Decision Analysis = Decision Engineering

James E. Matheson, SmartOrg

Suppose we were to ask an experienced and well-qualified engineer to specify the design of a bridge over a river crossing. Would we expect the bridge expert to contemplate for a while and then tell us the specification for a sound bridge? Of course not! The expert would examine the conditions where the bridge is to be built, the loads it must carry, the funds available for construction, etc. He would probably do a preliminary design of several feasible bridge types, calculate stresses and strains on the structural elements of the bridge and determine which design would allow the construction of the best bridge for this purpose. He would examine the effects of climate, such as flooding and winds. He would use many different skills in assessing the environment of the bridge and the needs of its users in developing possible bridges and in coming to a choice of the best one. He would likely consult experts in many specialties to refine his understanding of the needs and desires of the users as he goes through this engineering process of coming to a recommendation. He will need to explain to laymen why he made or recommends certain choices, and he may need to obtain the sponsors’ tradeoffs on matters such as cost versus aesthetics.

In contrast, executives are often asked to make critical choices based on gut feel. Even an experienced engineer would not attempt to build a sound bridge this way, and the executive, even one with a great education and lots of experience, should not be expected to arrive at a sound decisions this way either. Like a sound bridge design, a good decision needs to be properly engineered; it is naive to guess the answers directly.

Decision Analysis is a form of decision engineering. As such, it is most powerful when focused on high-value decisions dominated by uncertainty, dynamics and complexity. It is usually more important to uncover better alternatives, cut through the complexity and assess the biggest uncertainties than it is to finely optimize decision variables. While there is no clear boundary, Decision Analysis situations and Optimization situations are dominated by different issues and emphasize the use of different tools. In organizational settings, there are many reasons to use Decision Analysis, even if you think you know what to do. The first is to double check your intuition and possibly hone...
it further. Second, you may need to explain the basis of your decision to others: superiors to justify your actions or recommendations, and subordinates to convey the understanding necessary to execute the appropriate actions and adapt to new information. Third, you may want to bring many participants into the decision process. Often there are experts who can provide information needed to model and assess various factors. When responsibility for the decision is diffuse, a group may use the explicit structure of Decision Analysis to work together to develop a single recommendation. Decision Analysis is often used to get a wide range of participants to agree on the wisdom of the decision and to gain the knowledge and motivation to implement it well.

Importantly, our clients have changed over the years. When I began doing Decision Analysis in 1964, few managers or executives had even heard of decision or probability theory, and computers were huge mysterious machines in large air-conditioned rooms. These executives needed training and convincing every step of the way. Today, most executives have been exposed to decision and probability theory, use their own computers every day, use the Internet fluently and are predisposed to accept decision analysis methods and results if delivered on their terms.

The new paradigm is very different from the old decision-consulting paradigm. In brief some of the key shifts are:

• From Decision Doctor to Capability Builder
• From Client to Customer
• From Consultant Knows Best to Customer Knows Best
• From Managing Large Projects to Empowering Teams
• From “Custom Tailored” to “Off the Rack”
• From Empowered Consultants to Empowered Customers

For more than a decade, I have been part of a software and training organization, which has been learning how to deliver into this new paradigm. We have been successful in helping many organizations with hundreds of innovation decisions (e.g. R&D, Product Development, and Acquisition Strategy) and with balancing portfolios of these projects. The new paradigm works; clients are learning to differentiate between data-rich operational systems and more judgmentally-oriented strategic systems. New decision tools are helping them outpace their competition by supporting rapid, high-quality decisions.

Upcoming Events

Webinar: Decision Analysis = Decision Engineering
The presentation will introduce the mindset needed and the tools available for applying decision engineering in various decision settings, and show how the role of the Decision Analyst has evolved since its inception in the 1960s.

8:30 AM PDT | 20 March 2013 | More Information

Society of Decision Professionals DAAG 2013 Conference
SmartOrg’s Associate Somik Raha will be co-chairing the session “What Does ‘Decision Analytics’ Mean for Decision Analysts?” at this year’s DAAG conference.

Austin, TX | 11-12 April 2013 | More Information