COST ENGINEERING'S VITAL ROLE IN STRATEGIC MANAGEMENT

John K. Hollmann PE CCE [1,2,3]

[1] Consultant/Owner, Validation Estimating LLC, USA
[2] AACE International Technical Board (Editor: Total Cost Management Framework)
[3] ICEC Region 1 Director

Short Abstract

In terms of impact to company profitability, the cost engineering profession's most vital role is to support effective asset management strategy deployment, not project control. AACE International defines that vital strategic role in its new text *The Total Cost Management (TCM) Framework* (1). The *Framework* defines and maps a "strategic asset management" process that includes asset performance measurement and assessment, asset planning, and project initiation (if a project is the selected option) over the life cycle of the enterprise's asset and project portfolios. This paper describes that strategic process (and the rest of the *TCM Framework*), and the vital role of cost engineering practices in its successful application.

Keywords: Strategic Asset Management, Cost Engineering, Total Cost Management, TCM

Paper

Introduction/Background

An overall objective for most companies is to improve profitability; usually measured as return on capital in some flavor (e.g., ROI, RONA, EVA, etc). Strategies and practices that either increase revenue or reduce capital costs, or preferably both, are what businesses want. Industry is also recognizing that profitable outcomes from capital investments are primarily driven by strategies and practices deployed before capital projects are initiated.

In response, project management societies are developing new strategic business and portfolio-focused models to address the pre-project phases. Two examples are Japan's Project and Program Management for Enterprise Innovation (P2M) model [1], and the Project Management Institute's Organizational Project Management Maturity Model (OPM3) [2].

Technically speaking, the cost engineering profession is helping lead these strategic developments. AACE International has developed a strategic model called the *Total Cost Management (TCM) Framework*[3]. This model, which will be described in this paper, addresses the application of cost engineering practices in both strategic asset management and project control processes.

It is fitting that cost engineering help lead strategic developments because cost engineers should be in the business game long before management mentions the word "project". Practically speaking however, most cost engineers have minimal strategic management experience. Most are employed by E/P/C and A/E/C contracting and consulting companies performing post-initiation project planning and control functions. While the profession was founded in the 1950s largely by owner-employed cost engineers with strategic concerns[4],

their proportional representation (at least in leadership roles) has decreased as owners outsourced their strategic asset cost knowledge and cost engineering competency.

In 1983, Edward Merrow, reporting on ground-breaking project cost research at the Rand Corporation [now Owner/CEO of Independent Project Analysis, Inc. (IPA)] said "among the 30 or so owner companies that I know reasonably well,...not more than a handful of those companies are seriously willing to invest in internal efforts to fashion better estimating tools."[5] Sadly, these companies included many of the process industry's leading companies. Unfortunately, the situation has not improved much. In 2001, as an invited speaker at AACE's annual meeting, Mr. Merrow challenged the cost engineers in attendance to invest in better serving the business strategy side of companies or risk becoming irrelevant as a profession.

There are signs that owner thinking is changing. For example, since 2001, the number of owner companies that had more than 5 AACE members has increased by about 10 percent. The growing list of "positions offered" by owners in AACE's website is another good sign.

We can turn these signs into solid trends if we accept and act on the knowledge that the cost engineering profession's greatest potential contribution to company profitability is to improve company capital asset management. Project control is still important, but contributes less from a business profitability perspective. Owner business management will recognize, value and hire cost engineers (and maybe compensate them better as well) when we fully embrace, communicate and fulfil this vital, pre-project strategic role. The *TCM Framework* provides a map to help tell the story and guide us.

Total Cost Management

The AACE International Constitution and Bylaws defines *total cost management* as "the effective application of professional and technical expertise to plan and control resources, costs, profitability, and risks. Simply stated, it is a systematic approach to managing cost throughout the life cycle of any enterprise, program, facility, project, product, or service. This is accomplished through the application of cost engineering and cost management principles, proven methodologies and the latest technology in support of the management process." Put another way, total cost management is the sum of the practices and processes that an enterprise uses to manage the total life cycle cost investment in its portfolio of strategic assets.

