Luc De Ceuster

Focus on **Earned Value**

Earned Value Management for Successful Projects

First Edition

APraCom© Project Management

Focus on Earned Value

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For Franciscus De Ceuster
who left us too early

I want to thank my family and all my friends who have always supported me and were especially there for me at the end of last year when I was infected with H1N1 and had very small chances to recover. Their energy, concerns and help made it possible for me to recover remarkably well and finish this work.

I explicitly want to thank Guy without whom I surely would not be alive anymore. Of course my parents, my brother Steven and my family, Ludo, Dan, Michal, Miluše, Erik and Irena.

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Introduction

Once a project starts we move from the planning phase into the execute and control phase. The project team executes the project plan. The project manager will control the plan's execution and compares actual information he/she receives from the project team members with the data that were obtained at the end of the planning phase. The main documents the project manager has at his/her disposal have been generated during the initiation and the planning phases. These are (non limited list):

- Project Charter or other name;
- Work Breakdown Structure (WBS);
- Detailed task descriptions;
- Project precedence diagram and critical path;
- Gantt chart;
- Project resource planning (people and other resources)
- Periodical and Cumulative Project Budget or S-curve;
- Project risk management plan.

Project planning will use these documents as a project baseline and the project team members will give the project manager detailed information related to the tasks for which they are responsible. The information the team members will communicate should contain at a minimum the following data:

- Start and end date of each task;
- Cost incurred during the reporting period in order to work on each task;
- Estimated remaining duration of each task;
- Progress of the work in detail and overall;
- Other information that may be useful.

Using all the information available, the project manager is able to provide project stakeholders with a summary of the project status, and report on important parameters indicative of the financial position and its progress towards completion.

In the classical approach, financial information is only used to compare the actual spending with the time phased budget. Spending equal to the budget at that time in the project would lead to the conclusion that the budget is “on target”.

The main problem with the classical approach is that the financial and scheduling information were looked at separately and the information are not combined to a more sophisticated evaluation and forecasting system. There was no system set up to evaluate project performance using variances, performance parameters or indexes and using it to forecast the outcome of the project.

Project managers are reporting the data without exploiting the hidden information the data contained.

Past experience with complex projects has showed that it is difficult to predict the final outcome of the project. In many cases, management could only get a accurate idea of the total cost of the project *after* it was completed. In some cases, costs could only be accurately evaluated even later, when all accounts had been closed!

Although project success today is not only determined by the total cost of the project, or the time by which the project was late, money and schedule still remain important parameters. In many projects they still remain key elements, and project success may depend on just these two parameters. Just imagine some of the following examples:

- **Timing**: schedule delays may be catastrophic when the objective is to launch a new product or service before the competition does. Launching a product or service too late may have a negative impact on sales and return on the investment (ROI);
- **Cost**: delivering a project that is more expensive than initially estimated may have a serious impact on profitability. Higher initial cost (fixed costs) will move the break-even point to the right, which means that more products have to be sold before it becomes profitable.

The project management community realized over time that better forecasting methods made possible by integrating financial and schedule information should become standard. A good project performance evaluation system would be beneficial for many reasons, some of which some are mentioned below:

- To better allocate budgets;
- Identify budget and planning problems early in the process;
- Improve portfolio management;
- Better manage budgets;
- Know in what direction we are heading;
- ....

The first to use Earned Value Management was the United States Department of Defense (DOD) in the beginning of the 1960s when they started implementing “cold war” projects like the minuteman and Polaris missile. They started looking at project efficiency to know how government money was spent and to be able to predict the total cost of the project as early as possible.

The methodology they decided on was first used at the end of the 19th century, the beginning of industrialization. At that time, engineers started

evaluating the work that was done and measured efficiency of the processes they were monitoring.

The process is in fact relatively simple and, performance can be easily measured using information that is already available. The project manager is monitoring project progress and budget. During weekly reporting, information like work executed, money actually spent and, other parameters, are provided. Therefore, project-wide information is available to the project manager on a weekly basis.

The database that has been built during many years of projects by the DOD is in fact a very valuable treasure. Unlike private companies, military and government agencies tend to keep records of *all* projects including those that were overdue and over budget. Certainly in military history, it has become very important to learn from mistakes and not to conceal, or make them appear better. Military history is still a very important topic in Military Academies worldwide and is still the basis of Military Operations today. Hiding the “bad” experiences would reduce the capability of today’s military commanders to act in the most optimally decisive way.

