

ADDING VALUE TO EARNED VALUE: The PISA Π (PI) Chart¹ for Monitoring Project Implementation²

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This article is a companion-piece to a previous Journal article on Earned Value,³ and introduces a new graphic for monitoring & reporting integrated project schedule and cost performance status.

Every pedestrian Project Manager **knows** there are **nine (9) different combinations** in which a project can be during implementation with respect to its work schedule and budget, four of which are good, four mixed (good & bad) and one bad; as depicted in the following chart:

FIGURE 1 - Nine Possible Schedule & Budget Status Combinations during Project Implementation

| | | | | |
|--|-------|----------------------|-----------|---------------|
| B U D G E T | Over | | | |
| | On | | | |
| | Under | | | |
| | | Ahead | On | Behind |
| | | WORK SCHEDULE | | |

¹ **PISA PI: Project Implementation Status Altimeter Performance Indicator Chart**

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³ Smith, K. F. (2019). Understanding & Applying Earned Value: A 'Quick & Easy' Approach for Monitoring Project Implementation, *PM World Journal*, Vol. VIII, Issue V, June.

But Project Management Professionals (PMP)[®] of PMI⁴ and other organizations familiar with the Earned Value Methodology (EVM) **know better! Actually, thirteen (13) Schedule & Budget status combinations are possible.** Unless recognized the additional four can result in invalid cost performance assessments, reports, inappropriate recommendations, and executive management decisions which in turn trigger detrimental ‘vicious cycle’ actions that exacerbate the current situation.

These four (4) additional combination conditions are often unrecognized because **rather than monitoring the budget and actual cost for the work performed** – i.e. whether completed ahead or behind schedule -- **traditional financial management focuses its attention on the time-phased budget for accomplishing work.**

If the project stays ‘on schedule’ during implementation, **Figure 1** accurately depicts the situation. However, in most other instances, the possibility of ‘False Positives’ or ‘False Negatives’ exists. For instance, if project work is completed ahead of schedule, even if ‘on budget’ it will entail utilizing its budget earlier than scheduled. Similarly, if project work is delayed, the likelihood is that the project should not yet have incurred the cost budgeted for its accomplishment. These possibilities are depicted in **Figure 2**, below.

FIGURE 2 - Thirteen Possible Schedule & Budget Status Combinations during Project Implementation with False Positive or Negative Indications with respect to the Budget

| | | | | |
|--|--------------|----------------|-----------|----------------|
| B U D G E T | Over | False Negative | | |
| | On | False Positive | | False Positive |
| | Under | | | False Positive |
| | | Ahead | On | Behind |
| WORK SCHEDULE | | | | |

Awareness of these four additional possibilities is the ‘Added Value’ insight that the Earned Value Method (EVM) provides to its users.⁵

The thirteen possible combinations were further elucidated in the earlier Journal article⁶ and repeated in **Figure 3** – *with descriptive and illustrative data* -- on the following page.

⁴ The international Project Management Institute (PMI)[®]

⁵ A comprehensive discussion of EVM is included in my book **Project Management PRAXIS** (available from AMAZON).

⁶ Smith, K. F. (2019). Understanding & Applying Earned Value: A ‘Quick & Easy’ Approach for Monitoring Project Implementation, *PM World Journal*, Vol. VIII, Issue V, June.

FIGURE 3

The 13 Project Performance Indices (PPI) & Possible Project Status Conditions

During implementation, thirteen (13) “*performance vs. plan*” scenarios are possible — depending on the interrelationship between Planned Value (PV), Actual Cost (AC), and Earned Value (EV) — which the project’s manager should recognize, assess, and *redress if necessary*. These alternatives (with illustrative data) are shown in the table below:

| Project Performance Index PPI # | Planned Value PV or Budgeted Cost of Work Scheduled BCWS | Actual Cost AC or Actual Cost of Work Performed ACWP | Earned Value EV or Budgeted Cost of Work Performed BCWP | PROJECT STATUS CONDITION PSC |
|--|---|---|--|---|
| 1 | \$100 | \$80 | \$120 | Good. Work is ahead of schedule & with cost savings on the work done, as well as an apparent cost underrun on the budget. |
| 2 | \$100 | \$100 | \$120 | Good. Work is ahead of schedule, with cost savings even though the budget has been spent as planned. |
| 3 | \$100 | \$80 | \$100 | Good. Work is on schedule, with cost savings. |
| 4 | \$100 | \$120 | \$140 | Good. Work is ahead of schedule, with costs savings. <i>[But may have a cash flow problem if funds are released incrementally.]</i> |
| 5 | \$100 | \$120 | \$120 | Good. Work is ahead of schedule, with costs as planned for work done. <i>[But may have a cash flow problem if funds are released incrementally.]</i> |
| 6 | \$100 | \$100 | \$100 | “Ideal”. Everything going according to plan – On Schedule & Spending. <i>[Extremely Rare!]</i> |
| 7 | \$100 | \$60 | \$80 | Mixed – Good & Bad. Saving money on the work performed; but work is behind schedule. |
| 8 | \$100 | \$120 | \$100 | Mixed – Good & Bad. Work on schedule, but cost overrun incurred. <i>[May have a cash flow problem if funds are released incrementally.]</i> |
| 9 | \$100 | \$80 | \$80 | Mixed – Good & Bad. Spending as planned; but work is behind schedule. |
| 10 | \$100 | \$140 | \$120 | Mixed – Good & Bad. Work ahead of schedule, but a cost overrun has been incurred. <i>[May have a cash flow problem if funds released incrementally.]</i> |
| 11 | \$100 | \$80 | \$60 | Bad. Spending is slower than planned, but the Value is low — indicating a cost overrun; and the work is also behind schedule. |
| 12 | \$100 | \$100 | \$80 | Bad. Although the spending rate is as planned, since the Value is low, there is a cost overrun; and the work is also behind schedule. |
| 13 | \$100 | \$120 | \$80 | Bad. Work behind schedule, cost overrun <i>[and possible cash flow problem.]</i> |