The *TCM Framework* puts this all together in a process map or model format. The process is not intended to be a set of rules or work procedures. It is best used as a complete, integrated "go-by" process model or guide from which users can build or assess their own processes.

The Basis Model—Plan, Do, Check, and Assess (PDCA)

The TCM process model is based upon the PDCA management model known as the Deming or Shewhart cycle. The PDCA cycle is the framework for TCM because:

- it is time-proven and widely accepted as a valid management model;
- it is quality driven; and

• it is highly applicable to cost management processes that are cyclical by nature.

Interestingly, the Project Management Institute also chose to use PDCA as the basis of its process maps in the PMBOK Guide 3rd edition after AACE introduced the concept in 1996. [8] Figure 1 illustrates the PDCA process steps.

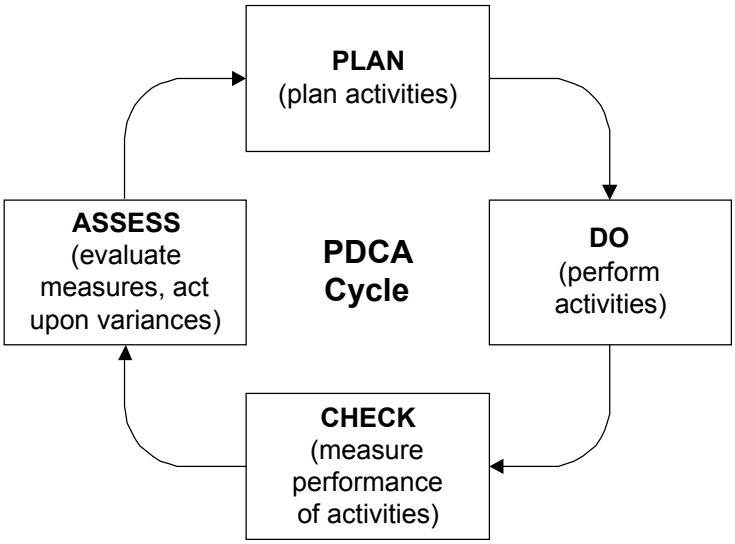

Figure 1: The Plan, Do, Check, Assess Cycle

Total Cost Management Process Map

Figure 2 shows the "mile high" TCM process map. The figure shows how the PDCA model is applied recursively (i.e., in a nested manner)—the basic process is applied for each asset and group or portfolio of assets, and then again for each project being performed to create, modify, maintain, or retire those assets.

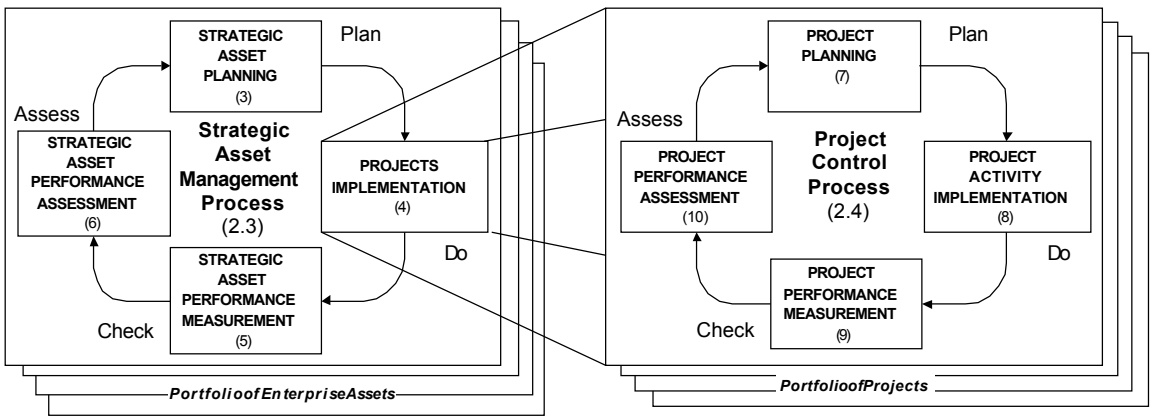

Figure 2: Total Cost Management Process Map

The two sides of the TCM process in Figure 2 are referred to respectively as the *strategic asset management* and *project control* processes. Project control is a recursive process nested within the "Do" or project implementation step of the strategic asset management process.

