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# How Project Metrics Can Keep You from Flying Blind

**Frank R. Parth  
Joy Gumz**

**December 14, 2003**



*If you cannot measure it, you cannot manage it.*  
Peter F. Drucker

Management guru Peter F. Drucker said it all when he stated that one must measure before one can manage. And it's obvious why: managing requires decisions to be made, often on incomplete information. Better information, even if incomplete, will improve decision-making.

The question in project management is how to get this better information. Analyst firms such as Gartner and Meta are quick to say metrics are essential. But they leave out the details on what measurements to take or the processes involved. Why?

The reason is that before you measure, you have to decide *why* you are measuring. What are your goals? This is a much tougher question than you might think. Metrics should be linked to what the organization is trying to accomplish on a strategic basis. Before deciding on the measurements to take, the organization's goals must first be clarified. These goals can then be used to determine the success criteria. Knowing your success criteria, you can then decide what information will give you the information you need, and how to collect it. These measurements can then be interpreted by management to understand, predict, evaluate, and improve.

### **Organizational objectives**

Common organization goals include increasing market share in expanding markets, increasing worker productivity, improving financial numbers such as profitability and cash flow, increasing sales and output, and improving customer service and satisfaction.

Leading firms often aim to be regarded as a market innovator through the release of new products, broadening product lines and practicing continual improvement.

In project terms, the goal is to measure the portfolio of projects in such a way as to drive the company's strategic objectives forward.

### **Metrics, measures, and flavors**

A metric is a quantitative property of a process or product whose possible values are numbers. A measure is a specific value of a metric for a given process or product.

There are multiple flavors for metrics. Counts, percentages, ratings, numbers, and trends can all be used. Metrics can be simple or composite. A simple metric measures the number of occurrences of a particular aspect of a product or process, e.g. the number of milestones achieved in a project. Composite metrics are used when it is necessary to apply a mathematical process to other metrics to obtain new information, e.g. The ratio of change requests to the total number of product requirements.

Metrics can be quantitative or qualitative. Quantitative metrics may appear straightforward but care must be taken in their collection as appearances can be deceiving. Whether a date for a milestone is made or not is obvious; recording fewer hours than actually spent on the activity can easily be done. Whether the deliverables associated with that milestone have been successfully delivered is more informative as to whether the milestone



date was successfully met or not. Care must also be taken with qualitative measurements to ensure that the same metrics are consistently used when doing the assessments.

Metrics can be either leading or lagging indicators. Lagging indicators can generally be used to predict future performance. It is well known in project management that, for projects using Earned Value Management, once approximately 20% of the project is complete, whether the project will be delivered on time can be predicted. A project that is behind at this point can rarely recover the difference. Leading indicators can be important for some organizations, e.g. knowing, with certainty, what resources will become available for planned project work. Project work can be initiated with

certainty with a result of increased productivity and personnel satisfaction.

**Balanced scorecard**

The balanced score card is a useful tool to translate these lofty, strategic goals into actions. For Six Sigma, it is critical. The balanced approach means that you can't measure in only one area – you have to measure in all the areas that are important to the business. The Balanced Scorecard uses a mix of financial and non-financial measurement as a summary of managerial and business performance, linking metrics regarding customers, internal processes, employees, and financial results to long term financial success. Key to the balanced scorecard is collecting perspective from differing viewpoints: the customer, the employee, the financial manager and the marketing manager.

**Balanced Scorecard Example**

<p align="center"><b>Financial</b></p> <p><b>Cost reduction</b> <b>Return on investment</b></p>	<p align="center"><b>Customer</b></p> <p><b>Satisfaction</b> <b>Retention</b> <b>Market share</b></p>
<p align="center"><b>Internal</b></p> <p><b>New product introductions</b> <b>Reduction in time-to-market</b></p>	<p align="center"><b>Employee Growth</b></p> <p><b>Quality of training</b> <b>Quality of projects worked on</b> <b>Project planned schedule vs. actual</b></p>

In order to develop specific metrics, you determine the critical questions to ask:

- From a financial perspective: Which projects contribute to cost reductions and what is their priority?
- From an internal perspective: What metrics for new product projects will show they are within budget and delivering what is expected?
- From a customer perspective: What metrics must be collected to

demonstrate whether new products have, or have not, increased customer satisfaction?

