Choosing the Right Measures - Prerequisite for Changing the Game

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How do you replace the hull and streamline the structure while the ship is steaming at full speed in rough waters?
Value engineering involves understanding business value and making informed IT decisions that maximize value.

- Enterprise architecture puts adaptive frameworks in place that enable rapid response at the speed of today’s business.

- Performance engineering means measuring position, speed, and rate of change and being ready and able to act on those measures.
Value, Architecture, and Performance

- Performance Engineering
- Measures
- Value Recognition
- Enterprise Architecture
- Business Drivers
“Would you tell me, please, which way I ought to go from here?”

“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where--” said Alice.

“Then it doesn’t matter which way you go,” said the Cat.

“--so long as I get somewhere,” Alice added as an explanation.

“Oh, you’re sure to do that,” said the Cat, “if you only walk long enough.”
Provide a “moving snapshot” of key performance indicators

- Current status
- Position relative to targets
- Movement toward targets

Provide “alerts” to identify critical action areas

- Focus on leading, not lagging indicators
- Identification of expected bands of acceptable performance

Communicate quantitative aspects of organizational goals in terms of targets and performance improvement
Why Measure?

- **Comparison**
- **Location**
- **Direction**
- **Progress**
- **Velocity**
- **Rates of Change**
• The product of IT is NOT source code. It is improved business performance.

• Understanding and coordinating IT goals and measures with Business goals and measures is essential.

• IT processes are being managed as business processes that require cost / benefit analysis.
Measures Must Be Clearly Mapped

- Structural Complexity
- Training Profiles
- Staffing Profiles
- Technology Acceptance

- Organization, Culture, Skills

- Architectural Characteristics
  - Level of Integration
  - Level of Standardization
  - Degree of Flexibility
- Quality Support
- Reliability

- Architecture & Support

- Team Profiles
  - Hierarchy Measures
  - Stability
- Experience and Training
- Productivity vs. Quality

- Business Effectiveness
  - Business Value
  - Customer Satisfaction

- Motivation

- IT Investment
  - ROI
  - Budget Control
  - Risk
  - Performance Profiles
  - Portfolio Investment

- Change Profile
  - Technical Condition
  - Complexity
  - Performance
  - Reusability

- Size
- Quality

- Change (Modification)
  - Average Time to Implement
  - Frequency of Releases
  - Cost per Modification
  - Rework Profiles

- IT Processes and Projects

- Cost
- IT Resources
- Staff/Project Schedule
- Process Quality
  - Reliability — MTTF
- Customer Responsiveness
- Time to Market
- Review Profiles
Meaningful Levels of Measurement

**Decision View**
- ROI
- Business Impact
- Price-performance
- Risk/Opportunity...

**Management View**
- Costs/Budget
- Schedule/Effort/Delay
- Standards
- Resource Availability...

**Operational View**
- Process/Activities
- Products/Specs
- Policy/Procedures
- Constraints/Guides...

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Measurement for Management Levels

Business Strategy

- Value
- Impact
- ROI
- Margins
- Risk/Opportunity

- Staffing
- Schedule
- Costs
- Effort
- Progress

- Throughput
- Change Rates
- Cycle Times
- Queues
- Productivity

- Size
- Complexity
- Volatility
- Reliability
- Quality

Project Management
Process Management
Product Management

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## Metrics Warehouse: From Measures to Strategy

