

IMPLEMENTING EARNED VALUE MANAGEMENT ON IT PROJECTS

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Short Abstract

Many IT projects may be classified as troubled, meaning that they do not meet schedule, cost or scope constraints. Very often, trouble is not recognized during project execution due to insufficient project management procedures and non-existing control mechanisms. According to PMI, Earned Value Management (EVM) has proven itself to be one of the most effective performance measurement and feedback tools for managing projects. In this paper I discuss monitoring IT project status using EVM thus enabling the project manager to expose potential troubles in the project early during project execution. Addressing issues immediately as they arise gives the project a greater chance of successful completion.

Keywords: earned value, EVM, performance reporting

Paper

Various studies estimate that a significant number of IT projects are troubled. For example, the 2004 CHAOS report by the Standish Group reports that as many as 74% of software development projects are troubled, meaning that they do not meet schedule, cost or scope constraints. Other studies estimate that as many as 90% of all IT projects fail to deliver on time and within budget.

The consequences of projects that are behind schedule and over their budget are additional cost for unplanned resources as well as lost market opportunities and dissatisfied customers because of late delivery, poor quality of accomplished deliverables and unmet expectations of stakeholders and ultimately poor financial results for organizations that sponsor such projects.

Many troubled projects could have overcome problems had they been monitored more closely and accurately and corrective actions taken immediately when it became known that the project was deviating from the planned schedule, cost and scope constraints. However, many companies still do not learn from past experiences and still do not see professional project management as a competitive advantage and a means of saving money by completing projects within planned time and cost budgets. In many organizations completing projects successfully may be directly tied to prosperity and meeting customer expectations.

Implementing project management in IT organizations

Good project management is not something that should be taken for granted. It has to be advocated and implemented in the same way as other key business functions in organizations. A study by the Center for Business Practices showed that implementing project management initiatives in IT organizations led to improvements in schedule estimating, customer satisfaction and alignment to strategic business goals. Those organizations that implement project management will be at a competitive advantage compared to those who do not. The

study goes a long way in validating the considerable gains an IT organization can make by planning and instituting formal project management practices. Observations and conclusions drawn from the study confirm that project management definitely adds value to organizations in all industries for all size organizations.

Measures that are most important with relation to project management are schedule estimating, customer satisfaction, alignment to strategic business goals, cost/hours estimating, time and budget to date, and quality. Many companies do not collect metrics that show the value of a project to the organization. Without mature project management techniques in place the progress and status of projects is not measured and monitored and consequently project failure comes as a surprise at the expected time of project completion.

An important part of project management procedures in organizations is to prepare and review project status reports. Organizations that do not require their project managers to submit status reports show disinterest in their projects and will often blame the project manager when a project is in trouble. On the other hand, strict procedures for reporting on the status of projects is an indication that management cares about the progress of projects and is willing to help when needed.

Monitoring IT project status

Monitoring IT project status may prove to be more difficult than simply requesting project status reports. One must ask themselves, how can we determine whether a software development project is on time, on budget and within scope? How can the project manager tell that a project is, for example, 30% complete? Is it when the coding is 30% complete? And continuing on this train of thought, how can one tell that 30% of the coding is complete? Has unit testing, integration testing, production testing, training and documentation been accounted for? Obviously, a detailed project plan must be in place at the beginning in order to be able to estimate where the project is with regard to plan.

The status of IT projects may be monitored in the same manner as any other project using Earned Value Management (EVM) techniques. According to PMI, EVM has proven itself to be one of the most effective performance measurement and feedback tools for managing projects. EVM can help clearly and objectively illuminate where a project is and where it is going in comparison to where it was supposed to be and where it was supposed to be going.

The concept of EVM is straightforward to understand. It requires that the project has been planned and has a known Planned Value. During project execution the project manager must track how much of the planned work has been accomplished thus determining the Earned Value. The third measure in EVM is the amount of work that has actually been performed or the amount of money that has been spent which represents the value of Accumulated Cost. All three variables (Planned Value, Earned Value and Accumulated Cost) are most commonly shown on a single diagram using cumulative values, a sample of such graph is shown in Figure 1. The time (x-axis) is shown in consecutive numbered weeks and the cost (y-axis) is shown in man-days. It is not the purpose of this paper to discuss the basics of EVM in more detail. The reader may learn more on this topic in other references.

