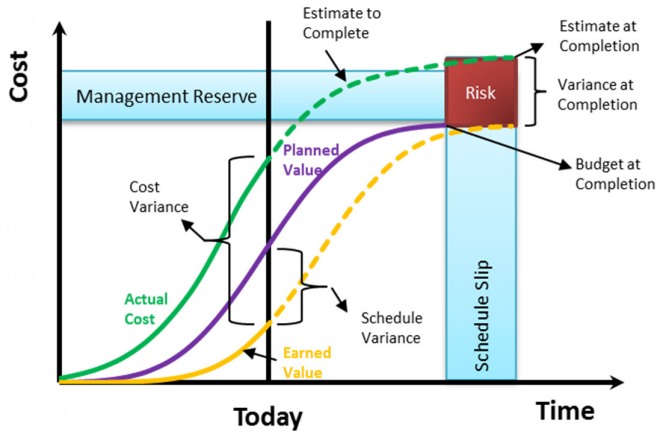
The Purpose of Earned Value Management



Project control tools are designed for a specific purpose, and for use in a defined set of circumstances. While in some situations there is sufficient flexibility in the software and system to accommodate other uses, generally misapplying a tool requires significant effort for very little value. This is as true for Earned Value Management (EVM) as it is for any other tool.

EVM is a performance management system with a focus on measuring the performance of the people assigned to manage specific work packages, control accounts, and the overall project. This contrasts with scheduling systems that focus on the effective use of resources within the time available to complete the work and financial systems that focus on the correct use and flow of project finances[1].

EVM was developed in the 1960s, based on PERT COST, which in turn was developed from the PERT TIME scheduling system[2]. EVM also drew on the well-established practice of cost engineering[3], but these two disciplines are designed for very different purposes. Cost engineering is focused on project cost estimating and control, EVM is focused on performance management.

Appreciating the difference between financial management, cost accounting, cost engineering, and earned value management is important for their successful implementation. These terms are not, and never have been, synonymous. For most project management professionals, the terms have the following meanings:

Financial management: the practice of handling a company's finances in a way that allows it to be successful. This generally includes various project accounting functions, supported by contract administration and purchasing. Managing the organization's cashflows by claiming payments correctly, getting paid, and in turn properly paying workers, suppliers, and contractors is critically important to any businesses' survival and has been for centuries.

Cost accounting developed in the 15th century to understand the unit cost of production to allow a viable sale price to be established. Activity-based costing (ABC) is a refinement to cost accounting developed in the USA manufacturing sector during the 1970s and 1980s. ABC uses a precise allocation of input costs (including organizational overheads) to accurately determine the cost base of an activity, or product.

Cost engineering: evolved in the early part of the 20th century to provide solutions to a number of limitations apparent in traditional financial management and cost accounting. The Association for the Advancement of Cost Engineering International (AACEi) defines cost engineering as: *the application of*

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1 For more on what EVM is not, see ***Earned Value Management - Six things' people don't get!*** https://mosaicprojects.com.au/Mag_Articles/AA011_EVM_Things_people_dont_get.pdf

2 For more on ***The Origins and History of Earned Value Management*** see: https://mosaicprojects.com.au/PDF_Papers/P207_EVM_History.pdf

3 For more on ***The Origins and History of Cost Engineering*** see: https://mosaicprojects.com.au/PDF_Papers/P207_Cost_History.pdf

scientific principles and techniques to problems of estimation; cost control; business planning and management science; profitability analysis; project management; and planning and scheduling[4]. Cost engineering focuses on estimating, budgeting, and project cost control.

Earned value management: evolved from traditional financial management and cost engineering in the 1960s. The USA DoD was finding the visibility and control provided by these established systems inadequate for their needs. EVM is based on a decomposition of the work of a project into work packages and control accounts, then assigning the responsibility for completing each work package to an identified manager, and then measuring the performance of the work, and by implication the manager on a regular basis (usually monthly)[5].

This understanding of the function and purpose of EVM is consistent across:

- The USA DoD, the organization that invented Earned Value,
- The committee responsible for publishing the National Defense Industrial Association (NDIA) / Electronic Industries Alliance (EIA) standard EIA-748, *Earned Value Management Systems*,
- The PMI Standards Development group responsible for the publication of ANSI/PMI 19-006-2019 *The Standard for Earned Value Management*,
- The AACE® committee responsible for International Recommended Practice No. 82R-13 *Earned Value Management (EVM) Overview and recommended practices consistent with EIA-748-C*, and
- The International Standards Organization (ISO), Technical Committee TC258 with representatives from 82 national standard bodies, responsible for publishing ISO 21508:2018 *Earned value management in project and programme manage*ment.