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Another chart in the earlier Journal article⁷ -- repeated in **Figure 4** below for ready reference and emphasis -- indicates how the traditional financial management focus misinterpreted the schedule and cost information provided in progress status reports.

FIGURE 4

| Traditional Financial Analysis (TFA) Incorrectly Assesses the <u>DIRECTION</u> of SIX PPI Cost Combinations as "Over" instead of "Under," or "Under" instead of "Over;" or "On" BUDGET. That is a 46% ABSOLUTE ERROR RATE! | | | | |
|--|-------|-------|-------|--|
| For Example: | | | | AS well as the <u>AMOUNT</u> of Underrun or Overrun in FOUR other Combinations for an additional 31% ERROR RATE, and a TOTAL 77% ERROR RATE! |
| PPI | PV | AC | EV | |
| 1 | \$100 | \$70 | \$120 | TFA Incorrectly Assesses the Amount of this Cost Underrun as \$30 instead of \$50 |
| 2 | \$100 | \$100 | \$120 | TFA Incorrectly Assesses this Combination as On Budget instead of an Underrun of \$20 |
| 3 | \$100 | \$80 | \$100 | |
| 4 | \$100 | \$120 | \$150 | TFA Incorrectly Assesses this Combination as a Cost Overrun of \$20 instead of an Underrun of \$30 |
| 5 | \$100 | \$120 | \$120 | TFA Incorrectly Assesses this Combination as a Cost Overrun of \$20 instead of "On Budget" |
| 6 | \$100 | \$100 | \$100 | |
| 7 | \$100 | \$60 | \$80 | TFA Incorrectly Assesses the Amount of this Cost Underrun of \$40 instead of \$20 |
| 8 | \$100 | \$120 | \$100 | |
| 9 | \$100 | \$80 | \$80 | Traditional Financial Analysis Incorrectly Assesses this Combination as a Cost Underrun |
| 10 | \$100 | \$140 | \$120 | TFA Incorrectly Assesses the Amount of this Cost Overrun as \$40 instead of \$20 |
| 11 | \$100 | \$80 | \$60 | TFA Incorrectly Assesses this Combination as a Cost Underrun of \$20 instead of an Overrun of \$20 |
| 12 | \$100 | \$100 | \$80 | TFA Incorrectly Assesses this Combination as On Budget instead of a Cost Overrun of \$20 |
| 13 | \$100 | \$130 | \$80 | TFA Incorrectly Assesses the Amount of this Cost Overrun as \$30 instead of \$50 |

