

A Not So Brief Assessment of:

Total Project Control: A Manager's Guide to Integrated Project Planning, Measuring, and Tracking. Stephen A. Devaux, John Wiley, 1999.

Summary and Recommendation

There's is great risk in writing about Devaux's book since in the past any suggestion that there are flaws in the concept described in the book has brought accusations of unprofessionalism.

I have a professional interest here though, since the development of project management tools is within my job description. Steve suggested I read the book then make an assessment of the ideas.

This is what I've done, but I suspect that my comments will not be well received.

I come to this book with some trepidation, mainly because of the suggestion that there is something missing from professional project management that can be addressed by the TPC method. My sense is this is a solution looking for a problem.

Devaux states in the preface, pp. xviii, ... "that TPC views the entire project process, from initial conception through delivery to the customer, as a coherent whole. It offers a major improvement over traditional project management..." This appears to be restating the obvious. What professional project management process and manager *would not* consider all the external and internal impacts on the project success? ^[1]

Let me qualify this opinion, before the *flames* start flying my way. I work as a Business VP in the Communications Group of [CH2M HILL](#), a \$2.2B project completion services and engineering management company. Our first level project management handbook ([Project Delivery System: Fourth Edition](#), CH2M HILL, 2001, ISBN: 0-9652616-0-3), defines [process steps](#) with identical outcomes as suggested here. The understanding of the processes and behaviors of a project manager are assumed to be present in anyone holding that job title.

I know there will be many who have their own personal "war stories" of how bad a particular project was managed. I'd contend that these stories do not reflect the profession, but rather are a reflection of "amateur" project management. Starting a book with the premise that "folks who are not professionally trained are doing it wrong..." seems to be a weak beginning.

The book suggests that professional project managers "don't" address projects as a whole. No doubt there are examples of failure, but are these the outcome of not addressing the project as a whole? [Terry Williams'](#) provides many references for the analysis of project failures.

It is also suggested that "traditional project management" neglects this "whole." Is this neglect a result of the failure to use the tools or training that project managers already have? Is it a failure to use the standard processes – PMBOK for example? Do project managers really need a new method, or do they simply need to use the methods, processes, and frameworks already in place as a

¹ Before going any further, let me state that PMBOK pg., Figure 1-1, shows the "overview of Project Management Knowledge Areas and Project Management Processes." §5. is *Project Scope*. I've come back to this paragraph and now feel Devaux has simply mislead the reader. The premise of TPC is that "...the scope of work is never quantified in a way that can support decision making." pp. xviii. This seems to be a red herring on which the entire book is based.

profession. Since there obvious needs for improvement in managing project, hopefully this book will answer that question.

The book describes several scenarios where projects have failed. I found these descriptions to be too narrow and anecdotal. One place to look for actual experiences on projects – and avoid much of this anecdotal approach is the [Major Projects Association](#) publications web page. Here are lessons learned from major projects. The reader “may” find a specific project management method is not the source of failure in many large and complex projects. This concern is a digression from the core premise of the book – that there is a “new and unique method of managing projects beyond that found in the current PM literature and practice.”

“The difference between a vision and an hallucination is the number of people that see it.”
– T. Paulson

In the end the though book seems to add little to the literature of managing projects, especially since there is a complete absence of a bibliography from which to do further research. There is a presentation of the DIPP indicator, but for the most part the book’s title goes unfulfilled. Much is a restatement of previous works, again without references. In addition the development of DIPP is weak, since the underlying theory of “expected monetary value,” is not developed at all – only announced without definition. For \$89.00 these gaps are even more troubling.

At a detailed level, DIPP (Devaux Index of Project Performance) and other “home brew” indices, offer little in terms of newness or business value, beyond estimates already in place. Expected Monetary Value (EMV) and “real options” theory are mature performance assessment processes. Devaux takes these concepts and uses the Estimate to Complete (ETC) in the denominator to construct his index - DIPP. DIPP is not a well behaved indicator though, generating a “divide by zero” error when the project nears its completion. This is not desirable behavior near the end of a project where careful “leading indicators” are needed to produce a “soft landing.”

In addition, DIPP has non-linear behavior through the project’s life cycle, so the user does not know the units of measure at any specific point in the project. This indicator is neither an unbiased point ^[2] statistic, nor stable over the area of evaluation. Both of these attributes are required for a reliable indicator for decision making.

Later in the book it is mentioned that cost is part of EMV. This concept is not found in the normal definition of EMV. Without references, it is hard to trace the development of this non-standard definition.

Another major disappointment, as mentioned above, is the complete lack of a bibliography or reference materials. It is unfathomable in today’s mature project management profession that Devaux would have no documented basis for his ideas. To this point there is no reference to the Expected Monetary Value (EMV) concept or risk management using EMV. Both are mature processes in project portfolio management and the risk management associated with making decision choices in the presence of statistical uncertainty.