Strategic Asset Management Process Map

Strategic asset management is not concerned with day-to-day project tasks; it focuses instead on monitoring and assessing asset performance, and initiating and managing the overall portfolio of projects in a way that addresses the strategic objectives of the enterprise. To twist an old saying, it is concerned with making the right investment (project or otherwise) rather than with doing projects right (i.e., not all investments are a project).

Figure 3 shows an expanded version of the strategic asset process model included in TCM. The numbers in each step refer to the sections of the *TCM Framework* that include the process maps for each step.

The strategic asset management process starts in the upper left of the figure with assessing enterprise strategies and objectives, stakeholder needs and desires, and resource constraints, and from those, establishing asset performance requirements. From there, it cycles through the asset planning and decision making, measurement, and assessment steps or subprocesses.

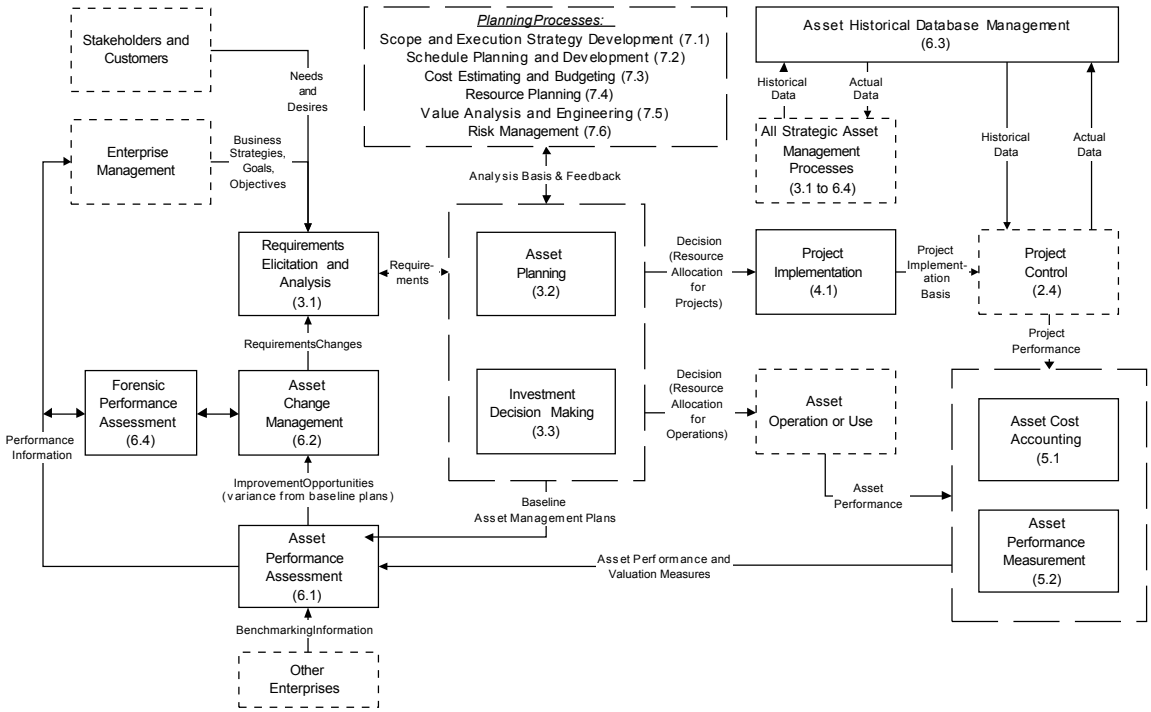

Figure 3: TCM's Strategic Asset Management Process Map

The asset management process requires that cost engineers have skills and knowledge in statistics, modeling, economic analysis, systems engineering, quality and value management, finance and accounting, and decision analysis. These are strategic planning and decision making competencies.