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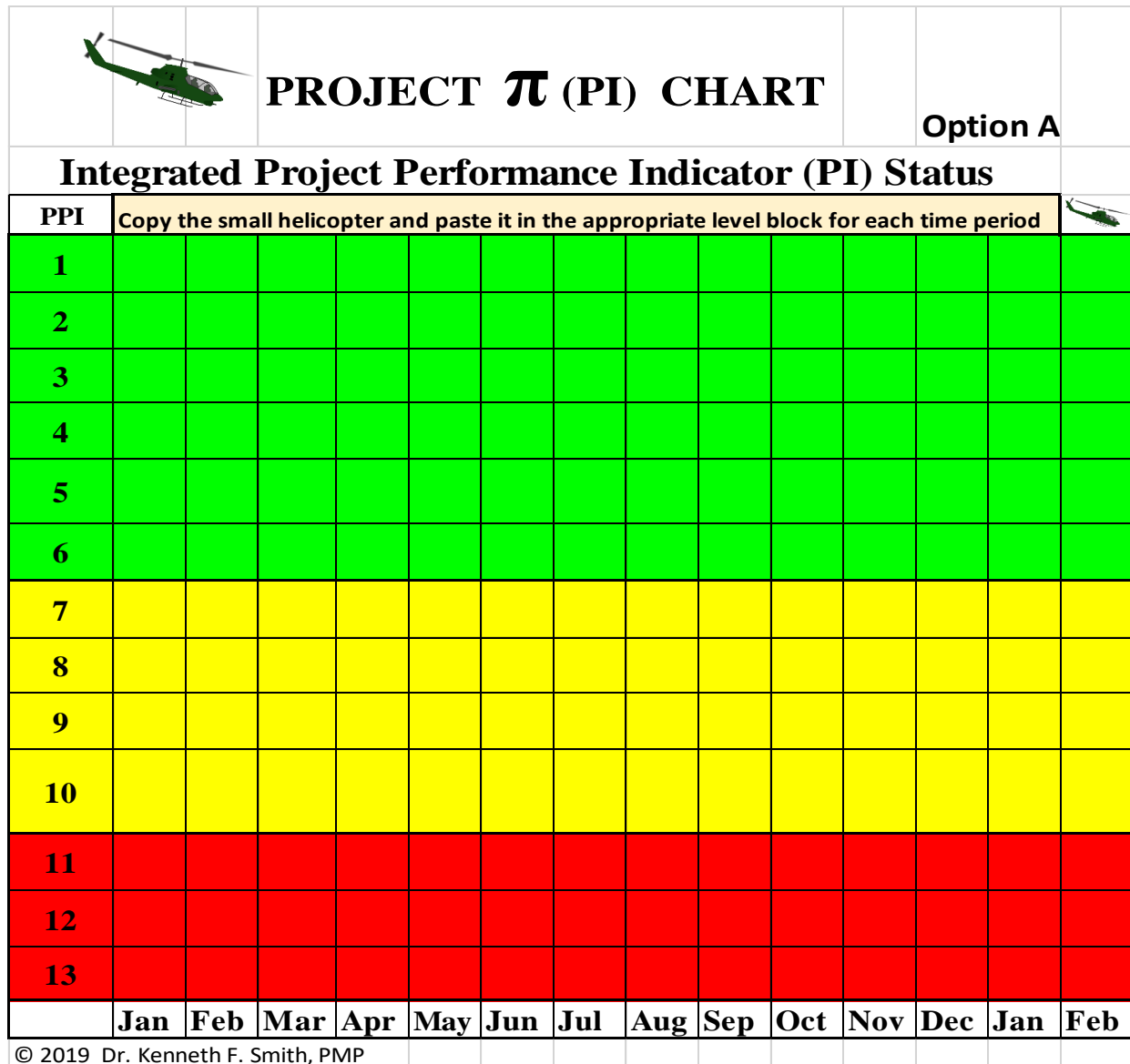
101

I also outlined two practical tools for applying Earned Value for integrated project monitoring; 1) an **S-Curve Transform** that depicts Earned Value Status for the life of a project, as well as 2) an **IPPSTAT Template** for computing the integrated Project Status for any given period; so they will not be reiterated here.

⁷ Ibid.



However, subsequently, I have had several requests for another graphic – *i.e. other than the S-Curve Transform*– that could depict project status at each time period over the life of the project in a more striking manner. Consequently, I have developed the Excel Project Implementation Status Altimeter Performance Indicator Chart (PISA PI Chart) shown in Figure 5 below. Hopefully it can serve that purpose.

FIGURE 5



For others of a more nautical bent who might be interested, I have flipped this chart as a **PISB II Chart -- Project Implementation Status Bathometer Performance Indicator (PI) Chart** -- with a scuba diver icon; shown in Figure 6 on the following page:

FIGURE 6

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|-----|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  PROJECT π (PI) CHART | | | | | | | | | | | | | Option B | | | | | | | | | | | | | | | | |
| Integrated Project Performance Indicator (PI) Status | | | | | | | | | | | | |  | | | | | | | | | | | | | | | | |
| PPI | | | | | | | | | | | | | | | Copy the small scuba diver and paste it in the appropriate level block for each time period | | | | | | | | | | | | | | |
| 13 | [Red] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | [Red] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | [Red] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | [Yellow] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | [Yellow] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | [Yellow] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | [Yellow] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | [Green] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | [Green] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | [Green] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | [Green] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | [Green] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | [Green] | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | | | | | | | | | | | | | | | |
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I'd be interested in any further reader feedback.

About the Author



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Dr. Kenneth F. Smith has been a project management consultant for ADB, the World Bank, and USAID for decades. He earned his DPA (Doctor of Public Administration) from the George Mason University (GMU) in Virginia and his MS from Massachusetts Institute of Technology/MIT (Systems Analysis Fellow, Center for Advanced Engineering Study). A long-time member of the Project Management Institute (PMI) and IPMA-USA, Dr. Smith is a Certified Project Management Professional (PMP®) and a member of the PMI®-Honolulu Chapter.

Ken is the author of **Project Management PRAXIS: A Treasure Trove of Practical Innovations to Classic Tools and Techniques for Planning, Monitoring & Evaluating Projects, Programs and Portfolios for “Quick and Easy” application by Project Management Practitioners.** (Available from Amazon)

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