Why this series

The Occasional Pictogram, ToP, will be a series of short essays about implementing good project practice as we at PTI gain more experience from our work as process improvement consultants (CMMI® variety). I hope the essays, which will appear irregularly at this page of the PTI web site, will interest others trying to implement better ways of organizing work in projects.

As authorized instructors in CMMI, we are required to deliver the entire SEI course material. Anyone who completes "Intro to CMMI" knows it as a grueling 3 days full of content. And after every course, a good number of student evaluations (upwards of 40% in our experience) say that more was expected on implementation. But the course content says little about how to merge CMMI "practices" (a model technical term) into the day-to-day life of projects and companies. Also, the model is a standard (an abstraction) by which "process" (another abstraction) is evaluated and so must be generic by design, far from implementation-ready.

Actual implementation will be up to you who will know the conditions on the ground in your company. The map (CMMI and general advice) is not the terrain (your local situation). The bird's-eye view (the model, consultant's lore) may have value as guidance, but being effective in the jungle requires the boots-on-the-ground view. Only you will know the roads and rough country, the seasons when storms and endemic diseases flare up, and when large predators circle improvement programs.

Implementing was to be the topic of a book I intended to write after my first, 1995, book on the CMM. I went merrily along, accumulating notes on implementation from field experience and the work of others and sketching pictograms. Then the CMMI v1.1 started to emerge about 2001 (models take years to be fully born), and the audience of the CMM book wanted a similar, illustrated book on the new model. Which I published in 2004, having to sideline the implementing project. Then about 2005 early signs of a CMMI v1.2 appeared followed by the expectation of another pictogram book on that model. The last pictogram book, *A Guide to the CMMI*, 2d edition on v1.2, which we published in 2007, was the hardest. It required a word-for-word comparison of CMMI v1.1 and v1.2 to be sure every change was covered. Luckily software tools like Adobe® Acrobat Reader were at hand. By then I realized I had written pretty much the same book three times.

The implementing book was still waiting to be written (Is this an obsession?), but instead of publishing all at once in a paper volume, we decided to issue it gradually as a series of essays in downloadable format here on the web.

I intend the series to have three features. First, the essays are based on my pictogram method – using simple hand-drawn icons to picture processes. The second is to stick as closely as possible, to scientific method. This means first of all that assertions are justified with reasons given. The opposite of this principle is opinion; an extreme example might be the kind of political talk where assertions appeal to emotion and slogans. Another opposite is the kind of statement often seen in the business press where CEO Jones of MegaCompany did *x* and evidently *y* resulted. *Post hoc, ergo propter hoc*. This version of non-scientific talk invokes unquestioned assumption, ideology, and, always, buzzwords.

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Also scientific method tries to base reasons, as much as possible, on first principles. In physical sciences, this means tracing back to Newtonian mechanics or thermodynamics. One of the early ToP essays will be on what I call project thermodynamics. Of course, talking about thermodynamics won't make a discussion scientific. But I hope to show why using elementary thermodynamics as an analogy and thinking in its terms will help clarify what goes on in projects. (There won't be much opportunity to use Newtonian mechanics.)

If you are applying the scientific method, which is supposed to insure objectivity, there is still something subjective, your viewpoint — specifically whether to focus on parts or the whole, components or the system. The one is reductionist, isolating elements (whatever they may be) while the other looks for relations among elements, which might themselves be subsystems, and the flows and forces among them.

The choice of elements to analyze is not just between trees or forest; there is a whole variety of viewpoints from living cells up through trees to forest to ecosystem to biosphere to planet, all valid and useful, and interconnected as systems. There is a question of scale too – the more reductionist, the smaller, or at least more isolated, the elements analyzed, and usually the more restricted and more stove-piped the discipline. Narrower is deeper. But thermodynamics, which looks at the flows of energy among elements of any system, is common to all scales in nature as well as in organizations. (In projects, we talk about effort hours, the equivalent of energy.)

Sooner or later the scientific method involves data – measurements, either of phenomena passively observed, or results of experiments, phenomena induced. In systematic process improvement (SPI), data seems not to be a strong component, at least so far. Maybe what data exists is not compelling – "doesn't apply to us, we're different", or is not detailed enough to indicate what action to take in your environment, etc. These reasons themselves may have multiple causes. Maybe we as practitioners haven't agreed on what to measure, so there are few standard (i.e., widely accepted) measures and therefore we often can't compare quantities in the same units. Almost certainly, choice of scale too is involved in what to measure. But this situation may be typical of an emerging body of knowledge. (I'm assuming that SPI is on the way to becoming a practical body of knowledge – concepts coming into common use, based on assertions that can be explained, defended, and criticized, for systems or their observable properties.) The upshot is that the ToP discussions won't be based much on data, but criticism, discussed next, will be welcome.

The third feature of the series is to be a target for critical discussion. Often discourse about technical projects, at least in software engineering, seems to be about the latest next thing. There have been many technical advances in software engineering since I started in 1971 – structured programming, the internet, graphics applications (non-technical folks can picture things without having to write FORTRAN!), iconic user interfaces, the web, higher-order languages, the agile movement, six sigma, CMMI, electronic documents. But the same project problems we had in the 1970s are the ones you see today in appraisals. Our tools get more productive, but the process improvement overlay (see ToP #1) keeps fragmenting instead of evolving to yield increased capability. No matter what advances come from new methods and technology, the same first principles are at work. See any DILBERT® comic strip.

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The essence of the scientific method, even when the subject area is weak in data, is the requirement to criticize assertions by means of other assertions based on reasonable arguments. Out of the discussion comes, eventually, concepts that make sense generally and perhaps even more eventually, data we can rely on.

So feel free to fire away. And if you want, I'll post your comments here as well.

Ken Dymond
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