EARNED VALUE MANAGEMENT

CLOGS PROFITS

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EXECUTIVE SUMMARY

Today's engineer-to-order and other project-based businesses are being tasked to deliver more projects faster but with fewer resources. To perform, they must no longer need to feel stymied by the limitations of traditional "politically correct" processes such as earned value management that hinder projects from being completed on time, within scope, and on budget.

An execution management method, based on the principles of Eliyahu Goldratt's book, *Critical Chain*, keeps execution synchronized throughout the organization and allows resources to be concentrated on only a few projects at a time. It also provides a simpler, more effective way to assess the urgency of each task. As a result, managers receive early warning signals so that emerging issues are resolved before they threaten getting things done on time, not after the fact.

Project-based organizations (PBOs) have struggled with the challenge of managing projects and getting them done on time and on budget. Unfortunately, the problem remains unsolved, even after investing billions of dollars in techniques ranging from critical path method/project evaluation and review techniques (CPM/PERT) to earned value management (EVM) and in software ranging from enterprise resource planning (ERP) to project portfolio management (PPM).

EVM embodies all that is wrong with traditional approaches. It is supposed to measure project progress in an objective manner, combining the measurements of technical performance (i.e., accomplishment of planned work), schedule performance (i.e., behind/ahead of schedule), and cost performance (i.e., under/over budget) within a single integrated method. EVM claims to provide an early warning of performance problems. EVM also promises to improve the definition of project scope, prevent scope creep, communicate objective progress to stakeholders, and keep the project team focused on achieving progress.

In reality, EVM is counterproductive. Although its goal — requiring organizations to provide accurate effort estimates in planning and achieve them in execution — sounds good, that's about the only good in EVM. If such good planning and execution were the results of EVM, its projects would be on schedule and on budget. However, re-

ality sings a different tune. EVM measurements ignore a simple fact: Projects are full of uncertainties:

- Customer requirements change.
- Technical problems are found.
- Additional work is discovered.
- Vendors do not deliver on time.
- The work materializes slower than expected.
- Approvals do not come in on time.
- Priorities change.

Moreover, as uncertainties multiply, plans go awry. Lacking a secure way to prioritize resources across multiple projects, people are constantly pulled from one project to fix other projects' problems. Priorities become unclear and people start multitasking. The result is not surprising; delays and firefighting break out all over.

Experienced managers intuitively know the devastating effects of uncertainties and contention for resources. Therefore, they respond by starting their work packets as soon as possible to have any hope of meeting their commitments. Unfortunately, when too much work is in execution, it only increases contention for resources.

Even though this scenario is repeated from project to project on a consistent basis, organizations always seem surprised by the ensuing schedule slips on their present-day projects. Again and again, they shift their focus from that of delivering projects to that of explaining delays.

Safeties can be sins

Add to these uncertainties and resource contentions another reality — the need to hold people accountable. Anybody who has ever managed projects knows that this is the *gordian knot* of project management, a problem that may be intractable. Nonetheless, traditional methods, such as EVM, assume a perfect world, one where events can be precisely planned and everyone knows exactly when tasks will get done.

Simple, standalone projects can accommodate uncertainties by adding

a little safety, a buffer, in each task. However, in more complex projects with resources shared across projects, small uncertainties multiply as delays on one begin to impact others as they contend for the same resources. As a result, the required safeties become immense, forcing many tasks to take way too long. That's why creating precise schedules for people and tasks is actually a recipe for disaster in multiproject situations. Yet this is what traditional project management methods, such as EVM, are forcing people to do.

Under EVM, if you're a manager who wants to be on target, you need to add a lot of safety into your estimates. The results? Student syndrome and the law of Parkinson! People will either wait until the last possible moment before starting the task, eating up safeties, or work will be expanded to fill the time available, meaning a lot of time is wasted doing things that just aren't needed. Bottom line: Projects will take too long and cost too much.

EVM measurements also encourage the execution of easy tasks that do not lie on the critical path, rather than the ones that are critical but difficult. It's human nature. Prioritize the five most important things you need to do today. If No. 3 is the easiest, don't you tend to do it first because your next monthly EVM review will shine? In project execution, this tendency to "earn value" also leads to quality disasters because it tempts project participants to do tasks out of sequence.

Over and over, project participants are forced to multitask in order to catch up. People are forced to open and work on new tasks instead of solving problems on their current ones. As these open tasks begin to pile up, managerial and problem-solving bottlenecks begin to form and bog the entire project down. In fact, projects managed using EVM actually "earn value" and show progress comfortably in the beginning. Then,

> **EVM embodies all that is wrong with traditional approaches.**

oops, there are no more easy tasks and everything comes to a screeching halt. And there you are again. The project becomes overdue and goes over budget, just like the projects before them and the ones to come.

Nonetheless and with the insanity of the same thing being done over and over with the same bad results, most organizations continue to bow to the "politically and corporately" correct gods of EVM/ERP, planning, collaboration, communication, and the other management trends of the day.

SYSTEM SERVICE

An execution management system synchronizes your organization's execution priorities and alerts your management to prospective problems, providing time for them to successfully intervene. It comprises:

- **Operational goals and measurements**: Goals and measurements communicate the performances and activities that are expected from managers. To assure overall success, operational goals must be in line with business goals, and measurements promote synchronized execution and impart timely interventions when early warning signals appear.
- **Management policies and processes**: Management policies enforce the new rules and management processes translate these rules into decisions and actions that all can readily understand.
- **Execution-oriented project plans**: Project plans not only capture the dependencies between your tasks and resources, but also encapsulate management decisions. These plans are not so detailed that control becomes difficult but do need to have enough detail to provide good execution priorities.
- **Management information**: Management information consists of execution priorities, early warning signals, and execution diagnostics. This information should be current and available — on demand — to all managers.

