Four of the eight chapters are written as case studies. Starting with a case study involving one or two inputs and outputs, more complex situations are developed in a natural way, as an extension of the case introduced in chapter 2. The whole process of building and interpreting DEA models is developed in chapter 4, and analysis and interpretation in chapter 6 by a continuation of the same case.

We are left in no doubt, however, that the case is not concocted for illustrating difficult material, but is based on hard experience with many applications in the private and public sector. Chapter 8 gives eight actual case studies.

The other four chapters are as follows. Chapter 1 on performance, efficiency and DEA sets the scene, chapters 3 and 5 on simple mathematical developments are very simple to follow, and chapter 7 is on using DEA. The linear programming formulations and other mathematical stuff is confined to the appendicies, which are also easy to read. In fact, there is interesting stuff even for the specialist.

The authors say they had two objectives, namely, to introduce the business analyst to a powerful tool for evaluating the performance of comparable units and to assist the technical research analyst in understanding the mathematical concepts underpinning DEA. They have achieved both objectives admirably.

GAUTAM APPA

REFERENCE

1. M. S. LEVITT and M. A. S. JOYCE (1987) *The Growth and Efficiency of Public Spending.* Cambridge University Press, Cambridge.

Handbook of Critical Issues in Goal Programming
CARLOS ROMERO
Pergamon Press, Oxford, 1991. 124 + xii pp. £25.01
ISBN 0 08 040661 0

Goal programming (GP) is a widely used technique in operational research, but, despite its popularity, this approach has been criticized and in some cases the results derived from GP models have been disappointing. In this book, the author has demonstrated that in most cases these problems are not inherent in the logic of GP but are the result of careless formulation of the problem and of unsatisfactory use of the approach. Throughout the book these critical issues associated with GP techniques have been well illustrated and possible remedies have been suggested.

The book starts with an introductory overview of GP and other related multiple-criteria decision-making approaches. It goes on to discuss the inherent capacity of GP to generate non-efficient solutions and to demonstrate how this possible disadvantage can be easily overcome. Certain practices which can lead to poor GP models are thoroughly analysed. These include; the equivalence of GP and LP solutions, erroneous formulation of an achievement function, omission of a deviational variable in the formulation of a goal and the naive setting of weights etc. The problems associated with redundant goals in GP as well as practical recommendations to avoid such problems are investigated. Non-linearities in linear GP models are discussed and GP with penalty functions is commented on. The relationship between GP, multiobjective programming and compromise programming is elaborated. A categorized bibliography on GP applications is well presented.

This is an informative and well structured book. It is designed to complement existing textbooks on GP. It will be of interest to students and researchers with some knowledge of GP, as well as the practitioners who are involved in building GP models for real-life decision problems.

E. EL-DURZI