

A Framework for Project Metrics

Deciding what to measure and
how to measure it

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WELCOME!

Focus of this workshop:

Project Metrics

With special attention to:

An effective way to select the



metrics you need



AGENDA

- Why we use project metrics
- Where project metrics come from
- How we usually choose them
- A different approach to metrics selection
- What we can hope to gain

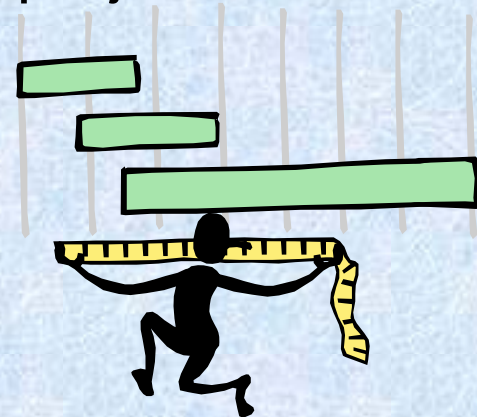
YOU WALK AWAY WITH:

- **An approach:** “Ask the question first, then select the measure”
- **A structure:** for management of metrics selection and usage



Project Metrics - Introduction

- What are **project metrics**?
 - Objectively measurable attributes of interesting project features
 - We use measurements of metrics to provide information about the health of a project
 - A source of important data for project control
 - A means by which we measure the project's final deliverable



Project Metrics - Introduction

- We generally understand that metrics require a:
 - Purpose
 - Baseline of reference
 - Means of measurement
 - Method for analysis
 - Reporting mechanism



Project Metrics

- What are the circumstances where project metrics become important?
 - Have you ever wrestled with how to measure progress in your project?
 - Or
 - Have you ever been asked to develop metrics for a project?

Reasons for using project metrics

- Evaluate project progress / project health
- Contribute to project control
- Risk mitigation
- Resolve a crisis
- Manage team performance
- Understand level of customer satisfaction
- Mandated by organization (e.g. PMO)
 - Feedback to Project Portfolio



Project Metrics - Introduction

- Whenever we consider project metrics we are faced with some very basic questions:
 - What should we measure?
 - What is the best way to measure it?
 - When should measurements be taken?
 - How do we use them?
 - How do we communicate them?



Project Metrics - Exercise

- Project metrics in use today
 - Name some project metrics that you have used
 - How did you choose those particular metrics?

Reasons for using project metrics

- This is important!
 - The metrics we use depend entirely on what we are trying to do
 - There are many more reasons for using project metrics that are generally appreciated



IMPORTANT

Project Metrics – Effective Use

- Before we can effectively use project metrics we must:



- Understand our objectives
- Be able to clearly articulate what we need to know
- Know what we want to measure in order to get the answer
- Have the ability to get the data
- Be clear on how we will use the data



Project Metrics – Effective Use



- The objective we have in mind will determine which set of metrics we will choose from
 - The metrics required to resolve a crisis will probably be very different from those needed to measure project progress

Choosing the Right Metrics

- With our objectives clear, we must then clearly state the question we need to have answered
 - Only with these questions in mind will we choose the right metrics.
 - Selecting a metric because it is commonly used may or may not provide us with the data we need
 - If we ask the question first, then we are much more likely to select the metric(s) that we need



Confusion about metrics

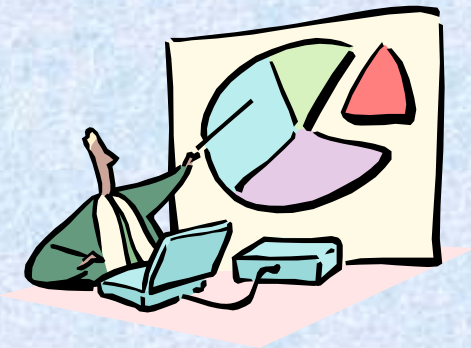
- From a company that specializes in Information Dashboards, we have these recommended project metrics (for a PMO):
 - Percent of projects completed on time
 - Percent of projects completed on budget
 - Earned value variance
 - Did the project meet customer expectations?
 - Roles of project team and stakeholders were well understood
 - Change process was well identified and managed appropriately

Choosing the Right Metrics

- Once we have selected our metrics, we must be able to actually collect the data.
 - This will be possible if we have the appropriate reporting structures, tools, etc. in place
- Examples:
 - If we decide that we need to carefully monitor resource utilization, we need to have an effective time reporting system
 - If we want to use EV, we need a way to measure work completed

Choosing the Right Metrics

- Finally, once we start measuring the data it is necessary to have a means of interpreting it, as well as a mechanism that will use it. Example:
 - We might choose to measure schedule variance of tasks on the critical path.
 - How much variance matters?
 - Who will decide what actions to take if thresholds are exceeded?
 - Who is tracking what the critical path is (it can change over time)?