Logically, cost engineers, who have both a working understanding of assets and cost management competency, should lead this process. However, industrial engineers [e.g., Association for Operations Management (APICS)] and management accountants [e.g., Institute of Management Accountants (IMA)] have historically filled these strategic roles.

While these fields are now leaders in methods such as activity-based costing (ABC) and enterprise resource modelling (ERP), they started by borrowing from cost engineering's play book. By focusing on project execution, the cost engineering profession effectively ceded the strategic ground to these professions. For example, project planning has always been inherently "activity-based". However, it was the management accounting world that coined the approach as "ABC" in the late 1980's and applied it to products. Similarly, life cycle cost analysis of investments is as old as the cost engineering profession; however, much of the business world thinks it was invented in the 1980s by a management consulting company (the Gartner Group) who slapped the label "Total Cost of Ownership" on it and applied it to IT investments.

Cost engineering still has a strategic advantage; these other fields have for the most part ignore the capital asset and project world while focusing on products and production. Cost engineering, through the TCM process, uniquely bridges the operations (ERP, ABC, and Performance Management) and capital (Project Management) worlds and pulls the methodologies together. It is a truly integrative, strategic framework for practice areas we must effectively recapture or at least keep up with.

Project Control Process Map

Project control is a process for controlling the investment of resources in an asset. The process illustrated in Figure 4, based on the PDCA cycle, is one that most cost engineers work in and are likely to recognize.