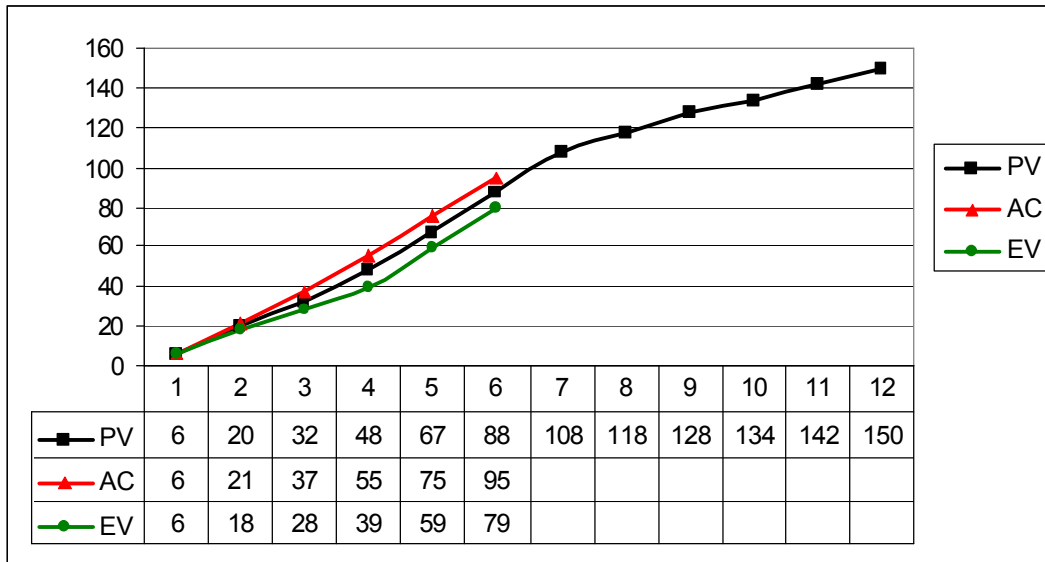


Figure 1: Sample EVM diagram

Implementing EVM on IT projects is not trivial. EVM requires that all project work is broken down for optimal planning, execution and control into tasks or activities. Earned value must be measured for each task preferably with objective measurement of tangible outcomes. On IT projects, subjective assessment of progress is often used, for example, estimating percent of completion. This brings us to the issue of software project planning. Such projects are especially difficult to estimate accurately and consequently poor estimates lead to poor project status reporting. Therefore it is crucial to plan as accurately as possible.

Software project planning

Project planning usually starts with defining and estimating WBS elements. Estimating any project WBS element is subjective, which is equally so in software development projects. The vast number of failed software projects confirm the belief that estimating software projects is extremely difficult, even impossible in certain situations. Let us look at some of the reasons why this is so and options to eliminate uncertainty.

As in any other project, WBS element estimation should be done by the project manager who should consult with experts and the actual implementers of the activities. In software projects, implementers are programmers who will do the bulk of the coding and testing. On average, programmers often estimate optimistically therefore giving estimates that are lower than actual. This may be due to the fact that programmers are optimistic in nature and believe that no task is too daunting for them. Or it may be because programmers understand estimating as only the activity of coding their own module without taking into account testing, documenting, integrating and quality assurance.

Estimating by the project manager using historical information may also prove to be unreliable because it may be difficult to find a similar enough project that was implemented in the past to be used as a basis of the new project estimate. It is questionable whether the project manager who is not a technical specialist will know how to compare different software

projects among themselves to be able to use historical information accurately and reliably for the purpose of planning new projects.