The core flaw in the DIPP concept is that it does not consider the sunk costs of a project in the estimate of the “project profit.” By

² A statistic is unbiased estimate of a given parameter when the mean of the sampling distribution of that statistic can be shown to be equal to the parameter being estimated.

ignoring the sunk cost, or at least by not insisting it be considered, Devaux creates a unstable index of the benefits of the project. By using only the Estimate To Complete (ETC) and the Expected Monetary Value (EMV) produced by the project, the past is ignored. "Real Options" theory is a much better starting point for the goal suggested by Devaux.

There are several good books already on the market including [*Project Finance: Tools and Techniques*](#), and numerous web sites that can be found searching for "project management, expected monetary value, real options." In addition the use of "sunk costs" as a project performance assessment depends heavily on the culture in which these costs are examined. ^[3]

For any predictor of the future, it's critical to understand the concept of a posterior statistic – one in which a revised probability is obtained after receiving new information. Instead of ignoring the past sunk costs, it should be a source of information used to forecast future outcomes.

In a project management situation the Estimate to Complete (ETC) and the expected monetary value (EMV) of the project depend on the previous "sunk" costs to arrive at the analysis point. EMV and ETC alone are not sufficient to estimate the net value (value minus costs) of the project. The effort of the past and therefore the probable effort in the future are needed as well.

Another aspect of statistical estimators of project completion value is the willingness of management to continue in the presence of uncertainty. The "estimate to complete" is a statistical estimator. A recent paper "Willingness to Continue Software Projects: Effects of Feedback Direction and Optimism under High and Low Accountability Conditions," *Journal of the Association of Information Systems*, outlines the concept of feedback optimism when making estimates of the cost to complete a software development project. The estimate to complete indicator in the book does not take into account any of the human factors involved in making such an estimate in the presence of uncertainty. The author does not take into consideration the statistical nature of ETC when used in conjunction with EMV. This is a major gap from my experience and seems to indicate a lack of understanding of the statistical nature of project related estimators.

³ "A Cross-Cultural Study on Escalation of Commitment Behavior in Software Projects," Mark Keil, Bernard Tan, Kwok-Kee Kan, Timo Saarinen, and Arjen Wassenaar, *MIS Quarterly*, 24(2), June 2000.

Recommendation

“Only the fool learns from his own mistakes, the wise man learns from the mistakes of others.”

– Otto von Bismarck
Devaux might improve this work through the research of others.

For \$89.00 I can't recommend the book. At this price point there are more mainstream works with a solid academic and field experience background.

I do not fault Devaux for the editing, reference and other theoretical gaps, since they are his own opinions, experiences, and understandings. Who am I to say they don't work for him and his followers. I do fault John Wiley's copy editor for allowing this book to go to print without peer review, references, and a bibliography. For \$89.00 it's an expensive collection of personal experiences and unsupported mathematics.

The writing of an “anecdotal experience book” has become popular these days, especially in the agile development domain. I'm too steeped in the hard sciences (physics and finance) to see this anecdotal approach as a desirable to any professional discipline.

A More Detailed Review

Starting with the summary review from above, I've taken a detailed look at each chapter of the book. I'll write the analysis as I go, so there may be comments on current chapters that are addressed later in the book.

First though, there are some serious issues with the book:

- There is no bibliography or reference list. An expensive book on a detailed and technical subject without a bibliography and references is simply unacceptable in today's world. ^[4] The author must have some collection of resources on his shelf that were used to derive the ideas found in the book. More importantly when he quotes others, there is no reference, when he makes blanket statements there is no backup source. He claims all the sources are well known to the reader, or can be found in PMI or other common locations. This is simply laziness at best or a lack of understanding of the knowledge development process needed in a professional development book at worst.
- There needs to be better copy editing. "Product" and "project" are often used interchangeably. References to product management roles are mixed with project management. Claims are made that traditional project management deals only with time and cost, not "scope." Chapter 5 of PMBOK is dedicated to scope management. The premise of TPC is based on the absence of "management of scope." This premise is seriously weakened by ignoring the PMBOK's description of the role of the project manager in controlling scope.

Introduction

In fact one could make the case that "scope" is the raw material used by the project management software to derive cost and schedule.

Devaux presents a triangle of project attributes: Time, Cost, and Scope. He states that project management packages address time and cost, but not scope. It's not clear this is the role of a project management package since the responsibility of the project manager using the package to define and manage scope not the software package. A brief background on the history of PM and some of the common components is then given.

A description of PM in the software industry (where I work) starts with an anecdote from a CIO commenting on the use of project management "...that stuff may work when you're dealing with manufacturing ... but it won't work in software." I'd contend this CIO is not qualified for her position, and Steve should get better clients. There are certainly many examples of disastrous decisions regarding PM in the IT business, but these are "human failings" that no methodology is going to fix. Bad-managers.com is a good place to look for real life examples. But like all anecdotal evidence ("I knew a guy once ...") it doesn't make for good analysis since there is almost always some underlying difficulty not associated with the primary problem.