- From an employee perspective: How do employees judge whether training is 'high quality' and how should this be measured? Some potential measurements include
  - actual versus projected attendance at each training course



- reviews of the courses from the students
- training courses providing versus organization and project plans
- results of post-training tests, and
- feedback from the product and other managers.

### **More project metrics examples**

Earned Value Management is one approach that defines its metrics very specifically and measures them constantly. Metrics include: cost variance, cost performance index, estimate at completion, schedule variance, schedule performance index, and others. If reserves are used, whether monetary or time, they should be measured for trending purposes.

There are many other metrics used in project management, from obvious ones such as are milestones being met to more sophisticated ones such as the trend in change requests against requirements.

Maturity assessment of process improvement often requires complete mastery of a level prior to advancing to the next level. If the project management maturity of an organization is at a basic level, it makes sense to collect basic project management metrics, rather than advanced project management metrics.

Basic project management measurements would normally include completions of milestones for the project activities compared to the plan; planned activities effort and duration compared to the plan, and work completed, effort expended, and funds expended in the project.

More advanced project management measurements might include effort expended over time to manage the development project, compared to the plan; frequency, causes, and magnitude of replanning effort; for each identified risk, the realized adverse impact compared to the estimated loss; and the number and magnitude of unanticipated major adverse impacts to the project.

Portfolio metrics might include the number of projects started during the previous quarter, number of projects completed during the previous quarter, percentage of milestones achieved compared to baseline for all projects, percent success ratio, average client satisfaction rating, and actual ROI compared to projected ROI.

Categorizing metrics can be useful, especially when efforts are to be directed toward process improvement. Categories may include the following:

- basic project management
- advanced project management
- subcontract management
- requirements analysis
- requirements management
- basic product development
- advanced product development
- product testing and verification
- teamwork and personnel
- training program
- process improvement
- defect prevention
- technology change
- employee
- customer, and
- other external (public opinion, regulatory)



### **Questions to ask when selecting metrics**

When selecting metrics, both the current environment and desired outcomes have to be considered. Question to ask may include:

- How mature is tracking of customer satisfaction in the organization, and should metrics from this be utilized?
- Are product requirements traceable? What is their complexity? How many requirements are there?
- What support infrastructure will be required?
- Have all environments in which the product will be used been defined?
- How stable are the product design requirements?
- Has a complete set of tests at system and subsystem level been identified?
- Has comprehensive issue tracking and failure analysis been established?
- Is risk management periodically updated, and does it accurately portray the project's risk?

Answering these and other questions will determine what additional metrics need to be tracked regarding both the product and the processes of the project.

Along with setting up and tracking metrics within the specific environment, it's important to create triggers which will help the project manager identify when the project requires corrective action. This also provides the project manager with incentive to track the metric, as it will help in project management.

### **Collecting metrics**

Planning on which metrics to use is just the beginning. As Peter Drucker says, "Plans are only good intentions unless they immediately degenerate into hard work." Metrics must be collected in a standardized fashion, and reported on consistently.

And it's important to explain how the metrics will be used. You will receive better cooperation from project managers and others collecting the metrics if the reasoning has been explained. It's also critical to set standards to ensure metrics are comparable across projects.

### **Communicating and reporting**

How will metrics be reported on? When, and how often? What comparisons will be performed? How will they be communicated? Databases and query tools make the data input relatively painless. But effective reporting must provide managers with useful information rather than just data. The key: determining the user's requirements. The report needs to present enough information to be actionable, and should be simple enough in design so it is obvious where the problems lie. If using color coding, it's imperative to have a definition of what the color means. Representing the data in pictures or graphs is usually preferred over 1000 words of explanation. For effective reporting, think stoplights and gauges.