Another common problem in estimating projects based on historical information is the implication that such historical information exists. In real life software projects are often implemented under immense pressure thus it is often the case that proper project management procedures are skipped in order to save time. A typical missed step in project management is to neglect to record relevant information, such as accumulated cost. In such cases it is actually irrelevant whether a project was successful or not because the level of its success is typically classified subjectively by the project manager and such information is not useful as historical information or lessons learned for future projects.

Estimating projects should also take into account the human side of software developers who are not all equally productive in software development. Some programmers work quickly and sloppily while some work slowly but reliably with all flavours of programmers in between. Studies quoted by Brooks show that the ratio between the best and least productive programmer in a software development team may be as much as 1 : 10 which again gives the project manager an impossible basis for estimating WBS element duration unless they are familiar with all members of the development team.

Some issues that may lead to unreliable planning are also predetermined project budget which forces the project plan to become too compressed and unrealistic to implement. In such situations it may be wiser to cut scope rather than try to do a poor quality solution with resources that need to work overtime in order to meet expectations.

The accuracy of the project estimate in software projects may also depend upon the programming language or development tool that is being used and therefore previous experiences may not be valid if the project team is using new and lesser known tools with which they have no previous experience.

The accuracy of the project estimate also depends upon the level of scope that is known at the time of estimating. Often not all details are known at the beginning of the project and therefore the scope is not completely defined or mutually understood. In such cases a preliminary estimate must be known at the beginning of the project with understanding among all stakeholders that the estimates may be refined in subsequent phases of project development as more detail is known. This is true for any project, not just software development projects. An initial project estimate, no matter how accurate or inaccurate, must be available in order to even begin to track project status and progress.

Reporting Earned Value

When the project plan is complete and accumulated cost is being recorded dutifully and accurately by the project team during project execution, it remains for the project manager only to report earned value and related metrics, for example calculating estimated project completion values, performance measures and indexes.

Reporting is the easiest part of performance measurement provided that all prerequisites, including planning and recording actual cost are met. What is done with the reported information is another matter. Sometimes stakeholders are not really interested in the status of the project and do not even look at the status report, rather, they just want to know when will the project be complete and why is it late.

Many IT organizations do not take indications of trouble on software development projects seriously enough as they arise. This may be due to the low level of project management maturity in organizations where it is not understood why project management adds value to the organization. Another issue is that project managers themselves often do not want to report that their project is heading for trouble, believing that they will handle any issues that come along.

A very typical mistake in software project management is believing that a project that is running late during initial phases of execution will still be able to catch up in later phases and finish on time. This is practically never the case. According to a study by the DOD which examined historical information on over 700 projects since 1977 it has been shown that when a project is at least 15% complete, any acquired overruns will persist until the end of the project and will probably increase by the time the project is completed, they will definitely not decrease. The explanation of this finding is that if the project team underestimated the initial phases of the project it is very likely that they underestimated the complete project.

Figure 2 shows an example of a real life project that was consistently running late from the beginning and was adding lateness as the project progressed. Even when it was obvious from the diagram that the lateness was accumulating during the initial weeks of the projects the management still did not take status reports seriously enough to approve additional resources to the project or to authorize any other corrective action that would bring the project back on course. The consequence was that the project was considerably late.

