All You Ever Wanted To Know About Supply Chains: Supply Chain Management by S. Chopra and P. Meindl

Sunil Chopra and Peter Meindl have recently updated their Supply Chain Management book (2. edition published by Prentice Hall). The new edition is more comprehensive than the previous edition; it includes basically two new chapters on *Sourcing* and *Pricing and Revenue Management*. Discussion of design options for a distribution network of Chapter 4 is also new material. The rest of the new edition is very similar to the first edition. This similarity between editions hopefully justifies me as a legitimate reviewer because I have used only the first edition in three sections of an elective 3-credit course at a business school. Practically, the class populations were split equally between MBA students and MS students. The students generally had above-average quantitative background with regard to ordinary business school students. My perspective on the book is partly shaped by my students' reactions. I believe that this perspective is a healthy one as a "good book" should teach well to a novice reader. Below, I go over the book in detail and discuss what readers can and cannot find in the book. At times, I take the liberty of suggesting additions/deletions of some topics or reordering some topics.

The new edition, like the old one, examines supply chains in six parts. The first part deals with *Building a Strategic Framework to Analyze Supply Chains*. This indeed is a good start to give a top-down view to readers. It starts a smooth transition from the qualitative discussions of an average business school course to more quantitative discussions of a supply chain course. Moreover, the students warm up with the subject matter while the three chapters of Part I are discussed. In Part I, the concept of a strategic fit between customer wishes and supply chain capabilities is very important. On the other hand, one can quickly skim over the sections of *Process view of supply chain* and *Expanding strategic scope*.

The second part is mainly on logistics: location and transportation analysis. This part used to come after inventory chapters in the first edition. Since outcomes of infrequent decisions typically become inputs for frequent decisions, infrequent decisions should be discussed first, e.g. location decisions should come before inventory decisions. Ordering decisions (effectively chapters) according to frequency eliminates potential confusion as to how decisions are related and what is their relative chronology. Hence, I applaud authors' decision to discuss logistics earlier. Location chapter includes interesting examples of inventory and transportation cost trade offs. These examples deserve a careful reading because they emphasize the concept of integration (system-view) which is a keystone for supply chain management. On the other hand, location (Chapter 5) and transportation (Chapter 14) could have remained next to each other. The relegation of transportation may be due to its inclusion of routing type combinatorial topics that may not be appropriate/interesting for some readers. Those readers may skip parts or all of the transportation chapter but the others can read the transportation immediately after the location. Speaking of the placement of chapters, I agree with the authors that network design decisions under uncertainty belong to Part II. This discussion was provided under the *Financial evaluation* chapter in the first edition. Authors use the methodology of decision trees to solve two examples here. With these examples, instructors may also illustrate how simulation can be used instead of decision trees. This is now made possible by an appendix in the new edition: *Simulation using spreadsheets*. If this appendix is pulled into Part II which seems possible with little effort, readers can be presented with a comparative discussion of decision trees and simulation. Such a comparison adds to the value of the book. It is helpful to practitioners who, for their specific problem, may need to make an "unbiased" choice between these techniques unlike some academicians who, for unclear reasons, tend to advocate one method over another. Lastly, I feel that some sections of the book were written quickly so inconsistencies in exposition occurred. For example in Section 4.3. *Design options for a distribution network*, the names and the order of the six options are not consistent with the discussion in the section and column names in Table 4.7.

Part III of the book is *Demand and Supply Planning*. It starts with a chapter on forecasting which discusses standard time series techniques. Standard time series techniques are not central to supply chain management, so they can be skipped. Besides, it is likely that the readers of this book are already exposed to some forecasting concepts. The last two chapters include an extended linear programming formulation example that illustrates

production planning and the sensitivity of the solution against different demand scenarios. Different demand scenarios are obtained by giving price discounts in different months. The challenge here is to generate these demand scenarios in a meaningful way that relates demands to prices. Assuming that scenarios are known a priori, I am afraid the book does not meet the challenge. I am not aware of literature that directly deals with forecasting the demand under different discount schemes. However, the bar need not be set so high; a common sense approach can satisfy a practitioner's needs. The readers will perhaps appreciate a section on demand forecasting with pricing more than the current forecasting chapter. Part III briefly introduces capacity management strategies for unstable demand. However, these strategies strongly affect the profitability of a company over a long run so they can be discussed in more detail.

