomotive, you've experienced overheating. Since hot coolant is the first indication that something's wrong, a Water Temperature Gauge is your first line of defense against an overheating engine.

Pressure Gauges: A loss of pressure from your water pump means there's probably a leak in your cooling system—which spells disaster for your engine. A Water Pressure Gauge delivers an early indication that pressures are fluctuating.

CAI
Computer Aid, Inc.®
The Basic Automobile Dashboard

- Automotive Gauge
  - Odometer
  - Clock
  - Fuel Level
  - Speedometer
  - Tachometer
  - Oil Pressure
  - Oil Temperature
  - Water Pressure
  - Water Temperature
  - Voltmeter
# The Basic Measures

<table>
<thead>
<tr>
<th><strong>Automotive Gauge</strong></th>
<th><strong>Asks the Question</strong></th>
<th><strong>To Measure</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Odometer</td>
<td>How far?</td>
<td>Deliverables Delivered</td>
</tr>
<tr>
<td>Clock</td>
<td>How long?</td>
<td>Duration</td>
</tr>
<tr>
<td>Fuel Level</td>
<td>How much further?</td>
<td>Input Units Available</td>
</tr>
<tr>
<td>Speedometer</td>
<td>How fast?</td>
<td>Deliverables per Unit of Time</td>
</tr>
<tr>
<td>Tachometer</td>
<td>How intensely?</td>
<td>Effort Intensity</td>
</tr>
<tr>
<td>Oil Pressure</td>
<td>Do we have enough lubrication to smooth interactions?</td>
<td>Supply of Lubricant to Smooth Interaction Between Components</td>
</tr>
<tr>
<td>Oil Temperature</td>
<td>How smooth are interactions?</td>
<td>Ability of Lubricant to smooth Interaction Between Components</td>
</tr>
<tr>
<td>Water Pressure</td>
<td>Do we have enough coolant to keep the engine producing?</td>
<td>Supply of Coolant to dissipate excess engine heat</td>
</tr>
<tr>
<td>Water Temperature</td>
<td>How effective is the coolant in keeping the engine cool?</td>
<td>Ability of Coolant to dissipate engine heat</td>
</tr>
<tr>
<td>Voltmeter</td>
<td>Is enough energy being applied to the other important systems?</td>
<td>Ability to Support other Control and Comfort Systems</td>
</tr>
</tbody>
</table>
## Comparative Metrics

<table>
<thead>
<tr>
<th>To Measure</th>
<th>Automotive Metric</th>
<th>IT Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliverables Delivered</td>
<td>Miles</td>
<td>Service Level Achieved, Function Point Delivered</td>
</tr>
<tr>
<td>Duration</td>
<td>Hour</td>
<td>Hour</td>
</tr>
<tr>
<td>Input Units Available</td>
<td>Gallons</td>
<td>Resource Hour</td>
</tr>
<tr>
<td>Deliverables per Unit of Time</td>
<td>Miles Per Hour</td>
<td>Earned Value Per Clock Hour</td>
</tr>
<tr>
<td>Effort Intensity</td>
<td>RPM</td>
<td>Hours Worked Per Week/Available Hours</td>
</tr>
<tr>
<td>Supply of Lubricant to Smooth Interaction Between Components</td>
<td>PSI</td>
<td>Stakeholder Interaction Satisfaction</td>
</tr>
<tr>
<td>Ability of Lubricant to Smooth Interaction Between Components</td>
<td>Degrees</td>
<td>Number of Open Issues from Stakeholder Interactions</td>
</tr>
<tr>
<td>Supply of Coolant to dissipate excess engine heat</td>
<td>PSI</td>
<td>Duration to Close Issues/Number of Issues</td>
</tr>
<tr>
<td>Ability of Coolant to dissipate engine heat</td>
<td>Degrees</td>
<td>Number of Escalated Issues</td>
</tr>
<tr>
<td>Ability to Support other Control and Comfort Systems</td>
<td>Volts</td>
<td>On Time Process Deliverables (Status, Reporting, Training)</td>
</tr>
</tbody>
</table>
The More Complex the Environment...
Did We Accomplish Our Objectives?

- To establish the need for monitoring the metrics that really matter.
- To identify why this is such a challenge.
- To identify the types of metrics that really matter.
- Show how familiar framework can be adapted for metrics identification (and communication).
- Give you enough to use back at your office to improve your metrics program.