

(TSI) is a three-stage approach, getting managers to think creatively about their problems using metaphor, then applying a framework to select the appropriate systems methodology which may consist of a range of hard or soft OR techniques and finally applying the methodology. Having read Jackson and Flood's paper, I look forward to finding out more about TSI.

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Logistics Systems Analysis

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The stated purpose of this monograph is to provide an integrated and practical way of modelling logistics systems. Instead of searching for the ultimate solution based upon detailed data and time-consuming numerical analyses, it shows how to develop reasonable solutions with as little information as possible. By virtue of the approach's simplicity, analysts are expected to gain understanding of the key factors in the problem area. It aims to identify broad properties of the solutions close to the global optimum. Optimal solutions are not sought in this book.

These are, in the reviewer's opinion, admirable aims. However, it must be noted that the book cannot be casually read, or dipped into at random. Whilst the intended audience is not specifically academic, it is written in the style that the publisher's series 'Lecture Notes on Economic and Mathematical Systems' would suggest. It is an OR book, and as such interested non-OR logisticians are advised to further their knowledge elsewhere, perhaps using McKinnon¹. The author suggests that it could be used for teaching, and therefore includes exercises at the end of each chapter, as well as a full list of references.

Initial chapters describe the author's approach, and discuss the nature of logistical costs. The bulk of the book is then taken up by the last four chapters, covering:

- optimization methods for one-to-one distribution,
- one-to-many distribution,
- one-to-many distribution with transshipments,
- many-to-many distribution.

The first of these chapters is used to illustrate the two-stage approach: firstly, perform analysis yielding broad solutions, and secondly, fine tune to specific solutions using all relevant information. The continuous approximation solution method is introduced, and is used in later chapters.

One-to-many distribution discusses deliveries from a single point to a number of locations. It reviews Eilon *et al.*², and more recent extensions of their work. Further models for more specialized problems are developed.

One-to-many distribution with transshipments studies problems where one distribution centre supplies customers via one or more transshipment points (or regional warehouses). Many practitioners are likely to find this the most relevant chapter since it relates to the establishment of strategies for freight movement.

The final chapter describes many-to-many problems, which may have any number of origins and destinations in the network. These are said to occur with public carriers, such as airlines, and in the post office.

In summary, if the author's primary aim is to communicate logistical ideas to non-logistical OR scientists he has probably succeeded. His practical approach is to be commended, although the general readability of his text is not.

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REFERENCES

1. A. C. MCKINNON (1989) *Physical Distribution Systems*. Routledge, London.
2. S. EILON, C. D. T. WATSON-GANDY and N. CHRISTOFIDES (1971) *Distribution Management: Mathematical Modelling and Practical Analysis*. Griffin, London.