responses. Hamaker argues that this activity goes beyond the legitimate bounds of a statistician.

If the statistician distinguishes between established facts and deductions and opinions, then directly related judgmental inputs to the decision maker can be made. The same would be true of lawyers tendering advice. They can state the law, but then legitimately give their opinion on the likely legal consequences of alternative courses of action, where the law does not cover the situation in a black and white fashion. It is worth noting that lawyers are not inhibited from becoming members of Boards of Directors; they are able to walk the tightrope between their role as a lawyers and their role as a decision maker. If statisticians feel inhibited from going any further than the preparation of data and their analysis, there is a danger that their role will increasingly be perceived as that of a technician rather than as an executive and they will be marginalized. Widening does carry some implications. For example, I believe that statisticians ought to have a basic knowledge of accounting and cost control processes, since so much statistical data is used as a background for financial calculations.

In general, the compartmentalized roles of professionals are breaking down, with far more cross-activity taking place. Deregulation in U.K. and Europe has seen to this, although there is a long way to go to integrate individual professions. It is unclear, under the new regime, how professional standards can be maintained and, indeed, enhanced. Statisticians do not have statutory regulation as is the case with accountants, doctors, lawyers, etc. There is a need for a self-regulating and monitoring arrangement so that those who have need for effective statistical advice can be aware of the standing of the individual. Whilst statistics should become a way of thought for all well educated persons, an important and continuing role remains for the expert.

Comment

John Neter

Harry Roberts has prepared a most interesting and provocative essay on applications of statistics in business. Roberts is concerned about the extent of statistical applications in general, and in business in particular. Other professions also are concerned about the relatively limited uses of their methodologies. The professions of management science and operations research are cases in point. But Roberts' main purpose is not to dwell on the current situation of relatively limited applications of statistics to business problems. Instead, Roberts' intent is "to place major emphasis on constructive suggestions for improvement of business practice by more effective use of statistics."

In proceeding from an assessment of the extent of current use of statistics in business to a consideration of means of improving business practice through an increase in the use of statistics, Roberts wanders on a somewhat rambling and repetitious path. Nevertheless, I am delighted that *Statistical Science* has provided this opportunity to a senior statistician to speak from his heart and to be able to make personal reflections from his many years of teaching and consulting experience without being confined to a tightly written scientific style.

Roberts paints his themes with broad brushstrokes and I do not wish to let quibbles with some details obscure my comments on Roberts' major themes. I shall therefore mention just a few instances where I have some disagreements with, or questions about, Roberts' details.

I concur with Roberts' assessment that statistical applications in business today are far below their potential level. However, with all of the developments in the use of statistical sampling in auditing that have occurred in recent years, I would not say that use of probability sampling in auditing is relatively rare. I certainly would agree that probability sampling in auditing still is utilized far less frequently than it might be.

In his discussion of the use of statistics to study cause and effect in business, Roberts cites observation after direct management intervention designed to improve process performance as an experimental study. Clearly, this would not be a formalized experiment where treatments are assigned randomly to experimental units.

When discussing expert systems in statistics, Roberts is concerned that these systems will duplicate the

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