Modeling the Future

There is a story recounted by Max DePree in *Leadership Jazz* about one of the colleges at a long-established university in England. A committee had been formed to discuss the renovation of one of the beautiful halls in the university. The roof of the hall was deteriorating. As the committee debated its task it became concerned about its ability to find wooden beams long enough to replace those that were in need of repair. The architect hired for the renovation project and the committee representatives understood that their predecessors had made provision for this situation. They visited a nearby wood, finding the grove of oak trees planted a century earlier from which the replacement beams could be hewn. Gary Hamel in *Leading the Revolution* quotes the French novelist Antoine de Saint-Exupéry as saying, "We do not inherit the land from our forefathers, we borrow it from our children." Our focus in this article is on exploring approaches that help us look forward and anticipate the influence of today's decisions and situations on future outcomes, approaches that help us model the future. We have heard much of the terminology "big data" in recent years. It is not surprising since we are drowning in data. Here we will look at how to swim by discerning meaning.

What does the word model mean, for it is used in many contexts? Here we mean mathematically describing a situation and making predictions from it. Being able to answer questions such as "That is concerning, we have high attrition rates for people who have only been with the organization two to three years. I see also that about half of our employees have been with us less than two years. What will happen to our employee losses in the next two to three years? We are facing a major crisis." Here is another HR leader: "We looked at the ages of our employees. There are quite a few people who have been with us less than three years, and a large number who may retire in the next five years. What if they do retire, what will our workforce look like and how will we conduct our business? We may soon have a major problem, what can we do to understand the issues more clearly?"

Models can be divided into three primary categories based on intended outcomes: descriptive, predictive, and prescriptive.

- Descriptive models characterize observed behavior
- Predictive models estimate the result of a new course of action
- Prescriptive models suggest a preferred course of action

There are two principal model constructs that are used: statistical and deterministic. Statistical approaches describe observed relationships without attempting to explain underlying mechanisms. They are most effective in the descriptive area and they become progressively less effective in moving to predictive and prescriptive approaches. One of the dangers of this technique is an implied causality where none exists. Box, Hunter and Hunter in *Statistics for Experimenters* show an example where there is a strong correlation between the population in the town of Oldenburg and the number of storks observed. While few would suggest that the increase in the stork population caused the increase in the human population, we can sometimes fall into such traps with statistical models. In spite of such pitfalls statistical models can be an effective means of characterizing observations.

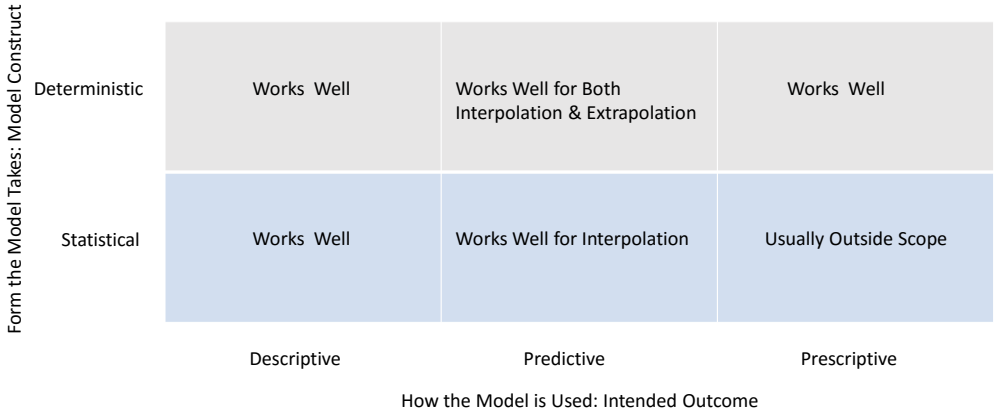
Econometric models are an example of the statistical category. They are based on statistical correlations of economic factors, for example the influence of the number of housing starts on demand for a given building material. This does not explain the underlying cause-and-effect mechanisms; instead it describes historically what happened to product demand as the number of houses built changed. Whether product demand changes due to change in demand for window frames, flooring, or other items may not be captured. A statistical correlation, such as this, is the most basic approach. It provides primarily a descriptive capability and the ability to estimate outcomes that fall within the range of the original data (interpolate). For example, what would happen to demand for a given building material if the number of housing starts fell to a level between that of the last two years?

Deterministic models, on the other hand, are based on underlying mechanisms and are designed to address predictive and prescriptive outcomes. Deterministic models provide the ability to estimate outcomes that fall outside the original data (extrapolate), in addition to the ability to interpolate. For example, what would happen to demand for a given building material if the number of housing starts increased 20% above the previous high? Deterministic models are the most powerful for predictive purposes. They are built on mathematical approaches that describe underlying mechanisms to account for observations. In doing this they address cause-and-effect relationships from which predictions of the influence of future changes are created. An example would be the projection of changes in the future population based on an understanding of birth rates, death rates and immigration rates. In some cases the statistical approach is combined with a deterministic framework to create a hybrid model.

Predictive models can lead to the next level, the ability to offer insights into preferred paths forward - to be prescriptive. Such a capability is a natural attribute of a deterministic model. It can be further refined by the incorporation of mathematical techniques such as optimization that estimate how to achieve the most desirable outcome. For example, the level of HR spending needed to minimize costs associated with employee attrition.

The following figure summarizes where different modeling approaches fit:

Application of Modeling Approaches



Given that deterministic models are potentially so powerful, why are they not used more broadly in the human resource field? The barrier is largely the difficulty of creating such models. They require a conceptual and analytical capability that can exceed our current state of knowledge. Examples of some initial steps are described in *Affiliation in the Workplace* with models addressing linkages among individuals, organizations, and communities. Where appropriate the exploration of each modeling area begins with an introduction to descriptive approaches. It proceeds with an examination of predictive models, in some cases from a statistical perspective, in others from a deterministic perspective. Where possible the exploration concludes by examining prescriptive implications. The models vary from a statistical link between two variables to an exploration of the connections between individuals and organizations. An example of the former at the community level is the relationship between changing unemployment rates and economic growth, mentioned in the accompanying article in this newsletter about workforce and social trends. Models linking the individual to the organization address issues such as the linkage between employee fulfillment and organizational value creation, the optimum attrition rate, and the influence of HR expenditures on value. At the organizational level models address issues such as workforce attrition, and hiring needs.

Workforce modeling can help organizations become more effective in their mission, more fulfilling places to work, and strengthen the communities in which they operate. People choose to join and stay with such organizations. Modeling helps us ask the right questions, while providing insights about, and answers to, those questions.

Parts of this article are drawn from *Affiliation in the Workplace: Value Creation in the New Organization* (Praeger, 2003) by Ron Elsdon.