

The IT Project Management

Lesson 6

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The EVM methodology

What is **Earned Value Management**? *Earned Value Management* (EVM) is a project management methodology that integrates schedule and costs, to measure project performance. Based on planned and actual values, EVM help to predict the future and enables project managers to adjust accordingly.

The methodology was introduced more than 120 years ago for financial analysis and used for the first time in project management in 1960 by the US DoD to verify the status of their projects in term of costs and schedule.

The EVM methodology/2

The basic principle of earned value management (EVM) is that **the value of the piece of work is equal to the amount of funds budgeted or used to complete it.**

It helps the PM to answer some important questions:

- Have we got to where we want (planned) to be in the project ?
- How efficient are we in the development of the project ?
- When are we going to finish this project ?

EVM/1

The EVM is based on the **Earned Value** concept compared with other cost parameters

- **BCWS (Budget Cost of Work Scheduled)**. The BCWS is the planned budget for the planned activities that have to be performed at a certain point of the project development.
- **BCWP (Budget Cost of Work Performed)**. The BCWP is the quantification of the planned value of the work actually performed up to a certain date and refers to what was achieved during the project development. It corresponds, by definition, to the **EARNED VALUE**, and it is obtained from the budget and the activities progress evaluation
- **ACWP (Actual Cost of Work Performed)**. The ACWP is the real cost incurred for the execution of the projects up to a certain date. This value refers to what has actually been spent.

EVM/3

Comparing the BCWS, BCWP, ACWP, we get some important information about the «health» of the project.

VARIANCE INDEXES

- $BCWP - BCWS = \text{schedule variance (SV)}$
- $BCWP - ACWP = \text{cost variance (CV)}$

PERFORMANCE INDEXES

- $BCWP/BCWS = \text{Schedule Performance Index (SPI)}$
- $BCWP/ACWP = \text{Cost Performance Index (CPI)}$

EVM/4

The meaning of

SCHEDULE VARIANCE : $SV = BCWP - BCWS$

- If SV is negative, the project is behind schedule.
- If SV is zero, the project is on schedule
- If SV is positive, the project is ahead of schedule.

COST VARIANCE : $CV = BCWP - ACWP$

- If CV is negative, the project is over budget
- If CV is zero, the project is on budget
- If CV is positive, the project is under budget

EVM/5

The meaning of some INDEXES:

SCHEDULE PERFORMANCE INDEX: $SPI = BCWP/BCWS$

- If $SPI < 1$, the project is behind schedule
- If $SPI = 1$, the project is on schedule
- If $SPI > 1$, the project is ahead of schedule

COST PERFORMANCE INDEX: $CPI = BCWP/ACWP$

- If $CPI < 1$, the project is over budget
- If $CPI = 1$, the project is on budget
- If $CPI > 1$, the project is under budget

EVM/6

Two other indexes (we will meet them later):

- **ESTIMATE TO COMPLETE (ETC)**

It is a forecasting technique used to predict the additional costs required to finish all remaining project tasks

This value tells the Project Manager **how much money** must be spent from this point forward, to complete the project.

- **ESTIMATE AT COMPLETION (EAC)**

It is the extrapolation of the current project status to the end of the project and is equal to the amount of money already spent on the contract plus the amount of money it will take to complete the contract.

This value tells the Project Manager **what the overall project budget** will be if everything else went according to plan.

The EVM methodology: the S Curve

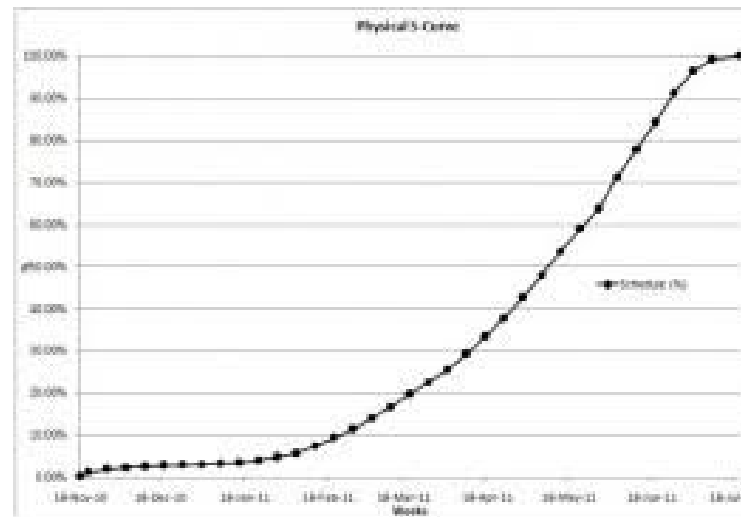
The Earned Value Management combines the control of the project **timing** AND its **costs**