⁴ The last person to produce a significant work without any reference was Albert Einstein's Nobel Prize winning paper on the photo electric effect.

Devaux seems to be laying the groundwork for the use of his methodology – TPC - as a solution to the problem of bad management. More anecdotes are given about “boneheaded” decisions regarding project management. As a side-bar I’m really adverse to text books and technical materials based on anecdotal examples. Unlike Terry Williams or Capers Jones who have done extensive research in the field, Devaux’s examples seem to be too personal as well as extreme examples to be accepted as general behaviors of the discipline.

Chapter 1

There seems to be a theme in the PM discussion forums that PM’s can “save the world.”

“If those bonehead business guys would just adopt project management methods, they’ll all be successful...”

This is a “cartoon” of course, but it seems to be a growing trend. The same occurred when XP software development discussions first started. They got through it, once they had to actually deliver on the promises of XP for the business guys, the reality of their blue sky promises of eliminating management came home to roost.

This chapter opens with a discussion of the complexity of projects as the source of problems. This echoes the work of many other authors. Again the Williams book provides an in depth assessment of the complexity issue and its impact on project work. A project is defined using the generally accepted wording, “a group of people, performing a task within a defined period, for a specific goal.”

Turner’s [The Handbook of Project-Based Management](#), provides a more in depth description of what a project is. This includes some important attributes that are critical to applying statistical project controls – the source of the TPC method based on EMV.

Projects:

- Bring about revolutionary (as opposed to evolutionary) improvements;
- Therefore create a state of disequilibrium, so the project manager must disrupt the status quo (as opposed to balancing conflicting requirements to maintain the equilibrium);
- To some extent always start without precedent; and
- Are risky because a project starts from limited experience.

These attributes seem to better position a project for the application of TPC-type processes. Understanding these attributes isolates all the “whining” from managers about getting everything right the first time. It’s simply not possible to “manage by planning” your way to a success and at the same time have minimal cost and schedule. They are mutually exclusive goals. Much work on “management as planning” can be found in the Lean Construction literature.

Starting on page 6 is an “anecdote” of a software product being managed to failure. Devaux’s description mixes project management with product and marketing decisions. In this tale, the PM is making all the decisions about product features, release dates, de-featuring promised features, shipping without approval of the CM board, etc. No wonder the product and the company got into trouble – there’s no product marketing (VP marketing role), there’s no business management (VP Operations role), there’s no financial impact assessment (CFO role).

Suggesting that good PM and especially TPC based PM would solve these problems seems a stretch. The problems described in this example are core business process issues, not solved by having good project management alone. The problems existed long before

projects were defined. They seem to start back in the board room, or at least at the senior management level. This is a common mantra for PM's in some quarters – “if you just had good PM, all your business problems would be over.” If only it were that easy, PM's would be on the board of directors of every company.

Moving to page 7, Devaux suggests that the PM is also responsible for the “profit” aspects of the project. This is wrong headed at best and simply bad business at worst. The profit aspects of a project that produces products is the **Product** Manager's responsibility in every commercial firm I've worked. Giving this to the **Project** manager simply hastens the demise of the product. Giving the “profit” part of the project away to those not responsible for the balance sheet breaks the governance aspect of the business. It removes the connection between strategy and tactics, and between management and execution. Not that PM's don't need to be deeply involved in the business management of a project – but not as responsible managers for the balance sheet of the business.

The TPC method may be useful for the Product Manager to learn about the current performance of a product development project. As well as changes in the product scope and its impact on the project can also be conveyed. But the responsibility for the project's financial success lies with the **product** manager, not the **project** manager.

Devaux concludes this page with “In the TPC approach, the true nature of the project, ... has to be comprehended fully so that the project can be managed accordingly.” The suggestion that projects are managed in isolation seems to have no basis in fact. PMBOK makes it abundantly clear that “all” aspects of the project, internal and external need to be managed. Our own PM method ([Project Delivery System: Fourth Edition](#), CH2M HILL, 2001, ISBN: 0-9652616-0-3), states the following roles of a project manager:

A Project manager should incorporate responsibilities into project management in a way that increases project performance.

This approach obviates the initial basis of Devaux's argument for TPC.

- Focus on the customer.
- Create a project vision.
- Build and maintain a project team.
- Plan and execute the project.
- Manage the resources.
- Ensure quality.

Devaux appears to create a problem and then provide the solution. But is it really the case that competent project managers ignore the core responsibilities of the role – as defined in PMBOK or any other professional PM framework? Instead of deploying TPC, how about first just getting the PM's to behave in a competent manner?

Devaux states “This is what the *total* of TPC means: The scope of work, as represented by the deliverables, is the most important part of the project.” It's hard to argue with this, since any project management text has the same statement. At this point in the book, Devaux has restated the obvious – scope is the critical factor in project work, restated “real options” theory under the banner of

TPC, and eliminated a critical part of PM (scope), then put it back under a different banner – all without one reference to the past work of others.