This consensus means:

1. EVM is not and never has been a payment management system. It is a performance management system focused on measuring the performance of the managers assigned to each work package and control account.
2. The values used in EVM (planned, earned and actual) are required to be measured in the same way, at the same time. This means the actual costs used as at 'time now' include all of the costs that have been, and will be, expended for the work performed to that point in time. Some of these costs may not be paid out of the accounts system for weeks, months, or occasionally years (eg, retention monies), but the full cost of the work accomplished is included in the EVMS as at the time the work is done.
3. The terms of contract are irrelevant to the calculations used in an EVMS. The timing and calculation of a contractor's invoices, the payment periods, and any subsequent subcontractor entitlements do not form part of the EVM calculations. These factors are of critical importance in the contractor's financial management and contract administration systems, but they are deliberately excluded from a proper EVMS to allow the rapid and accurate assessment of the performance of the work to date and its projected consequences.
4. EVM uses the approved budget costs as its starting point, EVM has no involvement in the cost engineering and estimating processes that are implemented to get to the approved budget,

[4] A discussion on the history of cost accounting and cost engineering is included in ***The Origins and History of Cost Engineering*** see: https://mosaicprojects.com.au/PDF_Papers/P207_Cost_History.pdf

[5] For more on the processes and implementation of an effective EVM system see: https://mosaicprojects.com.au/PMKI-SCH-040.php#Overview

and the performance management baseline used in EVM excludes the contractor's profits and management reserves.

5. EVM needs actual information in a much shorter timeframe than the accounts system, this requires estimates and approximations that are corrected later based on accounts information. Provided the assessments are based on knowledge any errors are usually minor and self-correcting over time. However, the need for these 'pencil book' assessments and replacement later with actual cost data means EVM cannot be run in an accounts system, what is needed is appropriate information from the accounts system.
6. Trying to use a scheduling tool to run EVM is equally inneffective:
    a. Schedule activities do not align with cost items in the accounts system making value allocation and assessment difficult,
    b. Schedules are too detailed (each work package has a set of schedule activities aligned with its scope of work),
    c. Measuring time performance is a different process to measuring value accomplished,
    d. Many of the capabilities needed in an EVMS are missing in most schedule tools.

The value of an EVM system is in two parts, first the timely identification of variances and performance issues allows management action to correct deficiencies and lock in gains. Second, the EVM projections of final cost outcomes based on performance to date are reliable and better than most alternatives. If Earned Schedule (ES) is used as part of the EVMS, similar projections for the time to complete can be obtained[6]. Consequently, for a full understanding of the current situation and effective control, the project needs:

- An effective financial management system linked to the corporate accounts[7]
- A robust procurement and contract administration system[8]
- Risk management to understand uncertainty[9]
- CPM (or other scheduling) to direct and plan the use of resources[10]
- EVM (cost) to manage performance and predict cost outcomes[11]
- Earned Schedule (ES) to predict time outcomes[12]

For more information and resources (many free) to help implement EVM based on the ISO and PMI standards, see the resources at: https://mosaicprojects.com.au/PMKI-SCH-040.php.

For implementing EVM based on EIA 748, the AACEi Recommended Practice No. 82R-13 is a good start.

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6 For more on predicting the time to complete see: ***Why Critical Path Scheduling is Wildly Optimistic!*** https://mosaicprojects.com.au/PDF_Papers/P117_Why_Critical_Path_Scheduling_is_Wildly_Optimistic.pdf

7 For more on ***cost management*** see: https://mosaicprojects.com.au/PMKI-PBK-025.php#Overview

8 For more on ***procurement*** see: https://mosaicprojects.com.au/PMKI-PBK-050.php#Overview

9 For more on ***risk management*** see: https://mosaicprojects.com.au/PMKI-PBK-045.php#Overview

10 For more on ***schedule management*** see: https://mosaicprojects.com.au/PMKI-SCH-010.php#Overview

11 For more on ***EVM*** see: https://mosaicprojects.com.au/PMKI-SCH-040.php#Overview

12 For more on ***earned schedule*** see: https://mosaicprojects.com.au/PMKI-SCH-040.php#Process2

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