A quick way to look at the EV is the analysis of the S Curve

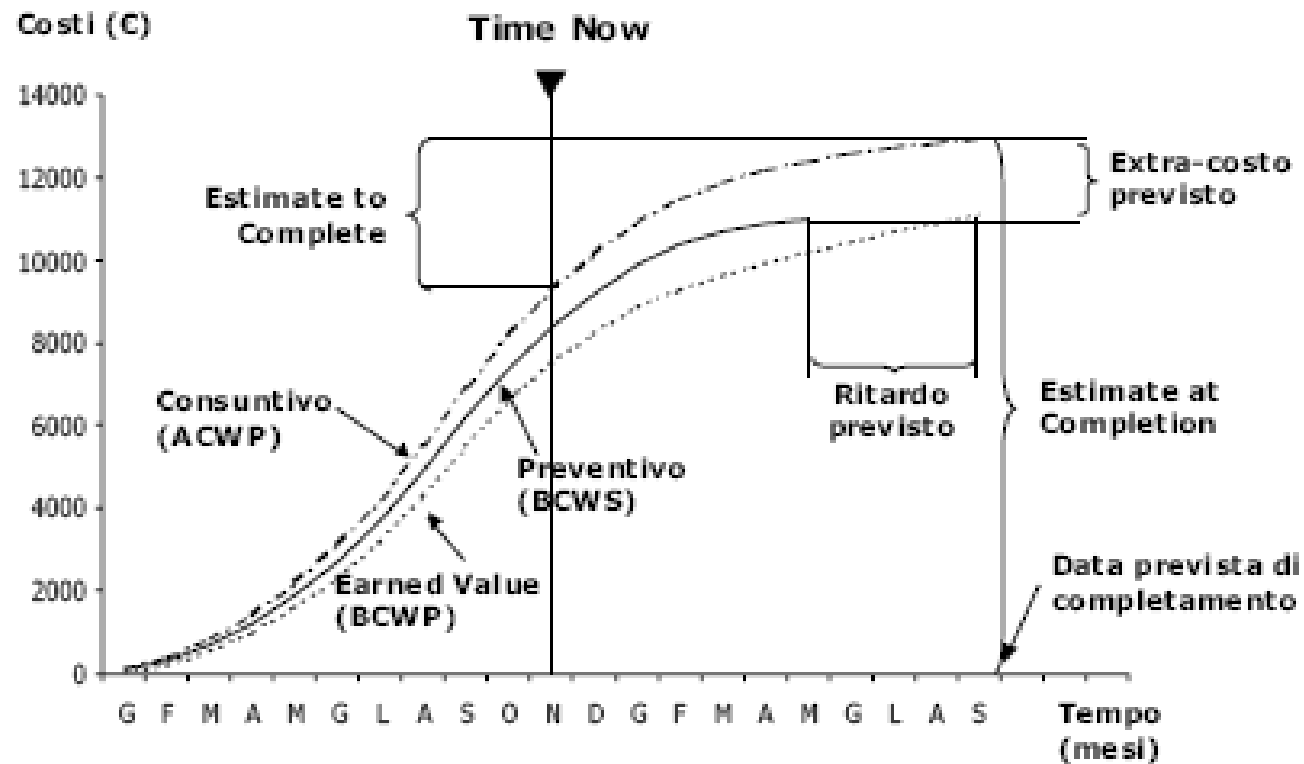
Definition:

In project management terms, an s-curve is a mathematical graph that depicts relevant cumulative data for a project—such as cost or man-hours—plotted against time.

The S-Curve



EVM with the S Curve



Manage the project

The methodologies introduced above have a single, important TARGET:

Support the Program Manager in

- **Understanding** the REAL situation of the Project in term of costs and time (hopefully the performances will be achieved)
- **Implementing** all the measures required to put (again) the project into the right path to be successfully completed
- **Re-programming** the project if required (a fact of life !), without affecting (possibly) the contractual finish date.

In the end: KEEP THE PROJECT UNDER CONTROL

An Exercise

EVM Exercise

A simple exercise: for a simple and not true (!) project, with 10 tasks, lasting 10 months, at a certain point of the project life (end of month 5), evaluate:

BCWS (full life)

BCWP at the date

ACWP at the date

SPI and CPI indexes at the date

S-Curve

Using EXCEL

The EVM Exercise: the data

Task #	Start date	Finish date	BCWS	Cost distribution	Task Progress % (per month)	BCWP at control date	ACWP at control date
1	start month 1	end month 1	50	linear	100%	to be calculated	m1: 50
2	start month 2	end month 3	100	linear	m2: 0,7 - m3: 0,8	to be calculated	m2: 70 - m3: 70
3	start month 3	end month 5	200	linear	m3: 0,7 - m4: 0,7 --m5: 0,7	to be calculated	m3: 90 - m4: 90 -m5: 90
4	start month 4	end month 5	200	linear	m4: 0,7 - m5: 0,7	to be calculated	m4: 120 - m5: 120
5	start month 5	end month 7	400	linear	m5: 0,7	to be calculated	m5: 160
6	start month 6	end month 8	500	linear			
7	start month 8	end month 9	200	linear			
8	start month 9	end month 9	50	linear			
9	start month 9	end month 10	200	linear			
10	start month 1	end month 10	200	linear	100%	to be calculated	100
	CONTROL DATE		end of month 5				

The EVM Exercise: Hints

- First step: draw the project GANTT chart (project # on the left column, time on the upper row)
- Allocate the planned costs to each project and each month (linear distribution of costs)
- Obtain the total costs per month, and calculate the cumulative costs: get the graph (costs on y axis, time on x axis). The BCWS S Curve
- For each month from 1 to 5 calculate the earned costs (how ?). Put the cumulative data in the graph. The BCWP S Curve
- For each month from 1 to 5 assign the ACTUAL costs. Put the cumulative data in the graph. The ACWP S Curve
- Calculate: Schedule Variance, Cost Variance, SPI and CPI