Choosing the Right Metrics

- In thinking about project metrics, it would be helpful if we had a structure with which to categorize them (e.g. Cost, Time)



- A given project objective will likely only be concerned with specific metrics categories. This would help streamline the selection process
- The categories themselves could serve to help define objectives.

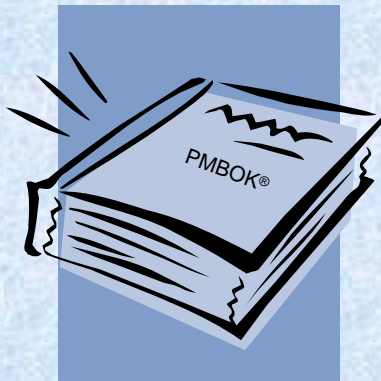
Project Metrics - Categories

- The majority of high-value metrics are derived from key questions that focus on specific aspects of the project.
- We can articulate these questions by focusing on:
 - Project Phase
 - Project Risk
 - Project Success Criteria
 - PMBOK® Knowledge Areas



Project Metrics - Categories

- Today we will focus on questions derived from consideration of the PMBOK® Knowledge Areas
 - The PMBOK® provides a very convenient structure with which to build categories of metrics.
 - Some key project questions and their Knowledge Area counterparts are shown in the following slides.



Project Metrics - Categories

Cost	Will the project meet the budget?
Time	Will the project meet the schedule?
Scope	Will the project deliver planned scope? Are scope changes in line with expectations?
Quality	Is the customer happy (i.e. are quality targets being met)?
Risk	Are we effectively anticipating and managing risk events relevant to this project?

Project Metrics - Categories

Communications	Are stakeholders getting the information they need? Are project results being reported accurately?
Procurement	Are we on track in the planned acquisition and management of goods and services?
HR - Issues & Actions	Are there significant, unresolved issues and action items? Have they seriously affected the project?
HR - Resources	Are we using the planned number of labor hours and other resources?

Project Metrics - Categories

- Each of the Knowledge Areas listed above is associated with many more potentially useful questions than are shown. The next slide shows some questions related to Time Management.

Project Metrics - Categories



- *Time Management*
 - Are project milestones being completed on schedule?
 - If not:
 - What Activities are affected?
 - What is the impact on the overall schedule?
 - Are we doing better or worse than last quarter?

Project Metrics - Categories

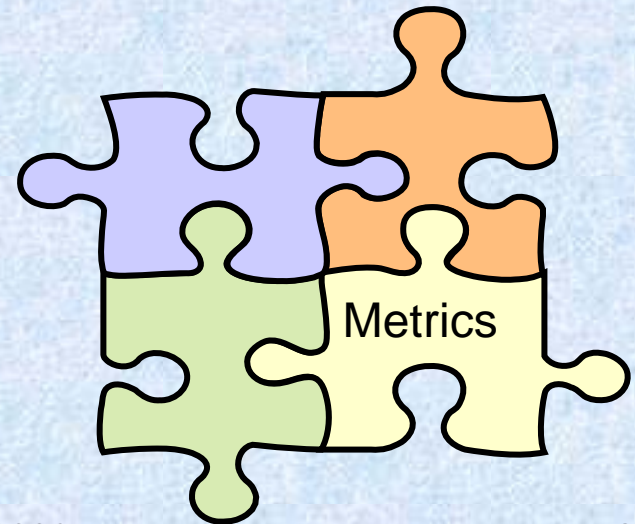
- Each of these questions can be answered by measurement of the appropriate metric. For example:
 - List of milestones with days early / late
 - List of impacted activities
 - Schedule Performance Index (SPI)
 - SPI trend over time

Project Metrics - Categories

- These metrics can give us insight into the health of the project and warning about factors that need attention
- One could argue that if we have a good list of metrics categorized by Knowledge Area and associated with key questions, our job of selecting metrics for our projects would be much easier
- The remainder of this talk will look at such a structure.

Project Metrics - Categories

- Note #1: Metrics are important and useful, but they are only one part of the puzzle.
 - Knowing that a project is off track does not tell you if there is any hope of bringing it back.
 - Full communication with the project team and delivery of full and accurate information by the team is essential to obtain a full picture of a project's health



Project Metrics - Categories

- Note #2: By stating clearly how the project will be measured, we also give the project team guidance on where they should put their efforts. So for example:
 - If we ask “have we been effective at finding cost-saving opportunities during contract negotiations”, the project team is more likely to make this a focus of their contract work. Cost reductions may result.
 - Making public the questions that underlie our metrics can have positive impact on the project.



