5 CONTRIBUTIONS TO HUMAN RESOURCE PLANNING

Richard J. Niehaus and Edward S. Bres, III

5.1. Introduction

The work of Abraham Charnes presents one with a kaleidoscope in which, no matter what angle or change in emphasis is presented, another picture of the frontiers of operations research emerges with all its attendant complex patterns and issues.

This chapter begins with the early history of developments in human resource planning models by Charnes, W.W. Cooper, and their colleagues. The main body of the chapter concentrates on the long-term collaborations of Charnes, Cooper, R.J. Niehaus, and others focusing on applications in the U.S. Department of the Navy. Interwoven into this discussion will be important related developments whereby this Navy-supported technology has influenced other major organizations. As will be seen, this human resource modeling work was also the test-bed for the development of important computational efficiency advances applicable to more general mathematical programming applications. The final section of the chapter takes stock of all these developments and outlines some areas where further improvements of the technologies might be sought.
5.2. Early History

The original work in human resource planning was also one of the seminal influences in the field of management science, namely, the well-known development of goal programming. As recounted in Charnes and Cooper [17], the immediate management problem was to devise an executive compensation scheme across a very large industrial organization. The management problem was to provide competitive executive salaries within an ordered structure while maintaining the flexibility to recognize individual performance. A comprehensive study using traditional social science methodologies such as least squares regression had failed to provide usable results. The Charnes, Cooper, and Ferguson [19] approach replaced these traditional regression methods by 1) explicitly controlling the solution through a series of inequality constraints, and 2) developing a linear programming method for use with less sensitive (or more stable) absolute-value regressions. This development, which was important in its own right, was further extended through use of a criterion function that measured attainment of specific management targets. In the sections that follow, this idea will be discussed in more detail, since it runs through many of the human resource models. A more recent review of goal programming can be found in Charnes and Cooper [18].

The development of this executive compensation model in a context of "actual use" illustrates the method of attack Charnes and his colleagues have successfully used over the years to bring about the development of new methodologies to provide an improved way to deal with ongoing management decision making. The model development is done in the context of the issue at hand with the collaboration of the internal staff of the organization concerned. Rather than using the traditional sequential model—research—development—implementation—the approach is essentially the reverse—implementation—development—research. The initial steps are to try to get something going that implements a statement of the issue at hand. Using a small, easily understood computational example, agreement is reached that the ideas are worth pursuing, after which a limited operational prototype is put together that also provides some short-term benefit to the organization. As the development reaches wider use, parallel research efforts are broadened to attack more remote "frontier issues" that magnify the payoffs to the organization. In this way, the modeling study operates on a payback-as-you-go approach, with important benefits to both the sponsor and science.

Another early stream of work important to the development of human resource models was in the area of budgeting and control. Again, we see the ideas of goal programming extended to a new use. Particular emphasis was on a selection from multiple competing projects, drawing on a pool of