Next is a discussion of multi-project portfolios and the introduction of Expected Monetary Value (EMV). There is no background provided on EMV, or references to EMV materials so far in the book. A quick search of Google will bring up several academic sites with EMV tutorials.

The example that starts on page 9 that introduces EMV describes standard Project Portfolio Management processes.

- Constrained resources.
- “Real options” decision making.
- Value based decision outcomes.

It’s not clear where TPC fits into this, since the problem described can be address with “out of the box” project portfolio management tools.

Chapter 1 concludes with a restatement of the obvious:

- Projects make money (or at least provide some monetary value) to the sponsors.
- All the work impacts this “profit.” Not clear how non-profit or not for profit or level of effort and service projects are classified in this profit making exercise, but I’ll ignore this for now.
- Portfolios of projects can be managed as well.
- Managing in the absence of profit results in “bad decisions.” This is typical Devaux, where a blanket statement is made, no references, no specific examples, not much but personal opinion.

Chapter 2

This chapter starts with a conjecture that projects “...hardly get planned at all.” I don’t know where Devaux works, but for our \$2.2B engineering services company as well as our aerospace, IBM, StorageTek, Sun, Level 3, and other business park neighbors, project management and planning are part of the business process. My problem here is Devaux writes this statement not from the personal point of view “... it’s been my experience that firms don’t plan well,” but from a generalized point of view. In our firm if a person behaved as Devaux describes on page 15, she’d be removed as a PM and sent back to school to try again.

The next page describes 6 pitfalls of an unplanned project. If the project is unplanned there’s more than six pitfalls I’m afraid. His point number 2 goes off into product management again - describing a failed door latch on a minivan. How a recall for a defective door latch is connected to project management practices is not clear. The latch was not “designed” to fail, it failed after production, it got recalled. How would PM have prevented this from happening? Maybe better engineering or QA could have, but the PM is simply the “organizer and score keeper” of the work efforts in most car manufacturers, not the design or quality engineer.

Number 5 on page 17 states a project abandonment number. Where this number comes from is not provided. If you look at Jones and other reliable sources, the number one cause of project abandonment is lack of user support and poor requirements, not poor planning.

A web search comes up with several sources. http://www.it-cortex.com/Stat_Failure_Cause.htm, is one starting point. In some of its surveys it lists missed milestones and budget overages as causes of failure. But, and this is critical, it does not list the causes of missed milestones and budget overages. Is it poor planning, poor requirements, poor quality software, underfunding to start, overly optimistic management, or changing markets. The problem with quoting statistics and especially quoting a number without a reference (unforgivable in any engineering setting), is there is no way to put the number in context. Therefore the number is suspect before the real value can be applied.

Jones provides some numbers from the [Six Sigma](#) point of view that says:

- Requirements failure – 80%.
- Expectations failure – 65%.
- Released defects – 60%.
- Cost overruns – 55%.
- Configuration management – 50%.

The point here is Devaux needs to provide references and a broader set of statistics before making blanket statements.

Page 19 starts with a story about “product” planning, referencing Dr. P. R. Nayak’s paper [“Managing Rapid Technological Growth.”](#) Interestingly this paper doesn’t discuss project management per se, but rather deals with work processes, self directed teams, and incremental development. It seems Devaux is confusing product and business management with project management again. I’m sure this is not the case, since he holds a PMP.

The product management processes include project management. But they also include: marketing, finance, support, channel management, sales, rollout, etc. All these activities can have project management steps, but to invert the roles and suggest that project management is the core activity is stretching the concept too much for me personally. Project management is a service to these functions. It is not the value added deliverable of this functions.

Devaux suggests that senior managers and project leaders believe that the role of planning is to generate accurate predictions of the future (page 20). Previously Devaux suggested that more planning is needed when the future was vague. These seem to be conflicting views.

We get to page 23 and DIPP appears with no definition, or reference in the book until page 33. There are some issues with DIPP:

- It is an unstable indicator. If the ETC is zero, you get a “divide by zero” error. In the “statistical estimator” world,

this creates an unstable estimator as it crosses certain boundaries.

- The factors entering EMV are the estimated value at the end of a “natural” state. How schedule, cost, and scope are connected to EMV and then to DIPP are not defined. These connections are hidden inside the “value” part of EMV.

Page 34 states that the “sunk” costs should have little impact on the analysis of future actions. This is not true. In Earned Value, the Cost and Schedule Performance Index (SPI/CPI) are strong indicators of future performance. These indicators are calculated from “past” performance. This is a critical misunderstanding in Devaux’s approach.

Project Performance

The project manager wants to know how well the project is performing. The question is, if \$1.00 is invested in work, how many dollars of value are returned? With this information, projections of Estimate at Completion (EAC) can be made. DIPP provides no such projection, since the past performance is “sunk” and according to Devaux has “... little impact...” on the EAC. Using only Estimate to Completion (ETC) to forecast the future ignores the performance of the past and therefore is a suspect number.