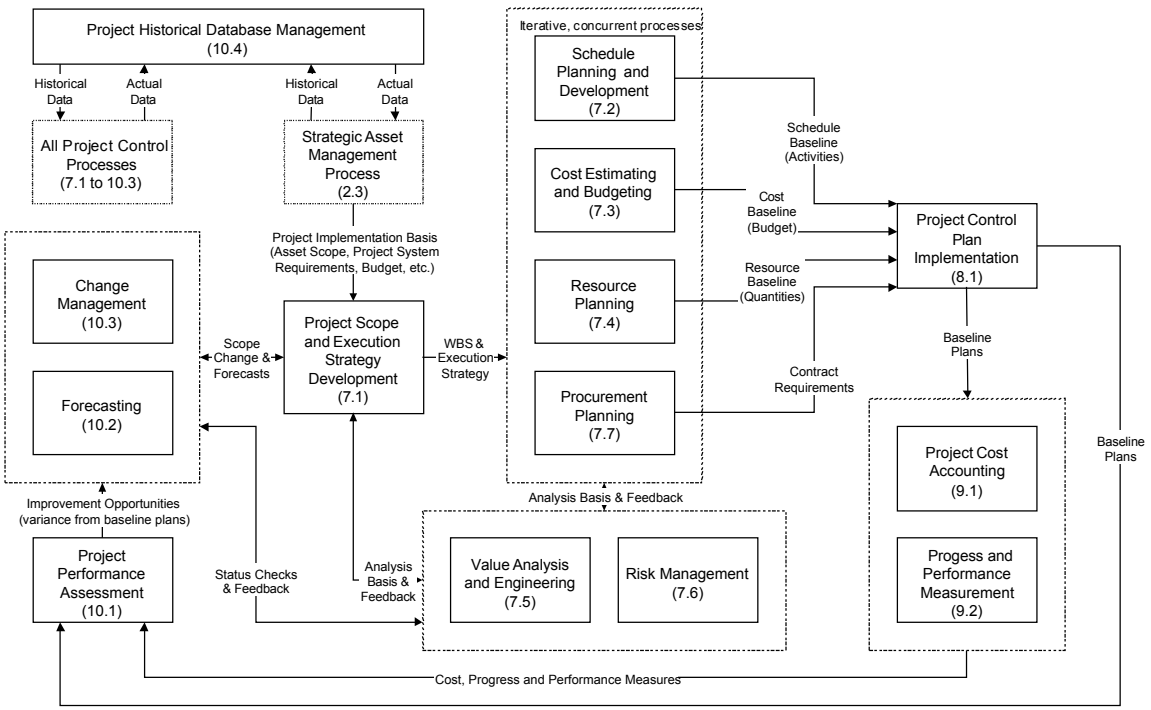

Figure 4: TCM's Project Control Process Map

Project control cannot make a bad investment profitable; the objective of "control" is to make project outcomes predictable. Strategic asset management is where business profitability is largely determined. Fortunately for cost engineers, strategic asset management and project control include many of the same competencies. In particular, cost estimating, risk management, and value engineering apply to both processes.

Returning to the background discussion in the introduction, it has been unfortunate that project control practice has not improved in recent decades any more than strategic asset management. Surveys by Pathfinder Inc.[6] and empirical research by IPA Inc.[7] found poor practices and outcomes. As Louis Cabano, President of Pathfinder Inc. said in 2002, "…there is widespread disillusionment and loss of confidence in the owner community regarding project control results and value-added contributions."[6] Hypothesized causes include owner outsourcing of the competency and over-reliance on increasingly powerful software and "processes" rather than the experience and competence of professionals. We need to develop competency in our organizations, not just process maps.

Strategic Competencies

As shown in Figure 5, AACE has taken the additional step of aligning its competency expectations (11R-88, Required Skills and Knowledge of Cost Engineering) with the *TCM Framework.*[9] This competency model, updated in 2005, includes enhanced coverage of the skills and knowledge required for strategic asset management such as requirements analysis, statistics, modeling, and decision analysis.