Ideally, communications regarding project metrics should be part of the each project's Communications Plan. Web sites often are effective tools for providing project-centric metrics, although it does require administrative support to keep it updated.



Also, the effectiveness of a metrics program is dependent on the communications within the corporation. Effective communications requires an open corporate culture, whereas a culture reminiscent of the court of Russian Czar Ivan the Terrible is bound to be unsuccessful.<sup>1</sup>

### **It all sounds so simple, what could go wrong?**

The steps seem straightforward, but anyone who has implemented a metrics program understands that the devil is in the details.

First, a metrics program is extra work. It's extra work to determine what is important, assess what data is needed, determine how to collect the data, define the reporting requirements, and design the processes. Implementing a metrics program is a project, but the process of reporting metrics over time is operations. It's critical that the program be sold to upper management so it can be sponsored, as well as to the rank-and-file who will be responsible for implementing it.

Second, it is possible to select the wrong metrics. The metrics chosen should be specific to what you're trying to measure, not generic metrics that you collect because they can be collected. Choosing the wrong metrics causes extra effort in numerous ways. The wrong data is measured. Extra effort is

spent on collection and reporting. Then, it is sometimes necessary to go back and try to collect the more relevant metrics after-the-fact. This process is rarely enjoyable.

Third, there can be bias in data collection. Though it can never be completely reduced, bias can and must be minimized to ensure useful and valid results. When conducting metrics surveys, questions must be direct and unambiguous. Answers must be just as carefully constructed. Bias can also originate in the selection process for respondents to a survey, such as only surveying certain customers. Bias can also result from a respondent not being forthright. This can be difficult to detect unless correlated, non-corroborative information exists. This can sometimes be avoided through proper controls on collecting metrics data.

Ultimately, it's the people involved who make a metrics program work.

### **Summary and recommendations**

Before you kick off your project management metrics program, ask these key questions.

*Do we understand our strategic goals, and the priority of each?*

*Where is our organization in terms of project management maturity? Should we start a basic metrics program first, and build on it?*

*Do we have the skills internally, and the time to initiate this type of program – or do we need outside counsel?*

*What is our corporate culture? Can a metrics program be effective, or will change management be needed?*

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<sup>1</sup> One of the cruelest czars in Russian history, Ivan the Terrible earned his name. When bad news was delivered to him, he was known for taking the pointed metal staff that he carried and driving it through the foot of the messenger, insisting all the while that the messenger continue speaking.





*Would upper management support a metrics initiative?*

Answering these questions first will give you a much better understanding of where your organization is before you commit to the effort that a metrics program requires. After all, the first rule of metrics is never gather metrics just to have them. It is time consuming and frustrating when the measurements are not put to use. The best metrics initiatives link projects and strategy to produce long-term results.

Is a metrics program worth it? If your project involves software, consider this statistic: The Software Engineering Institute's Capability Maturity Model (SEI CMM) estimates returns of four- or five- to one for successful metrics programs, when organizations are at the higher performing levels.

## **About the Authors**

### **Frank R. Parth, MBA, MS, PMP**

is the President of Project Auditors, an independent project management, training, and auditing company headquartered in southern California. Mr. Parth has over 25 years experience in technology development. He is a published author and an international speaker in project management and teaches project management courses for local universities. He obtained an MBA from the Peter F. Drucker Graduate Management Institute and is a certified Project Management Professional by the Project Management Institute.

### **Joy E. Gumz, CPA, PMP**

is a Director at Project Auditors. She is an acknowledged expert on enterprise software and technology implementations with in-depth expertise in commercial off-the-shelf software for financial and human resources. She has held senior consulting positions with Peoplesoft, Plumtree Software, and Ernst & Young, and has worked internationally. She has published articles in PM Network, a Project Management Institute publication, And is a reviewer for Computing Reviews, the publication for the Association for Computing Machinery. She is also a guest Lecturer at the University of California – Irvine.