The statement “DIPP indicates the expected profitability” doesn’t make sense. DIPP is a ratio (numerator and denominator), but it is not profitability, as stated on page 35. The profitability of a project or a portfolio of projects is at least earnings – cost, not a ratio of two dissimilar units of measure. The restatement of DIPP is,

$$\text{DIPP} = \frac{\text{EMV}}{\text{ETC}},$$

where both EMV and ETC are cumulative values at the end of the evaluation period. Expected monetary value is given by,

$$\text{EMV}_j = \sum_{i=1}^N X_{ij} P_i$$

where X_{ij} is the payoff for action j and event i , and P_i is the probability of event i occurring. EMV is a cumulative probability distribution. The EMV expression “accumulates” all payoffs, but the DIPP expression represents only the cost of completion for a specific numbers of events i .

When ETC goes to zero at the end of the project, DIPP blows up. Before then it’s sensitivity increases as a function of the denominator. Again a poor behavior for a statistical indicator.

This “units of measure” problem is not uncommon. Without careful assessment of the statistical properties of the cumulative distribution of EMV one might jump to the conclusion that EMV and ETC can be combined to produce a ratio. But since EMV is a cumulative distribution and ETC is a point (scalar) value – at least in Devaux’s work – measurement integrity is easily compromised.

A statistical distribution divided by a point value creates an unknown unit of measure. In fact the ETC can be seen as a statistical estimator as well. Recent work of Walter Lipke at the Oklahoma Air Logistics Center describes the details of this effort. ^[5]

The term [CLIN](#) is used on page 30 to describe the list of contract deliverables. The CLIN number is for "procured" items, including build to order. These seems like an obtuse approach in this book for defining functionality for the scope of the project. In the subpart 207.71 spec, the Statement Of Work (SOW) is called out. But it is in the SOW is itself a complex document many times containing other obtuse descriptions of deliverables.

The conclusion of Chapter 2 suggests that managing projects is about managing change. This should be the mantra of all project managers. Devaux does not yet suggest how to manage this change or resolve the conflicts associated with change. He suggests that "planning" is critical to managing change. And that accuracy in planning is critical. But before there can be accuracy there has to be knowledge of the requirements. Devaux seems to confuse accuracy with knowledge. The project manager can detect the lack of knowledge on a project. But providing that knowledge is a "user" or "stakeholder" issue. The PM cannot synthesize the knowledge nor increase accuracy in the absence of this knowledge.

The Difference Between lack of Knowledge and Inaccuracy

Many requirements are unknown. They are not inaccurate. Instead of trying to build a "detailed and flexible" plan how about building an "adaptive" plan that encourages change rather than trying to control it. This is the role of agile project management in the domain of agile software development. Fuzzy goals are NOT resolved by planning, they are resolved by making them clearer. They can be made clear by getting feedback from those who have the knowledge - these are the customers.

There's an odd footnote on page 28 – a superscript 4, with no reference. Might this be a remnant of the real footnotes that were left behind. On this same page is a description of a "typical ... corporate project that was undertaken." This work process is clearly flawed. Our process includes the PM on day one in a pre-sales role.

"Traditional PM deals only with cost and schedule..." starts a concept on mid-page 29. This simply is not true. Even PMBOK doesn't say this. Any PM book says scope control, definition, and management is core to project management. Why does Devaux keep saying this? Chapter 5 of PMBOK is dedicated to scope management.

Page 34 says and I'm trying to understand:

- "... *future project profitability is the EMV – ETC.*" This is NOT correct as stated. Project profitability is the revenue generated by the project minus the total cost of the project. EMV is an estimate of the "value" – you could call that revenue of the project. ETC is the current estimate to complete. Near the end of the project ETC may be zero (0) or a very small number. In the beginning of the project ETC is likely to equal the Estimate At Completion (EAC).
- "*DIPP is an index of the efficiency with which the project resources will be utilized until completion.*" This is actually not true, since DIPP is both unstable (divide by zero) and does not account for the sunk cost of the project. DIPP is a

⁵ Lipke's work can be found in STSC's [CrossTalk](#) magazine

measure of the value of the project at some end state relative the cost remaining to complete the project.

- *"... management has the option of increasing costs by investing in additional resources. ... organizational DIPP might .. go down, while raw profitability increase."* If the cost of the project goes up, and the EMV stays the same the profitability can not increase.

Finally reaching the end of Chapter 2 produces a summary:

- *"The entire organization engaged in project work should at all times be driven by optimization of the multi-project portfolio's profit."* This is straight out of the book portfolio management. Using DIPP as an indicator of utilization is still; problematic, but more on that later.
- *"Project profitability is a compromise among work scope, time, and cost. If work scope is quantified as EMV, the project can be measured and optimized by using DIPP."* EMV is the probability of delivering "value" (cost, revenue, some form is value to the analyst) of an endeavor at point in time. If this is the definition of scope it is certainly is a new one.

So here's the real problem so far:

- Scope is defined as EMV.
- DIPP is presented as an indicator of project performance.

