Enterprise Performance Measurement

July 20, 1999

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Objectives

• Define EPM for software-intensive organizations:
  – Vendors of software products
  – Internal IT departments
  – Developers of software-intensive systems

• Provide a method for defining enterprise information needs and providing measurement feedback to meet those needs

• Focus on the role of the enterprise manager and staff

• Incorporate established methods and techniques into a systematic approach
Agenda

- Perspectives on Enterprise Measurement
- EPM Concepts
- Benefits
- Tools and techniques
- Summary
What is Enterprise Performance Measurement?

EPM is a process for developing, aligning and using effective measures to view and manage a wide variety of near term and strategic challenges at all levels of the enterprise
What is an Enterprise?

Any corporate or business unit organized with a distinct mission, market segment, or suite of products and services

- A Company
- A Major Division within a Company

Enterprise managers have a focus on the long term health and profitability of the enterprise
Measuring the State of the Enterprise

Where are we going? Are we headed in the right direction?

What’s our cargo capacity relative to the East India Company? How fast did we go last time? Are we gaining or losing ground against them?

Where are we? How far have we come? How far do we have to go?

Where are we? How far have we come? How far do we have to go?

What must we do to satisfy our patron? Are we on track in terms of profits? Do we need more or bigger ships?

Sail capacity? Are sails being used effectively?

Are we prepared for storms?

Is crew excited about this adventure? Do we have enough food supplies? Are they competent?

Can we handle the shoals? What about threats from pirates?

SS Enterprise
Dashboard of Performance Measures (1980)

- Costs
- Debt
- Liabilities
- Profitability
- Capital Expenditures
- Sales
- Cash Flow
- Assets

Source: Bogan and English, Benchmarking for Best Practices
EPM Supports all Levels of an Enterprise

- Level 1: Corporate mission, vision, strategy
- Level 2: Business-unit missions, goals, and strategies
- Level 3: Functional-area goals and strategies
- Level 4: Program and control goals and strategies
Building The EPM Process

Enterprise

- Vision
- Strategy
- Objectives
- Risks
- Critical Success Factors

- Resolve issues
- Approve measures
- Revise objectives
- Direct Implementation

Business Units

- Define vision, based on perspective
- Develop objectives
- Define CSFs

- Align and approve definitions, baselines and indicators
- Resolve or report issues for resolution

Functional Levels

- Use PSM to develop new categories and measures
- Define Collection and reporting methods
- Establish Baselines

- Definitions of data and collection methods
- Defined baselines
- Recommended indicators
- Issues for resolution
Hierarchical Information Needs

Enterprise → Business Performance
Goals → Feedback

Business Units → Interpret and Align Business Performance Objectives

Process → Efficiency and Effectiveness of Production

Project → Accomplishment of Project Budget and Schedule

Product → Satisfaction of Customer Requirements
EPM Process Cycle

- Understanding the external context
- Establishing goals appropriate to the business strategy
- Understanding internal processes and identifying opportunities
- Making investment decisions in projects and initiatives
- Measuring performance relative to the strategy
EPM and Measurement are Evolutionary

1. Understand Context
   - Develop/Update Estimate of the Situation (EoS)
   - Define/Refine Approach
     - Stakeholders
     - Objectives
     - Alternatives
     - Constraints

2. Analyze Risks
   - Perform Risk Analysis
   - Review Risk Analysis

3. Plan EPM Development
   - Plan Risk Aversion
   - Execute Risk Aversion
   - Review Alternative
   - Plan and Schedule

4. Develop EPM System
   - Develop and Verify Product
   - Monitor and Review

5. Execute EPM System
   - Place Product Under Change Control
   - Review Progress
   - Update Spiral Plan

Commit to Proceed

Commit to Plan

Review Technical Product

Review Context

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Fundamental Contributions

At the enterprise level, measurement serves three fundamental purposes:

- Defines the focus of business objectives and strategies and aligns them across all levels of the organization.
- Establishes a common language for communicating targets, capabilities, payoffs, risks, status, outcomes, impacts.
- Provides proactive feedback for strategic-level monitoring, problem identification, decision making, action planning.
The Power of Alignment

A true enterprise perspective can be achieved only when measurement systems are aligned across all levels of the enterprise

- Entire organization focuses on a limited number of initiatives
- Everyone knows what is important and what is being measured
- Everyone understands the essential standard terms and data
- Everyone understands how their effort contributes to the corporate objectives
Alignment of Measurement Systems

Some Misconceptions:

1. Measurement systems can grow from the ground up
   - Very few bottom-up initiatives are successful
   - Lack resources, priorities, management requirements

2. Goal-Based Measurement programs can be implemented without a framework
   - Leads to independent measurement systems at each level/project
   - Lack risk assessments, documented assumptions, historical data, baseline data to measure growth

3. EPM often implemented as an executive management system
   - Danger of becoming an uncoordinated collection of data for senior management, disconnected from lower levels and supporting data
Defined Measures Provide a Common Language

Measures define the objectives
Drive agreement on issues
Promote understanding
  Cycle time, defect, error, etc.
Communicate status
Define and predict causes of concern
Support effective decisions

Feedback loops are a primary ingredient
Executive Leadership Required

(Chaos is not)

Business, rather than technology perspective

Both strategic and tactical PLUS...

- resource alignment
- follow through
- results sharing
- support
- data analysis
- priority
- commitment
What Should Result

Ability to better manage enterprise as a single complex, ever-changing system, rather than as disjointed parts

Ability to assimilate and communicate critical information for situation assessment and proactive decision making

- Information about important shifts in industry and the marketplace
- Information about the enterprise’s own “vital signs”

A well-founded business case for selecting, prioritizing, and staging investments in IT
Some Specific Techniques Involved

A sampling:

- Customer surveys
- Benchmarking
- Activity value chains
- Activity-based costing
- Risk management
- Cost of Quality
- Knowledge Management
- Balanced scorecards
- IT portfolio analysis
- Return on investment analysis
- Many more
Balanced Scorecard

Typically four kinds of measures to balance

- Customer demand & satisfaction
- Internal capability & performance
- Learning capability & performance
- Financial capability & performance

Outcomes vs. outputs

- Outcome measure: Assessment of the results of a function or program activity compared to its intended purpose. E.g., goods delivered on time, informatics capability attained.

- Output measure: Recording or calculation of an activity or effort. E.g., delivery miles logged, lines of code written.

Leading vs. lagging indicators

- Leading: What might be; performance drivers—inputs & outputs
- Lagging: What has transpired; outcomes & impacts
# Example Scorecard

<table>
<thead>
<tr>
<th>Category</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business</strong></td>
<td>Market Share</td>
</tr>
<tr>
<td></td>
<td>Profitability</td>
</tr>
<tr>
<td></td>
<td>Customer Satisfaction</td>
</tr>
<tr>
<td><strong>Corporate Value</strong></td>
<td>Return on Investment</td>
</tr>
<tr>
<td><strong>Process Performance</strong></td>
<td>Efficiency (Cost of Quality)</td>
</tr>
<tr>
<td></td>
<td>Time to Market (Cycle Time)</td>
</tr>
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<td></td>
<td>Quality (Defect Rate)</td>
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<tr>
<td></td>
<td>Price (Productivity)</td>
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<tr>
<td></td>
<td>New Features</td>
</tr>
<tr>
<td><strong>Organizational Health</strong></td>
<td>Turnover</td>
</tr>
<tr>
<td><strong>Project Oversight</strong></td>
<td>Composite Status</td>
</tr>
<tr>
<td></td>
<td>Risk Exposure</td>
</tr>
</tbody>
</table>
Customer Surveys

Understand customer demand and satisfaction by studying experiences with, perceptions about, and expectations for your products and services.

