Forecasting under Uncertainty
(continued from the 2010 March issue)

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In Forecasting under Uncertainty — Part One (March 2010) I introduced Value Map models that identify key project development technical, commercial and cost variables that influence expected economic value of a project, product or other business opportunity. At the conclusion of Part One, I posed a number of rhetorical questions:

• How does the model handle uncertainty?
• Where do the numbers come from?
• What does the computer do?
• What information and direction does the computer provide from the evaluation?
• What is the math underneath?

I will address each of these questions in the article that follows.

Dealing with Uncertainty and the Numbers
As noted in March, there are varying degrees of uncertainty around each of the variables in the business model; basically, you know a lot about some variables such as unit cost but may know very little about other variables like market size and the share you can obtain. To the best of your knowledge, you want to capture “what you know” and “what you do not know.” (When I use the terms “you” and “your” I am referring to the collective “you and your” — the best judgment of experts in key functions such as marketing, sales, finance and R&D. Throughout this article, I will refer to the collective as “the team.”)

The Value Map enables team members to get their heads around, and understand, the model structure—the first step in getting everyone on the same page and achieving buy-in. The objective is to encourage stakeholders to engage in meaningful discussions around each model variable.

Templates display each variable in the Value Map, serving as the entry point for data. Stakeholders typically develop data inputs during team meetings, in person or via the web. On the development side, there are generally a number of phases the project must pass through to achieve development success. In the example below,

Phases A and B have been successfully completed (1.00 probability); the team’s judgment is that there is a 70% chance of achieving the goals of Phase C and an 80% chance of achieving Phase D.

The computer calculates the overall probability of development success as 56% (the four probabilities multiplied 1.00 x 1.00 x .70 x .80).
Note that for review and tracking purposes, the basis for each value assessment and a notation of the details of each change are captured by the computer.

The team next addresses cost and schedules for each of the development phases (template not shown) and turns to the more challenging task of assessing the uncertainties around Commercial Contribution (the combination of revenue and costs). Unlike the development numbers where each phase has a probability of success (you achieve results or you do not), market and related variables each have ranges of values that represent “what you know” and “what you do not know.”

To conserve space, only a portion of the Commercial Contribution template is shown below; the complete template contains all of the variables in the Value Map. The example shows the variables for the base new product market, including market size, launch year, growth rates and margin.

It is important to note that each of the variables is set to a Low, Base and High number within the range. These ranges are developed during often spirited discussions among the stakeholders, experts and other team members. Where there are important differences of opinion and a wide range of uncertainty it is vital that this range be captured for it truly reflects “what we do not know.”

In the example, there is a range of $125 million between the Low and High value assessments, which as will be shown later, can have a significant affect on the profitability of the product.

How does one get to these numbers, avoiding pulling assumptions out of the air? You need to challenge people to think as broadly as possible, given that there is a natural tendency to provide narrow ranges. Ask questions about the Low and High numbers and insist that the persons responding provide as much evidence as possible for the assessment. For instance, “You have assessed the Low market size as $375 million. Can you think of a situation where the market could be lower than this?” This question may result in considerable discussion and either the $375 million will be accepted or lowered. The same approach needs to be applied to the High market size, “Can you think of a situation where there is a 10% chance that the market could be higher.” As with each of the numbers in the model, the idea is to encourage in-depth discussion around the range of values.

It is important to note that it is the discussion around the model variables that provides the most value to decision making, not the specific numbers.
Putting the Computer to Work
When all variables have been assessed and data entered into templates, it is time for the computer to go to work.

Let’s jump ahead to the last question above, “What is the math underneath the Value Map?” Value Maps, while graphic in nature, represent a very sophisticated set of decision analysis-based equations that interpret the impact of each variable and its range of uncertainty on the final value measure: “expected net present value (ENPV)”. ENPV is traditional NPV adjusted to reflect the uncertainties in the model. The mathematic model is technically called an “influence diagram,” a methodology developed by SmartOrg chairman, Jim Matheson and his colleagues at SRI and Stanford University during the 1960s.

(Note: a corollary to this type of analysis is called “Monte Carlo” analysis, a similar but less robust approach.)

A typical influence diagram:
I show the diagram to emphasize that this is serious business! It’s there but you don’t have to worry about it.

Like driving a Porsche, you want to know how fast it goes, corners and gets you there not how the valves and power train function.

In next month’s ValuePoint, I will reveal the results of the evaluation, how to interpret them and how to use them to make decisions about where to apply efforts to create the highest possible value.

As always, if you have questions about anything in this or other ValuePoint articles, do not hesitate to contact me (dcreswell@smartorg.com).