Both are new and unique definitions:

- Project profit is the revenue generated by the project minus the cost of delivering the project measured for some period of time (the breakeven time, the payback time, the metric for project success time).
- DIPP is an unstable indicator that ignores the sunk cost of the project and only looks at the expected monetary value and the estimated cost to complete.

What happened to all the sunk cost? Where will it be charged? How can the past charges be ignored when asking the "project profitability" question.

Chapter 3

Chapter 3 starts with a restatement that projects consist of scope, time, cost and an emphasis on the concept that "scope" is the core issue with project management. In the section "quantifying the Project Triangle," Devaux states that "cost which is really resource usage," ignores materials, subcontractors, pass through charges, corporate allocations, and other costs associated with real world projects.

The concept that "time is money" is presented, but the units of measure for turning time into money are not well developed. It is assumed there is a linear relationship between time and money. If not of course the use of this approach with the project triangle falls apart, in the same way as cost being linearly associated with resources.

Linear correlation between Time and Cost

Figure 3.1 on page 40 shows an equilateral triangle with scope on the base, time and cost on the two elevation sides. This icon assumes that time and cost are linearly proportional, that time and scope are the only variables associated with cost and all three are related in a linear fashion.

On page 42, there is mention that “profit is value minus cost.” As well, Expected Monetary Value (EMV) is used in the discussion. However EMV is the expected value of an outcome in the absence of the cost to deliver this value.

Devaux makes several statements here that need clarification:

1. “Time can be quantified into dollars” – this is the case ONLY if there is a linear relationship between time and the accrued cost during the passage of time. Other relationships exist in practice of course, so the triangle analogy is limited to a simple case of fixed expenditures over time.
2. “The connection between time and cost is assumed linear. If time passes, costs continue to be accrued.” This case is too simple for any practical usage. As time passes the project is delayed, but costs need not be accrued. Assigning resources to other projects, suspending the resource’s charges, moving the resources to other productive work – all break the linear relationship between time and cost.

This model seems to work if the project is labor based. What happens when the project has a large non-labor component. The removal of an installed concrete bridge and its replacement with a second may involve large non-labor costs.

TPC Business Case

Next is the TPC Business case. The statement ...“EMV ... is not constant: it is a variable dependent upon, among other things, the delivery date of the final product.” Technically this is not true. EMV is a point estimator, derived from the underlying outcomes and their costs. For any one instance of EMV it is constant. For multiple EMVs there are multiple values. This notational detail is not mentioned in the text.

$$EMV_j = \sum_{i=1}^N X_{ij} P_j$$

could be used to indicate this situation where j this the j ’th alternative configuration of the EMV calculation. But it still remains that time and cost have nonlinear relationships in actual projects.

What other things is it dependent on? Using the expression for EMV, it is dependent on the “payout” and the probability of a payout. Relating these events to the end date is a second order effect.

This approach is used to “dollarized” time, which is useful. Using EMV in the business case is also useful. The concept of a delay curve is introduced with Figures 3.10 and 3.11 used to show the decline in project value as a function of time. The concept of EMV is starting to

be presented better in this section, with a two state selection with associated probabilities.

The concept of "DRAG" is introduced. Devaux defines DRAG as the amount of time an activity is adding to the duration of the total project, or the amount of time that could be saved by removing an activity from the project schedule.

Project Delay Curves

At this point I've become convinced Devaux does not actually understand the concept of EVM.

EVM is a probabilistic estimator of the economic value of a decision – in this case the completion of a project. But Devaux uses it without including the probability aspects.

For example in Figure 3.11 there are no probabilities associated with each time to market dates. He is correct to show the reduction in value as time proceeds, but has missed the probability of delivery on each date.

Figure 3.10 does show a correct example of EMV.

Devaux introduces the concept of delay and its impact on the project's "profit." I'm troubled by the naïve example of the satellite visiting the comet. "Storing" the satellite because it was finished before the launch is a common occurrence in spacecraft construction. There is no aerospace vendor that would absorb the cost of a launch delay not directly related to their efforts. "Missing the launch" is a silly counter example as well. If Devaux wants to be taken seriously he needs to come up with real examples of the impact of delay on projects. Again Terry Williams is a good place to start to understand the complexities of project delays and the costs that result.

The nuclear power plant refueling example is better positioned to show these impacts. However the economic model of power generation is not well understood here. EMV is a probabilistic estimate of the "value" of a decision – usually a binary choice. The "start date" of the power station also has a probability associated with it. In a real power station example both the start date and the subsequent generation of revenue and the costs incurred to get the plant back on line can be used to construct the same curve (unlikely to be linear) without all the hand waving over EMV and DIPP.

The example in Figure 3.9 is a true EMV outcome. Figures 3.10 and 3.11 show a delay curve, mention the term "probability" but don't show any of the probability impacts. They do seem to show that "delaying the deliverable has economic impact." But it seems that the probability aspects of EMV have been lost.