After execution management, an aircraft in the repair cycle is ready for use in 80 days less than before execution management efforts.

A MODEL PBO

Warner Robbins Air Logistics Center is the largest industrial complex in Georgia, employing more than 25,584 civilian, contractor and military people. Before execution management, the C5 aircraft production line's turnaround time was 240 days with 13 aircraft in the repair cycle. After execution management, turnaround time is shortened to 160 days with only seven aircraft in the repair cycle.

At the Franz Edelman Award Competition in 2006, Ken Percell, chief operating officer of the center, affirmed, "The increase in C-5 availability has generated an additional 180 million ton-miles of airlift capability. For our Air Mobility Command operators, that will result in revenue generated of $49.8 million per year.

"While our line required 12 aircraft, global mobility depended on realignment of C-17 aircraft to perform some critical C-5 missions. The additional C-5's had a replacement cost based on C-17 equivalents of $2.37 billion. This is an immediate realization that has made it easier for the Air Force to discontinue C-17 production early as the C-17's return to the original missions."

Management news isn't all bleak

Adding people and processes to track and report delays without changing the rules of managing execution will not help, nor will making managers more skilled at fighting fires and negotiating resources for their projects. To obtain the required leap in performance, old rules for running projects must be abandoned, including EVM.

The positive news is that effective rules for managing project execution, based on Eliyahu Goldratt's theory of critical chain, have now been proven in a wide range of environments. Execution management is the process that uses these rules and keeps resources across the entire organization synchronized and focused around a uniform set of task priorities.

Following are the new rules for managing project execution:

1. Don't start projects as soon as possible. Contrary to conventional thinking, starting all work as soon as possible is counterproductive. It creates bottlenecks, gives rise to confusion about priorities, and induces multitasking. Instead, successful execution begins by acknowledging that the most heavily loaded resources (constraints) determine how many projects can be done. Releasing projects faster than what the constraints can handle is useless.

Limit the number of projects in execution, based on capacity constraints, and sequence and release projects into execution based on the availability of those constraints.

TIME, NOT MONEY

When managing projects, making efficient use of time is the key to success. This is true from both operational and business perspectives because:

• When projects start running out of time, an organization experiences more than just project delays. There are cost overruns and, all too often, compromises in scope and quality. Even though managers attempt to attack cost overruns by trying to make their resources more efficient, it is well-documented (and common sense) that the longer a project takes, the more resources it will consume. In fact, when pursuing "resource efficiency," managers actually stretch projects out, increasing costs.

• Once projects fall behind, expediting costs are often incurred.

• For capital-intensive projects, the longer the project takes, the higher the cost of the tied-up money.

• In multiproject organizations, time also equals throughput. The faster that a project gets completed, the faster new capacity becomes available to do the next project.

There is no argument that processes and discipline are essential for ensuring that customer requirements are understood and met and that work gets done with high quality, but these goals are easily compromised when projects come under time pressures. Creating time is vital for following quality processes and discipline.

From the viewpoint of business performance, whether the organization develops new products, constructs infrastructure, overhauls aircraft, or shuts down plants for maintenance, the faster the project gets done, the more value it delivers. As product life cycles continue to shrink, faster time-to-market translates into higher pricing and larger market shares. The faster the infrastructure project gets finished, the faster its benefits start accruing. Faster turnaround in aircraft repair and overhaul equates to higher fleet availability with less aircraft. Faster completion of plant maintenance frees up higher productive capacity.

Project-based businesses that feed into these value chains are able to create competitive advantages for themselves by guaranteeing on-time delivery of their sub-projects. And, if they are on the critical path of overall projects, they can even charge a premium!

2. Don't turn task estimates into commitments. Contrary to conventional practice, turning task estimates into commitments only prolongs projects without increasing the chances of delivering them on time. When people are held accountable for task level estimates, they build in safeties to protect themselves against uncertainties. In execution, these safeties get wasted due to multitasking.

Don't measure people against estimates to condense task-level safeties into strategic buffers that protect the longest path of the project rather than each individual task.

3. Don't create precise schedules for resources at planning time. Set task priorities in execution based on how much buffer is remaining. Tasks with the lowest buffer ahead of them get the highest priority. Furthermore, if buffers in a project are running too low, managers and executives now have the early warning signals that allow them to intervene when there is still time.

Organizations as varied as aircraft maintenance and repair, new product development, and engineer-to-order manufacturing are using execution management to raise their outputs by 10 percent to 40 percent rather than a miniscule two to four percent that the rest of the players in their industry are targeting. They have become more responsive to customers (lead-times are shorter) and avoid large investments and expenses (more can be done with less). These organizations are large and small, public and private.

It's been said, "The more complex a problem is, the simpler its solution ought to be." So it is with execution management, which simply and efficiently helps executives identify constraints, assign buffers where they achieve the most, and drive execution priorities based on relative buffer consumption. By getting updated estimates of time-to-completion from currently active tasks, they can stay on top of how much of the buffer is consumed in an ongoing fashion. As long as there is some predetermined proportion of the buffer remaining. If task variation consumes a buffer by a certain amount, they raise a flag to determine what they might need to do if the situation continues to deteriorate. If it deteriorates past another point in the buffer, they put those plans into effect.

(And, if the customer demands EVM updates, go ahead and provide them. Just keep EVM far from your execution management system!) ❖