Understand which factors contribute most to current and potential satisfaction.
Activity-Based Costing

Reduce costs by...

- Assigning identifiable costs (and sometimes allocating common costs) to specific tasks, which roll up to specific processes and outputs
- Identifying opportunities for improved effectiveness and efficiency

Enables determination of the profit contribution that each activity and product bring to the company, irrespective of organizational structure
## Comparison of Alternative Budgeting Approaches

<table>
<thead>
<tr>
<th>Traditional Cost Basis</th>
<th>Budget ($K)</th>
<th>Activity Cost Area</th>
<th>Budget ($K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Labor</td>
<td>1,000</td>
<td>Marketing</td>
<td>200</td>
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<tr>
<td>Indirect Labor</td>
<td>500</td>
<td>Staffing</td>
<td>300</td>
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<tr>
<td>Other Direct Costs</td>
<td>500</td>
<td>Project Management</td>
<td>200</td>
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<td></td>
<td>Quality Assurance</td>
<td>100</td>
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<tr>
<td></td>
<td></td>
<td>Software Production</td>
<td>450</td>
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<tr>
<td></td>
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<td>Inspections &amp; Reviews</td>
<td>100</td>
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<tr>
<td></td>
<td></td>
<td>Rework</td>
<td>200</td>
</tr>
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<td>Testing</td>
<td>100</td>
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<td>Delivery</td>
<td>50</td>
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<td>Configuration Management</td>
<td>100</td>
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<tr>
<td></td>
<td></td>
<td>Financial Reporting</td>
<td>200</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2,000</strong></td>
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<td><strong>2,000</strong></td>
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</tbody>
</table>
# Worksheet Calculations for an Activity-Based Estimating Model

<table>
<thead>
<tr>
<th>Activity</th>
<th>New Code (Size = 450)</th>
<th>Reused Code (Size = 710)</th>
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</thead>
<tbody>
<tr>
<td>Preliminary Design</td>
<td>0.59</td>
<td>1.20</td>
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<tr>
<td>Detailed Design</td>
<td>0.89</td>
<td>1.20</td>
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<tr>
<td>Code and Unit Test</td>
<td>2.21</td>
<td>1.10</td>
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<tr>
<td>Integration Test</td>
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<td>1.00</td>
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<tr>
<td>Correct and Retest Integration</td>
<td>0.41</td>
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<td>System Test</td>
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<td><strong>Total</strong></td>
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**Note:**

Once the estimating factors are derived, they are applied to the Effort and Cost elements to derive the estimates in terms of staff months and dollars.
Risk Management

Identify and assess risks

- Group the risks, analyze timings and develop trigger points
- Calculate probability, consequence, risk exposure

Plan mitigation strategies; track the results

Risk Management Table

<table>
<thead>
<tr>
<th>Risk ID #</th>
<th>Risk Name</th>
<th>Description</th>
<th>Risk Grouping</th>
<th>Risk Timing</th>
<th>Risk Trigger</th>
<th>Original P</th>
<th>Original C</th>
<th>Original E</th>
<th>Mitigation Options</th>
<th>Mitigation Results P</th>
<th>Mitigation Results C</th>
<th>Mitigation Results E</th>
<th>Current P</th>
<th>Current C</th>
<th>Current E</th>
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</table>
Business Value-driven IT Investments

- Strategic linkage
  - Hierarchy of goals & strategies throughout organization

- Core competency development
  - Knowledge management techniques for managing intellectual capital

- Alternatives identification & selection
  - IT portfolio analysis

- Alternatives selection & justification
  - Return on investment (ROI) analysis
Summary

• EPM is a process for developing effective measures to view and manage the enterprise

• Starts with corporate strategy, objectives, critical success factors

• Holistic objectives, associated measures and feedback loops are aligned throughout the organization

• Balanced Scorecard hands off to PSM to develop detailed measures based on critical success factors

• Key Elements:
  – Consistency of focus on business issues
  – Common definition of measures
  – Development of baseline project data
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