At this point I gave up on Chapter 3, since it simply continued with more bad examples of the use of EMV.

Chapter 4

I looked forward to Chapter 4, since planning a project is what we do here in the PMO. It became clear immediately that Devaux is a Big Design Up Front (BDUF) guy. On page 61, "The job of planning ... is to develop a document that specifies ... all the components and subcomponents to be developed by the project."

In the software world this is a pipe-dream. In other "design and build" processes it is a laudable goal but no self respecting PM would seek this goal. In the nuclear power station refueling "project" this kind of planning process can be done. What's missing here is a context in which this goal is possible or even desirable.

Devaux's concept that the Statement of Work (SOW) is the most important part of the project is true – *in the beginning of the project*. Once the SOW is stable, execution of the project tasks becomes the most important part of the project.

Parameters of Scope

Devaux describes three parameters of scope:

1. Appearance
2. Performance
3. Standards

The examples used in appearance seem odd for the scope of a project. Using an automobile example the “appearance” or style of the car is not usually part of the scope of work for manufacturing the car within a project context.

Performance as part of scope is usually defined in the requirements document. My take here is that Devaux is using “requirements” interchangeably with “scope.” One place to start sorting out this confusion would be “[Issues with Requirements Elicitation](#),” Christel and Kang, CMU/SEI-92-TR-012. Since Devaux again has no references, it’s not clear he’s speaking from experience, skills, knowledge or simply anecdotal evidence.

My sense in this section is Devaux is interchanging *Product* and *Project* management roles. Many of the decisions made that impact product cost – tamper proof seals, styles of cars – are product decisions not project decisions.

Assumptions Appendix

Devaux suggests that an appendix of assumptions be included with the SOW. I would strongly suggest that each statement in the SOW have the assumptions included in the same paragraph. Having an appendix not only physically hides the assumptions, it creates a logical disconnect for the reader.

Chapter 5

Chapter 5 provides a nice overview of the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS). Unfortunately Devaux has mixed the two in Figure 5.2.

Organizational components (design engineering, manufacturing, packaging & shipping, and sales & marketing) are inserted above the activities they perform. As well the WBS components below these organization components are “roles” played by the organization stated at a very general level – build prototype, design packaging, train sales. This is a missed opportunity. It’s like showing a schedule example as “begin – do all work – end.” The WBS should show the deliverable components of the product or project. Figure 5.2 shows the roles and responsibilities of the people who will deliver the product for the “MegaMan Development Project.”

There are many ways to “test” for a good WBS. Here are some I’ve used:

- Status and completion are measurable
- Start and end of events are clearly defined
- Each activity has a deliverable
- Each activity’s duration is reasonable

- Work assignments are independent
- Cost and schedule are easy to estimate

In Figure 5.4 a better example is provided. One in which the “breakdown” of the work is shown as “new automobile” and the functions that do the work are connected to the deliverables.

Just as I was starting to enjoy reading, Devaux does it again – he introduces an acronym without a definition. Page 81 has “CBT” in the second paragraph. I’m sure it is “content based training” but this is symptomatic of the poor copy editing of this very expensive book.

Guides for WBS

Page 88 provides a guide for building WBS. Although there is likely no one that would object to any of this advice, there are numerous resources for building WBS’s on the web. NASA, DoD’s MIL-HDBK-881 and few starting points.

Devaux has some good suggestions that we for work decomposition as well. I p[ersonally have tasks can’t last longer than 3 to 5 days – Devaux has them at 80 hours.

His comment on using verbs as tasks is also our guide. We add to that using nouns as milestones. If this is done and a schedule is produced then the tasks and milestones can be read as a statement of work.

Value Breakdown Structure

Devaux suggests that TPC provides a unique concept in the Value Breakdown Structure (VBS). The concept of control accounts in Earned Value is nearly identical.

What does come through though is the use of EMV for the WBS. This is also nearly identical to the “real options” branching structures found in many decision making processes.

Estimating and Accuracy

Estimating is such a critical aspect of managing the project. Devaux provides a few “off the cuff” pieces of advise with no resources to back them up.

This is a missed opportunity. He throws in DIPP again as the savior of the project when in fact the quality of the estimates is an independent variable in DIPP.

This section describes some ideas on producing accurate estimates. Devaux conjectures that the person who is responsible for the work is the one to do the estimate is naïve. In the construction business “estimators” don’t do the work they estimate to cost of the work. In aerospace estimating of the construction of satellite sensors are generated through complex models in the program office, not just the engineering office.

The major gap here is that mature tools and processes used for estimating projects are currently in the market place. Stochastic models, Barry Boehm’s COCOMO models, Capers Jones, construction cost estimating and many other domains are not even mentioned.

Chapter 6 and Chapter 7

These two chapters are dedicated to the critical path method of scheduling. We use CPM at times and our customers use it nearly all the time in the deconstruction of the nuclear weapons plant. For our IT work we haven’t gotten very interested in CPM, since we use Extreme Programming (XP) to plan our efforts. There have been times where CPM was useful – the move of the data center.