Framework for Project Metrics

Cost Metrics - Exercise



- What are the most important metrics related to Project Cost?
 - What are the most important questions related to Project Cost?
-
- It is much easier to use metrics if we focus on the underlying questions
 - The questions of greatest importance may change over time

Cost Variance from Plan

Did the project meet its cost targets in the most recent reporting period?	% under or over budget for the past reporting period
Is the project as a whole meeting its cost targets to date?	% under or over budget for the project to current date
Will the remainder of the project cost what we planned? (Is the method used to determine this reasonable?)	% by which Estimate To Complete varies from plan (and formula used to calculate it) Note: (ETC = cost to complete remainder of project)
When the project is done, will it cost what we planned? (Is the method used to determine this reasonable?)	% by which Estimate At Completion varies from plan (and formula used to calculate it) Note: (EAC = total cost when project is done)

Earned Value Measures

How much had we planned to spend on the work products that we have actually produced to date?

Earned Value (EV = budgeted cost of work completed)

Have the work products that we have produced to date actually cost what we expected?

Cost Performance Index (CPI) plotted over time (CPI = EV/Actual Cost) [values < 1 indicate higher than anticipated cost]

Time Metrics - Exercise



- What are the most important questions to ask about Project Schedule?
- What Schedule Metrics might you use to answer these questions?
- We will look at Milestones and Schedule

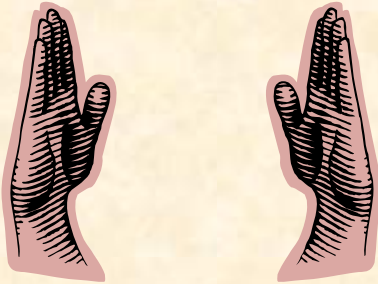
Milestones

Are project milestones being completed on schedule?	Days late
If not, what activities are affected?	List of subsequent activities impacted
And what is the impact on the overall schedule?	Impact on overall project schedule (days extended)

Schedule

Is the project currently on schedule?	SPI (SPI = EV/Planned Value) [values < 1 indicate delays in the project]
Is the project schedule holding, getting better or slipping?	SPI plotted over time (SPI trend)

Scope Metrics - Exercise



- What are the most important questions to ask about Project Scope?
- What Scope Metrics might you use to answer these questions?
- We will look at Change Orders and Change Order Impact

Change Orders

Is project scope being effectively managed?	<ul style="list-style-type: none">- Number of project scope changes not captured in a Change Request (e.g. de-scoping) [may require an audit]- Number of baseline changes (legitimate changes to scope, schedule, cost or quality approved by the project Sponsor)
Is product scope being effectively managed?	Number of primary requirements added or removed from Scope since the end of Planning Phase
Is this project following its plan?	Number / severity of scope forecast changes (acknowledged deviations from plan that do not change the baseline)

Change Order Impact

Have Change Orders caused a significant change in the projected Project Cost?	Percent change in Estimate at Completion (EAC) directly caused by Change Orders. (Compare current EAC to EAC baseline set at end of Planning Phase)
Have Change Orders caused a significant change in projected Project Duration baseline?	Percent change in project duration directly caused by Change Orders. (Compare adjusted baseline to Duration baseline set at end of Planning Phase)
Have Scope Changes materially affected the project's estimated ROI? Is the project still worth doing?	Percent change in ROI from that used to originally approve the Project Charter (Note: use revised EAC to calculate new ROI)

Quality Metrics - Exercise



- What are the most important questions to ask about Project Quality?
- What Quality Metrics might you use to answer these questions?
- We will look at Defect Reports and Rework

Defect Reports

Is the production team meeting agreed upon quality standards?	Total number of milestones missed due to quality issues to date
Are we effectively fixing serious defects?	<ul style="list-style-type: none">- Percent of serious defect fixes rejected by QA- Percent of fixes to serious defects that result in regression
Are we finding the number of serious defects we expected at this point in the project?	Number of serious defects reported in the last reporting period versus projection
Are we fixing Stop-Ship defects fast enough to meet the planned ship date?	Forecast date versus Plan date on which number of Stop-Ship defects = 0

Rework

Is the project team meeting agreed-upon quality standards?

Number of deliverables rejected by customer for quality reasons in last reporting period and overall

If not, what impact is rework having on cost and schedule?

Hours and dollars spent doing rework in last reporting period and overall

Risk Metrics - Exercise



- What are the most important questions to ask about Project Risk?
- What Risk Metrics might you use to answer these questions?