<table>
<thead>
<tr>
<th>Size</th>
<th>Effort</th>
<th>Schedule</th>
<th>Quality Level 1</th>
<th>Quality Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team size, # application users</td>
<td>Total hrs budgeted, Total $ budgeted</td>
<td># steps</td>
<td>KSLOC, (FP), Pages document</td>
<td></td>
</tr>
<tr>
<td>Labor rate</td>
<td>% effort completed, Cost variance (planned vs. actual)</td>
<td>cost by CAPP, effort by CAPP, Defect cost</td>
<td>$/KSLOC, $/page, $/application</td>
<td></td>
</tr>
<tr>
<td>Actual hours</td>
<td>% Time completed, Schedule variance (planned vs. actual)</td>
<td>steps completed, Reviews completed/ Total # reviews, Tests completed/ Total # tests, etc.</td>
<td>products completed, Programs coded/ Total # programs, Reqmts traced/ Total # reqmts, etc.</td>
<td></td>
</tr>
<tr>
<td>Available hours</td>
<td></td>
<td># defects per process downtime, MTTF</td>
<td># defects per product, complexity</td>
<td></td>
</tr>
<tr>
<td>Defect correction rate, MTTR</td>
<td># of requirement changes</td>
<td># defects per process downtime, MTTF</td>
<td># defects per product, complexity</td>
<td></td>
</tr>
<tr>
<td>Closed requests/ per report period (productivity)</td>
<td>Defects delivered (effectiveness)</td>
<td>Defects discovered by phase, Age of open defects</td>
<td>Customer satisfaction</td>
<td></td>
</tr>
</tbody>
</table>
Measures Change

**PROCESS LEVEL**
- Defect Causal Analysis
- Technology Insertion Analysis
- Productivity

**PRODUCT LEVEL**
- Quality Metrics
- Reliability
- Design
- Volatility

**APPLICATION LEVEL**
- Complexity
- Performance
- Cost

**QUALITATIVE LEVEL**
- Size
- Effort
- Defects (categorization)
- Cycle Time (schedule)

**REPEATABLE LEVEL**
- Software Configuration Management
- Software Quality Assurance
- SW Project Tracking and Oversight
- Software Project Planning
- Requirements Management

**DEFINED LEVEL**
- Peer Reviews
- Software Product Engineering
- Integrated Software Management
- Training Programs
- Organization Process Definition
- Organization Process Focus

**MANAGED LEVEL**
- Software Quality Management
- Quant. Process Management

**OPTIMIZED LEVEL**
- Process Change Management
- Tech. Change Management

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Comparative Analysis

Current Baseline

Benchmarks

Prior Baselines

Project Histories, Other Baselines
Choosing the Right Measures

• Measures must be ACTIONABLE.
• Identifiable contribution to
  • Business decisions
  • IT decisions
• Measures must be practical to collect.
• Keep the number of metrics SMALL.
• Understand the roll-up of measures into measures at other management levels.
Cautions about Metrics

• Indicators, not absolutes
• Only as good as the supporting data
• Must be understood to be of value
  • Business understanding
  • IT understanding
• Not for judging individual performance
• Cannot identify, explain, or predict everything
• Need iterative analysis from multiple viewpoints
• Avoid direct comparison of projects
• No single metric
### Some Core Metrics – a starting point

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>UNIT OF MEASURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Counts of physical code</td>
</tr>
<tr>
<td>Reuse</td>
<td></td>
</tr>
<tr>
<td>Progress</td>
<td></td>
</tr>
<tr>
<td>Rework</td>
<td></td>
</tr>
<tr>
<td>Effort</td>
<td>Counts of staff hours expended</td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Rework</td>
<td></td>
</tr>
<tr>
<td>Resource allocations</td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>Calendar dates tied to milestones, reviews and audits, deliverable products</td>
</tr>
<tr>
<td>Quality</td>
<td>Counts of software problems and defects</td>
</tr>
<tr>
<td>Rework</td>
<td></td>
</tr>
<tr>
<td>Readiness for delivery</td>
<td></td>
</tr>
<tr>
<td>Improvement trends</td>
<td></td>
</tr>
</tbody>
</table>
Priorities within a project:

- Understand the data you are getting now
- Standardize the content of future measurement reports
- Define and collect the additional information you need for project planning and tracking

Priorities within an organization:

- Understand historical data you already have
- Get consistent data from project to project
- Get consistent data over time
What should we measure, and why?

- Secure executive sponsorship
- Identify critical stakeholders
- Conduct facilitated workshops:
  - Business area leaders
  - IT leaders
- Evaluate proposed measures
- Develop balanced scorecards
- Focus on the alignment and translation of IT and Business objectives
- Make it visible
- Own the responsibility
- Tailor the reward system
Communication

INCREASED PRODUCTIVITY
Balance
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