Introduction to STEP Web Seminar

by

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History: About 15 years ago, I was Manager of Mathematical Sciences for IBM North America – responsible for selling all IBM's mathematical software. My team and I quickly discovered that the best way to sell a rather expensive piece of software was to use this software to solve a pressing problem for a prospective customer. I don't think we ever lost a sale when we did this. The only problem with this approach was that it took a lot of staff time to work on each problem. It finally dawned on us that we should get out of the software business and sell our time, instead.

I started a small consulting practice, sponsored by IBM, called Management Technologies, hired half a dozen Math and Management Science folks like myself, and put our modeling skills on the market. We built simulation and optimization models of our clients' businesses, and used these models to solve some of their very important, but seemingly intractable problems. We did crew scheduling for a

major airline, portfolio optimization for a Wall Street investment group, production planning for a couple of large semiconductor manufacturers, and market segmentation for a huge credit card company. In each of these cases, we began by building a model of our client's business operations, and then optimizing that model.

We competed with Price Waterhouse, Ernst and Young, Bain, and Arthur Andersen. We were neutral on where they bought the hardware and software needed for the solution. Because we were vendor-neutral, clients almost always bought H/W and S/W from IBM. We were wildly successful. In a few years, we had 200 consultants in about 20 countries, bringing in about $60M/year at gross margins exceeding 42%. The other side of this coin is that our clients saved roughly a total of $300M/year. They saved this much because of the clarity of thinking and the insights made possible by having formal models of their businesses.

How an Activity-Based Dynamic Business Model Works:

(A) What is modeled? The basic human activities that are the building blocks of business processes.

(B) What is the overall framework of the model? Controlled Flows of Customers, Employees, Products, Money, Information, etc.

(C) What is the result of running one of these models? Time histories of all business variables, *e.g.,* Net Profit.

(D) How can a new strategy be prototyped? Make two runs: one with the business-as-usual strategy and one with the new one. Compare the graphs of all the important variables (Customer Satisfaction, Receivables, Payables, Net Profit, etc.) and make a judgment on the "bottom line"

(E) How are such "intangible" things like employee leadership, experience, morale, or training modeled? Human qualities are modeled in how effectively and efficiently individual people perform each activity. A happy, well-trained and experienced department store clerk is more likely

to generate high customer satisfaction than an unhappy, untrained and inexperienced clerk. This goes to the bottom line since the satisfied customer is more likely to return to the store sooner and to buy more than the dissatisfied customer would buy. Thus, a training program could be "bottom line" evaluated by running a one-year simulation with the program and another run without it. The "value" of this training could be measured by the difference in net profit for the year. If this "value" is greater that the program's cost (instructors' pay, employee time away from work, …) then the program would have paid for itself. Of course, in this example, the modeler would need help from H/R professionals in order to model how an employee's performance in a particular activity would be modified by changing the level of training.

(F) Are there benefits of modeling beyond "bottom line evaluation"? Yes! Perhaps the greatest of these is the insight an executive can gain through an iterative process of making a run, changing a couple of assumptions, and then making another run. One begins to learn the "hidden" dynamics of one's own business. A

manager can begin to understand, for instance, how far to go in raising pay levels. As pay is gradually increased, employee morale improves, and probably performance, as well. This might mean more sales and higher customer satisfaction, eventually leading to more profit. But, before long, a point of diminishing returns is reached. Eventually, higher pay won't have any measurable benefit to the firm. Even though the employee may get happier and happier without limit, his other limitations will eventually hold him back from performing better. You don't need a model to understand that raising an hourly wage from $10 to $1,000 won't yield a hundred-fold improvement in bottom line results. But just how far should you go to get an improvement in performance that's worth the increased pay? You do need a model to answer this question.

Goals for Today: This is what I'll be talking about for the next hour or so: (1) I'll lay the groundwork about why you should *want* to have formal models of your business built, (2) I'll very briefly go over a couple of real examples, so you can get the idea of what a model is, (3) I'll show you the steps involved in building a *holistic enterprise model*, and (4) I'll take any questions you may have.

I will *NOT* be teaching you how to build models. Model building is both art and science – both of which take a long time to master. I will give you some guidelines on the characteristics a good business modeler must have.

Here is what I hope you will get out of this hour and a half: (a) motivation to explore the potential benefit of formal models within your own organizations, (b) sufficient understanding to recognize this opportunity, and (c) willingness to pursue it