Risk

Has adequate risk planning been done for this project? Is this project's risk profile adequately understood?

- Number of new serious risks that have been identified since the end of Planning Phase but which could have been identified earlier
- Number of serious issues (i.e. caused change in cost or schedule baseline) not anticipated in the Risk Register

Is the Risk Register adequate for the project?

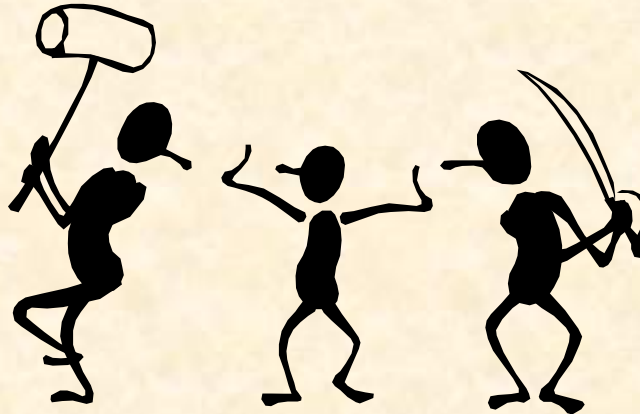
- Number of risk events that occurred without warning
- Number of risk events for which the Risk Response Plan was inadequate

Is the project team dealing effectively with any inadequacies in the Risk Register?

Cost / Time impact of planned-for Risk Events over time

Issues Metrics - Exercise

- What are the most important questions to ask about Project Issues?
- What Issues Metrics might you use to answer these questions?



Issues

Is this project encountering more urgent issues that would be expected for its size and complexity?	Total number to date versus projected / historic number
Are Action Items being closed in a timely manner?	% of Action Items open for < 30 days listed by urgency [100 is a good number]
Are there significant Action Items that the project team cannot bring to a close?	% of Action Items open for > 30 days listed by urgency [0 is a good number]
Has adequate planning been done for this project?	Number of issues that cause a change in project baseline or forecast

Opportunity Metrics - Exercise



- What are the most important questions to ask about Project Opportunities?
- What Opportunity Metrics might you use to answer these questions?

Opportunity Metrics

<p>Have we taken advantage of cost-saving opportunities during contract negotiations?</p>	<p>Instances of cost reduction (e.g. purchase price of goods was less than expected; project has incorporated a novel approach offered by the vendor)</p>
<p>Has the project team seized opportunities to use labor-saving techniques?</p>	<p>Instances of labor savings (e.g. different approach allowed the same endpoint to be reached with fewer than planned hours)</p>
<p>Does this project benefit from good teamwork?</p>	<p>Instances of good stakeholder relationships (e.g. stakeholders praise their good working relationship with the project team)</p>
<p>Does this project have effective communication channels?</p>	<p>Instances of good communication (e.g. stakeholder identifies a new urgent issue & the project team immediately resolves it)</p>
<p>Has the project team been empowered to appropriately manage risk?</p>	<p>Instances of positive risk (e.g. project team takes advantage of an advance in technology to cut cost)</p>

Project Metrics

- Summary

- First ask the question, then determine the metric
- Review the PMBOK® Knowledge Areas
- Build a Questions to Metrics library for your organization
- Only use metrics that you really need
- Questions may change over time (project phase)
- Use metrics to manage risk (e.g. trigger events)
- Engage metrics that will directly measure your progress toward specific project success criteria

Beyond Project Metrics



Looking beyond the project

- Business Goals
 - Project metrics do not tell the whole story
- The successful Projects Portfolio
 - A Portfolio has its own Goals
- PM Maturity
 - OPM3[®] is a goldmine of maturity metrics

Project Metrics

- Q&A



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Links of Interest

- Measuring and Managing Success – Karen White
 - http://www.pmsolutions.com/articles/pdfs/it_pm/measure.pdf
- Project Success and Failures – Max Wideman
 - <http://www.maxwideman.com/guests/metrics/failures.htm>
- Project Metrics – Max Wideman
 - <http://www.maxwideman.com/issacons/iac1008/sld001.htm>
- Balanced Scorecard Approach To Metrics
 - <http://www.isixsigma.com/library/content/c011008a.asp>

Links of Interest

- Measuring Project Health - Neville Turbit
 - http://www.projectperfect.com.au/info_project_health.php
- How project metrics can keep you from flying blind – Project Auditors
 - <http://www.projectauditors.com/Papers/Whitepapers/ProjectMetrics.pdf>
- Navigating with project metrics: Are we there yet? - Gary Pollice
 - <http://www.ibm.com/developerworks/rational/library/content/RationalEdge/sep04/pollice/index.html>