

Critical Path and Earned Value Management

Two elegantly simple metrics, both rich with meaning, have been part of project management since the very beginning of the profession:

1. Critical Path Method or CPM, and
2. Earned Value Management or EVM

CRITICAL PATH

CPM was initiated by the DuPont Company in the 1950s. The objective is to calculate and communicate the shortest completion time possible for a project and highlight those critical tasks, which, if delayed, would delay the whole project.

EARNED VALUE MANAGEMENT

EVM emerged in the 1960s, when the US Department of Defense established a computation and communication approach using a set of 35 criteria. Industry has now codified EVM in the ANSI EIA 748-A standard. Calculations can be complex, but the intent is to appraise and drive improvement in project scope, schedule, and cost with the simple comparison of earned value, EV, to planned and actual performance.

Project practitioners, especially those certified as Project Management Professionals (PMP) through the Project Management Institute (PMI) are well acquainted with both CPM and EVM together with their features, requirements, formulations, and calculations, as well as their strengths and weaknesses. We have included this appendix on CPM and EVM not for the purpose of educating or advocating but to show how project managers have included these metrics in their OPPMs.

The combination of the powerfully visual nature of OPPM, augmented by showing either CPM or EVM, adds specific early warnings to the report. Over the years, project managers have shared with us various ways to accomplish this.

CRITICAL PATH SHOWN ON THE OPPM

By design, OPPM tasks do not show dependencies; therefore, a critical path is not readily apparent. Experience has shown that full PERT charts and graphical network illustrations of the Work Breakdown

Structure, though essential to project managers, tend to over-communicate and therefore don't communicate to important stakeholders.

Simple OPPM techniques, however, have been used to highlight the critical path. The easiest and clearest technique we have seen is to print the task numbers (found at the far left of each major task) in red for those major tasks on the critical path. People reading the OPPM easily see which tasks are on-time or ahead or behind schedule. Referencing the color of the task number, then shows whether it's critical and therefore whether its timeliness will impact the schedule of the project as a whole.

Powerful OPPMs should be able to be read without additional explanation. They communicate best to the broadest audience when they are intuitive and devoid of translation keys. The red numbering technique works because those who understand and request CPM data will know what to look for. For others, it does not further clutter the OPPM.

EARNED VALUE SHOWN ON THE OPPM

The basic OPPM shows a bar in the lower right section representing total project cost. Actual cost is shown with both an amount and a color indicating the seriousness of any overruns. (See How to Read the OPPM in Chapter 2.) Without the performance to schedule shown in the middle of the OPPM, the cost comparison graph is insufficient, since with that data

alone, you don't know whether you are getting the value (scope and timing) you wanted for what you planned to pay.

What appears to be under budget—good—news could really be bad news with reduced spending due primarily to delayed work. Or apparent over-budget bad news could really be good news as extra expenditures have produced greater scope in less time than originally planned.

Earned Value Management is specifically designed to address these issues by simply comparing value earned with value planned.

Unfortunately, there are relatively few executives and project stakeholders who understand EVM. We recommend one delightful book that makes the complex that requirements and benefits of EVM easy and accessible, along with another that is an in-depth tutorial.

1. ***Project Management: The CommonSense Approach: Using Earned Value to Balance the Triple Constraint (Third Edition)***, by Lee R. Lambert and Erin Lambert, and
2. ***Earned Value Project Management (Third Edition)*** by Quentin Fleming, and Joel Koppelman.

Again, we will not go into the methods and essential elements necessary for EV calculations. The costs section of the OPPM in the lower right of the document is the place to show Earned Value comparisons. The most visually clear depiction of EV on an OPPM we have seen shows three stacked horizontal bars.

One represents actual cost for actual work (AC), one represents planned cost for planned work (PV), and another represents planned cost for actual work (EV).

The schedule variance is visible by comparing EV to PV. The cost variance is shown by comparing EV to AC. Finally, the EV bar is given a color—green for acceptable values, yellow for modest negative values, and red for unacceptable negative values.

As previously warned, you should be careful not to clutter your OPPM, yet some have found real value in showing the Cost Performance Index (CPI) and the Schedule Performance Index (SPI).

$$\text{CPI} = \text{EV} / \text{AC} \text{ and } \text{SPI} = \text{EV}/\text{PV}$$

These are included as qualitative major tasks, and given color designations following each reporting period—green when the value is greater than one and yellow or red for predetermined values less than one.

A final word of caution. The power of the OPPM is that anyone familiar with it can immediately read it and glean the important information it contains. The simpler you make your OPPM the more successful the deployment of your project and the communication of your project's performance will be. As a successful project manager, you are, by your very nature, detailed oriented. That concentration on details has long been an important contributor to your success. You follow up on things, you readily chart, graph, and measure, and you

know and understand detail—which is why you have to fight your own inclination to be complex.

Initially, it will feel counterintuitive to keep the OPPM as simple and consistent as possible, but trust us: The simpler the tool, the more successful your project will be. Add CPM or EVM only if you really use it and can efficiently obtain it, and if those to whom you communicate want it and know what it means.