I had the same experience during my aviation teaching. Some years ago, I met one of my old students flying back from Nice (France) to Brussels (Belgium). All passengers had been waiting impatiently because everybody saw the plane landing, but boarding never seemed to start.

My old student invited me to the cockpit for the flight and I also could invite a friend. When he arrived in the cockpit, the question was obvious: “why did we have to wait so long to board the plane and why did we leave with an important delay while we saw you arrive even before time?” Without any problems, he

explained that his approach was not how it should have been and he decided to make a “go around”[1] and start the approach procedure again.

Hiding mistakes would only lead to unsafe behavior and would not guarantee safe flying conditions. When a pilot makes a mistake in the cockpit, he/she shouldn't hide it but openly speak about it. In fact, the people hiding their mistakes to others in order to appear perfect will finally get into a situation where they do everything wrong. The problem is that in our world around us, many people are posing like “perfect” or are playing the role of the person who made mistakes and learned from it. In fact many of them are hypocrites who only believe in themselves and are hiding their imperfection.

For companies, it may be important to appear perfect to their customers and competitors. In reality, we all know that this is certainly not the case. People should not select companies because they appear to be perfect. We should select a company because we believe in their capabilities to do what we expect from them, and therefore it is more important to know and trust how they manage and solve problems and crises than to assume they will not make any mistakes.

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1 *A “go around” in aviation relates to a landing that is broken off. There are many reasons for which a landing can be cancelled: another plane may still be on the runway, a technical problem that changes the approach parameters, unsafe weather conditions, too much deviation from the glide slope or from the center of the runway and many other reasons. In most cases it is not related to an emergency. For the passengers however, it may be a bit scary. The pilot will first return to a safe position and then explain to the passengers what really happened. During one event, coming back from Rwanda in a DC10, the flaps system showed an alert related to an asymmetry between the left and right flaps. Continuing the landing would be very dangerous and the pilot decided to “go around”, recalculate the approach parameters with a safe flap setting and tested everything at a safe altitude to be sure not to encounter any problems at the final approach. As you may assume, everything ended well!*

If a company wants to hide its errors to the outside world, it should at least be honest to take into account all their experiences, also the worst ones, to set up company statistics. Removing the projects that management does not like will falsify the statistics, which will be using in the future to do business. In fact, this would be like navigating a ship through dangerous waters with the wrong maps! Just tell this to your shareholders when you explain another failure!

Projects are not always done in a perfect way. Many parameters influence what is being done and the experience of the project manager does not relate to the fact he can plan a project perfectly. His or her experiences become really valuable from the moment the project begins and how he or she will handle unforeseen events. Making plans is and remains an important phase of the project and should never be neglected. Preparation will show, already in advance, what can go wrong. In fact, once the project starts it is the ability of the project manager to manage the unforeseen events that will determine the success of the project.

The Japanese company Toyota has built a strong worldwide reputation related to quality and reliability of their products. The company's methodology has been discussed on many occasions. One of the most important elements in their philosophy relates to the fact that nothing is perfect. A production process or a project going on without interruptions or errors cannot exist. Each time an issue or problem show up, it is an opportunity for improvement. Hiding problems only lead to more and larger problems.

The classical tools that project managers use and get trained with relate to planning, estimating, scheduling and others. These focus on the initiation and planning phases of the project. Earned Value Management

(EVM) is in fact an additional tool, that will help the project manager to better manage his/her project during project execution.

EVM has been used by the DOD for more than 40 years and has been applied also by other US government agencies like the Department of Energy (DOE). EVM has also been integrated in Public Offering Procedures in the US. Nevertheless, the EVM is not yet widely in use in the industry. In many cases, financial control and forecasting is in many cases limited to following up spending and comparing it with the budgeted cost. In many cases however, no real financial control is done at all.

Using EVM is in fact not difficult. The necessary parameters can be calculated using very simple mathematical formulas, and predictions of final project costs can be done very quickly. EVM can be used on any project whatever duration or complexity. Of course, the technique and its conclusions become very interesting for complex, high risk and long duration projects.

As we all know, the more detail we want, the more work we ask to be done and the more complex and time consuming the interpretation of the results becomes. Obviously, the rigor and the frequency of application of EVM will increase with project complexity and risk.

Since computing software has become more available to project managers, gathering and consolidating data has also become easier. Many software programs offer functions that allow us to integrate EVM without any supplementary effort. Of course, having the data at hand does not mean that the people will use it.

Statistics held by DOD show that EVM offers a very