In general CPM is provided by Microsoft Project and Primavera and we use these tools out of the box. I'd recommend those with more interest in CPM to these chapters. But for me I brushed over them and skipped ahead to Chapter 8.

Chapter 8

This chapter discusses "activity based resource assignments." This seems to be another "made up" set of words for ideas that are already present in earned value and activity based costing.

Calculating the Project DIPP

Skipping to this section Devaux provides an example of how DIPP can be used to make decisions. All the problem with DIPP aside page 219 has an example that makes no sense.

A project scheduled to last 30 weeks has a budget of \$3,876,783 and a resulting value of \$10M. The decision is to extend the schedule to 34 weeks (4 more weeks or a 13% extension).

The value of the project is reduced to \$2M if delivered at the 34 week date. But interestingly the cost to complete the project – the ETC for the unstated analysis date – stays the same. If the project slips 13% in time, why doesn't the cost of completion also increase 13%. If not 13% what would be the increase or decrease in the cost as a result of the schedule changes?

Such a fundamental gap in logic caused me to skip to the next chapter.

Chapter 9

The task of resource scheduling and leveling is very difficult in most "discovery design" projects. Software development is one of those. We have not pursued the use of resource leveling at the detail level for many reasons, but the main one is there simply are too many variables. This is not to say resource leveling is not valuable on other domains. Tools for resource leveling still don't provide useable answers.

Although there are some interesting concepts in this chapter, Devaux again invents terminology and I simply can't follow the logic.

Earned Value

On page 286 Devaux gives an anecdote of earned value. His description that "every activity in the project is 'weighted' by some attribute that is common to all the activities. Then, as each activity is completed, our project is said to have 'earned' the value of that pre-determined weight."

This description is not only over simplified it is wrong. The "value" of a task or deliverable – it's BCWP is not weighted by some attribute common to all activities. BCWP is defined in many ways depending on the domain. In the construction business BCWP is the operational value of the item being constructed. In software development BCWP can be (we use this) the apportioned value of that feature to the user base.

Since the description of EV is "off" here, I'll assume Devaux has not actually worked in an EV based business.

But like many other topics in this book there are no references. This leads me to conclude that Devaux has little understanding of earned value as well.

If as Devaux suggests "each activity is assigned the earned value equal to its budget..." the task is a "level of effort" project. In Level of Effort BCWS = BCWP. The only variances in Level of Effort is cost, the schedule has no variance, since the passing of time accrues value.

On the same page "The attribute used for weighting activities may be anything ... but the most common ... is budgeted dollars." Devaux goes on to state that the budget is for resources. He ignores the non-labor component, the value added components generated by manufacturing and other actual value increasing components as the project proceeds.

I'm troubled most by the conjecture on page 287 where Devaux states that the acronyms used in EV ... "have done more than anything else to scare people away."

Really? And DIPP, DRAG, CLUB, DRED, all used prior to their explanation are not confusing? This is simply poor authorship and bad copy editing.

At the top of page 287 Devaux makes another serious error. "At the beginning of the project two types of data get plotted against the one schedule..."

- All data in EV are plotted against time, not the schedule. This may sound odd, but the periodic passage of time is the basis of earned value reporting. What is going on the in schedule is important. But the EV numbers are rolled up and the tasks are now lost in the reporting.
- Two rather than three values are plotted. BCWS, BCWP, and ACWP.
- Devaux refers to Figure 10.4 to show how BCWP and ACWP accumulate during the project. Figure 10.4 is a VBS chart having nothing to do with EV.

Again these serious errors caused me to skip to the end. Gratefully the next chapter is the last.

Chapter 11

Devaux starts the chapter with one of his "off the cuff" remarks..."despite having been around for 40 years traditional PM is mostly ignored." Where has Steve been working? Certainty not in aerospace, construction (not mom and pop but Bechtel, CH2M HILL, Parsons), government contracting, etc. His NASA, DoD, and nuclear power outages (it's called refueling cycles) as examples where PM is used simply say to me "Steve doesn't get out much."

At this point I've come to expect this flippant remark so I'll just turn the page.

My Conclusion

I'd suggest you not by this book at this price point. For \$89 your money is better spent of other PM books. This thing wore me out. Between the notion that DIPP is an indicator of project success and

the boneheaded description of EV and the restating of the obvious on CPM, there simply is not anything here worth \$89.

I did read the book as Steve asked me to. But it's a book I'll set on the back shelf and not pick up again. I know there are those who strongly defend Devaux's DIPP concept. For those folks, please continue, I have no other suggestion. I've moved beyond trying to explain the flaws in the use of estimators that blow up and behave in non-linear ways and most of all don't consider the past when forecasting the future.

This type of book unfortunately is written in a much too personal style. Without peer review, references, and actual examples, the personal nature of the book takes over. What is missing is a view of project management from the "outside looking in" not the "inside looking out."

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