Why Can't People Estimate: Estimation Bias and Strategic Mis-Estimation

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Abstract: ***Many people view an estimate as a quick guess that no one believes anyhow. But producing a viable estimate is core to project success as well as ROI determination and other decision making. In decades of studying the art and science of estimating it has become apparent that: most people don't like to and/or don't know how to estimate; those that estimate are often always wildly optimistic, full of unintentional bias; strategic misestimating provides misleading estimates when it occurs. However, it is also obvious that viable estimates can make projects successful, outsourcing more cost effective, and help businesses make the most informed decisions.***

That is why metrics and models are essential to organizations, providing the tempering with that outside view of reality that is recommended by Daniel Kahneman in his Nobel Prize winning work in estimation bias and strategic mis-estimation.

I. EXPERTS ARE PROVIDING BIASED ESTIMATES

One can merely scan the news and see the daily disasters that come from poor estimates. And as much as they try people continue to produce such poor estimates. It's not that people are not capable. It is that they are hardwired to produce optimistic estimates. They think that this time things will go better. This time the mistakes of the past will not occur. They think they are smarter this time and they have this one under control. But alas, history too often repeats itself yielding lost time, lost money, and lost careers.

Time and time again we see biased estimates coming from both experts and technologists. In the article "Delusions of Success: How Optimism Undermines Executives' Decisions" the authors point out that people routinely exaggerate the benefits while discounting the costs. The authors go on to suggest that tempering, that is providing an outside view such as past measurement results, traditional forecasting risk analysis and parametric modelling can help. Additionally they advise not removing optimism but balancing optimism with realism.

Kahneman and Tversyk found that judgement errors are systematic and predictable, not random and that such errors continue even when the estimators are aware of them. The root cause is that each new venture is viewed as completely unique and that they took an "inside view" focusing on the components being estimated rather than the outcomes of similar completed actions.

Applying Estimating ranges: The first and simplest method of helping to mitigate estimation bias is to have estimators estimate ranges of best case, likely case, and worst-case rather than just a single point estimate. Having to think about those cases, when everything goes right and when everything goes wrong, helps people recognize areas where they might be biased in the positive sense.

Douglas Hubbard, author of the book, How *to Measure Anything*, suggests that the perception of measurement being a single point value is a key reason why many things are perceived as immeasurable. That is, if we are willing to estimate a range including our uncertainty we can estimate better. Furthermore, if the range of uncertainty can be reduced, as shown in Figure 1, the decision making capability also improves.

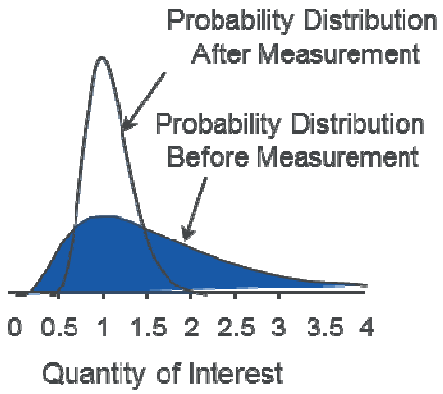

Figure 1 Measurement Reduces Risk, Copyright Hubbbard

II. REFERENCE CLASS FORECASTING

Reference class forecasting is a technique which demonstrates that the best predictor of performance is actual performance of implemented comparable projects. This "outside view" focuses on the outcomes of completed analogous projects. Using this procedure it is recommended that the prior projects should be analogous and that these projects should be used to compute a probability distribution. Then by comparing the new projects to the range of completed projects one can identify probable estimation bias. Parametric estimation models such as SEER provide a superset of reference class forecasting, allowing adjustment for people, process, and product issues impacting the new program.

III EXPLAINATIONS FOR POOR ESTIMATING

Flybjerg identified three explanations for poor estimating:

1. Technical: Inadequate data & Models (Vanston)
2. Psychological: Planning Fallacy, Optimism Bias - causes belief that they are less at risk of negative events
3. Political/Economic: Strategic misrepresentation - tendency to underestimate even when experienced with similar tasks overrunning (Flyvberg)

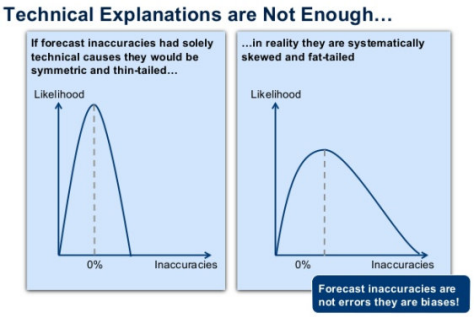

Figure 2 Estimation Bias, Not Technical Drive Many Estimates, Copyright Flybjerg

In the world of IT estimation: adequate models are available, psychological poor estimating is the frequent culprit, and political/economic strategic misrepresentation is a regular occurrence often caused by management dictating the functionality, the resources, and the schedule without regard for the resulting quality or the possibility of even achieving the plan. This violates the "Iron triangle of project management". The iron triangle points out that if you change one dimension: resources, scope or schedule, quality suffers. In software development there is a minimum time required to complete a particular software product. Trying to deliver the product in less time would result in poor quality.

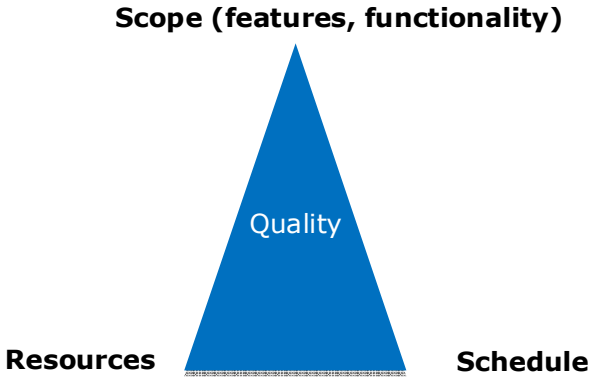

Figure 3 Iron Triangle of Project Management

III. Conclusions

Measurement can reduce risk. Risk reduction can provide significant business value. Using a method of estimating that doesn't rely solely on an expert's judgment but incorporates an independent view helps ensure viable estimates. Viable estimates help avoid starting projects that are unaffordable and contribute greatly to the production of successful projects.

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