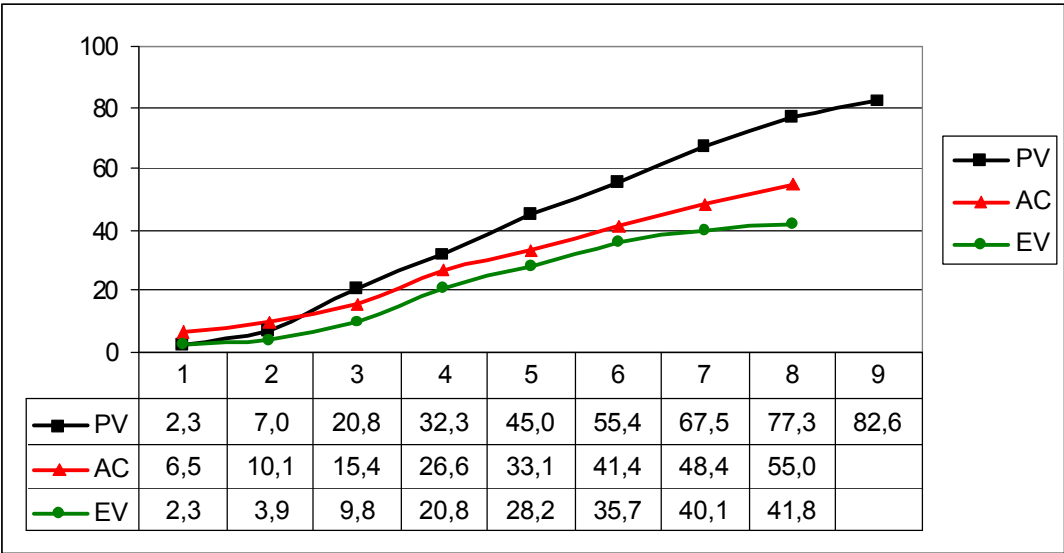


Figure 2: Example of EVM on a project that completed late due to insufficient resources

Another example of a typical software development project that was late and over budget is shown in Figure 3. The project was considerably late, but the status report consistently reported that the earned value was 80% for several consecutive months.

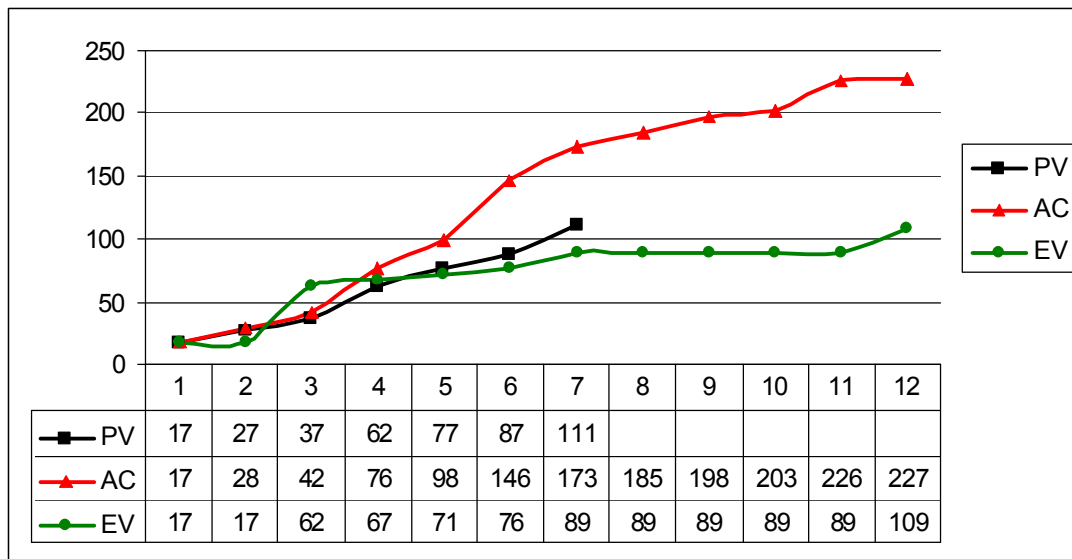


Figure 3: Example of EVM on a project that was late and over budget

Conclusion

Mature project management with formal project status and progress reporting procedures provides a realistic picture of the project, the resources it is using and the progress it is making towards its goals. It enables the project outcome to be predictable which reduces uncertainty, contributes to mitigating risk and gives feedback especially on long-running projects. Regular periodic monitoring and reporting on the status of the project gives an indication of the overall project health and signals that the project may go off its planned course.

According to the Standish Group, project management is most valuable when planning new projects or enlarging existing ones. Not all projects need formal project management techniques. Project management probably should not be used on small, simple projects, when the overhead of project management is greater than the project value. However, there should be no exceptions when it comes to software development projects and there should be no excuse for stakeholder inaction, especially when status reports indicate potential trouble.

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