Part IV and V constitute the core of the book and they make it truly a Supply Chain book, say as opposed to a logistics book. The first two chapters of Part IV are inventory planning for certain and uncertain demands. The last chapter of Part IV first presents the news vendor problem and then goes in to Section 12.3 *Managerial Levers to Improve Supply Chain Profitability*. This is a very important section and includes the concepts of improving forecast quality, quick response and postponement. Readers will enjoy reading this section and more importantly will gain practical knowledge. The topics in Section 12.4 *Supply Chain Contracts* are also important but this section is very short for readers to understand and appreciate. An important aspect of supply chain management is dealing with multiple players with different, possibly conflicting, objectives. Contracts are used to align these objectives for the profitability of the entire chain. Thus, contracts (buy-back, revenue sharing, quantity flexibility) deserve more discussion. In the next chapter, (Chapter 13 in Part V) authors revisit contracts and provide more discussion. The reason for discussing contracts in two different chapters is perhaps a historical one as the first edition did not have Chapter 13. I believe Chapter 13 is written and is simply appended, but it preferably should have been integrated with the presentation of contracts in Chapter 12. In spite of my critique, I must point out that a semi-quantitative presentation of contracts is not trivial so many supply chain books avoid it. The next chapter is transportation which I allude to above. The final chapter of Part V is a new one called *Pricing and Revenue Management*, a comprehensive but disappointing title; it basically talks about customer segmentation and overbooking (say, an aircraft to account for passengers not showing up). Readers expecting to find a discussion of dynamic pricing or discounting will be disappointed.

The final Part is *Coordination, Information Technology and E-business*. Coordination chapter is an important one as it includes the discussion of the bullwhip effect. The discussion and the practical examples are comprehensive, they are also somewhat qualitative so can be more accessible to readers. However, for readers, who hear about bullwhip effect and want to see it in the first chapter of a supply chain book, I advise some patience because the bullwhip effect is presented in the 16th chapter of this 18 chapter book. Instructors must be careful to reserve enough time towards the end of a semester to cover this chapter. The last two chapters provide a qualitative but technology oriented discussion of Information systems and E-business. The latter topic is more relevant than the former for supply chains. However, both topics are covered in other books/courses in more detail so I think hardly anybody will read this book for its last two chapters.

At the end of chapters, the reader can find qualitative discussion questions and quantitative exercises. The exercises help the reader to better comprehend the subjects and allow the instructors to measure students' understanding. There also are 2-3 page case studies at the end of some chapters. These cases are too short for an in-class case study discussion so instructors may bring in longer cases from other sources. Some quantitative derivations are postponed to the appendices at the end of the chapters. Thus, the flow of the presentation is kept smooth while giving a chance to an interested reader to see the details. Discussion questions, exercises, case studies and appendices help the book to qualify as a "good textbook".

Is this book for you? If you are a curious practitioner but the only time you hear the term supply chains is on TV commercials, this book is too detailed for you. If your job requires knowledge of supply chains but your background is not in engineering or management, you should read this book only after some introductory texts.

If you have an engineering or management background but want to refresh/update your knowledge, this book is just for you. As a textbook, it can be used at junior graduate or senior undergraduate level. However, the readers must have earlier exposure to linear programming and probability. The book can be used at a business or engineering school by adjusting the mix of quantitative and qualitative discussion.

Unlike most others, the book attempts to provide a quantitative discussion of supply chains. The attempt is not entirely successful due to organization of some ideas but it is in the correct direction. It may take 1-2 more editions to succeed in this attempt. Some readers may correctly think that addition of several appendices will facilitate the understanding. For example, an instructor can supplement the logistics chapters with linear and integer programming notes, and inventory chapters with probability notes. However, I believe that authors chose to keep the focus on supply chains by excluding such appendices and I support their choice. Readers interested in a stronger linear programming focus can refer to other books, say J. Shapiro's "Modelling the Supply Chain".

This 567 page book touches upon almost all the supply chain topics and can easily be voted for one of the most comprehensive books. Thus, you will find a discussion on any topic you ever wanted to know about supply chains. However, the question is whether you can learn all these topics by reading this book. Maybe not; you may need several point of views or books. But if you insist to read only one book on supply chains, this is it. Enjoy!

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November 2003
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