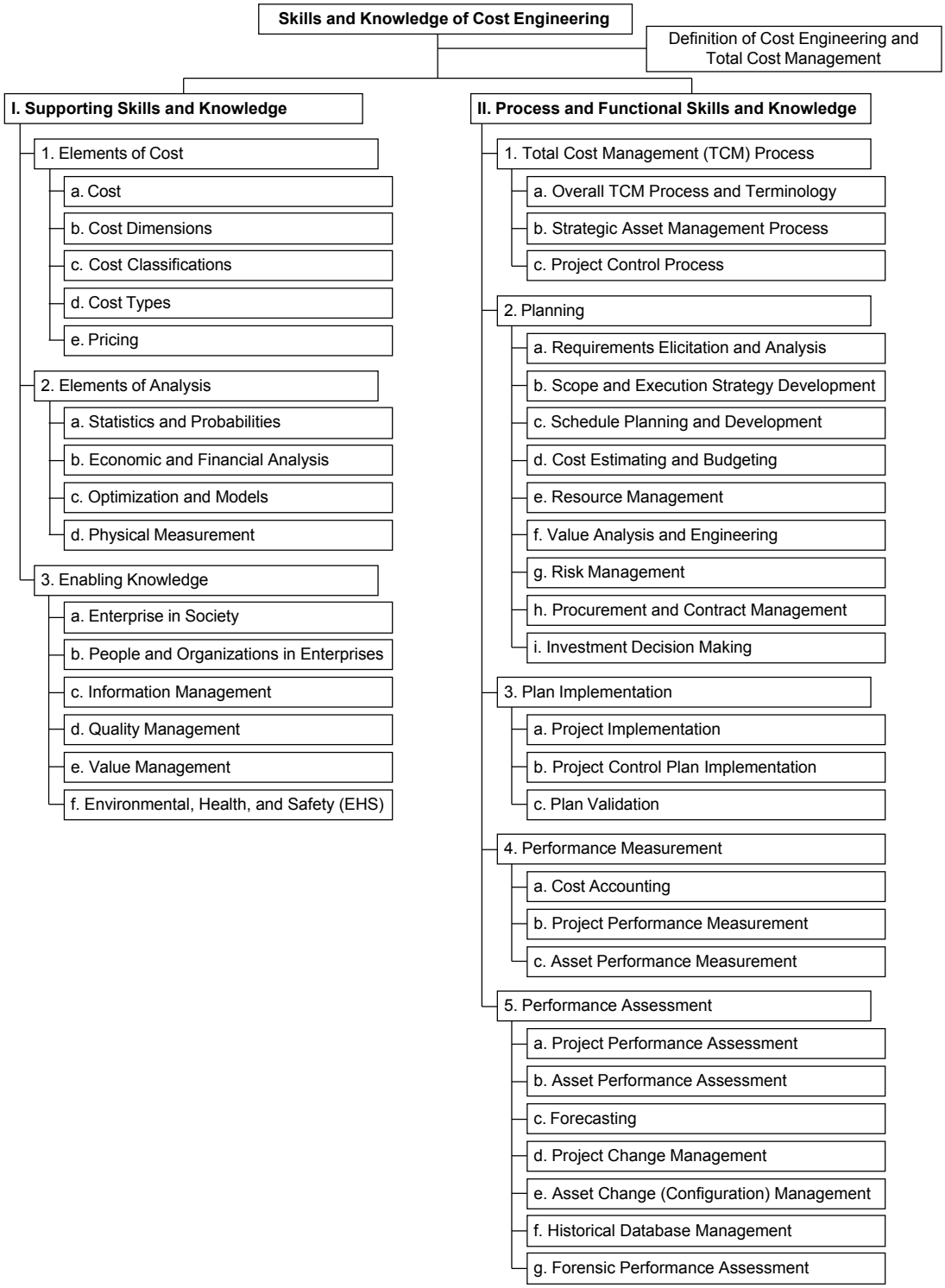

Figure 5: AACE's Required Skills and Knowledge of Cost Engineering

Conclusion

Understanding project cost estimating, scheduling, and control is not enough for many cost engineers at owner companies; they must also understand asset life cycle cost management. They must be able to support business management and their investment decisions (project or otherwise), not just project management. Cost engineers at contractor companies must also be prepared to support their owner clients. AACE International explicitly recognizes this fact in

the new *TCM Framework* text and its updated recommended practice 11R-88 *Required Skills and Knowledge of Cost Engineering* described in this paper.

We must not cede life cycle asset cost management practice to the planning engineers and management accountants who have staked that claim. We know that cost engineering uniquely combines technical, working understanding of assets and projects with cost management skills and knowledge. We know our companies assets inside and out; we know how our companys' projects work; now, we need to let management know what we know and get to work. Let's make sure everyone recognizes cost engineering's unique and vital role in strategic management.

REFERENCES

1. Project Management Institute (PMI), An Executive's Guide to OPM3: A Guide to Strategic Success, Business Improvement and Competitive Advantage, PMI, Upper Darby, PA, 2004.
2. Project Management Professionals Certification Center (PMCC), A Guidebook for Project and Program Management for Enterprise Innovation (P2M). PMCC, 2004.
3. Hollmann, John K, editor, The Total Cost Management Framework: A Process for Applying the Skills and Knowledge of Cost Engineering, AACE International, Morgantown WV, 2006.
4. Morris, Robert R., AACE International; 50 Years of Service 1956-2006, AACE International, Morgantown WV, 2006.
5. Merrow, Edward W., Cost Growth in New Process Facilities, P-6869, The Rand Corporation, Santa Monica, CA, 1983.
6. Cabano, Louis, "Project Control" – To Be or Not To Be, Continues To Be The Question!, PM Panorama, http://www.pathfinderinc.com, Pathfinder Inc, Summer 2002.
7. Hollmann, John K., Best Owner Practices for Project Control, Cost Engineering, Vol. 45, No. 09, AACE International, Morgantown, WV, 2003.
8. Project Management Institute (PMI), A Guide to the Pr6ject Management Body of Knowledge (PMBOK® Guide), 3rd ed. Upper Darby, PA: PMI, 2004.
9. AACE International, Required Skills and Knowledge of Cost Engineering, Recommended Practice 11R88, AACE International, Morgantown WV, 2005.